Your

CADILLAC

FILE COPY
DO NOT REMOVE

An Owner's Manual

covering the

CADILLAC V-12 and V-16

Series 37-85, Series 37-90

1937

Your CADILLAC

Printed in U. S. A.

You are a valued customer of the Cadillac Motor Car Company. We are anxious, therefore, that you secure the best service from your car, and we have prepared this book to help you. We welcome any suggestions or questions* at any time regarding this book, our Authorized Service Stations, or the car itself.

CADILLAC MOTOR CAR COMPANY
Service Department

*In writing to us on matters pertaining to your car, always give the ***engine number***. The engine number location is described on page 6.

Axle Lubrication

(*Revised Instructions*)

Only Cadillac-approved Hypoid Lubricant can be safely used in the rear axle. To assure correct axle lubrication, use only lubricants provided by or approved by Authorized Cadillac Service Stations.

Every 1000 miles the axle should be inspected, and lubricant added as required to bring the level up to the filler. Any lubricant on the Cadillac approved list can be used for this purpose.

Every 6000 miles the lubricant must be drained, the differential case flushed, and fresh lubricant installed.

The above information supersedes the instructions given on pages 42 and 47 of this book and in the Lubrication Chart.

As the Owner of a new Cadillac

You will want to know—

RIGHT AWAY

VERY SOON

LATER

License Data

Engine Number: Series 37-85.....4130001 and up
Series 37-90..... 5130301 and up

The engine number, which is also the serial number, is stamped on the crankcase on the generator drive chain housing. It contains figures only, and no letters. It can be read easily upon lifting the right side of the hood.

The engine number is to be used in license and insurance applications, and in general reference to the car.

	37-85	37-90
Type of Engine	V-12	V-16
Bore and Stroke.....	3⅛ x 4 in.	3 x 4 in.
Piston Displacement.....	368 cu. in.	452 cu. in.
Taxable Horsepower.....	46.9	57.5
Wheelbase:	138 in.	154 in.

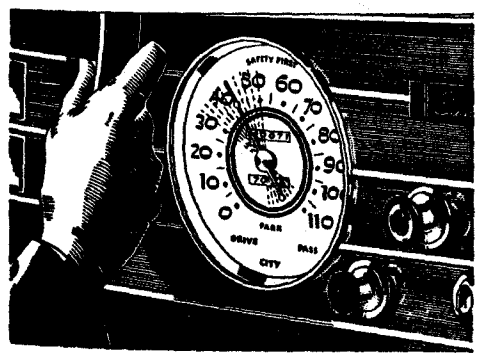
Weight: Consult the distributor or dealer who sold you the car, or the Motor Vehicle Commissioner of your State. Weights of all Cadillac body styles are regularly supplied to these authorities.

The Break-In Period

Strictly speaking, your Cadillac car does not require a break-in period, for it is never necessary to drive at speeds below a specified maximum. We nevertheless urge that you drive at moderate speeds during the first 500 miles, even though it is only to accustom yourself to the handling of the car.

One definite precaution must be observed during this period. When driving a new car at speeds over 40 miles per hour, let up on the accelerator for ten or twelve seconds at frequent intervals. The important thing is not miles per hour, but avoiding continuous high speed.

A newly-built car will not develop its maximum speed and power or demonstrate its best fuel and oil economy during the first 2,000 miles. Regardless of how carefully an engine is built, this "running-in" period always improves its performance. Keep this in mind when checking performance during the first few weeks of ownership, and do not attempt ***maximum*** speeds until after 2,000 miles.



The Right Gasoline

The Cadillac V-12 and V-16 engines provide all the benefits of modern, high-compression design, yet they can be adjusted readily to use almost any grade of gasoline. As adjusted at the factory, they will perform satisfactorily with 70-octane fuel, which is the rating of the so-called "regular" grade of gasoline marketed by most refiners in the United States.

Some car owners may prefer to use premium grades, of which "Ethyl" gasoline is the best known. These fuels have octane ratings well above 70 and, if used with an advanced spark setting, will permit the engine to develop more power. Fuels with octane ratings of less than 70 will usually cause the engine to "knock" or "ping" unless the spark is retarded. Ignition timing and "ping" are explained on page 52.

The most important thing is to buy your fuel from a reputable company in order to insure uniform quality and freedom from impurities that might clog the strainers or cause harmful chemical action in the engine. Your Authorized Cadillac-LaSalle Service Station can advise you regarding the most suitable grades of gasoline available locally, or adjust your engine for the grade of fuel you prefer to use.

The gasoline tank capacities are:

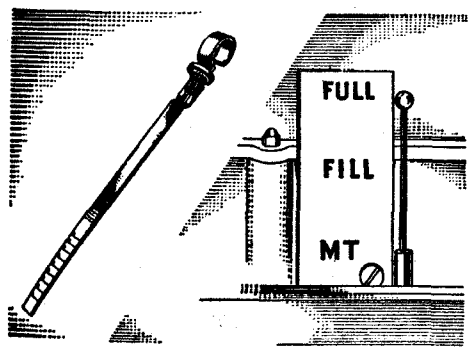
Series 37-85 ..... 25 gallons
Series 37-90 ..... 30 gallons

The Right Engine Oil

During the first 2,000 miles, the lighter grades of engine oil must be used. Add S.A.E. 30 in warm weather and 10-W in weather below freezing. These lighter grades are necessary for running-in a new engine.

After 2,000 miles, and every 2,000 miles thereafter—the crankcase should be drained and refilled with oil of the correct grade. The grade depends upon the season of the year and the type of driving, as explained on pages 44 and 45.

In checking the engine oil level between oil changes, there is only one safe rule: ***Check the oil level every time gasoline is purchased and add oil as required.*** Oil will not be required every time, but it is better to check the level unnecessarily a dozen times than to miss the one time that more oil is needed.



The gauge is on the left side of the crankcase on both V-12 and V-16. Add oil to V-12 engines when the plunger indicates 8 quarts or less, and bring the level up to 9. Add oil to V-16 engines when the red ball drops to "Fill," and bring it up to "Full."

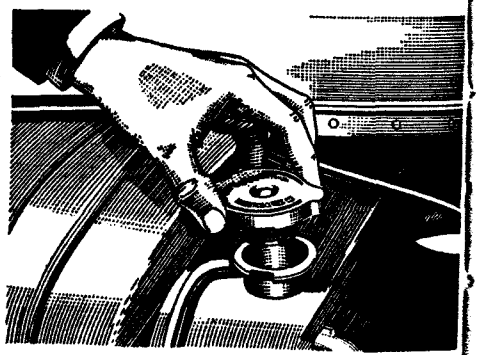
Cooling Liquid Level

The radiator filler cap is also located under the hood at the left, for convenience in checking the liquid level when checking the oil. The level should be checked at least once every week or ten days.

Ordinarily only water needs to be added at these times, although, if any considerable quantity is required during cold weather, the strength of the anti-freeze solution should be tested.

When the cooling system is drained and refilled, it is necessary to use anti-rust solutions in summer and anti-freeze in winter. The correct solutions for these purposes are discussed on page 55.

Caution—When removing the filler cap from a hot engine, rotate the cap toward the left until the stop is reached. This is the vented position, which allows steam to escape. Keep in this position until the pressure in the system has been relieved, then turn more forcibly to the left to remove. Turn the cap all the way to the right when reinstalling.



Tire Pressure

The tire pressure is the fourth item requiring frequent attention. All tires, including spares, should be checked every week or ten days,* and maintained at the correct pressures:

Series 37-85.....32 pounds minimum
Series 37-90.....36 pounds minimum

Check the pressure when the tires are cold, preferably in the morning, and never after a fast run. Heat developed on fast runs or from hot pavements increases the pressures and they decrease again when the tires cool.

Frequent checking is essential with low pressure tires, as variations of only a few pounds make an appreciable difference in riding qualities and tire wear.

If your spare tire is concealed in the rear compartment, always unlock the lid and have the attendant check the spare while he is checking the others.

The procedure for changing wheels when a tire is flat is given on page 62.

* * *

The regular attention required by your Cadillac car, in addition to the four topics just covered, includes lubrication at 1,000 mile intervals and a few items of general care, all of which are explained on pages 41 to 47. Read these pages before your car has traveled 1,000 miles.

*When touring and covering several hundred miles a day, check the tire pressure every day or two.

Instruments and Controls

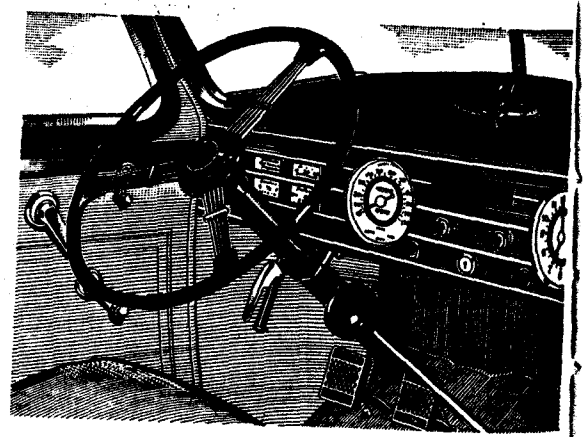
Comfort and convenience for the driver contribute to greater safety, as well as to more enjoyable driving. The Cadillac driver's compartment has been designed with this in mind. Note the following:

The seat adjustment is easily made by lifting the catch on the left side of the seat base and sliding the seat backward or forward to the most comfortable position. On long trips, changing the adjustment occasionally will be found helpful in avoiding fatigue.

The hand brake lever is out of the way, yet it is within easy reach of the driver's left hand, as the illustration shows.

The ignition and lighting controls—the radio, when installed—are convenient to the driver's right hand.

The instruments are grouped for best visibility. The four smaller dials are directly in front of the driver, yet so placed that the steering wheel hub or spokes do not interfere, while the larger-faced speedometer and clock are equally visible at the right.



Gasoline Gauge

The gasoline gauge is operated electrically. It indicates the quantity of fuel in the tank ***only when the ignition is turned on.*** When the ignition is turned off, the pointer drops beyond the "empty" mark.

As an extra precaution against running out of fuel, the gauge is so calibrated that it reads "empty" when one or two gallons still remain in the tank. On this account, it is seldom possible to add the full capacity of the tank when the gauge reads "empty."

"Battery" (Ammeter)

In place of the ammeter, a battery charge or discharge indicator is used. This gauge should indicate "charge" as soon as the car is running 15 or 20 miles an hour. If it fails to do so, or if it shows a discharge when the engine is not running and no electrical equipment is in use, the cause should be investigated immediately.

This type of indicator is used in place of an ammeter because, with the method of regulation now employed in the charging circuit, ammeter readings no longer provide important information for the driver. Information on the charging circuit is given on page 67.

Oil Pressure Gauge

The oil pressure gauge should always show pressure while the engine is running. If it does not, stop the engine ***at once*** and investigate the cause.

Temperature Indicator

The temperature of the fluid in the cylinder blocks is shown on this dial.

The needle should register within the "normal" range except on long, hard drives in summer weather, when it may register "hot." This condition need not cause alarm, as the pressure-operated overflow will normally prevent water losses at temperatures up to 220°F.

When the engine does run hot on long drives, it is important to check the oil and water levels frequently. Observe the precaution given on page 10 when checking the water level.

The indicator often rises to "hot" right after the engine is shut off. This condition is entirely normal. It is due to the heat that remains in the cylinder blocks after air and water circulation have stopped.

If the indicator should show "hot" during short runs under normal driving conditions, the cause should be investigated.

Clock

The instrument panel clock is electrically driven and fully automatic in operation. Interruptions in the current will naturally cause the clock to stop.

After the current has been reconnected, it is necessary merely to reset the hands, as the resetting mechanism will again put the clock in operation.

Radio

Radio installation is contemplated in the design of the Cadillac car. ***A sounding board for a speaker is built into the roof above the windshield.*** The instrument panel is laid out so that Cadillac radio controls can be made an integral part of the design.

The myth of radio distracting the driver has long since been exploded. Listening to the radio tends rather to lessen the tensions that cause undue haste.

Improvements in automobile radios during recent years have brought these sets to a par with most house sets. Cadillac radios are outstanding in performance, and we invite you to secure a demonstration from your Cadillac-LaSalle dealer.

Lighting Controls

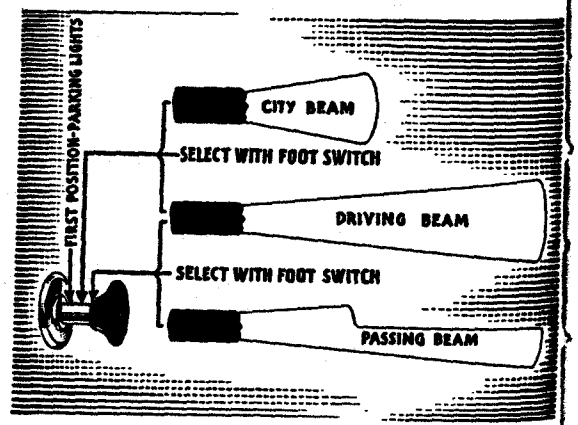
V-12—The headlamps are controlled by two switches: a three position button on the instrument panel and a foot switch at the left of the clutch pedal. The beam in use at any time shows up in illuminated letters on the indicator.

The three headlight beams and the lighting switch positions are illustrated clearly in the drawings below.

When driving on lighted highways, set the hand control in the second position and select the "City" beam with the foot switch.

When driving on unlighted ***straight*** roads, set the hand control in the third position. Select the "country driving" beam with the foot switch, but change to "country passing" whenever a car from the opposite direction approaches within 500 feet.

When driving on unlighted ***winding*** roads, set the hand control in the second position, and use the foot switch to select the "country-driving" beam and to switch to the "city" beam whenever another car approaches. The "city" beam is the only safe passing beam for winding roads. (See drawing on page 17).

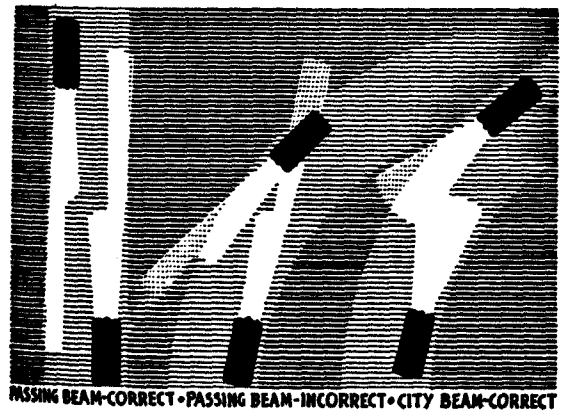


Courtesy and safety both demand the use of the passing beams exactly as outlined. We urge every Cadillac owner to observe these instructions faithfully, as carelessness in these matters is leading authorities to consider further restrictions of headlamp driving beams. Please cooperate in safe use of adequate lighting equipment.

Two types of lighting are available in the driving compartment. Direct light for reading maps, finding dropped articles, etc., is secured with the map lamp, which is switched on automatically when you pull it out. This lamp can conveniently be turned in its socket to throw the light in any direction desired.

The translucent dials of the instrument panel are lighted from behind. The switch for these lights is located at the lower edge of the panel just to the left of the steering column. The switch permits adjustment of the intensity of these lights to suit individual preferences.

V-16—The V-16 headlamps are controlled by a lever at the steering wheel hub, combined with the foot switch. The positions of the lever are "parking", "off," "city," "country," as marked on the wheel hub. The foot switch is effective only in the "country" position, in which it selects either the "driving" or the "passing" beam. The hand lever must be used to switch from "driving" to "city" beams, as recommended for winding roads.

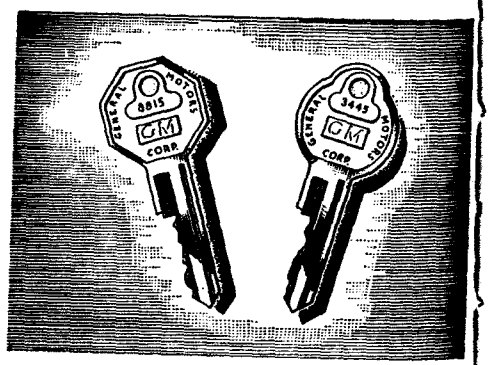


Locks and Keys

Maximum protection is provided by the Cadillac system of locks and keys. Two sets of two keys each are furnished with the car. The octagonal-handled key is the driver's key; it operates the right front door, the ignition switch, and the spare wheel lock on cars equipped with exposed spare tires or fenderwells.

The round-handled key operates the compartment locks, including those for the instrument panel compartment, the rear deck on Coupes, and the trunk compartment on Sedans. The advantage of this arrangement is that baggage can be kept locked while the car is left with public garage or parking lot attendants.

As a protection against unauthorized persons securing keys, the key numbers do not appear either on the keys or the face of the locks, but on small metal slugs fastened in the keys. Mark these key numbers on your Certificate of Title or Bill of Sale, as soon as you take delivery of the car, and



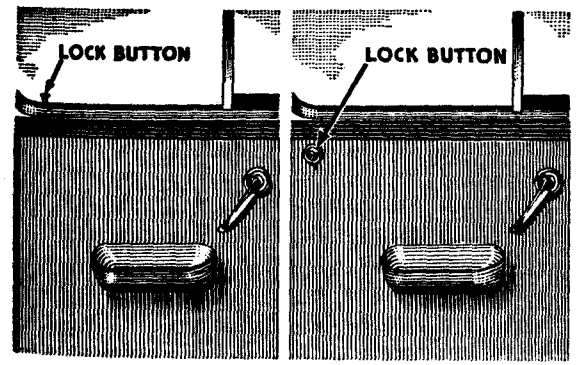
have your dealer knock these number slugs out of the keys and destroy them. If this is not done, you lose part of your protection.

Duplicate keys, if required, can be ordered by key numbers from the nearest Authorized Cadillac-LaSalle Service Station. If the key number is not known, you must order by car engine number from your own dealer or from the Cadillac Motor Car Company, Detroit.

Door Locks

The doors can all be locked from the inside by tripping the small lock button. They can also be locked from the outside with the button by tripping the button while the door is open and then ***holding the door handle all the way down*** while closing the door. The button snaps to the unlocked position when the door is closed in the usual fashion.

The right front door can be locked and unlocked with the driver's key. It can also be locked with the lock button and when so locked, the key will unlock it. ***Be careful not to lock the keys in the car when locking doors with the lock button.***



Lock your car. Never leave it unlocked when unattended.

Ventilation

The ventilating panes in the front door windows and the rear windows of sedans can be pivoted to secure any degree of ventilation, with a minimum of drafts.

In cold weather or in rain or snow, they can be opened slightly to provide just enough air circulation to prevent window and windshield steaming or fogging.

In extremely hot weather, the front ventilators can be turned almost completely around to a position that will "Scoop" air into the car.

Additional air can be secured in warm weather through the cowl ventilator, which is screened to keep out insects, etc.

Starting the Engine

The choke control is of the semi-automatic type. The button must be pulled out to start a cold engine but for starting a warm engine or warming up the engine, it should be flush with the panel.

To start a **cold** engine, depress the clutch pedal, switch on the ignition, pull out the choke, and press the starter button. Push the choke button all the way in as soon as the engine starts.

The engine should start in from 5 to 25 seconds of cranking. If it does not, release the starter button and look for the cause:

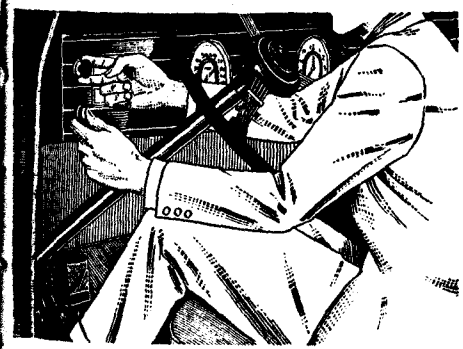
Check the contents of the gasoline tank.

See that the throttle button is pushed in to the dash, especially in cold weather.

Make sure the ignition key is turned all the way on.

Crank the engine with the accelerator pedal held all the way down to open the throttle fully. This will correct any tendencies to a flooded or over-rich condition.

Do not run down the battery by too much use of the starting motor when the engine does not start readily. First find the cause; otherwise the battery may be run down sufficiently to make starting impossible.



If a **hot** engine is hard to start, open the throttle fully by pushing the accelerator slowly to the floorboards, and then crank the engine. Release the accelerator after the engine starts.

Cold Weather Operation

Winter weather brings no inconvenience to the Cadillac owner who has his car properly prepared for low temperatures and who follows correct procedures in starting and driving. Winter preparation of your Cadillac consists of the following:

Adequate servicing of the cooling system for cold weather, including the use of an approved anti-freeze, as described on page 56.

Draining the engine crankcase and refilling with 10-W or 20-W engine oil, according to the lowest temperature expected, as explained on page 44.

Cleaning the gasoline filter and adjustment of the carburetor. See page 53.

Checking up on the mechanical condition of the engine, particularly the valves and ignition, to make certain that the engine is properly tuned. See page 51.

Special attention to the needs of the storage battery. See page 66.

Starting the engine in cold weather requires the same procedure as at other times, but with emphasis on the following precautions:

1. Use of 10-W or 20-W oil to assure free cranking.

2. Always depressing the clutch pedal when cranking the engine, to relieve the starter of the load of turning the transmission gears.

3. Correct use of the choke control.

4. Making sure by regular tests that the battery is kept fully charged or nearly so.

After the engine has started, it is a good plan to engage the clutch gradually while the transmission is in neutral to permit the engine to free up the lubricant before the car is driven. ***Always let a cold engine warm up for at least 30 seconds before driving the car.***

Cold weather driving can be made much more comfortable by the installation of a good car heater. Your Cadillac-LaSalle dealer can supply you with an approved type of heater. Ask to see these heaters.

Suggestions

for

Safer Driving

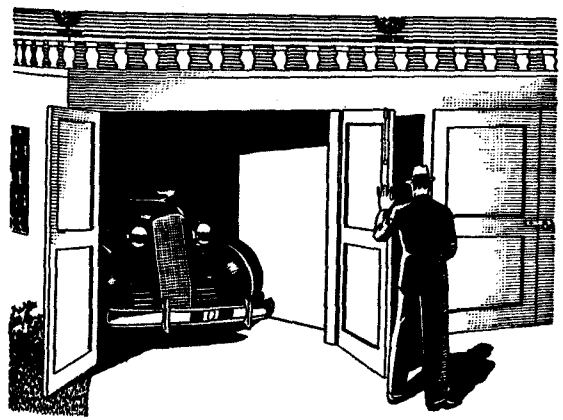
Everyone knows how to drive these days but, judging by accident records, everyone does not know how to drive safely. Although Cadillac drivers as a class are more careful and skillful than the average, we are including this section to enable you to check up on your technique and modernize it where necessary.

The suggestions on the next few pages are not driving lessons; they are simply reminders of ways to make your driving safer and more comfortable. We ask that you read them all. Most of them will be familiar but worthy of review. And among them there will certainly be some that are new and well worth the few moments required to read the entire section.

Carbon Monoxide

Always open the garage doors before starting the engine. The engine exhaust always contains carbon monoxide, a deadly poisonous gas, which must be allowed to escape outside the garage.

Under normal starting and warming up conditions almost any automobile engine running in a two car garage, with the doors closed, will accumulate enough gas in three or four minutes to overcome any occupants. In cold weather, when the engine requires more choking, the accumulation is even more rapid.



Starting the Car

Skillful driving includes the ability to coordinate the operation of the gear-shift lever, clutch and accelerator in a way that will start the car in motion and take it through the gear changes without jerk or jar. The smoothly acting clutch and Syncro-Mesh transmission with which the Cadillac car is equipped provide the best kind of assistance for these operations. The following principles of gear shifting will enable you to check up on your own driving habits.

Normally a car should be started in low gear. It will move off more smoothly and pick up speed more quickly and—with the Synchro-Mesh transmission—the shift into second can be easily and quietly made.

Note: Gear clash when shifting into low is caused either by not pushing the clutch pedal all the way down or by not waiting 2 or 3 seconds to allow the gears to stop spinning.

The shift into second can be made as soon as the car has gained enough momentum to travel 10 or more miles per hour. The shift into high can be made at any speed above 20 miles per hour.

In moving the gear shift lever of a Syncro-Mesh transmission, never jerk the lever. Always move it with a steady deliberate motion to permit the synchronizing mechanism to function.

Stopping the Car

You have probably observed, in using your brakes, that the pedal pressure and pedal travel required are both very slight. This is due to the design of the Cadillac brakes with their hydraulic linkage and their self-energizing shoe action.

Stopping the car, as you know, generates heat at the brake linings and drums, and results in wear of the brake linings. Maximum lining life can be secured by avoiding emergency stops as much as possible. On approaching a stop sign or red traffic signal, coast up to the stopping place ***with the engine in gear*** and apply the brakes early with gradually increasing pressure, releasing the clutch ***just before*** the car is brought to an easy stop.

Applying the brakes with the clutch engaged is essential in slippery weather and it is advantageous at all times. You must, of course, remember to disengage the clutch just before you stop or you will stall the engine.

In bringing the car to a stop from high speeds, in stopping on icy pavements, or in going down long hills, the efficient way to slow up the car is by a succession of "snubbing" actions of the brakes rather than by continuous pedal pressure.

It is better not to use brakes at all at extremely high speeds except in case of emergency. If possible, coast down to 50 or 60 M.P.H. before applying them.

Night Driving

The first requirement of safe night driving is adequate lighting, and in this the Cadillac system excells. The headlights have been designed with highly efficient driving and passing beams. Selecting these beams is performed safely and easily by means of the foot-operated switch at the left of the clutch pedal.

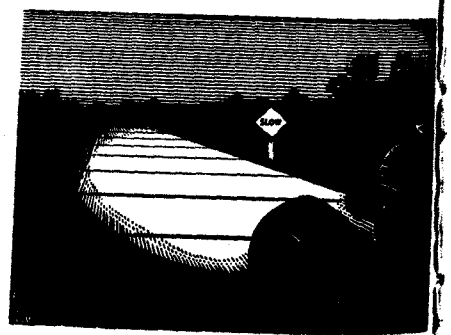
The generator charging circuit is also designed to meet the requirements of night driving. The current and voltage regulation does not decrease the charging rate at high speeds, but operates in accordance with the current required for lights, radio and other electrical equipment.

Your safety ultimately depends, however, on wise use of this equipment. Observe the following rules in driving at night:

Keep your speed low enough at all times to permit stopping within the distance illuminated by your headlights.

When passing other cars, use the correct passing beam. Watch the right hand edge of the road. Do not look into the lights of the approaching car.

In fog at night, ***slow down*** and switch the lights to the "city" position. This reduces to a minimum the glaring reflections from the fine drops of moisture in the air.



Winter Driving

Aside from preparation for cold weather (page 22) and using the correct procedure for starting and warming up the engine, the chief problem of winter driving is handling the car on roads made slippery by snow and ice.

The important thing on ice is never to attempt to do anything suddenly. Do not attempt sudden starts, sudden stops, or sudden turns; otherwise spinning wheels or skidding is inevitable.

In starting the car on icy pavement, the trick is to turn the rear wheels ***very slowly*** Shifting into low gear and engaging the clutch slowly without racing the engine will avoid most difficulty with spinning and slipping.

Stopping on icy pavements is even more troublesome. To stop successfully, it is necessary to slow down quite a distance from the stopping point, applying the brakes in a series of brief moderate movements, instead of with continuous pressure. The clutch should not be disengaged until the car has almost stopped.

Taking slippery curves or turns without skidding can be readily accomplished by treating each turn as though it were going to be a stop. In other words, approach the turn very slowly and then, when you are actually in the turn, press the accelerator ***lightly*** to apply some power to the rear wheels. With power turning the wheels, a skid is less likely to occur.

If the car should start skidding, turn the front wheels in the direction of the skid, and take your foot off the accelerator. Do not apply the brakes.

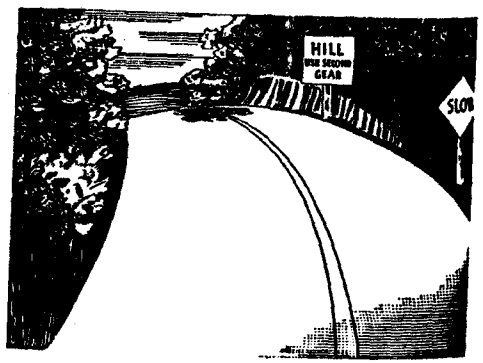
Tire chains on the rear wheels are often helpful in securing more traction, especially in mud or deep snow.

Mountain Driving

In going ***up*** a steep hill, the important thing is to get a good start. If you don't get a good start, or if the hill is too steep anyway, shift to second gear while the car is still travelling between 20 and 25 miles per hour. Waiting until the speed is less than this increases the danger of stalling.

In going ***down*** a long hill, always keep the car in gear and, if necessary, shift to second or even to low gear. ***Use the same gear in descending a hill as was required to climb it.*** When second gear must be used in descending a hill, it is best to shift before beginning to descend, although the Cadillac Synchro-Mesh transmission permits shifting at any time with a minimum of effort. In shifting from high to second, remember to move the gear shift lever ***deliberately*** to give the synchronizing mechanism time to function.

Above all, keep to your own side of the road and never pass another car when approaching the crown of a hill, on a curve, or in any circumstances when the view ahead is in any way obstructed.



Touring

Touring usually means higher speeds, unfamiliar roads, and new and interesting scenery. Driving under these conditions demands that you pay more conscious attention to the details of handling your car, and that you pay particular attention to the following:

Keep an eye on the speedometer. With the quietness of the Cadillac engine and chassis, and the smooth ride provided by the Cadillac spring suspension, it is extremely difficult to judge your speed. Let your speedometer keep you from over-driving your range of vision, especially at night.

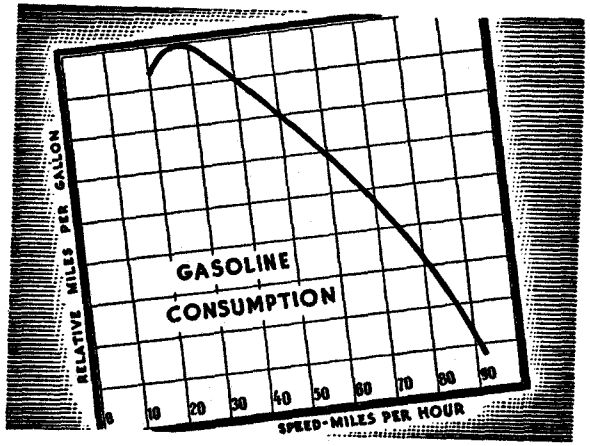
Take plenty of room in overtaking other cars. In passing a car that is going 40 miles an hour, you must travel the same distance required to pass at least 18 cars parked together along the road. Then add in the speed of the car coming the other way and you can see that plenty of room is required.

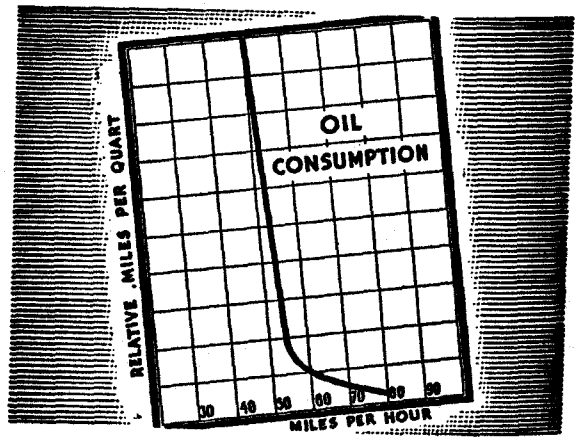
Take turns at safe speeds. The best technique for doing this is to apply your brakes when approaching the turn, enter it at reduced speed and then accelerate as you come out on the straightaway. This method is not only safer but it also enables you to make better time.

Before shutting off the engine after a long hard drive, especially in hot weather or mountain driving, let the engine idle for 2 or 3 full minutes. This will usually cool the engine sufficiently to prevent boiling and loss of water, and will make starting easier as well.

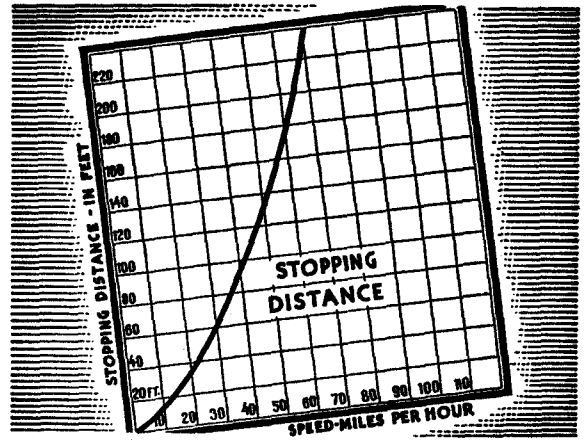
High Speed Driving

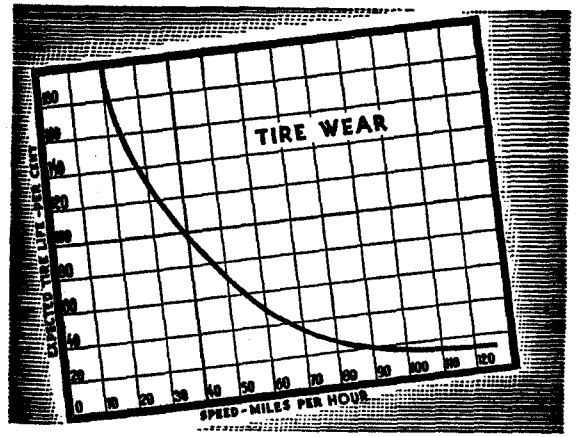
Your Cadillac automobile will travel at almost any speed you may wish to drive. Experienced drivers realize, however, the element of danger in speed and attempt maximum speeds only when conditions are extremely favorable.





Considerable attention is being given to the effect of high speeds on the car, particularly in regard to fuel consumption, oil consumption, tire wear, and brake effectiveness. In order that Cadillac owners may have the facts on these important items, we are reproducing on these pages four charts which make these items clear. A brief review of these facts will indicate why many wise motorists are touring at more moderate speeds—from 45 to 55 M. P. H.





Gasoline Economy

The number of actual miles per gallon that any owner gets from any car depends upon a large number of factors, some of which the owner can control and some he cannot. Factors over which the owner has little, if any, control are the condition of the road surfaces, the number of hills and turns, the amount of traffic, and the climatic conditions, particularly the wind and temperature.

Careful attention to the controllable factors will, however, enable any owner to increase considerably his gasoline mileage. The factors to be considered are:

1. Speed . . . The charts on pages 32 and 33 indicate emphatically how much you can save by driving at moderate speeds.
2. Stopping . . . Coast to a gradual stop whenever possible. This saves both fuel and brake lining.
3. Idling . . . Shut off the engine while parked, even for a few minutes, in front of stores or homes, or when waiting for long freight trains at railroad crossings. Idling, except to warm up a cold engine, is sheer waste.
4. Lubrication . . . Keep both the engine and chassis well lubricated at all times.
5. Tires . . . Keep your tires properly inflated to avoid excessive road friction.
6. Mechanical Condition . . . Your engine must be kept "in tune" to use its fuel economically. Periodic adjustments of the ignition system and occasional valve regrinds will pay for themselves in gasoline saved.

Tire Life

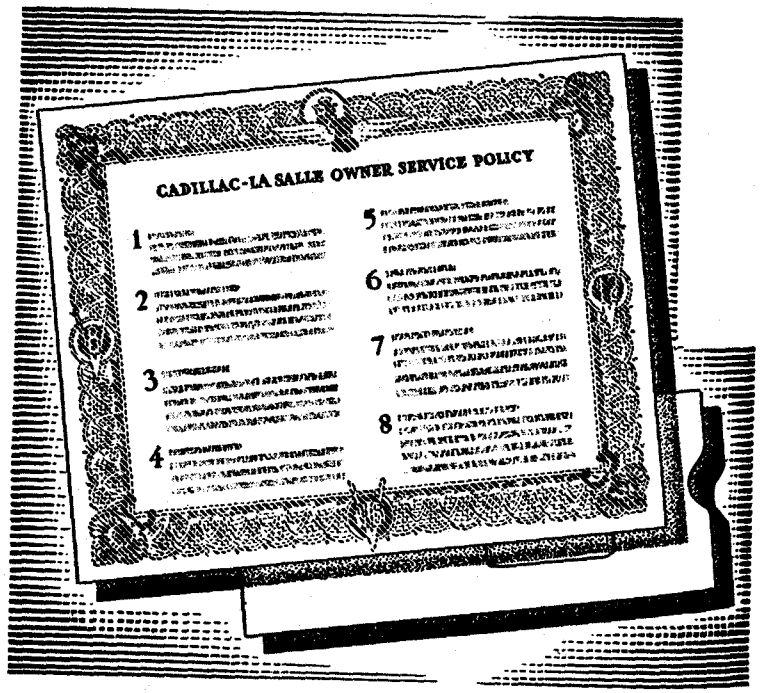
Maximum tire life can be secured by careful attention to a few essential details of care and driving habits, namely:

1. Keep the tires properly inflated at all times.
2. Avoid spinning the wheels when starting.
3. Avoid sudden stops.
4. Turn corners at moderate speeds. (See page 31.)
5. Steer around bumps, ruts, or minor obstructions in the roads.
6. Keep out of car tracks.
7. Do not bump or scrape the curb when parking.
8. Keep the front wheels in proper alignment.
9. Interchange the tires, left to right, and front to rear, every 4,000 miles.
10. Register your tires under the Special Tire Warranty. (See page 39.)

Cadillac LaSalle Service

As purchaser of a new Cadillac car, you will be interested in knowing what you are entitled to under the Cadillac-LaSalle Owner Service Policy, and what you can expect at Authorized Service Stations.

The Owner Service Policy Certificate is illustrated below and described on the opposite page. Immediately following is a brief discussion of Authorized Service.

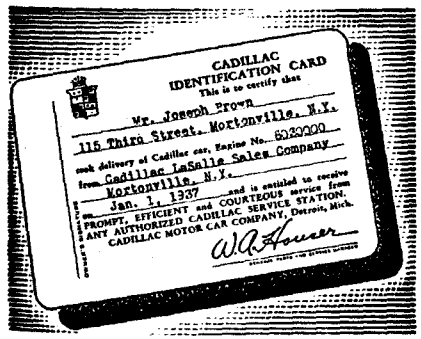


Owner Service Policy

When you took delivery of your car, you received from our distributor or dealer an "Owner Service Policy Certificate," which we ask you to read carefully at this time, if you have not already done so.

You will note from your Certificate that you are entitled to a number of privileges, including: free inspections and adjustments during the first 90 days or 4,000 miles of ownership, replacement without charge of any parts adjudged by this Company to be defective under its Warranty, and free inspections at any time, provided no disassembly of parts is required.

You are also entitled, when touring, to the same consideration from ***any*** Authorized Service Station as you would receive from the service station of the dealer who sold the car, by merely presenting your Identification Card. This card will be sent to you by the General Sales Manager of the Cadillac Motor Car Company as soon as delivery of your car has been reported. ***Sign this card as soon as it is received and always carry it with you when touring.***



As an aid to touring owners, Authorized Service Stations are listed under the Cadillac-LaSalle trademark in the classified telephone directories of most of the larger cities.

Authorized Service Stations

We want to take one page of this book to recommend Authorized Cadillac-LaSalle Service Stations.

Keeping Cadillac owners satisfied with their cars will pay us dividends in future car sales. It will also pay the Cadillac dealer who makes the sale, and naturally he will conduct his service station with that in mind. No one else will have as great an interest in keeping your car's performance at its best.

Authorized Service Stations have other, more evident advantages, which include more experience in servicing Cadillacs, complete and up-to-the-minute service information, adequate tools and equipment, and the use of genuine Cadillac parts.

Our interests coincide in this matter of servicing your car. We therefore urge you to patronize Authorized Service Stations.

Tire and Battery Registration

The tires and battery on your Cadillac car are covered by separate warranties by their respective manufacturers. ***These warranties, to be effective, require prompt registration when the equipment is put in use.***

Tires are warranted by the tire manufacturer against road hazards for 12 months from date of purchase, provided the tires are registered and a Warranty Certificate issued ***at the time of delivery.*** Your Cadillac-LaSalle dealer will be glad to arrange this for you. Consult him at once on this important matter.

The battery in your car is guaranteed for 90 days, but if you will have it registered ***immediately*** with a Delco Battery Service Station, you can obtain an Adjustment Policy Service Certificate which protects you for 21 months or 21,000 miles. Your car dealer will be glad to assist with this also.

Lubrication

Everyone knows that a modern motor car can be driven considerable distance without adequate lubrication and care; yet if everyone realized the extent of the damage actually done by this type of neglect, cars would receive much better attention.

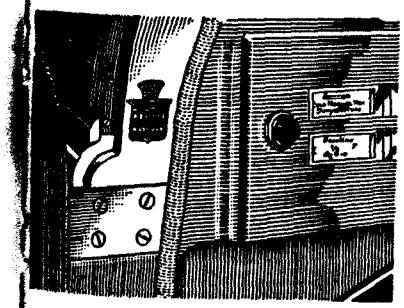
In order that the Cadillac car may deliver throughout its life the performance built into it, we urge every Cadillac owner to protect his rather considerable investment by conscientious observance of all of the items recommended in this chapter.

Authorized Lubrication

The lubrication information in this manual is given as a matter of information rather than to encourage the performance of this work by owners or chauffeurs. Lubrication is best performed with the efficient, specialized equipment used in up-to-date service stations, and there should be no occasion for resorting to the slow, untidy, ineffective hand gun methods of former years.

Lubrication operations can be performed most satisfactorily by your Authorized Cadillac-LaSalle service station. In addition to having the specialized equipment previously referred to, they also have the correct lubricants, complete instructions, and experience on Cadillac cars.

When a lubrication operation is performed at an Authorized Service Station, the number of the **next** lubrication and the mileage at which it is due will be posted on the crest-shaped plate on the left front door pillar. When this mileage appears on the speedometer, the car can be taken to any Authorized Service Station and, by asking for "schedule lubrication," the car will receive the exact lubrication required.



Authorized lubrication service can be purchased at a special rate by means of the Lubrication Agreement. Ask your dealer about this money-saving plan.

Lubrication Schedule

	Lubrication Number											
	1	2	3	4	5	6	7	8	9	10	11	12
Every 1000 miles												
Oil starter and generator oil cups.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Oil hand brake connections.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Oil clutch release mechanism.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Oil body hardware.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Lubricate distributor.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Lubricate water pump.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Lubricate chassis connections.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Add water to battery.†	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Add liquid to radiator	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Check tire inflation.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Every 2000 miles												
Drain and replace engine oil.		✓		✓		✓		✓		✓		✓
Clean carburetor air cleaner.		✓		✓		✓		✓		✓		✓
Every 3000 miles												
Add lubricant to transmission.			✓		*				✓			*
Add lubricant to rear axle.			✓		*				✓			*
Add lubricant to steering gear.			✓		✓				✓			✓
Every 6000 miles												
Clean, repack and adjust front wheel bearings.					✓							✓
Drain, flush and refill transmission.					✓							✓
Drain, flush and refill rear axle.					✓							✓
Lubricate clutch release bearing (V-16).					✓							✓
Lubricate brake assister (V-16).					✓							✓
Clean crankcase ventilating inlet.					✓							✓
Oil speedometer drive cable.					✓							✓

See Lubrication Chart for Complete Lubrication Instructions

†Inspect battery every 2 weeks in Summer.
*Refill transmission and axle with proper grade of lubricant every 6000 miles.

Lubrication Schedule

The complete lubrication schedule is given on the opposite page. If faithfully followed, the schedule will provide correct lubrication of each wearing surface on the car. The items listed in the schedule are illustrated in the "Lubrication Chart" supplied with this manual, which will assist the operator in locating the various lubricating points.

You will note that the schedule calls for a lubrication operation each one thousand miles. After 1,000 miles of driving, lubrication No. 1 is due, at 2,000 miles No. 2 is due etc. At 13,000 miles the schedule begins again with No. 1.

The schedule is expressed in mileage intervals because most cars are driven 1,000 miles or more each month, and lubrication is required after 1,000 miles of driving. ***If the mileage each month is less than 1,000, the car should be lubricated once each month, regardless of mileage.***

In addition to the operations included in the lubrication schedule, there are several other items of maintenance regularly required which are listed here for your convenience:

Shock absorber fluid.....Check level twice a year

Brake fluid.....Check level twice a year

Cooling system.....Flush twice a year—Spring and Fall

Gasoline lines and strainers.....Clean twice a year—Spring and Fall

Interchange tires (See page 63)....Every 4 months

Engine oil filter.....Replace every 6000 miles

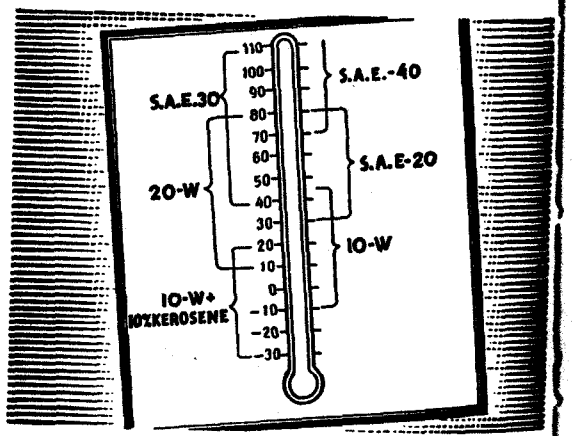
Engine oil pan.....Remove and clean once a year

Engine Oil Recommendations

During summer weather, engine oil can be selected upon the basis of the type of driving. S.A.E. 30 oils should be used for driving at moderate speeds. If high speed driving is the rule, however, heavy duty oils of S.A.E. 40 or 50 grade will provide better oil mileage than will the lighter grades.

During cold weather, selection should be based primarily upon easy starting characteristics, which depend upon the viscosity (fluidity) of the oil. The table on the next page gives the viscosity specifications of the various grades of oil, while the diagram below shows the temperature ranges within which each grade can be relied upon to provide easy starting and satisfactory lubrication.

When the crankcase is drained and refilled, the oil should be selected, not on the basis of the existing temperature at the time of change, but on the anticipated minimum temperature for the period during which the oil is to be used. Unless the



engine oil is selected on the basis of the viscosity at the prevailing minimum winter temperature, difficulty in starting will be experienced at each sudden drop in temperature.

Only 20-W and 10-W oils are suitable for use when weather conditions are below 30°F. The reason for this is shown in the chart below, which indicates that the viscosity limits of 20-W and 10-W oils are taken at a temperature of 0°F., whereas those of S.A.E. 20, 30 and 40, all of which are summer grade oils, are taken at a temperature of 130°F.

Heavy duty oils of S.A.E. 40 or 50 may be used in cold weather if the car is kept in a heated garage or if the heavy duty oil has a cold viscosity sufficiently low to insure against hard starting. Otherwise, the oils specified in the chart must be used and, in cases of prolonged driving at high speeds, ***the oil level checked more frequently*** as the rate of consumption will be higher than at moderate speeds.

VISCOSITY NUMBER	VISCOSITY (SAYBOLT UNIVERSAL)					
	0°F.		130°F.		210°F	
	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.
10-W(*)	5,000	10,000	—	—	—	—
20-W(**)	10,000	40,000	—	—	—	—
S.A.E.20	—	—	120	185	—	—
S.A.E.30	—	—	185	255	—	75
S.A.E.40	—	—	255	—	—	

*SUB-ZERO POUR POINT **ZERO POUR POINT

Engine Lubrication

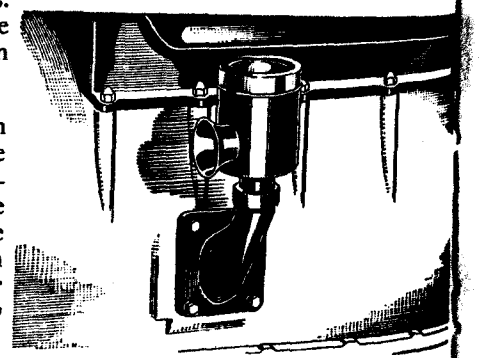
The engine oil level should be checked every time gasoline is purchased and, whenever necessary, enough oil should be added to bring the level up to the 9 quart or "Full" mark.

Particular attention should be paid to the oil level in cases of prolonged driving at high speed. At high speeds the oil is consumed many times as rapidly as at city driving speeds and oil must be added more frequently to maintain the proper level.

The useful life of the engine oil is greatly prolonged by the oil filter and the crankcase ventilating system, but the oil pan should be drained and fresh oil added every 2,000 miles.

Draining the oil as prescribed above will not assure clean oil indefinitely. It is necessary also to clean out any accumulated particles or sludge in the engine oil pan. The oil pan and screen should therefore be removed and thoroughly washed with gasoline every 12,000 miles. It is a good plan to have the main and connecting rod bearings inspected by a competent mechanic while the oil pan is down.

The air cleaner for the crankcase ventilating inlet at the left front of the engine (see illustration) should also be cleaned every 12,000 miles. Remove the copper gauze unit, clean in gasoline, dip in engine oil, and reinstall.



The oil filter is located on the left side of the crankcase at the rear. The oil filter removes any dirt or abrasive material from the oil. Due to the gradual accumulation of this material, ***the filter must be replaced every 12,000 miles.***

Lubricants

Cadillac engineers have worked out in detail the specifications for the lubricant required for each point to meet the particular conditions of speed, load, temperature and kind of metals in contact. Authorized Cadillac-LaSalle Service Stations are prepared to furnish lubricants under these specifications to give the best results in their respective localities. When the car is lubricated by someone not familiar with Cadillac specifications, lubricants should be called for by S. A. E. viscosity numbers.

Special Hypoid Lubricant must be used in the rear axle. The lubricant level should be inspected every 3,000 miles, and the lubricant should be drained, the differential case flushed, and fresh lubricant installed every 6,000 miles, as indicated on the schedule.

Only Cadillac approved Hypoid Lubricant can be used in the rear axle. To assure the correct rear axle lubricant at all times, use only lubricants provided by or approved by Authorized Cadillac Service Stations.

The transmission, steering gear, wheel bearings, and grease gun connections each require a specific type of lubricant. Only operators familiar with these requirements and having the right materials should be permitted to lubricate the car.

Lubricant Capacities

	V-12	V-16
Engine Crankcase	9 Quarts	10 Quarts
Transmission	2½ Pints	4½ Pints
Rear Axle	5 Pints	6 Pints
Cooling System	17 Quarts	24 Quarts

Maintenance Suggestions

Information is given in this section on the major mechanical features of the car, and particularly on the more frequently required service operations. The operations given can be performed by anyone having a few ordinary tools and a fair degree of mechanical training or ability.

No attempt has been made to include complete service information in this section. Many important service operations require both a high degree of skill and the use of expensive special tools and equipment. Operations of this nature should be performed only by those having the facilities for doing the work satisfactorily.

Body

The body of your car deserves the same care and attention as the chassis. Care of the body consists simply of regular lubrication of those body parts requiring it, as given in the Lubrication Schedule and Chart, and regular cleaning of the finish and the upholstery.

Care of Finish—The lacquer finish of the car can be kept new and lustrous with only a thorough wiping with a soft dry cloth every few days. With this care, washing will be required only when considerable mud or dust has accumulated.

Washing the car can be accomplished simply and easily with plenty of clean, cold water, a soft wool sponge, and a clean chamois. Soap and hot water are not only unnecessary but undesirable. Never wash the car in the direct rays of the hot sun and never wash it when the sheet metal surfaces are hot from a hard run.

In the winter time the car should be washed frequently if it is driven over roads or streets where salt or calcium chloride are used to melt snow or ice. These road chemicals have a severe effect on the finish of lacquer or plated parts if allowed to remain on them for any length of time.

With the turret top as used on the Cadillac, the only attention required by the top is cleaning in the same fashion as the other sheet metal parts.

If the car finish appears dull after washing, the original brightness and lustre may be restored by the use of a good lacquer polish. It is important to use only a dependable lacquer polish as some polishes contain excessive abrasive material and other harmful ingredients.

Care of Upholstery—Regular monthly cleaning of the car's interior with a vacuum cleaner and a whisk broom will keep the upholstery in the best of condition and will prevent excessive wear. The whisk broom should be used to loosen the dirt and grit, which causes more rapid wear than use,

while the vacuum cleaner should be used to lift out the loosened dirt.

Spots on the upholstery can usually be cleaned with any good dry cleaner used sparingly. For cleaning specific types of spots, the following suggestions may be helpful:

Battery Acids—Pour enough ordinary household ammonia water on the spot to cover it. Let it stand about a minute, then rinse it off with a clean cloth dipped in cold water. This treatment should be applied at once, as after a few hours battery acids will produce a hole in the material.

Blood Stains—Rub the stain with a clean cloth dampened with cold water.

Candy—If the candy does not contain chocolate, the stain can be removed by rubbing with a cloth moistened with very hot water. (Avoid the use of hot water on upholstery except where specifically called for.) Chocolate stains can be removed by rubbing with a cloth and lukewarm water, then sponging with carbon tetrachloride.*

Chewing Gum—Moisten the gum with carbon tetrachloride and work the gum off the fabric with a dull knife while it is still moist.

Fruit Stains—Rub vigorously with a cloth dampened with very hot water. Let dry, then sponge with carbon tetrachloride.

Grease and Oil Stains—Use gasoline (but not Ethylized gasoline) or carbon tetrachloride. If the fabric is saturated with oil, pour on the cleaning fluid and soak it up by pressing a white blotter on the spot before sponging in the usual manner with a cloth dampened in the fluid.

Ice Cream—Use the same method as for removal of fruit stains. If the stain is persistent, use a cloth moistened with warm soap suds, then cold water. After drying, sponge with carbon tetrachloride.

Tar—Moisten the spot with carbon tetrachloride and remove as much as possible of the tar with a dull knife. Then sponge again with cleaning fluid.

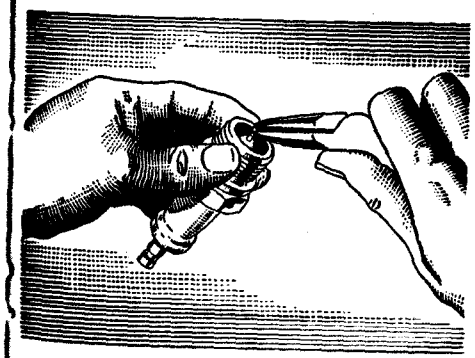
*Where reference is made to carbon tetrachloride, use any good non-inflammable cleaning fluid, of which carbon tetrachloride is an essential ingredient.

Engine

The amount of attention required by the engine is surprisingly small, considering the number of working parts and wearing surfaces. All that is required is adequate lubrication with the correct grade of engine oil (see page 44), and occasional adjustments as explained in the following paragraphs.

Ignition System—The ignition system must supply to each cylinder in turn at exactly the right time a spark hot enough to ignite the highly compressed gasoline mixture in the cylinders. And, at the ordinary cruising speed of 60 miles per hour, the system must supply approximately 16,000 of these sparks ***per minute.*** Is it any wonder that the ignition contact points and spark plugs require occasional attention?

The need for attention to the ignition system is usually indicated by sluggish engine performance, due to lack of a hot enough spark. Many experienced owners do not wait for this symptom, however, but have the ignition system checked periodically, ***about twice a year or oftener.*** The ignition system should always be checked at the beginning of cold weather in the fall, to assure easy starting during the winter months.



The work required by the ignition system consists of the following:

Cleaning the spark plugs and setting the gap to .025-.030 inch.

Install new plugs if the old plugs are badly worn. Spark plug manufacturers recommend new plugs each 10,000 miles. A. C. Spark Plug Model G-7 is recommended for Cadillac V-12 cars and Model G-6 for V-16 cars.

Cleaning the timer contact points in the distributor and setting to a gap of .018-.024 inch for V-12 or .014 to .018 inch for V-16.

Replacement of worn contact points is a very inexpensive operation that will keep engine performance lively for a longer period of time.

Retiming the ignition to the timing marks on the flywheel and synchronizing the timing by proper setting of the movable contact arm.

The engine is correctly timed when the spark for the No. 1 cylinder occurs exactly as the IG/A (ignition-advance) mark lines up with the pointer. To change the timing, loosen the lock screw on the timing quadrant and move the distributor housing as required.

Carbon and Detonation—Most automobile owners have been taught that a detonation or "ping" in the engine is an indication of an over-advanced spark or of carbon in the engine, and probably the latter. While this is true, the following supplementary information must be included when considering "ping" in any high compression engine.

On cars with high compression engines, detonation occuring on rapid acceleration at ***low*** speeds and disappearing at about 15 miles per hour, is normal and indicates that the engine is performing at top efficiency. Detonation at higher speeds can be eliminated by checking and correcting the following:

Grade of gasoline used—The Cadillac V-12 and V-16 engines are designed for use with gasoline of 70 octane (anti-knock) rating. Gasoline of a lower rating may be used safely, but in this case the ignition timing must be retarded to a point where the engine will not knock.

Over-lean-mixture—This may be due to an incorrect carburetor adjustment or to an obstruction in the fuel feed.

Spark plugs—One or more faulty spark plugs will cause pre-ignition in their respective cylinders. Replace these with spark plugs of the correct size.

Accumulation of Carbon—Accumulated carbon can be removed by scraping after taking off the cylinder head, or by burning if carefully done.

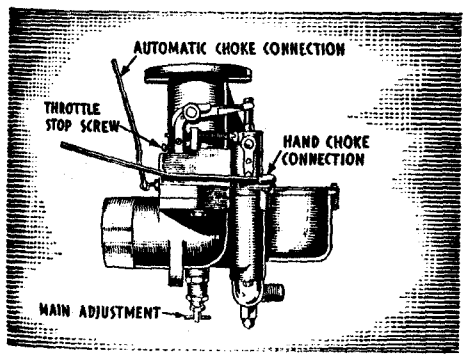
Valve Service—The condition of the valves should always be inspected at time of carbon cleaning, and refacing operations performed if required. The table below gives the various limits to be observed in valve reconditioning. Good workmanship and the use of adequate equipment for this operation is important.

Valve Service Data:

	Inlet Valve	Exhaust Valve
Seat Angle	45°	45°
Seat Width	$\frac{5}{64}$"	$\frac{5}{64}$"
Seat Eccentricity	Not over .002"	Not over .002"
Stem-guide Clearance	.0015"	.0025"

Carburetors—To adjust the carburetors on V-12 and V-16 engines:

1. Run the engine until it is thoroughly warm.
2. Disconnect the automatic choke linkage at both carburetors.
3. Make sure that the hand choke control is fully released on both carburetors.
4. Disconnect the coil wire for the right cylinder block and adjust the left carburetor while only the left cylinders are firing.
5. Adjust the main metering screw for smooth idling, then set the throttle stop screw so that the engine will just turn over without stalling.



6. Repeat the adjustment for the right carburetor while the right cylinders only are firing.
7. With all cylinders operating, the engine should idle at about 320 R. P. M. Adjust stop screws to this speed.

8. If the adjustment is slightly rich, turn both metering screws the same amount toward the lean side.

The carburetor float setting is correct when the distance from the gasoline level to the top of the float bowl flange is 7/8".

Air Cleaner—Your Cadillac car is fitted with an air cleaner of the "oil bath type," which operates very efficiently in removing dust from the air drawn into the engine. ***As this type of cleaner accumulates considerable dust and dirt, it requires regular cleaning every 2,000 miles, or oftener if extreme conditions are encountered.***

The cleaner is cleaned and re-oiled in the following manner:

Remove the gauze unit and wash thoroughly in gasoline, taking particular care to wash all the accumulated dirt and dust out of the wire mesh.

Dry all the units thoroughly, either with compressed air or an adequate drying period.

Pour one pint of S.A.E. 50 engine oil (S.A.E. 40 in winter) in the reservoir and assemble the wire mesh and cap.

NOTE: No oil should be placed on the wire mesh.

Gasoline Filter—A gasoline filter is provided at the fuel pump on the front left hand side of the engine. Any accumulation of water or sediment should be cleaned out when it can be seen in the glass bowl. Remove the bowl by unscrewing the thumb nut and swinging the yoke to one side. If the screen strainer sticks, remove it by pulling straight down.

Any dirt on the strainer should be washed off with gasoline, and the bowl should be wiped clean. Then reinstall screen and bowl, making sure the bowl seats properly against the cork gasket, and remember to turn on the gasoline.

Other Service Operations—Major service operations on the engine, such as replacement of bearings or reconditioning of cylinders, should be performed only by experienced workmen having the necessary instructions and equipment.

Cooling System

The attention required by the cooling system consists of keeping it filled to the proper level with the proper fluid, and keeping all connections tight to insure a leak-proof system.

The capacity of the cooling system is 17 quarts on the V-12 and 24 quarts on the V-16, when filled to the proper level, which is one inch below the top of the filler.

Anti-Rust Treatment—When the car is delivered to the owner, a small amount of chemical inhibitor is added to the fluid in the cooling system, in order to reduce foaming and retard the formation of rust and scale, thus helping to keep the system clean. It is not necessary to add more inhibitor each time that water or anti-freeze is added, but whenever the cooling system is drained and refilled, a suitable inhibitor should be added. Your Authorized Service Station can advise you regarding the proper material to use.

Cleaning Cooling System—It is recommended that the cooling system be thoroughly cleaned and flushed twice a year, or every 6,000 miles, preferably by reverse-flow flushing. In any event, the cooling system should be cleaned and thoroughly tightened before anti-freeze is added at the beginning of cold weather.

The following method of cleaning the cooling system can be used if facilities for reverse-flow flushing are not convenient.

Run the engine until it is warm; then stop the engine and open the drain valve for the cooling system. The entire system is drained by one valve, located just below the water pump. After the liquid has drained off, refill the cooling system with hot water, run the engine for a few moments and

again drain the system. Repeat this operation until the water is clean when it is drained.

In cases where the accumulation of rust and scale is so great that this method does not clean the system adequately, the system should be flushed out, using a solution of water containing one pint of sal-soda (washing soda) and one quart of kerosene, and running the engine for half an hour. After this operation, the system must again be thoroughly flushed in order to clean out all traces of this cleaning solution. Do not allow any of the solution to reach the car finish.

Anti-Freeze

Anti-freeze solutions that can be safely used are of two types: The volatile types such as denatured alcohol and methanol or the non-volatile types such as distilled glycerine and ethylene glycol.

If you prefer to use alcohol or methanol solutions, it is important that the solution be tested at frequent intervals, and that sufficient anti-freeze be added to replace any loss by evaporation; otherwise there is a danger of damage by freezing. When using these solutions, it is also important to avoid spilling any on the car finish, or if any is spilled, to flush off immediately with a large quantity of water.

Distilled glycerine and ethylene glycol are more expensive in first cost but, as they are not lost by evaporation, only water needs to be added. Solution lost through leaking or foaming must, of course, be replaced and on this account it is especially important to make sure that the system is leak-proof before adding this type of anti-freeze.

Glycerine and ethylene glycol should be used in accordance with instructions and in the proportions recommended by the anti-freeze manufacturer. Ordinarily they should not be mixed with other solutions. No additional rust inhibitor should be added when the anti-freeze contains an inhibitor. Many branded alcohol anti-freezes and most non-volatile anti-freezes contain rust inhibitors.

Whenever anti-freeze is to be installed, check over the entire cooling system. Replace any worn hoses and tighten all hose connections. Inspect water pump, fan

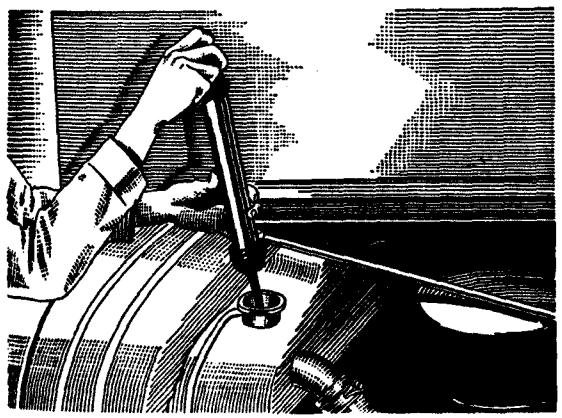
belt, and radiator shutters and thermostat for proper operation. Clean cooling system thoroughly to remove all rust and scale.

When glycerine or ethylene glycol are to be installed, one special precaution must be taken. New cylinder head gaskets should be installed, and the cylinder heads tightened thoroughly to prevent any possibility of the cooling liquid getting into the engine crankcase.

Salt solutions, such as calcium chloride or magnesium chloride, sodium silicate, kerosene, honey, glucose and sugar solutions are not satisfactory for use in automobile radiators.

Use of Hydrometer—In using a hydrometer to determine the temperature at which a solution will freeze, the test must be made at the temperature at which the hydrometer is calibrated. If the solution is warmer or colder, it must be brought to this temperature or errors as large as 30 degrees F. may result.

Alcohol and methanol solutions have, for all practical purposes, the same specific gravity and they may be tested with the same hydrometer and mixed in the same solution. When testing alcohol or methanol solutions, allowances must be made for the effect of the inhibitor on the hydrometer reading. With the inhibitor in the cooling system, the actual freezing temperature is ***five degrees higher*** than indicated by the hydrometer.



Transmission

The Cadillac transmission incorporates synchronized gear shifting, and quiet operation in all speeds. Synchronization is applied to all shifts into high or second gear, for maximum convenience and safety.

The only attention ordinarily required by the transmission is lubrication at 3,000 mile intervals. The correct grade of lubricant is essential to long life and continued quiet operation. Lubricants meeting the specification S.A.E.-90-EP can be used the year round.

Clutch

The clutch on V-12 cars is of the single plate type, having one driven disc faced on both sides with long wearing friction material, cushioned with a special metal segment to assure smooth engagement.

To provide maximum ease of control, small centrifugal weights integral with the clutch release levers are used to increase the spring pressure as the engine speed increases, giving low pedal pressure at low engine speeds, yet securing adequate engagement pressure at high speeds.

The clutch on V-16 cars is of the two plate design, having four engagement surfaces to assure long life and smooth engagement.

The only attention or adjustment ordinarily required by the clutch is periodic adjustment of the clutch pedal. The pedal should have ⅞ to 1⅛ inches free travel on V-12 cars, and 1¼ to 1½ inches free travel on V-16 cars. This can be secured by turning the adjusting nut on the pedal rod.

Rear Axle

The Cadillac rear axle is of exceptionally rugged design and construction to assure long life and quiet operation. A strong rugged type of gear mount maintains accurate gear adjustment over a long period of use. The gear ratios are:

Series 37-85.....4.60 to 1
Series 37-90.....4.64 to 1

The propeller shaft incorporates two needle bearing universal joints, which are packed with lubricant and sealed. Sealed ball bearings are used at the rear wheels, and they require no readjustment or other attention. Because of these features, the only regular servicing required by the rear axle is lubrication of the gears.

Special Hypoid Lubricant, available at Authorized Service Stations, must be used in the rear axle. This lubricant is of the proper viscosity for year round use, although it should be drained and replaced with fresh lubricant every 6,000 miles. No other lubricant can be safely used. (See page 47.)

If, after a long period of use, the rear axle gears require adjustment or other servicing, a complete new gear assembly can be secured on an exchange basis at moderate cost. This exchange is handled through your Authorized Service Station.

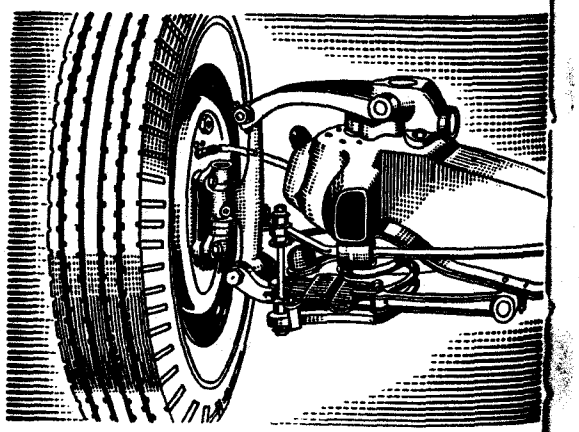
Front Wheel Suspension

Independent front wheel suspension is used on all Cadillac cars to provide easier riding and safer driving. With this construction the front end of the car is supported on soft coil springs controlled by double action shock absorbers, and the suspension arms hold the wheel spindle and steering knuckle in the correct position regardless of the spring deflection.

The unexcelled riding qualities of the car are the result of this front suspension combined with the long-leaf semi-elliptic rear springs, hydraulic shock absorbers, and the ride stabilizers used at both front and rear.

The caster, camber and front wheel toe-in dimensions are given in the box below. These factors ordinarily require checking only after a collision or in case of considerable driving on rutted roads or bumping of curbs.

Caster	$-\frac{1}{4}°$ to $+\frac{1}{4}°$
Camber	$0°$ to $\frac{1}{2}°$
Toe-in	$0''$ to $\frac{1}{16}''$



Steering

Cadillac steering ease is the result of the following features of design:

1. The worm and roller steering gear in which the entire steering mechanism operates smoothly on large anti-friction bearings.
2. Center point steering, made possible by individually sprung front wheels, which assures freedom from road shocks and accurately maintained steering geometry. The steering ratio is 24 to 1 on both Series 37-85 and 90.

The only service ordinarily required by the steering system is regular lubrication of the connections and the steering gear. Steering gear lubricant (S-200) is the only lubricant that should be used in the steering gear; otherwise wear and hard steering may result.

Tools

The tool kit supplied with the car includes tire changing equipment and a few general use tools, as follows:

Hammer	Open End Wrenches (3)
Screw Driver	Tool Bag
Large Screw Driver	Jack and Handle
Pliers	Wheel Mounting Wrench
Adjustable Wrench	Wheel Disc Pry,
Spark Plug Wrench	if Discs are used

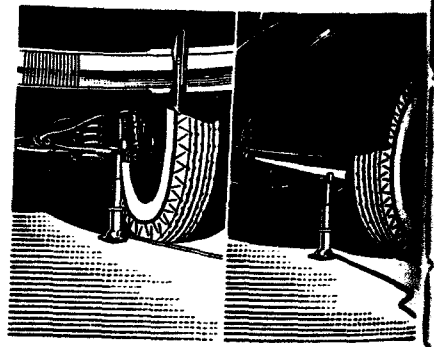
The tools are stowed in the rear deck or trunk compartment next to the spare tire, except the jack handle and wheel wrench, which are carried under the front seat. On cars with an exposed spare wheel at the rear, the tools are all under the front seat.

Wheels and Tires

Jack Pads—To facilitate raising the car when a tire is flat, the car is fitted with special pads in accessible positions near the front and rear wheels. The jack must be placed under the pad and the car jacked up only high enough to clear an inflated tire; otherwise, difficulty may be encountered in removing the wheel.

Changing Wheels—Remove the hub cap by prying off with a screw driver. On cars fitted with wheel discs, the cap and disc are integral and are pried off with a special right angle tool. Remove the mounting bolts* around the hub. Before taking the wheel off the hub, turn the wheel and hub so that the mounting stud, which is located between two of the bolt holes, is at the top. The wheel must then be lifted partially off the hub and swung so that the front side is brought forward, after which the wheel can be rolled out from under the fender toward the rear.

When reinstalling a wheel, roll it in under the fender from the rear and lift it up on to the hub, hanging it on the mounting stud and then inserting the mounting bolts. Do not tighten the bolts in rotation; after tightening one bolt, tighten the one opposite.



*Studs in the hub and mounting nuts are used on V-16.

Wheel Bearing Adjustment—The only service operation regularly required by the wheels is lubrication and readjustment of the front wheel bearings each 6,000 miles, as provided in the lubrication schedule. To perform this operation:

Remove bearings, thoroughly clean out old grease and dry.

Coat bearings completely with a thin coating of wheel bearing grease, and reassemble hubs and bearings on spindle.

Using a wrench with an 8-inch handle, tighten adjusting nut with one hand while rotating wheel hub to seat all parts.

Back off adjusting nut 1/12 of a turn and, if the slots line up, insert cotter pin. Otherwise, back off nut until cotter pin can be inserted.

Tires—Tire inflation pressures and procedure are given in detail on page 11.

The life of all four tires may be increased considerably by interchanging them at regular intervals of 4,000 miles. The right front tire should be interchanged with the left rear and the left front with the right rear. This will subject all tires to equal amounts of all types of wear, and thus increase their useful life.

Brakes

The hydraulic brakes used on Cadillac cars are designed and constructed to provide the utmost in features of safety, operating ease and freedom from frequent attention.

The brake master cylinder and supply tank for the fluid is located under the left front floor board on V-12 cars and under the hood near the steering gear on V-16 cars. From the master cylinder fluid is piped to the brake wheel cylinders through steel tubing and flexible hoses, led through the frame in a manner that provides full protection.

The motion of the car either forward or in reverse is converted into additional braking energy by the action of the brake shoes themselves, as the motion of the car tends to carry the shoes into closer contact with the brake drums.

The importance of safe brakes leads us to urge that you have any required brake service work performed at an Authorized Service Station. This is especially important when brake relining is required as Genuine Cadillac-LaSalle brake lining must be used to assure satisfactory results as to braking ease and lining life.

If an ordinary brake adjustment is required, the procedure outlined below can be followed in an emergency: Turn the adjusting screw at each wheel (at the lower part of the dust shield) clockwise until the wheel is locked, then back off adjustment until the wheel turns freely. Repeat at each of the four wheels.

A complete brake adjustment is made by performing the following operations at each wheel:

Turn eccentric adjustment to secure .010-inch clearance between lining and drum at both ends of secondary shoe.

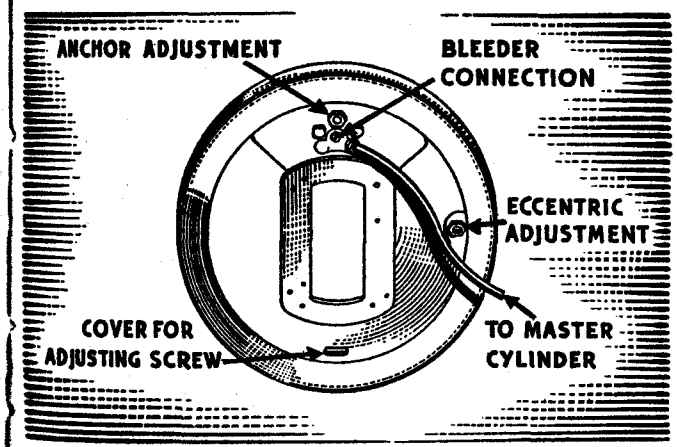
If clearance at ends of shoe varies more than .002-inch, readjust anchor by loosening lock nut and tapping anchor pin with soft hammer. Then readjust eccentric for .010-inch clearance.

Adjust primary shoe by turning adjusting screw until a light drag is felt, then turn back just enough to free.

Adjust pedal rod to allow ¼ to ⅜-inch free pedal movement.

One important item of regular attention required by the braking system is checking of the level of the fluid in the master cylinder reservoir. This level should be checked every 6,000 miles and special No. 5 brake fluid added regularly to keep the reservoir at least half full. Use only special No. 5 fluid.

In the event that the level falls too low, air may enter the system. If air is present in the system at any time it will be necessary to bleed the entire braking system; otherwise unsatisfactory operation will result.

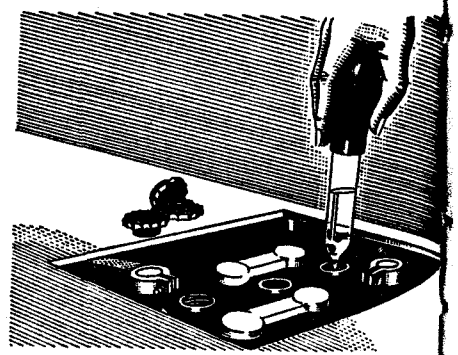


Electrical

Storage Battery—The Storage Battery is carried in a compartment underneath the left front seat on V-12 cars and under the right front fender on V-16 cars. The V-16 battery is accessible for adding water under the hood on the right side.

The battery is filled with an acid solution from which the water slowly evaporates, making it necessary for fresh distilled water to be added to each of the three cells at regular intervals to bring the level up to the bottom of the filling tubes. ***Distilled water should be added at least every 1000 miles and, in warm weather, every 500 miles or at least every two weeks.*** Hydrant water or water that has been in contact with metallic surfaces is not satisfactory.

After adding water to the storage battery in freezing weather, the car should immediately be run far enough to mix the water with the acid solution thoroughly. If the car is parked immediately after water is added, the water is likely to stay on top of the acid solution and may freeze, thus causing extensive damage to the battery.



Generator Charging Circuit—The generator is mounted at the front of the engine and is driven by a silent chain which also drives the water pump. The generator is of the shunt wound, two-brush design, and is provided with an automatic charging rate adjustment, so that no manual adjustment is required.

The generator charging rate is at all times controlled by two factors, the amount of current being used and the state of charge of the battery. When the battery is partially discharged, the charging rate is high; when it becomes fully charged, the charging rate is lowered.

The relays and regulators controlling this adjustment are assembled in a dust and moisture proof regulator box mounted on the engine side of the dash. The regulators are properly adjusted, tested and sealed at the factory. They should require no attention in service excepting that the external connections should be kept tight and clean.

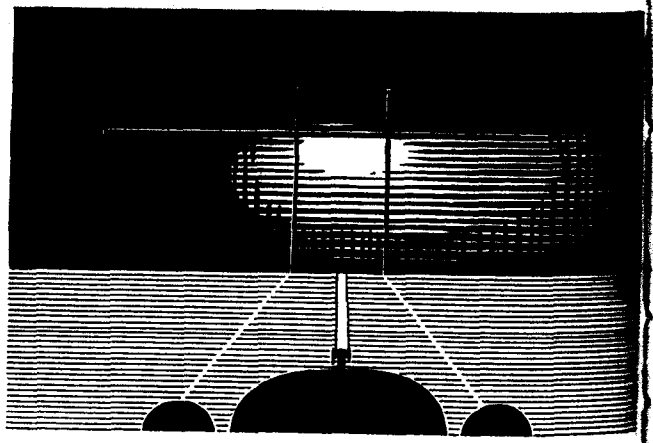
CAUTION: Whenever disconnecting any wires in the generator circuit or in the harness opening at the regulator box, the battery must be disconnected first of all. Otherwise, there is a possibility of the loose connections being shorted or grounded in a way that will reverse the generator polarity or otherwise damage the charging circuit.

Lighting

Care of Headlamps—The headlamps require periodic cleaning and occasional readjustment. To clean the headlamps, remove both headlamp doors. Clean the lenses with alcohol inside and outside. Carefully wipe all dust from the reflectors and, if necessary, polish them with a soft rag dipped in a mixture of lamp black and alcohol. In polishing reflectors, always rub from the center straight out to the rim; never rub in circles.

Inspect the gaskets and replace them if they are damaged or do not register properly. Replace any bulbs that are burnt out or that show signs of blackening. Try the lighting switches in all positions to see that all bulbs burn properly.

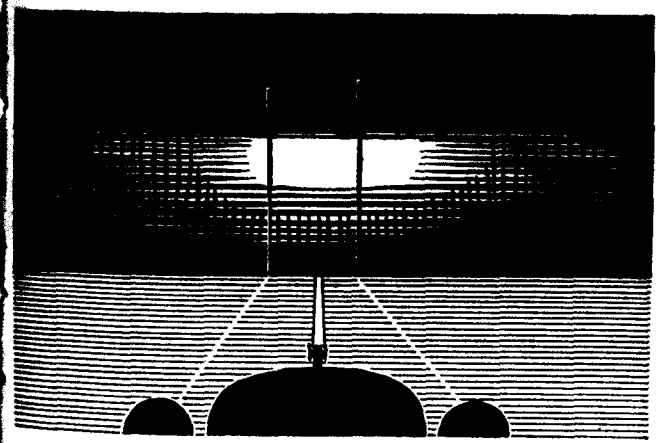
The headlamps are designed for prefocused bulbs, so no focusing adjustment can be made in the lamps. On this account, only prefocused bulbs can be used in these lamps, and no other bulbs will be satisfactory. Because of this design, aiming is the only adjustment required by the headlamps.



Headlamp Adjustment—Place the car on a level surface with the headlamps aimed toward and 25 feet from a garage door or other reasonably light colored vertical surface. Draw a horizontal line on this surface at the level of the headlamp centers. If your state requires a loading allowance, draw this horizontal line the required distance below the level of the lamp centers. Sight through the center of the rear window over the radiator cap to determine the center point of the horizontal line and draw vertical lines through points at the right and left of this center point directly ahead of the center of each headlamp.

The lighting switches should be turned to the "Driving" position, which means that the lower filaments will be lighted in both lamps. One of the headlamps should be covered. The beam from the uncovered lamp should then appear as shown on page 68, if it is a left headlamp, or as shown on page 69 if it is a right headlamp.

When correctly aimed, the beam from the left headlamp should have the upper edge of the hot spot at the horizontal line and the left edge at the vertical line directly ahead of the lamp as shown. The beam from the right headlamp should likewise have the upper edge of the hot spot at the horizontal line, but with the maximum intensity centered on the vertical line directly ahead of the lamp and the right cut-off of the hot spot about a foot to the right of this line as shown.



The position of the headlamp beam is changed laterally by means of a side adjustment screw which is accessible on V-12 cars from the inside of the radiator shell. The beam is moved to the left or right by tightening or loosening this screw. After the adjustment has been made, tighten the lock nut securely. On V-16 cars, lateral adjustment is made by removing the headlamp doors and turning the screws on each side of the reflector.

The beam may be raised or lowered by turning the adjustment screw which is accessible in a depression in the bottom of the lamp body. As this adjustment is spring-loaded, no lock nut is provided.

The V-12 headlamps are not to be aimed with the lens and door removed as reinstalling the door might change the adjustment slightly. Because of this possibility, it is advisable to check the headlamp adjustment whenever V-12 headlamp doors are removed for any reason, even for changing bulbs.

No further aiming is required for the lower or passing beams.

Lamp Bulbs—In replacing lamp bulbs in any of the lights on the car, the same candle power bulb should be used for replacement as was originally installed. It is a good plan to carry a spare set of these lamp bulbs in the car at all times.

The bulb in the map lamp may be replaced after unscrewing the knob at the end of the shield.

The lamp bulbs used in the car are as follows:

Location	Voltage	Candle Power	Mazda No.
Headlamps	6–8	32-50 R. H.*	2530-L
		32-32 L. H.	2330-L
Rear Lamps		21-3	1154
Dome Light	6–8	15	87
Rear Lamps (Driving) Quarter Lights Map Lamp	6–8	3	63
Parking Lamps (In Headlamps) Instrument Lamps	6–8	2	55
Clock Lamp Indicator Bulbs	6–8	1	51

*Except in certain states where this bulb has not yet been approved.

Storing the Car

If the car is to be stored for any length of time it is important that a few precautions be taken to protect it from deterioration. Blocking up the car to take the weight off of the tires and placing a cover over the entire body will protect the tires and finish. The engine and the storage battery, however, require special attention.

The engine should be run until it is thoroughly warm. The filter bowl should then be removed (see page 54) and the engine run until all of the gasoline is drawn out of the pump and the carburetor.

Oil should be injected into the cylinders while the engine is still warm. This may be done by pouring two or three tablespoonsful of engine oil into the spark plug holes. Cranking the engine a few times after that is done will distribute the oil evenly over the pistons and cylinder walls. The cooling system should then be drained.

The battery should be fully charged and the solution should be at the proper level. If possible, arrangements should be made to have the battery charged from an outside source every two months during the storage period.

★ ★ ★

SERIES 37-85 and 90

CADILLAC LUBRICATION CHART

Check the engine oil every time gasoline is purchased

Rear Axle
V-12 and V-16

Add Special Hypoid lubricant to bring level up to filler.
Every 3000 miles

Drain, flush, and refill with fresh lubricant.
Every 6000 miles

Storage Battery
V-12 and V-16

Add distilled water to bring level up to bottom of filler tubes.
Every 1000 miles

In warm weather check level every two weeks.

Transmission
V-12 and V-16

Add lubricant to bring level up to filler.
Every 3000 miles

Drain, flush, and refill with fresh lubricant.
Every 6000 miles

Brake Assister
V-16 only

Remove plug and inject about 2 ounces of vacuum cylinder oil.
Every 6000 miles

Pedal Shaft
V-12—1 inner end
V-16—1 each end

Apply chassis lubricant to connections with grease gun.
Every 1000 miles

Steering Gear
V-12 and V-16

Add steering gear lubricant to bring level up to filler.
Every 3000 miles

Engine Oil Filler
V-12 and V-16

Check oil level every 100 to 150 miles and add oil as necessary. Drain crankcase and refill through either filler.
Every 2000 miles

Front Wheel Bearings
V-12 and V-16

Remove bearings, clean, repack with wheel bearing lubricant. Readjust bearing before reinstalling.
Every 6000 miles

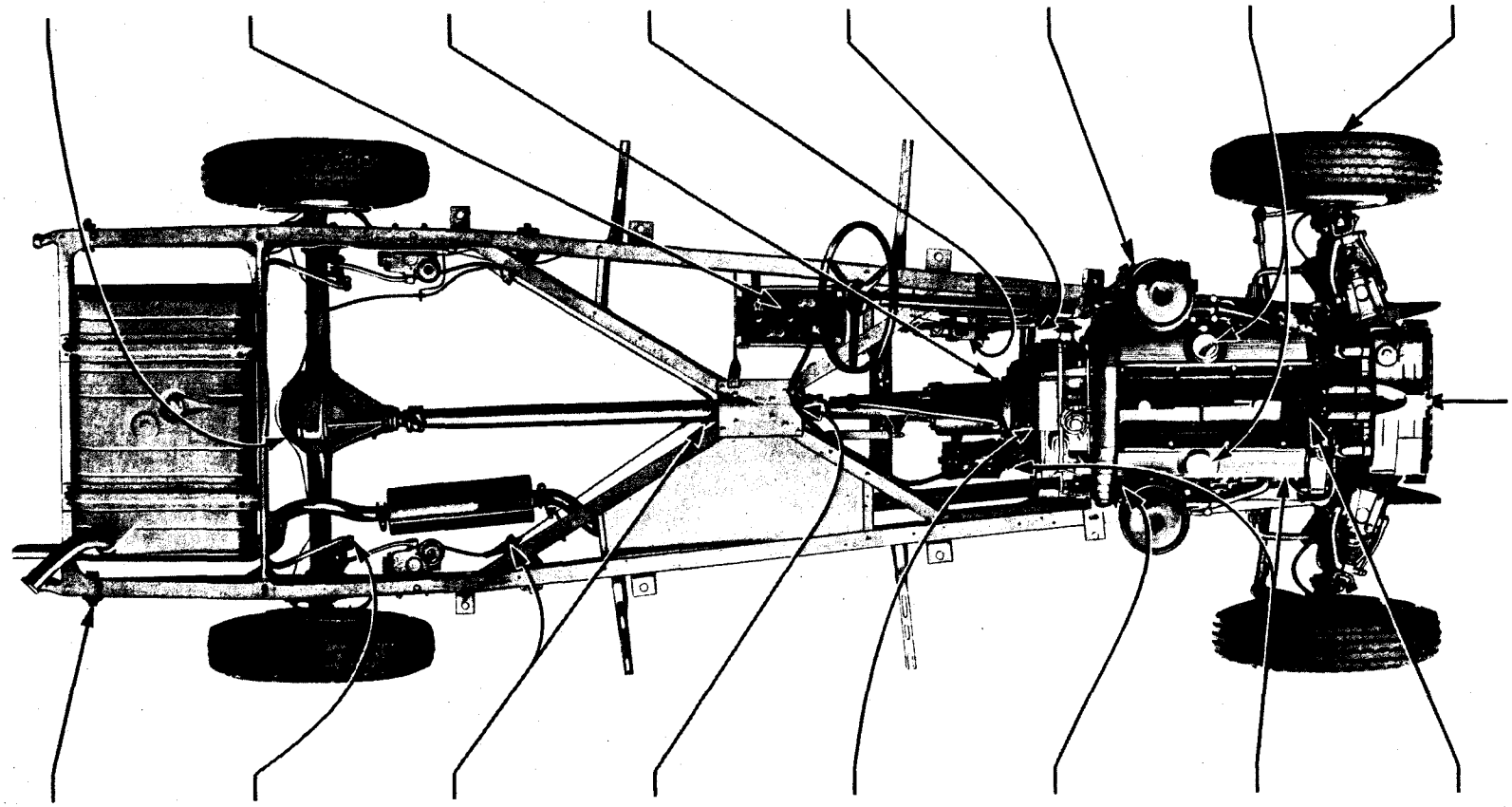
Air Cleaner and Oil Filter
V-12 and V-16

Remove air cleaner filtering unit, drain and refil with one pint of SAE 50 engine oil and reinstall.
Every 2000 miles

Remove oil filter and replace with new unit.
Every 6000 miles

Front Wheel Suspension and Steering Connections

Apply chassis lubricant to connections with grease gun at points shown below.
Every 1000 miles



List of Lubrication Points

V-12 Series 37-85 No. Lubrication Points	Location	V-16 Series 37-90 No. Lubrication Points
4	Outer end upper suspension arms	2
4	Steering knuckle support bearing	4
4	Outer end lower suspension arms	4
4	Inner end lower suspension arms	4
4	Steering tie rods ends (2 rods)	4
2	Steering drag link ends	2
	Intermediate steering arm fulcrum bolt	1
	Front stabilizer connecting link	4
22	Total	25

Body Hardware
V-12 and V-16

Apply a few drops of light oil to door hinges, clean all door striker plates and wedges and apply a small amount of vaseline.
Every 1000 miles

Rear Spring Shackles
V-12—2 each side
V-16—1 each side

Apply chassis lubricant to connections with grease gun.
Every 1000 miles

Shock Absorber and Stabilizer Bar Links
V-12—4 each side
V-16—2 each side

Apply chassis lubricant to connections with grease gun.
Every 1000 miles

Brake Cross Shaft and Cables
V-12

Apply few drops of engine oil to hand brake linkage.
Every 1000 miles
V-16

Apply chassis lubricant to connections with grease gun.

Apply oil to hand brake and ride regulator linkage.
Every 1000 miles

Universal Joint Splines
V-12

Apply chassis lubricant to connection with grease gun.
Every 1000 miles
V-16

Substitute a pressure fitting for the plug in the slip joint and add chassis lubricant.
Every 1000 miles

Clutch Release Bearing and Release Fork
V-16 only

Fill grease cup on release fork with wheel bearing lubricant and turn down.
Every 1000 miles

Use same lubricant in cup on release bearing.
Every 6000 miles

Water Pump
V-12 and V-16

Add water pump lubricant through pressure connection. Reinstall cap tightly on connection after adding lubricant.
Every 1000 miles

Starter and Generator
V-12 and V-16
1 oil cup on starter
2 on generator

Apply a few drops of engine oil with oil can.
Every 1000 miles

Distributor
V-12 and V-16

Apply water pump lubricant to connection with grease gun.
Every 1000 miles
V-16 only

Apply a few drops of engine oil to oil cup.
Every 1000 miles

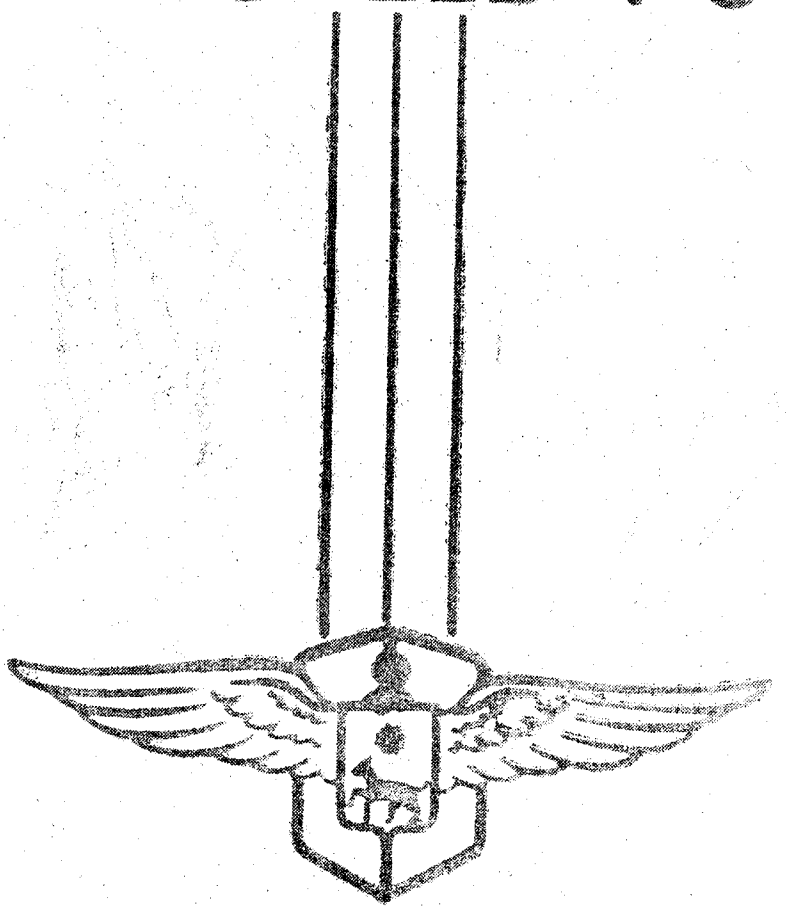
CAUTION: Open garage doors before starting engine

Edition No. 37-81
1.5M-10-36
Printed in U. S. A.

CADILLAC

V-8
V-12
V-16

LA SALLE V-8



CADILLAC FOR 1937

The Cadillac 1937 program is marked by the most complete market coverage ever achieved by the Cadillac Motor Car Company. For the first time Cadillac-La Salle completely covers all price groups from $900 and up. This has been accomplished by a marked reduction in the La Salle price and the introduction of new lines of cars.

During the forthcoming year, over a half million people will purchase cars in the price groups which Cadillac-La Salle now cover. This indicates the size of the market from $900 up which we are now in a position to dominate.

It is actually felt that the unit sales of our 1937 cars should be at least three times as much as those of the 1936 line. Of particular importance to you is the fact that this possibility of increase exists in every locality, regardless of size or population. Each salesman's, dealer's or distributor's success depends upon his own individual activity in connection with the 1937 program. New merchandising methods will be needed because of La Salle's lower price. Not only will this new market require different merchandising tactics than we have ever used before, but it will bring us more directly within the range of additional competitors. If our merchandising methods are correct, this should cause us no concern, because our product represents the highest dollar value that Cadillac has ever offered.

The return of La Salle to the V-Type Engine enables us to make a strong mechanical presentation on every line. Interiors have been improved and mechanical advancements are also noteworthy. No other salesman has at his command such powerful sales arguments based on economy, performance and luxury as the Cadillac-La Salle salesman for 1937.

The 1937 program consists of a new La Salle with a Cadillac Built V-Type eight cylinder engine in five body styles in a new greatly widened market.

The Series 60 Cadillac, with four body styles, features increased horsepower and greater interior luxury at a lower price.

The introduction of the Series 65 stops all gaps that have heretofore appeared in our price range and brings to the consumer a large, powerful, luxurious car below the price of the Fleetwood.

The 1937 Fleetwood line is divided between two models and wheelbases. The Series 70, with four body styles, is expressly designed for the purchaser desiring a car of utmost luxury, combined with greater handling ease, and is especially adaptable to city driving.

The Series 75 Fleetwood brings the same degree of luxury on a longer wheelbase and will be sought by the people who desire large, powerful cars.

The Cadillac V-12 is the finest car of its type built today and couples outstanding performance with rich appointments to make it the finest quality car for all around usage.

Mechanical improvements have been made on the Cadillac V-16 so that Cadillac can continue to provide utmost satisfaction to those people who demand the world's finest and most luxurious form of transportation.

The Cadillac Motor Car Company feels that it has provided its retail organization with the greatest program ever presented with regard to market coverage and competitive sales advantages. The success of the program depends entirely upon the retail sales organization's ability to capitalize upon this unusual position. Because product knowledge is essential to successful selling, the following pages have been prepared for your study and frequent reference.

NEW FEATURES OF CONSTRUCTION

La Salle and Cadillac V-8 Engine

Increased Engine Performance:
- Greater power to weight ratios.
- Improved carburetion.
  - Non-"percolating" design.
  - Concentric fuel chamber.
  - Fully automatic choke.

Increased Smoothness and Quietness:
- 3-point engine supports.
- Re-designed rear engine support.
- Improved hydraulic valve silencers.
- Lighter flywheel.
- Torsional vibration dampener (Cadillac V-8).

Improved Serviceability:
- Lower engine speeds (50, 60, 65, 70).
- Oil cleaner.
- Oil bath air cleaner.
- More rigid cylinder block.
- Lighter cylinder heads.
- Stronger connecting rods.
- Longer fan belt life.
- Improved generator accessibility.

Improved Cooling System:
- Thinner radiator cores.
- Bayonet radiator filler caps.

Quieter Clutch:
- Permanently lubricated clutch throwout bearing.
- Hardened clutch throwout bearings.
- Improved manufacturing tolerances.
- Larger facing area (Series 50).

New Transmission:
- More durable than former types.
- All gears helical.
- Pin type synchronizers.
- Short, rigid case and shafts.
- Shafts more closely spaced.
- Offset shifter shafts.
- Transmission cover on bottom.

La Salle and Cadillac Chassis

Rigid Frame (50 and 60):
- I section X-members.
- More rigid attachment of X-members to side bars.
- Strengthened radiator cradle.

Improved Brakes:
- Moulded brake linings on both primary and secondary shoes.
- Increased brake friction area (50 and 60).

Hypoid Rear Axle (50 and 60):
- Strongest axle for its weight.
- Less unsprung weight.
- Low spiral angle.
- Aluminum bronze thrust bearings for differential pinions.
- Shim adjustment for differential.
- Cylindrical differential housing.
- Rigid, heavily ribbed carrier.
- Larger axle shaft at hub.
- Welded-on differential cover.

Easier Steering:
- Steering steadiness improved by new engine mounts.
- Zero caster angle.
- Cross mounted drag link (50 and 60).
- Eccentric bushing roller adjustment.
- Straddle mounted roller shaft.

Refined Front Suspension:
- Improved ratio of front to rear springs.
- Reduced unsprung weight (65 and 70).

Improved Rear Springing:
- Waxed liners (50 and 60).
- Reduced unsprung weight (50, 60, 65 and 70).
- Threaded shackle bolts and spring bushings (50 and 60).
- Upper and lower shackle bolts threaded (65, 70, 75 and 85).
- Rubber front spring bushing (65, 70, 75 and 85).

Improved Shock Absorber and Stabilizer Action:
- Front stabilizer added to La Salle.
- Cross link rear stabilizer (50 and 60).
- End-to-end shock absorber valving.
- Softer shock absorber valving.

New shock absorber links.
Dash pot controlled inertia shock absorbers in rear (65, 70, 75 and 85).
New front shock absorber yoke (65, 70, 75 and 85).
Softer stabilizer action.

Strengthened Propeller Shaft:
Larger spline.
Alloy steel spider.
More material in joint.

Quieter Exhaust System.
One large muffler (50 and 60).
Exhaust spreader (50 and 60).
Two mufflers (65, 70, 75 and 85).
Expansible attachments.

General:
Larger outer front wheel bearings (50 and 60).

Electrical System:
New high output generators.
Generator in engine vee.
Relocated light switch.
Sturdier instruments.
Rattleproof and breakproof horn buttons.
Improved headlamp beam control.

La Salle and Cadillac Body Styling

Modern Appearance:
Greater overall length (50 and 60).
New radiator grilles.
Wide bumpers with insignia.
New front fender contour.
New hood louvres.
Vee cowl ventilator and hood top.
Redesigned radiator ornament (Cadillac).
Novel body belt treatment (50 and 60).
Vee rear quarter windows (50 and 60).
Airfoil, separated running boards (50 and 60).
Longer rear fenders.
Modern tail lamp design.
More slope of rear of sedans (50 and 60).

Unisteel Turret Top Bodies (50 and 60).

Structural box-unit construction.
Body frame within chassis frame without metal-to-metal contact.
Steel flooring indented against sound resonance.
Improved all-weather and noise insulation.
Wider weather stripping.
Welded unions and joints.
Drip mouldings.

Luxurious Interiors:

New instrument panels (50 and 60).
New instrument dial designs.
New steering wheel.
High quality upholstery.
New trimming styles.
One-piece garnish mouldings (50 and 60).
New interior hardware.

Increased Comfort and Convenience:

Greater headroom (50 and 60).
Increased legroom (50 and 60).
Level floors.
Heavy, leather re-enforced carpeting.
Re-located transmission lever.
Pivot type sun visors.
Front compartment ash receiver.
Rising front seat (50 and 60).
Greater rear seat width (50 and 60).
Button type door locks.
Swinging rear quarter windows (50 and 60).
Increased luggage space (50 and 60).

1937 MAJOR SELLING FEATURES

KNEE ACTION

The Cadillac design of Knee Action wheels provides a perfection in riding comfort unobtainable in conventional automobile design. Three years of intensive research and three years of actual usage have been utilized to bring the Knee Action principle to its present peak of development.

This basic improvement in riding comfort offered by Cadillac is the result of a complete redesign of the chassis. It is not an addition to a conventional car design. Balanced springing, independent front wheel suspension, a complete redistribution of car weight and much easier steering summarizes this engineering achievement. The rigid front axle, stiff front springs and tiresome steering have been discarded forever.

Individually sprung front wheels permit a much softer spring action than is permissible in the conventional design with heavy front axle. Springs must necessarily be very stiff and harsh in their action to support the axle. Knee Action's helical coil springs may be co-ordinated in ratio of flexibility with its rear springs and afford a uniform balance of car weight. This combination effects the soft boulevard and flat high speed ride, so characteristic of the new Cadillac and La Salle. Both front and rear compartments ride equally well without any pitching, tossing or neck-snapping.

Since each front wheel has its own spring, wheels may follow road irregularities independently without transferring shocks through the front axle which are multiplied throughout the frame and body in nerve-breaking vibrations.

Steering accuracy has also been increased by a redesigned steering gear-arrangement. The two steering cross rods are of equal length and are parallel to the lower forked arms which support the wheels. The steering radius in both left and right turns is practically equal. This design also eliminates car wander and shimmy since wheel movements cannot be transferred to the steering mechanism.

Knee Action provides an invaluable asset and safety feature in the event of tire blowouts at high speeds. Since there is no axle to carry deflection from one wheel to the other, steering is unaffected. This would also be true if, by

some grossly improbable chance, damage should be done to one of the coil springs. Each spring is subjected to tests with every kind of tremendous force and pressure which could possibly be imposed upon them.

Each wheel is attached directly to the frame by two forged forked arms. These arms hold the wheels constantly in perfect alignment. Correct caster and camber angles are always maintained which eliminates uneven tire wear and maintains perfect steering geometry.

Each of these superlative values resulting from Cadillac Knee Action design combine to insure every new car owner of the finest roadability obtainable in a motor car today. Both the car and wheels are at the correct angle on high speed turns, while scientific distribution of mass provides a low center of gravity.

The Cadillac ride is well above comparison with any other car and its advantages may be presented conclusively on demonstration.

THE UNISTEEL TURRET TOP BODY BY FISHER

To attain a new all-time high in motoring safety and riding comfort, Unisteel Turret Top bodies are used on all closed models of La Salle and Cadillac Series 60. Passengers ride within a steel structural box of heavy steel, carefully insulated against sound, weather and temperature. Innumerable reinforcements of steel braces have been carefully installed for assured permanency and maximum strength. All structural joints are welded, thus eliminating screws, rivets or bolts which cause squeaks and weaknesses as they become loose after rough road driving.

A heavy solid steel floor forms the underbody of these new structural steel Fisher bodies. A very unusual feature of this steel floor is the effective manner by which drumming sounds and reverberating noises, so noticeable and nerve-racking in steel bodies on other cars, are eliminated. This flooring in the new Cadillac-La Salle bodies is ribbed and stamped at various points in order to prevent noise vibrations from being set up in the body. The location of these indentations was determined after a long series of experiments with delicate sound instruments and many tests

under varying conditions. Passengers are thus assured of a quiet and most relaxing ride.

The cowl assembly is a complete all steel unit welded and braced at various points to give an exceedingly rugged framework. The rear body construction is similar to the front in that it has heavy steel braces welded in place for strength and permanency.

To this inner body framework construction is added a heavy steel outer paneling which practically doubles the strength of the body and reduces still further any tendency toward weaving and swaying. Insulated indentations and ribbing of the inner paneling plays an important part in preventing the creation and amplification of noises.

As a cover to this sturdy box-like steel structural unit is the one-piece solid steel Turret Top in its improved form. Steel roof rails are covered with an asphalt impregnated material for deadening sound. Sturdy grooved "U" shaped steel roof bows support the heavy metal top and are anchored to these steel rails.

These new bodies for Cadillac Series 60 and La Salle truly represent a frame in their own right. Yet they are securely anchored to a new chassis frame of great strength and rigidity. A noteworthy feature of this union of body frame to chassis frame is the complete absence of metal to metal contact which prevents the transmission of sound vibrations to the body itself. Fabric and rubber pads between the body and frame deaden telephonic rumbling so characteristic of single unit frame construction.

Many years of research and experimentation have been utilized by Fisher Body before the disadvantages of conventional all-steel body construction were ironed out. This is in keeping with Cadillac tradition to incorporate important features of construction and design after they are tried and proved equivalent to Cadillac sttandards of unsurpassed quality.

HYPOID REAR AXLES

La Salle and Series 60

Cadillac has developed a new design of a hypoid rear axle. Although hypoid axles have been in use on other makes of cars for several years, there has never been one

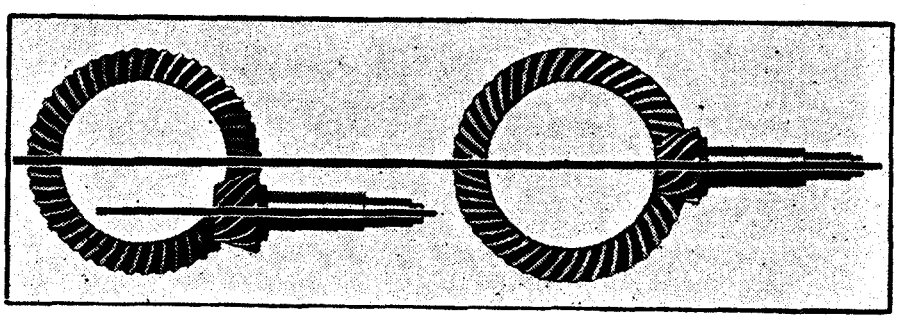
designed that fully met Cadillac's rigid requriements of quiet operation, strength and owner convenience.

For the 1937 La Salles and Cadillac Series 60, Cadillac engineers have designed a hypoid axle that overcomes these objections. It is the strongest axle for its weight that is known today. It is silent in operation. Although Special E. P. lubricant is required, this lubricant has been much improved and is now generally available.

One of the reasons for the long life and quiet operation of the assembly is derived from Cadillac's design for a lower spiral angle than is ordinarily used on the ring gear and pinion teeth. This feature gives better and quieter tooth contacts and reduces friction and bearing loads. Another feature is that this design does not have the distortion during heat treatment that is so pronounced in hypoid gears having a higher spiral tooth angle.

By developing a hypoid gear that meets all of Cadillac's requirements, the lighter and shorter wheelbase cars attain a higher degree of interior comfort without marring the exterior styling or causing mechanical difficulties than it has heretofore been possible to attain.

The advantage of a hypoid axle is that it permits a lower floor level than is possible with spiral bevel and undivided propeller shafts unless an unsightly and uncomfortable rear



Pinion Mounting
Hypoid Rear Axle Spiral Bevel Rear Axle

compartment floor tunnel is used. This is because the pinion is mounted below center in the hypoid rear axle. This results in a lower positioned drive shaft which in turn permits lower floor levels without requiring tunnels to insure proper clearance.

By having lower floor levels all purchasers of La Salles and Series 60 Cadillacs obtain 2⅜ additional inches of interior headroom while the low roof line, necessary for up-to-date styling, is maintained.

In the longer wheelbase cars low floor levels are not necessary for generous interior headroom. The additional length requires a higher roof line for perfectly proportioned styling and hence the hypoid axle has no advantages for cars of this length.

Cadillac engineers felt that since no advantage could be gained by adopting the hypoid axle to the larger, heavier cars it would not be judicious to change from their long successful and proven type of spiral bevel axle.

In spite of the fact that the new Cadillac designed hypoid axles are the strongest axles known for their weight, Cadillac engineers do not feel that this type of axle should be used on heavier cars. The longer cars are considerably heavier than the shorter cars and must be designed to carry loads of seven and eight passengers, as well as heavy luggage, over all types of rough, sandy or muddy roads. Since with hypoid axles the teeth function under greater friction than on spiral bevel types heavy loads subject them to greater wear which is evidenced by the noisy action of heavy cars of other makes using a conventional hypoid axle.

Cadillac does not pursue a hide-bound policy of following age-old traditions. Hence, its engineers are free to design the best features into each of its products. This is one of the causes contributing to continual desertion of the fine car field to Cadillac.

PEAK LOAD GENERATOR

In order to cope with increasingly heavier electrical drains, two new and improved Peak Load Generators of exclusive design are used on Cadillac and La Salle. Both these generators have greater capacity than before at both low and high speeds to maintain peak battery charge, a feature unobtainable in generators used on other cars.

The Peak Load Generator is entirely flexible in action, charging as high as 26 and 28 amperes at touring speeds if the battery is low and great drains are imposed upon it. However, as the battery is gradually recharged to its peak condition, the voltage regulator reduces the generator charging rate accordingly and evenly. Only a low trickle of 5 or 6 amperes is used in addition to the ignition drain when the

battery is completely recharged. Peak condition is maintained at all times; battery life is prolonged; and the need for frequent attention to battery water is reduced because danger of overcharging, which evaporates the water, is eliminated.

The additional current-control feature is used on the new Peak Load Generator for the Cadillac Fleetwood models. This device controls the generator's output at a constant rate with a possible maximum of 26 amperes above 20 m.p.h. as noted in the chart on Page 107. This is further assurance against overcharging and depleted battery life.

Even without the current control feature, Cadillac's exclusive voltage regulator design gives the improved Peak Load Generator the undisputable distinction of superiority over the conventional step type. It is one of Cadillac-La Salle's in-built extra values for 1937.

PRECISION MANUFACTURING

The great satisfaction which owners of Cadillac-built cars enjoy is due largely to Cadillac features of construction and design. Cadillac's precision methods, inspection systems and standards of craftsmanship are the criterion of the automotive industry.

Since quality with disregard to cost has been the basis and by-word of Cadillac manufacturing methods, it is necessary that the strictest of standards be adhered to. These standards apply rigidly and uniformly to every unit which is to become a part of a Cadillac-built automobile.

First there is the standard for material. Experts in metallurgy draw up the exact specifications for the mineral content of all metals used. As soon as a supply of raw material is received at the factory, samples are taken to the chemical laboratory. There the metal is analyzed to determine if those specifications have been met. If it is correct, it is brought to the specified degree of hardness and temper by trained men at the Cadillac factory. Every forging, whether it be a connecting rod or bolt, is submitted to the Brinnell hardness test. Cadillac knows its material before it is released for manufacture.

The second standard is that of accurate dimensions. There is an unwritten and unbreakable law of accuracy among Cadillac craftsmen. Over 27,000 dimensions must be within one thousandth of an inch; 37,000 more must be within two thousandths of an inch. Weights also must undergo critical measurement, as illustrated by the balancing machine whose light wavers excitedly if a crankshaft is out of balance more than one sixteenth of an ounce inch (1/16 oz. pressure at 16 inches radius from center of crankshaft). These are examples of accuracy far ahead of any other manufacturer.

Strength is a third Cadillac standard. This is determined by innumerable and exhaustive tests. The fatigue test is one of these and is famous for its detection of a weakness in any part or mechanism. It was found under this test that the new all-silent transmission was 100% more durable than any other pleasure car transmission now built. The new hypoid rear-axles also had to prove indisputable superiority over all other axles of like or differing design before they received final approval by Cadillac engineers.

These three standards combine to form the fourth basic standard of unsurpassed Cadillac quality. To be positive that standards of material, dimensions, strength and workmanship are right, there are many inspectors in the plant to check upon work as it flows through production. Even after transmission gears and rear axle gears have been finely machined, lapped to a glass-like surface, and carefully mated together by hand for uniformity, they must pass the eye and ear of an inspector. He operates his own set of master gauges with full authority for rejection. These master gauges are checked each day with the renowned Johanssen gauges, first imported into the United States by Cadillac. Two Johanssen gauge blocks fit so perfectly together that they become as one single block and can be separated only with force.

After all these expensive precautions in manufacturing, one might reasonably ask, "How can Cadillac and La Salle be offered at such amazingly low prices?" The answer lies in the continued desertion of the fine car field to Cadillac. As the volume of productive output rises, the unit cost of that output falls.

A second important reason for Cadillac-La Salle value relative to price is efficiency in manufacturing. Cadillac was

the first manufacturing concern to employ interchangeable parts in an automobile. It has made great strides in furthering this technique in manufacture. Also Cadillac uses the most modern multi-purpose machinery that has ever been developed.

An interesting illustration of Cadillac efficiency is seen at the dynomometer test. Before assembly in the chassis, every engine is placed on blocks in order to test its efficiency under operating conditions. It is started and run on illuminating gas. The electricity generated by the dynomometer is conducted to the factory power plant to be used for lighting and operating purposes.

Cadillac and La Salle represent quality at a high rate of productivity and efficiency. These cars offer values unobtainable, though expected, of cars in the highest price brackets.

SUPERIORITIES OF CADILLAC V-TYPE DESIGN

The V-type engine, which imparts such outstanding features of performance to the 1937 line of cars, could only be built by Cadillac. This company recognized the outstanding advantages of V-type design as early as 1914 and has concentrated on the efficient development of it ever since. That, today, a precision built V-type engine has been developed which can be incorporated in a car selling at so low a price is a great tribute to the Cadillac Engineering Department.

Recognized throughout the world for their engineering "firsts" these outstanding engineers have never abandoned their primary interest of developing the V-type engine—the fundamentally perfect design for engines of eight cylinders or more.

From 1934 through 1936 Cadillac designed, manufactured and produced a straight eight La Salle to provide its retail organization with a product that combined the appeals of a finely built car at a relatively low price. During this period it was necessary to have a car at a price that would provide the sales organization with a sufficient volume in spite of economic conditions.

The straight-eight type of engine was used so that this finely built car could be sold at a price below which a precision built V-type engine could then be produced. Collaborating with General Motors engineers who had long experience in the straight eight field, the Cadillac Engineering Department was able to design quickly an engine superior to other straight eights because of certain Cadillac features of design and fine methods of precision manufacture.

V-8 Developments Continued

But the development of the V-type eight was not being neglected.

For a year prior to 1934 Cadillac engineers were devoting their time to designing a precision-built V-type engine that would complement a fine body and chassis and could be sold for below $2,000.00. Because of the differences in design between straight and V-type eight cylinder engines, this was a difficult task to accomplish without compromising with Cadillac's high standards of design and manufacture.

Naturally, the engineers insisted on maintaining all of Cadillac's rigid requirements and principles.

It was not until three years after the work began that the first success of this program was evidenced—the 1936 Cadillac Series 60. This was a Cadillac car in every respect, a car with amazing performance due to its V-type engine, yet it sold for as low as $1,645.00.

For 1937, because of the further development of this program and the increased volume, Cadillac is able to produce the Cadillac-built La Salle with a Cadillac-built V-type eight cylinder engine at a decidedly lower price.

The marvelous features and performance of this car are described in other sections. They are due to the high development of the fundamentally correct 90° V-type eight cylinder design.

V-type Advantages Recognized

One of the chief advantages of V-8 design is that the main bearings carry no load originating from the inertia forces of the engine. In straight-eight design, regardless of compensators on the crankshaft, the main bearings must assume this additional load because the inertia forces cannot be offset as they are in V-type design.

As early as 1922 the eminent automotive engineer, C. F. Kettering, said "With the unlimited funds and with the vast resources of the General Motors Corporation at my command, were I assigned the task of building another truly fine motor car engine where the size of the engine required of itself eight cylinders, it must needs be of the 90° V-type design."

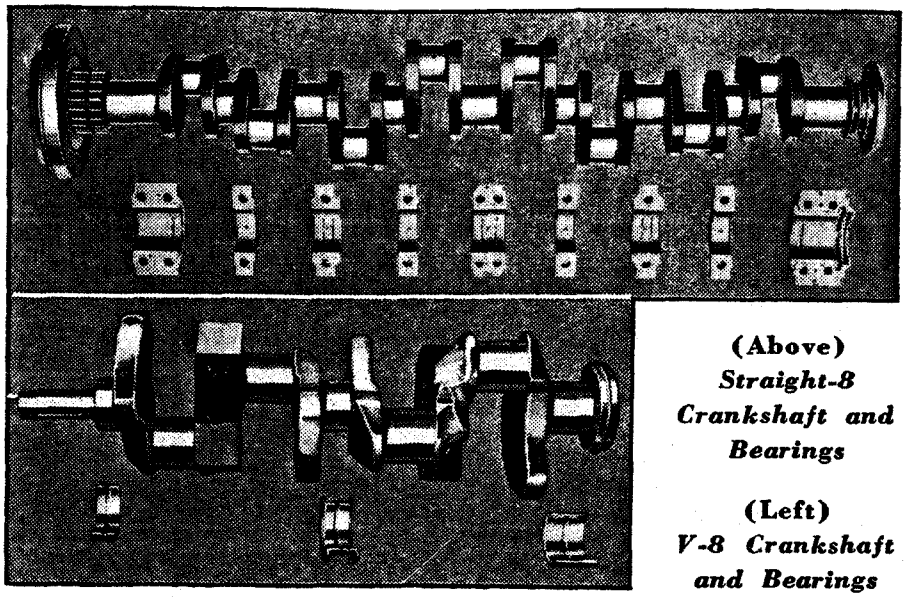
For over two decades Cadillac has been the builder of a fine V-type eight cylinder engine. It has been of 90° design and in developing it Cadillac has used Mr. Kettering's formula of utilizing the vast resources and funds of General Motors as well as their own unparalleled experience in this field.

The fundamental advantages of a V-8 engine over other designs are:

1. Simplicity of design:
   a. Longer life.
   b. More economical maintenance.
   c. Greater operating efficiency.

2. Compactness:
   a. Smoother operation.
   b. Permits most efficient functioning of fuel, cooling and lubricating systems.
   c. Grants more body space per inch of wheelbase.

To prove the simplicity of V-8 design it is only necessary to look **inside** the engine and make a comparison in a like manner with the working parts of a straight eight.



(Above) ***Straight-8 Crankshaft and Bearings***

(Left) ***V-8 Crankshaft and Bearings***

The simplicity of the Cadillac crankshaft is obvious, with its three main bearings of extremely wide surfaces. Contrast these with the nine small bearings of the eight-in-line crankshaft. The wider V-eight bearing surfaces retain oil better and are easier to lubricate than the nine narrow bearings of the straight eight engine. Consider also how much easier it is to properly align only three bearings of the Cadillac crankshaft instead of the nine used in the straight eight design.

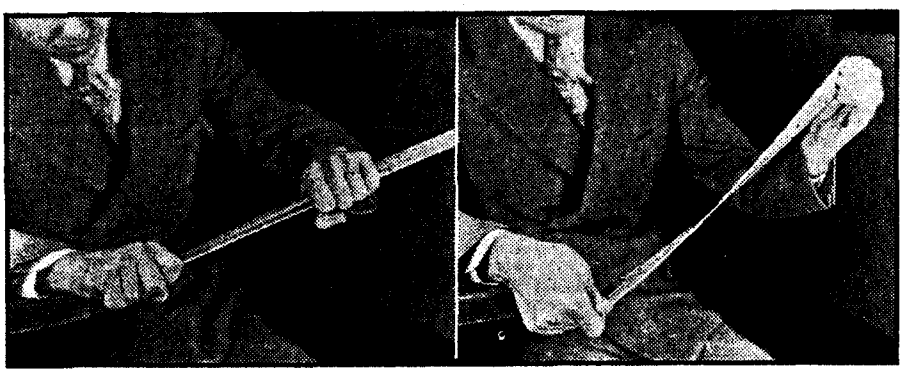
In the Cadillac 90° V-type engine the short compensated crankshaft, its length considered, has a much greater relative diameter than the in-line eights and is therefore much better able to withstand the great stresses imposed on it by the explosive forces of the engines and the centrifugal forces set up by the rapid crankshaft revolutions.

For these reasons the Cadillac V-type engine is assured longer life and its maintenance is far more economical than it is possible to achieve with straight eight operation.

Operating smoothness, to a degree not approached in other types, is also an asset of V-8 design. This smoothness

results largely because of two features in the Cadillac V-type engine. First, a characteristic of a 90° angle in V-8 engine design is its cancellation of inertia forces of the pistons which, as a consequence, eliminates this source of vibration giving the Cadillac and La Salle V-8 engines unexcelled high speed smoothness.

Second, torsional vibration of the crankshaft is avoided. Torsional vibration of a crankshaft is the rapid alternate twisting, first in one direction and then in the other, set up by the power forces applied to it. The Cadillac crankshaft, being short and rigid, is not affected by these twisting forces as are the long crankshafts of all straight eight engines. The logic of this is easily demonstrated with an ordinary desk ruler.



One Half Ruler Twist. *Full Ruler Twist.*

First, by holding the ruler at its extremities and exerting pressure (force) in different directions with each hand, observe the amount of twist developed. This demonstrates the effect the forces developed in a straight eight engine have upon the crankshaft. Now try the same procedure using only half the ruler's length and see how much more resistance is

One Half Ruler Snap. *Full Ruler Snap.*

offered to the twisting force. This simple demonstration clearly shows why the longer shaft is less capable of withstanding twisting forces than the short rugged crankshaft used in Cadillac V-type engines.

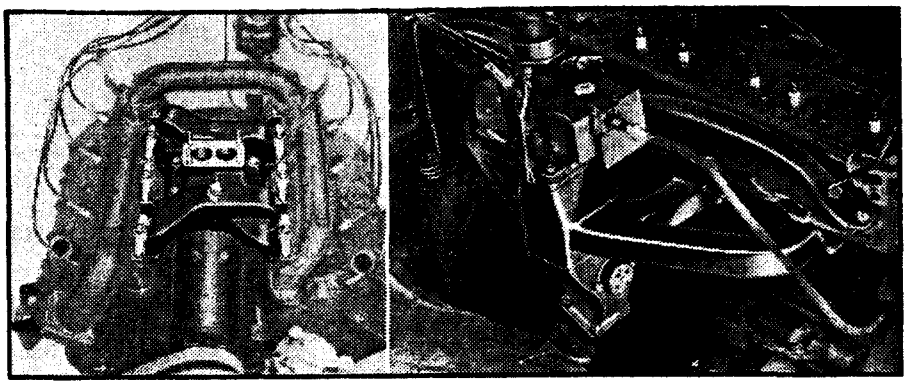
Operating smoothness from lack of vibration in V-type design can also be easily demonstrated. By holding the ruler on the desk so that as much as possible of its length projects over the edge and snapping the free end, the possibility for development of crankshaft vibration in straight eight design is shown. Now reduce the overhang of the ruler from the desk by half and see how rigid the ruler remains when attempts are made to snap it.

Because of this freedom from vibration in a short object the crankshaft of the Cadillac V-type eight provides smoothness of performance impossible in other eight cylinder designs.

Another advantage arising from the compactness of the V-type engine is the greater efficiency with which the fuel, cooling and lubricating systems operate.

V-8 Features Most Efficient Carburetion

The disposition of the carburetor in relation to the two blocks of cylinders is largely responsible for its efficient operation. By placing the carburetor between the cylinder blocks the farthest cylinder is only about half the corresponding distance that it is in straight eight engines.



V-8 Equalized Manifolds. *Straight-8 Unequal Manifolds.*

This eliminates the need for long intake manifolds in which vaporized fuel has time to condense.

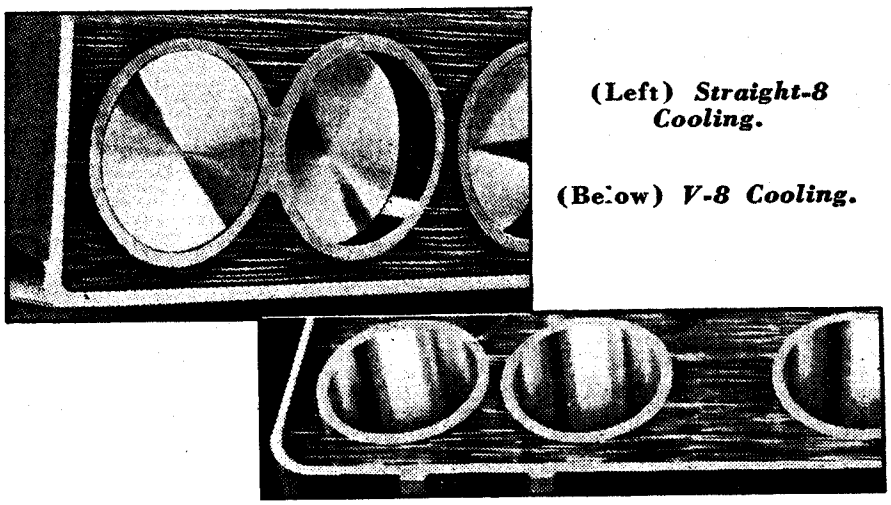
The location of the Cadillac carburetor between the cylinder blocks is clearly the most suitable position if perfect distribution of gases to the cylinders is to be obtained.

Cadillac V-8 Cooling Better

Cadillac V-type design also features a more positive and efficient water cooling system than it is possible to design

into a straight eight engine. In the Cadillac type V-8, water enters the right hand cylinder block under high pressure and half is by-passed to the left hand block. Cool water is thus introduced at the front of the right hand block and at the center of the left hand block so that the maximum distance which the cooling water must travel is far less than in a straight eight engine. The variation in temperature throughout the engine is thus about half of that in a straight eight engine. In straight eights the water enters the block at the front and travels the full length of the engine before cooling the rear cylinders. This results in hotter running rear cylinders and causes uneven cylinder temperatures as the water naturally becomes hotter and loses its cooling capacity as it passes each of the eight-in-line cylinders.

Another great advantage in cooling over straight eight design arises from the fact that a V-type engine permits a greater water cooling area around the cylinders and valves.



(Left) *Straight-8 Cooling.*

(Below) *V-8 Cooling.*

Because of the great length of a straight eight engine, which must be fitted into a limited space, the water areas must be restricted in size and cooling efficiency is lost.

The highly efficient cooling system of the Cadillac type V-8 improves operating efficiency, reduces oil consumption and avoids warping of cylinder bores and valve seats caused by overheating. Only V-type design lends itself to such efficiency in cooling system design.

V-8 Better Lubricated

Lubrication of the moving engine parts is also more efficiently accomplished in V-type eights than in straight eights because of the basic advantages of its design.

In addition to the features of fewer main bearings to lubricate, and their wider surfaces which retain oil better, there are other advantages inherent to V-type design. The passages through which the oil must travel are shorter than in straight eight design. This reduces chances of lubrication failure and there is less chance of the oil passages becoming plugged up and the oil is not retained in them so long.

The shortness of the V-8 crankcase also insures positive lubrication. When straight engines operate on grades or decelerate from touring speeds the oil flows to one end of the crankcase which may result in the engine being oil starved. A bearing operating without oil may be burned out in one or two seconds which proves the damage which can result from such action. In a V-type engine such an accident is impossible as the crankcase is too short to permit the oil level from uncovering the oil pump inlet.

In the Cadillac type V-8, dependability of the lubrication system is assured by elimination of oil lines. In this type engine, oil is directed under pressure through drilled holes in the crankcase removing the danger of engine failure from broken oil lines which may develop in straight eight engines using a complicated piping system for lubricant circulation.

Because of its compactness the short V-type eight requires few camshaft bearings which further simplifies the lubrication system, insures dependability, and decreases operating costs.

V-Type Design Saves Space

One of the chief advantages of V-eight design is the power it develops for each cubic inch of engine compartment space. This not only gives Cadillac built cars more available body interior room for each inch of wheelbase, but also permits the use of an engine of greater power and displacement, which results in the unparalleled performance of the 1937 line of cars.

Compare the 322 cubic inch displacement of the new La Salle and 346 cubic inches of the new Cadillac 60 with straight eight engines on wheelbases similar to the 124" length of these models. The Cadillac built V-8 engines develop more power than those in any cars of a similar size.

With straight eight design it is impossible to obtain such

power and efficiency without greatly increasing the under-hood space. If it were attempted to produce a straight eight engine with a similar displacement in a short engine space, the bore would have to be small and the stroke long. This would result in very high piston speeds, as is found in big straight eight engines of today, with consequent increased wear and decreased life. Such an engine would be entirely undesirable. Should the bores be widened instead of the stroke lengthened, more engine space would be required. To accommodate such an engine, hood length would also have to be increased and passenger space decreased.

With Cadillac V-eight design the engine develops more power, runs at a lower speed, and leaves more room for interior body space than any straight eight engine does on a comparative wheelbase.

LOOK AT LASALLE'S IMPORTANT SELLING FEATURES

Body Features

New Streamlined Beauty.

Luxurious Interiors.

Unisteel Turret Top Construction.

Increased Head, Leg and Seat Room.

Engine Features

Inherently Balanced Cadillac-Built V-8 Design.

Rigid Crankshaft.

Short, Rigid Crankcase.

Complete Lubrication.

Equalized Manifolding.

Peak Load Generator.

Electrically Controlled Choke.

Chassis Features

124-Inch Wheelbase.

Hypoid Axles.

More Rugged Transmission.

More Rigid Frame.

Two Ride Stabilizers.

Knee Action Wheels.

Center Point Steering.

LA SALLE FOR 1937

La Salle is unquestionably destined for unrivaled leadership in the lower brackets of the medium priced automobile field in 1937. This all-inclusive statement is not based on enthusiasm and far-fetched imagination. It is founded on facts which are fundamental in increasing or decreasing the sale of any automobile. The success of its acceptance depends upon the car's quality, style, size and price. The proof of the first three of these important factors in relation to the new La Salle is in glaring evidence on each of the following pages devoted to a description of this outstanding product of Cadillac manufacturing. Study these features carefully. Look at La Salle and satisfy yourself that La Salle's performance, economy, roomy and luxurious interiors, comfort and styling are beyond any reasonable comparison with any competitive car in or above its price class.

Cadillac guards its reputation in the fine car field with every possible degree of vigilance. Its reputation is the life blood of its successful existence. Cadillac would not lend its name to anything less than the highest quality known to automotive manufacture.

Cadillac enters an entirely new price field with the new La Salle. In so doing, La Salle salesmen have an opportunity to obtain a much greater share of the total available automobile business for 1937 than they have heretofore obtained. As the scale of the automobile price moves downward from $2,000.00, the unit sales of cars increase by great amounts. These figures are particularly illuminating as the scale approaches the low price fields. For example, in 1935, the last full year for which complete registration figures can be obtained, the combined total of automobiles sold in the $1,000 to $1,100 bracket amounted to 45,000 units. In the next lower bracket of $900 to $1,000, there were 142,000 units sold. Even though the price was only $100 less, the total available market for these cars almost tripled.

Figures available for the first six months of 1936 show a similar relationship between these two price brackets, but the unit sales have more than doubled because of increased consumer spending for automobiles. There will be approximately 285,000 cars sold this year in the range of $900 to $1,000. There is every reason to believe there will be an-

other large increase in sales volume within this price range during 1937. Even though unforeseen events should reverse this trend the new wider market for La Salle in 1937 will yield a greater profit making opportunity than has ever been known in La Salle history.

A complete new Cadillac-built La Salle with countless mechanical improvements and inspiring beauty is offered for the first time in this market of unusual sales opportunities. It will not sell itself. Only increased concentration of sales effort will convince the increased number of possible La Salle buyers that this is an unrivaled extra-value car.

LA SALLE PERFORMANCE

The superiority of V-8 design over the eight-in-line type is borne out most clearly in a comparison of La Salle's outstanding performance, durability, economy, and handling ease with the previous model.

The new La Salle is powered by a 30% larger V-8 engine of 322 cubic inch displacement. This engine develops over 125 horse power at 3400 R.P.M. as compared to the 1936 Series 50 engine which developed 105 horse power at 3600. Bore and stroke of the new engine are 3⅜" x 4½". Important refinements made in the 322 cubic inch engine used on the new La Salle are, in addition to the superlative V-type design: improved carburetion, improved valve silencer action, three-point engine mountings for smoothness and lower engine speeds for improved serviceability.

The remarkable speed, acceleration and hill climbing ability of these new cars is due to higher power to weight ratios. The new La Salle has 8.1 cu. in. of displacement per 100 lbs., while the 36-50 had 6.6 cu. in. displacement per 100 lbs. of car. As a result, low speed acceleration is improved 20%. In considering this percentage figure it should be remembered that 10% is the difference between a very good automobile and a poor one.

What is more important is the greatly improved accelerative ability at touring speeds. For example, at 80 miles per hour the acceleration of the new La Salle has been improved by 250%.

Supplementing La Salle's spectacular performance is its unexcelled roadability, a most important improvement for high speed driving safety and comfort. The new La Salle is

as steady at 80 miles per hour as it is at 30! A number of new features contribute to this remarkable steadiness, among them: 3-point engine mountings, front ride stabilizer, improved shock absorbers and zero caster angle.

Part of the advantage gained in performance by the higher power to weight ratio has been taken in increased accelerative ability; part also contributes to lower engine speeds by permitting reductions in rear axle ratios. The 36-50 axle ratio was 4.55 to 1; the 37-50 is 3.92 to 1. For this reason the engine speed has been reduced by 460 engine revolutions per mile. The advantages of overdriving gears are obtained constantly and at all speeds. Overdriving gears complicate the transmission mechanism which increases the opportunity for maintenance costs and reduces its operating efficiency. No thought need be given to a control button on the instrument board or a fourth position of the shifting lever. The new La Salle owner receives all the advantages of low engine speeds at no additional cost in the delivered price.

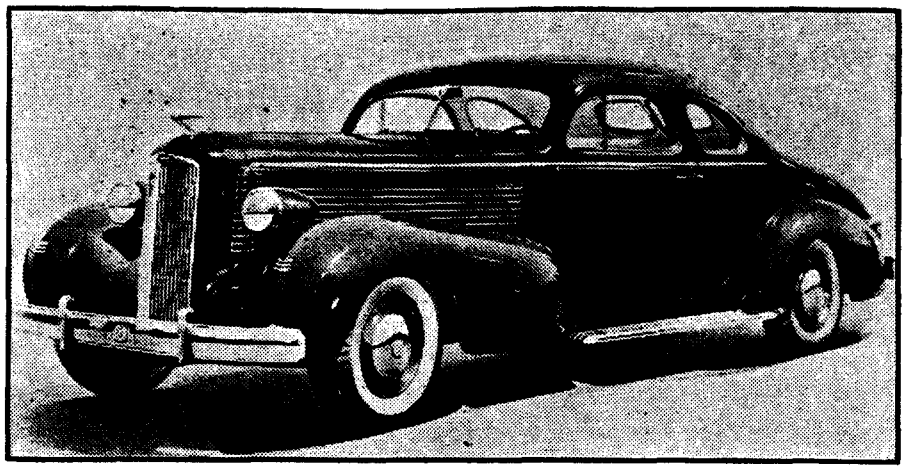
These reductions in engine speed greatly improve gasoline and oil economy.

Numerous repeated tests show engine wear is reduced by 25% and engine noise by approximately the same amount. Maintenance costs are greatly reduced and engine life lengthened. All one can hear at high speeds in the new La Salle is the whistle of the wind. It may be said conservatively that La Salle is the outstanding performer of the year. La Salle recognizes only one superior performer, the Series 60 Cadillac.

BODY STYLES AND EXTERIORS

A casual glance at the new La Salle for 1937 confirms its undisputed record as style leader for the automotive world. An advanced degree of modernism and good breeding are reflected in every detail of La Salle's long, sweeping lines and smooth contours. La Salle owes no affiliation to outmoded exterior design. This new car personifies popular approval of something new and different, and portrays vividly its agile performance.

The new La Salle is offered in five body styles, including a new Five Passenger Convertible Sedan.

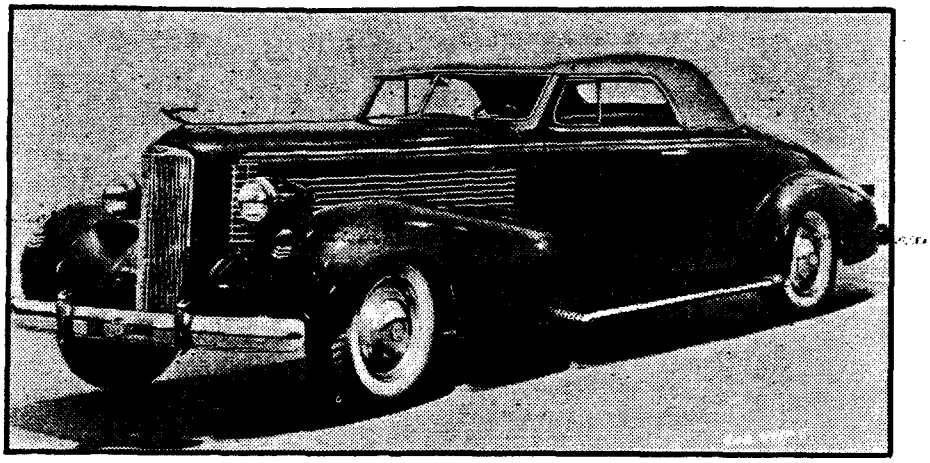


LA SALLE TWO PASSENGER COUPE

	Dimensions
Front Seat Width (Hips)	53″
Front Seat Width (Shoulders)	53¾″
Front Seat Cushion to Floor	14⅜″**
Front Seat Depth	18″
Dash to Front of Front Seat	26½″
Front of Front Seat to Clutch Pedal	18¾″*
Steering Wheel to Front Seat Cushion	6″
Steering Wheel to Front Seat Back	13½″*
Headroom—Cushion to Roof—Front	39½″
Headroom—Floor to Roof	50″
Inside Maximum—Body Width	55″
Front Door Width	41¼″
Width Over Front Fenders	74⅜″
Width Over Rear Fenders	72 3/16″
Overall Height	67⅜″
Overall Length—Bumper to Bumper	201¾″

* Dimensions taken with front seat in full rearward position —Seat may be adjusted 4″ forward.

**Rear of front seat rises ¾″ with 4″ forward movement.

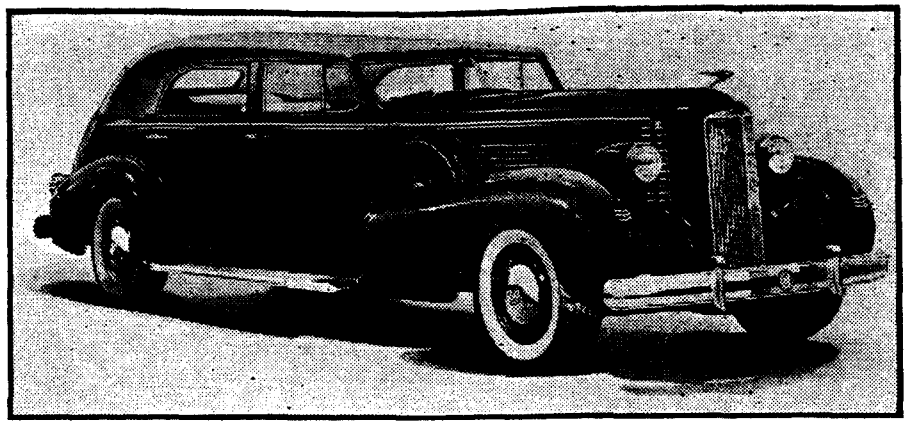


LA SALLE CONVERTIBLE COUPE

	Dimensions
Front Seat Width (Hips)	53″
Front Seat Width (Shoulders)	53¾″
Front Seat Cushion to Floor	14⅜″**
Front Seat Depth	18″
Dash to Front of Front Seat	26½″
Front of Front Seat to Clutch Pedal	18¾″*
Steering Wheel to Front Seat Cushion	6″
Steering Wheel to Front Seat Back	13½″*
Headroom—Cushion to Roof	36″
Inside Maximum—Body Width	55″
Front Door Width	41″
Width Over Front Fenders	74⅜″
Width Over Rear Fenders	72 3/16″
Overall Height	66⅛″
Overall Length—Bumper to Bumper	201¾″

* Dimensions taken with front seat in full rearward position — Seat may be adjusted 4″ forward.

**Rear of front seat rises ¾″ with 4″ forward movement.

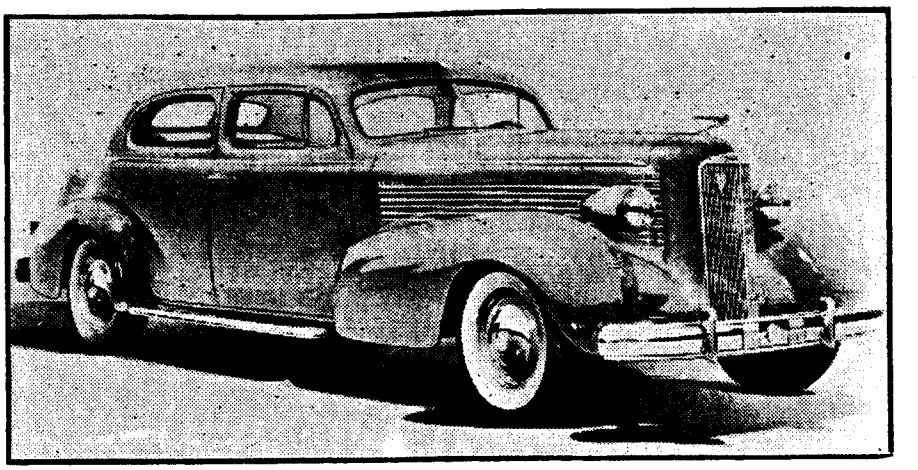


LA SALLE FIVE PASSENGER CONVERTIBLE SEDAN

	Dimensions
Front Seat Width (Hips)	53½"
Rear Seat Width (Hips)	47"
Front Seat Width (Shoulders)	53¾"
Rear Seat Width (Shoulders)	49"
Front Seat Cushion to Floor	14⅛"**
Rear Seat Cushion to Floor	15¼"
Front Seat Depth	18⅝"
Rear Seat Depth	20"
Dash to Front of Front Seat	25¼"*
Back of Front Seat to Front Rear Cushion	13⅝"*
Front of Front Seat to Clutch Pedal	17¾"*
Steering Wheel to Front Seat Cushion	6¼"
Steering Wheel to Front Seat Back	13"*
Headroom—Cushion to Roof—Front	37¼"
Headroom—Cushion to Roof—Rear	37"
Headroom—Floor to Roof	49¾"
Inside Maximum—Body Width	55"
Front Door Width	34¼"
Rear Door Width	27⅜"
Width Over Front Fenders	74⅜"
Width Over Rear Fenders	72 3/16"
Overall Height	66¾"
Overall Length—Bumper to Bumper	201¾"

* Dimensions taken with front seat in full rearward position —Seat may be adjusted 4" forward.

**Rear of front seat rises ¾" with 4" forward movement.

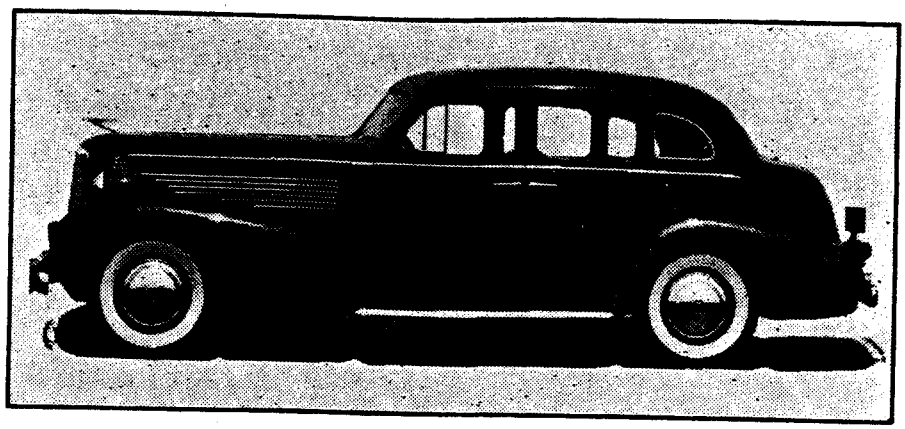


LA SALLE FIVE PASSENGER TWO DOOR TOURING SEDAN

	Dimensions
Front Seat Width (Hips)	53″
Rear Seat Width (Hips)	47″
Front Seat Width (Shoulders)	53¾″
Rear Seat Width (Shoulders)	53⅞″
Front Seat Cushion to Floor	14⅜″**
Rear Seat Cushion to Floor	14½″
Front Seat Depth	18″
Rear Seat Depth	20″
Dash to Front of Front Seat	26⅛″*
Back of Front Seat to Front Rear Cushion	15¼″*
Front of Front Seat to Clutch Pedal	18¾″
Steering Wheel to Front Seat Cushion	6″
Steering Wheel to Front Seat Back	13½″
Headroom—Cushion to Roof—Front	37¾″
Headroom—Cushion to Roof—Rear	36½″
Headroom—Floor to Roof	50¼″
Inside Maximum—Body Width	55⅝″
Front Door Width	
Width Over Front Fenders	74⅜″
Width Over Rear Fenders	72⅛″
Overall Height	67⅝″
Overall Length—Bumper to Bumper	201¾″

* Dimensions taken with front seat in full rearward position —Seat may be adjusted 4″ forward.

**Rear of front seat rises ¾″ with 4″ forward movement.



LA SALLE FIVE PASSENGER TOURING SEDAN

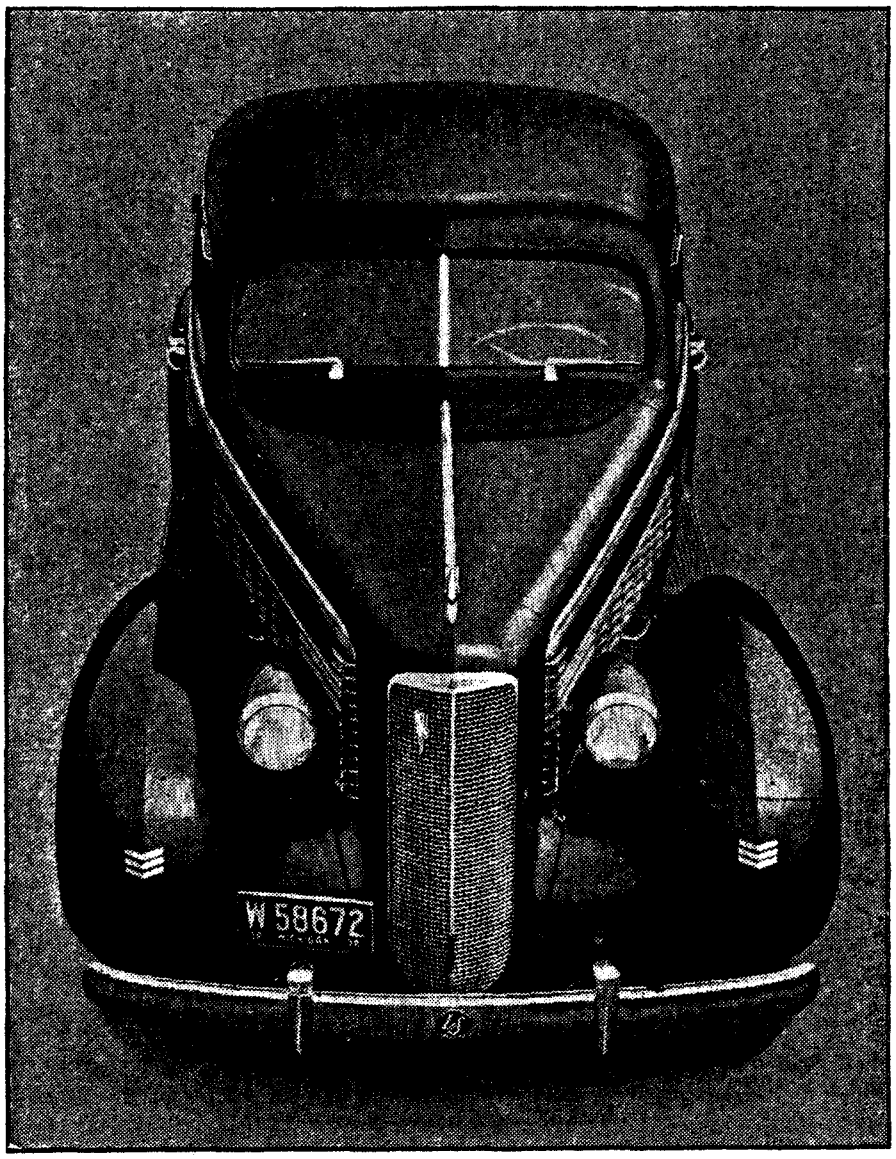
	Dimensions
Front Seat Width (Hips)	53″
Rear Seat Width (Hips)	47″
Front Seat Width (Shoulders)	53¾″
Rear Seat Width (Shoulders)	53⅞″
Front Seat Cushion to Floor	14⅜″**
Rear Seat Cushion to Floor	14½″
Front Seat Depth	18″
Rear Seat Depth	20″
Dash to Front of Front Seat	26⅛″*
Back of Front Seat to Front Rear Cushion	15¼″*
Front of Front Seat to Clutch Pedal	18¾″*
Steering Wheel to Front Seat Cushion	6″
Steering Wheel to Front Seat Back	13½″*
Headroom—Cushion to Roof—Front	37¾″
Headroom—Cushion to Roof—Rear	36½″
Headroom—Floor to Roof	50¼″
Inside Maximum—Body Width	55⅝″
Front Door Width	33¾″
Rear Door Width	27⅝″
Width Over Front Fenders	74⅜″
Width Over Rear Fenders	72⅛″
Overall Height	67⅝″
Overall Length—Bumper to Pumper	201¾″

* Dimensions taken with front seat in full rearward position —Seat may be adjusted 4″ forward.

**Rear of front seat rises ¾″ with 4″ forward movement.

FRONT VIEW

The radiator and grille is a striking example of style innovation by La Salle. The die-cast honeycombed design warrants its additional expense since it lends an appearance of fine car quality and solidity in keeping with Cadillac heritage that cannot be effected in the cheap, conventional single stamping widely used by other cars. An especially



Front View New La Salle.

designed V-8 emblem and the famous La Salle coat-of-arms add a touch of color to the brilliant chrome of the grille.

The large bullet-type headlamps fit closely to the sides of the radiator casing as if they were an integral part of the casing's construction. The headlamps are ducoed to

match the body and add a finished touch to the car's fleet appearance.

Massive fenders with a new, distinctive high center ridge sweep low over the wheels and shield the running gear and chassis from view. Bumpers are of the wide, spring bar type and are mounted through rubber-insulated grommets to the front frame arms. Two sturdy guards are attached to both front and rear bumpers and both reflect shock-proof utility as well as beauty.

The smooth steel Turret Top sweeps back from the wind shield and provides additional lasting beauty, unmarred by the conventional fabric insert panel which cracks and fades after weathering.

The V-shaped windshield is set at a rakish angle of 39° in keeping with La Salle advanced styling. This increased slope and sharper vee provides much more visibility for the driver because windshield posts may be set further rearward, thus avoiding a dangerous blind spot, common to the more upright windshields. The clear vision safety glass is mounted in rubber channels and securely cemented to the cowl structure for permanent sealing against weather and rattles. The outer center division moulding of the windshield is brightly chromed and aligned with the attractive hood moulding which accentuates long hood appearance. Double windshield wipers, with concealed mechanism, are neatly mounted at the bottom of the windshield. The forward opening cowl ventilator is screened and is tightly sealed by a one piece rubber gasket. It is fitted with the over-center type of locking mechanism.

SIDE VIEW

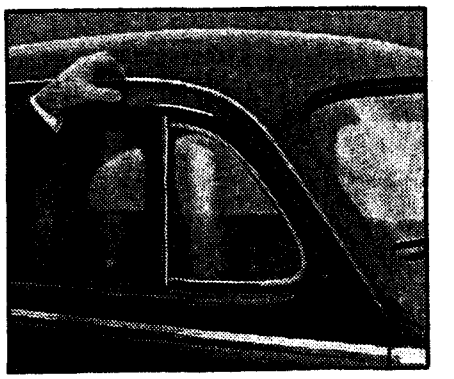
One of the important elements in La Salle's advanced styling is the distinctive die-cast hood louvre treatment. This new treatment reflects excellent good taste and accentuates the new La Salle's dynamic lines. An added touch of finish is reflected in the chrome "La Salle" name in small letters on the side of the hood near the cowl.

New drip mouldings fit smoothly with the Turret Top contours and are ducoed to match. These extend from the bottom of the front pillar up and over the doors and rear quarter windows.

A chromed belt moulding of stainless steel extends from the radiator casing to the rear of the car. It is of modern colonial design and matches the long, closed grip door handles. These sweep close to the body, eliminating the danger of catching clothes.

Running boards have also received beauty treatment in the use of chromed finishing plates. They are separate from the fenders which prohibits the collection of snow, ice and dirt which is unsightly and damaging to the fender finish.

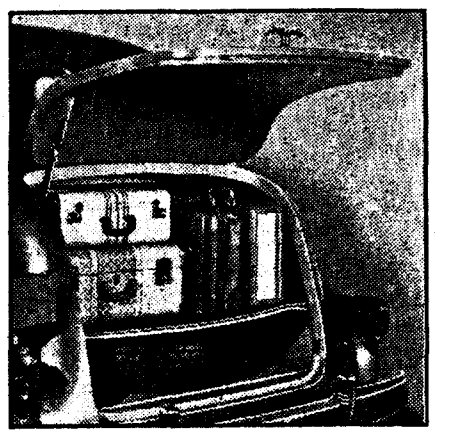
The rear fenders' appearance reflects their sturdiness and are fully skirted. The new tail lamps fit smoothly into the rear fenders and are an object of beauty as well as utility. The lens are semi-octagonal in shape, which throws light well over the road, making backing at night easy. These also provide unusual illumination for the rear of the car — another factor in night driving safety. Directly beneath each lamp is a red reflector button as a factor of safety in case of burned out bulb.



Deep Drip Moulding.

REAR VIEW

The large, built-in trunk is form fitting and an integral part of the body. The full length trunk lid is held by two heavy external hinges and when open is supported by a self-locking spring arm. In this position immediate access to the trunk interior is afforded where there is plenty of room for four cases. The spare tire is carried beneath the platform for easy removal.



Accessible, Roomy Trunk.

Two passenger Coupe models carry the spare tire in the same manner and also have a large luggage compartment behind the interior seat. The rear deck lid now opens from the body floor level facilitating access to the spacious, watertight rear luggage compartment. The

self-locking spring arm support holds the lid firmly in nearly upright position and may be easily released by lifting the lid slightly before closing. The Convertible Coupe has a separate tire compartment and lid below the rumble seat.

A heavy utility bumper with upright guards protects the rear of the car. They are chromed and the La Salle emblem is inserted in the center.

BODY INTERIOR

The La Salle Fisher Body interiors have been newly styled for greater luxury and comfort. The floors of both compartments are level and afford increased legroom. A long, comfortable foot rest is recessed in the back of the front seat for extra unobstructed floor space. Newly designed garnish mouldings of Shadow Metallic color with a Kasha Beige insert panel have a very modern appearance. Hardware also has been tastefully designed in the colonial mode, with a new snap spring to insure secure holding of handles in place. The instrument panel has been redesigned and is strikingly handsome with instruments grouped for quick reading.

Upholstery and Trim

Unusual quality is afforded La Salle buyers in the new upholstery options. There are tan or gray Bedford Cords or plain Broadcloths to choose from, with harmonizing headlining, side-walls and carpeting. The upholstery fabrics are 100% wool and are noted for their long wearing qualities.

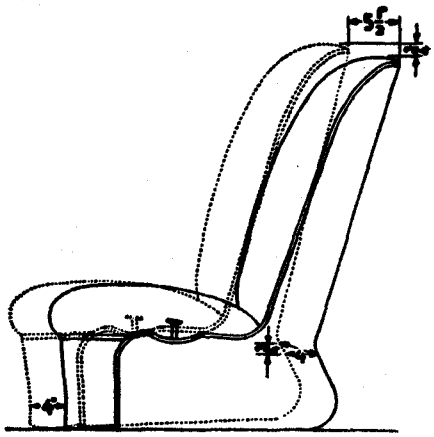
An important feature of these new La Salle interiors is their fine tailoring. Decorative beading is used on the door side walls and front seat backs. This beading is backed with rubber which retains its shape and does not become soggy in damp climates like the cheaper pressed paper used on other cars.

The Two-Passenger Coupe has two novel opera seats which fit snugly into the back wall and fold upright on two chrome hinges. This affords additional luggage space when they are not in use. When drawn into position, they face each other. Wool padded springs are used in the seat constructions for comfortable riding.

For the La Salle Convertible coupe there are six color options of leather and two of whipcords. When whipcord is selected, it is used on the door panels, arm rests, and luggage compartment walls, as well as on the seats and cushions. Leather trim jobs use genuine cowhide on door panels, arm rests, seat cushions and backs. The back of the front seat luggage compartment walls and rumble seats are covered in closely matched durable material.

Front Compartment

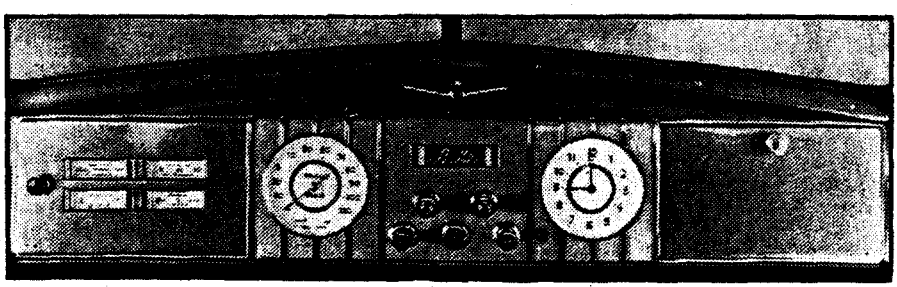
Large doors permit quick, easy access to the front compartment. Driver and passengers relax on soft Marshall type springs covered with thick combination wool padding. A new type of trip latch adjustment permits the back of the front seat to rise 3/4" with a forward movement of the front seat. The top of the seat back also tilts forward 1 1/2", moving 5 1/2" forward when the front of seat cushion moves 4". For people of small stature, the need and annoyance of an extra cushion is eliminated. Any driver can select the exact position most to his or her liking.



Multiple Front Seat Adjustment.

Arm rests are provided on both doors, and are so designed to support the arm in a restful position.

The newly designed, extremely costly instrument panel is truly a work of art. It is finished in Shadow Metallic to match the mouldings and door sills. The panel has a raised effect at



Beautiful Clear Vision Instrument Board.

the center finished in Kasha Beige, with wide vertical chrome strips located on both sides of the clock and speedometer.

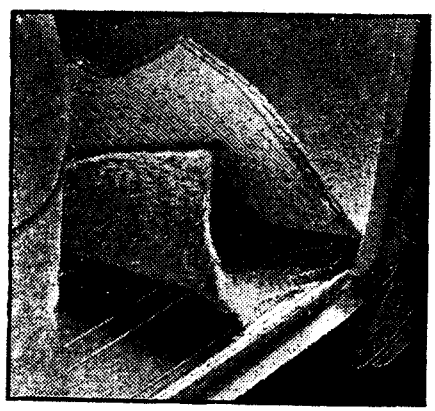
From a practical standpoint, this panel has exceptionally

clear visibility. The necessary instruments for safe driving, including speedometer and headlamp beam indicator and water temperature, oil pressure, generator charge and fuel gauges are grouped conspicuously and attractively before the driver. Centrally positioned in the panel is the ignition lock switch with a cigar lighter and map light above, and the hand throttle and headlamp switch below. To the right of this group is the very large electric clock.

A combined rheostat and switch provides bright or dim instrument lighting and is located on the bottom flange of the instrument board to the left of the steering column. The windshield control switch is located on the center moulding forward of the ash receiver. The wipers always operate regardless of engine load or speed. At the top of the panel, above the central group of controls, is a polished escutcheon plate etched with the name "La Salle." If radio is desired, this plate is removed to accommodate the radio controls. The right hand side of the panel is devoted to a spacious package compartment and is equipped with a lock. The hand brake control is mounted on the left of the steering column immediately beneath the instrument panel, where it is out of the way, yet quickly available when needed.

There are three features embodied in the front compartment which will appeal to new La Salle owners. There is a large ash receiver equipped with snap lid surmounting the center of the instrument board, within easy reach of driver and passengers.

A second feature promoting convenience and driving safety is the two large sun visors operating on a swivel that they may be moved quickly to the desired position. They are cloth-covered to match upholstery and trim, and are richly reinforced with leather.



Front Compartment Carpet and Padding.

Rounding out the luxurious appointments, the floor is covered with a heavy, rich carpet and is fitted carefully around all openings to eliminate the inflow of drafts and dust. To prevent scuffing and assure longer wear, the carpet is reinforced with leather beneath the foot pedals.

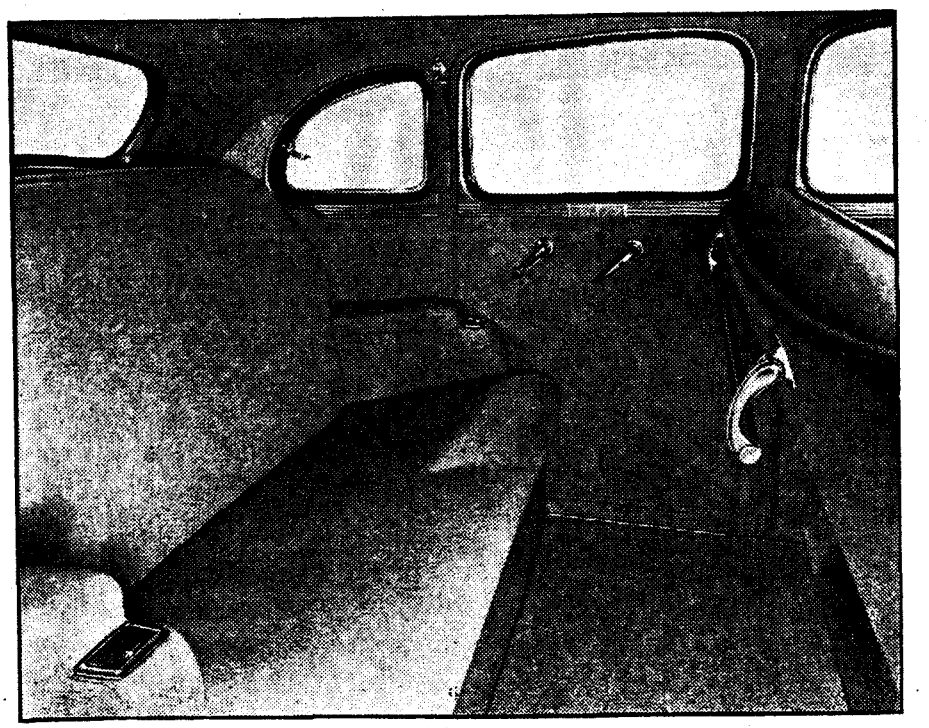
La Salle's front compartment carpet is definitely a luxurious fine car feature—far more richer than the rubber mats used on competitive cars.

Corresponding with other fittings, the streamlined steering wheel is exceptionally neat in appearance. It is extra strong, the hub and center being an expensive die-casting and the comfortable rim is built up from a solid steel base, centered and finished with moulded rubber. There are no controls to catch on clothes or interfere with driving. The horn button has improved rattleproof and breakproof construction. It is finished in black to match the steering wheel and is attractively ornamented with a design which features the name "La Salle" in chrome.

A V-type windshield of clear vision safety glass affords a greater scope of driving vision. Its slope has been increased to 39° which eliminates glare and reflections from both front and rear. A rear view mirror permits an unusually clear view of the road behind, through the wide rear window.

Rear Compartment

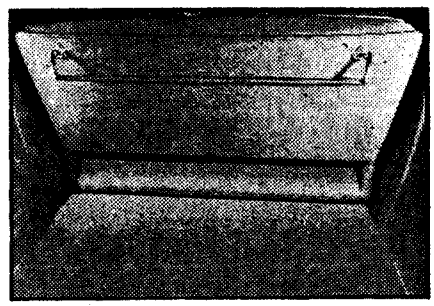
La Salle's costly construction is in evidence everywhere in the enlarged rear compartment of the new La Salle. There is an abundance of rear seat room which permits three



Rear Compartment: La Salle Touring Sedan.

persons to relax in comfort without crowding. Particular attention has been given to appointments to insure maximum utility as well as convenience and ease.

Like the front compartment, the rear seat back is shoulder high and is expertly fitted with coil springs and thick padding for greatest bodily comfort. The extra comfort of the deep, resilient seat cushions is due to the use of expensive Marshall type springs covered by a heavy wool padding beneath the rich, wrinkle-free upholstery. There is no protruding channel in the floor. It is thickly carpeted and padded as is the footrest recessed in the back of the front seat. The robe rail is carpet covered and recessed in the back of the front seat.



Full Width Footrest and Carpet Covered Robe Rail.

Soft, wide arm rests are built in at either side at a higher and greater angle to accommodate the arm's natural, restful position. Recessed in front of each arm rest is a conveniently accessible ash receptacle with snap lid. Narrow pillars and wide, clear, safety glass windows permit unobstructed vision. The rear quarter window has an easily operated latch in order that the rear portion of the window may be pivoted outward providing draftless ventilation. A rear window curtain is out of view behind the rear seat and may be drawn upward and secured with a chrome fitting. Padded assist straps are handily positioned on both rear door pillars. A dome light of colonial design to match the hardware is in the center of the roof operates from a switch on the right center pillar. Simply, but tastefully treated, the rear compartment is an additional reflection of quality and modern appearance which makes the name of La Salle the criterion of motor car styling.

FISHER NO-DRAFT VENTILATION

Fisher No-Draft Ventilation is a major feature of convenience and comfort. This unexcelled means of ventilating cars has many outstanding features of merit; it permits an abundance of fresh air to enter and circulate throughout the car, at the same time carrying out all stale air; it has

the advantage of being individually controlled to suit the convenience of each occupant, and it prevents frosting, steaming and fogging of all windows. In the event that driver or passengers may be smoking, the interior is kept fresh and free of disagreeable fumes and odors.

In hot weather, the front ventipanes may be adjusted so as to scoop in great volumes of cooling air. This is an exclusive feature not found on any other ventilating system. Above the front doors, drip shields are installed which permit the front ventilators to be opened in inclement weather, keeping out rain or snow. Edges of the drip shields are rounded for safety.

When not in use, the ventipanes fit snugly in a cushion of live rubber, making them draft, water and rattle proof.

Though widely imitated, no other system of ventilating closed car interiors is even comparable to Fisher No-Draft Ventilation—the first scientific and most dependable method of positive closed car ventilation.

ACCESSORY PRICE LIST

CADILLAC MOTOR CAR CO.
DETROIT, MICH.

OCTOBER, 1936

CADILLAC-LA SALLE ACCESSORIES

FLEXIBLE STEERING WHEEL
All 1937 Series $15.00

HEATER-DEFROSTER (HOT WATER)
All Series 24.50

INGE MIRROR
All Series 8.00

HOT WATER HEATER
All Series 19.50

HOT AIR HEATER
Series 36-37-60, 65, 70, 75 ..... 50.00
Series 36-37-80, 85, 90 ..... 60.00

LICENSE FRAMES
All Series (pair) 5.50

LUGGAGE COMPARTMENT CARPETS
Series 36-37-50, 60 (5 wheel) 5.00
Series 36-37-50, 60 (6 wheel) 7.50

LUGGAGE—TAN DUCK OR BLACK DUCOID FINISH
Gentlemen's Aviator 35.00
Ladies' Aviatrix 35.00
Wardrolette 47.50

MISCELLANEOUS
Blue Coral 2.50
Body Polish (pint) ..... .60
Bulb Kit 1.25
Dust Mitt ..... .50
Fabric Cleaner (pint) ..... .60
Flashlight 1.50
Glass Cleaner ..... .65
Handy Brush 2.00
Metal Polish (pint) ..... .60
Moto-Pack 6.25
Tire Gauge 1.50

RADIO MASTER—COMPLETE WITH AERIAL
All Series 79.50

RADIO STANDARD—COMPLETE WITH AERIAL
All Series 59.50

ROBES
Fleetwood Cloth and Crushed Plush or Alpaca $45.00
Pillow to match 8.00
Monograms 5.50
Double Alpaca Robe in Brown or Gray 20.00
Alpaca and Plush Robe 20.00

SEAT COVERS—SEA-BREEZE
All Series (per seat) 7.50

SPOTLIGHT
Closed Cars 22.00

TIRE CHAINS
6.50 x 19 ..... 8.50
7.00 x 16 ..... 8.50
7.00 x 17 ..... 8.75
7.00 x 18 ..... 8.75
7.50 x 16 ..... 8.75
7.50 x 17 ..... 8.75
7.50 x 18 ..... 9.75
7.50 x 19 ..... 9.75

TIRE COVERS—METAL
Series 37-50-60—each 15.00
Series 37-65-70-75-85—each 17.50

VENTILATING-DEFROSTING FAN
All Series 6.50

WATER-COOLED CUSHION
All Series 7.50

WHEEL DISCS—(CHROME)
All 1937 Series (each) 4.00

WHEEL TRIM RINGS
All 1937 Series (each) 1.50

1937 CADILLAC-LA SALLE ACCESSORY GROUPS

	PRICES
Group B-5 Series 37-50	$22.50
Group B-6 Series 37-50	54.00
Group A-5 Series 37-50-60-65-70-75-85	36.50
Group A-6 Series 37-50-60	66.50
Group A-6 Series 37-65-70-75-85	71.50

ACCESSORIES INCLUDED IN GROUPS

B-5
5 Trim Rings
Flexible Wheel

B-6
6 Trim Rings
Flexible Wheel
2 Metal Tire Covers

A-5
4 Wheel Discs
Flexible Wheel
License Frames

A-6
4 Wheel Discs
Flexible Wheel
License Frames
2 Metal Tire Covers

(ALL PRICES INCLUDE INSTALLATION)

CADILLAC V-8 SERIES 37-75–30%

Special—138" Wheelbase

7523S	7 Pass. Special Tour. Sedan	$2445.00	1711.50
7533S	7 Pass. Special Tour. Imperial	2645.00	1851.50

CADILLAC V-8 BUSINESS CARS SERIES 37-75–30%

138" Wheelbase

7523SL	8 Pass. Business Touring Sedan	2575.00	1802.50
7533SL	8 Pass. Business Touring Imperial	2775.00	1942.50

BASIC GROUP "X" EQUIPMENT

Ornament—Extra Tire and Tube
Air Cleaner
Group Price.....$48.00–33.60

6 Wheels and Fenderwells.....$90.00 ..63.00...

7.50-16 Royal or Firestone 6-ply black sidewall tires are standard equipment.

Additional charge for white sidewall tires $5.50 per tire. 3.50

CADILLAC V-16 SERIES 37-90–30%

Fleetwood Body—154" Wheelbase

5875S	7 Pass. Sedan	$7350.00	5145.00
5875	7 Pass. Limousine	7550.00	5285.00

6 Wheels and Fenderwells.....$120.00 84.00....

7.50-17 Royal or Firestone 6-ply black sidewall tires are standard equipment.

Additional charge for white sidewall tires $6.35 per tire. 4.00

ACCESSORY GROUPS

LA SALLE

A 5 (5 Wheel)	A 6 (6 Wheel)
Wheel Discs	Wheel Discs
Flexible Wheel	Flexible Wheel
License Frames	Tire Covers
	License Frames
Group Price.....$36.50	Group Price.....$66.50

B 5 (5 Wheel)	B 6 (6 Wheel)
Trim Rings	Trim Rings
Flexible Wheel	Flexible Wheel
	Tire Covers
Group Price.....$22.50	Group Price.....$54.00

CADILLAC SERIES 60

A 5 (5 Wheel)	A 6 (6 Wheel)
Wheel Discs	Wheel Discs
Flexible Wheel	Flexible Wheel
License Frames	License Frames
	Tire Covers
Group Price.....$36.50	Group Price.....$66.50

CADILLAC SERIES 65, 70, 75, 85

A 5 (5 Wheel)	A 6 (6 Wheel)
Wheel Discs	Wheel Discs
Flexible Wheel	Flexible Wheel
License Frames	License Frames
	Tire Covers
Group Price.....$36.50	Group Price.....$71.50

CADILLAC ACCESSORIES

Master Radio (installed complete)	$79.50
Standard Radio (installed complete)	59.50
Wheel Discs—(each)	4.00
Wheel Trim Rings (each)	1.50
Flexible Steering Wheel	15.00
License Frames (pair)	5.50
Metal Tire Covers (each) La Salle, and Cadillac Series 60	15.00
Metal Tire Covers (each) Cadillac, Series 65, 70, 75, 85	17.50
Luggage—Tan Duck or Black Duckoid Finish—Wardrobette	47.50
Ladies' Aviatrix	35.00
Gentlemen's Aviator	35.00
Luggage Compartment Rug (5 Wheel)	5.00
Luggage Compartment Rug (6 Wheel)	7.50
Hot Water Heater	19.50
Hot Water Heater—Defroster	$4.50
Hot Air Heater (Dual Register) for Cadillac only	50.00 & 60.00
Fleetwood Robe (made of identical upholstery cloth)	45.00
Double Alpaca Robe	20.00
Alpaca and Plush Robe	20.00
Seat Covers (each seat)	7.50
Tire Chains La Salle and Cadillac	8.50 to 9.75

Cadillac La Salle

PRICE LIST

FOR 1937

OCTOBER 20, 1936

•

ALL PRICES F. O. B. DETROIT
SUBJECT TO CHANGE
WITHOUT NOTICE

CADILLAC MOTOR CAR
COMPANY
DETROIT, MICHIGAN, U. S. A.

LA SALLE V-8 SERIES 37-50–27%

Fisher Body—124" Wheelbase

5067 2 Pass. Convertible Coupe 53.50 $1175.00 .857.75.
5049 5 Pass. Convertible Sedan. 40.00 1485.00 1084.05.
5027 2 Pass. Coupe..... 29.50 995.00 ..726.35.
5011 5 Pass. 2 Door Tour. Sedan 32.00 1105.00 ..806.65.
5019 5 Pass. Touring Sedan.... 32.75 1145.00 ..835.85.
124" chassis.....26.50–850.00–620.50
160" " Comm....28.00–925.00–675.25

BASIC GROUP "X" EQUIPMENT

Ornament—Extra Tire and Tube
Bumpers and Guards—Clock—Air Cleaner
R.FW–23.00–16.79 Group Price.....$55.00–40.15
6 Wheels & FW.....65.00–47.45
Except Conv. Sedan.....45.00–32.85
WSW tires—6 ply tires... 3.60– 2.50

CADILLAC V-8 SERIES 37-60–28%

Fisher Body—124" Wheelbase

6067 2 Pass. Convertible Coupe 41.50 $1575.00 1134.00.
6049 5 Pass. Convertible Sedan. 47.75 1885.00 1357.20.
6027 2 Pass. Coupe..... 38.75 1445.00 1040.00.
6019 5 Pass. Touring Sedan.... 41.00 1545.00 1112.40.
124" chassis.....34.50–1250.00–900.00
160" " Comm....36.25–1325.00–954.00

BASIC GROUP "X" EQUIPMENT

Ornament—Extra Tire and Tube
Air Cleaner
Group Price.....$38.00–27.36

6 Wheels and Fenderwells.....$65.00 ....46.80.
Except Convertible Sedan..... 45.00 ....32.40.

7.00-16 Royal or Firestone 4-ply black sidewall tires are standard equipment.

Additional charge for white sidewall tires $3.60 per tire. 2.50
" " " 6-ply tires 3.60 " 2.50
Extra charge for right hand fenderwell on all body styles except
Convertible Sedan.....$23.00
16.56

CADILLAC V-8 SERIES 37-65–28%

De Luxe Fisher Body—131" Wheelbase

6519 5 Pass. Touring Sedan..... 51.00 $1945.00 1400.40
X group..... 45.50 32.76
FW–85.00 – 61.20 6-ply 4.55–3.00
WSW–4.55–3.00 WSW&ply 5.50–3.50

CADILLAC V-8 SERIES 37-70–30%

Fleetwood Body—131" Wheelbase

7067 2 Pass. Convertible Coupe 66.50 $2745.00 1921.50.
7029 5 Pass. Convertible Sedan 67.50 2795.00 1956.50.
7057 2 Pass. Sport Coupe..... 64.25 2645.00 1851.50.
7019 5 Pass. Touring Sedan... 60.00 2445.00 1711.50.
131" chassis.....45.50–1750.00–1225.00

BASIC GROUP "X" EQUIPMENT

Ornament—Extra Tire and Tube
Air Cleaner
Group Price.....$45.50 –31.85

6 Wheels and Fenderwells.....$85.00 ....59.50.

7.50-16 Royal or Firestone 4-ply black sidewall tires are standard equipment.

Additional charge for white sidewall tires $4.55 per tire. 3.00
" " " 6-ply tires 4.55 " 3.00
" " " 6-ply WSW 5.50 " 3.50

Cad. V-16 Series 37-90(Cont'd)

5812 5-Town Cabr.....196.00–8750.00–6125.00
5825 7-Town Cabr.....198.00–8850.00–6195.00
5850S 5-Sedan.....165.00–7300.00–5110.00
5830FL 5-Imp.Cabr....176.00–7800.00–5460.00
5833S 5-Town Sedan....164.00–7250.00–5075.00
5835 2-Conv. Coupe....170.00–7550.00–5285.00
5875FL 7-Imp. Cabr....177.00–7850.00–5495.00
5876 2-Coupe.....167.00–7400.00–5180.00
5880 5-Conv. Sedan....177.00–7850.00–5495.00
5885 5-Conv. Coupe....177.00–7850.00–5495.00
5891 7-Limo. Brougham.196.00–8750.00–6125.00
154" chassis.....143.00–6250.00–4375.00

CADILLAC V-8 SERIES 37-75–30%

Fleetwood Body—138" Wheelbase

7529 5 Pass. Convertible Sedan..... 82.00 $3445.00 2411.50
7519 5 Pass. Touring Sedan..... 65.25 2645.00 1851.50
7509F *5 Pass. Formal Sedan..... 83.25 3495.00 2446.50
7539 5 Pass. Town Sedan.... 75.75 3145.00 2201.50
7523 7 Pass. Touring Sedan..... 68.50 2795.00 1956.50
7513 7 Pass. Touring Imperial 72.75 2995.00 2096.50
7543 *7 Pass. Town Car.... 105.00 4545.00 3181.50
138" chassis.....48.50–1850.00–1295.00
156" " Comm....53.75–2100.00–1470.00

CADILLAC V-12 SERIES 37-85–30%

Fleetwood Body—138" Wheelbase

8529 5 Pass. Convertible Sedan..... 96.75 $4145.00 2901.50
8519 5 Pass. Touring Sedan..... 80.00 3345.00 2341.50
8509F *5 Pass. Formal Sedan... 97.75 4195.00 2936.50
8539 5 Pass. Town Sedan.... 90.50 3845.00 2691.50
8523 7 Pass. Touring Sedan..... 83.00 3495.00 2446.50
8533 7 Pass. Touring Imperial 87.25 3695.00 2586.50
8543 *7 Pass. Town Car..... 120.00 5245.00 3671.50
138" chassis.....63.25–2550.00–1785.00

BASIC GROUP "X" EQUIPMENT

Ornament—Extra Tire and Tube
Air Cleaner
Group Price.....$48.00 –33.60

6 Wheels and Fenderwells.....$90.00 63.00.....

7.50-16 Royal or Firestone 6-ply black sidewall tires are standard equipment.

Additional charge for white sidewall tires $5.50 per tire. 3.50

*Folding trunk rack available at.....$50.00
35.00

UPHOLSTERY CHART NO. 1

Series 37-50, 60, 65, 70, 75, 85, 90

Upholstery used on Cushions and Back Rests only - except where bodies are trimmed the same throughout.

Code No.	Description	Trim No.	Part No.	Side Wall Material Trim No.	Side Wall Material Part No.	Headlining Material Trim No.	Headlining Material Part No.
37	Tan - Pin Stripe Cloth	76T137	4081883	77T137	4081884	78T137	4081885
38	Gray - Pin Stripe Cloth	79T137	4081886	80T137	4081887	81T137	4081888
40	Tan Bedford Cord	50T137	4075025	53T137	4075028	23T137	4074176
41	Tan Novelty Bedford	51T137	4075026	53T137	4075028	23T137	4074176
42	Tan Plain Cloth	52T137	4075027	53T137	4075028	23T137	4074176
43	Gray Bedford Cord	55T137	4075029	58T137	4075032	22T137	4074175
44	Gray Novelty Bedford	56T137	4075030	58T137	4075032	22T137	4074175
45	Gray Plain Cloth	57T137	4075031	58T137	4075032	22T137	4074175
80	Tan Bedford Cord	40T137	4075019	42T137	4075021	11T137	4074121
81	Tan Plain Cloth	41T137	4075020	42T137	4075021	11T137	4074121
82	Gray Bedford Cord	44T137	4075022	46T137	4075024	17T137	4074103
83	Gray Plain Cloth	45T137	4075023	46T137	4075024	17T137	4074103
86	Black Leather - For LaSalle 37-50	1T1337	4074202	1T1337	4074202		
87	Tan Leather - For LaSalle 37-50	2T1337	4074234	2T1337	4074234		
88	Gray Leather - For LaSalle 37-50	3T1337	4074236	3T1337	4074236		
89	Green Leather - For LaSalle 37-50	4T1337	4074238	4T1337	4074238		
46	Black Leather-For Cadillac 37-60,65	1T1337	4074202	1T1337	4074202		
47	Tan Leather-For Cadillac 37-60,65	2T1337	4074234	2T1337	4074234		
48	Gray Leather-For Cadillac 37-60,65	3T1337	4074236	3T1337	4074236		
49	Green Leather-For Cadillac 37-60,65	4T1337	4074238	4T1337	4074238		
	Blue Leather	5T1337	4074240	5T1337	4074240		
	Red Leather	6T1337	4074242	6T1337	4074242		
	Black Leather	7T1337 or E0.814	4068671	7T1337	4068671		
	Tan Leather	8T1337 or E0.815	4068672	8T1337	4068672		
	Gray Leather	9T1337 or E0.817	4068673	9T1337	4068673		
	Green Leather	10T1337 or E0.816	4068674	10T1337	4068674		
	Gray Mohair-For LaSalle Export	47T137	4076703	47T137	4076703	17T137	4074103
	Gray Mohair-For Cadillac 37-60 Export	47T137	4076703	47T137	4076703	22T137	4074175
	Gray Mohair-For Cadillac 37-70,75, 85 Export	47T137	4076703	47T137	4076703	69T137	4075034
	Tan Mohair-For Export	24T137	4074135	24T137	4074135	25T137	4074136
	Brown Pattern Cloth	60T137 or W4901	4075035	62T137	4075037	63T137	4075042
	Brown Bedford Cord	61T137 or W4902	4075036	62T137	4075037	63T137	4075042

UPHOLSTERY CHART NO. 1 (Continued)

Series 37-50, 60, 65, 70, 75, 85, 90

Upholstery used on Cushions and Back Rests only - except where bodies are trimmed the same throughout.

Code No.	Description	Trim No.	Part No.	Side Wall Material Trim No.	Side Wall Material Part No.	Headlining Material Trim No.	Headlining Material Part No.
	Brown Plain Cloth	62T137 or W4903	4075037	62T137	4075037	63T137	4075042
	Tan Plain Cloth	64T137 or W4909	4075038	64T137	4075038	65T137	4075043
	Gray Pattern Cloth	66T137 or W4905	4075039	68T137	4075041	69T137	4075034
	Gray Bedford Cord	67T137 or W4906	4075040	68T137	4075041	69T137	4075034
	Gray Plain Cloth	68T137 or W4907	4075041	68T137	4075041	69T137	4075034
	Tan Plain Cloth	9T136 or W4723	4068683	9T136 or W4723	4068683	10T136	4068684
	Blue Gray Figured Cloth	11T136 or W4724	4068685	11T136 or W4724	4068685	12T136	4068686

COLOR COMBINATIONS (Continued)

Series 37-50

x Comb. Code No.	BODY AND SHEET METAL Color Name	Color No.	Mfgr.	WHEELS Color Name	Matching Color No.
20	Black	2422101	Dupont	Black Dulux	
				Flare Red	943549
				Clearwater Green	24250567
21	Admiral Blue	24250534	Dupont	Admiral Blue	24250534
22	Ricardo Maroon	24252338	Dupont	Flare Red	943549
23	Douglas Green	24250618	Dupont	Clearwater Green	24250567
24	Peruvian Gray	24252337	Dupont	Flare Red	943549
25	Briarcliff Blue	24250878	Dupont	Lullwater Blue	24250951
26	Springdale Green Metallic	20252276	Dupont	Springdale Green Metallic	20252276
27	Golden Beige Metallic	20251626	Dupont	Ormond Brown	24250589
28	Rockledge Gray	24251015	Dupont	Clearwater Green	24250567
29	Santaupe Metallic	20251485	Dupont	Kashan Blue	24250686

Series 37-60, 65, 70, 75, 85

50	Black	20488	R & M	Black	
				Flare Red	943549
				Clearwater Green	24250567
51	Antoinette Blue	22290	R & M	Antoinette Blue	22290
52	Richelier Maroon	26630	R & M	Flare Red	943549
53	Charlevoix Green	20355	R & M	Thistle Green	24650702
54	LaMothe Gray Iridescent	P.S.103	R & M	Flare Red	943549
55	Andre Blue	20230	R & M	Andre Blue	20230
56	Bouquet Green	20398	R & M	Bouquet Green	943892
57	Frontenac Brown Iridescent	P.S.841	R & M	Frontenac Brown	1823496
58	Cavalier Blue Iridescent	P.S.2336	R & M	Cavalier Blue Iridescent	1823890
59	Menard Gray Iridescent	P.S.134	R & M	Flare Red	943549
60	Beauregard Beige	0-20830	R & M	Cinnebar Red	24650798

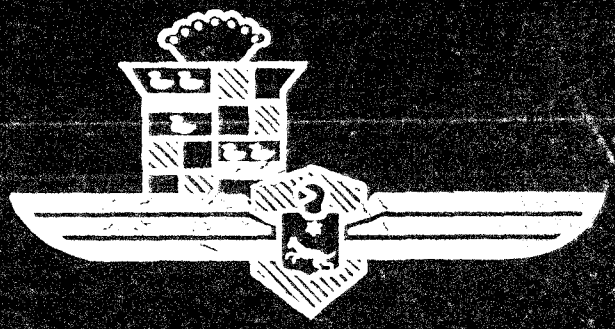
Series 38-50, 60, 60S, 65, 75, 90

1	Black	20498	R & M	Black	94-005
				Clearwater Green	94-5245
				Flare Red	94-3549R
2	Antoinette Blue	22290	R & M	Antoinette Blue	9420506
3	Patillo Maroon	26655	R & M	Patillo Maroon	9420501
4	St. Regis Green	020364	R & M	Atlantis Green	9420505
5	Moleskin Gray	20181	R & M	Flare Red Dulux	943549R
6	Pelham Gray	020155	R & M	Desert Sand	9420499
7	Manchu Beige Iridescent	P.S.816	R & M	Laquedoc Orange	9420504
8	Chantel Blue	020219	R & M	Chantel Blue	9420511
9	Deauville Beige Iridescent	P.S.815	R & M	Deauville Beige Iridescent	9420502
10	Cloudmist Green Iridescent	P.S.308	R & M	Cloudmist Green Iridescent	9420500
11	Fairhaven Blue Iridescent	P.S.202	R & M	Fairhaven Blue Iridescent	9420507
12	Cruiser Gray Iridescent	P.S.108	R & M	Nimbus Gray Iridescent	942663
13	Edgewood Green Iridescent	P.S.340	R & M	Edgewood Green Iridescent	9420503
14	Italian Cream	20734	R & M	Italian Cream	9420498
15	Carolina Green	20361	R & M	Carolina Green	20361
16	Sea Gull Gray	21271	R & M	Carolina Green	20361
17	Oxblood Iridescent Maroon	P.S.608	R & M	Oxblood Iridescent Maroon	P.S.608
18	Barcelona Blue	022224	R & M	Cascino Beige	242-51737

Steering Wheel, Steering Column, Hand Brake Lever and Instrument Panel	Series 38-50, 60, 60S, 65	Light Beige	20251942
	Series 38-75, 90	Worth Brown	2429835

x Code Comb. No. will be found on Body Plate on dash.

CADILLAC
LASALLE



SHOP MANUAL

for 1937

Introduction

This Shop Manual is a book of reference on the adjustment and repair of Cadillac and LaSalle motor cars. It is intended for the use of service men who are already familiar with automobile construction and repairing in general. It is not a text book on elementary automobile mechanics.

In form, the book is designed for rapid reference. The General Motors parts grouping system is followed (See next page). Each group consists of a brief description, service information in the form of notes, and a specification table giving important dimensions and clearances.

Much of the information is given in full page pictures. The illustrated pages are laid out to show, as far as possible in picture form, the various repair operations, as well as the differences and similarities of the various series.

Models Included

Information is given in this Manual covering the following series cars:

Series	No. of Cylinders	Bore and Stroke	Wheelbase	Engine No.
37-50 LaSalle	**V-8**	**3⅜″ x 4½″**	**124″**	**2230001 and up**
37-60 Cadillac	**V-8**	**3½″ x 4½″**	**124″**	**6030001 and up**
37-65 Cadillac	**V-8**	**3½″ x 4½″**	**131″**	**7030001 and up**
37-70 Cadillac	**V-8**	**3½″ x 4½″**	**131″**	**3130001 and up**
37-75 Cadillac	**V-8**	**3½″ x 4½″**	**138″**	**3130001 and up**
37-85 Cadillac	**V-12**	**3⅛″ x 4″**	**138″**	**4130001 and up**
37-90 Cadillac	**V-16**	**3″ x 4″**	**154″**	**5130301 and up**

In presenting information within the various groups, the LaSalle construction is covered first, then the 37-60 Cadillac, and finally, the larger Cadillac cars. This order has been followed because it gives first the information on the larger-volume cars.

Identification

Each Cadillac and LaSalle car when shipped carries an engine number which is also a serial number. This is the number to use in filling out license and insurance applications and in general reference to the car. The engine number is stamped on the car in the location indicated.:

Series 37-50, 60, 65, 70 and 75—On the crankcase just behind the left cylinder group, parallel to the dash.

Series 37-85 and 90—On the upper surface of the generator drive chain housing.

The body style number, job number, and paint and trim numbers are stamped on a plate attached to the front of the dash under the hood on the left side on LaSalle 37-50 and Cadillac 37-60, 65, 70, 75, and 85, and to the edge of the cowl on the right side on Cadillac 37-90. The body style numbers are listed on page 22.

The Service Department invites correspondence with Service Managers and Shop Foremen on all matters discussed in the Shop Manual.

Group Arrangement

This Manual is divided into fourteen main groups, as follows:

1. **Body**
2. **Frame**
3. **Front Wheel Suspension**
4. **Rear Wheel Suspension**
   —Includes Rear Axle, Rear Springs and Shock Absorbers, Propeller Shaft and Universal Joints.
5. **Brakes**
6. **Engine**
   —Includes Cooling, Ignition, Carburetion, and Manifolds. Generator and Starter are covered in Group 12.

6a. **Clutch**

7. **Transmission**
8. **Fuel Tank and Exhaust System**
9. **Steering**
10. **Wheels and Tires**
11. **Chassis Sheet Metal**
12. **Chassis Electrical System**
    —Includes Battery, Generator, Starter, Horns, Lighting and Instruments.
13. **Radiator**
14. **Lubrication**

TABLE OF CONTENTS

CONTENTS (Cont'd)

Engine (Cont'd)

Clutch

Transmission

Fuel Tank and Exhaust System

CONTENTS (Cont'd)

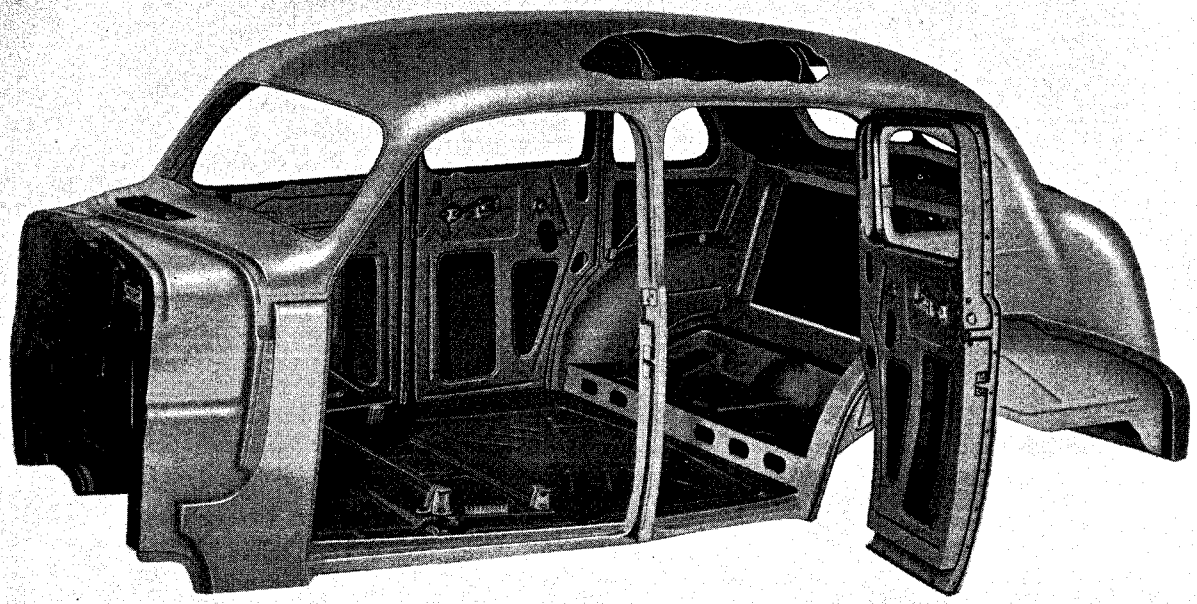


Fig. 1 Construction of "Uni-Steel" Sedan Body

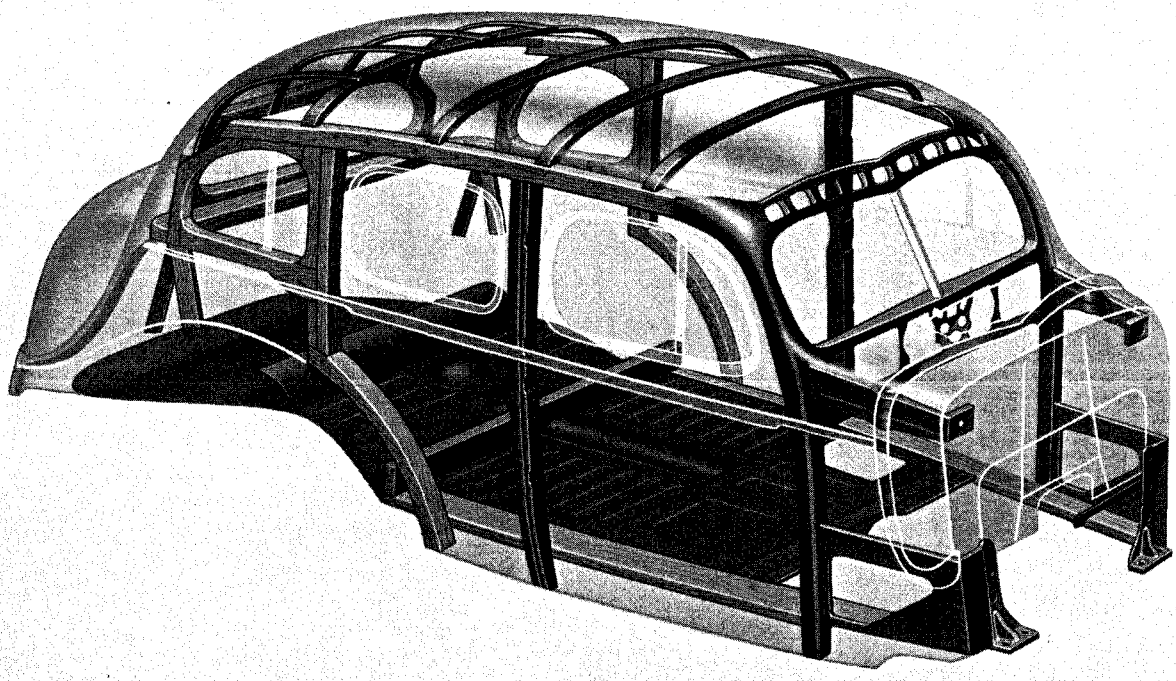


Fig. 2 Construction of Composite Sedan Body

Plate 1. Body Construction

BODY

General Description

Two different types of body construction are used in the bodies of 37-series Cadillac and LaSalle cars. Series 37-50 and 60 cars have a "Uni-steel" Fisher body. Series 37-65 cars have a composite Fisher body. The remainder of the series have composite Fleetwood bodies. Turret tops are used on all closed body styles, excepting Formal Sedans and Town Cars, which have steel tops covered with leather.

The body shell construction used in the four-door sedans of both the "Uni-steel" bodies and the composite bodies is illustrated in Plate 1. Each body type has been carefully designed, reinforced, insulated and sound-proofed to meet the individual requirements of the car upon which it is used.

Doors and Windows

The front doors on all 37-series bodies are hinged at the windshield pillar. The rear doors are hinged at the rear body pillar on all series, excepting Fleetwood Convertible Sedans and some V-16 body styles, which have the rear doors hinged at the center pillar.

The all-metal doors used on the series 37-50 and 60 cars, illustrated in Plate 5, are similar in appearance to the composite type doors, Plate 6, used on the other 37-series cars. The principal differences are in the basic construction, which is shown in the illustrations, and in the heavier weight of the composite type door.

All 37-series bodies have the I. C. V. no-draft ventilating system, which provides pivoting glass panels in all front doors, and in the rear quarter windows of 5 and 7-passenger sedans, excepting series 37-50 and 60, and in the rear doors of Formal Sedans and Town Cars. The ventilating panels are controlled by handles conveniently located just below the window. On series 37-50 and 60 bodies, the rear quarter no-draft ventilating panels have been replaced by swinging windows as shown in Plate 5 Fig. 15.

One-piece steel garnish mouldings and finish panels are used on series 37-50 and 60 bodies. Steel garnish mouldings with wood finish panels to match are used on series 37-65 bodies. All-wood garnish mouldings and finish panels are used on the Fleetwood bodies.

Locks and Keys

The interior door locks on all 37-series cars, except the V-16, have a press button type lock mechanism which consists of a rod extending from a knob at the window garnish moulding down to a pawl in the door lock, as shown in Plate 5. The interior door locks on the V-16 have a pawl lever or trip button which protrudes inside the door. Pushing the press button down or tripping the pawl lever up locks the door in the respective types of construction.

Single-bitted keys are used on all 37-series cars. The right front door and the spare wheel lock on cars equipped with exposed spare tires or separate tire compartments have lock cylinders operated by the octagonal-handled ignition key. See Plate 3, Fig. 6. The instrument board compartment lock, the trunk compartment lock, and the rear deck lock on Coupe body styles have lock cylinders operated by the round-handled key.

As a protection against unauthorized persons securing keys, the key numbers do not appear either on the keys or on the face of the locks. These numbers are stamped on small metal slugs fastened in the keys, and can be knocked out of the handles, after an appropriate record has been made, so that duplicate keys can be ordered by number if the keys should be lost or stolen.

Body Types and Style Numbers

A selection of thirty-two regular body styles, aside from the custom built jobs for the Cadillac V-16, are available on the 37-series line of Cadillac and LaSalle Cars. Commercial chassis are also available in series 37-50, 60 and 75 cars. A list of regular body types and style numbers is given on page 22.

Service Information

Detailed information on major body service operations, including sheet metal work, body frame repairs, etc., is issued by the Fisher Body Service Division through the medium of body service manuals and bulletins, which are available to all Authorized Distributors and Dealers.

The following information on body service pertains only to those operations that should be understood by every automobile service man and performed in every service station.

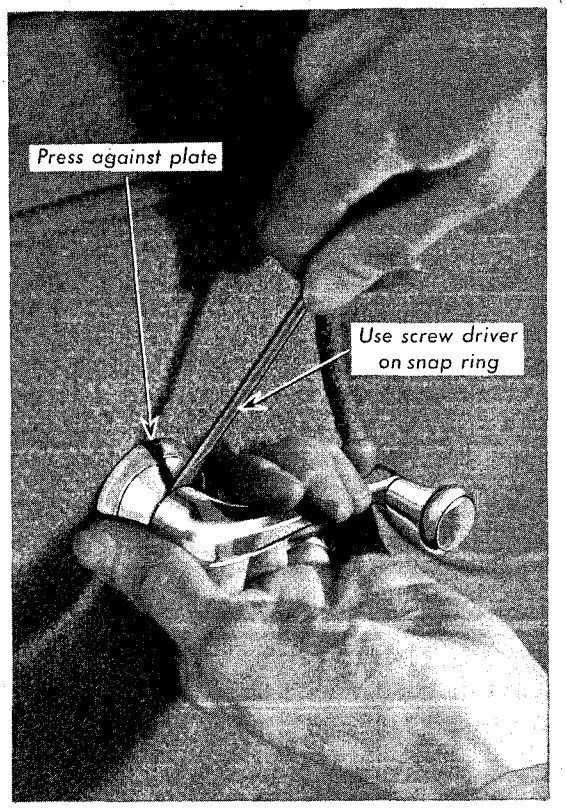


Fig. 3
Removing Interior Handle—Fisher Type

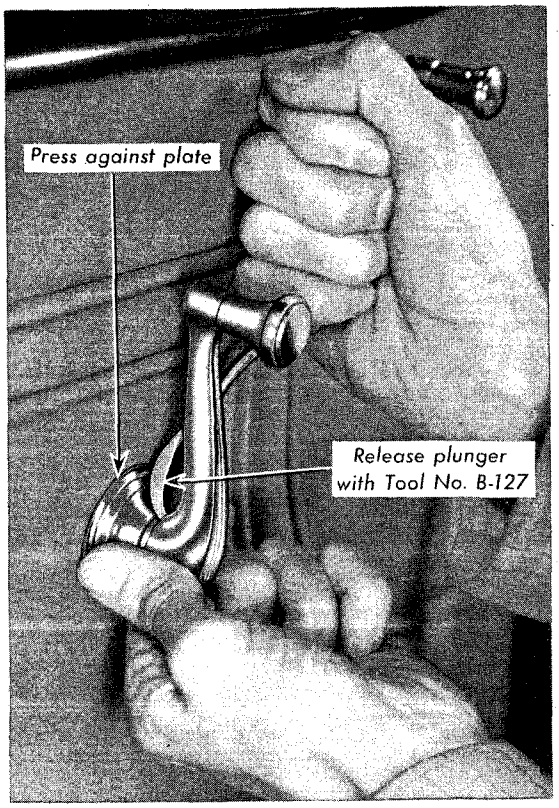


Fig. 4
Removing Interior Handle—Fleetwood Type

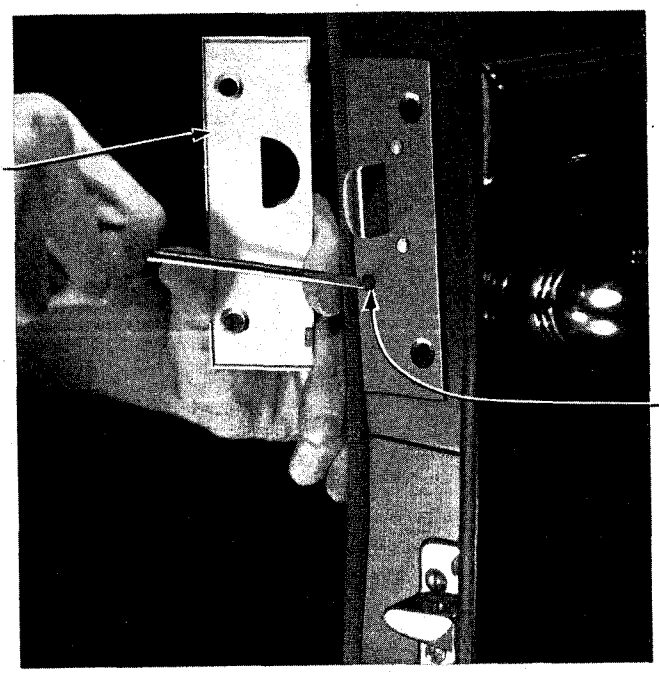


Fig. 5 Removing Outside Door Handle

Plate 2. Door Hardware

1. Cleaning Upholstery and Carpets

Care must be exercised in cleaning upholstery material and floor carpets used in car interiors. In using a fabric cleaner having a hydro-carbon base, use the cleaner as sparingly as possible, and brush lightly to avoid spots or rings.

Spot cleaning will leave rings of discoloration on flat fabrics more often than on nap cloth, and for that reason they should be cleaned by taking the whole panel as a unit rather than a spot only.

Before spot cleaning, always thoroughly dust off the cushion, or better still, vacuum clean the surface, removing all accumulated dust and dirt.

Use carbon tetrachloride or any other equally good cleaning solvent, and with a clean white wiping cloth rub lightly over the soiled spot to remove all traces of the soil without rubbing it into the goods, changing to a clean part of the wiping cloth as often as it is soiled until no soil shows on the white wiper and the soiled spot has disappeared.

Then clean the entire panel, using enough cleaner to saturate the whole panel, and while the surface is still wet use the suction nozzle of a vacuum cleaner to suck up through the fabric the surplus cleaning fluid which has dissolved all grease, oil, soot and other grime, leaving nothing to dry on the surface to discolor or ring it.

Many types of stain or soil can be removed without the use of a cleaner, by simply applying warm soap and water in moderate quantities. Use a neutral (non-alkaline) soap to make frothy suds and apply with a clean cloth or sponge. In rinsing, use a damp cloth and do not moisten fabric any more than necessary.

After cleaning, fabric can be freshened by steaming. Spread a damp cloth over the surface and touch a hot flat-iron to it lightly, or wring a very heavy cloth out of very hot water and spread it over the upholstery for about 10 minutes.

Note: Some fabrics, particularly some floor carpets, are impregnated with rubber backing, originally applied as a solution, which binds the nap securely. Use only soap and water on these fabrics because gasoline or other petroleum distillate cleaners may dissolve the backing and loosen or otherwise damage the nap.

2. Cleaning Chromium-Plated Parts

Chromium-plated parts require occasional cleaning to restore the lustre and protect the plating from deterioration. This is especially true of plated chassis parts, which are exposed to ice-removing chemicals in winter and dust-laying chemicals in summer. Frequent cleaning will prevent these chemicals from acting on the plating.

Chromium-plated parts which have been subject to the action of such chemicals may require more than cleaning, depending upon the length of exposure and the strength of the chemicals. In such cases, polishing with a good metal polish will usually remove the discoloration and restore the lustre. Wiping with a cloth dampened in kerosene will help to protect the plating from further deterioration.

Discoloration of chromium-plated parts under the action of chemicals used on roads and pavements is not an abnormal condition and is not an indication of defective plating.

3. Cleaning Leather Tops

The black leather tops on Formal Sedans and Town Cars require a definite cleaning and retouching procedure if the tops are to retain their luster and not deteriorate. The following method should be used for removal of ordinary dust and grime:

1. Use lukewarm, not hot nor cold water, and any mild soap, such as Castile or Ivory.

2. Work up a thin suds on a piece of cheesecloth and go over the leather surface.

3. Go over leather again with a piece of damp cheesecloth, using no soap.

4. Wipe dry with a soft cloth.

If the finish is dulled so that this method does not properly restore the luster, but the black undercoat is in perfect condition, the original luster can be restored in this way:

1. Wash with naptha on a piece of cheesecloth to remove all accumulated dust and dirt.

2. Allow to dry from four to five hours.

3. Spray top with coat of Clear Top Leather Finish.

If the black undercoat shows signs of wear after washing with naphtha, it should first be sprayed with a thin coat of Black Top Leather Prime and allowed to dry from two to three hours. After the primer coat has thoroughly dried the top should then be sprayed with a coat of Clear Top Leather Finish.

For best results in maintaining leather tops, the foregoing procedures should be followed in detail. Both "Clear Top Leather Finish" and "Black Top Leather Prime" are obtainable under those names and in small quantities, from the Radel Leather Mfg. Co.. Newark, N. J.

4. Removal of Door Handles

Outside door handles on all series cars are removed by unscrewing the set screw in the inside end of the door handle. The lock finishing plate must be removed on series 37-65, 70, 75, 85 and 90 Cadillac cars to reach the set screw. See Plate 2, Fig. 5.

Inside door handles, including remote control handles, ventilator handles and window regulator handles are removed by pressing back the finishing plate against the trim to permit release of the handle locking device See Plate 2.

On Fisher bodies, this device is simply a horseshoe-shaped spring wire, which can be snapped off with a narrow screwdriver or with Tool No.

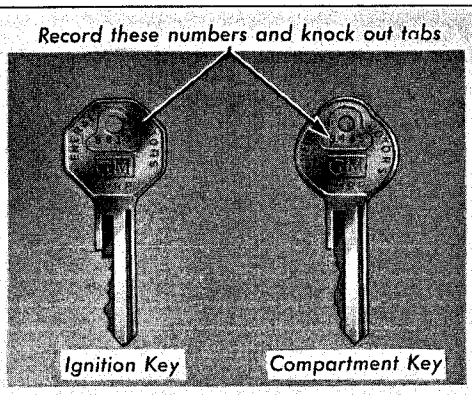


Fig. 6 Keys—One Set

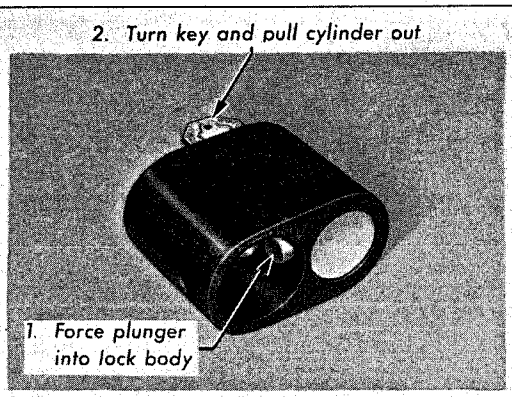


Fig. 7 Removing Lock Cylinder (Exposed Spare Tire)

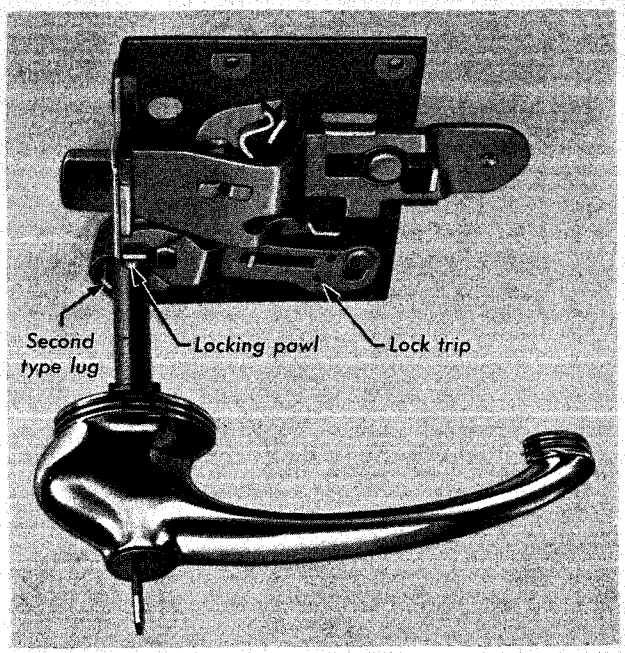


Fig. 8 Door Handle and Lock Mechanism

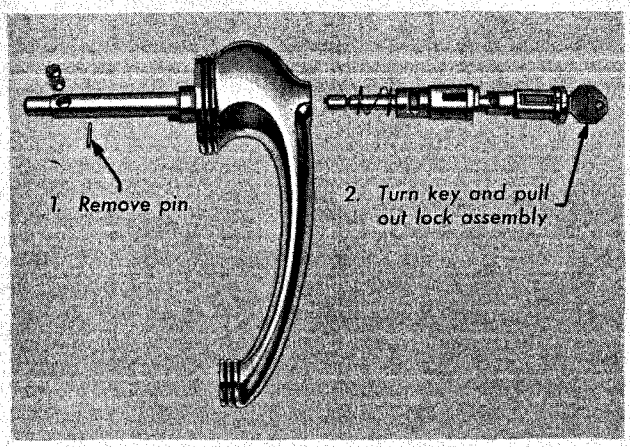


Fig. 9 Locking Handle Disassembled

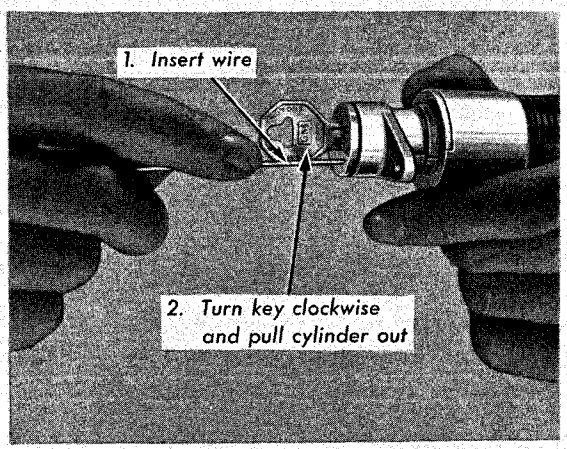


Fig. 10 Removing Ignition Lock Cylinder

Plate 3. Locks and Keys

HMB-133. On Fleetwood bodies, a plunger is used, which must be depressed with Tool No. HMB-127 to release the handle.

Note: If the plunger sticks, tap the end of the handle with a block of wood covered with a piece of felt or leather. Use this same block of wood to reinstall the handles.

In the event that the door handle ferrules of 37-series cars become excessively loose, correction should be made by installing a new ferrule assembly that fits the handle more snugly. These assemblies are carried in stock in the Parts Division.

5. Garnish Moulding Screws

In any location on the 37-series cars where the garnish mouldings are held in place by screws that are exposed to view, Phillips' double slot screws have been used for this purpose because the special screw driver required to install or remove these screws will not slip and mar the garnish moulding.

The special Phillips screwdrivers are available from the Hinckley-Myers Company, of Jackson, Michigan, Under Tool No. B-206.

6. Interior Door Locks

The interior door locks on all 37-series cars, except the V-16, have a press button type lock mechanism which consists of a rod extending from a knob at the window garnish moulding down to a pawl in the door lock as shown in Plate 5.

The interior door locks on the V-16 simply have a trip button protruding inside the door directly at the lock pawl.

7. Inoperative Door Lock

On some of the early series 37-50 and 60 cars, difficulty has been encountered in a few cases, where the key for the door handle lock failed to lock or unlock the door.

This condition is due to the locking pawl in the inner end of the handle not engaging properly with the lug in the lock, or to the lug being somewhat out of position.

The remedy for this trouble is installation of a new door lock, with second type lug, and a new pawl. See Plate 3, Fig. 8.

8. Door Lock Removal

The following procedures cover removal of the door locks on the all-steel as well as the composite type bodies used on the 37-series cars.

Series 37-50 and 60 — 1. Remove door lock knob, garnish moulding, and door trim pad. (See Note 18.)

Note: Door garnish moulding is held in place with self-tapping screws along top and side edges of door.

2. Remove door outside handle.

3. Remove six screws holding door lock assembly to door inner panel. Two of these screws are in the edge of the door. See Plate 5.

4. Remove interior door lock rod.

5. Remove remote control mechanism.

6. Disconnect remote control connecting link from lock.

7. Remove glass run lower channel.

8. Remove lock from lower part of door.

The reverse order of the above operations will apply for door lock installation.

Series 37-65, 70, 75, 85 and 90 — 1. Remove door lock knob or button at garnish moulding and loosen trim pad around door lock.

Note: Door garnish moulding is held in place by same screws that hold the upper glass run channel (Bailey Channel) to the door frame, and can be pulled out toward the inside after these screws have been removed.

2. Remove the interior door lock rod. (Except 37-90).

3. Remove door outside handle.

4. Remove screws in lock face and casing.

5. Remove lock by disengaging it from remote control link.

The reverse order of the above operations will apply for door lock installation.

9. Servicing Lock Cylinders

Key and lock parts furnished for service use by the factory Parts Division include the following:

Keys Coded lock cylinders	When key number is supplied with order
Key Blanks Uncoded cylinders	For use with key-cutting equipment

Key-cutting equipment for medium and large size service stations can be purchased from Briggs and Stratton Corporation, Milwaukee, Wisconsin. The necessary equipment includes a key decoder (Part No. 45-807), key cutting machine (45-755) and lock checking and staking tool (45-765). Complete instructions for servicing keys are supplied with this equipment.

Removing Door Handle Lock Cylinder — Remove the door handle from the door by unscrewing the set screw at the inner end of the handle. Then remove the retaining pin in the handle shank and draw the cylinder out with the key inserted. (See Plate 3, Fig. 9.)

Trunk Handle Lock Cylinder—This is removed in the same manner after the handle has been removed from the trunk lid.

Removing Ignition Lock Cylinder — Insert the key in the lock and turn in clockwise direction until it stops, then insert a pointed stiff wire (a bent paper clip will do) in the hole provided in the cylinder to depress the plunger. Continue to turn the key in a clockwise direction and then pull cylinder out. (See Plate 3, Fig. 10).

Removing Glove Compartment Lock Cylinder—Unlock compartment door, push door lock catch all the way down; then turn key in clockwise direction and pull lock cylinder straight out toward front.

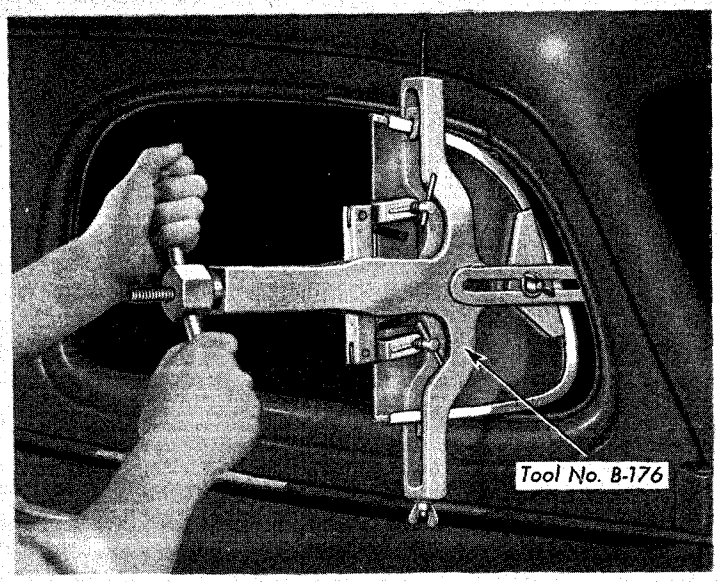


Fig. 11 Removing Ventilator Glass

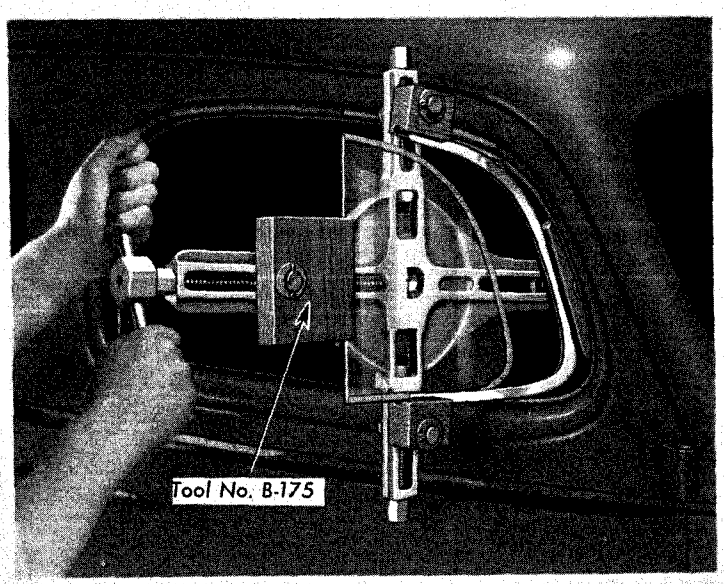


Fig. 12 Installing Ventilator Glass

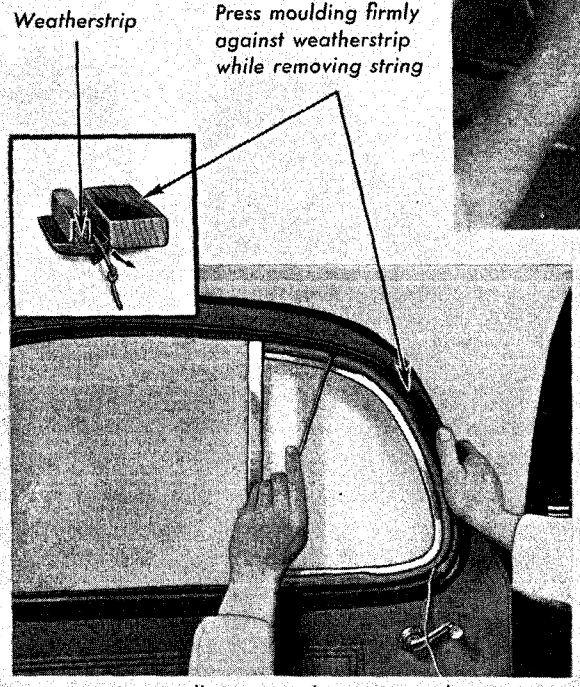


Fig. 13 Installing Ventilator Weatherstrip

Plate 4. Ventilator Glass Replacements

Removing Tire Lock Cylinder — (Fenderwell or Exposed Spare)—Unlock and remove lock body from carrier. Press in on the lock plunger, forcing it further into lock body, until lock cylinder springs out at the end in which the key is inserted. (Plate 3, Fig. 7.)

10. Replacement of Ventilator Glass

On Series 37-50 and 60 cars with the new all-steel bodies, the rear quarter window has been replaced by a swinging glass window that acts as a ventilator. Removal of this assembly can be made in the following manner:

1. Remove the rear quarter window garnish moulding by taking out Phillips' screws along upper face of moulding.
2. Remove screws holding ventilator frame in window opening. (See Plate 5, Fig. 15).
3. Tip ventilator assembly inward at top and lift ventilator up and out.
4. Remove glass by removing screws and disassembling frame.

The reverse of these operations will apply when installing.

Note: When replacing, use No. FS-1039 cement on flange of window opening.

Replacement of regular I. C. V. ventilator glass is the same on all bodies. It is unnecessary to remove the ventilator assembly, garnish moulding, or control handles, except in the case of series 37-50 and 60 rear quarter windows.

The ventilator glass is a tight press fit in the channel, and on this account special tools should be used for removing and installing it. Removal requires the use of a puller, Part No. HMB-176. If the glass is to be reinstalled or used again, friction tape should be used between the puller clamp and the glass to prevent the clamp from marring or scratching the glass surface.

Note: Removal can be made easier by inserting a thin glazing or putty knife between glass and channel all the way around channel and applying light machine oil to knife so that oil flows between channel and glass.

Installation of a ventilator glass requires pushing tool, Tool No. HMB-175. Glass filler—a special tape available from the factory Parts Division—must be used to wrap the edges before installation. Two thicknesses of this filler are available, thin and medium. If a heavier filler is required, two thicknesses of the thin filler can be used.

Place strips of filler over the top and bottom edges of the glass, arranging the strips at the rear corners so that they will come under the ends of the channel when the glass is in position. Then wrap the three edges of the glass that go in the channel with a single strip of the filler.

After wrapping the glass, spring the two ends of the glass channel slightly toward each other and start the glass in the channel a few inches by hand, placing the glass in the lower end first and then forcing it into the upper end.

If either the top or bottom edge of the glass lags while it is being forced into the channel, the pushing tool should be adjusted up or down to bring the pressure point closer to the lagging edge. The lagging edge may also be tapped gently with a block of wood and a hammer to assist in evening it up in the channel.

The glass should be pressed in until both ends are flush with the ends of the channel, after which the channel ends should be pressed down on the glass and the ends of the glass filler trimmed off even with the edges of the channel.

If a ventilator weather strip loosens from the retainer, it should be re-cemented in place with FS-1039 cement and allowed to dry for at least an hour under pressure.

11. Replacement of Windshield Glass

Replacement of a windshield glass for any reason should always include an investigation and correction of the cause of the difficulty. Setting of garnish moulding screws too tight or binding of the glass in the frame opening are points that should be checked. Pressure at any point should be eliminated before installing new glass.

The procedure to be followed in replacing a windshield glass, one section at a time, is as follows:

1. Remove windshield wiper arm and blade. Loosen screws in wiper housing cap.
2. Remove rear view mirror.
3. Tape the instrument panel full length of garnish moulding.
4. Remove garnish moulding and center division by taking out Phillips' screws along face of moulding.
5. Remove glass and channel together from the inside, taking care not to kink or damage chromium bead.
6. Check windshield opening frame with template and .010 inch feeler gauge until template is level all the way around the opening and does not rock or tilt.
7. Remove the channel from the old glass for installation on the new.

Note: If the channel is torn or in anyway damaged it should be replaced.

8. Apply sealing compound FS 1039 to the windshield flange and install the rubber channel and windshield glass.
9. Seal the center division channels and gaskets by setting the four screws that hold the outer and inner channels against the gaskets.
10. Seal the windshield rubber channel outer lip, by applying FS 1040 sealing compound with Sealing Gun No. B-182. The nozzle of the gun should be inserted well beneath the rubber lip to perform this operation properly.
11. Reinstall garnish mouldings, rear view mirror, and windshield wiper parts.

12. Removal of Door Window Glass

Front Door Glass—Series 37-50 and 60—1. Remove door window garnish moulding, by removing retaining screws along top and side edge of door.

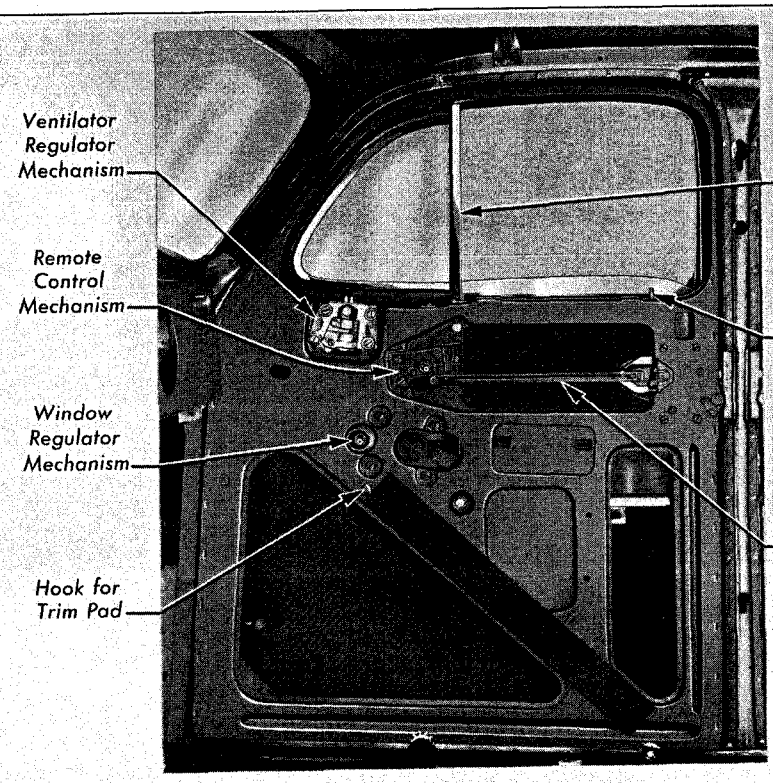


Fig. 14 Typical Right Front Door

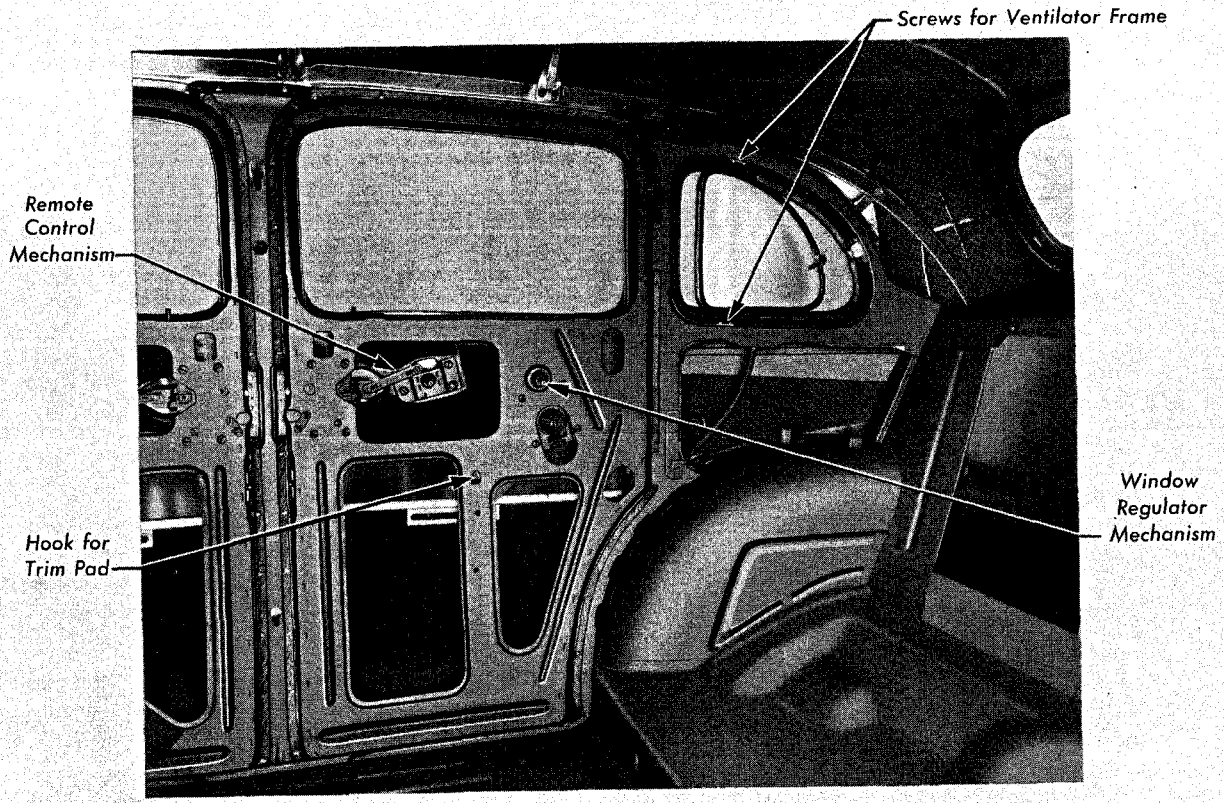


Fig. 15 Typical Right Rear Door and Quarter

Plate 5. Under-Trim Construction—"Uni-Steel" Bodies

2. Remove upper glass run channel.

3. Remove center division channel by taking out two screws at both top and bottom of channel.

4. On two-door and coupe models raise glass and remove four small screws and washers from regulator cam.

5. Lower glass slightly, tip inward at top to clear door.

6. Turn regulator handle raising window as far as possible so that cam may be seen in window opening.

7. Unhook glass lower sash channel from regulator cam and remove glass.

Series 37-65, 70, 75, 85 and 90—1. Remove door window garnish moulding (See Note 8, page 13).

2. Remove all inside door handles, including the ventilator handle. (See Note 4, page 11).

3. Loosen the trim around the window and slightly below the lock board filler board.

4. Remove filler board and lock pillar corner block at top of board.

5. Loosen trim at bottom of door just far enough to reach the window lift cam at the lower edge of the glass with the glass in its lowest position.

Note: Removal of the trim entirely is not recommended as it would then be necessary to relocate the trim on the door when installing it.

6. Remove retaining screws in lift cam and pull cam slightly away from bracket on glass channel.

7. Loosen vertical division channel and swing out of position to clear glass.

8. Raise glass all the way up out of the window opening, pulling the top edge out just enough to clear the door.

9. Remove metal channel from old glass for installation on a new glass whenever the glass is to be replaced.

Rear Door Glass—Series 37-50 and 60—Procedure for replacement of rear door glass is the same as that outlined for the front doors, except that there is no I. C. V. center division to remove.

Series 37-65—1. Remove garnish mouldings. (See Note 8, page 13).

2. Remove upper glass run channel.

3. Raise door glass and tip inward at top to clear door.

4. Unhook glass lower sash channel from regulator operating arm and lift glass out of window opening.

Series 37-70, 75, 85 and 90—1. Remove garnish mouldings. (See Note 8, page 13.)

2. Remove upper glass run channel.

3. Loosen trim at bottom of door **just enough** to reach the window cam lifts with window all the way down.

4. Remove four screws holding lift cam channel to metal window channel.

5. Disengage lift cam channel by sliding it out vertically past the cams.

6. Raise door glass, tilt inward to clear door, and remove from door opening.

13. Installation of Door Window Glass

To reinstall a door glass, reverse the operations outlined in Note 12, for removal of door window glass.

When installing the garnish moulding, it is necessary to work the lip or flange of the ventilator weather strip out over the garnish moulding. In order to do this without damaging the weather strip or the moulding, a heavy string or cord should be used as shown in Plate 4, Fig. 13.

The string should be knotted at each end and then wrapped around the weather strip inside of the flange close to the retainer. The garnish moulding is next installed and pressed firmly against the weather strip. With the moulding held in this position, the string is pulled out, pulling the flange out over the garnish moulding with it. The string should be removed gently; otherwise the weather strip may be damaged.

14. Slipping Down of Rear Door Glass

In the event that the rear door glass of series 37-50 and 60 cars "works down" when the car is in motion, the remedy for correcting this condition is to increase the tension of the regulator spring.

This tension may be increased by changing the position of the anchored end of the spring in the spindle. Simply remove the spring and reinstall it with the anchored end turned ½ turn clockwise. This will cause the spring to be wound ½ turn tighter when the outer end is rehooked.

In most cases, the additional ½ turn in the spring will increase the tension enough to eliminate any slipping down of the rear door window. If this does not eliminate the trouble, a second type regulator should be installed. They are available from the Parts Division.

15. Replacement of Rear Quarter Glass

Series 37-50 and 60—On ***four door sedan bodies*** the rear quarter window has been replaced by a swinging rear quarter ventilator which can be removed or installed as explained in Note 10, page 15.

On ***two door sedan (coach) bodies*** the procedure for replacing the rear quarter window glass is as follows:

1. Lower glass and remove screws holding upper glass run channel (Bailey Channel) to body opening.

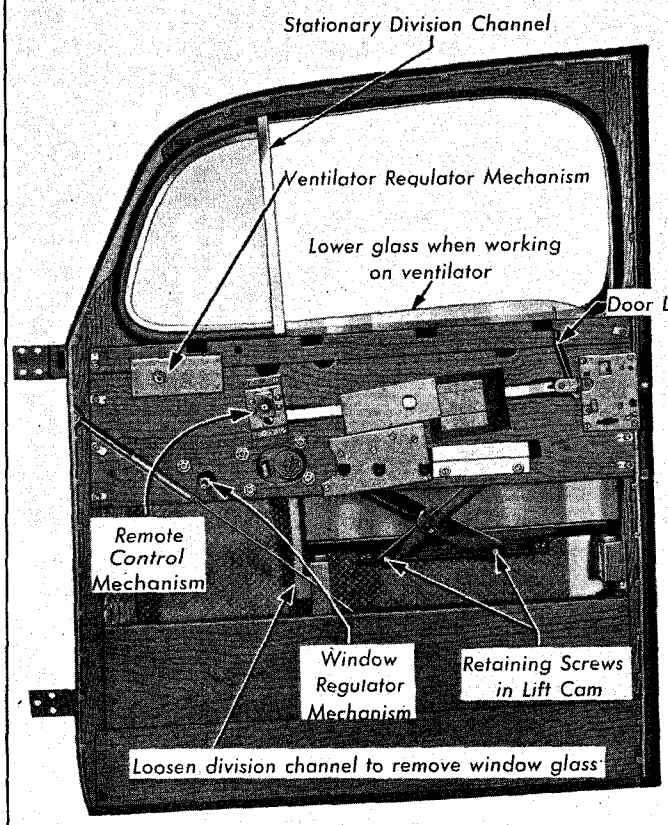


Fig. 16 Typical Right Front Door

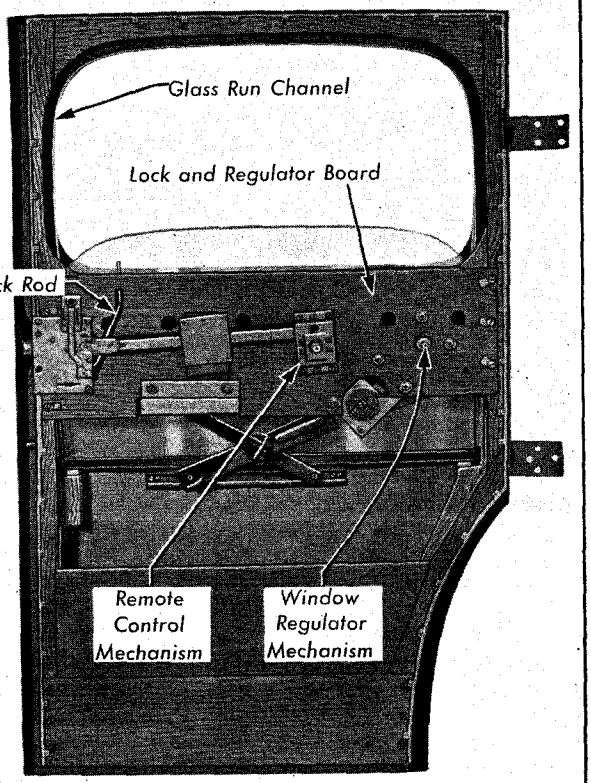


Fig. 17 Typical Right Rear Door

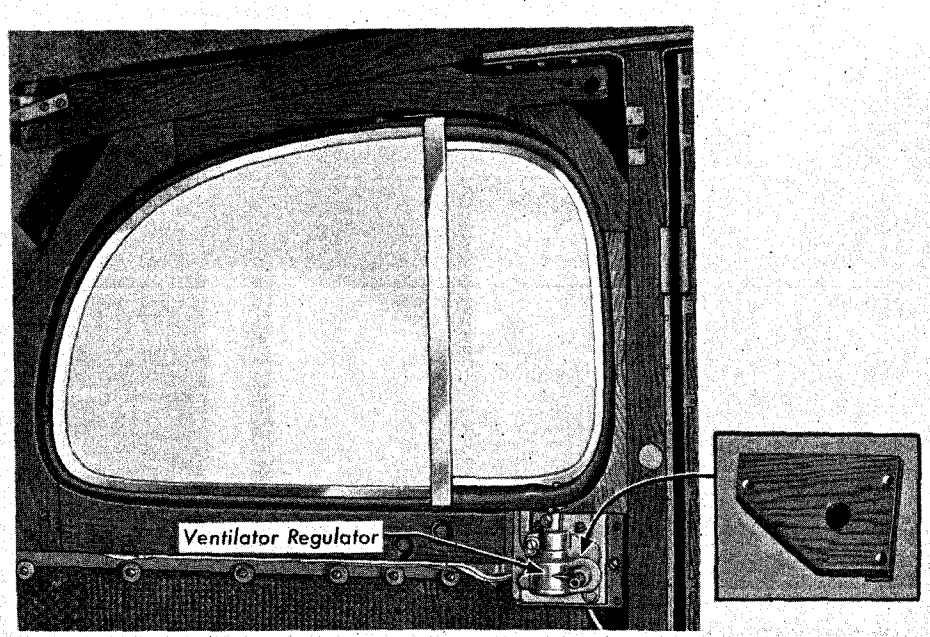


Fig. 18 Typical Left Rear Quarter (4-Door Sedan)

Plate 6. Under-Trim Construction—Composite Bodies

2. Remove garnish moulding.

Note: On some cars garnish moulding is held in place by same screws as run channel. On others, the garnish moulding snaps into place with spring clips that can be pryed out of window opening at top to remove.

3. Remove glass run channel.

4. Raise glass all the way up out of window opening, tipping top out toward inside to clear body.

5. Unhook glass lower sash channel from end of the regulator cam.

6. Remove glass from opening.

Installation—reverse order of above operations.

On ***coupe bodies*** the rear quarter windows are stationary and replacement is merely a matter of removing or installing (in reverse order) the glass assembly in the following manner:

1. Remove garnish moulding.

Note: Garnish moulding is held in place by Phillip's screws along face of moulding.

2. Pull the glass and rubber channel out toward inside of body.

Remember to seal the glass channel in place with FS-1039 cement when re-installing the glass.

Series 37-65, 70, 75, 85 and 90—All Fisher and Fleetwood composite body styles with rear quarter windows have I. C. V. ventilators or stationary windows which can be removed or installed in the following manner:

1. Remove garnish moulding by taking out Phillip's screws along face of moulding.

2. Loosen trim around window.

3. Remove the retaining screws in the glass channel.

4. Loosen outside lip of rubber channel and remove glass and channel toward inside.

5. Remove channel from old glass for installation on new, if glass is to be replaced.

Note: If channel is torn or damaged in any way, it should be replaced.

The glass is installed in the reverse order of its removal, except that the glass channel must be sealed in place with FS-1039 cement.

16. Replacement of Back Window Glass

The back window glass and channel of all 37-series cars is retained in place by the garnish moulding, installed under pressure.

The procedure for removing this glass is as follows:

1. Take out rear seat cushion to avoid any possibility of damage to it.

2. Take out all Phillips' screws along face of molding and division bar and remove moulding.

3. Loosen rubber channel and pull glass and channel assembly out toward inside of body.

4. Remove channel from old glass for installation on new, if glass is to be replaced.

Note: If channel is torn or damaged in any way, it should be replaced.

To install a back window glass, proceed as follows:

1. Install channel assembly on glass.

2. Install the glass and channel assembly in place in window opening.

3. Make sure lip of rubber channel is even all around window opening.

4. Seal the glass and channel assembly in place with FS-1039 cement.

5. Install garnish moulding, pressing it firmly in place with Tool No. HMB-177 while installing retaining screws.

Note: Do not exert too much pressure against glass or pillar posts when making this installation.

17. Replacement of Ventilator Assemblies

Series 37-50 and 60—Procedure for removal and installation of I. C. V. ventilators in series 37-50 and 60 all-steel bodies is as follows:

1. Remove garnish moulding by taking out retaining screws along top and side edges of door.

2. Remove ventilator control handle and door remote control handle.

3. Loosen door trim down about five inches.

4. Remove two screws holding top of ventilator assembly to door.

5. Remove screw holding bottom of ventilator assembly to door.

6. Remove four screws holding ventilator regulator to door inner panel.

7. Open ventilator slightly and pry top of assembly in.

8. Close ventilator and remove from door.

Reverse order of the above operations will apply as an installation procedure.

Series 37-65, 70, 75, 85 and 90—The procedure for removal and installation of I. C. V. ventilators in the front doors and rear quarter windows of series 37-65, 70, 75, 85 and 90 composite bodies is as follows:

1. Remove garnish moulding by removing screws that hold the upper glass run channel in place on doors or by removing Phillip's screws along moulding on rear quarter windows.

2. Remove ventilator control handle and, on doors, the inside door handles. (See Note 4).

3. Loosen trim around window and regulator board.

4. On front doors, remove filler board at top of lock board.

5. Remove weather strip from vertical channel between ventilator and window glass.

6. Remove retaining screws in weather strip retainer.

7. Remove ventilator assembly by pulling out at top and lifting up to disengage drive shaft from regulator.

Reverse order of the above operations will serve as an installation procedure. Care should be taken to seal the ventilator assembly carefully in place with FS-1039 cement when making this installation.

18. Door Trim Pad Removal and Installation

Series 37-50 and 60—Removal—1. Remove door window garnish moulding. (See Note 8, page 13.)

2. Remove regulator and remote control handles.

3. Remove arm rest assembly (on front doors) by removing the two screws holding the trim retainer plate.

4. Remove two self-tapping screws located at bottom corners of trim pad.

5. Insert a flat tool between trim pad and door inner panel and separate evenly all the way around door until corrugated nails are entirely loose from door inner panel.

6. Lift trim pad up and disengage it from two hooks on door inner panel and remove. See Plate 5.

Installation—1. Straighten corrugated nails so they will engage slots in door inner panel. See Fig. 19.

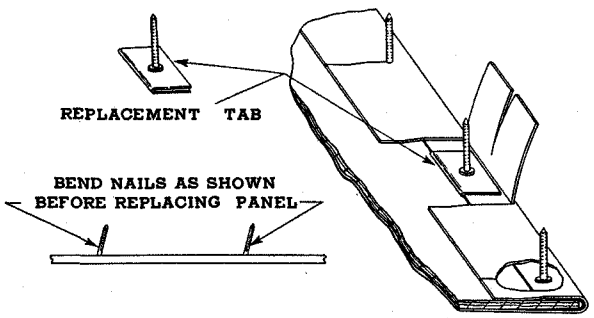


Fig. 19 Door Trim Pad Replacement

2. Engage slots in foundation of door trim pad over hooks on door inner panel.

3. Align door trim pad with door and with a rubber or smooth wooden mallet, drive the corrugated nails into the slots in the door inner panel.

Note: Nails should be driven in a little at a time in order to get an even installation.

4. Install two self-tapping screws at lower corners of trim pad assembly.

5. Install garnish moulding, regulator and remote control handles and inside locking knob.

6. Replace arm rest assembly.

Series 37-65, 70, 75, 85 and 90 — Removal—1. Remove door window garnish moulding. (See Note 8, Page 13.)

2. Remove regulator and remote control handles.

3. Remove arm rest assembly. (On front doors).

4. Untack trim from top edges of regulator board.

5. Turn down trim and remove tacks holding foundation of pad to regulator board.

6. Starting in the vicinity of the door lock, insert a flat tool between trim pad and door pillars and pry trim loose from door.

7. Follow this procedure all around door and finish operation by detaching complete trim pad from door.

Installation—The reverse order of the above operations will serve as a guide for door trim installation. Care should always be exercised to get the trim on evenly.

19. Door Adjustments

In order to check the fit of body doors, it is necessary to remove the wedge plate and door side bumpers so that the door will act freely on its hinges.

Three points should be checked to assure proper door fit. They are as follows:

1. Check the vertical alignment spacing at the hinge side of the door.

2. Check the horizontal alignment on lock side of door by belt moulding alignment.

3. Check the door flanges for alignment of door flanges which should be flush with body panels, except at the roof drip moulding.

Unequal vertical alignment indicates either loose hinge bolts or screws or a bent hinge. Loose hinges should be tightened securely. Bent hinges should be removed and straightened. See Fig. 20.

Improper alignment of the door belt moulding and the body belt moulding indicates that the door is swinging too high or too low. Correction of this trouble should be made by readjustment of the body bolts and shims. (See Notes 20 and 21).

Sprung doors indicate a strained condition and should be corrected by relieving or counterbalancing the forces until proper alignment is secured. Stiffener rods and strainer straps are sometimes used if the door will not stay in position.

20. Body Bolt Adjustment

The recommended procedure for adjusting the body bolts on 37-series cars varies slightly for the different models.

Body bolts used on series 37-50 and 60 cars should be turned down 1½ to 2 turns after the lock washers have been flattened.

On the remaining 37-series cars, the body bolts should be turned down only 1 turn after the lock washers have been flattened.

The same adjustments apply to both closed and convertible body styles.

21. Body Shims

The body shims on 37-series cars are of two different types, those used on Fisher Bodies and those used on Fleetwood bodies.

The shims used on Fisher Bodies are all made of burlap, impregnated with rubber latex. There are six shims on each side, resting on the two longitudinal members of the frame. The front shims and the pair third from the front are 1/8" thick while the rest are 3/8" thick.

To replace any of these shims, except the third pair from the front, the body bolts must be removed and the body pried up about 1/4" above the shim so that the thick part of the shim projecting through the frame, may be lifted out. The third pair of shims are slotted and may be removed by loosening the body bolts.

If the body is slightly out of line and further shimming is required, a 3/32" thick steel washer may be placed on top of the regular shim and the body bolts then tightened as described above. These metal washers are frequently required on the back pair of shims on Fisher Bodies.

The shims used on Fleetwood Bodies are much the same as those used on Fisher Bodies. They are made entirely of rubber except the front pair, which are made of burlap. They are all 3/8" thick. The front pair have 3 sections each 1/8" thick. If the body is out of line these sections may be added or removed as required. The replacement and adjustment of the shims on Fleetwood Bodies are the same as on Fisher Bodies.

22. Door Weatherstrip Installation

In the event of air leaks around the sill plate on any 37-series cars which were not provided with a door lower weatherstrip, this condition may be corrected by installation of door weatherstripping which is available from the factory Parts Division.

Note: Two weatherstrips are required for Coupe or Coach models, and three for Sedan models. (One of the three pieces is to be cut in two for the rear doors.)

When ordering, be sure to state the color and number required.

The procedure for installing door lower weatherstripping is as follows:

1. With the door closed make a chalk line on the door trim pad at the top of the sill plate to show where the weatherstrip is to be installed.
2. Remove the two screws on the lower corners of the door trim pad.
3. Measure the door width at the chalk line and cut the metal and rubber base of the weatherstrip to this length.

Note: Leave the fabric covering one inch longer at each end than the metal base so that it may be folded under at each end.)

4. Place weatherstrip against door trim pad so that the top edge of it falls on the chalk line and ends are even with the trim pad.
5. With a wooden mallet, drive the weatherstrip tacks into the door trim pad and turn surplus fabric under at ends.
6. Drill or punch new holes for the two self-tapping corner screws.

If one door is equipped with weatherstrip, the corresponding opposite door should likewise be equipped for appearance sake even if no air leaks are present.

23. Body Compounds

Four special body compounds are all that are necessary to service properly the 37-series bodies.

Cement FS-1039 is used for setting braces and wood joints, for cementing rubber parts to metal, and for any other use where rubber dough has been recommended.

A similar compound, FS-1040, is thinner in nature, and is recommended for sealing the outer lip of the weatherstrip rubber channel and for

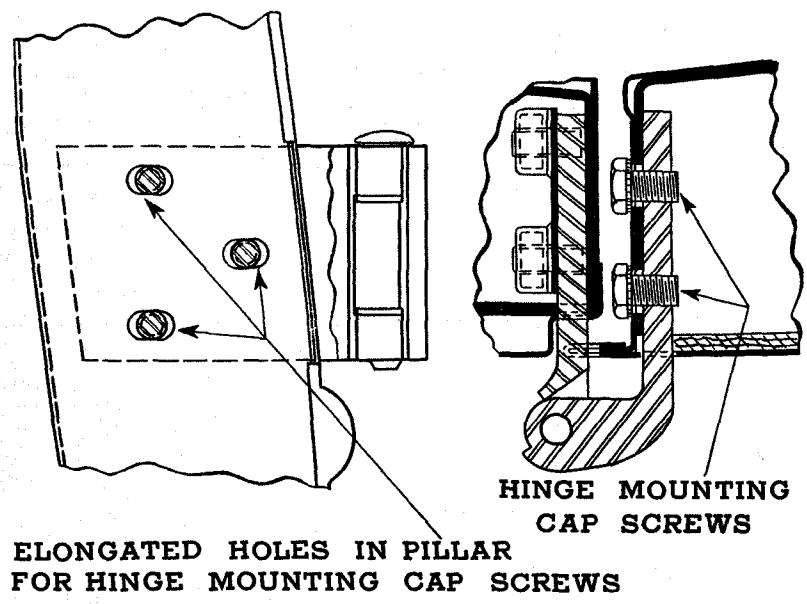


Fig. 20 Door Hinge Adjustment

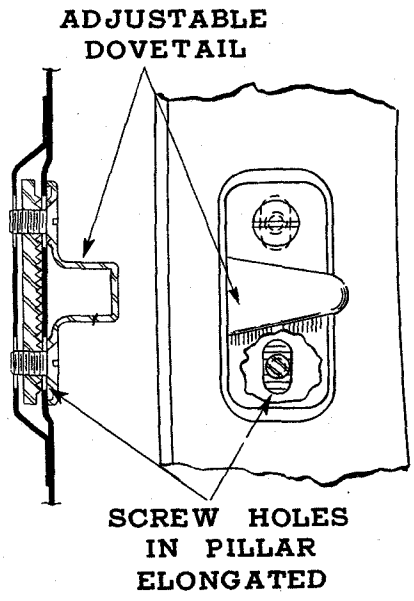


Fig. 21 Door Wedge Plate Adjustment

recementing loose portions of weatherstrip, deadener felt, etc. This may be used in Force Feed Gun No. B-182.

Trim cement FS-796 is used for adhering seat back materials, kick carpets, etc. It is especially adapted to cementing all heavy materials used in interior trim.

Asphaltine paste, FS-1044, is used to cement the sound silencer felts to the various metal panels. All four of these compounds can be secured on order from the Hinckley-Myers Company, Jackson, Michigan. This Company also supplies the body service tools mentioned in the text.

In addition to these, modeling clay provides an excellent means of checking accurately clearances at various points. For example, in checking the fore and aft clearance of doors, small pieces of clay may be rolled into balls and stuck to the body pillar. When the door is closed, each ball is compressed so that the clearance at each point can be accurately measured. These clearances are otherwise particularly difficult to check, due to the overhang of the door.

24. Body Wiring

If any of the lights or other electrical equipment in the body fail to operate, the trouble is usually due to one of the following causes:

1. A faulty or burnt out bulb.
2. A disconnected or broken wiring terminal.
3. A broken or short circuited wire.

Tracing down of such difficulty can be made in the following manner.

First, check the body wiring circuit by connecting one end of an independent wire to the body wiring connector beneath the instrument board and the other end of the wire to the dead lamp.

1. If the lamp ***fails to light,*** the trouble is either a burnt out bulb, a faulty ground, or a disconnected wire in the connector.

2. If the lamp ***does light,*** the trouble is a broken connection or a short circuit in the main wiring system.

Correction of the difficulty when located through the above check is merely a matter of parts replacement, reconnection of terminals, or installation of new wiring, etc., as the case requires.

Body Types and Style Numbers

Series 37-50 (124" Wheelbase)—Fisher Bodies		
5 Touring Sedan 2-Door	37-5011	Trunk, concealed spare
5 Touring Sedan 4-Door	37-5019	Trunk, concealed spare
5 Convertible Sedan	37-5049	Plain back, r. h. fenderwell.
2 Convertible Coupe	37-5067	Rumble seat, spare under deck.
2 Sport Coupe	37-5027	Two opera seats, spare under deck. Rumble seat when ordered.
Series 37-60 (124" Wheelbase)—Fisher Bodies		
5 Touring Sedan	37-6019	Trunk, concealed spare
5 Convertible Sedan	37-6049	Plain back, r. h. fenderwell.
2 Convertible Coupe	37-6067	Rumble seat, spare under deck.
2 Sport Coupe	37-6027	Two opera seats, spare under deck. Rumble seat when ordered.
Series 37-65 (131" Wheelbase)—Fisher Bodies		
5 Touring Sedan	37-6519	Trunk, concealed spare
Series 37-70 (131" Wheelbase)—Fleetwood Bodies		
5 Touring Sedan	37-7019	Trunk, concealed spare.
5 Convertible Sedan	37-7029	Trunk, concealed spare.
2 Sport Coupe	37-7057	Rumble seat, spare under deck.
2 Convertible Coupe	37-7067	Rumble seat, spare under deck.
Series 37-75 (138" Wheelbase)—Fleetwood Bodies		
5 Formal Sedan	37-7509-F	Plain back, exposed spare.
7 Imperial Sedan	37-7513	Plain back, exposed spare.
5 Touring Sedan	37-7519	Trunk, concealed spare.
7 Touring Sedan	37-7523	Trunk, concealed spare.
7 Special Touring Sedan	37-7523-S	Trunk, concealed spare
5 Convertible Sedan	37-7529	Trunk, concealed spare.
7 Imperial Touring Sedan	37-7533	Trunk, concealed spare.
7 Special Imperial Touring Sedan	37-7533-S	Trunk, concealed spare.
5 Town Sedan	37-7539	Trunk, concealed spare.
7 Town Car	37-7543	Plain back, exposed spare.
Series 37-85 (138" Wheelbase)—Fleetwood Bodies.		
5 Formal Sedan	37-7509-F	Plain back, exposed spare.
7 Imperial Sedan	37-7513	Plain back, exposed spare.
5 Touring Sedan	37-7519	Trunk, concealed spare.
7 Touring Sedan	37-7523	Trunk, concealed spare.
5 Convertible Sedan	37-7529	Trunk, concealed spare.
7 Imperial Touring Sedan	37-7533	Trunk, concealed spare.
5 Town Sedan	37-7539	Trunk, concealed spare.
7 Town Car	37-7543	Plain back, exposed spare.
Series 37-90 (154" Wheelbase)—Fleetwood Bodies		
7 Imperial Sedan	37-5875	Plain back, concealed spare.
7 Sedan	37-5875-S	Plain back, concealed spare.

FRAME

General Description

The frames used in the 37-series Cadillac and La Salle cars are of the center junction, X-type construction, which gives maximum rigidity, strength, and stability to the car. All of the frames are somewhat similar in appearance, although the frame dimensions and some of the details of construction are different between frames because of the difference in wheelbase lengths and individual requirements. (See Plate 7.)

Series 37-50, 60 and 90 frames are constructed with the side-bars formed outward at the front cross member so as to enclose the helical front springs. Series 37-65, 70, 75 and 85 frames have straight sidebars with the spring pads formed by an extension of the front cross member.

The X-member of series 37-50 and 60 frames, constructed of "I" section steel beams, adds greatly to the strength and rigidity of these lighter frames. Channel section steel beams serve the same purpose in the heavier frames used on series 37-65, 70, 75, 85 and 90 cars.

A special bracket is mounted at the front center of the front frame cross member of series 37-65, 70, 75, and 85 frames to carry the radiator and fender support. The radiator and fender support is mounted on the top of the front frame cross member on series 37-50, 60 and 90 cars.

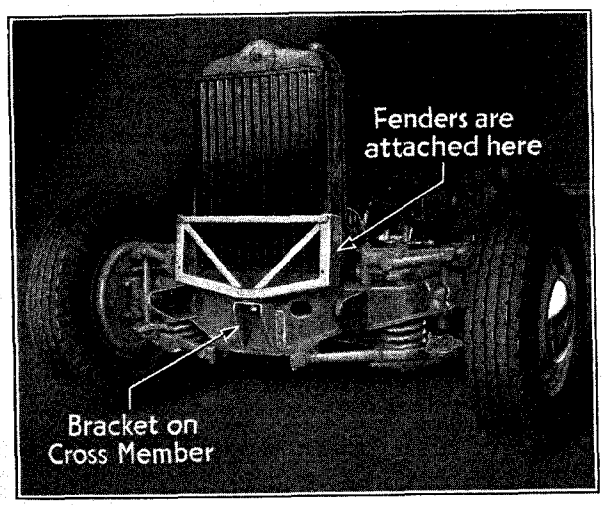


Fig. 1. Radiator Mounting, Series 37-65, 70, 75, 85

Specially built frames with one-piece sidebars and heavily reinforced X members are used on all 37-series commercial chassis. These frames are available for series 37-50, 60 and 75 only. The wheelbase lengths are shown in the specification table on page 25.

Self-Locking Nut

A new type self-locking nut, which does not require either a lock washer or cotter pin to prevent it from coming loose when once tightened, is used in a number of places on the chassis of 37-series cars.

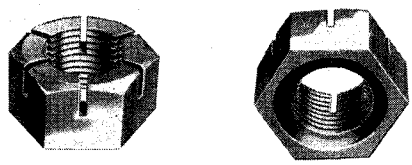


Fig. 2. Self-Locking Nut

This self-locking nut looks like an ordinary castle nut except for the narrow slots in the head and the recess in the bottom. These features of design, along with the natural resilience of the steel alloy, result in perfect thread contact, and high resistance to stripping or breakage, as well as to movement, are secured when the nut is tightened down.

The action taking place when the nut is tightened is as follows: The outer bearing surface on the bottom makes contact with the seating surface and the slotted portions of the head tend to close in and down on the bolt, forming a frictional contact with both sides of each thread that will resist movement, except with a wrench, so long as the seating pressure is maintained.

This nut can be used only at points where the base resistance is absolutely solid. A list of the points on the car where it can be used is given in the 37-series Parts List. Do not use this nut at any other points.

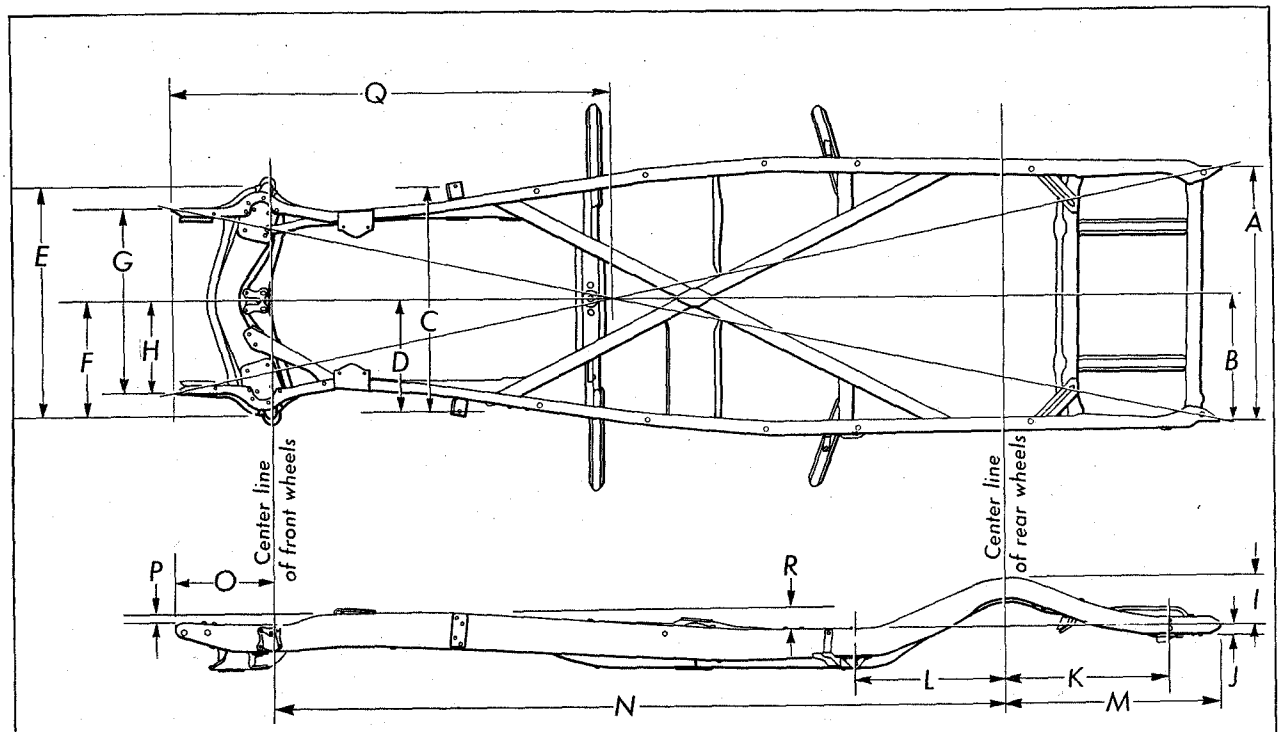


Fig. 3 Frame, Series 37-50 and 60

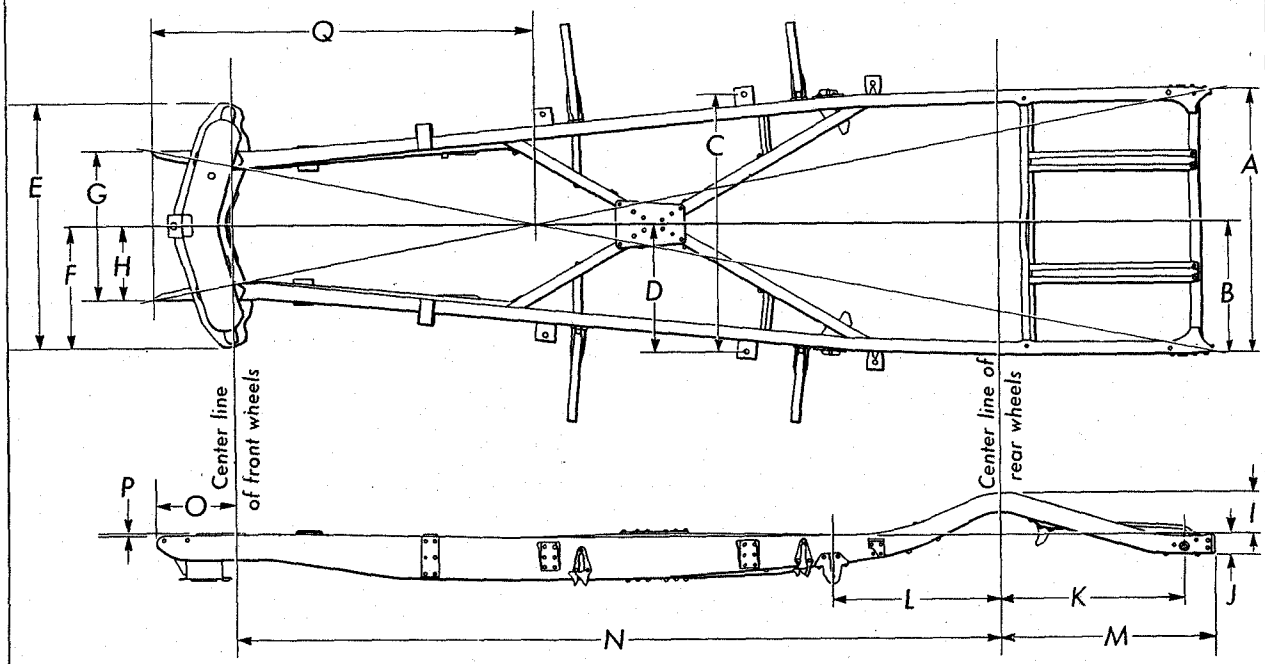


Fig. 4 Frame, Series 37-65 and 70

Plate 7. Frame Details and Dimensions

FRAME

Specifications

(See Plate 7)

Dimensions	Series			
	37-50 37-60	37-65 37-70	37-75 37-85	37-90
A(*B)	43 7/8"	47"	49"	45 1/2"
C(*D)	38 7/8"	45 5/8"	47 1/8"	48"
E(*F)	39 1/2"	43 1/8"	43 1/8"	39"
G(*H)	32"	26 1/4"	26 1/4"	32 7/8"
I	8 7/16"	7 1/4"	6 7/8"	6 1/8"
J	‡1 11/16"	3 3/4"	4 1/8"	———
K	28"	31 7/8"	31 7/8"	31 3/4"
L	25 3/8"	28 7/8"	28 7/8"	33"
M	**36 3/4"	36 1/2"	36 1/4"	39 3/4"
N	123 3/4"	131"	138"	154 1/8"
O	*17 1/4"	15"	15"	15 1/4"
P	† 13/16"	1 1/16"	11/16"	13/16"
Q	‡‡75"	65 1/2"	66"	87 3/4"
R	3 5/8"	———	———	———

*(B = 1/2A) (D = 1/2C) (F = 1/2E) (H = 1/2G)
‡Measurement taken from center line of bumper bracket.
**Measurement taken from face of bumper bracket at center line.
*Measurement taken from end of frame sidebar at center line.
†Amount of kick up at front end of frame.
‡‡Dimensions approximate. Intersection must fall on center line of frame.

NOTE: Fig. 4, Plate 7, typical of series 37-75, 85 and 90 frames.

Chassis Model Designation

124 in. Wheelbase (322 cu. in. V-8 engine)—series 37-50
124 in. Wheelbase (346 cu. in. V-8 engine)—series 37-60
131 in. Wheelbase (346 cu. in. V-8 engine)—series 37-65
131 in. Wheelbase (346 cu. in. V-8 engine)—series 37-70
138 in. Wheelbase (346 cu. in. V-8 engine)—series 37-75
138 in. Wheelbase (368 cu. in. V-12 engine)—series 37-85
154 in. Wheelbase (452 cu. in. V-16 engine)—series 37-90

Commercial Chassis

160 3/8 in. Wheelbase.....37-50 and 60
155 3/4 in. Wheelbase.....37-75

Tread

	Series 37-50 & 60	37-65 & 70	37-75 & 85	37-90
Front	58"	60 3/16"	60 3/16"	59 3/8"
Rear	59"	60 1/2"	62 1/2"	62"

First Engine Serial Number

Series 37-50.....2,230,001
Series 37-60.....6,030,001
Series 37-65.....7,030,001
Series 37-70, 37-75.....3,130,001
Series 37-85.....4,130,001
Series 37-90.....5,130,301

FRONT WHEEL SUSPENSION

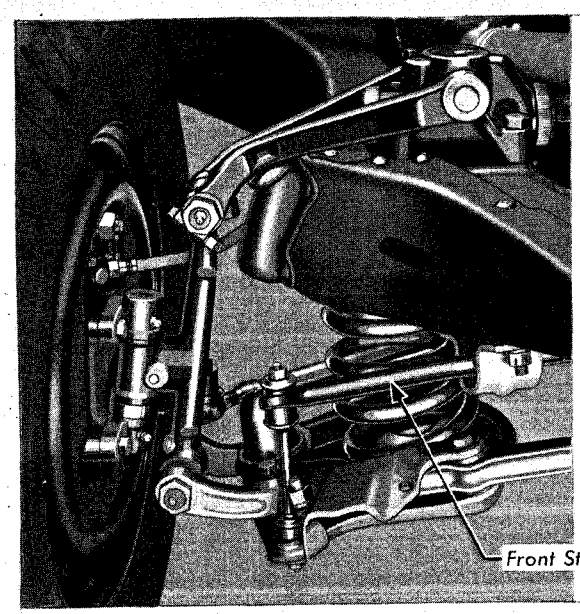


Fig. 1 Steering Knuckle and Support
Series 37-50 and 37-60

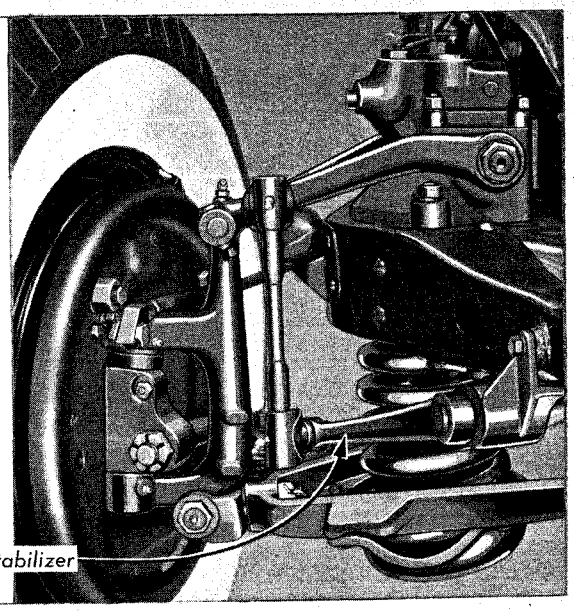


Fig. 2 Steering Knuckle and Support
Series 37-90

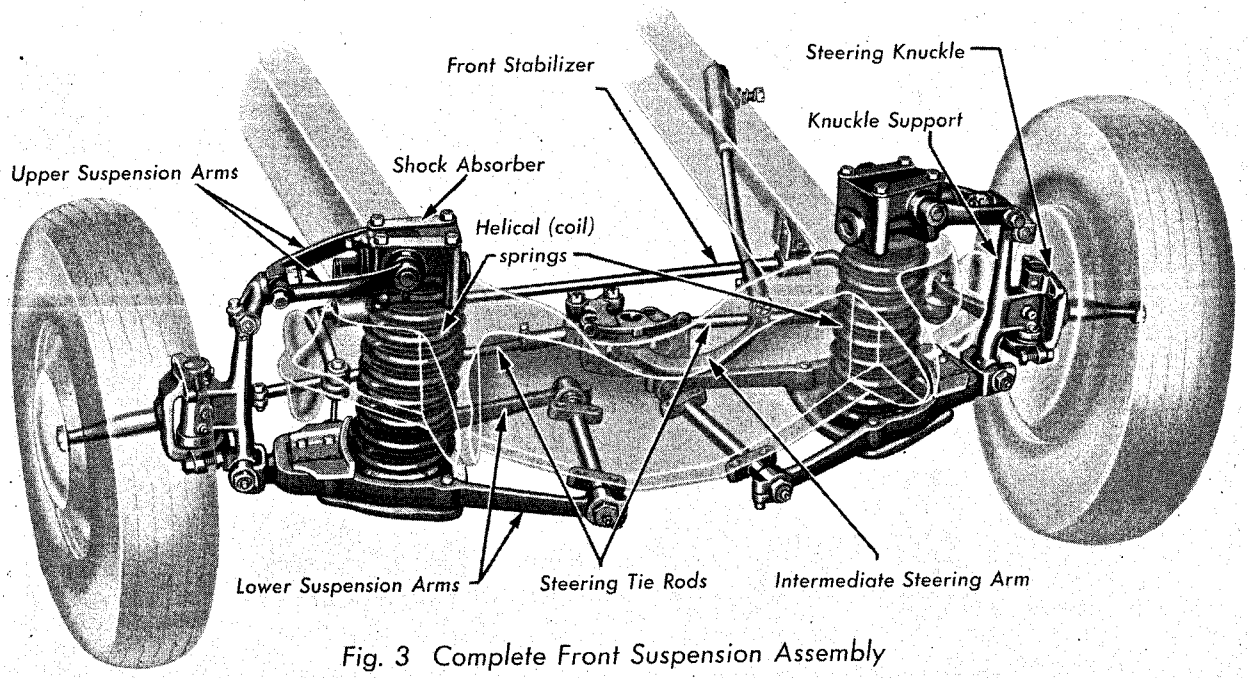


Fig. 3 Complete Front Suspension Assembly
Series 37-65, 70, 75 and 85

Plate 8. Front Wheel Suspension System

FRONT WHEEL SUSPENSION

General Description

The same type of independent front wheel suspension system that was used on previous series Cadillac and La Salle cars has been continued on the 37 series cars. The design of this system, with its coil springs, integral shock absorbers, pivoted suspension arms, and sturdy steering knuckle supports, is shown in Plate 8. The construction illustrated is typical of the 37 series design.

The front stabilizer bar on series 37-50, 60, and 90 cars is forward-mounted as shown in Plate 8, Fig. 1 and 2. On the remaining models the front stabilizer bar is mounted to the rear of the frame front cross member.

Series 37-65, 70, 75, 85 and 90 cars have needle bearings at the top and bottom of the steering knuckle pins. The lighter weight series 37-50 and 60 cars have plain bushings at this point.

Service Information

1. Lubrication

The threaded bushings of the front wheel suspension system require thorough lubrication, with the weight of the car off the bearings, every 1,000 miles.

When lubricating these parts, therefore, the front end of the car must be lifted with a jack placed under the center of the front cross member, so that the car is supported at the frame, and the front suspension system entirely relieved of weight.

The front end of the car must be lifted by the frame in order to secure thorough lubrication of the front suspension bearings.

FRONT WHEEL ALIGNMENT

Front wheel alignment is the mechanics of keeping all the inter-related factors affecting the running and steering of the front wheels in proper adjustment. Correct alignment is necessary to keep the front wheels in their true running position and is essential for easy and efficient steering, as well as the prevention of abnormal tire wear.

2. Important Wheel Alignment Factors

1. Tire inflation.
2. Trueness, balance, and tracking of both front and rear wheels.
3. Adjustment of front wheel bearings.
4. Condition of shock absorbers.
5. Adjustment of steering gear and all steering connections.
6. Caster angle of steering knuckle support.
7. Camber angle and knuckle pin inclination.
8. Toe-in of front wheels in straight ahead position.
9. Toe-out of front wheels on turns.
10. Condition of all bushings and bearings.

3. Correction of Wheel Misalignment

The following factors should be checked and put in proper setting, in the order given, when testing the wheel alignment of any car.

Tire Pressure—Checking and inflating the tires to the proper pressure is the very first operation of any wheel alignment job. It is essential to good steering, good riding, and maximum tire life. Under-inflation alone results in actual misalignment, with consequent hard steering and excessive tire friction, which causes rapid and uneven tire wear.

The correct tire pressures, front and rear, for 37 series cars are:

37-50, 60 . . . . . 26 lbs. minimum
37-65, 70 . . . . . 28 lbs. minimum
37-75, 85 . . . . . 32 lbs. minimum
37-90 . . . . . 36 lbs. minimum

Wheel Run-Out—Wheel run-out should not exceed $\frac{3}{32}$ in. measured at the side walls of properly inflated tires. Run-out should be checked with the wheels in place on the car, and should be eliminated as far as possible before checking other factors of alignment. Fig. 6 shows the procedure for marking high spots on the tire and the manner in which the wheels should be positioned when checking caster, camber and toe-in.

Instructions for correction of wheel run-out are given on page 141.

Wheel Eccentricity—Wheels and tires should run as nearly concentric as possible with the steering knuckle spindle. Eccentricity should not exceed $\frac{1}{16}$ inch measured at the center line of the tire with the wheel mounted on the spindle. Any out-of-round condition beyond this limit will tend to cause wheel shimmy and tramp, as well as excessive tire wear.

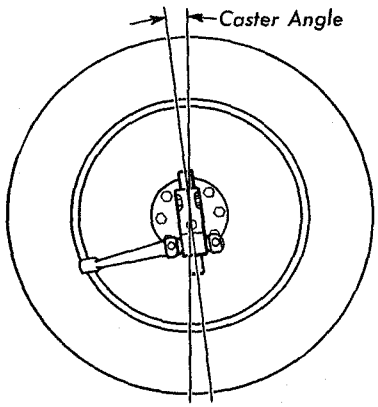


Fig. 4 Front Wheel Caster

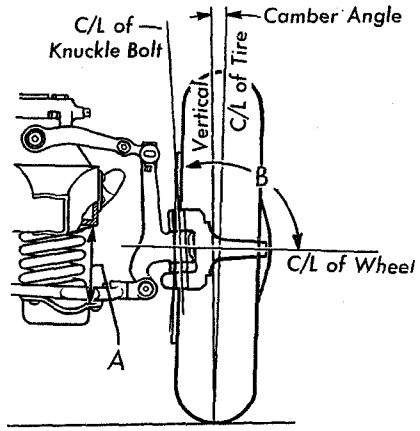


Fig. 5
Elements of Front Wheel Camber

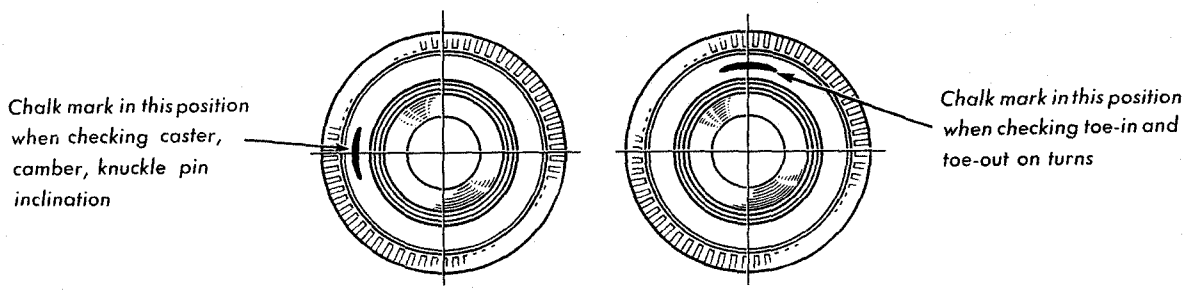
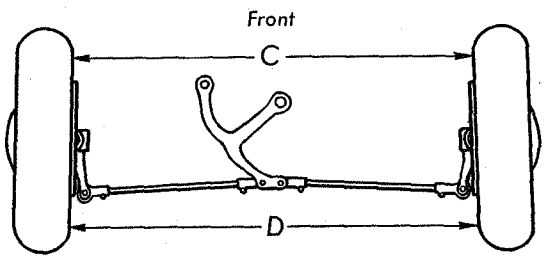


Fig. 6 Location of point of greatest run-out on front wheels when checking alignment factors



C should be 1/16-inch less than D

Fig. 7 Front Wheel Toe-in

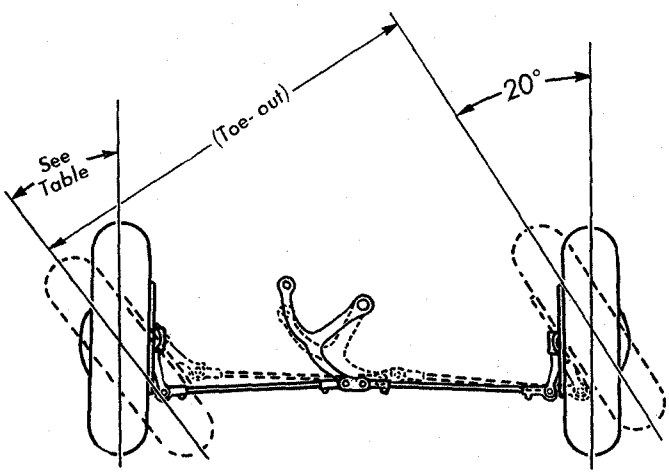


Fig. 8 Toe-out on Turns

Plate 9. Front Wheel Alignment Factors

Wheel and Tire Balance—Accurate balance of the front wheels, tires, and brake drums is important because any unbalanced condition will tend to produce wheel tramp and high speed shimmy.

The procedure for balancing wheels accurately is explained on page 141.

Tracking of Wheels—Another essential factor in the maintenance of good steering and the prevention of excessive tire wear is the proper tracking of the front and rear wheels. Failure of the wheels to track can be determined by marking the position of the wheels on a clean level floor and making a diagram of the rectangle, or by following the car on the highway.

If the wheels are out of track, check the position of the rear axle on the springs to make sure that the spring center bolts are not sheared. These bolts serve to keep the axle in place. The type and condition of the springs, as well as the alignment of the frame, should also be checked. It will be necessary to replace or straighten any broken, bent, or otherwise damaged parts to correct these troubles.

Wheel Bearings—Correct adjustment of the front wheel bearings must be maintained for proper functioning of the front wheel suspension system. The procedure for adjusting these bearings is explained on page 142.

Shock Absorbers — Good steering requires properly performing shock absorbers. Most of the trouble that develops here is due to insufficient fluid, incorrect operation of shock absorber valves, or worn or damaged parts.

A careful check and servicing to insure that the shock absorbers are in good mechanical condition and filled with the proper grade of fluid will usually serve to correct these troubles. (See Note 10, Page 55.)

Steering Gear and Steering Connections—The proper adjustment and lubrication of the steering gear and steering connections is of obvious importance to the satisfactory performance of the steering system. An incorrectly adjusted steering system may cause any of the steering complaints, even though the front wheels are in correct alignment.

Any adjustments to this unit should be preceeded by a careful check of all steering connections to insure that there is no binding nor excessive looseness at these points. Tests can be made by raising the front wheels off the floor and moving the connections by hand.

Complete instructions for the servicing of this unit are given in the Steering Gear section, page 135.

4. Caster Angle

(The four factors now to be explained —caster, camber, toe-in and toe-out, can be properly considered the essential elements of wheel alignment. In checking these elements, the use of precision equipment and careful workmanship is essential.)

Caster is the angle of backward inclination between the steering knuckle bolt and vertical. See Plate 9, Fig. 4. The purpose of caster is to stabilize steering by imparting a trailing action to the front wheels.

Excessive caster causes hard steering due, among other factors, to the increasing tendency of the front wheels to toe-in. Under these conditions the weight of the car has a tendency to turn the wheels in at the front around their respective steering knuckle bolts, resulting in front wheel shimmy.

Insufficient caster may result in car wander. Excessive reverse caster will cause erratic steering with a tendency to turn one way or the other, instead of traveling in a straight course.

5. Caster Adjustment

The proper caster setting for series 37-50 and 60 cars is ¼° to 1°, for series 37-65, 70, 75, 85, and 90 cars, —¼° to +¼°.

When checking the caster angle, it is important to take the reading with the weight of the car on the front wheels, and to position the wheels as shown in Plate 9, Fig. 6. The caster angle should come within the limits given above and be equal within ¼° on both sides of the car.

The procedures for setting the caster angle on 37-series cars are as follows:

Series 37-50 and 60—1. Loosen clamp screw at upper end of steering knuckle support.

2. Remove lubrication fitting from front bushing for threaded pin at upper suspension arm.

3. Insert Allen wrench, Tool J-619, through the hole from which the lubrication fitting was taken and adjust the caster by turning the threaded pin until the desired caster setting is secured, as shown in Plate 10, Fig. 9.

Note: Turning threaded pins in a clockwise direction increases caster and vice versa. It is important to turn the pin in complete turns only so as not to change the camber setting. See Plate 10.

4. After completing the adjustment to recommended specifications, tighten clamp screws and reinstall the lubrication fittings.

Note: The above procedure can be used to change the caster angle two or three degrees. If caster is out more than this, check the front suspension parts for misalignment and make correction by replacing bent or misaligned parts rather than by excessive adjustment.

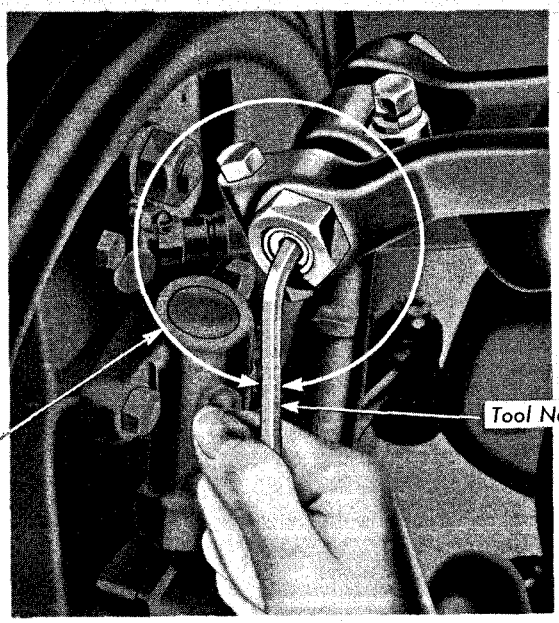


Fig. 9 Caster Adjustment
Series 37-50 and 37-60

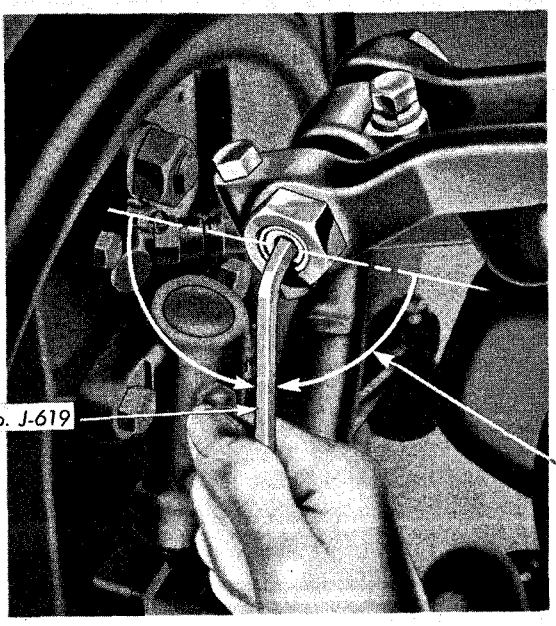


Fig. 10 Camber Adjustment
Series 37-50 and 37-60

Caster adjustment should be made in complete turns only. Turning threaded pin clockwise increases the caster. Turning it counter-clockwise decreases the caster.

Camber adjustment is made in 1/2 turns only: Position of eccentric portion of threaded pin controls the camber from zero to maximum in 180° turn

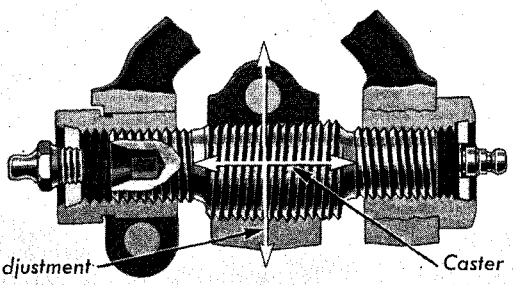


Fig. 11 Cross Section of Eccentric Pin at Upper Suspension Arm

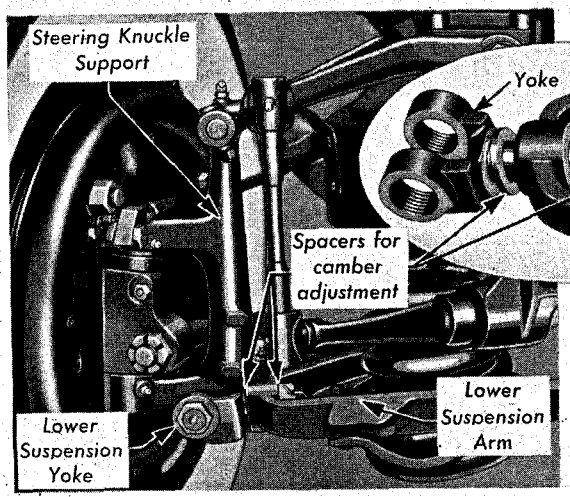


Fig. 12 Camber Adjustment—Series 37-90
Adjustment typical of 37-65, 70, 75 and 85

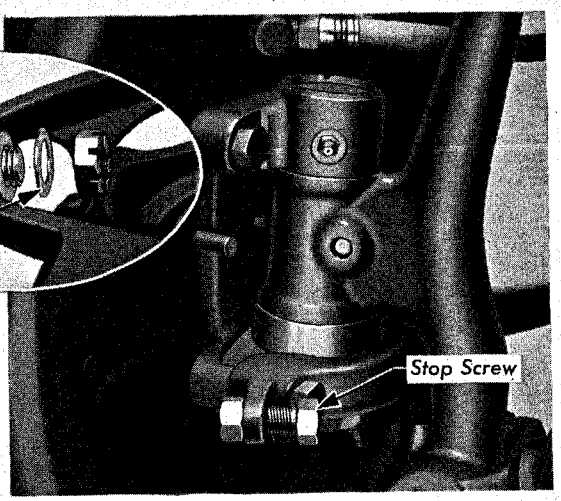


Fig. 13 Steering Stop Screw Adjustment
Series 37-65 and 37-70

Plate 10. Caster—Camber—Stop Screw Adjustments

Series 37-65, 70, 75 and 85—1. Loosen retaining nuts fastening steering knuckle support yokes to upper and lower suspension arms.

2. Loosen clamp screw at upper end of steering knuckle support.

3. Remove lubrication fitting from front bushing of upper support yoke.

4. Insert Allen wrench, Tool J-619, through the hole from which the lubrication fitting was taken and adjust caster by turning the threaded pin until the desired caster setting is secured, as shown in Plate 10, Fig. 9.

Note: Turning threaded pins in a clockwise direction increases the caster and vice versa.

5. After completing adjustment to recommended specifications, tighten yoke retaining nuts and support clamp screws, and reinstall the lubrication fittings.

Note: The above procedure can be used only to change the caster angle two or three degrees. If caster is out more than this, check front suspension parts for misalignment and make correction by replacing bent or misaligned parts rather than by excessive adjustment.

Series 37-90—1. Remove locking bolts in outer end of upper suspension arms for threaded pin in steering knuckle support.

2. Turn threaded pin with wrench until desired caster adjustment is secured.

Note: Turning threaded pins so that upper end of steering knuckle support is moved toward rear of car increases the caster and vice versa. Threaded pin must be turned in multiples of ½ or full turns so that locking bolts can be installed.

3. After completing the adjustment to recommended specifications, reinstall locking bolts.

Note: The above procedure can be used only to change the caster angle two or three degrees. If caster is out more than this, check the front suspension parts for misalignment and make correction by replacing bent or misaligned parts rather than by excessive adjustment.

6. Camber

Camber is the outward tilt of the front wheels at the top. See Plate 9, Fig. 5.

The purpose of camber is to support the greater part of the car weight on the inner wheel bearings, to reduce side thrust on the steering knuckle bolts, to compensate for looseness and wear in the steering knuckle and wheel bearings, and to bring the point of pivot near the center of the tire tread.

Too much camber is undesirable because of the effect it has on tire contact with the road. In order to secure the effect of camber required for easy steering and minimum wear of parts, the steering knuckle bolts are inclined inward at the top to reduce the amount of camber which would otherwise be necessary. It is obvious, therefore, that the angle of inclination of the steering knuckle bolts (Plate 9, Fig. 5, Angle "B") is closely associated with the wheel camber in its effect on steering.

7. Camber Adjustment

The proper camber setting for series 37-50 and 60 cars is ¼° to 1°, for series 37-65, 70, 75, 85 and 90 cars 0° to ½°.

When checking the camber, the front wheels should be turned so that the high spot on the tires is in a horizontal plane, as shown in Plate 9, Fig. 6. The camber angle should be within the limits shown above and equal within ¼° on both sides of the car.

Knuckle Bolt Angle—If camber is incorrect the inclination of the steering knuckle bolt ("B" Fig. 5) should be checked according to the specifications on page 48. An incorrect angle indicates bent suspension arms or steering knuckle supports, which of course have a direct effect on camber. Bent parts should be replaced and, since the installation of new parts may affect the turning angle of the wheels, the toe-out of the wheels on turns should be checked after such replacements.

It is also advisable after making a camber correction to change the tires, putting the front ones on opposite rear wheels and the rear ones on opposite front wheels to provide a normal tire contact.

Camber Correction—The procedure for setting the camber angle is as follows:

Series 37-50 and 60—1. Loosen clamp screw at upper end of steering knuckle support.

2. Remove lubrication fitting from front bushing of upper support yoke.

3. Insert Allen wrench, Tool J-619, through the hole from which the lubrication fitting was removed, and adjust the camber by turning the threaded pin until desired adjustment is secured.

Note: Since the camber adjustment is controlled by the eccentric action of the threaded pin, ½ turn gives the maximum adjustment and is all that should be required. (See Plate 10, Fig. 10.)

4. After completing adjustment to the recommended specifications, tighten the knuckle support clamp screws and install the lubrication fittings.

Series 37-65, 70, 75, 85 and 90—1. Remove retaining nut and spacers from the steering knuckle support yoke at the lower suspension arm. (See Note 13.)

2. Remove steering knuckle support yoke and reinstall with spacers arranged so as to secure the correct camber, as shown in Plate 10, Fig. 12.

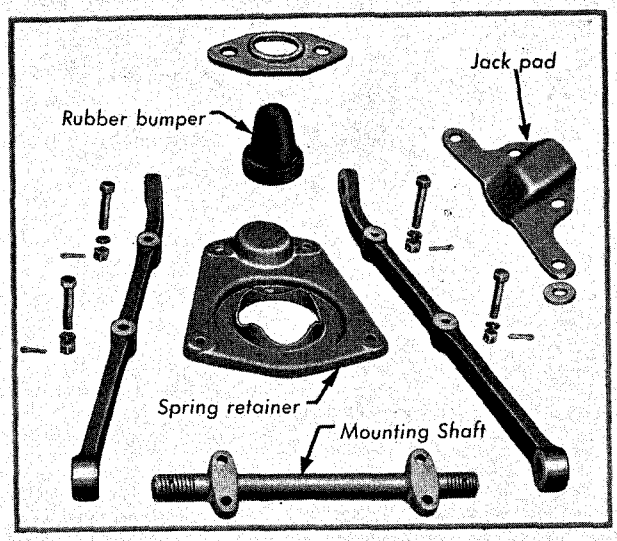


Fig. 14 Lower Suspension Arm
Series 37-50 and 37-60

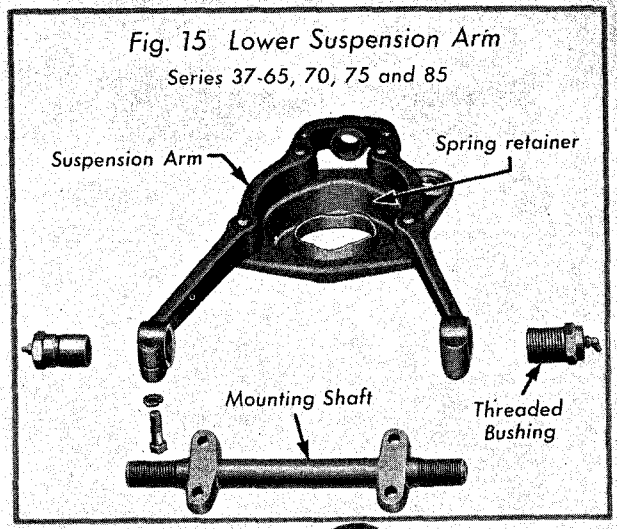


Fig. 15 Lower Suspension Arm
Series 37-65, 70, 75 and 85

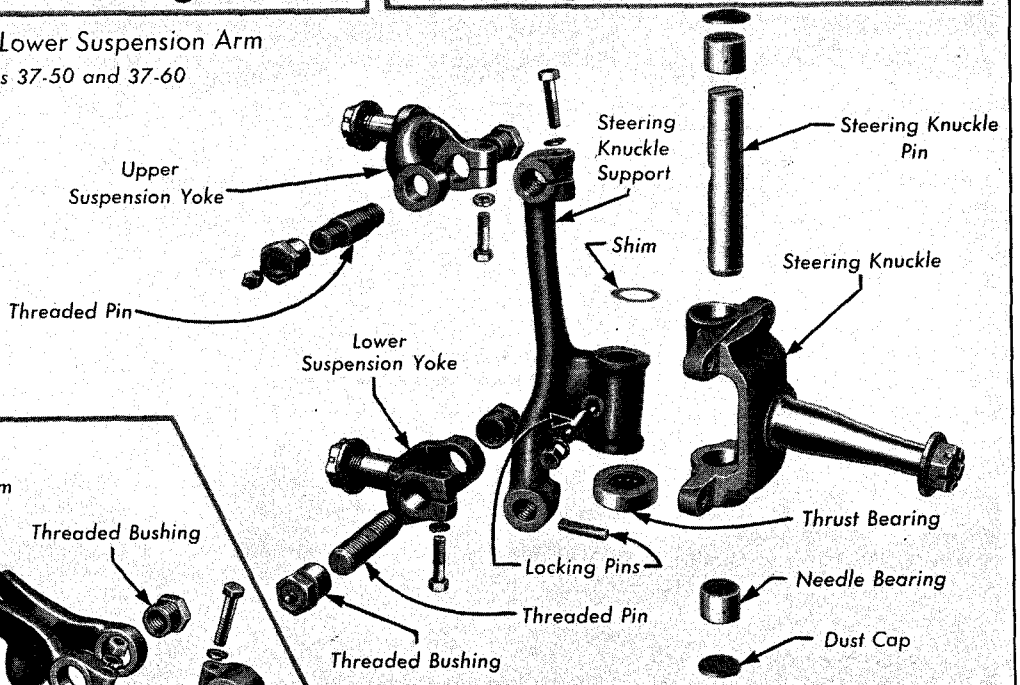


Fig. 17 Steering Knuckle Assembly
Series 37-65 and 70
Typical of 37-75 and 85

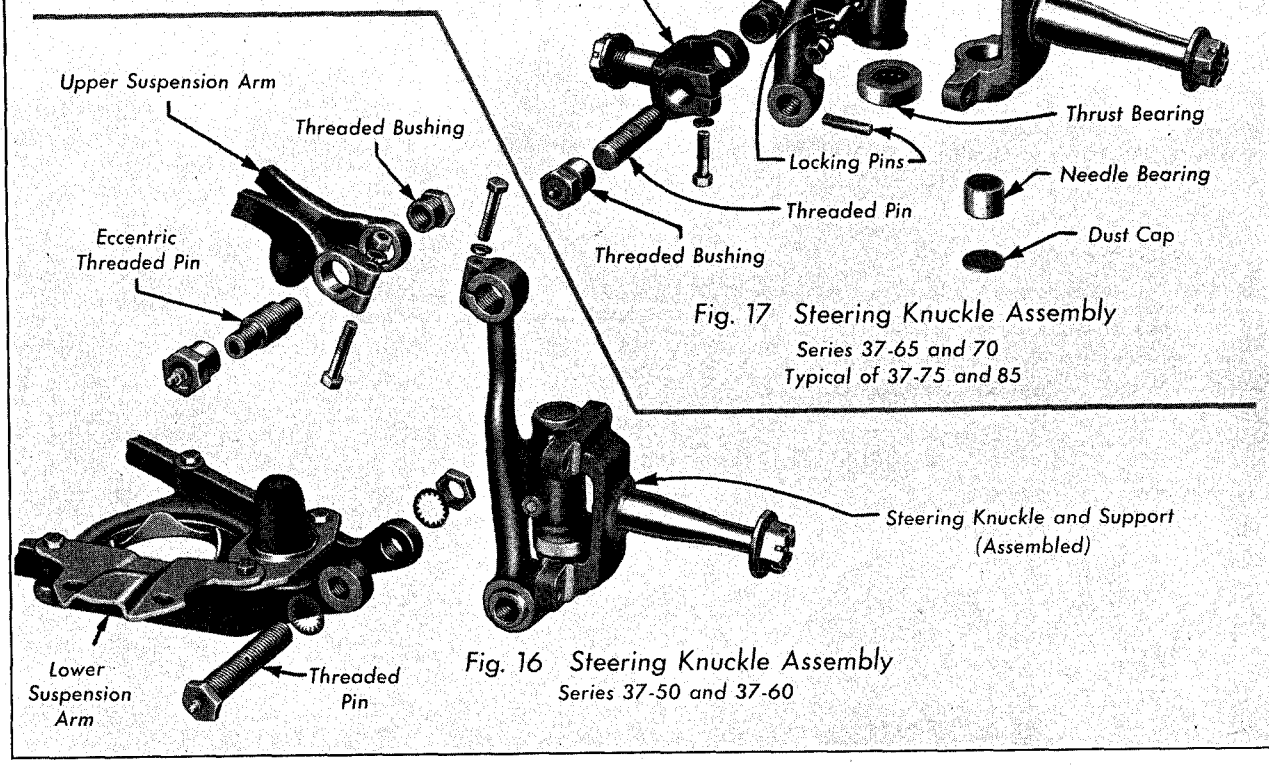


Fig. 16 Steering Knuckle Assembly
Series 37-50 and 37-60

Plate 11. Front Suspension Parts—Disassembled

Note: The camber can be decreased, if necessary, by installing the spacers between the suspension arms and the yoke instead of next to the retaining nut, and vice versa.

3. After completing the adjustment according to specifications, reinstall the steering knuckle support yoke retaining nut, tighten securely and lock in position.

8. Toe-in

The setting or adjustment of the front wheels so that the distance between them is less at the front than at the rear is called "toe-in." See Plate 9, Fig. 7.

The purpose of toe-in is to make the wheels roll straight-ahead and compensate for the tendency of cambered wheels to roll outward. Toe-in is also necessary to prevent abnormal tire wear.

9. Adjustment of Toe-in

The proper toe-in setting depends upon the type of equipment used for checking. When measuring toe-in with equipment that is used while the car is at rest, the toe-in should be from $\frac{1}{16}$ to $\frac{3}{32}$-inch. When testing with "scrub board" equipment that takes the measurement while the car is in motion, the limits should be from 0 to $\frac{1}{16}$-inch.

When checking toe-in, the wheels and tires should be made to run as nearly true as possible and the readings should be taken only when the front wheels are in a straight-ahead position and with the steering gear on its high point. The high spot on the side of the tires should be in a vertical plane, as shown in Plate 9, Fig. 6, when testing on stationary equipment.

The procedure for making the toe-in adjustment is as follows:

1. Loosen the clamp screws at each end of the steering tie rods.

2. Turn both tie rods an equal amount until the desired toe-in setting is obtained.

Note: Turning the tie rods in the direction the wheels revolve when the car moves forward decreases the toe-in. Turning the tie rods in the opposite direction increases the toe-in.

3. When adjustment has been completed according to the recommended specifications, tighten all clamp screws.

10. Toe-Out on Turns

The tendency of the front wheels to toe-out on turns is another factor of front wheel alignment which is important. See Plate 9, Fig. 8.

Toe-out develops when the front wheels are turned to the right or left, depending on the amount of deflection from the straight-ahead course, because of the difference in the arc made by the inside wheel as compared with that of the outside wheel.

Toe-out on turns is essential to easy steering and maximum tire life. It is provided for by the design of the steering knuckle arms, whose geometry bears a definite relationship to the steering radius, the wheelbase of the car, and the distance between the steering knuckle bolts.

Toe-out is checked by turning the wheels to the right or left, locating the outside wheel in a definite position, and determining the setting of the inside wheel. With the outside wheel set to 20°, the setting of the inside wheel should be 21¾° to 23¼° for series 37-50 and 60 cars, and 22° to 23½° for series 37-65, 70, 75, 85 and 90 cars.

Errors in the setting of the inside wheel are usually due to bent steering knuckle arms, which should be corrected by replacement. When replacements of this kind are made, it is important to check the steering knuckle supports and suspension arms to make sure that they have not been damaged and to see that the camber and caster are correct and equal on both sides; and that the toe-in is correct.

11. Adjustment of Steering Stop Screws

Whenever a complete check of front wheel alignment is made, it is well to check the adjustment of the steering stop screws to prevent any possibility of chassis interference with the wheels on turns or of the steering gear roller bottoming in the housing. No stop screw adjustment is required on series 37-75 and 85 cars, as stops are provided in the steering gear housing design.

The procedure for setting the stop screws on the remaining series is as follows:

1. Turn the front wheels to the exact straight-ahead position and mark the steering wheel with a piece of tape at the high point.

2. Turn the steering wheel two complete revolutions to the right and adjust the right hand stop screw until it rests against the stop. Plate 10, Fig. 13 shows the stop screw for series 37-65 and 70 cars.

3. Again set the wheels in a straight-ahead position and turn the steering wheel two complete turns to the left and adjust the left hand stop screw as described above.

12. Removing and Installing Steering Knuckle and Knuckle Pin (All Series)

To remove the steering knuckle and knuckle pin:

1. Lift front end of car from floor with jack or hoist.

2. Remove car wheel, wheel hub and brake drum assembly, and wheel bearings.

3. Disconnect tie rod at steering arm pivot ball joint.

4. Remove brake dust shield.

Note: It is recommended that the brake hose be disconnected during this operation, although it is possible to remove dust shield without doing so if care is exercised not to damage brake hose.

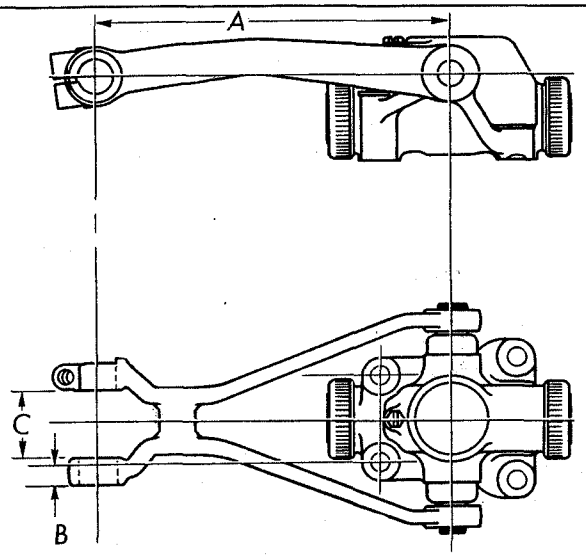


Fig. 18
Upper Suspension Arm and Shock Absorber
Series 37-50 and 60

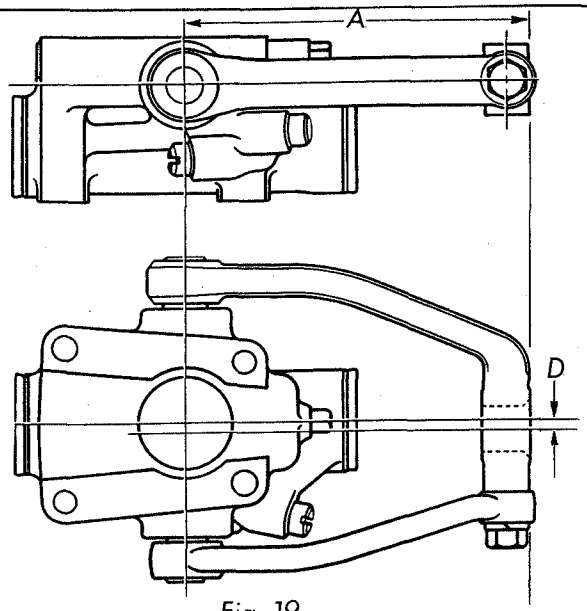


Fig. 19
Upper Suspension Arm and Shock Absorber
Series 37-65, 70, 75 and 85

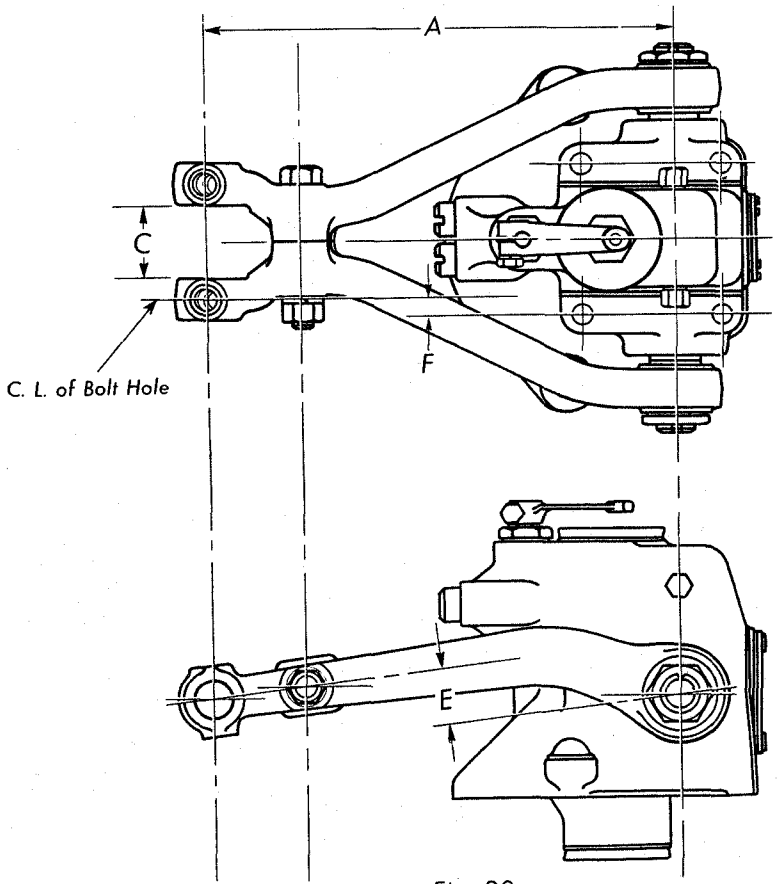


Fig. 20
Upper Suspension Arm and Shock Absorber
Series 37-90

Plate 12. Alignment of Shock Absorber Arms

5. Remove locking pin from steering knuckle support. (From steering knuckle on series 37-90).

Note: On series 37-50 and 37-60 cars, locking pin is a tight press fit and should be driven out from end with flat surface on side. On series 37-65, 70, 75, 85 and 90, locking pin is a threaded bolt.

6. Remove dust caps at upper and lower knuckle pin holes, tap out steering knuckle pin, and disassemble steering knuckle support from steering knuckle, taking care not to damage thrust bearings. (See Plate 11).

Note: On series 37-65, 70, 75, and 85 cars, the needle bearings at top and bottom of steering knuckle pin should be removed from the steering knuckle to complete the disassembly. On series 37-90 cars the needle bearings are located in the steering knuckle support.

Installation should be made in the reverse order of operations. Proper lubrication of parts when assembling is most important.

13. Removing and Installing Steering Knuckle Support and Yoke Assembly

Removal from series 37-50, 60 and 90 cars:

1. Remove steering knuckle as previously explained.

2. Place jack under lower suspension arm to support coil spring while disconnecting upper end of steering knuckle support.

3. Disconnect front stabilizer bar.

4. Loosen clamp screws at upper end of steering knuckle support. (Series 37-50 and 60 cars only.)

5. On series 37-50 and 60 cars, loosen clamp screw in upper suspension arm at threaded pin.

6. On Series 37-50 and 60 cars, mark the position of the threaded pin so that the correct caster and camber position can be maintained when reassembling.

7. On series 37-50 and 60 cars, remove threaded bushing at rear end of threaded pin.

8. On series 37-50 and 60 cars, remove lubrication fitting at front end of threaded pin, insert Allen wrench, and remove threaded pin from steering knuckle support and upper suspension arm.

9. On series 37-90 cars, remove two retaining screws holding threaded pin in position in upper suspension arm and remove pin from arm.

10. Swing the steering knuckle support outward at top to free from car.

Note: Helical car spring can be removed at this point, if desired, by lowering jack under lower suspension arm.

11. On series 37-50 and 60 cars, remove threaded bushing and threaded pin from lower suspension arm, which will release steering knuckle support as final operation. On series 37-90 cars, remove retaining nut that holds the steering knuckle support yoke to the lower suspension arm.

Installation—The reverse order of operations will serve as a guide for reassembly.

When assembling the threaded pins at the upper and lower ends of the steering knuckle support, it is important to install the pins as nearly as possible in their original position because the eccentric pin at the top controls the caster and camber adjustment as explained in Plate 10.

Removal from series 37-65, 70, 75 and 85 cars:

1. Remove steering knuckle, as previously explained.

2. Place jack under lower suspension arm to support coil spring while disconnecting upper end of steering knuckle support.

3. Disconnect stabilizer bar link.

4. Remove the retaining nut which holds the steering knuckle support yoke to the upper suspension arm.

5. Swing steering knuckle support outward at top to free from upper suspension arm.

Note: Helical car spring can be removed at this point, if desired, by lowering jack under lower suspension arm.

6. Remove retaining nut that fastens steering knuckle support yoke to lower suspension arm.

7. Remove steering knuckle support and yoke assembly.

Dimensions

Plate 12. Shock Absorber Arms

Dimensions	Series			
	37-50, 60	37-65, 70	37-75, 85	37-90
A	9 7/8	7 19/32	7 19/32	10
B	17/32	—	—	—
C	1 7/8	—	—	1 5/8
D	—	5/32	5/32	—
E	—	—	—	1 1/4
F	—	—	—	13/32

All Dimensions Given In Inches

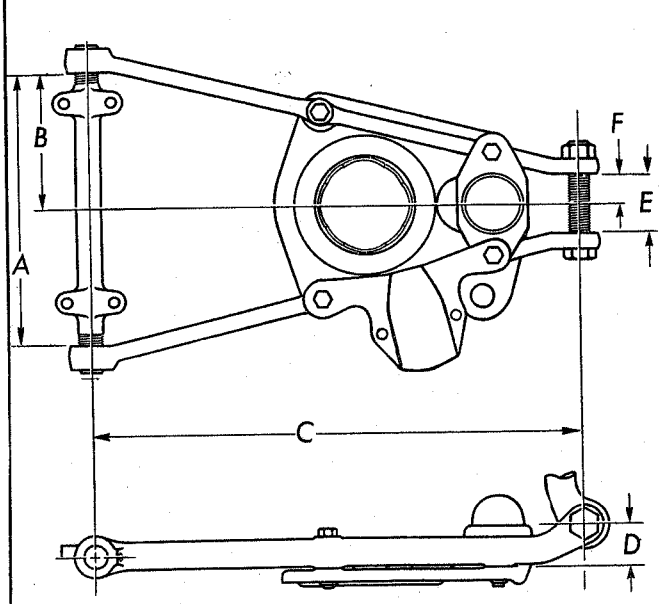


Fig. 21
Lower Suspension Arms
Series 37-50 and 60

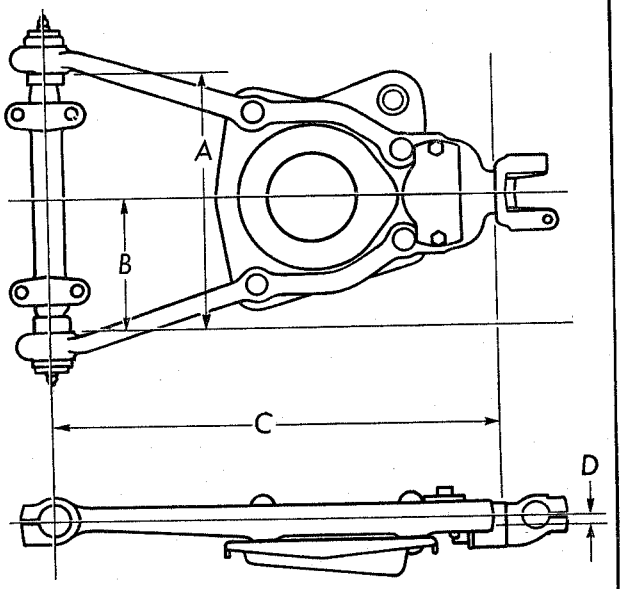


Fig. 22
Lower Suspension Arms
Series 37-65, 70, 75 and 85

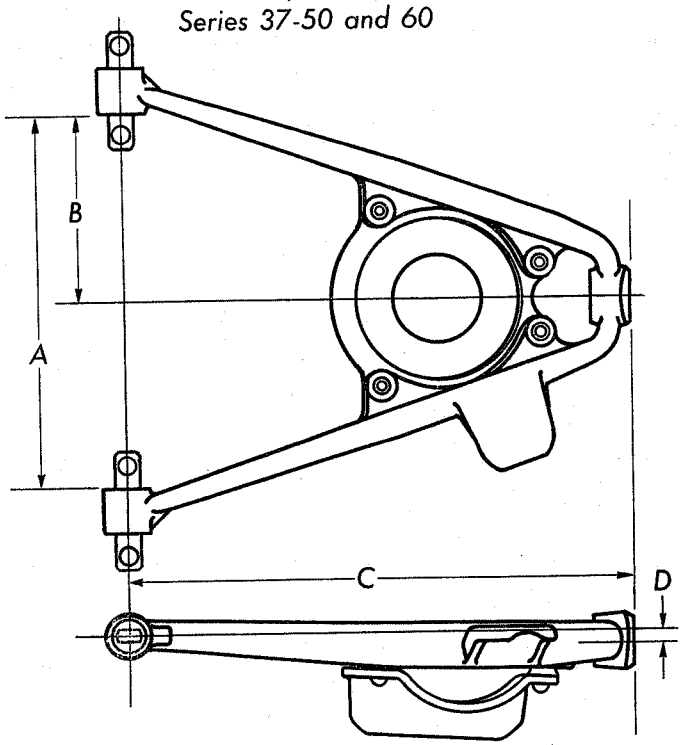


Fig. 23
Lower Suspension Arms
Series 37-90

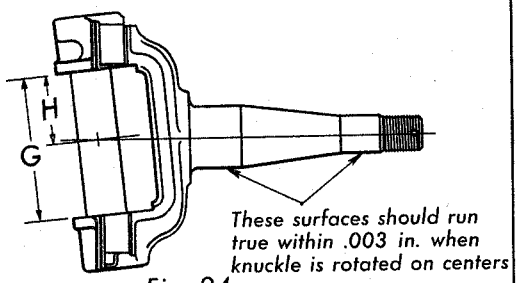


Fig. 24
Steering Knuckle
Series 37-75 and 85
Typical of 37-50, 60, 65 and 70

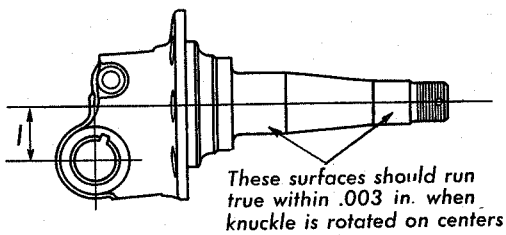


Fig. 25
Steering Knuckle
Series 37-90

Plate 13. Alignment of Suspension Arms and Steering Knuckles

8. Loosen clamp screws at upper and lower steering knuckle support yokes and upper end of steering knuckle support.

9. Remove threaded bushing and pin assembly at ends of steering knuckle support and mark the position of the threaded pin so that it will be possible to reassemble the unit in its original position to maintain proper steering alignment.

Installation—The reverse order of operations will serve as a guide for reassembly.

When assembling the threaded pins at the upper and lower ends of the steering knuckle support yokes, it is very important to assemble them in their original position so that the correct wheel alignment relationship will be maintained.

The final step is to check the elements of front wheel alignment to make sure that all adjustments are correct.

14. Replacing Lower Suspension Arms and Front Car Springs

1. Remove front wheel, hub, bearings, and steering knuckle support, as previously explained.

2. Remove coil spring by lowering jack and dropping outer end of lower suspension arm to the floor.

3. Remove suspension arm by removing mounting shaft bolts at frame cross member.

4. Place suspension arm and mounting shaft assembly on bench and disassemble mounting shaft from arm. See Plate 11, Fig. 14 and 15.

Installation—The reverse order of operations will serve as a guide for installation.

When installing the lower suspension arms, see that the coil springs have insulators at each end and are properly seated in their retainers when lifting the suspension arm with the jack for assembly of the steering knuckle support.

Lubricate all parts thoroughly after installation.

15. Nut for Front Stabilizer Link

On some of the first series 37-50 and 60 cars, the front stabilizer link nut measured only ½-inch in outside diameter, and in some instances, did not lock securely.

If any difficulty should arise due to the loosening of this link, a new type nut, Part No. 5302387, should be installed. The new nut measures $\frac{9}{16}$-inch across the flats and has sharp instead of rounded corners so that it may be locked more securely against the retainer.

16. Checking Bent Parts

Whenever it is necessary to check the alignment of parts which have been bent or damaged by accident or other cause, the figures shown in Plate 12 to 17, along with the specifications given on the accompanying pages should be used to determine the extent that the parts are out of alignment.

17. Straightening Bent Parts

The straightening of bent parts in the front wheel suspension system should be attempted only within the following limits:

Parts should not be straightened if they are sprung out of alignment more than 5°. To straighten parts while cold is likely to result in

Dimensions

Plate 13. Suspension Arms and Steering Knuckles

Dimensions	Series			
	37-50, 60	37-65, 70	37-75, 85	37-90
A	$10\frac{15}{16}$	$11\frac{1}{4}$	$11\frac{1}{4}$	$13\frac{5}{8}$
B	$5\frac{15}{32}$	$5\frac{5}{8}$	$5\frac{5}{8}$	$6\frac{13}{16}$
C	$19\frac{23}{32}$	$18\frac{23}{32}$	$18\frac{23}{32}$	$18\frac{1}{4}$
D*	$1\frac{21}{32}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$
E	$2\frac{3}{8}$	——	——	——
F	$1\frac{3}{16}$	——	——	——
G	3.042 3.046	3.124 3.126	3.593 3.595	—— ——
H	$1\frac{1}{4}$	$1\frac{15}{64}$	$1\frac{23}{32}$	——
I	——	——	——	$1\frac{31}{64}$

*D is Distance from Centerline of Hole for Mounting Shaft to Centerline of Yoke Bolt.

All Dimensions Given In Inches

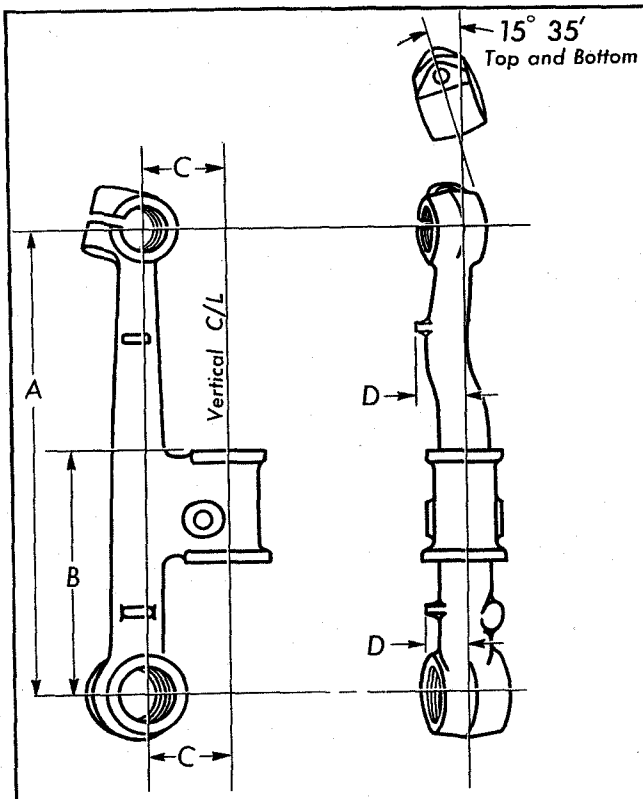


Fig. 26
Steering Knuckle Support
Series 37-50 and 60

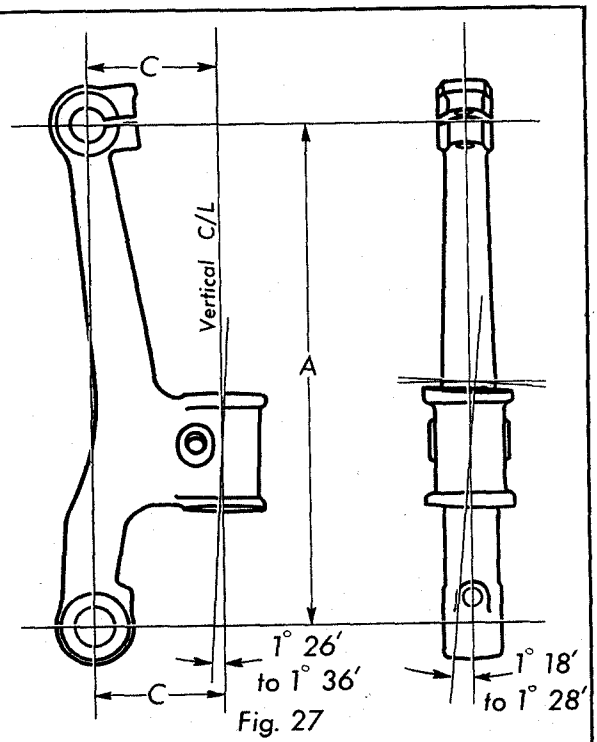


Fig. 27
Steering Knuckle Support
Series 37-65 and 70

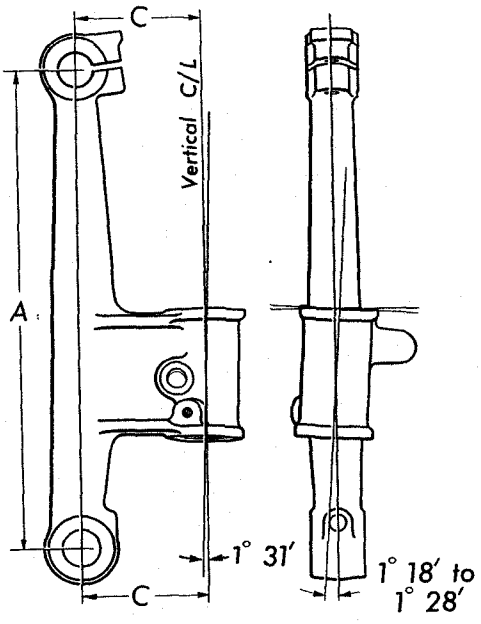


Fig. 28
Steering Knuckle Support
Series 37-75 and 85

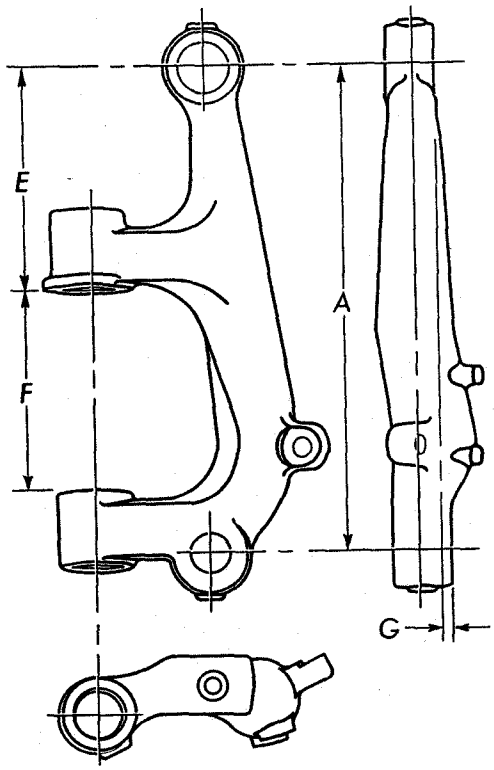


Fig. 29
Steering Knuckle Support
Series 37-90

Plate 14. Alignment of Steering Knuckle Supports

stresses and sometimes in cracks invisible to the naked eye, which will render the part unsafe for use. Straightening with heat will destroy the effect of previous heat treatment, leaving the steel either soft and weak or brittle and easily broken.

Welding of parts subjected to severe strain should never be permitted because the welding process will change the structure of the metal around the weld, rendering it unsafe for further use.

18. Care of Shock Absorbers

Aside from periodic checking of the liquid level, the shock absorbers require attention only in cases of noisy operation or unsatisfactory riding. Correction of either of these conditions is explained in Note 10, page 55 for both the front and rear shock absorbers.

Shock absorber valve data are given in the specification table, and the installation of valves is evident from the sectional views in Plates 18 and 21.

19. Swishing Noise in Shock Absorbers

On some of the first series 37-50 and 60 cars, a swishing noise is sometimes heard at low speeds over rough roads due to the action of the oil discharged through the valves of the shock absorbers.

In case of such complaints, correction should be made by installing late type valves in the shock absorbers. The code and part numbers of these late type valves are as follows:

		Code	Part No.
Compression,	Front	1 DX	5316018
"	Rear	1 BX	5316019
Rebound	Front	1 EX	5316017
"	Rear	1 L	5316020

In most cases, replacement of the valves in the front shock absorbers will be sufficient to eliminate the trouble, although the valves in the rear shock absorbers can be changed if necessary. This change can be made on the front shock absorbers without removing them from the car. Rear shock absorbers must be removed to make this change.

It is **important** to change **both compression and rebound valves** and to refill the shock absorbers with oil after the change has been made.

Valve No. 5316019 coded 1BX may also be used, if necessary, on series 37-65, 70, 75 and 85 front shock absorbers, for both rebound and compression.

Again, it is important to change **both** compression and rebound valves and to refill the shocks with oil after the change has been made.

20. Installing Front Shock Absorbers

The correct mounting of the front shock absorbers on Series 65, 70, 75 and 85 is clearly shown in Plate 8, Fig. 3. Make certain that these shock absorbers are always installed in this position, as it is possible to install them upside down, which would of course throw the entire front suspension system out of balance.

Dimensions

Plate 14. Steering Knuckle Supports

Dimensions	Series			
	37-50, 60	37-65, 70	37-75, 85	37-90
A	10.209 10.229	10.893 10.913	10.898 10.908	$10\frac{21}{32}$
B	$5\frac{5}{16}$	——	——	——
C	$1\frac{31}{32}$	$2\frac{13}{16}$	$2\frac{13}{16}$	——
D	$\frac{7}{8}$	——	——	——
E	——	——	——	$4\frac{53}{64}$
F	——	——	——	4.514 4.524
G	——	——	——	$\frac{7}{32}$

All Dimensions Given In Inches

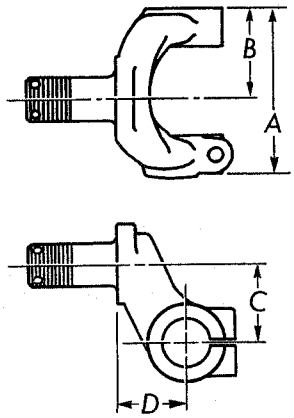


Fig. 30
Yoke—Upper Suspension Arm
Series 37-65, 70, 75 and 85

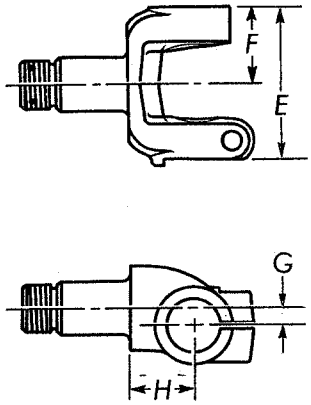


Fig. 31
Yoke—Lower Suspension Arm
Series 37-65, 70, 75 and 85

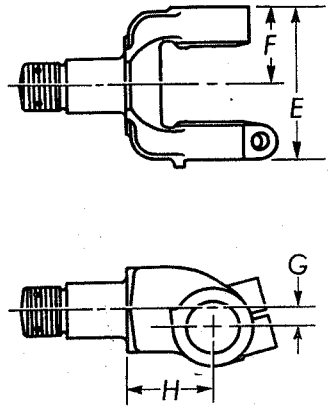


Fig. 32
Yoke—Lower Suspension Arm
Series 37-90

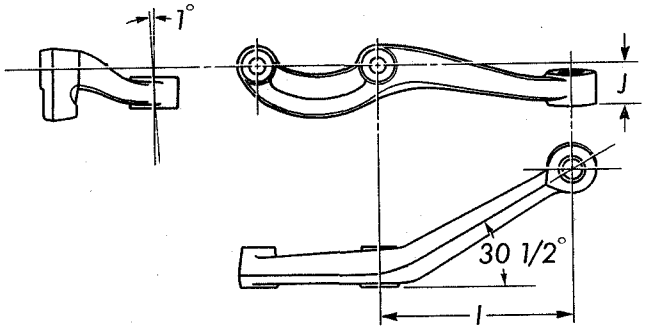


Fig. 33
Steering Knuckle Arm
Series 37-50 and 60

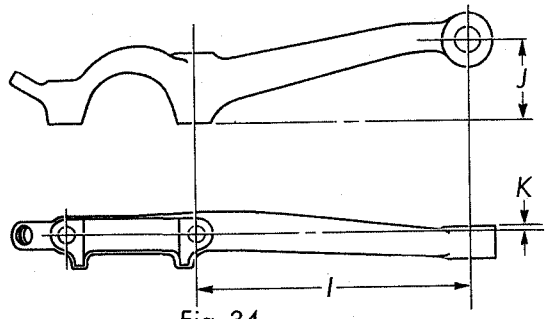


Fig. 34
Steering Knuckle Arm
Series 37-65 and 70

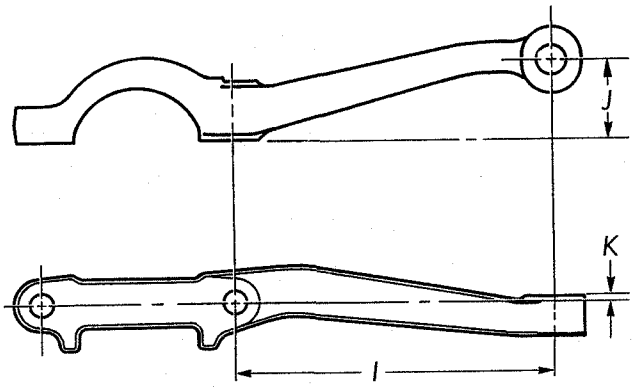


Fig. 35
Steering Knuckle Arm
Series 37-75 and 85

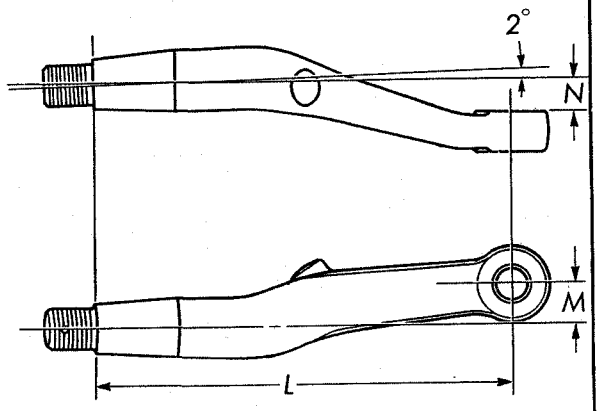


Fig. 36
Steering Knuckle Arm
Series 37-90

Plate 15. Alignment of Yokes and Steering Arms

FRONT WHEEL SUSPENSION

Diagnosis Chart

Effect	Cause	Remedy
Hard Steering (Indicated by tightness in steering system)	Low or uneven tire pressure	Inflate tires to proper pressure.
	Steering gear or connections adjusted too tight	Test steering system for binding with front wheels off floor. Adjust as necessary and lubricate.
	Steering tie rod ends adjusted too tight. (Series 65, 70, 75, 85, 90)	Check for binding with front wheels off floor. Adjust as required and lubricate
	Insufficient or incorrect lubricant used.	Check lubricant in steering gear and lubricate steering system as required.
	Excessive caster	Check caster and adjust as necessary.
	Suspension arms bent or twisted.	Check wheel alignment by testing the camber, knuckle bolt inclination and caster. If arms are out of car, check against specifications. Replace arms with new ones.
	Front springs sagged.	Check overall length of springs. Sagged springs should be replaced with new ones.
	Frame bent or broken.	Check frame for proper alignment and breakage. Repair or replace frame as necessary.
	Steering knuckle bent.	Replace with new knuckle.
Excessive Play or Looseness in Steering System	Steering gear or connections adjusted too loose or worn.	Adjust or install new parts as necessary.
	Steering knuckle bearings worn.	Install new bearings.
	Front wheel bearings incorrectly adjusted or worn.	Adjust bearings or replace with new parts as necessary.

Continued on page 43.

Dimensions

Plate 15. Yokes and Steering Arms

Dimensions	Series			
	37-50, 60	37-65, 70	37-75, 85	37-90
A	———	$3\frac{5}{16}$	$3\frac{5}{16}$	———
B	———	$1\frac{13}{16}$	$1\frac{13}{16}$	———
C	———	$1\frac{5}{8}$	$1\frac{5}{8}$	———
D	———	$1\frac{3}{8}$	$1\frac{3}{8}$	———
E	———	$3\frac{3}{16}$	$3\frac{3}{16}$	$3\frac{3}{16}$
F	———	$1\frac{19}{32}$	$1\frac{19}{32}$	$1\frac{19}{32}$
G	———	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$
H	———	$1\frac{5}{16}$	$1\frac{5}{16}$	$1\frac{3}{4}$
I	5	$6\frac{31}{32}$	$6\frac{5}{8}$	———
J	1	$2\frac{1}{16}$	$1\frac{5}{8}$	———
K	———	$\frac{3}{64}$	$\frac{3}{64}$	———
L	———	———	———	$8\frac{3}{4}$
M	———	———	———	$\frac{7}{8}$
N	———	———	———	$\frac{25}{32}$

All Dimensions Given In Inches

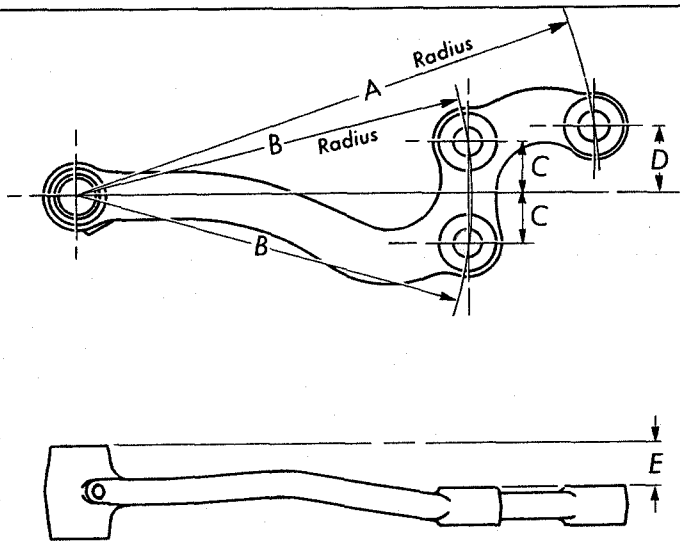
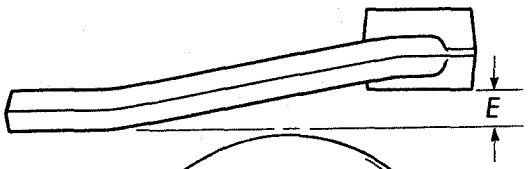


Fig. 37
Intermediate Steering Arm
Series 37-50 and 60



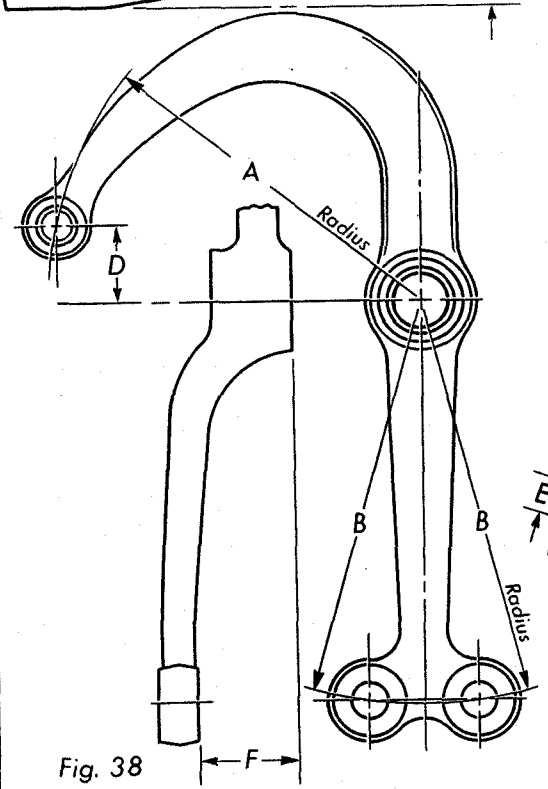


Fig. 38
Intermediate Steering Arm
Series 37-65, 70, 75 and 85

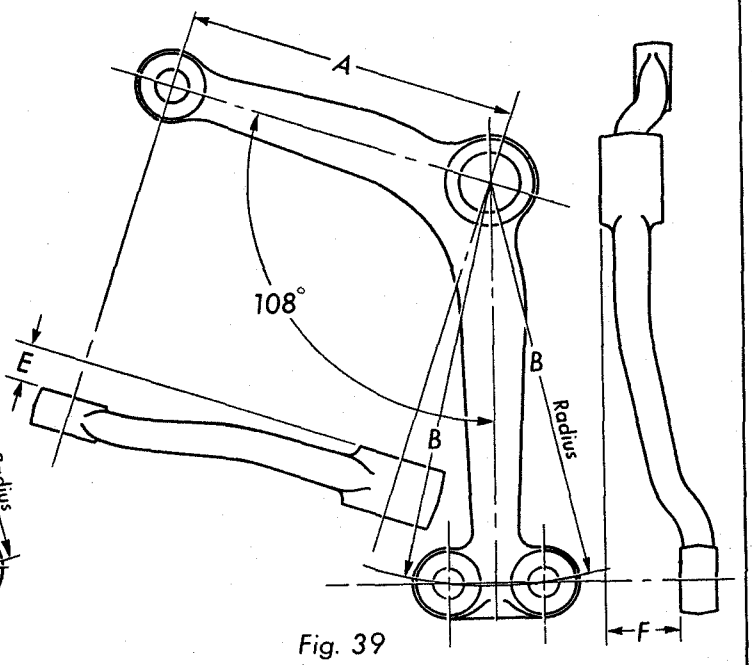


Fig. 39
Intermediate Steering Arm
Series 37-90

Plate 16. Alignment of Intermediate Steering Arms

FRONT WHEEL SUSPENSION

Diagnosis Chart—(Cont'd)

Effect	Cause	Remedy
Erratic Steering on Application of Brakes	Low or uneven tire pressure	Inflate tires to proper pressure.
	Brakes incorrectly or unevenly adjusted.	Adjust brakes.
	Front springs weak.	Replace with new springs of correct type.
	Insufficient or uneven caster.	Check caster and adjust as necessary.
	Steering knuckle bent.	Replace with new knuckle.
Car Pulls to one Side	Low or uneven tire pressure	Inflate tires to proper pressure.
	Rear wheels not tracking with front wheels.	Check alignment of rear wheels with front wheels and correct as necessary.
	Brakes incorrectly or unevenly adjusted.	Adjust brakes.
	Shock absorbers incorrectly or unevenly adjusted, improperly lubricated, or inoperative.	Check adjustment and correct as necessary. Also make sure they are filled with fluid.
	Wheel bearings adjusted too tight.	Check for binding with front wheels off floor. Adjust bearings and lubricate.
	Toe-in incorrect.	Adjust tie rods to make front wheels toe-in proper amount.
	Incorrect or uneven caster.	Check caster and adjust as necessary.
	Incorrect or uneven camber.	Check camber and correct by adjustment or replacing parts
	Front springs sagged.	Check overall length of springs. Sagged springs should be replaced with new ones.
	Rear spring eye straightened out.	Replace eye leaf or spring assembly.
	Rear axle shifted. (Spring clip bolts loose or center bolt sheared.)	Check spring clips for looseness. Also measure from rear spring bolt to axle housing. This distance should be uniform on both sides of car.
	Frame bent or broken	Check frame for proper alignment and breakage. Repair or replace frame as necessary.
	Steering knuckle bent.	Replace with new knuckle.
	Steering knuckle arm bent.	Check by testing toe-out. Replace with new arm.
Scuffed Tires	Tires improperly inflated.	Inflate tires to proper pressure.
	Wheels or tires out of true.	Check for wheel and tire wobble. See that wheels and tires are properly mounted.
	Steering knuckle bearings worn.	Install new bearings.
	Toe-in incorrect	Adjust tie rods to make front wheels toe-in proper amount.
	Uneven caster.	Check caster and adjust as necessary.
	Incorrect toe-out on turns.	Replace steering knuckle arms with new ones.
	Suspension arm bent or twisted.	Check wheel alignment, If arms are out of car, check against specifications.
	Steering knuckle bent.	Replace with new knuckle.
	Excessive speeds on turns.	Caution driver.

Continued on page 45.

Dimensions

Plate 16. Intermediate Steering Arms

Dimensions	Series			
	37-50, 60	37-65, 70	37-75, 85	37-90
A	$10\frac{7}{8}$ R	$7\frac{5}{8}$ R	$7\frac{5}{8}$ R	$7\frac{1}{2}$
B	$8\frac{1}{4}$ R	$8\frac{1}{2}$ R	$8\frac{1}{2}$ R	$9\frac{1}{4}$ R
C	$1\frac{1}{16}$	———	———	———
D	$1\frac{3}{8}$	$1\frac{5}{8}$	$1\frac{5}{8}$	———
E	$\frac{61}{64}$	$\frac{25}{32}$	$\frac{25}{32}$	$\frac{7}{8}$
F	———	$2\frac{13}{16}$	$2\frac{13}{16}$	$1\frac{11}{16}$

All Dimensions Given In Inches

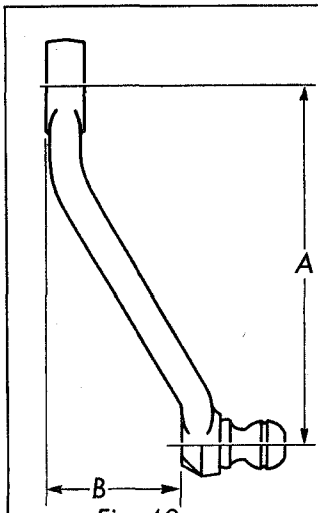


Fig. 40
Pitman Arm
Series 37-50 and 60

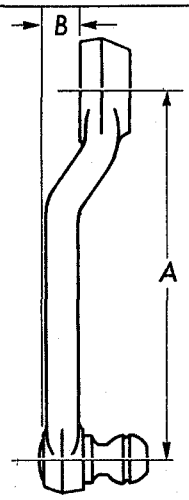


Fig. 41
Pitman Arm
Series 37-65 and 70

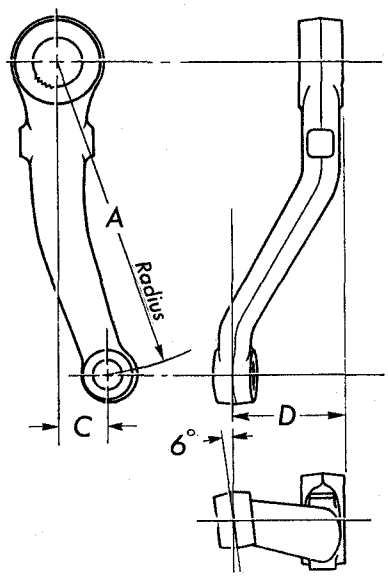


Fig. 42 Pitman Arm
Series 37-75 and 85

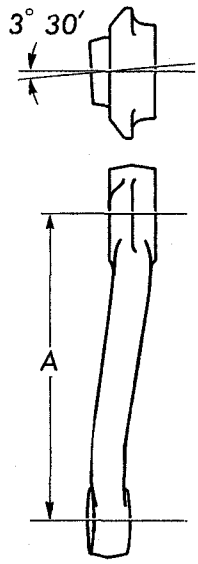


Fig. 43 Pitman Arm
Series 37-90

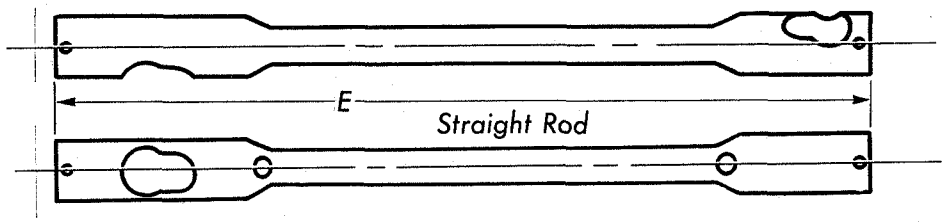


Fig. 44 Steering Connecting Rod Series 37-50 and 60

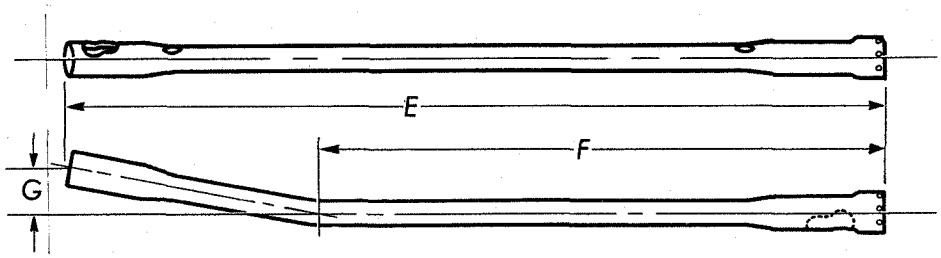


Fig. 45 Steering Connecting Rod Series 37-65 and 70

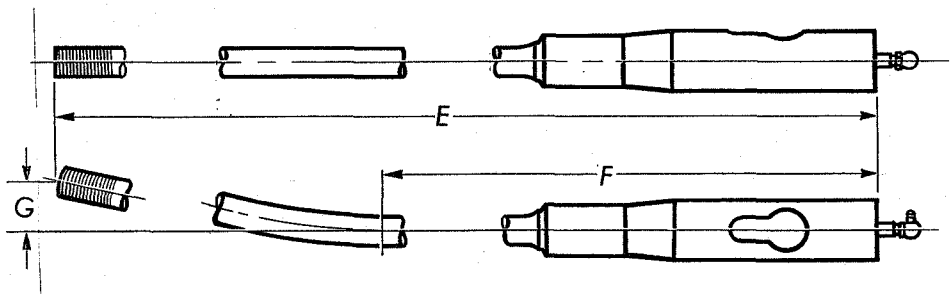


Fig. 46 Steering Connecting Rod Series 37-75, 85 and 90

Plate 17. Alignment of Steering Gear Arms and Connecting Rods

FRONT WHEEL SUSPENSION

Diagnosis Chart—(Cont'd)

Effect	Cause	Remedy
Cupped Tires	Tires improperly inflated.	Inflate tires to proper pressure.
	Normal cupping of tires.	Explain to owner that such cupping is due to normal action
	Wheels, tires or brake drums out of balance.	Balance wheels and tires. Also check for out of balance brake drums and for eccentric or bulged tires and replace as necessary.
	Dragging brakes. (Incorrectly adjusted)	Adjust brakes.
	Worn steering knuckle bearings or wheel bearings incorrectly adjusted or worn.	Adjust or replace parts as necessary.
	Uneven caster.	Check caster and adjust as necessary.
	Steering knuckle bent	Replace with new knuckle.
Front Wheel Shimmy	Low or uneven tire pressure.	Inflate tires to proper pressure.
	Steering connections incorrectly adjusted or worn.	Adjust or install new parts as necessary.
	Front wheel bearings incorrectly adjusted or worn.	Adjust bearings or replace with new parts as necessary.
	Shock absorbers incorrectly or unevenly adjusted, improperly lubricated or inoperative.	Check adjustment and correct as necessary. Also make sure they are filled with fluid.
	Steering knuckle bearings worn	Install new bearings.
	Toe-in incorrect.	Adjust tie rods to make front wheels toe-in proper amount.
	Incorrect or uneven caster.	Check caster and adjust as necessary.
	Steering knuckle bent.	Replace with new knuckle.
	Wheels, tires, or brake drums out of balance.	Balance wheels and tires. Also check for out of balance brake drums and for eccentric or bulged tires and replace as necessary.
	Wheels or tires out of true.	Check for wheel and tire wobble. See that wheels and tires are properly mounted.
	Steering gear incorrectly adjusted.	Adjust steering gear.
	Insufficient or incorrect lubricant used.	Check lubricant in steering gear and lubricate steering system as required.
	Eccentric or bulged tires.	Replace with new ones.
Front or Rear Wheel Tramp	Wheels, tires or brake drums out of balance.	Balance wheels and tires. Also check for out of balance brake drums and for eccentric bulged tires and replace as necessary.
	Front springs weak.	Replace with new ones of correct type.
	Shock absorbers incorrectly or unevenly adjusted, improperly filled or inoperative.	Check adjustment and correct as necessary. Also make sure they are filled with fluid.

Continued on page 47.

Dimensions

Plate 17. Steering Gear Arms and Steering Connecting Rods

Dimensions	Series			
	37-50, 60	37-65, 70	37-75, 85	37-90
A	$7\frac{3}{8}$	$7\frac{11}{16}$	$7\frac{11}{16}$	7
B	$2\frac{29}{32}$	$\frac{25}{32}$	———	———
C	———	———	$1\frac{11}{64}$	———
D	———	———	$2\frac{5}{8}$	———
E	$16\frac{1}{16}$	$33\frac{7}{32}$	$24\frac{19}{32}$	$34\frac{3}{4}$
F	———	$23\frac{3}{32}$	$17\frac{7}{8}$	$19\frac{5}{8}$
G	———	$1\frac{21}{32}$	$1\frac{7}{16}$	$3\frac{5}{32}$

All Dimensions Given In Inches

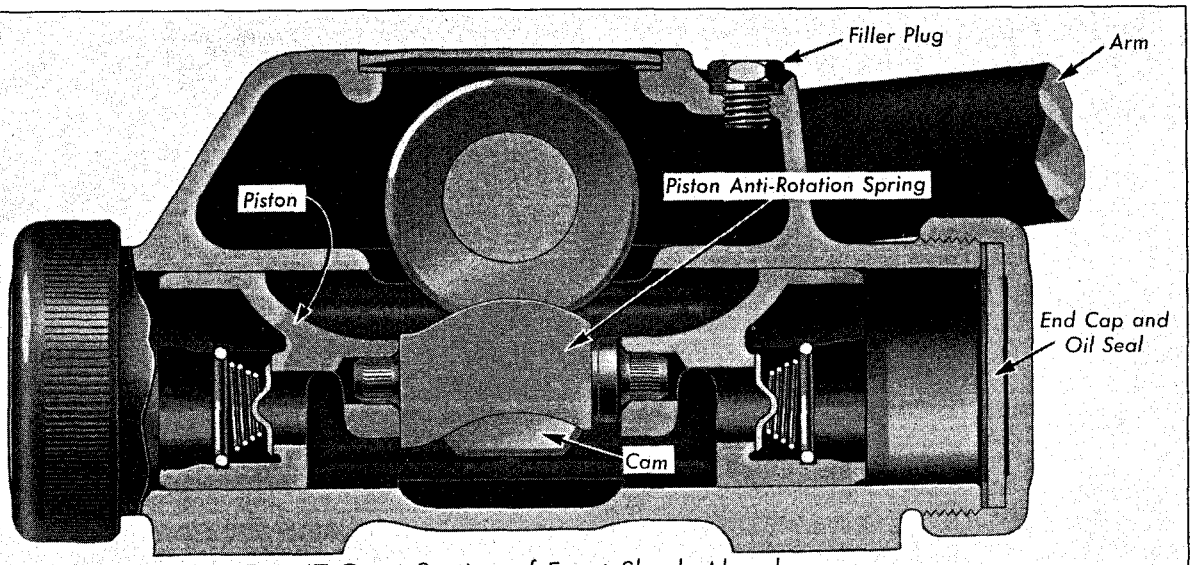


Fig. 47 Cross Section of Front Shock Absorber
Series 37-50 and 60

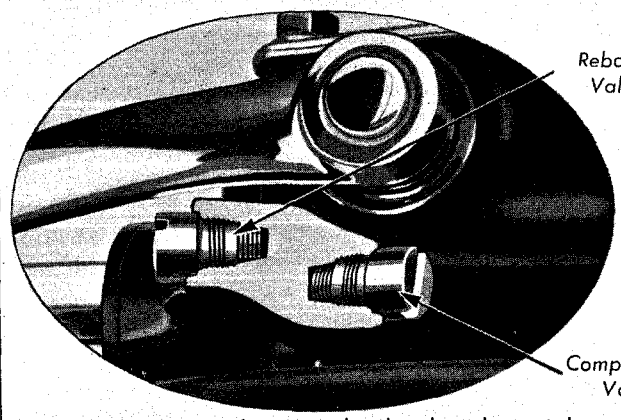


Fig. 48 Location of Front Shock Absorber Valves
Series 37-65, 70, 75 and 85

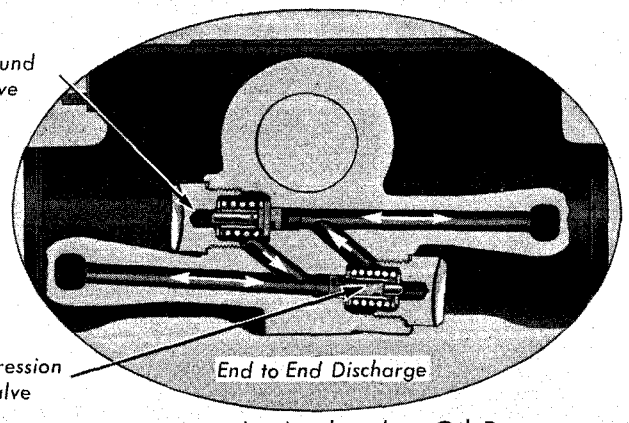


Fig. 49 Shock Absorber Oil Passages
Series 37-75 Typical of All Series

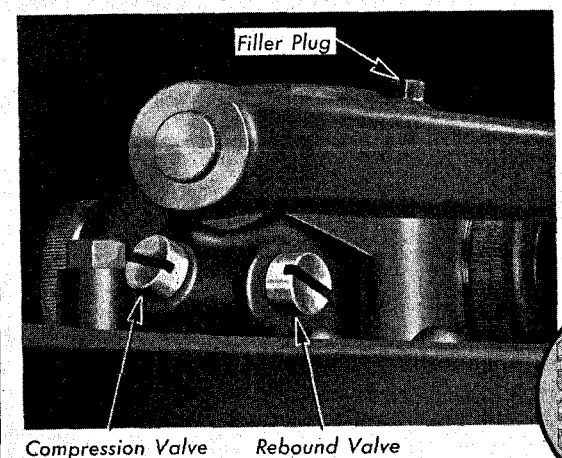


Fig. 50
Location of Front Shock Absorber Valves
Series 37-50 and 60

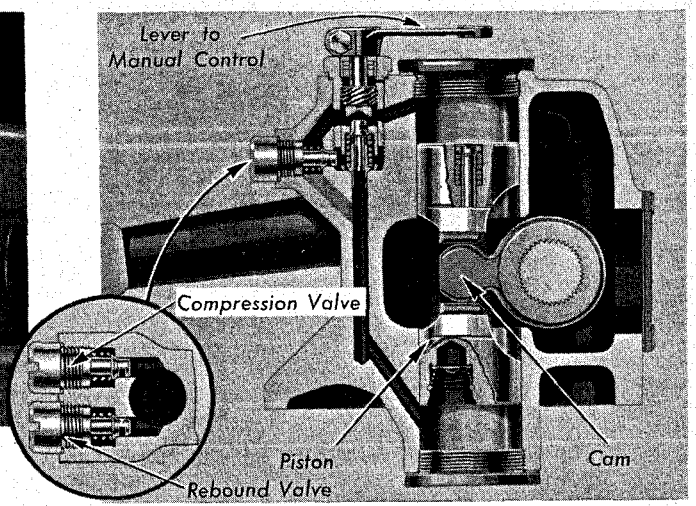


Fig. 51 Cross Section of Front Shock Absorber,
Series 37-90

Plate 18. Front Shock Absorber Details

FRONT WHEEL SUSPENSION

Diagnosis Chart—(Cont'd)

Effect	Cause	Remedy
Car Wanders	Low or uneven tire pressure.	Inflate tires to proper pressure.
	Steering gear or connections adjusted too loose or worn.	Adjust or install new parts as necessary.
	Steering gear or connections adjusted too tight.	Test steering system for binding with front wheels off floor. Adjust as necessary and lubricate.
	Steering knuckle bearings worn.	Install new bearings.
	Wheels toe-out in straight ahead position.	Adjust tie rods to make front wheels toe-in proper amount.
	Insufficient or uneven caster.	Check caster and adjust as necessary.
	Steering knuckle bent.	Replace with new knuckle.
	Rear axle shifted. (Spring clip bolts loose or center bolt sheared).	Check spring clips for looseness. Also measure from rear spring bolt to housing. This distance should be uniform on both sides of car.
	Better tread on rear tires than on front ones.	Change tires putting ones with best tread on front.
Road Shocks	High air pressure.	Deflate tires to proper pressure.
	Steering gear or connections incorrectly adjusted.	Adjusted steering gear and connections.
	Excessive caster.	Check caster and adjust or replace parts as necessary.
	Shock absorbers incorrectly or unevenly adjusted, improperly lubricated or inoperative.	Check adjustment and correct as necessary. Also make sure they are filled with fluid.
	Front springs weak or sagged.	Check overall length of springs. Replace weak or sagged springs with new ones, of correct type.
	Wrong type or size of tires used.	Install new tires of correct type and size.
	Steering knuckle bent.	Replace with new knuckle.

Front Spring Data Chart

Series	Body Model	Wheel Equipment	Spring No.	Part No.	Free Length	Color Marking	Remarks
37–50	All Passenger Cars	5 wheel	1422058	1422058	14⅛"	Yellow	
		6 wheel	1297819	1297819	14¼"	Red	
	Commercial Chassis		1420986	1420986	15"	Yellow	
37–60	All Passenger Cars	5 wheel	1422058	1422058	14⅛"	Yellow	
		6 wheel	1297819	1297819	14¼"	Red	
	Commercial Chassis		1420986	1420986	15"	Yellow	
37–65	All Passenger Cars	5 wheel	1420986	1420986	15"	Yellow	
		6 wheel	1413788	1413788	15"	Brown	2 Daubs center coils
37–70	All Passenger Cars	5 wheel	1420986	1420986	15"	Yellow	
		6 wheel	1413788	1413788	15"	Brown	2 Daubs center coils
37–75	All Passenger Cars	5 wheel	1413789	1413789	14⅞"	White	2 Daubs center coils
		6 wheel	1413790	1413790	14⅞"	Red	2 Daubs center coils
	Commercial Chassis		1413791	1413791	15"	Yellow	2 Daubs center coils
	Special Bus Job		1420237	1420237	15"	Yellow	2 Daubs center coils
37–85	All Passenger Cars	5 wheel	1413790	1413790	14⅞"	Red	2 Daubs center coils
		6 wheel	1413791	1413791	15"	Yellow	2 Daubs center coils
37–90	All Passenger Cars	5 wheel	1404503	1404503	15⅛"		Tagged
		6 wheel	1404504	1404504	15⅛"		Tagged

FRONT WHEEL SUSPENSION

Specifications

Subject and Remarks	37-50, 60	37-65, 70	37-75, 85	37-90
Camber of front wheels	¼°-1°	0°-½°	0-°½°	0°-½°
Angle between steering knuckle bolt and wheel spindle	95°-51′	95°-51′	95°-16′	95°
Angle between steering knuckle bolt and vertical (Cross-wise Inclination)	4°-51′	5°-38′	5°-38′	4°-30′
Caster angle	¼°-1°	0° ± ¼°	0° ± ¼°	0° ± ¼°
Lubrication—See Note 1—				
Shock absorbers—				B-D
Check valves—Control				5-3
Rebound	1-EX	1-BX	1-BX	5-3
Compression	1-DX	1-BS	1-BS	
Note: Check valve markings are stamped on outside cap.				
Fluid	Delco	Delco	Delco	Delco
Type No.	1946	1951	1951	1950-D-2
Springs, car—				
Diameter (outside)	5 3/16″	5 3/16″	5½″	5½″
Free length (approximate)—				
Five wheel	14 7/8″	14 7/8″	14 7/8″	15 1/8″
Six wheel	14 7/8″	15″	15 7/8″	15¼″
Note: If spring has sagged more than ¼ inch, it should be replaced.				
Identification: Spring No. is stamped on flat surface of end coil.				
See Front Spring Data Chart page 47.				
Standard equipment on—				
Five wheel cars	1422058	1420986	1413789	1404508
Six wheel	1420986	1413788	1413790	1404504
Steering gear and connections. See "Steering Gear" section, page 135.				
Steering stop screw adjustment. See Note 11.				
Toe-in (in motion)	0-1/16″	0-1/16″	0-1/16″	0-1/16″
Toe-in (at rest)	+ 1/32 to + 3/32″	+ 1/32 to + 3/32″	+ 1/32 to + 3/32″	+ 1/32 to + 3/32″
Toe-out on turns—				
With outside wheel set at 20° inside wheel angle should be	21¾-23¼°	22-23½°	22-23½°	22-23½°
Tread—Front	58″	60 3/16″	60 3/16″	59 3/8″
Tread—Rear	59″	60½″	62½″	62″
Turning Radius				
Right	20 ft.	21½ ft.	24 ft.	23½ ft.
Left	20 ft.	21½ ft.	23½ ft.	23½ ft.

REAR WHEEL SUSPENSION

General Description

Three different type rear axles are used on the 37-series Cadillac and LaSalle cars. Series 37-50 and 60 cars have a hypoid axle as shown in Plate 19, Figs. 1 and 2. Series 37-65, 70, 75, and 85 cars have a semi-floating spiral bevel axle as shown in Fig. 3. Series 37-90 cars have a spiral bevel axle, of similar design to that of series 37-85, except that the ¾-floating construction is used.

The rear axle housings of all 37-series axles are of the banjo type, and designed for underslung semi-elliptical rear springs. The axle shafts on all 37-series cars are keyed to the driving hub on which the wheels are mounted. Permanently lubricated and sealed annular type ball bearings are used at the rear wheels.

The cylindrical type differential housing is used on all 37-series cars, except the V-16 which has the external bearing type differential housing. Tapered roller bearings are used on all 37-series differential carriers. Special aluminum bronze thrust washers are used to reduce wear between the pinion gears and the housing.

The axle shaft oil seals on the hypoid axles are located at the outer end of the axle tubes. On the spiral bevel axles, they are located at the inner end.

Two needle-bearing universal joints and a tubular propeller shaft are used on all 37-series cars. On series 37-50, 60, 65, 70, 75 and 85 cars, the splined portion of the propeller shaft is constructed by cutting splines on the inside of a tube that is pressed and welded into a second tube as illustrated in Plate 20, Fig. 5. Lubrication of the splines is provided for by a lubrication fitting in the propeller shaft at the slip joint.

On series 37-90 cars, the spline shaft is on the end of the propeller shaft instead of the universal joint coupling. On these cars, lubrication is provided for by screw plugs at both the spline shaft and the universal joint cross.

Semi-elliptical rear springs of two types are used on the 37-series cars. Series 37-50 and 60 cars have rear springs in which the leaves are separated by waxed liners as shown in Plate 20, Fig. 9. These springs do not require any lubrication in service, nor do they require spring covers as used on the other models. Series 37-65, 70, 75, 85 and 90 cars use the conventional type springs fitted with spring covers as shown in Plate 20, Fig. 10.

The spring bolt at the front end of the rear springs of series 37-50 and 60 cars is threaded to fit the threaded metal bushing used. The spring bolt at the front end of the rear springs on series 37-65, 70, 75, 85 and 90 cars is mounted in rubber bushings. Threaded shackle pins with metal bushings are used at both top and bottom of the rear spring shackles on all models except the 37-90 which has threaded metal pins and bushings at the bottom and rubber bushings at the top.

The shock absorbers on all 37-series cars, both front and rear, are of the double-acting hydraulic type. One and one-half inch end-to-end discharge shock absorbers are used on series 37-50 and 60 cars. One and three-quarter inch shock absorbers of the same design are used on the remaining models. The rear shock absorbers of series 37-65, 70, 75, 85 and 90 cars are equipped with a dash-pot controlled inertia mechanism to provide variable shock absorber action according to the requirements for different kinds of service. In addition, the 37-90 cars have manual control of all four shock absorbers through a "Ride Regulator" handle under the dash.

Two different type rear stabilizer bars are used on the 37-series cars. Series 37-50 and 60 cars have a cross-link type stabilizer. The remaining models have stabilizers with links connecting them to stabilizer brackets on the axle housing, as shown in Plate 21, Fig. 14.

Service Information

1. Lubrication

The use of proper lubricant in the rear axles of all 37-series cars is an important consideration with which every service man should be familiar. **Only Cadillac-approved Hypoid Differential Lubricant** should be used.

The lubricant level should be inspected and fresh lubricant added, if necessary, every 1,000 miles. The lubricant should be drained, and the differential case thoroughly flushed, and refilled with fresh hypoid lubricant every 6000 miles.

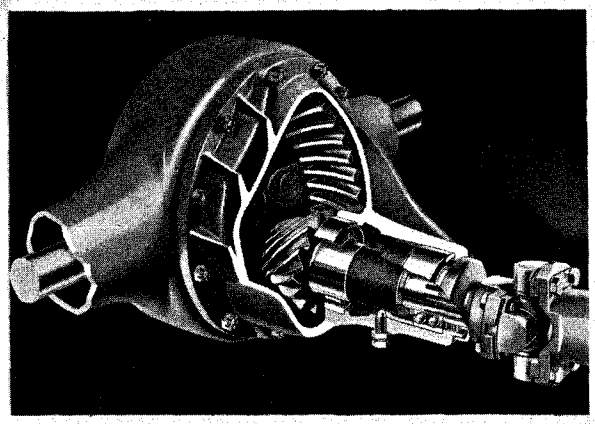


Fig. 1 Cut-Away View of Hypoid Rear Axle

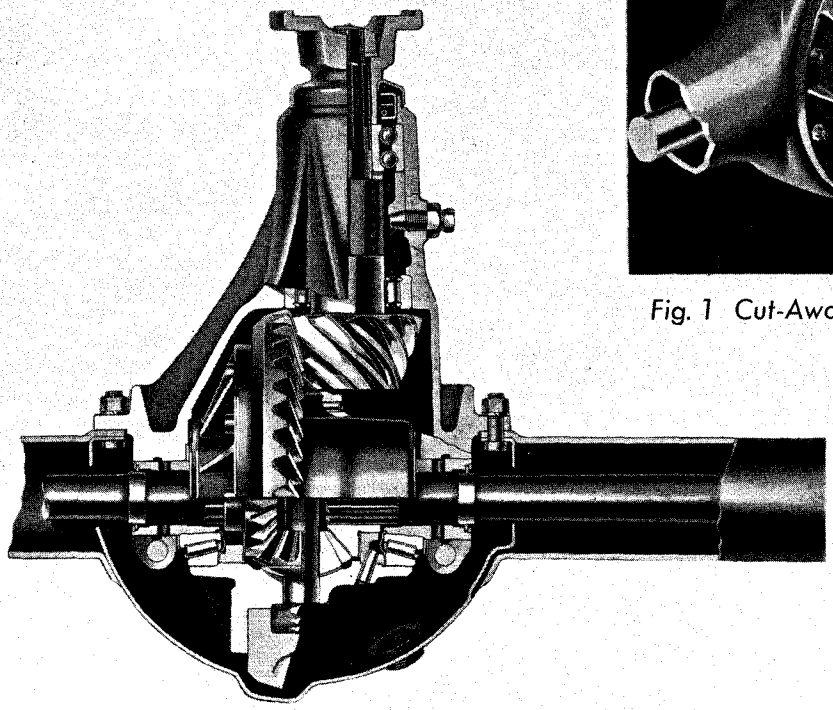


Fig. 2 Cross-Sectional View of Hypoid Rear Axle

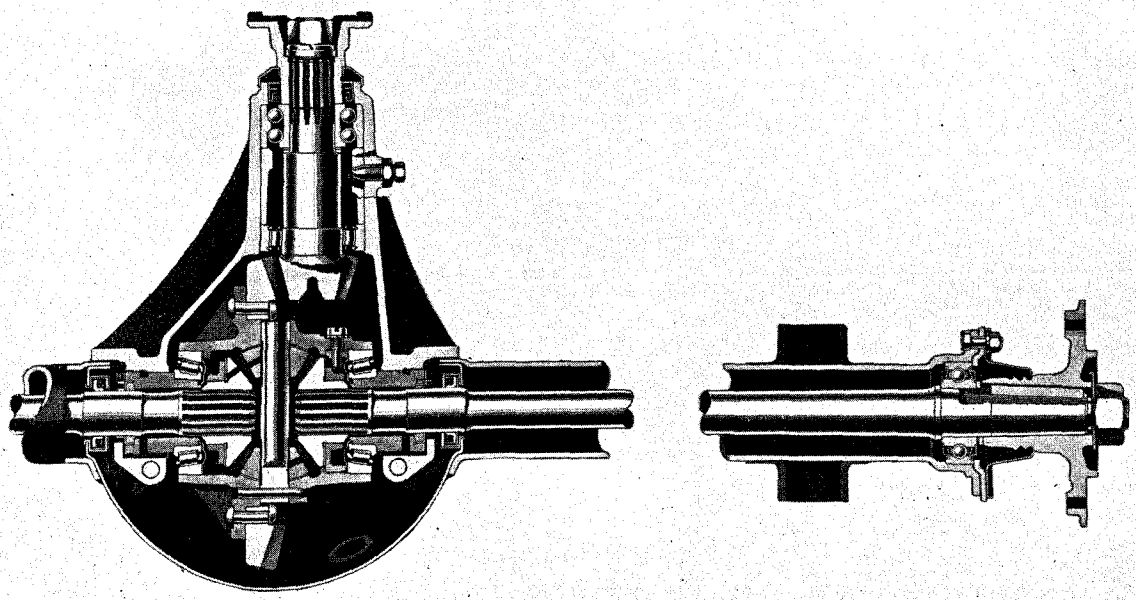


Fig. 3 Cross-Sectional View of Spiral Bevel Axle

Plate 19. Rear Axle

2. Cleaning Vent Holes

The axle housings of all 37-series cars are provided with vents to maintain atmospheric pressure conditions inside the axle housing under all driving conditions. On series 37-50 and 60 axle housings the vent consists of a small hole at the top of the housing.

On series 37-65, 70, 75 and 85 axle housings there are two small holes in the bottom of the housing, one on each side of the drain plug, which vent the space between the inner and the outer housings.

On series 37-90 cars, the vent consists of a vent pipe in the top of the differentail housing and has a fitting and pipe extending down the side for the same purpose.

These holes should always be kept open; they should in fact be checked every time the lubricant level is inspected. If they should become clogged, the lubricant may become too high and might overflow to the wheels, and get on the brake linings.

3. Rear Axle Breather Baffle Installation

Replacement rear axle housings supplied by the Parts Division for installation on series 37-65, 70, 75 and 85 cars formerly were not fitted with the baffle for the axle housing breather. This part was purposely omitted, as the service man making the replacement was expected to transfer the baffle from the replaced housing to the new housing.

If this baffle is not changed over, rear axle lubricant may leak out through the breather and especially through the hole in which the baffle screw should have been inserted.

It is important that this baffle, shown in Fig. 4, is installed in every axle. Whenever an axle housing is installed on series 37-65, 70, 75 or 85 cars, check the breather opening and make sure that a baffle is installed.

To insure a good seal for the baffle plate, it is advisable to use a small amount of Dolphinite Cement between the baffle and the housing in the same way that gasket paste is used.

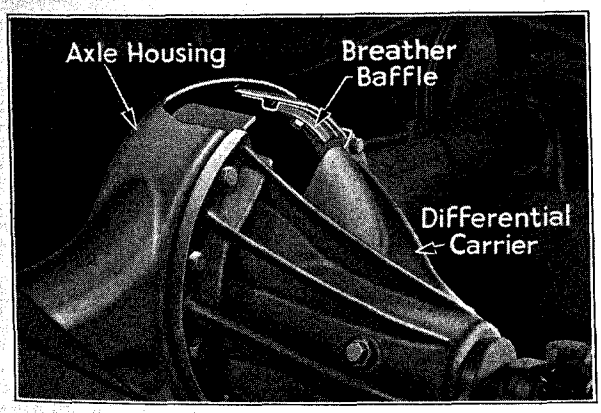


Fig. 4. Axle Housing Breather

4. Removal and Installation of Axle Shafts

Semi-floating Axle—All Series except 37-90.

1. Dismount the road wheel
2. Remove the retaining nut from the end of the axle shaft.
3. Pull the wheel hub and brake drum assembly off the shaft, using puller.
4. Remove the brake dust shield, observing the precautions given in Note 9, Page 63.

Note: The axle shaft is held in the housing by the dust shield which, when bolted in place, bears against the outer race of the wheel bearing.

5. Pull the shaft and bearing assembly out of the housing, using Tool No. J-838.

Installation — The axle shaft is installed in the reverse order of its removal. It will be necessary to bleed the brake line, which was disconnected to remove the dust shield. The axle shaft specifications and interchangeability possibilities are given in the Axle Shaft Data Chart on Page 56.

¾-Floating Axle—Series 37-90.

1. Remove hub cap.
2. Remove bolts from flange of wheel hub.
3. Remove wheel and axle shaft.

Reverse operations to install shaft.

5. Removal and Installation of Differential Carrier

Any service on the differential gears or ring gear and pinion should be handled by replacement of the complete differential carrier assembly. No disassembly or adjustment of this unit should be attempted in the service station. To replace the assembly:

1. Disconnect the pinion shaft at the rear universal joint.
2. Remove the axle shafts. (See Note 4).
3. Remove the cap screws holding the carrier to the axle housing and take out the entire assembly.

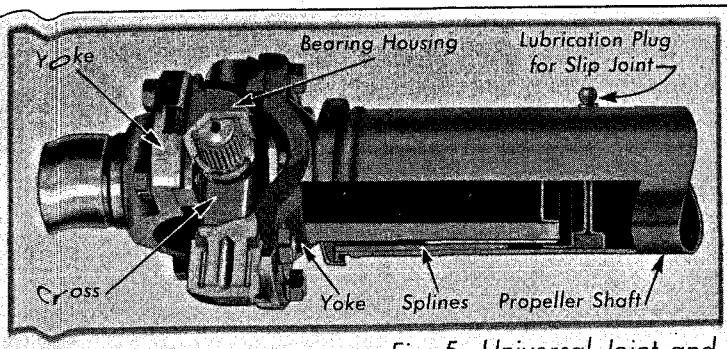
To Reinstall—reverse the above procedure.

6. Removal and Installation of Universal Joint

To remove the universal joint on all series cars, it is necessary only to remove the cap screws that hold the journal caps to the yokes. If a joint is removed and is not to be disassembled, the opposite bearing retainers should be wired together to keep them in place on the journals of the cross.

Disassembly of the joint after removal from the yokes is accomplished by pulling the retainers off the cross journals and taking out the needle bearings.

Before reassembling a joint, wash all parts thoroughly in gasoline or kerosene and blow them out with air to remove all traces of dirt and grit. Repack the bearings with wheel bearing grease when assembling.



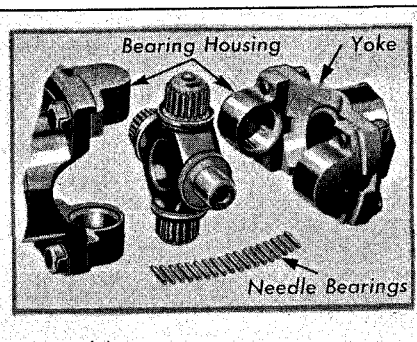


Fig. 5 Universal Joint and Slip Joint Assembly

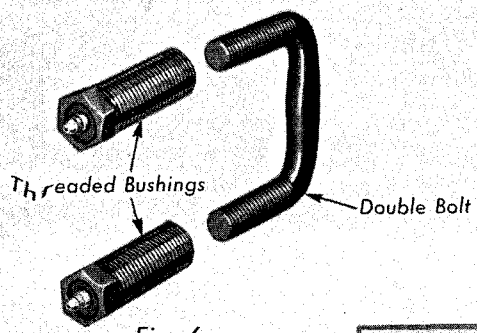


Fig. 6
Shackle Bolt Assembly
Series 37-50 and 60

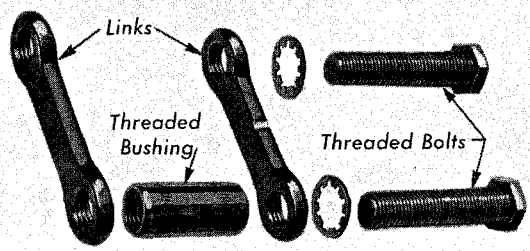


Fig. 7 Shackle Bolt Assembly
Series 37-65, 70, 75 and 85

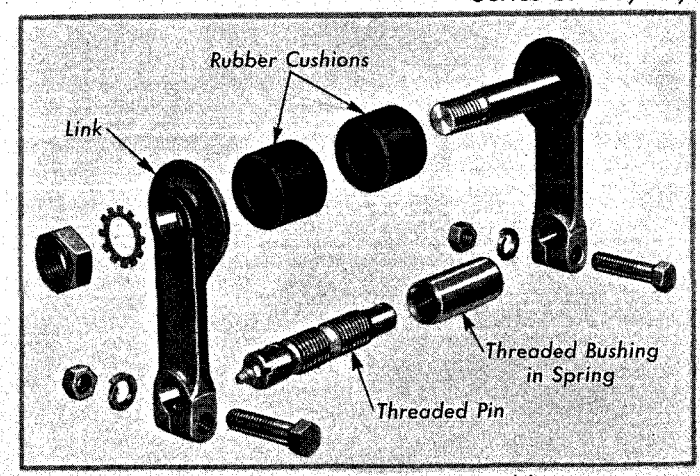


Fig. 8 Shackle Bolt Assembly
Series 37-90

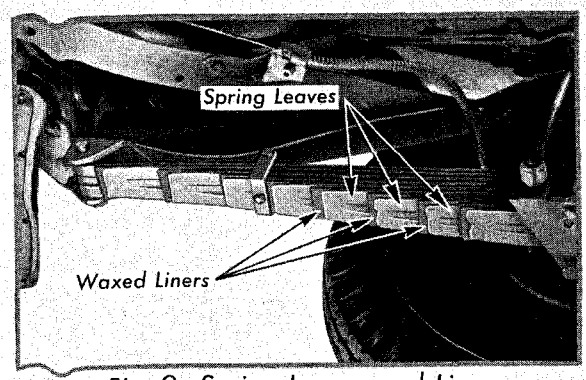


Fig. 9 Spring Leaves and Liners
Series 37-50 and 60

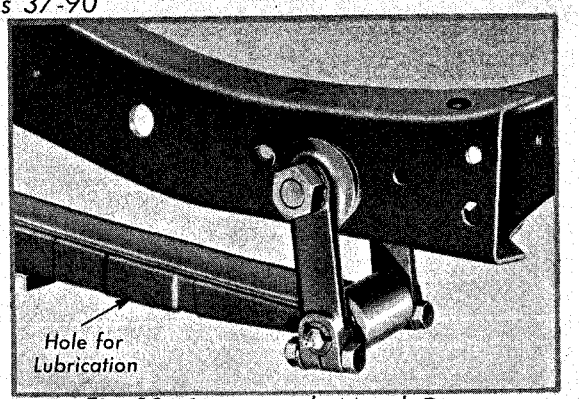


Fig. 10 Spring with Metal Cover
Typical of Series 37-65, 70, 75, 85, 90

Plate 20. Universal Joints and Rear Springs

The cap screws used for the universal joints are made of special material and heat treated. When reinstalling a joint, therefore, use either the original cap screws or new screws for this purpose secured from the factory Parts Division. Ordinary cap screws must not be used. New locking plates should also be used when the retaining screws are reinstalled

Care should be exercised to assemble the universal joint spline connection and the propeller shaft in the correct position. The arrow on the universal joint should always be in line with the arrow on the propeller shaft.

7. Removal and Installation of Spring Shackles

The spring bolts at the front end of the rear springs on all 37-series cars are easily removed or installed without interference from any sheet metal parts. Removal of these bolts is simply a matter of turning the bolt out of its bushing on series 37-50 and 60 cars, or removing the retaining nut and pulling the bolt out of its rubber bushings on series 37-65, 70, 75, 85 and 90 cars.

To reinstall, reverse the above procedure.

Disassembly and assembly procedure for 37-series rear spring shackles is apparent from Plate 20, Figs. 6, 7 and 8.

Removal of a rear spring requires removal of the front spring bolt, the U-bolts that clamp the spring to the rear axle, the spring shackle bolt on series 37-65, 70, 75 and 85, the spring shackle bushing on series 37-50 and 60, and the complete disassembly of the spring shackles on series 37-90.

8. Lubrication of Rear Springs

Series 37-50 and 60—

These cars have rear springs with waxed liners as shown in Plate 20, Fig. 9. These springs should not be lubricated in service.

Series 37-65, 70, 75, 85 and 90—

These cars have conventional type rear springs with metal covers.

Attention need be given to spring lubrication only in the event of springs squeaking or of hard riding due possibly to need of lubrication. In such instances, the springs can be lubricated, using a special tool provided for the purpose, in the following manner:

1. Disconnect shock absorber links.

2. Raise the rear end of the car with overhead hoist or chain fall until all weight is taken off rear springs.

3. Install the clamp (Tool No. J-595) over one of the spring covers with the lubricant outlet fitting entering the hole in the under side of the cover, and screw the injector tip in until it has fully penetrated the inner canvas covers.

4. Apply a grease gun filled with graphite lubricant (G-15) to the connection in the clamp and force the lubricant into the spring cover.

5. At the same time, insert a large screw driver in the end of the spring cover and pry the second leaf away from the eye leaf to permit the lubricant to flow between the leaves.

6. Apply lubricant until it seeps out at both ends of the spring cover.

If it should seep steadily out at the large end and not appear at the spring eye end, a clamp should be applied to the large end to prevent further flow while the lubricant is being forced to the spring eye end.

If the lubricant seeps out between the sections of the cover, the tool has not been inserted through the canvas. The tool must penetrate the inner canvas covers.

Caution: Do not let the car down while the injector tip is inserted, otherwise the tip will be broken off by the end of the nearest leaf.

7. Upon removing the clamp, plug the hole with one of the special buttons furnished with the tool. Install the button by simply tapping in place with a light hammer.

9. Adjustment of Rear Shock Absorbers

The adjustment of the rear shock absorbers on series 37-65, 70, 75 and 85 cars is made by pushing up on the locking cap and turning the adjustment operating shaft with a screw driver until the desired "ride" position is secured. See Plate 21, Fig. 14. The shaft has three positions—soft (S), medium (M) and firm (F). The firm position is with the operating shaft turned in a clockwise direction to the (F) position, etc. It is important that both rear shock absorbers be adjusted to the same position of control.

The Cadillac V-16 is equipped with a dash controlled ride mechanism. The procedure for adjusting this additional ride regulator is as follows:

1. Put ride regulator handle at steering column in the "firm" position, which is all the way up.

2. Disconnect the rod from the control lever at each of the four shock absorbers.

3. Turn each control lever to the fully closed or compressed position. In this position, it should be at an angle of 45 degrees to the center line of the car.

4. If any of the control levers are not in the correct position, they should be readjusted on the control shaft by loosening the locking screws and turning them to the correct position.

5. Adjust the yokes on the rods at the right front and right rear shock absorbers so that the control levers are in the fully closed position at the same time, with all slack in the rods taken up.

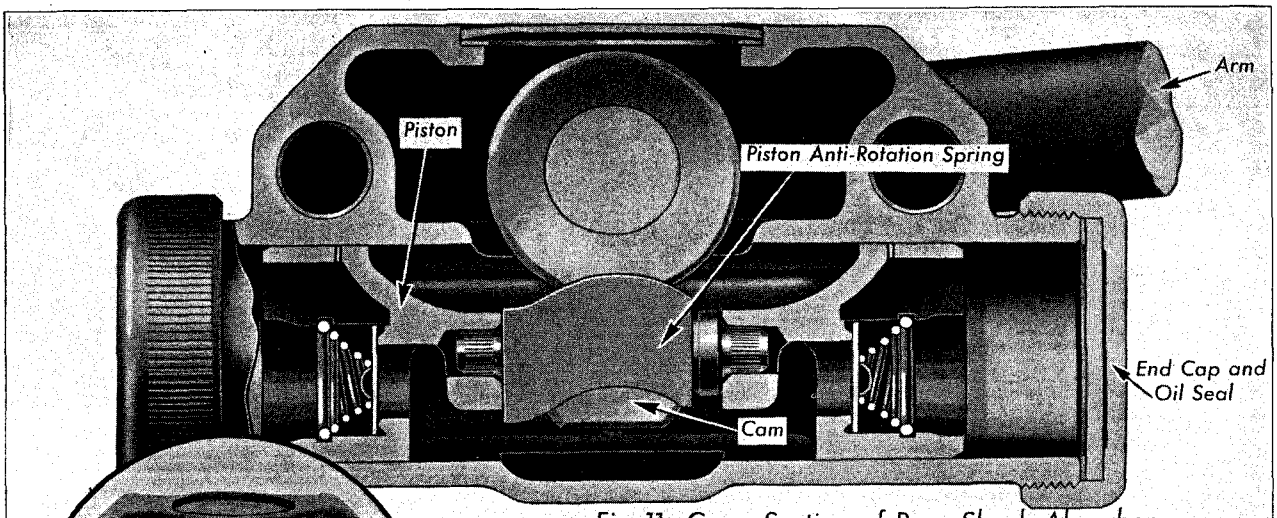


Fig. 11 Cross Section of Rear Shock Absorber Series 37-50 and 60 Typical of Series 37-65 and 70

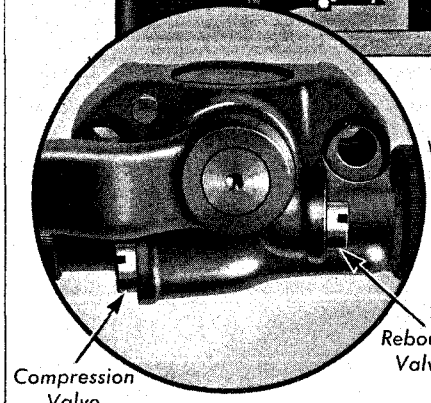


Fig. 12 Rear Shock Absorber Valves Series 37-50 and 60

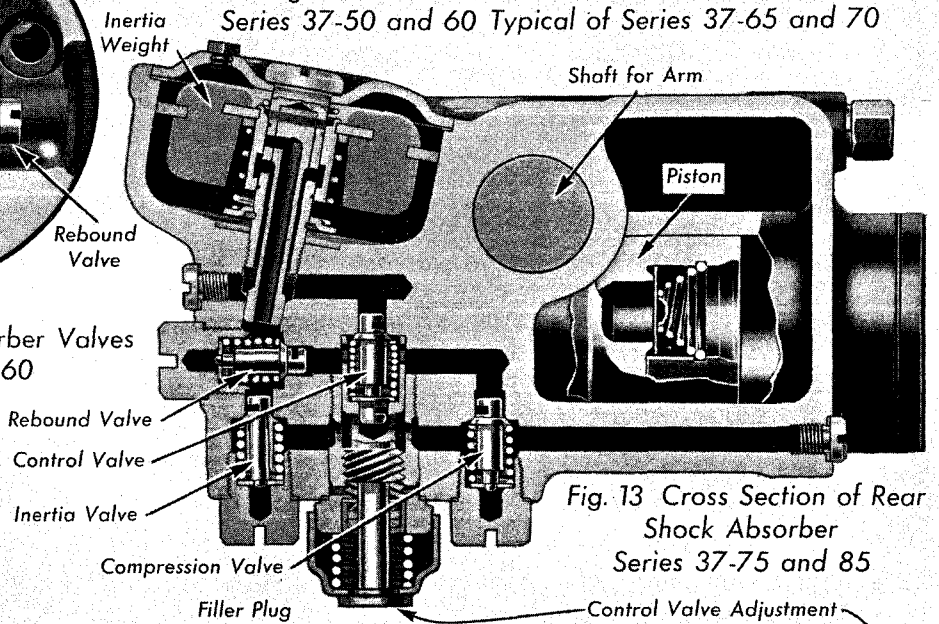


Fig. 13 Cross Section of Rear Shock Absorber Series 37-75 and 85

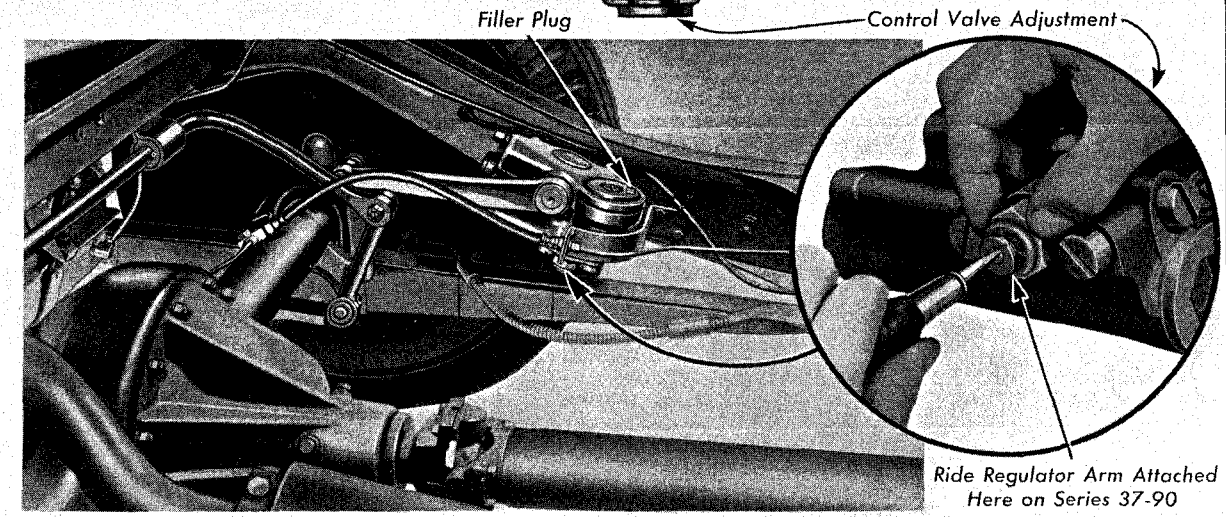


Fig. 14 Rear Shock Absorber Linkage and Adjustment Series 37-75 and 85

Plate 21. Rear Shock Absorber Details

6. Move the regulator handle up and down two or three times, returning it to the "firm" position. Then check both right-hand control levers to see that they are still in the fully closed position. If not, shorten one or both rods still further.

7. Shorten or lengthen the yoke at the left rear shock absorber so that the control lever is in the fully closed position. Again move the regulator handle and again check both rear control levers. If the left rear control lever closes before the right, lengthen the left-hand rod rather than shorten the right-hand rod to obtain proper synchronization.

8. Adjust the yoke at the left front shock absorber so that the control lever is in the fully closed position. Again move the regulator handle and again check both left-hand levers.

9. Make sure that the screws holding the shock absorbers to the frame are tight and that the pivots at the lower end of the rear shock absorber links are also tight. In order to tighten the shock absorber link pivots properly, the stabilizer links should be temporarily disconnected.

This procedure coordinates the control levers so that the lever on each shock absorber is fully closed when the hand control on the steering column is all the way up in the "firm" position. With all four shock absorbers in the "firm" position at the same time, they will operate simultaneously throughout the full range of control.

10. Shock Absorber Service

The only service ordinarily required by the shock absorbers, aside from periodic checking of the liquid level, is the correction of either noisy operation or unsatisfactory riding qualities.

Noisy operation of the rear shock absorbers on some series 37-65, 70, 75 and 85 cars, noticeable when driving over rough pavement, may be due to the shock absorber pistons rotating and striking the sides of the cam. The remedy for correction of this difficulty is to install new anti-rotation springs in the shock absorbers. These springs are available from United Motors Service.

Note: Late type shock absorbers having anti-rotation springs incorporated in their design may be identified by a letter "B" stamped on the hub of the shock absorber arm. Early type shock absorbers did not have these springs.

Another cause of noisy operation of shock absorbers is looseness somewhere in the shock absorbers or shock absorber linkage. In case of such trouble check and tighten the entire shock absorber mechanism. This means, first of all, checking and tightening the shock absorbers on the frame; making certain that the arm is tight on the splined shaft and going over and tightening all of the linkage.

In making this check-up, it is not enough simply to look at the connections and decide that they "look" sufficiently tight; a wrench must be used at every point and everything well-tightened.

It is also important to make certain that all four shock absorbers are filled with shock absorber fluid and that there is no air in the cylinders or passages. In case of complaint, it may be necessary to bleed all four shock absorbers to get all of the air out of the cylinders and passages.

To do this properly, make sure that the shock absorber is correctly mounted and thoroughly tightened to the car frame, then remove the filler plug and fill with shock absorber fluid. Reinstall the plug securely and, with the link disconnected, move the shock absorber arm up and down several times the full length of its travel.

This operation of adding fluid, reinstalling the plug and working the arm should be repeated until all of the air is worked out of the shock absorber. This may take three or four operations. The shock absorber is satisfactorily bled when no more fluid can be added after working the arm in the manner just described, or when there is absolutely no play in the arm. Always have the filler plug tightly in place when moving the arm, otherwise more air will be drawn into the shock absorber fluid.

In cases of unsatisfactory riding, not due simply to lack of lubrication, correction can ordinarily be made by putting the shock absorbers in good operating condition.

Unsatisfactory riding may be caused by insufficient absorber fluid, dirt in the fluid, or improper setting of the control adjustment. The first things to be done in cases of complaint is to check the level of the fluid in the shock absorbers, insufficient fluid can be corrected by careful bleeding and refilling as previously described.

Only after it is known that all shock absorbers contain the proper amount of fluid should any other tests be made to determine the cause of unsatisfactory riding qualities.

Dirt in the shock absorber fluid may cause unsatisfactory operation by causing the valves to stick. In such cases the difficulty can usually be recognized by moving the shock absorber arm up and down. The presence of dirt on the valves will be indicated by the lack of resistance in one or both directions. In case dirt is present, the shock absorber should be removed, thoroughly cleaned and blown out with air, and refilled with clean shock absorber fluid.

REAR WHEEL SUSPENSION

Axle Shaft Data Chart

Series	Part No.	Right or Left Hand	Length
37-50 & 60	1418897	R. & L.	31" —31 1/8"
37-65 & 70	1421997	R. & L.	31 3/4"—31 7/8"
37-75 & 85	1412653	R. & L.	31 15/32"—31 19/32"
37-90	1401144 1401145	R. H. L. H.	36 1/16"—36 3/16" 33 17/32"—33 21/32"

Rear Spring Data Chart

Series	Body Model	Spring No.	Part No.	No. of Leaves	Remarks
37-50	2 Passenger Cars 5 Passenger Cars Commercial Chassis Heavy Duty Chassis	1421758 1421759 1421760 1421761	1421758 1421759 1421760 1421761	9 9 11 11	White paint on rear eye Orange paint used on later cars
37-60	2 Passenger Cars 5 Passenger Cars Commercial Chassis Heavy Duty Chassis	1421758 1421759 1421760 1421761	1421758 1421759 1421760 1421761	9 9 11 11	White paint on rear eye Orange paint used on later cars
37-65	2 Passenger Cars 5 Passenger Cars	1421100 1421101	1096714 1096715	9 9	
37-70	2 Passenger Cars 5 Passenger Cars 5 Pass. Conv. Sedan	1421100 1421101 1421102	1096714 1096715 1096748	9 9 9	
37-75	5 Pass. Cars (Except 5 Pass. Conv. Sedans) 5 Pass. Conv. Sedans, & 7 Pass. Cars & Town Cars Livery Jobs Commercial Chassis Special Bus	1421102 1421103 1422104 1421105 1422360	1096748 3503065 1096749 1096758 1096795	9 10 11 11 13	
37-85	5 Pass. Cars (Except 5 Pass. Conv. Sedans) 5 Pass. Conv. Sedans, & 7 Pass. Cars & Town Cars Heavy Duty Jobs	1421102 1421103 1421104	1096748 3503065 1096749	9 10 11	
37-90	2 Pass. Cars and 5 Pass. Coupes 5 Pass. Cars (Except 5 Pass. Coupes) 7 Pass. Town Cars Heavy Duty Jobs	1403069 1403068 1403068 1403071	1096277 1096278 1096278 1096279	9 10 10 11	

Identification: Spring number is stamped at center of bottom leaf.

REAR WHEEL SUSPENSION

Specifications

Subject and Remarks	37-50	37-60	37-65, 70	37-75	37-85	37-90
Axle housing out of true, not over	1/16"	1/16"	1/16"	1/16"	1/16"	1/16"
Axle shaft—						
Length	31-31 1/8"	31-31 1/8"	31 3/4-31 7/8"	31 15/32"-31 19/32"	31 15/32"-31 19/32"	36 1/16-36 3/16" R.H. 33 17/32-33 21/32" L.H.
Marking (on outer end of shaft)	G. M. No. 4	G. M. No. 4	G. M. No. 4	G. M. No. 4	G. M. No. 4	G. M. No. 4
Out of true (at ground surface near splines) not over	.004"	.004"	.004"	.004"	.004"	.004"
Gear ratios—						
Standard	3.92-1	3.69-1	4.30-1	4.60-1	4.60-1	4.64-1
Optional	None	None	None	None	None	4.3 or 4.07-1
Lubrication—Axle—						
Differential capacity	5 pts.	5 pts.	5 pts.	5 pts.	5 pts.	6 pts.
Grade recommended:						
Summer	Cad. Hyp. L.	Cad. Hyp. L.	Cad. Hyp. L.	Cad. Hyp. L.	Cad. Hyp. L.	Cad. Hyp. L.
Winter	Cad. Hyp. L.	Cad. Hyp. L.	Cad. Hyp. L.	Cad. Hyp. L.	Cad. Hyp. L.	Cad. Hyp. L.
Also see Lubrication section.						
Shock absorbers—						
Rebound valve	1-L	1-L	1-5X	5-5X	5-5X	5-3
Compression valve	1-BX	1-BX	2-5X	1-5X	1-5X	1-B
Inertia valve	.....	.....	OL	OL	OL	.....
Control valve	.....	.....	GX	GX	GX	C-D
Shock absorber fluid	Delco	Delco	Delco	Delco	Delco	Delco
Springs—See Rear Spring Data Chart, page 56.						
Tread	59"	59"	60 1/2"	62 1/2"	62 1/2"	62"

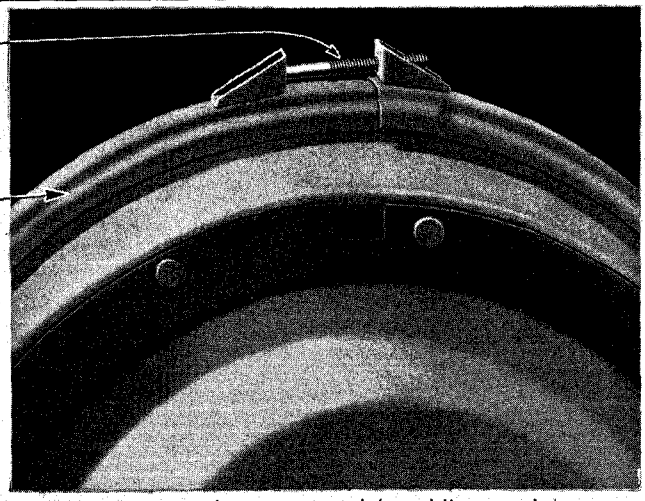


Fig. 1 Brake Dust Seal (Cadillac Only)

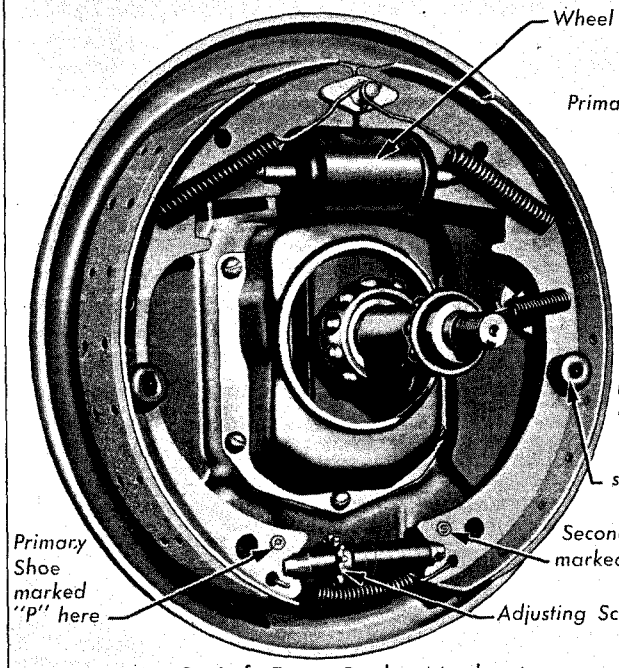


Fig. 2 Left Front Brake Mechanism

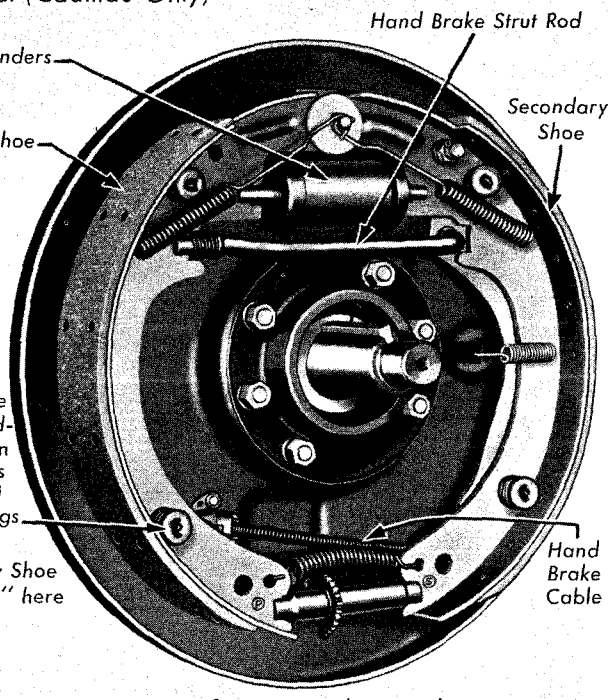


Fig. 3 Left Rear Brake Mechanism

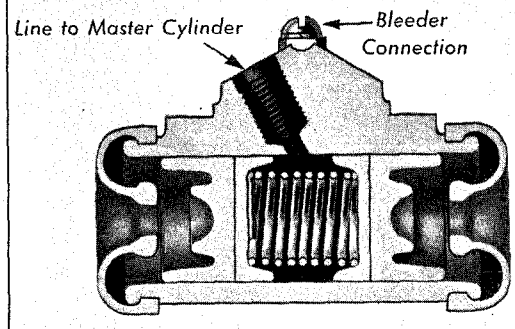


Fig. 4 Cross Section of Wheel Cylinder

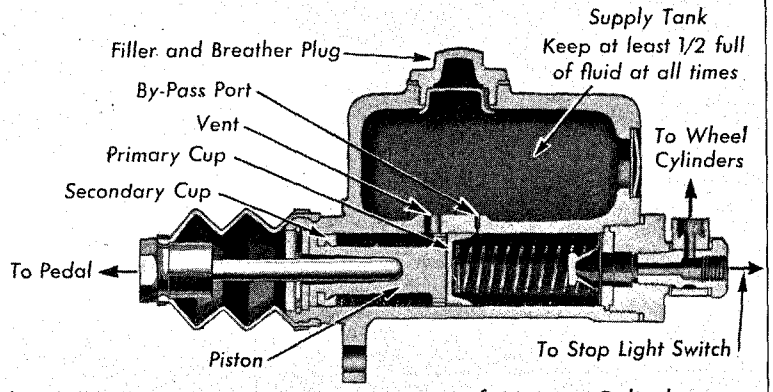


Fig. 5 Cross Section of Master Cylinder

Plate 22. Brake Details

BRAKES

General Description

The braking system on the 37-series Cadillac and LaSalle cars comprises service brakes of the hydraulic type combined with a hand lever that operates the rear brake shoes through a mechanical linkage. A vacuum brake assister is used on the 37-90 V-16 Cadillac.

The service brake system consists of a combined fluid supply tank and master cylinder, in which the hydraulic pressure is originated; four wheel cylinders in which the pressure is applied to operate the brake shoes against the wheel drums; and the tubing and flexible hoses connecting the master cylinder to the wheel cylinders.

The combined supply tank and master cylinder is mounted on the frame beneath the left front floorboards, except on 37-90 where it is just behind the steering gear. The main function of this unit is to maintain a constant volume of fluid in the system at all times, regardless of expansion or contraction due to temperature changes. It also serves as a pump when bleeding the brake lines.

The compensating action of this unit can be understood by referring to Plate 22 Fig. 5. When the pedal is depressed, the piston primary cup immediately closes the by-pass port and builds up pressure in the system. When the pedal is released, the return of the piston and primary cup is much faster than the return of the fluid to the master cylinder.

Consequently, a momentary vacuum is created, which draws additional fluid into the system through the drilled holes in the piston and past the lip of the primary cup. Then, when the retracting springs fully release the brake shoes, the excess fluid in the master cylinder passes up through the by-pass port and the entire system is ready for the next brake application.

The wheel cylinders are of the double piston type. The cylinder casting is mounted on the brake dust shield, while each of the two pistons is connected to one of the brake shoes by means of a link. Pressure of the fluid in the wheel cylinder when the brakes are applied causes the pistons to move in opposite directions, thus forcing the brake shoes into contact with the drums. Pressure cannot be built up in the system until all shoes are in contact with their respective drums.

The front wheel cylinders have a larger diameter than the rear cylinders; consequently, the front and rear cylinders are not interchangeable. This arrangement of the wheel cylinders gives a higher braking ratio on the front wheels than on the rear. (See Specifications.)

The pistons in the master cylinder and in the wheel cylinders are provided with cup packings which act as seals to prevent the loss of brake fluid and, consequently, of braking pressure.

The hand brake lever is mounted under the instrument panel at the extreme left. It is connected by a steel cable to a lever mounted on the frame X-member. From this lever cables extend to each rear brake, where they actuate the brake shoes by means of a curved lever and strut rod.

Moulded brake lining is used on both primary and seconadry brake shoes of all 37-series cars except the V-16, which has moulded lining on the primary shoes and woven lining on the secondary shoes.

The brakes of all 37-series Cadillac cars are protected from water, dirt, or other foreign matter by a brake seal mounted around the outside edge of the brake dust shield as shown in Plate 22, Fig. 1.

Service Information

1. Brake Seals

The brake seals that are installed on 37-series Cadillac cars must be removed whenever any work is done on the brakes that requires removal of the brake drums.

Removal of these seals is easily performed by expanding the seal and lifting it from the dust shield after removing the nut on the clamp screw where the two ends of the seal are fastened together. See Plate 22, Fig. 1. Installation can be made by reversing the above procedure.

2. Brake Adjustment (Service Brakes)

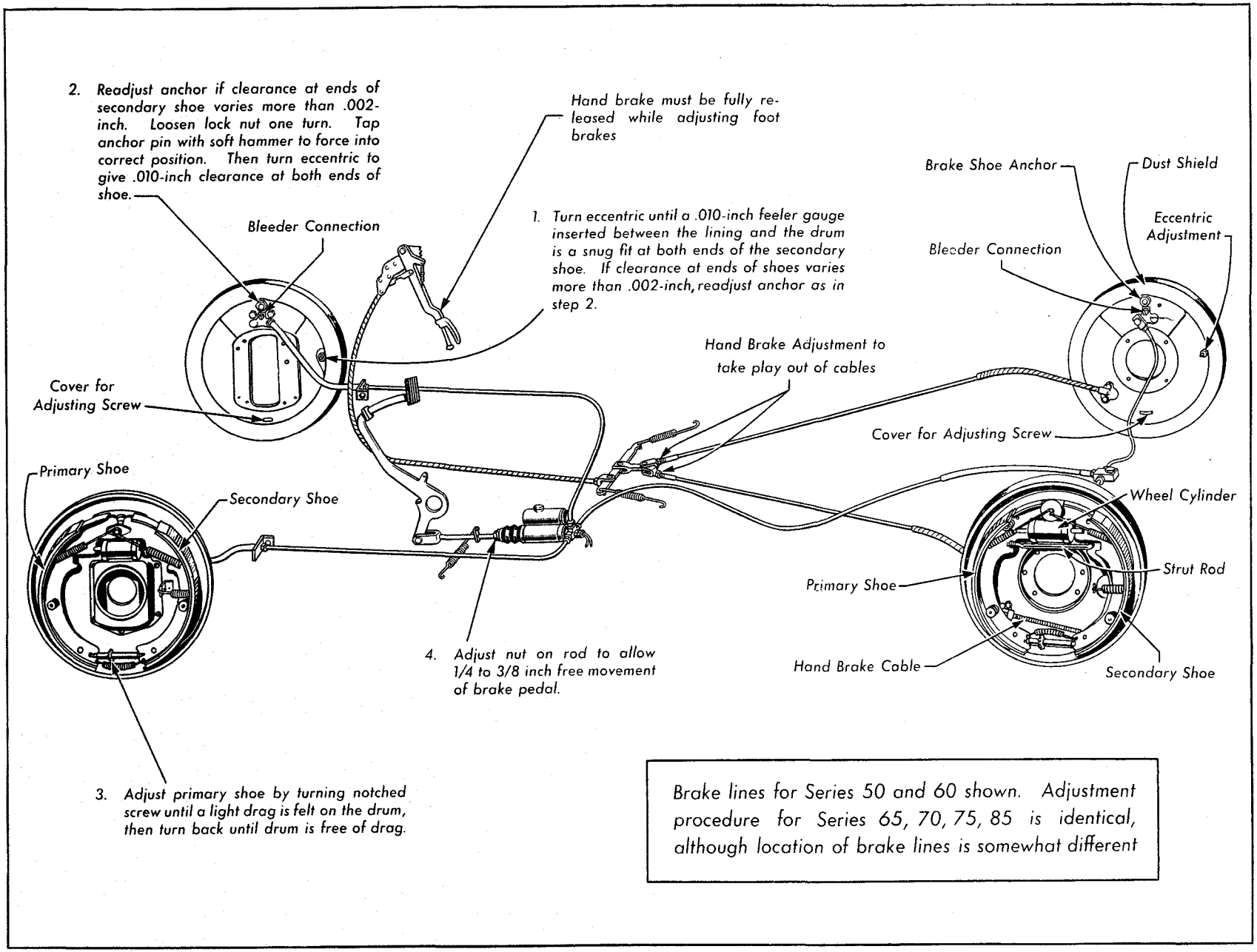
1. Make sure that hand brakes are fully released.

2. Jack up car, dismount all four wheels, and remove the inspection hole covers from the brake drum and dust shield.

3. At each wheel loosen the lock nut at the eccentric adjustment. (See Plate 23) Insert a .010-inch feeler gauge between the lining on the secondary (rear) brake shoe and the drum.

4. Clearance between the lining and the drum can be taken up to the required .010 inch by turning the eccentric in the direction of forward wheel rotation. Check the clearance at both ends of the brake shoe and, if there is more than .002 variation, the anchor pin must be readjusted.

5. To readjust the anchor pin, loosen the lock-



23. Brake Adjustment Chart

ing nut and tap the pin lightly with a soft hammer in the direction required to equalize the clearance at both ends of the secondary shoe. Retighten the locking nut at once, and recheck the clearance at both ends of the shoe.

6. The clearance between the primary brake shoe and the drum is secured by turning the notched adjusting screw, through the hole in the lower part of the dust shield, using Tool HM-13985. Move the outer end of the tool toward the center of the wheel to decrease the clearance until the brake drags. Then turn the adjusting wheel in the opposite direction just until the brake drum is completely free of drag.

7. Reinstall the adjusting hole cover and the drum inspection hole cover.

8. Repeat steps 3 through 7 uniformly for each of the four wheels.

9. Finally, adjust the operating rod that connects the brake pedal to the master cylinder. This rod must be adjusted to allow ¼ to ⅜-inch free movement of the brake pedal before it starts the piston on its pressure stroke.

Note: This adjustment is important and must not be neglected. The piston primary cup must clear the by-pass (Fig. 5, Plate 22) when the brake pedal is disengaged, otherwise the brakes will drag.

3. Brake Assister Adjustment

Adjustment of the vacuum brake assister, used on series 37-90, is illustrated and explained in detail in Plate 24.

This adjustment is made, if required, after the 37-90 brakes have been adjusted as explained in Note 2.

4. Hand Brake Adjustment

No adjustment is required by the hand brakes other than the elimination of any slack in the connections. This must be checked whenever the brakes are relined, or in cases of excessive hand lever travel. Make this check as follows:

1. See that foot brakes are fully released.
2. Apply hand brake slowly until all slack is taken up in the linkage and the strut rod just starts to operate the brake shoe in one wheel unit.
3. Keep the brake shoes in this position by holding the cable and, after fully releasing the hand lever, adjust the clevis on the front end of the cable so that the clevis pin can just be installed.
4. Repeat this operation for the other rear brake.
5. If the brakes drag with the hand lever in the fully released position, back off the clevis adjustments until they are free.

5. Bleeding the Braking System

The braking system requires bleeding, either entirely or in part, whenever any of the pipe lines are disconnected or whenever air gets into any of the lines. If the pipe line is disconnected from the master cylinder, the system must be bled at all four wheels. If a pipe is disconnected from an individual wheel cylinder, however, only that one wheel cylinder requires bleeding.

1. First of all, fill the supply tank with genuine Special No. 5 brake fluid. Keep the tank at least one-half full of fluid all during the bleeding operation. Tool No. J-713 is a special supply reservoir for automatically maintaining the correct level.

Note: The supply tank filler plug is accessible upon removing the cover-plate on V-8 cars, the left front floorboard on V-12 cars and by lifting the left side of the hood on V-16 cars. Extreme care must be used to prevent dirt from entering the master cylinder while this filler plug is removed.

2. Remove the cap screw from the end of the bleeder connection at the wheel cylinder and attach the bleeder drain tube, Tool No. J-628, allowing it to hang in a clean container such as a pint fruit jar.

3. Unscrew the bleeder connection three quarters of a turn.

4. Depress the brake pedal by hand, allowing the pedal to return slowly to the released position.

This provides a pumping action which forces fluid through the tubing and out at the wheel cylinder, carrying with it any air that may be present.

5. Watch the flow of fluid from the hose, preferably by keeping the end of the hose below the surface of the fluid, and when air bubbles cease to appear, or when the stream flow is uninterrupted, close the bleeder connection.

Depressing the pedal 5 to 7 times is usually sufficient to bleed a line.

6. If the entire system is to be bled, repeat the foregoing operations at each of the four wheels.

7. Replenish the fluid in the supply tank after each cylinder is bled. Should the supply tank be drained during the bleeding operation, air will enter the system and necessitate rebleeding of that line after the tank has been refilled.

The fluid withdrawn in the bleeding operation should not be used again. Refill the supply tank with fresh fluid only.

8. Before reinstalling the filler plug at the conclusion of the bleeding operation, make certain that the supply tank is more than half full of fluid.

6. Relining Brakes

1. Jack up car.
2. Remove all four wheels.
3. Remove brake seal on all Cadillac cars.
   Note: The 37-50 La Salle is not equipped with brake seals.
4. Remove wheel hub and brake drum assemblies.
   Note: Do not depress the brake pedal when one or more of the brake drums is removed.
5. Disconnect hand brake cable clevises at lever on frame.

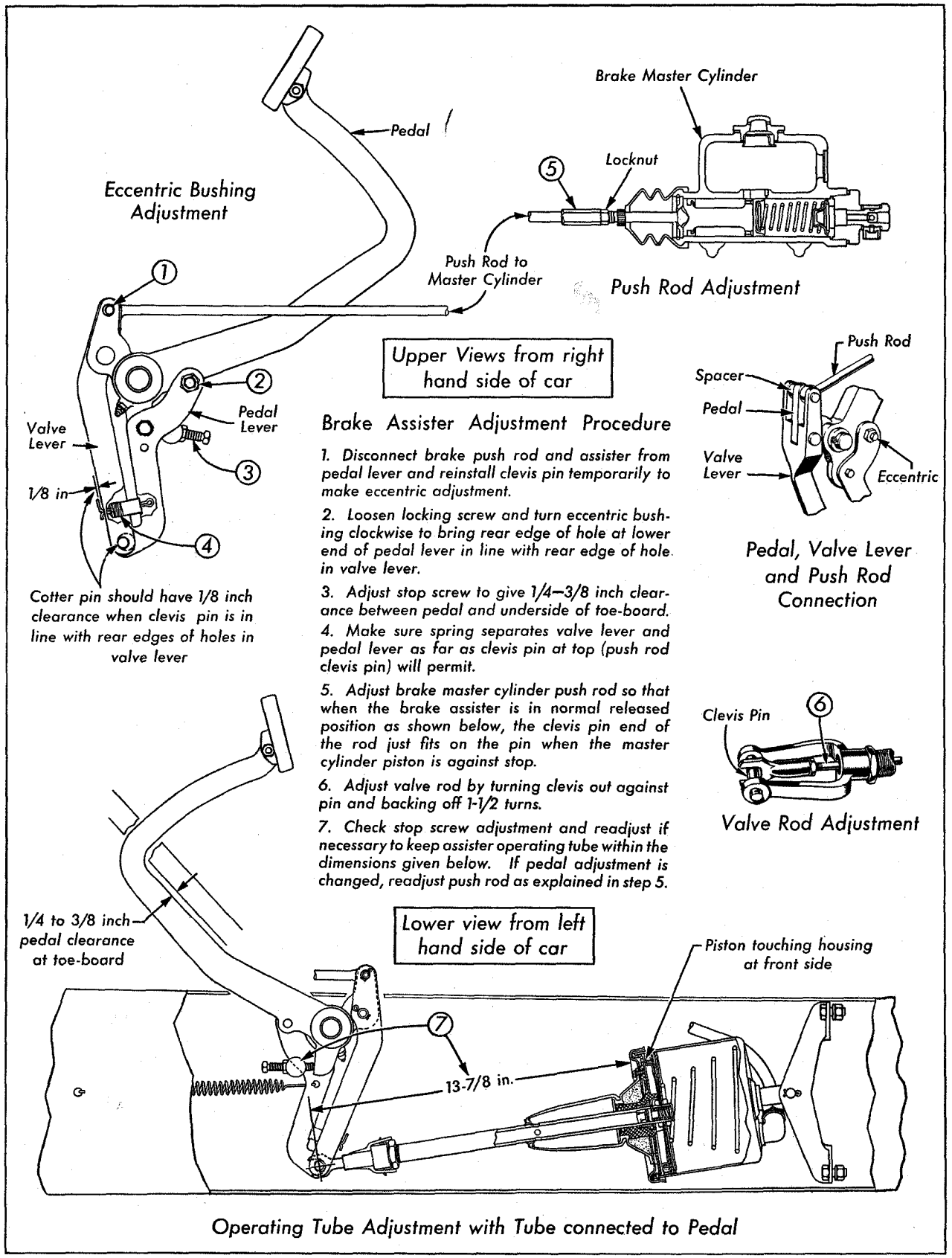


Plate 24. Brake Assister Adjustment—Series 37-90

6. Remove brake shoe hold-down cups and springs.

7. Disconnect brake shoe return springs and shoe connecting springs.

8. Attach piston clamp, Tool No. J-718, to the wheel cylinder and remove the brake shoes.

9. Disconnect the hand brake cables from the hand brake operating levers at the rear brakes.

10. Check the lining wear. If linings are worn nearly flush with the rivets, install new linings.

Note: The brake shoes must be installed with the primary shoe at the front and the secondary shoe at the rear. The primary shoe is identified by the letter "P" stamped on the web near the adjusting screw end; the secondary shoe by the letter "S" in the same position.

11. If it is necessary to true brake drums, do not grind out more than .030 inch over the original limit of the inside diameter. (See Specifications.)

12. Check the steering knuckle pin bushings for looseness.

13. Tighten the bolts that hold the dust shields to the rear axle and the front wheel spindles.

14. Install the brake shoes, the brake shoe hold-down cups and springs, and the return springs and connecting springs. The piston clamp can then be removed.

15. Install the wheel hub and drum assemblies, the brake seals on Cadillac cars, and the wheels.

Note: Readjustment of the notched adjusting wheel and centralization of the shoes at the eccentric adjustment may be necessary to permit assembly of the hubs and drums.

16. Adjust the front wheel bearings.

17. Check the rear spring U-bolts and the rubber insulators between the rear axle and the springs and adjust if necessary as follows: Tighten the U-bolts with uniform tension, keeping the lower pads flat with the bottoms of the springs. Tighten the nuts until the rubber starts to squeeze out beneath the edges of the retainers, after which tighten the lock nuts securely.

18. Adjust the brakes as outlined in Note 2.

7. Relining Brake Shoes

The brake lining used on all 37-series cars for service requirements is already cut to size, surface ground, chamfered at the ends, drilled and counterbored for the rivets, and ready for installation on the shoes. Installation is merely a matter of riveting the lining in place and smoothing up the edges of the lining around the rivet hole counterbores.

Note: When installing new lining be sure to clean face of shoes thoroughly before riveting lining in place.

8. Lubricating Brake Dust Shields

A popping noise may sometimes occur in the brakes when they are applied in forward speed after having been applied in reverse. This is generally a result of the edge of the shoe hanging slightly on the bosses of the dust shield before centralizing.

In such cases, the edges of the shoes should be smoothed up where they contact with the bosses on the dust shield and lubricated slightly.

A suitable lubricant for this purpose is furnished under specification number G-2½-B. Care should be taken in applying the lubricant to make sure that none is permitted to get on the brake lining.

This procedure should eliminate any objectionable popping. It should be remembered, however, that the centralizing action of the brakes may result in a slight click when the brakes are applied in reverse. This noise is hardly noticeable and should cause no annoyance.

9. Removal and Disassembly of Brake Unit

1. Remove wheel and wheel hub and brake drum assembly.

2. Disconnect the flexible hose or brake line assembly from the wheel unit.

Note: It is possible to dismount the dust shield for the front brake without disconnecting the hose, provided the assembly is supported in such a manner as to avoid strain or damage to the hose. The line must be disconnected for the rear dust shield and in cases where the front brake mechanism is to be disassembled.

3. Remove the bolts holding the dust shield to the steering knuckle or the axle, and dismount the complete assembly.

Note: When removing the rear brake from the car, the hand brake cables must be disconnected at the lever on the frame.

4. In reassembling wheel cylinders, note that fronts and rears are not interchangeable. The front cylinders may be identified by the larger bore.

5. To reinstall the assemblies, reverse the above operations, and bleed the lines if they were disconnected.

10. Regrinding Brake Drums

When regrinding brake drums in the service station, the drums must not be ground down more than .030 inch beyond the original limit of the inside diameter. See Specification Table for brake drum size. When brake drums are too thin, the intense heat that frequently develops will cause them to distort and warp. The drum thickness should be measured ½ inch from the outer flange.

Replacement brake drums supplied by the Parts Division are finished at the factory before being shipped. This eliminates the necessity for further finishing after installing on the wheel.

BRAKES

Diagnosis Chart

Effect	Cause	Remedy
Brake Pedal Goes All Way Down to Toe Board.	Normal wear on linings.	As the brake linings wear, it becomes necessary to set the shoes closer to the brake drums. When adjusting the brakes the drums should be cool and the shoes should be set as close to the drums as possible without dragging. The shoe anchor pins should not be disturbed when making the adjustment to compensate for lining wear.
	Leaks in brake system.	A leak in the pipe connections will allow the pedal, under pressure, to go gradually to the toe board. A cup leak does not necessarily result in loss of pedal travel, but is indicated by a loss of fluid in the supply tank. If no leaks are found either at the wheels or the connections, the master cylinder should be removed and the bore checked for scratches and scores.
	Air in brake system.	Air in the brake system will cause a springy, rubbery action of the brake pedal. If a sufficient quantity of air is present in the system, the brake pedal will go to the toe board under normal pressure. All air in the brake system must be expelled by bleeding as explained in Note 5.
	No fluid in supply tank.	The fluid level in the supply tank should be checked. Should the tank become empty, air will be introduced into the system, necessitating bleeding as explained in Note 5.
Brakes Drag at All Wheels	Mineral oil in brake system.	Mineral base oil, such as engine oil and kerosene, when present in the brake system will cause the cylinder cups to swell and bind, making it necessary to replace all rubber parts. To correct this condition, the brake system should be flushed with alcohol and refilled with Special No. 5 brake fluid.
	Port hole in master cylinder closed.	It is imperative that the port directly ahead of the master cylinder piston cup be open when the brakes are released. Should this port be blocked by the piston cup not returning to its proper release position, the pressure in the system will gradually build up, forcing all brakes to drag. Loosening one of the bleeder screws at the wheels will relieve the system of pressure and give temporary relief. The bleeder screw must be tightened before the car is driven.
Brake Drags at One Wheel.	Weak or broken brake shoe return spring	Replace spring with a new one.
	Brake shoes set too close to drum.	Readjust shoes to eliminate dragging as outlined in Note 2.
	Cylinder cups distorted.	The rubber cylinder cups will swell and become distorted if kerosene, gasoline or any other similar fluid is used instead of alcohol to flush the brake system or to clean these parts. Under this condition the return action of the shoes will be retarded and the brake drums will heat. The remedy is to replace the cups with new ones, washing them and flushing the brake system with alcohol and then to dip the new parts in brake fluid before reassembling them.
	Loose or defective wheel bearings.	Adjust or replace bearings with new ones as necessary.

BRAKES

Diagnosis Chart—(Cont'd)

Effect	Cause	Remedy
Car Pulls to One Side When Brakes Are Applied.	Oily linings.	Install new linings or complete reconditioned shoes. Oily linings cannot be cleaned and used again successfully. Also correct condition which caused linings to become oily.
	Brake shoes improperly adjusted.	This condition is evidenced by one wheel sliding before the others. The car may also pull to one side or drift when the brakes are applied with the front brakes improperly adjusted. The brakes must be readjusted with approximately the same clearance at wheels as outlined in Note 2.
	Dust shield loose on steering knuckle or axle.	A loose dust shield will permit the brake assembly to shift on the retaining bolts. Tighten dust shield and readjust the shoes.
	Different makes of lining used.	Different makes of lining have different braking efficiency. Linings other than those specified by the factory may cause a car to pull to one side when the brakes are applied. Install new linings.
	Tires not properly inflated.	Inflate tires to correct and uniform pressure.
Springy Pedal Action	Brake shoes improperly adjusted.	This condition is evidenced by one wheel sliding before the others. The car may also pull to one side or drift when the brakes are applied with the front brakes improperly adjusted. The brakes must be readjusted with approximately the same clearance at all wheels as outlined in Note 2.
	Air in brake system.	Air in the brake system will cause a springy, rubbery action of the brake pedal. If a sufficient quantity of air is present in the system, the brake pedal will go to the toe board under normal pressure. All air in the brake system must be expelled by bleeding as explained in Note 5.
Excessive Pedal Pressure Necessary to Stop Car	Brake shoes improperly adjusted.	This condition is evidenced by one wheel sliding before the others. The car may also pull to one side or drift when the brakes are applied with the front brakes improperly adjusted. The brakes must be readjusted with approximately the same clearance at all wheels as outlined in Note 2.
	Incorrect linings used.	Install new linings or complete reconditioned shoes. Poor grades of brake linings lose their gripping qualities after a few thousand miles. As the frictional quality of the lining decreases the pressure on the brake pedal must naturally be increased to get the equivalent stop.
	Oily linings.	Install new linings or complete reconditioned shoes. Oily linings cannot be cleaned and used again successfully.
	Lining making only partial contact with drum.	Grind off high spots on lining and readjust brakes as necessary.
Too Light Pedal Pressure (Brake Action Severe)	Brake shoes improperly adjusted.	This condition is evidenced by one wheel sliding before the others. The car may also pull to one side or drift when the brakes are applied with the front brakes improperly adjusted. The brakes must be readjusted with approximately the same clearance at all wheels as outlined in Note 2.
	Dust shield loose on steering knuckle or axle.	A loose dust shield will permit the brake assembly to shift on the retaining bolts. Tighten dust shield and readjust the shoes.
	Oily linings.	Install new linings or complete reconditioned shoes. Oily linings cannot be cleaned and used again successfully.

BRAKES

Specifications

Subject and Remarks	37-50, 60	37-65, 70	37-75, 85, 90
Braking area (foot brakes) square inches	220	220	257.5
Drums—			
Inside diameter	11.995-12.005″	11.995-12.005″	13.995-14.005″
Out of round, not over	.007	.007	.007
Clearance between brake lining and drum	.010	.010	.010
Run out, Max. installed	.010	.010	.010
Regrinding (See Note 10)			
Fluid	Special No. 5	Special No. 5	Special No. 5
Lining—			
Length: Front primary (forward shoe)	12 15/16″	12 15/16″	12 1/4″
Front secondary (rear shoe)	12 15/16″	12 15/16″	15″
Rear primary (forward shoe)	12 15/16″	12 15/16″	15″
Rear secondary (rear shoe)	12 15/16″	12 15/16″	15″
Width: Front brake lining	2 1/4″	2 1/4″	2 1/4″
Rear brake lining	2″	2″	2 1/4″
Thickness: Front brake lining	3/16″	3/16″	1/4″
Rear brake lining	3/16″	3/16″	1/4″
Composition Primary lining	Moulded	Moulded	Moulded
Secondary lining	Woven	Woven	Woven
Pedal—			
Clearance between pedal and underside of toe-board	1/4-3/8″	1/4-3/8″	1/4-3/8″
Free play (See Plate 23)	1/4-3/8″	1/4-3/8″	1/4-3/8″
Ratio (percentage of braking effect)—			
Front brakes	54 1/2%	56%	(75, 85) 58% (90) 55%
Rear brakes	45 1/2%	44%	(75, 85) 42% (90) 45%
Springs—			
Primary and secondary shoe retracting springs—			
Free length inside loops	4 7/8″	4 7/8″	5 41/64″
Tension stretched to 5 13/16″	50-60 lbs.	50-60 lbs.	.....
Tension stretched to 6 25/32″	.....	.....	57-69 lbs.
Brake shoe connecting spring at adjusting screw—			
Free length inside loops	3 29/32″	3 29/32″	3 23/32″
Tension stretched to 4 5/16″	36-44 lbs.	36-44 lbs.	45-55 lbs.
Wheel cylinder bore—			
Front wheel cylinder	1 1/16″	1 1/16″	1 1/4″
Rear wheel cylinder	1″	1″	1 1/16″

ENGINE

General Description

Four different engines are used in the 37-series Cadillac and La Salle cars. A 322 cubic inch 90° V-8 engine is used in the series 37-50 LaSalle, a slightly larger 346 cubic inch, 90° V-8 engine in the series 37-60, 65, 70 and 75 Cadillac cars, a 368 cubic inch 45° V-12 engine in the series 37-85 Cadillac, and a 452 cubic inch 45° V-16 engine in the series 37-90 Cadillac.

La Salle and Cadillac V-8 Engines

The cylinder blocks and crankcase of all 37 series V-8 engines are made in one casting of grey iron. The cylinder heads are also of cast iron.

The crankshaft is supported by three main bearings. The main bearing caps are cast iron, and are held in place with special cap screws and lock washers. Shell type bearings are used. End thrust is taken by the center main bearing.

Six counterweights are used, four of them integral with the crankshaft. Number two and five counterweights are piloted by locating sleeves and held to the crankshaft by special cap screws and lock washers. Harmonic balancers are used on all Cadillac engines.

The connecting rods for opposite cylinders are carried side-by-side on the same crankpin. The large end of the connecting rod is split on an angle to permit removal from the top of the cylinder block. The rods are rifle-drilled for pressure lubrication of the piston pins and the large ends are also drilled for lubrication of the cylinder bores. The connecting rod bearings are of the steel-back babbitted type.

The pistons are of T-slot design and made of aluminum alloy which has been anodized to provide a hard aluminum oxide wearing surface. Two compression rings and two oil rings are used on the pistons. The piston pins float in the connecting rods and are retained in the pistons by snap rings. The bore of the piston pins in the 37-60, 65, 70 and 75 engines is tapered to give a thicker wall at the center than at the ends.

The camshaft is a solid shaft supported by three bearings and driven by a silent chain. Both the crankshaft and the camshaft sprockets are stamped with a locating mark, letter "O," for timing the camshaft when installing the chain.

Hydraulic valve lifters are used on all V-8 engines for maintaining zero clearance between valve stem and lifter, thereby assuring quiet operation and efficient valve action, besides eliminating the necessity for valve tappet adjustments. A detailed description of this mechanism is given in Note 21, page 83.

The distributor and oil pump drive gear is integral with the camshaft. The camshaft gear meshes with an idler gear that drives a single gear on the shaft that drives both the distributor and the oil pump. The distributors rotate in a clockwise direction on all 37 series engines.

Oiling System—The gear type oil pump is bolted to the bottom of the crankcase at the left of the rear main bearing. Oil enters the pump through a screened and floating intake as shown in Plate 37, Fig. 37. This intake floats on the surface of the oil at all times and draws off only the clean surface oil. Sludge and dirt collect in the bottom of the oil pan where they will not be drawn into the lubricating system. The oil pressure regulator is built into the pump body.

Oil is forced by the pump through a passageway drilled in the crankcase to the oil header, which is drilled longitudinally along the left side of the crankcase. From the oil header other drilled passages branch through the bearing support webbs to the three main and the three camshaft bearings.

Oil is carried from the rear camshaft bearing to the distributor and oil pump drive shaft and gears, and from the front bearing to the timing chain. Oil from the forward end of the header passes through the oil filter and then to the four sets of hydraulic valve lifters.

Oil from the main bearings passes through drilled passages to the crankpins, where part of the oil lubricates the connecting rod bearings, part flows up to the piston pins, and part passes through the small holes in the big end of the connecting rod to lubricate the cylinder bores.

A suction type crankcase ventilating system is used, which provides a positive and nearly constant air circulation through the crankcase at all times. With this system, air enters the crankcase through the oil filler cap, which is fitted with a copper mesh air filter. The air and any contaminating vapors are then drawn out by the two baffled openings in the valve covers. See Plate 37, Fig. 39.

Two outlet openings are provided in the valve chamber. At low speeds, the vapors are discharged through a pipe located in the inlet manifold, which has a strong vacuum at low engine speeds. At high speeds, the vapors are discharged through a pipe located at the rear of the air

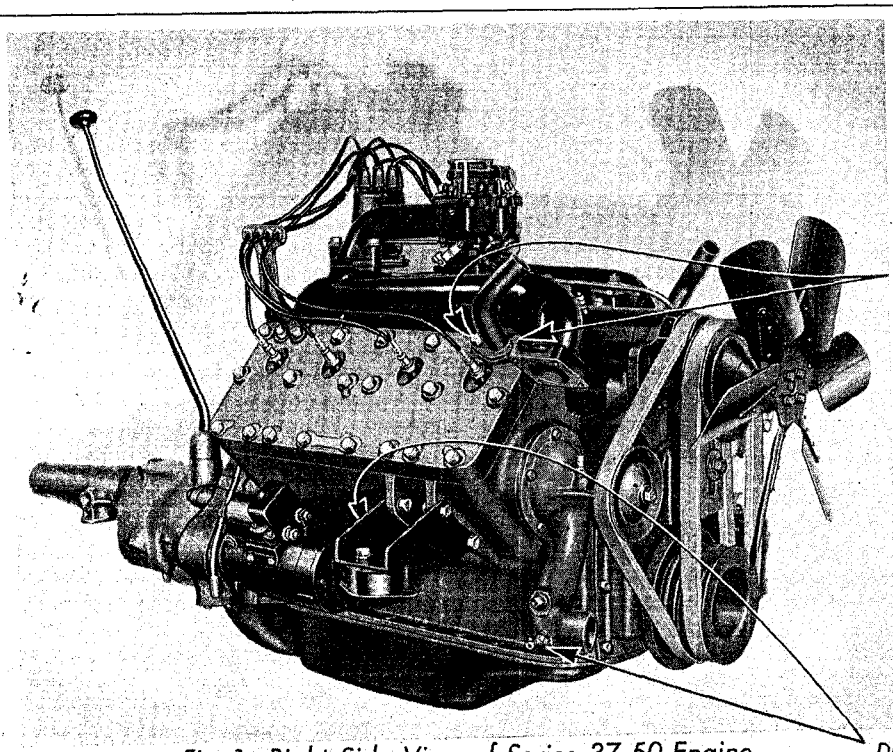


Fig. 1 Right Side View of Series 37-50 Engine Typical of Series 37- 60, 65, 70 and 75

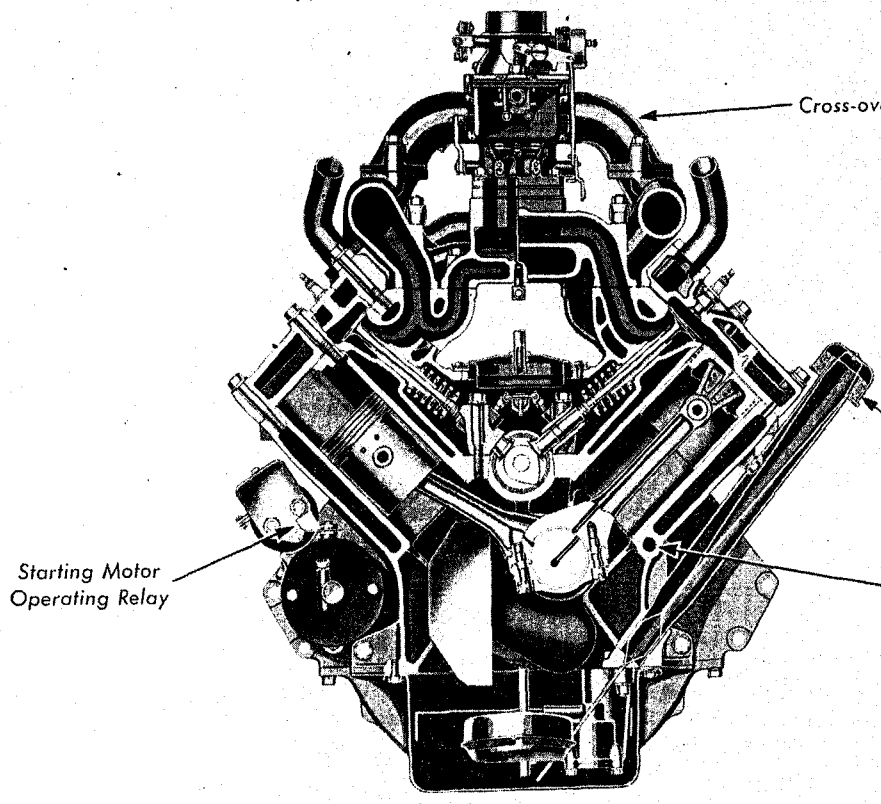


Fig. 2 Cross Sectional View of 37 Series V-8 Engine

Plate 25. Engine—Series 37-50, 60, 65, 70, 75

cleaner where the high velocity of the air passing into the carburetor provides the suction to draw the air from the crankcase.

Cooling System—The water pump, located at the front of the right hand cylinder bank, is driven by a belt which also drives the generator, located in the engine vee. A permanently sealed ball bearing is used at the outer end of the water pump shaft, and automatically adjusted chevron type water pump packing provides a water and air tight seal around the shaft at the impeller end.

A separate belt is used to drive the fan. It is adjusted by raising or lowering the fan bracket, which is mounted to a support on the engine front cover. The fan rotates on a permanently sealed ball bearing, and does not require lubrication in service.

The water pump draws fluid from the bottom of the radiator and delivers it directly to the right cylinder bank. The water is then by-passed at the center of the cylinder block where half of the fluid is forced through a cored passageway to the left cylinder bank. After circulating through the blocks, the fluid passes out through an outlet in the top of each cylinder head leading to the upper tank of the radiator and repeats the cycle. Full length water jackets provide an even temperature over the entire length of the cylinder walls.

A built-in pressure valve type radiator filler cap with a bayonet safety catch is used to protect the cooling system from loss of water or anti-freeze through boiling.

Ignition System—The ignition system consists of an induction coil, mounted on the forward side of the dash; a timer which interrupts the low tension current from the battery and produces a high voltage in the secondary circuit of the coil; and a distributor to direct the high voltage current to the spark plugs.

The distributor is fully automatic in operation. It is mounted at the rear of the engine and is driven by camshaft gearing as shown in Plate 41, Fig. 53. A single contact arm is used with an eight lobe breaker cam which is integral with the distributor shaft. The ignition setting is indicated by a timing quadrant at the base of the distributor housing and is controlled by revolving the housing a few degrees either way from the zero mark on the scale. The automatic spark advance is controlled by centrifugal weights. Timing marks are stamped on the belt pulley at the front end of the crankshaft.

Carburetion—All 37-series Cadillac V-8 engines are equipped with a Stromberg carburetor, (See Plate 42, Fig. 55) as standard. On the 37 series La Salle V-8 engines, both Stromberg carburetors and Carter carburetors, (See Fig. 56) were used.

Although the fundamental design of these two makes of carburetors is different, their operation and performance is quite similar. They are both duplex downdraft carburetors. In each case, the left barrel supplies fuel to the two center cylinders in the left cylinder bank and the two end cylinders in the right cylinder bank. The right barrel supplies fuel to the remaining cylinders. Each barrel has a separate main metering jet and an adjustable idling jet.

Both carburetors have vented fuel nozzles which permit any gas bubbles that may form in the carburetor to escape without forcing gasoline out of the nozzle. These nozzles are known as "non-percolating" jets, and improve the performance during overheated conditions which might otherwise cause difficulty in starting the engine.

Both makes of carburetors are provided with a drain in the float chamber cover of the carburetor to prevent flooding. Any gasoline overflowing into the drain is carried to the ground by a tube passing to the rear along the engine vee and down at the side of the flywheel housing.

The Stromberg carburetor is equipped with a fully automatic electric choke. This device depends for its operation upon a thermostat and a small electric heating element that is heated by electric current when the ignition switch is turned on to start the engine.

The Carter carburetor has a Climatic Control choking device. The thermostat in this unit is operated by heat piped into the control box from the exhaust manifolds when the engine is started.

A combination fuel pump and vacuum pump is mounted on the front engine cover directly behind the fan. The pump is driven by a removable eccentric keyed to the front end of the camshaft.

Manifolds—Two separate intake manifolds made up in a single casting, are used on the 37 series V-8 engines. Each manifold supplies the two center cylinders on one side and the two end cylinders on the opposite side.

The exhaust manifolds, like the intake manifolds, are mounted on top center of the cylinder groups. There are three exhaust ports in each cylinder bank. The end cylinders have individual ports, while the center cylinders are grouped together in one part, from which a passage leads to the heated chamber of the intake manifold. A cross-over pipe just forward of the rear exhaust port connects the left hand exhaust manifold with the right hand manifold.

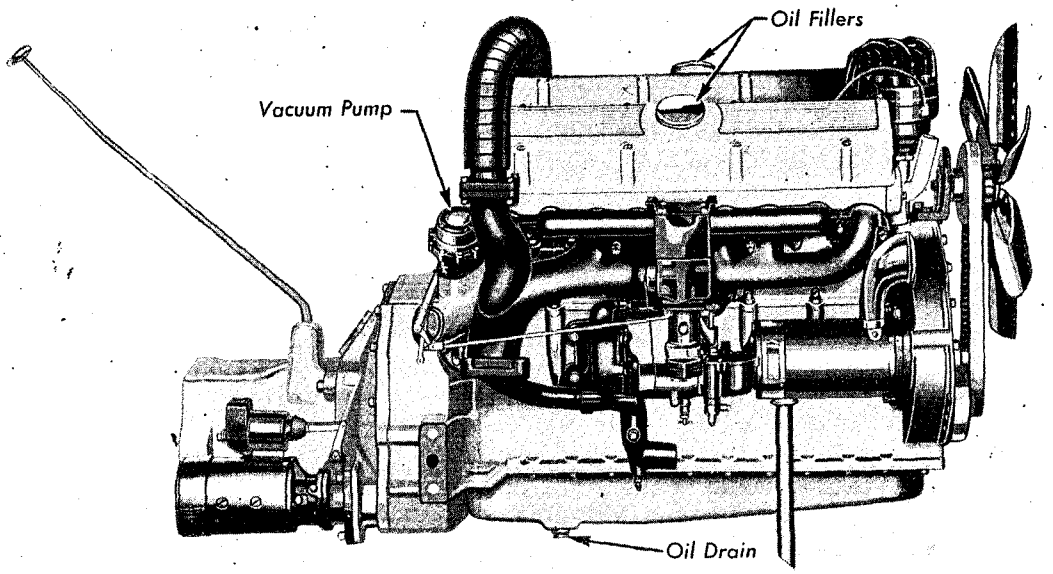


Fig. 3 Right Side View of Series 37-85 Engine
Typical of 37-90

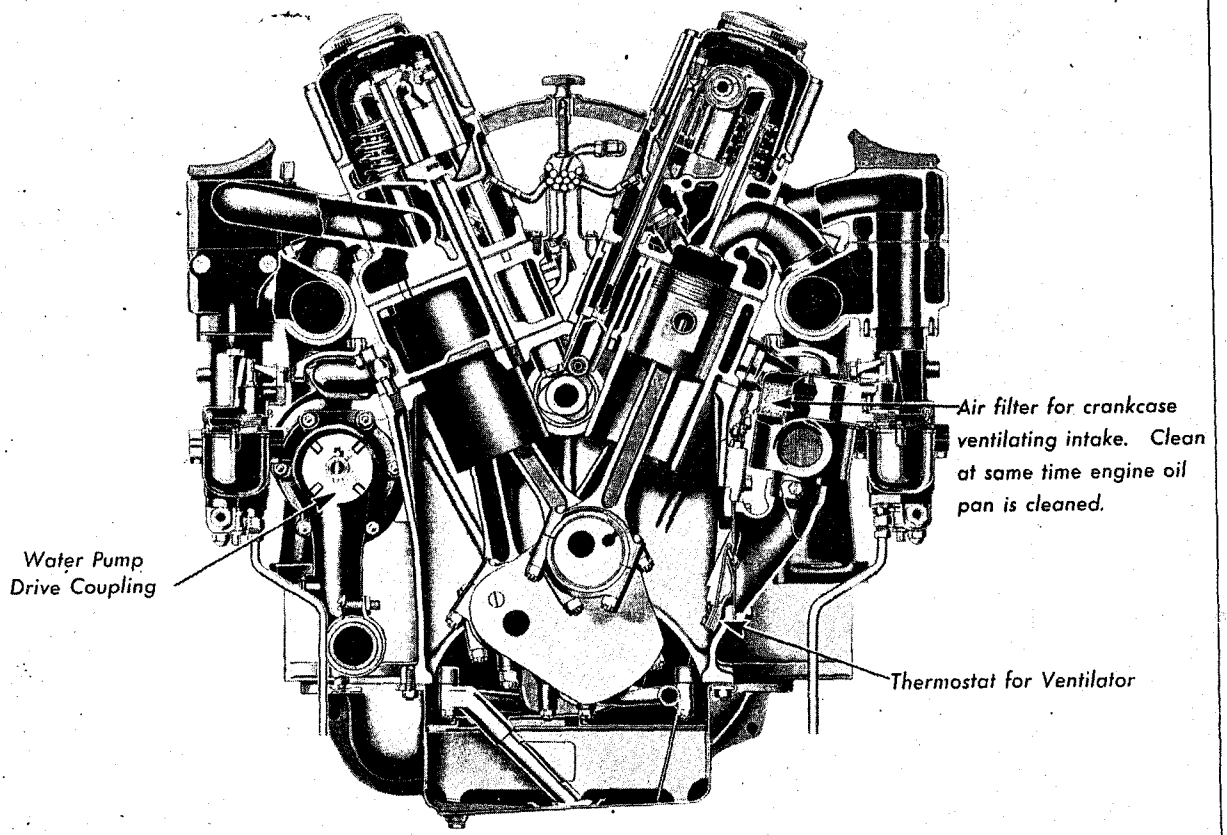


Fig. 4 Cross Sectional View of Series 37-85 and 90 Engines

Plate 26. Engine—Series 37-85 and 90

On series 37-50 and 60 engines, the exhaust pipe take-off is at the front of the right hand cylinder block. On series 37-65, 70, and 75 engines the exhaust pipe take-off is at the rear of the right hand cylinder block.

Engine Supports — The 37-series V-8 engines are supported by two rubber mountings at the side of the cylinder blocks toward the front of the engine, and one rubber mounting at the transmission extension in the rear.

The supports are so designed that the effect is to allow free movement of the engine through a limited distance beyond which increasing resistance dampens out any excessive motion or shaking of the engine.

The rear support is constructed so that a combination shearing and compression action on the rubber pads in the support produces the above effect.

CADILLAC V-12 AND V-16 ENGINES

The Cadillac V-12 engine, used on the series 37-85, and the Cadillac V-16 engine, used on the series 37-90, are of the same general design. These engines have an aluminum crankcase with separate cast iron cylinder blocks for each bank of cylinders. The angle between the blocks is 45°. These blocks are so designed that the cylinder bores extend several inches into the crankcase. The cylinder heads contain the overhead valve mechanism, which is in turn protected by cylinder head covers.

The series 37-85, V-12 crankshaft is supported by 4 main bearings and the series 37-90, V-16 crankshaft, by 5 main bearings. Both shafts are forged with integral counterweights and have a harmonic balancer at the front end.

The connecting rods for opposite cylinders are carried side by side on the same crankpin. The rods are rifle-drilled for pressure lubrication of the piston pins. The connecting rod bearings are of spun babbit.

The pistons are of T-slot design and made of aluminum alloy, anodized by an electrolytic process to provide a hard aluminum oxide wearing surface. Four piston rings, three compression and one oil ring, are used. The piston pins are locked in the pistons with set screws.

The camshaft is a hollow shaft supported by four bearings in the V-12 engine and five bearings in the V-16 engine. It is driven by a silent chain which also drives the generator and water pump. Because of its length, the chain is provided with an automatic adjustment idler sprocket, and a timing chain vibration dampener.

The valves are operated through push rods and rocker arms, which incorporate an automatic valve silencer mechanism for taking up all clearance, thus assuring silent operation and eliminating the necessity for tappet adjustment. (See Plate 26).

Oiling System—The oil pump is attached to the rear main bearing cap and is driven by spiral gears at the rear of the camshaft. The pump draws oil from the center of the oil pan and delivers it through copper pipes to the main bearings, and from there through drilled passages to the crankpins. Oil from the front main bearing reaches the oil pressure regulator and the timing chain. Oil from the rear main bearing is carried to the hollow camshaft and is piped to the oil filter, from which it is returned to the valve silencers and rocker arms.

Crankcase ventilation is provided by the rotation of the counter-weighted crankshaft, which draws air in through a thermostatically controlled and screened intake at the left front of the crankcase and expels vapors through the valve tappet compartments.

Cooling System — The water pump is on the right side of the engine just in back of the generator and driven through a flexible coupling by the same shaft. Automatically adjusted water pump packings of the chevron type are used. Fluid is drawn from the bottom of the radiator and delivered by the pump to two outlets, one leading up to the right block, and the other going through the rear of the crankcase and over to the left block.

Ignition System—The distributor is mounted at the front of the engine and driven by the camshaft through spiral gears. The ignition circuit for each bank of cylinders is separate: two coils are used, and two contact arms, operating alternately on a breaker cam. Two condensers are contained in the distributor housing.

The spark advance is fully automatic and controlled by centrifugal weights. Ignition timing marks are stamped on the flywheel, and are visible through an opening in the bell housing on the right hand side.

The ignition coils are mounted in a bracket at the forward end of the radiator brace rods. They are connected to the ignition switch through an armored cable running directly to the center of the instrument panel.

Carburetion — Two separate carburetors are used—one for each bank of cylinders. They are of the expanding-vane updraft type. Both are operated by single throttle and choke connections, requiring accurate synchronizing. A semi-automatic choke is employed.

The fuel pump is located at the left front of the crankcase and operated by a driving rod actuated by a cam on the vertical shaft for the timer distributor. A separate vacuum pump is used, located at the rear of the engine Vee, and driven by an eccentric on the end of the camshaft.

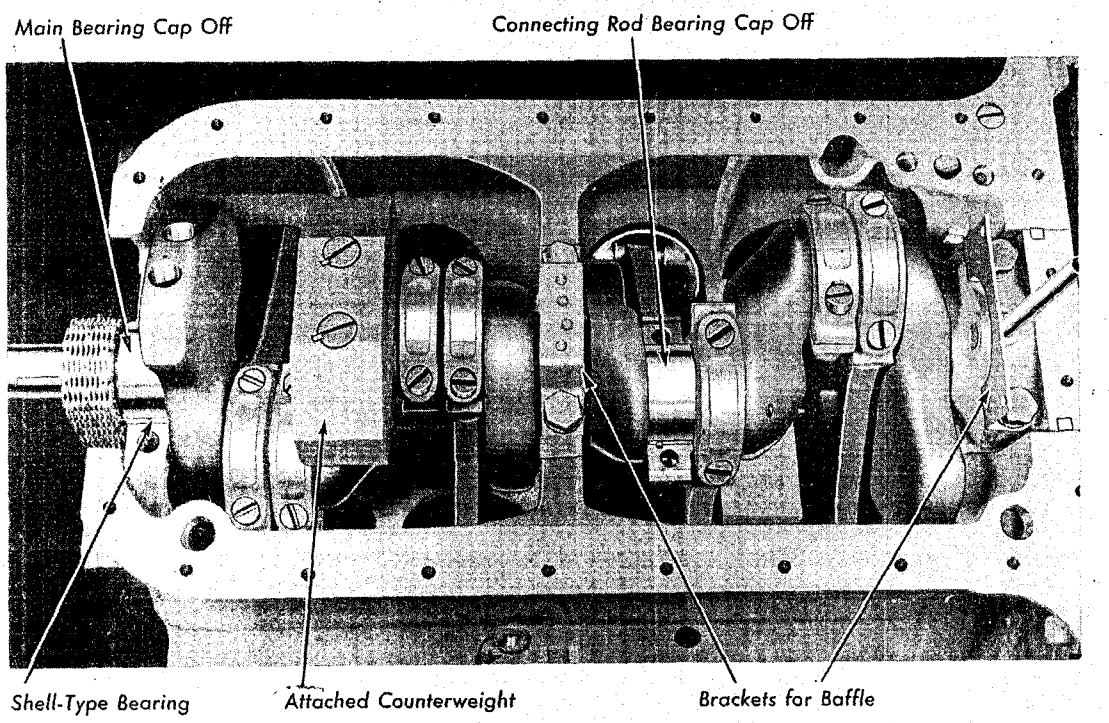


Fig. 5 Engine Crankcase Interior—Series 37-50, 60, 65, 70, 75

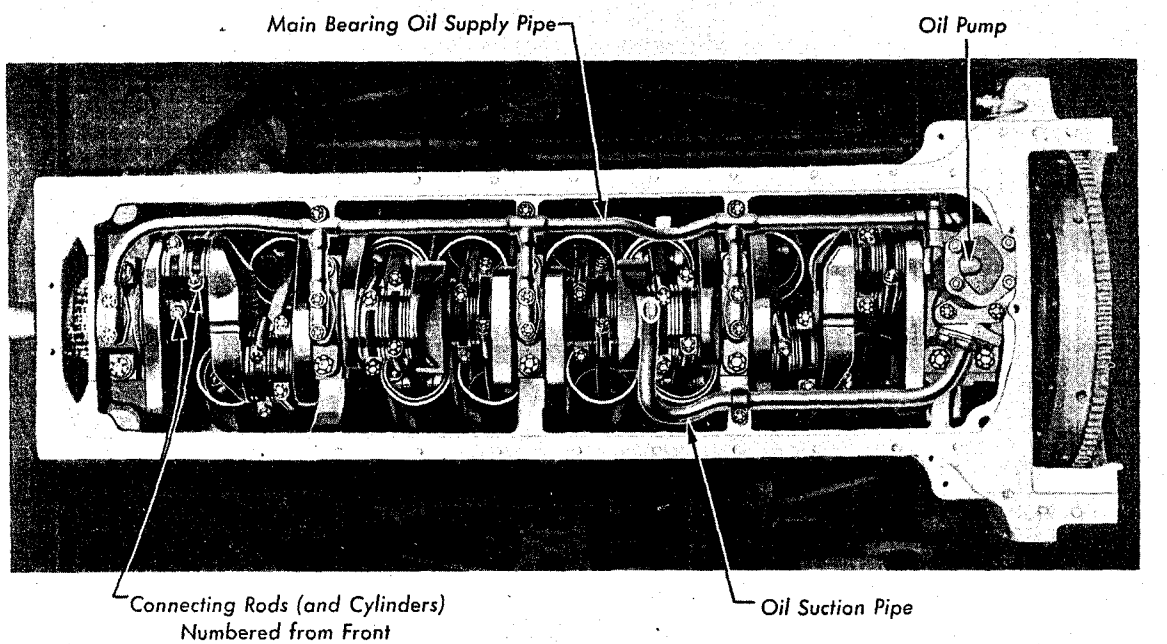


Fig. 6 Engine Crankcase Interior—Series 37-90—Typical of 37-85

Plate 27. Engine Crankcase

Manifolds —The intake manifolds on the V-12 and V-16 engines are made of cast aluminum alloy and are designed expressly for updraft carburetion. A separate manifold and intake header is used for each bank of cylinders. The construction is shown in Plate 26.

The exhaust manifolds on these engines are made of cast iron and have a baked porcelain finish. The construction of these manifolds is also shown in Fig. 26. On the V-12 engine the manifold for each bank is in two sections, the forward one of which carries the upper part of the intake header and includes a chamber for heating the fuel passing into the engine from the carburetor. The design of the V-16 exhaust manifolds is similar to that of the V-12, excepting that each manifold is in three sections instead of two. On these engines the center section, which includes the chamber for heating the fuel passing into the engine, is a unit by itself.

On the V-12 engines a cross-over pipe at the rear cylinder ports conducts the exhaust gases from the left hand manifold over to the right hand manifold. From here the gases of both manifolds are carried by a single pipe to the mufflers along the right hand side of the car and out at the rear through a single exhaust pipe.

On the V-16 engines two separate and complete exhaust systems and mufflers are used, one for each cylinder bank. No cross-over pipe is required with this system.

Engine Supports — The engine is mounted in rubber at five points; one on each side of the engine front cover—one on each side of the flywheel housing—and one on the transmission extension at the rear of the transmission.

Service Information

1. Cylinder Numbering

The left front cylinder is designated as number one cylinder on all 37 series cars. The cylinder numbering is made according to arrangement, rather than firing order. The odd numbered cylinders are on the left bank and the even numbered cylinders on the right bank.

2. Replacing Main Bearings

When main bearings are found to be worn beyond the limits specified on page 105, they should be replaced. No attempt should ever be made to shim or otherwise take up worn bearings.

Replacement main bearings are furnished to exact size and do not require reaming or scraping. They can be installed without removing the crankshaft by observing the following procedure:

1. Remove the cap from the front main bearing and remove the worn bearing shell from the cap.

2. Rotate the crankshaft in a reverse direction to turn the upper shell out of the crankcase.

Note: No special tool is provided for this operation. Instead, a cotter pin should be placed in a vise and the rounded end flattened to a T shape. Then the pin can be inserted in the oil passage hole in the journal and the projecting head will contact the bearing and force it out as the shaft is turned.

3. Place the new upper bearing shell on the crankshaft journal with the locating lug in the correct position, and rotate the shaft to turn the upper shell up into position.

4. Install the lower bearing shell in the cap and reinstall the cap.

5. Repeat this procedure for each main bearing.

Note: New bearings will not provide satisfactory operation if the crankshaft journals are worn or scored. Worn limits for micrometer testing are given in the Specification table on page 105.

Always install new cork plugs in the grooves in the sides of the rear main bearing caps, when reinstalling caps, to prevent oil leaks around the cap. These plugs should be well greased to facilitate installation in the grooves.

3. Clean Oil Lines Before Installing New Bearings

Before installing new main or connecting rod bearings in any engine, it is important to clean out thoroughly all of the oil lines in order to remove any foreign material that might later damage the new bearings.

Oil piping can be cleaned satisfactorily by blowing out with compressed air. Drilled passages, however, as used in series 37-50, 60, 65, 70 and 75 engines, require additional effort. The following procedure will assure satisfactory cleaning.

1. Remove the oil pump.

2. Remove oil filter.

3. Remove the plug at the front end of the crankcase oil header. See Plate 31, Fig. 20.

5. Apply compressed air and intermittent shots of kerosene from an oil can at the header opening.

A more thorough cleaning of the oil lines can be secured when the radiator is off the car and the crankshaft and camshaft out, by removing the plug for the header and the plugs for the lines to the bearings (See Plate 31) and cleaning the lines with a stiff wire brush.

Whenever the oil lines are cleaned, the small oil hole in the lower end of each connecting rod should be inspected and cleaned out, if necessary, to assure adequate cylinder wall lubrication.

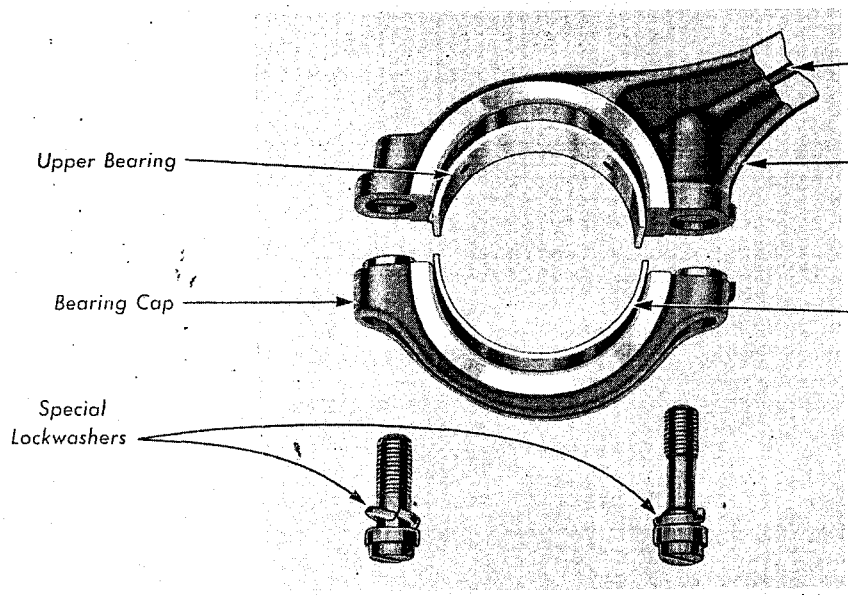


Fig. 7 Connecting Rod and Bearing Assembly
Series 37-50, 60, 65, 70 and 75

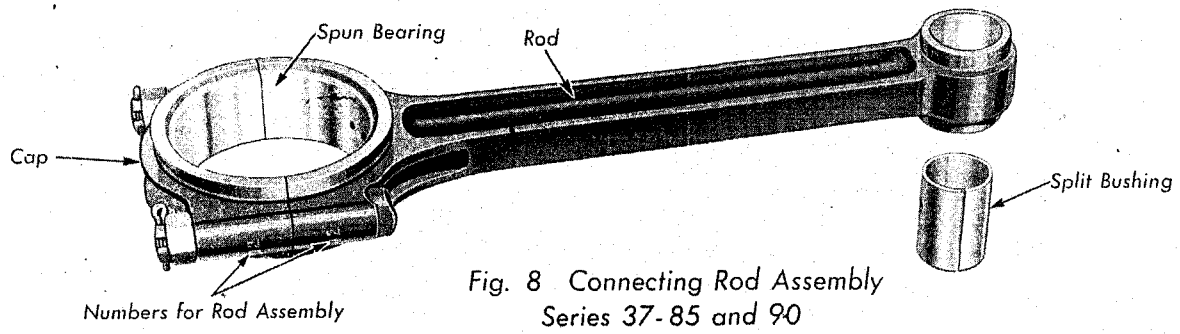


Fig. 8 Connecting Rod Assembly
Series 37-85 and 90

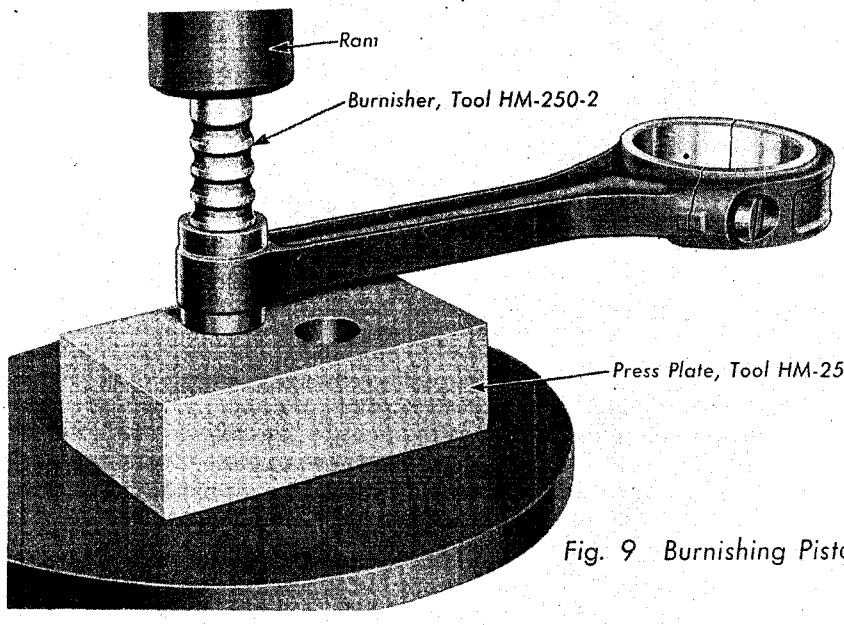


Fig. 9 Burnishing Piston Pin Bushing

Plate 28. Connecting Rod Details

4. Removing Connecting Rods

Series 37-50, 60, 65, 70 and 75 connecting rod and piston assemblies must be removed from the **top** of the cylinder blocks because of the compact design of the crankcase. All 37-series V-8 rods are split on an angle to permit withdrawal through the bores.

Series 37-85, V-12 and series 37-90, V-16 connecting rod and piston assemblies should be removed from **below.** It is not necessary to take off the cylinder heads to remove the connecting rod and piston assemblies on these overhead valve models.

Always inspect the crankshaft journals carefully, whenever connecting rods are removed, because a rough or scored crankpin will result in further bearing failure if it is not corrected before the engine is reassembled.

5. Connecting Rod Bearings

If connecting rod bearing clearances exceed the limits given on page 105, the bearings on V-8 engines or rods on V-12 and V-16 engines should be replaced. No attempt should be made to shim or adjust worn bearings. The connecting rod bearings used in series 37-50, 60, 65, 70 and 75 engines are of the shell-type. These bearings are replaceable, and can be removed or installed without removing the piston and connecting rod assembly from the engine. It is necessary only to remove the connecting rod bearing caps and replace the bearings.

The connecting rod bearings used in series 37-85 and 37-90 engines are of the spun babbit type. Replacement of these bearings must be made by exchanging the rods. Exchange should be made through the factory Parts Division.

Returned rods must be in proper condition without burns, scores or file or punch marks, which would prevent factory reconditioning and thus disqualify the rods for exchange. Mechanics should attach numbered metal tags to rods or lay them in trays in the sequence of removal or installation instead of marking them with a punch or file.

6. Oil Holes Identify Upper Shell of V-8 Connecting Rod Bearings

The upper and lower halves of the connecting rod bearings used in series 37-50, 60, 65, 70 and 75 engines are not interchangeable because of the holes in the upper bearing for the oil passages in the body of the connecting rod.

Extreme care should be exercised when installing these connecting rod bearings to make sure that the ***upper half*** is installed in the top of the rod or no oil will reach the piston pins and cylinder walls. Failure to make the proper installation may result in extensive damage to the engine.

7. Connecting Rod Alignment

When straightening connecting rods, the rod is more liable to hold its shape if it is bent a little further than necessary and then bent back until it is straight. Otherwise, it may return to its former shape, due to the roughness of the alloy steel used in its construction.

When checking the alignment of the connecting rod assembly, both sides of the piston should be tested by reversing it on the alignment fixture. Both sides of the piston should rotate parallel with the face of the fixture. Tool No. HM-109214 is available for making these tests.

8. Connecting Rod and Piston Assembly

The pistons in all 37-series engines should be assembled on the rods so that the "T" slot in the skirt will be on the left side of the engine.

When assembling connecting rods to the crankshaft be sure that the numbers on the rods are toward the bottom of the engine and that they correspond with the numbers on the caps.

Note: Removal of bearing caps should be made by first loosening the screws part way, and then tapping the cap with a hammer to free the cap from its locating dowel, before complete disassembly.

The lock washers under the connecting rod screws are of special design and material. ***New lock washers*** must be always used under the connecting rod bolts in series 37-50, 60, 65, 70 and 75 engines. They are available only through the factory Parts Division.

When installing main bearing or connecting rod bearing caps on 37 series V-8 engines, a wrench with a handle no longer than twelve inches should be used. A special wrench kit, Tool No. J-835, is recommended for this operation. The lip socket included with this tool should always be used to avoid any possibility of damage to the caps.

Proper installation of connecting rod bearings as explained in Note 6, is important.

9. Removal and Installation of Piston Pin Bushings

The removal and installation of the split-type piston pin bushings in the connecting rods of all 37-series cars requires the use of a kit of special tools. This kit, Tool No. HM-250, includes a bushing replacer, expanding bar, burnishing tool, and press plate for use on an arbor press.

The bushing should be removed in an arbor press. It should be started by giving the handle of the press a sudden jerk instead of a steady pull. After it has started it will move out quite freely. The connecting rod should then be thoroughly cleaned of all chips and dirt.

The bushing cannot be pressed into the connecting rod in the usual manner. Instead, it is first forced into the rod and then expanded with a burnishing bar to press the bronze into very close contact with the steel rod, which at the same time burnishes the bearing, leaving a long hardwearing bearing surface.

To install the bushing, proceed as follows:

1. Make sure that the oil hole in the bushing is in line with the oil hole in the rod and that the split is at right angles to the length of the rod.

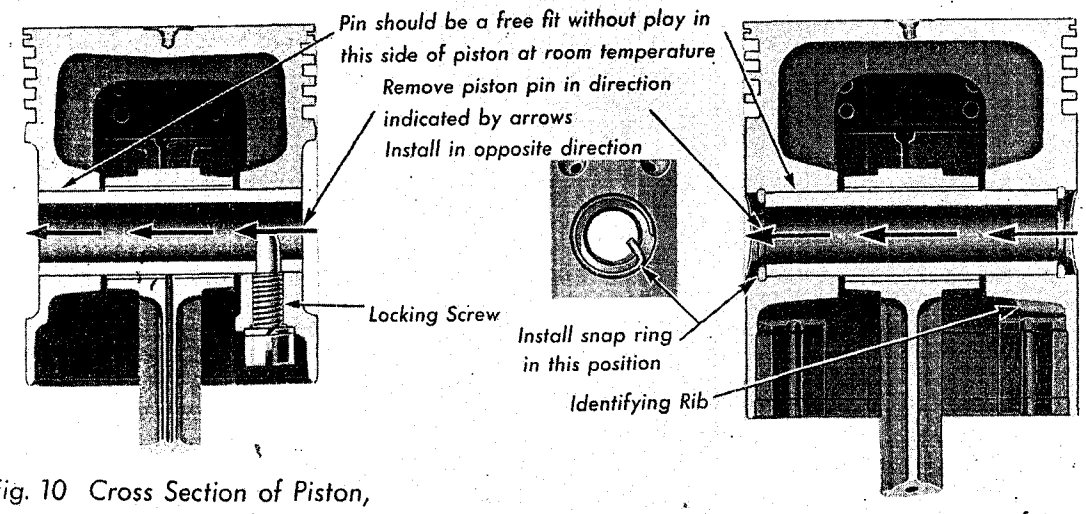


Fig. 10 Cross Section of Piston, Series 37-85 and 90

Fig. 11 Cross Section of Piston, Series 37-50, 60, 65, 70 and 75

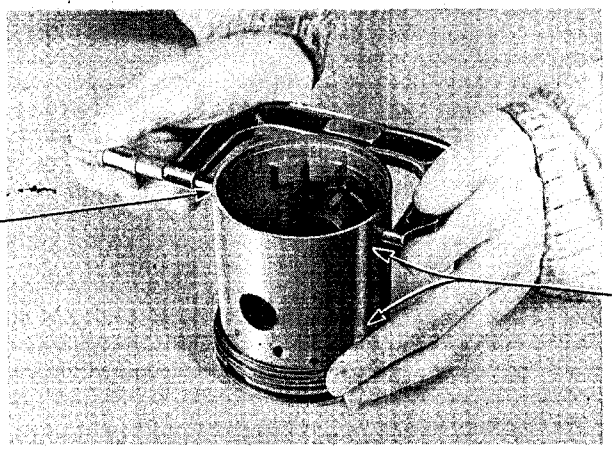


Fig. 12 Measuring Piston Diameter

With feeler in place in cylinder and piston in its running position but without rings, the piston should drop of its own weight with the thin feeler and hold tightly in place with the thick feeler.

	Series	Thin Gauge	Thick Gauge
Gauge Thicknesses	85-90	.0015 in.	.002 in.
	50,60,65,70,75	.002 in.	.0025 in.

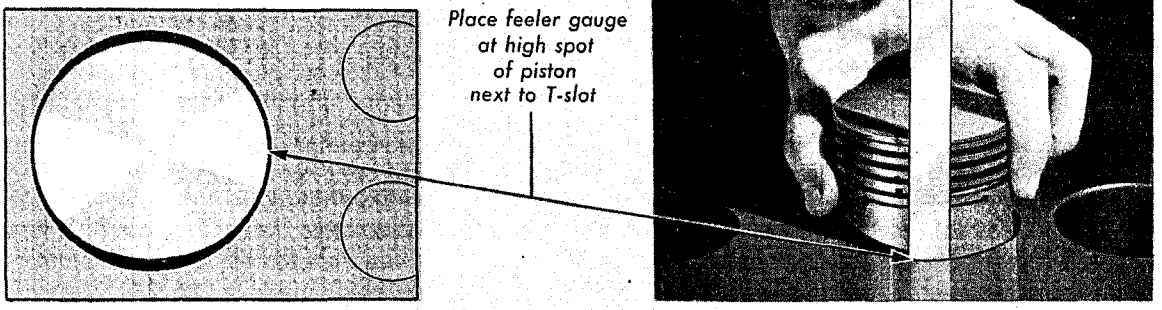


Fig. 13 Fitting Pistons to Cylinder Bores

Plate 29. Piston and Bore Servicing Operations

2. Press the bushing into the rod, using the bushing replacer and a 2 or 3 ton arbor press.

3. Pass the burnishing tool through the bushing. Use kerosene as a lubricant for the expanding and burnishing operation.

Note: When expanding or burnishing the bushing, a heavier arbor press of about 4 tons capacity should be used.

4. If the bushing moves during the burnishing process, it is too loose. It should be removed and another one installed.

5. If the correct clearance between the piston pin and the bushing is not secured after the first burnishing, the burnishing operation should be repeated in order to increase the size of the piston pin hole.

6. After installing the bushing, the parts should be thoroughly cleaned and the oil passages blown out with air to remove chips and dirt.

The press plate used during these operations has two holes—one used for assembling, expanding and burnishing—and the other for removing the bushing.

10. Removing and Installing Piston Pins

Removal—Series 37-50, 60, 65, 70 and 75:

1. Remove snap ring that holds piston pin in place in piston.

2. Place the piston in boiling water to expand the piston pin hole.

3. Push piston pin out of piston by hand from the raised rib side of the piston hole boss as shown in Plate 29, Fig. 11.

Note: Never use an arbor press to remove piston pins because the pressure may distort or crack the piston.

Installation—Series 37-50, 60, 65, 70 and 75

1. Lubricate piston pin with engine oil.

2. Heat the piston in boiling water.

3. Push the pin into the piston by hand from the side opposite the boss with the raised rib. See Plate 29, Fig. 11.

Removal—Series 37-85 and 90.

1. Remove piston pin locking screw.

2. Heat piston in boiling water to expand piston pin hole.

3. Push the piston pin out by hand from the locking screw side as shown in Plate 29, Fig. 10.

Note: Do not use an arbor press for this operation.

Installation—Series 37-85 and 90.

1. Lubricate piston pin with engine oil.

2. Heat piston in boiling water.

3. Push piston pin into piston by hand from the side opposite the locking screw. See Plate 29, Fig. 10.

11. Measuring Piston Clearance

When fitting anodized aluminum pistons, two feeler gauge ribbons of different thickness should be used. These ribbons should be from $\frac{3}{8}$ to $\frac{1}{2}$ inch wide and, for convenience, from 7 to 10 inches long. The following thicknesses are required:

	Thin Gauge	Thick Gauge
Series 37-50, 60, 65, 70, 75.	.002″	.0025″
Series 37-85, 90	.0015″	.002″

The ribbon should be placed at the high spot of the piston next to the "T" slot as shown in Plate 29, Fig. 13. With the feeler gauge in the above location in the cylinder and the piston in its running position, the piston should drop of its own weight with the thin feeler and hold tightly in place with the thick feeler.

For convenience, the fit trials may be made with the upper end of the piston just sufficiently above the top of the cylinder to hold it with the fingers. The feeler ribbon, the piston, and the cylinder wall should be clean, and the ribbon must be free from kinks and wrinkles when fitting pistons.

Replacement pistons are furnished by the factory Parts Division in the following oversizes:

All V-8's	V-12 and V-16
Standard	Standard
.003 Oversize	.005 Oversize
.005 Oversize	.015 Oversize
.010 Oversize	
.015 Oversize	
.030 Oversize	

Piston diameters, as given in the specification table, can be measured with a large micrometer, as shown in Fig. 12. The measurements must be taken on the large diameter, which is 90° from the piston pin hole. Measure at two points; just above the lower edge and just below the lower ring groove.

Before ordering pistons for replacement, it is extremely important to determine the size of the cylinder bores by actual measurement. This is essential because the cylinder bore may have been enlarged by refinishing without being marked "oversize." Actual measurement at the time of replacement is the only certain way of avoiding errors in ordering. Cylinder bore diameters must be measured accurately with an inside micrometer or dial indicator as shown in Plate 30, Fig. 16.

12. Worn Cylinder Blocks

The cylinder blocks of series 37-50, 60, 65, 70 and 75 engines with a single casting for both cylinder blocks and crankcase can be reconditioned most advantageously in the service station. The recommended procedure for boring and honing these blocks is given in Note 13.

The cylinder blocks of Series 37-85 and 90 engines cannot be reconditioned in the service station with the same precision and accuracy that can be held on the V-8 blocks. Replacement with factory-reground cylinder blocks is, therefore, the

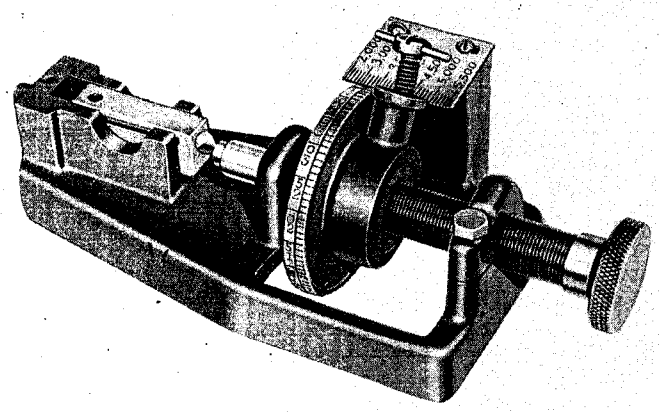


Fig. 14 Micrometer for Setting Cutter

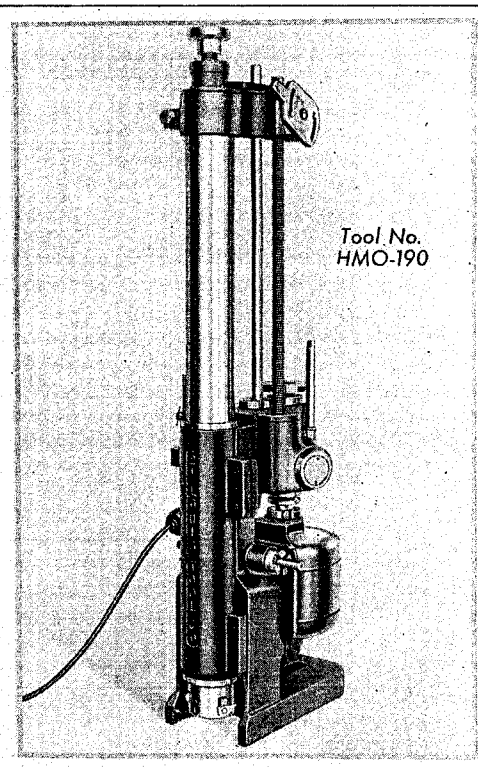


Fig. 15 Precision Boring and Honing Fixture

Fig. 16 Measuring Taper and Roundness

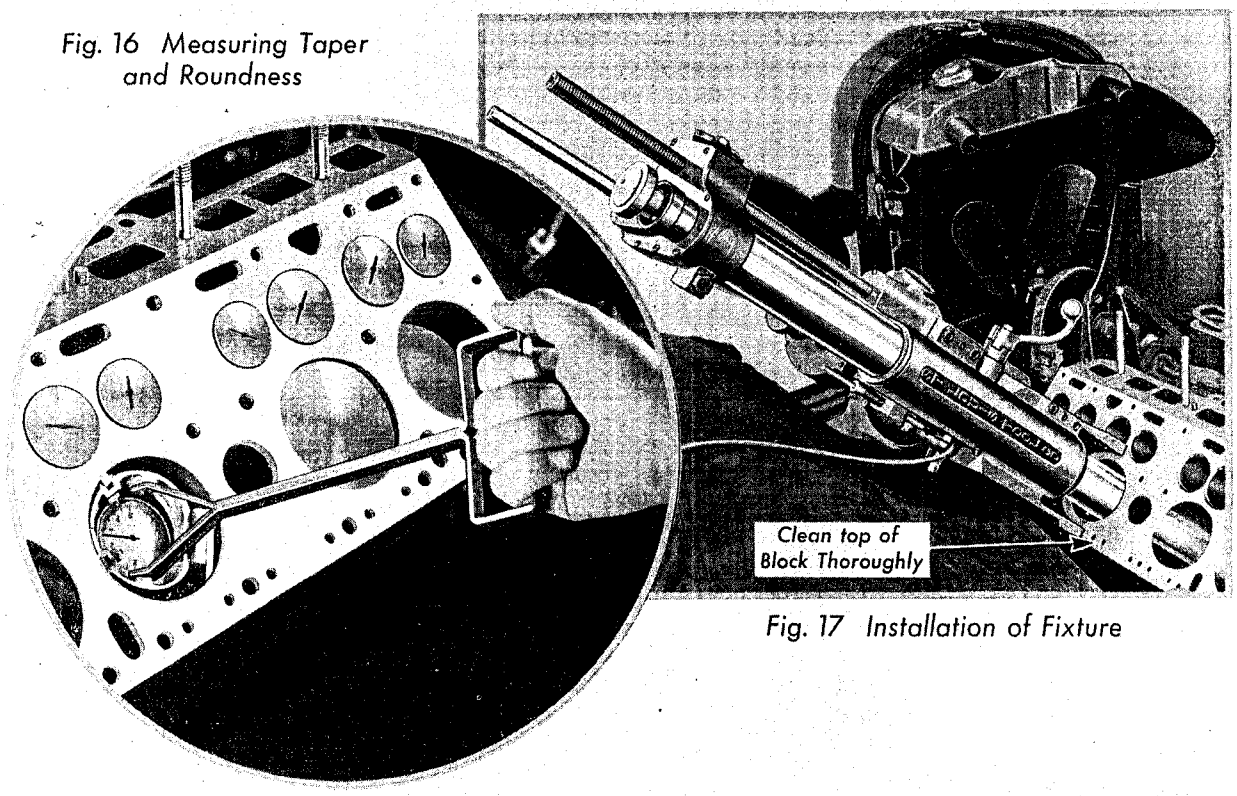


Fig. 17 Installation of Fixture

Plate 30. Cylinder Boring Operations—Series 37-50, 60, 65, 70, 75

recommended procedure on all V-12 and V-16 engines. Reground cylinder blocks, fitted with pistons, rings, and piston pins, are available for V-12 and V-16 engines through the factory Parts Division, in .015 and .030 inch oversizes.

When ordering V-12 and V-16 cylinder blocks, first determine the amount of wear on the blocks to be returned for exchange. If standard size blocks show less than .012 inch wear or out-of-round, they may be returned in exchange for first oversize blocks. If the wear exceeds .012 inch, but is less than .027 inch, second oversize blocks should be used.

13. Reconditioning 37-series V-8 Cylinder Blocks

The following procedure is recommended for boring and honing of all 37-series V-8 cylinder blocks in the service station. Special Tool HMO-190 is used to perform this operation because its use enables the job to be done without removing the engine from the car.

Boring Out Cylinders

1. Clean the top of the motor block thoroughly, as the success of the operation depends upon a level base for the tool. Use a file to remove all carbon and burrs.

2. Measure all cylinders with a gauge-type inside micrometer to determine the cylinder showing the greatest amount of wear.

3. Using the special micrometer shown in Plate 30, Fig. 14, set the cutting tool to the correct size and lock in position. Allow .0015″ for honing to bring the cylinder to the exact size.

4. Place the anchoring device, cross bar and expanders in the cylinder next to the one that is to be bored. The cross bar should be properly placed on the bottom of the cylinder, and the expanders firmly expanded against the cylinder wall.

5. Place the tool on the engine block, sliding the base under the anchoring screw, and lower the cutting head into the cylinder to be bored.

6. Locate the centering dogs about 3 inches down from the top of the cylinder. The centering dogs are controlled by the knurl-knob at the top of the tool. The tighter the knurl-knob, the better the centering of the tool. After the tool is centered—

7. Tighten down the anchoring screw to eliminate all possibility of the tool slipping while in operation.

8. Release the centering dogs and raise the cutting head.

9. With the cutting head raised, push the centering dogs back into their proper position so that they cannot touch the cylinder wall in the boring operation.

10. Install cutter holder in boring bar and lock in position.

11. Bore out cylinder.

Honing—

After the cylinder has been bored out, it should be honed to the exact size required for a perfect piston fit. For this purpose, it is recommended that a wet hone be used. With the roughing stones, approximately .001″ should be honed out, and then with the fine 400 or 500 grit finishing stones, take out about .0003″.

When this has been done, the cylinder should be carefully inspected for tool marks. Also, the taper should be checked with a dial indicator. When inspecting the cylinder walls for finish, use a light in the crankcase and the slightest imperfection in the cylinder wall will be shown up clearly.

After completing the above operation, the cylinders will be from .0002 to .0003″ undersize, and from this point the pistons should be fitted.

Piston Fit

The size of the pistons received from the Parts Division will vary within .0015″. Check each piston in all the cylinders, using both a .002″ and a .0025″ feeler gauge. Due to the variation in piston size, some may fit at this point. The remaining cylinders should be honed with the 500 grit stones until each piston is properly fitted. After all the pistons have been fitted they should be marked and set aside while the crankcase is being cleaned out.

Kerosene should be used to clean the crankcase. After it has been thoroughly cleaned, out, the oil lines should be blown out to remove all of the boring chips and any vestige of honing grit that might have lodged in them.

After these operations have been completed, the pistons should be installed in their respective

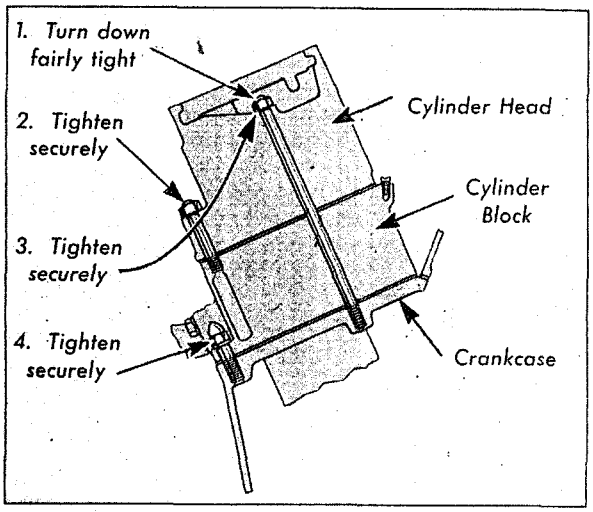


Fig. 18 Tightening Cylinder Heads Series 37-85 and 90

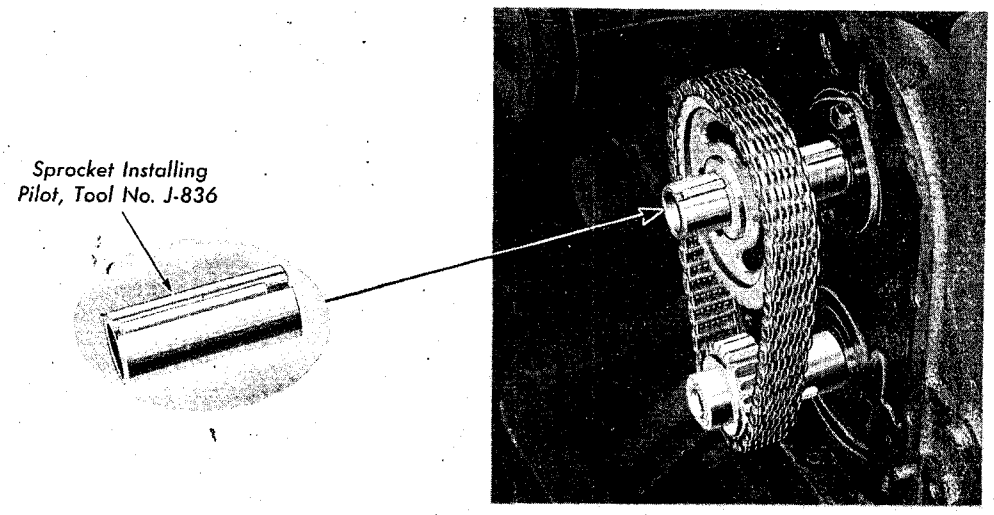


Fig. 19 Installing Timing Chain

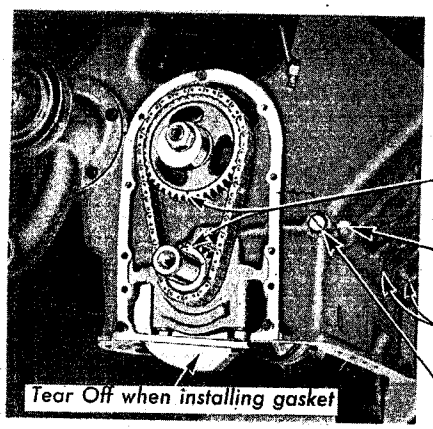


Fig. 20 Front End of Crankcase

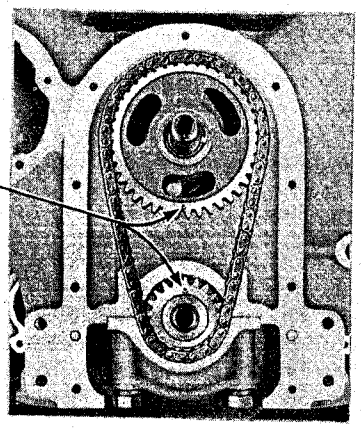


Fig. 21 Timing Marks

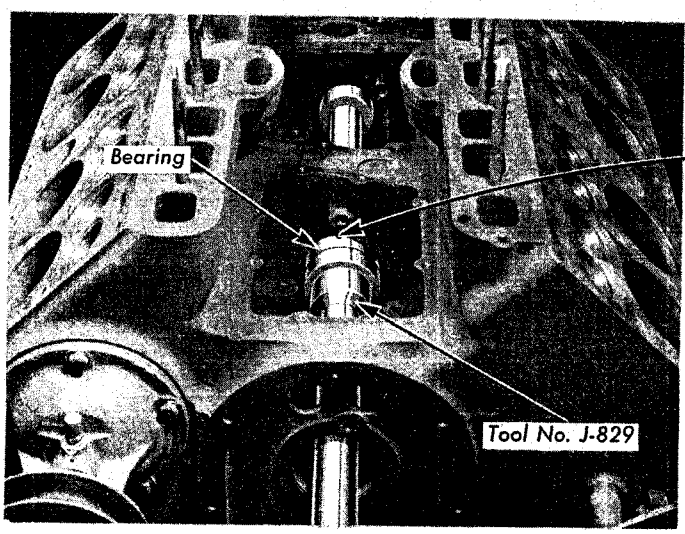


Fig. 22 Installing Camshaft Bearings

Plate 31. Camshaft and Timing Chain—Series 37-50, 60, 65, 70, 75

places and the engine re-assembled. By following the above dimensions carefully a perfect job of reboring cylinders and fitting oversize pistons can be accomplished.

14. Installation of Cylinder Heads

Series 37-50, 60, 65, 70 and 75

The two cap screws used at the water outlet connection on each cylinder head of series 37-50, 60, 65, 70 and 75 engines have oversize heads and are ½ inch longer than the remaining cylinder head cap screws. ***Use these screws only at the water outlet connection.*** See Plate 25, Fig. 1.

If these screws are installed at any other point on the cylinder head and an attempt is made to draw them up, they may break through the water jacket and irreparably damage the entire engine block.

Series 37-85 and 90

The cylinder heads of V-12 and V-16 engines are held in place with studs and nuts instead of cap screws. Proper installation of these heads with their overhead valve mechanism etc., requires a certain amount of care and adherence to the procedure shown in Fig. 18, for tightening the nuts as the cylinder heads are brought into place.

15. Installing Cylinder Head Gaskets

Cylinder head gaskets on 37-50 engines are similar to those on series 37-60, 65, 70 and 75 engines, except for the bore, which is sufficiently different to prevent their use interchangeably. Use of the wrong gasket in either case may result in a sluggish engine, due to an enlarged combustion chamber or to a hot spot caused by burning away of the gasket.

Identification of the two gaskets is easily made by the part number stamped on one surface between the two inside cylinder bore holes. The 37-50 part number is 1419114; the 37-60, 65, 70 and 75 part number 1419759. The gaskets are interchangeable between the right and left cylinder blocks of their respective engines.

Perfect Seal Gasket Paste is recommended for use when installing cylinder head gaskets. This paste remains in a semi-fluid state which assures a good seal and permits easy disassembly at any time.

The paste is available from the Parts Division in a kit under part No. 1096830, containing an eight ounce tube of paste and a special roller for applying it. A carton of 12 eight ounce tubes is available under part No. 1096831.

Cylinder head gaskets for series 37-85 and 90 engines are interchangeable between right and left cylinder blocks of their respective engines.

16. Changing Compression Ratios

All 37-series engines are equipped with high compression cylinder heads as standard. In the event that a lower compression ratio is required to meet certain operating conditions, this can readily be secured by installing special shims (2 on each side) between the cylinder heads and blocks of series 37-50, 60, 65, 70 and 75 engines, or special thick gaskets between the cylinder head and blocks of series 37-85 and 90 engines.

The necessary shims or gaskets for lowering the compression ratio of standard 37 series engines are available from the factory Parts Division under the following part numbers:

Series	Part Name	Part Number
37-50	Shim	1421931
37-60, 65, 70, 75	Shim	1421930
37-85	Gasket	894339
37-90	Gasket	896450

17. Replacing Camshaft Bearings

Series 37-50, 60, 65, 70 and 75—The recommended procedure for removing or installing the camshaft bearings on series 37-50, 60, 65, 70 and 75 engines is as follows:

Removal—

1. Dismantle engine by removing such parts as the generator, carburetor, manifolds, distributor drive mechanism, hydraulic valve lifter assemblies, etc., so that camshaft can be removed.
2. Remove radiator and engine front cover.
3. Remove transmission and flywheel housing.
4. Remove camshaft.
5. Remove camshaft bearings by pushing them out of engine bearing supports in which they are a press fit.

Note: Special Tool No. J-829 is recommended for this operation.

Installation—

1. Check new camshaft bearings carefully for trueness, out-of-roundness, finish, etc.
2. Paint outside surface of new bearings with white lead so they will slip readily into place.

Note: Be sure to line up oil holes in bearings properly with passageways when installing bearings.

3. Install front camshaft bearing, piloting installation tool at rear and center bearing locations.
4. Install rear camshaft bearing, piloting installation tool at front.
5. Install center camshaft bearing, piloting installation tool at front and rear bearings. See Plate 31, Fig. 22.
6. Reinstall camshaft, front engine cover, transmission and clutch housing.

Note: Exercise great care not to scrape or damage camshaft bearings in any way when installing camshaft as sharp edges of cam lobes may easily ruin bearing.

7. Reassemble engine complete in reverse order of disassembly.

Series 37-85 and 90—The procedure for installing new camshaft bearings on series 37-85 and 90

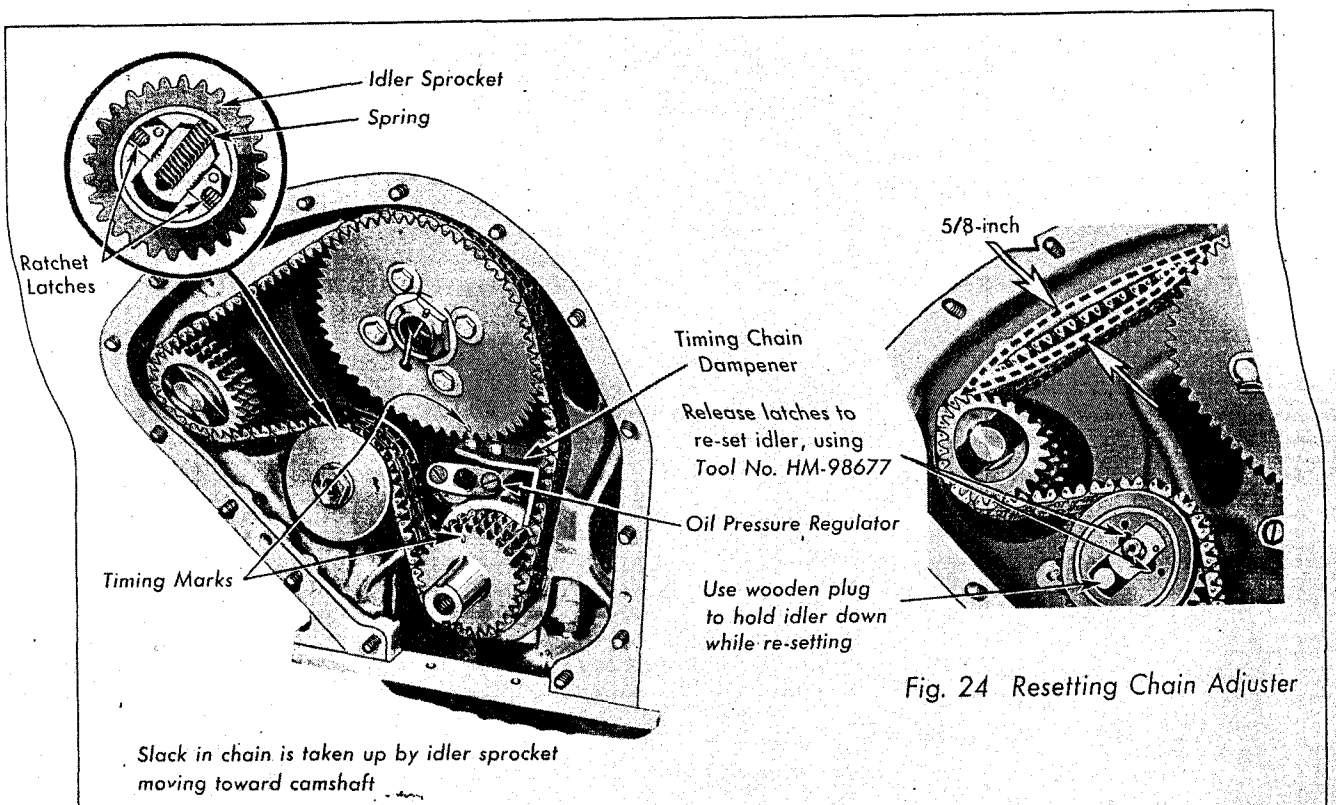


Fig. 24 Resetting Chain Adjuster

Fig. 23 Timing Chain Series 37-85 and 90

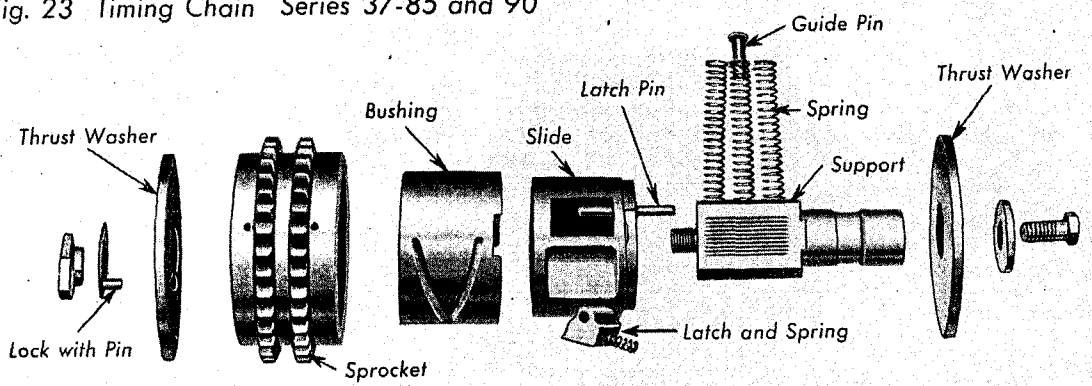


Fig. 25 Automatic Chain Adjuster—Disassembled

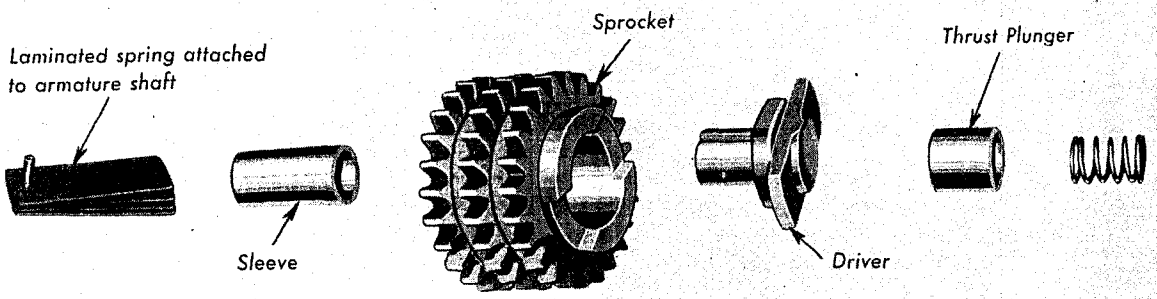


Fig. 26 Generator Driver—Disassembled

Plate 32. Front End Chain Mechanism—Series 37-85 and 90

engines is similar to that of V-8 engines, except for the difference in engine size and construction and that no special tools are required.

18. Removing V-12 and V-16 Camshafts

When removing the camshaft from series 37-85 and 90 engines, the vacuum pump and the distributor drive shaft must both be removed before any attempt is made to draw out the camshaft.

The gear on the distributor drive shaft meshes with a gear on the camshaft. The driven gear would be damaged by striking against the blank sides of the camshaft gear if an attempt was made to remove the camshaft first. Removing the camshaft with the vacuum pump in place would permit the pump driving rod to fall into the crankcase.

19. Replacing Timing Chain and Sprockets

Series 37-50, 60, 65, 70 and 75

Engine timing chains and sprockets should be installed as a unit. Care should be exercised to see that the timing marks are properly lined up as shown in Plate 31.

Pilot, Tool No. J-836, should be used on the end of the camshaft when installing the chain and sprockets. Do not attempt to force the camshaft sprocket on the shaft, as this might damage the distributor and oil pump drive gear or the rear camshaft bearing.

The front cover plate gasket of all V-8 engines is an open end gasket, but for easier handling is supplied with a closed end. When installing this gasket, therefore, tear off the lower portion as shown in Plate 31, Fig. 20.

Series 37-85 and 90—The timing chains and sprockets used on the V-12 and V-16 engines are similar in design and construction. Installation of the chain and setting of the automatic adjusting mechanism for eliminating any free play that may develop in the chain is shown in Plate 32.

All 37-series V-12 and V-16 engines are equipped with a timing chain dampener to prevent chatter in the automatic chain adjuster by lessening the amount of chain whip at moderate speeds. Proper adjustment of the dampener, which is located on the oil pressure relief valve body, is essential to quiet engine performance.

The timing chain dampener may be adjusted by loosening the screws by which it is attached to the relief valve body and shifting it through the clearance provided in the screw holes. Additional movement may be obtained, if necessary, by loosening the relief valve attaching screws and shifting the entire valve as desired.

As shown in Plate 32, Fig. 23, the dampener should be adjusted to give .015" clearance top and bottom between the face of the dampener and the timing chain. If the angle of the dampener is not sufficient to give the desired clearance it may be increased by bending the dampener in a vise.

20. Removing and Installing Valves

To remove the valves from series 37-50, 60, 65, 70 and 75 engines, it is necessary first to remove the valve lifter assemblies. The valve spring keepers can then be removed by compressing the springs with valve lifter J-257-X. (See Plate 34). This valve lifter is also used for installing the keepers when reinstalling the valves.

Before reinstalling the valve lifter assemblies, the valve stems should be checked for proper length using the valve stem length gauge J-1055, see Plate 34, Fig. 30. If the valve stems are found to be too long when checked in the closed position, they should be ground off until the tool will slide into place.

Installation of the lifter assemblies is greatly facilitated by the use of tool J-827, which holds the tappet plungers down.

Illustrated instructions for removing and installing series 37-85 and 90 overhead valves are given in Plate 35.

21. Valve Silencer Operation

Series 37-50, 60, 65, 70 and 75—The design and construction of the hydraulic valve lifter mechanism used on all 37-series V-8 engines is shown in Plate 33.

The manner in which these valve lifters operate is as follows: Oil is forced under pressure directly to each tappet body through the longitudinal passageway drilled in the valve guide casting. From this passageway oil enters the chamber inside of the valve lifter body through a small hole leading into the plunger cylinder. The oil pressure opens the ball check valve, Fig. 28 in the inner cylinder, permitting oil to pass into the space in the cylinder below the plunger.

When the cam brings the valve lifter up against the resistance of the valve spring, the oil in the inner cylinder is trapped by the ball check valve. This prevents the plunger from sliding down into the cylinder, and with the valve lifter spring keeping the plunger in contact with the valve stem at all times, zero clearance is maintained between the stem and lifter, providing silent valve operation.

Series 37-85 and 90—The design and construction of the automatic valve silencer mechanism used on the 37 series V-12 and V-16 engines is shown in Plate 35.

The manner in which these valve silencers operate is as follows: Each rocker arm for the overhead valves is mounted on a flanged eccentric bushing. Located directly below the flange of this bushing is a dash pot, the plunger of which bears against a cam on the flange at all times. Upward pressure of the spring under the plunger keeps the eccentric in such a position that the rocker arm always touches both the valve stem and the push rod.

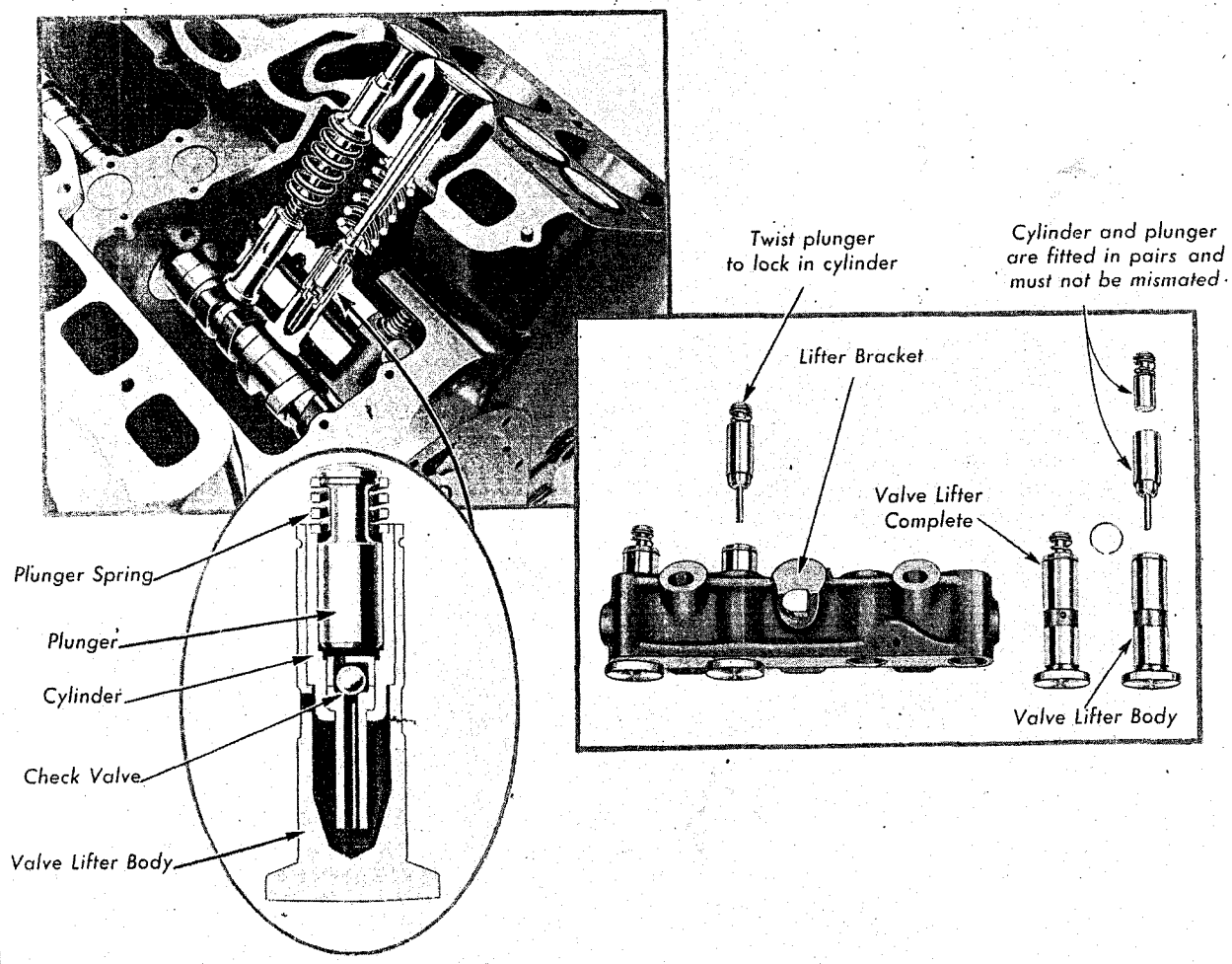


Fig. 27 Arrangement of Valves, Valve Lifters, and Silencer Parts

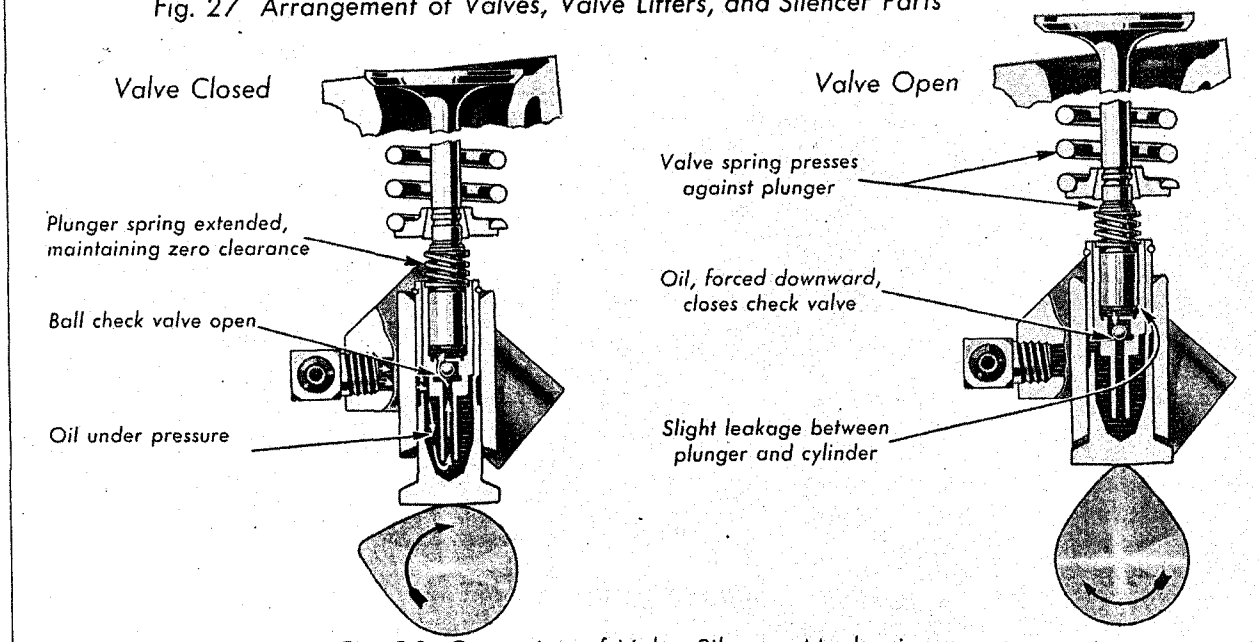


Fig. 28 Operation of Valve Silencer Mechanism

Plate 33. Valve Mechanism—Series 37-50, 60, 65, 70, 75

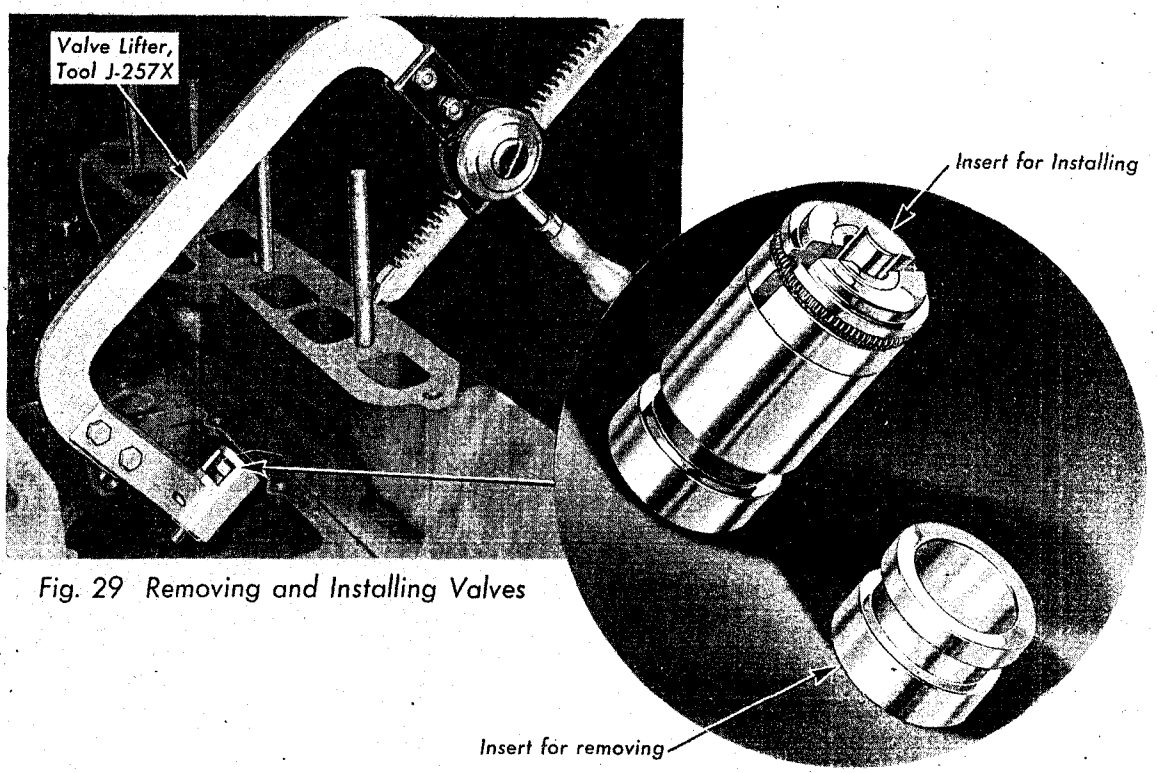


Fig. 29 Removing and Installing Valves

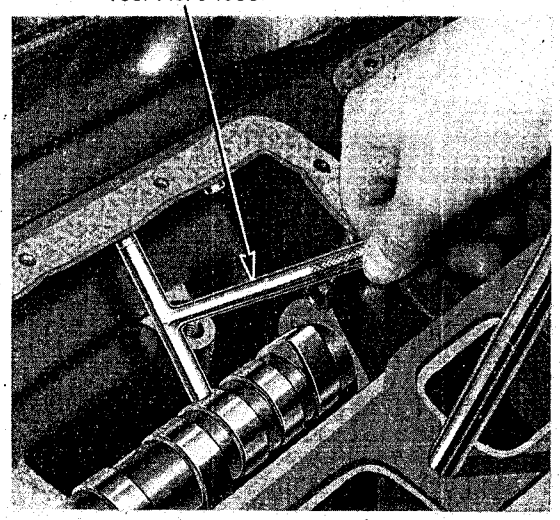


Fig. 30 Checking Valve Stem Length

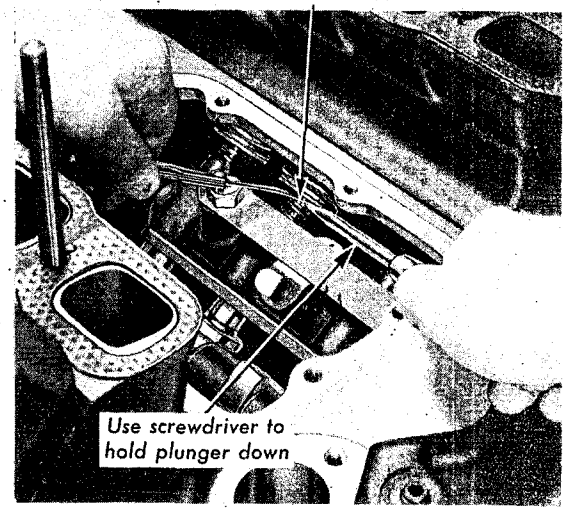
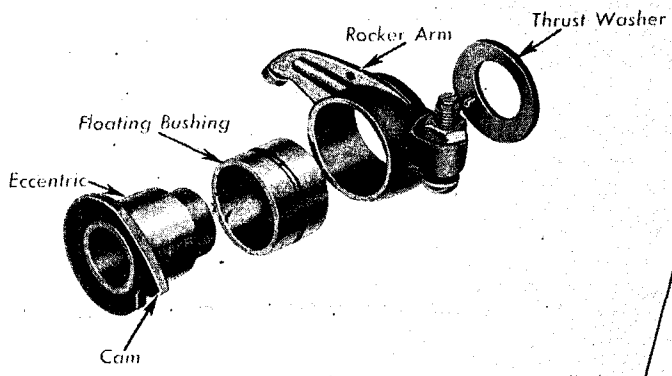
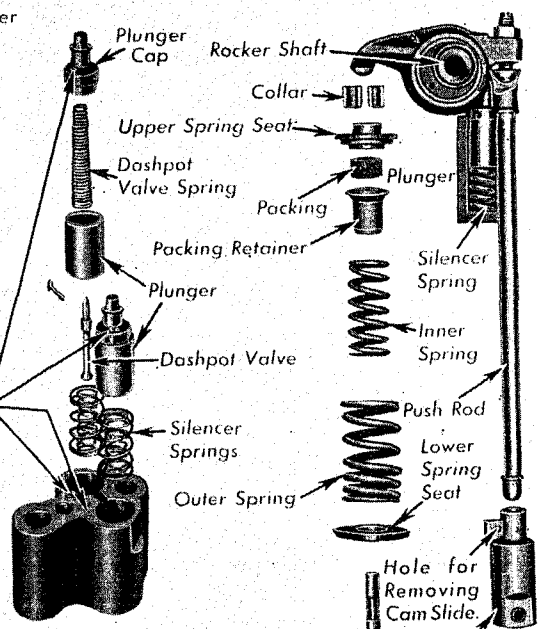


Fig. 31 Checking Valve Lifter Operating Clearance

Plate 34. Valve Service Operations—Series 37-50, 60, 65, 70, 75





1 Plunger must be installed in cylinder having same number of identification marks.

Fig. 33
Valve Silencer and Rocker Arm Disassembled

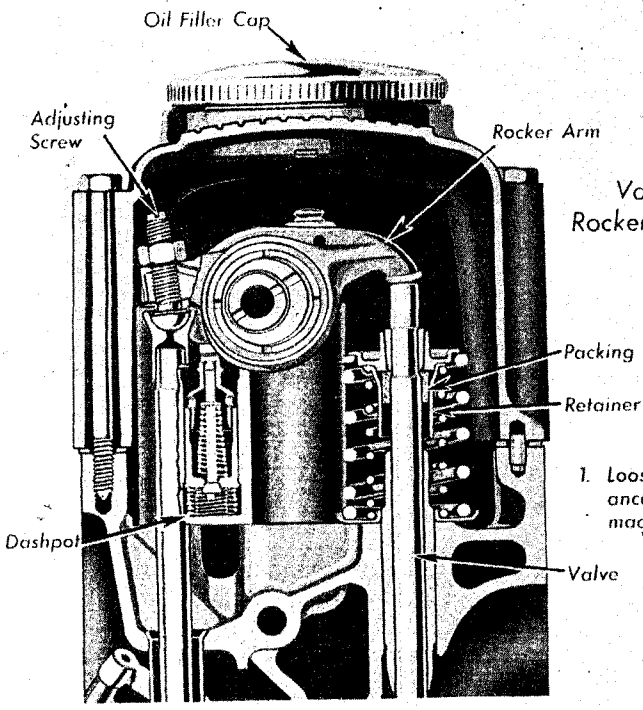
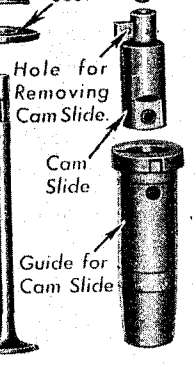


Fig. 32
Sectional View of Valve Operating Mechanism

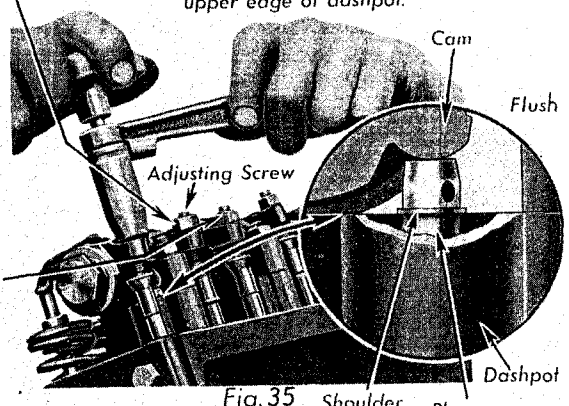


Note:
Lubricate cam slide before installing in engine.

Fig. 34
Valve and Cam Slide Disassembled

1. Loosen lock nut to adjust valve clearance. Tighten after adjustment is made.

2 Push plunger down until bottom of hole is on level with or slightly below upper edge of dashpot.



3. Turn adjusting screw down until all clearance is taken up at both ends of rocker arm. Release plunger and back off adjusting screw to locate plunger in correct position.

Fig. 35
Valve Adjusting
Back off adjusting screw until shoulder on plunger is flush with dash pot.

Plate 35. Valve Service Operations—Series 37-85 and 90

The dash pot cylinder below the plunger is kept full of oil and prevents the plunger from sliding down into the cylinder when the valves are in operation. The clearance between the plunger and the cylinder, however, is just enough to let the plunger move down slowly, to compensate for expansion as the engine heats up. A small poppet valve opening downward in the bottom of the plunger permits oil to enter the chamber below the plunger, providing silent valve operation at all times.

22. Noisy Operation of V-8 Valve Silencers

Noisy operation of the hydraulic valve mechanism used on series 37-50, 60, 65, 70 and 75 engines may be due to:

1. Plugged or loaded oil filter.
2. Incorrect oil level.
3. Improper oil pressure.
4. Weak valve lifter plunger springs.
5. Dirty, scored or worn valve lifter parts.

Loaded Oil Filter—The oil filter is the first thing to be checked in case of noisy valve operation on 37-series V-8 engines. A plugged or loaded oil filter will not provide proper protection to the valve silencer mechanism and may be a contributing factor to noisy valve operation. If such a condition is found therefore, the filter should be replaced as the first step toward correction of the trouble.

Incorrect Oil Level—The level of the oil in the engine is another important factor relating to quiet valve operation. The oil level should never be above nor more than one quart below the 7 quart mark on the oil level indicator. If the level is too high, foaming may result; if the level is too low, air may enter the pump inlet. In either case, noisy valve action will result and it is, therefore, an important item to check when such trouble is encountered.

Improper Oil Pressure—Correct oil pressure is also an important factor to be checked in case of noisy valve operation. Extremely high pressure may lift the entire hydraulic unit against the plunger spring, permitting excessive plunger movement and wear. Low pressure permits oil relief leakage between the plunger and cylinder to exceed the oil feed through the ball check valve.

If the valve action is noisy after the oil is hot, determine the oil pressure at the silencer pipe. Pressure here should be 3 to 5 pounds when gauge on dash reads 12 to 15 pounds.

Trouble with the oil pressure usually results from a leak somewhere in the oiling system, a stuck or improperly operating oil pressure relief valve, or scored and faulty operation of the oil pump. Correction, of course, should be made by eliminating any leaks in the oiling system, and replacement of any defective parts as the case may require.

Weak Valve Lifter Plunger Springs—In some cases, noisy valve operation may result from weak valve lifter plunger springs which permit excessive plunger movement and wear. If such a condition is thought to be the cause of the difficulty each valve silencer unit should be checked as follows:

1. Remove the four valve lifter assemblies.
2. Disassemble unit and thoroughly clean each assembly so that each plunger and cylinder is entirely free from oil.
3. Carefully dry each part and reassemble unit.
4. Check the pressure required to compress each plunger spring, ***dry.***

If the strength of these springs is such that less than 6 or 7 pounds is required to compress them, the hydraulic unit should be replaced. The valve cylinder and plunger are mated and should be replaced as a unit.

Dirty, Scored or Worn Valve Lifter Parts—The following are further causes of noisy valve operation on 37-series V-8 engines:

Single noises—A recurring tap or click synchronized with the valve action indicated trouble in single silencer units, which should be disassembled and inspected for

1. Sticking mechanism.
2. Dirt, pitting or incorrect clearance between plunger and cylinder.
3. Operating clearance between plunger and valve stem.

Sticking—resulting from dirt or foreign particles is the most likely cause. It can be corrected by thorough cleaning of individual parts after disassembly by wiping with a soft cloth and washing in gasoline.

A stuck ball check valve may be unseated with a small blunt tool, after which the cylinder should be washed thoroughly in gasoline.

Air pressure may be used to dry parts but the nozzle should be held at least two inches away.

The engine oil pan should always be removed and cleaned, and the engine flushed when dirt has been responsible for sticking, otherwise the condition may recur almost immediately. The oil passages in the valve lifter brackets should also be thoroughly cleaned.

Pitting and Scoring—of the surfaces may cause sticking. This may result from gritty particles, excessive wear or damage during installation. This condition requires replacement of the hydraulic unit (cylinder and plunger). It is not necessary to replace the valve lifter body.

Note Slight scratches on the valve lifter body have no effect on the operation of the engine or the valve silencers.

Incorrect clearance—between the cylinder and the plunger is usually caused by mismating of parts. The parts of the hydraulic unit—cylinder and plunger—are carefully fitted in production and are not interchangeable.

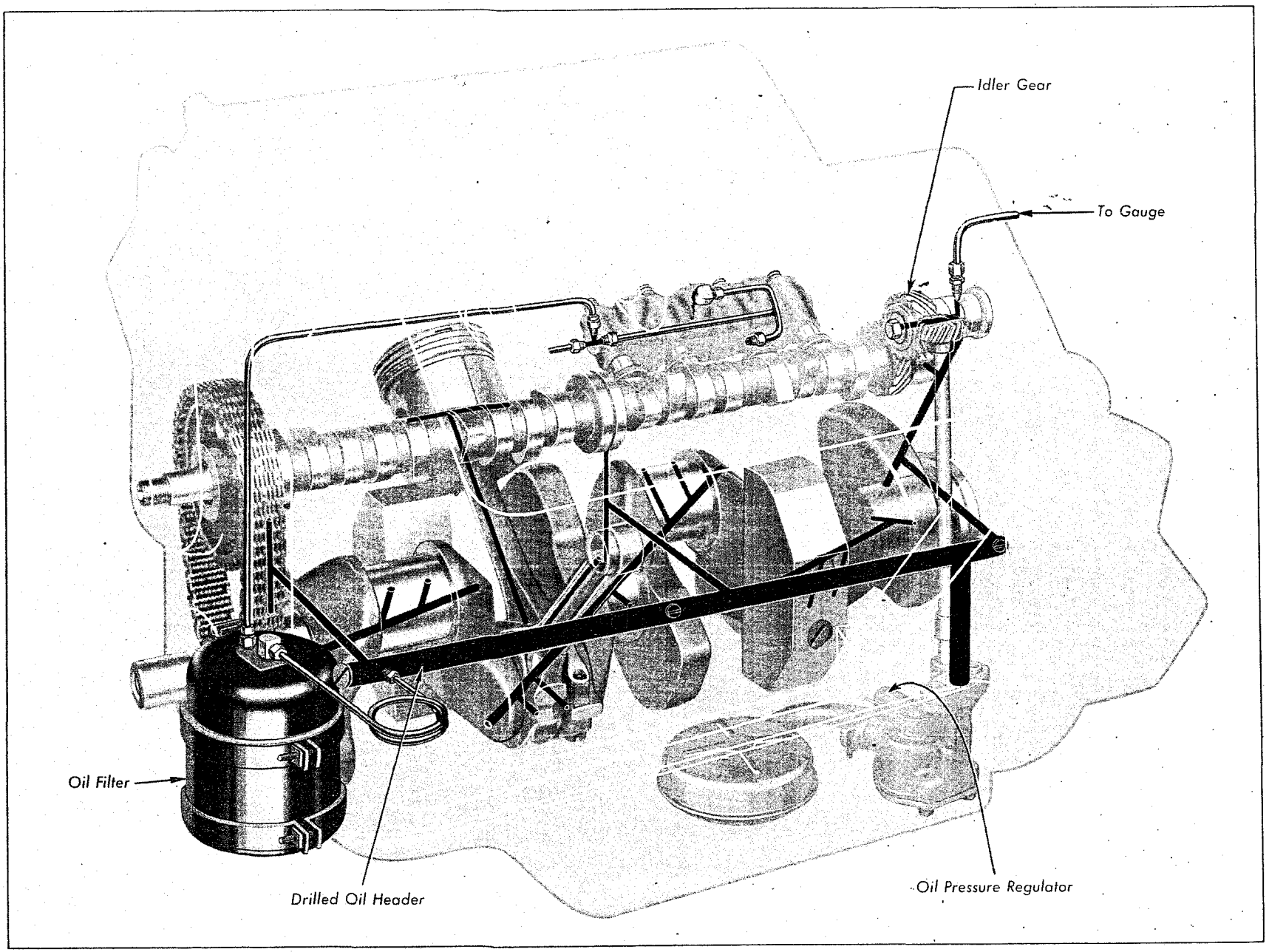


Plate 36. Engine Oiling System—Series 37-50, 60, 65, 70, 75

Reassembly—When reassembling the silencer parts, note the following:

1. The ball check should rattle when the cylinder unit is shaken.
2. The plunger should bounce back when pressed quickly into the cylinder and released.
3. The plunger spring should be locked into the cylinder body with a twist of the plunger.
4. The cylinder should slide smoothly into the tappet body when free of oil.

Valve Clearance Check—There must always be .030-.070 inch clearance between the valve stem and the top of the plunger measured with no oil in the hydraulic unit and with the plunger and plunger spring fully depressed. (See Plate 34, Fig. 31).

Measure this clearance with a feeler gauge—

1. When new silencer parts are installed.
2. If the locations of parts are changed.
3. When valves are reseated.

If the clearance is less than .030 inch, grind a few thousandths off the end of the valve stem and check with Tool J-1055 when installing valves as explained in Note 20.

Installation—After the installation has been completed, the hydraulic units should be filled with oil by running the engine until the valve action becomes quiet.

23. Noisy Operation V-12 and V-16 Valve Silencers

Noisy operation of the valve silencers on series 37-85 and 90 engines may be due to:

1. Dirt in the mechanism.
2. Incorrect clearance between silencer plunger and cylinder.
3. Leakage of check valve.
4. Wrong operating clearance between rocker arm and push rod.
5. Clogged oil filter.

Dirt—or carbon particles anywhere in the silencer mechanism may cause noisy operation and excessive wear. The remedy is thorough cleaning of all parts in gasoline.

> Note: Whenever the valve cover is removed and the valve silencers are exposed, they should be kept covered to prevent dust and dirt from settling in the mechanism.

Incorrect Clearance—between plungers and cylinder walls may be due to excessive wear, which would necessitate replacement; or to the interchanging of the plungers.

The plungers and dashpots are not interchangeable, and they are marked to insure correct assembly. The number of marks etched on the plunger should correspond with the number of marks appearing on the dashpot casting. (See Plate 35, Fig. 33).

Leakage of the Check Valve—is usually due to particles of foreign matter being lodged on the valve seat. This can be corrected by thorough cleaning. When reinstalling, revolve the check valve on its seat to assure its being properly seated.

The Operating Clearance — between the rocker arm and push rod is adjusted as shown in Fig. 35.

24. Valve Spring Pressure V-12 and V-16

The relation between valve spring pressure and valve travel on series 37-85 and 90 engines is such that each .010 inch of travel is equivalent to 2.73 lbs. of pressure. The seating pressure of the valves may be reduced considerably by the slight increase in travel occasioned by a valve reseating operation.

The valve seating pressure should accordingly be checked after a valve refacing operation, using Tool No. J-444. The correct seating pressure with both valve springs properly installed is from 48 to 63 lbs. If the pressure is less than this, one or more .040 inch spacers (Part No. 889407) should be installed under the valve spring retainers. Each spacer will raise the seating pressure approximately 11 lbs.

Each valve should be tested separately and one or more spacers installed as required. In case of extremely low pressure, the valve springs should be checked against the specifications to make sure that they have not lost tension and shortened in use.

Reduced valve seating pressures would affect engine performance to a noticeable degree, especially in making cold weather starting more difficult, and in some cases might cause the valves to burn.

Valve seating pressure for eight cylinder engines is tested only by testing the valve springs according to the specifications on page 107.

25. Oil Filters

Clean engine oil is an essential requirement to satisfactory engine operation and all 37 series Cadillac and LaSalle cars are, therefore, equipped with an oil filter. The filters are of the cartridge type and should be ***replaced every 6000 miles*** to insure proper protection to the engine at all times.

On V-8 engines the oil filter also acts as an air trap and aids in keeping any air from entering the hydraulic valve mechanism. This is added assurance of quiet valve operation on these engines.

26. Cleaning Oil Pan and Screen

Cleaning of the engine oil pan and screen is recommended on all series engines at 12,000 mile intervals.

All of the engine oil passes through the oil pan and screen before reaching the oil pump. Foreign matter that may be in the oil is both screened out and permitted to settle out at this point so that the oil reaching the pump is quite free from abrasive particles.

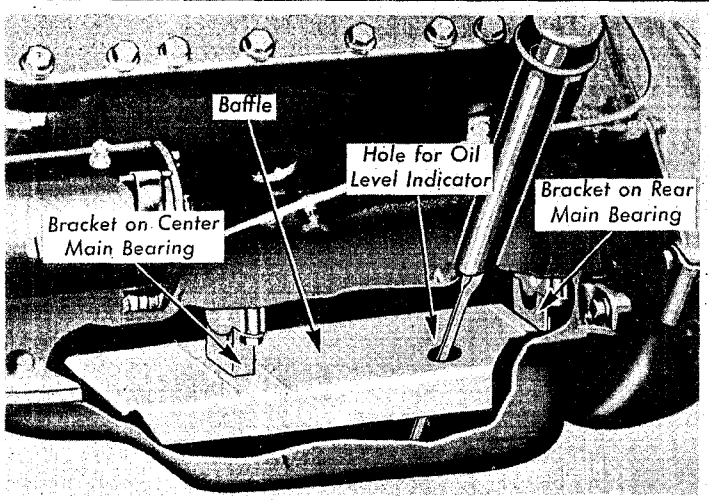


Fig. 36 Oil Reservoir Baffle

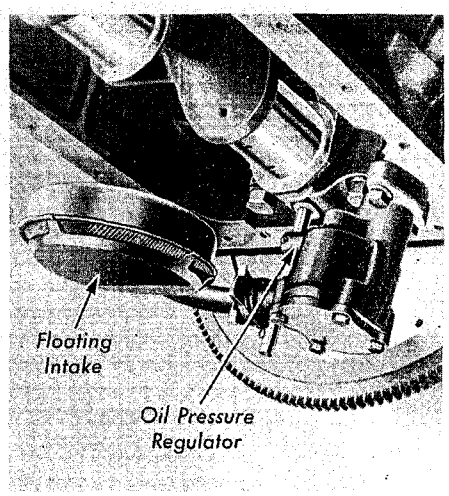


Fig. 37 Oil Pump and Intake

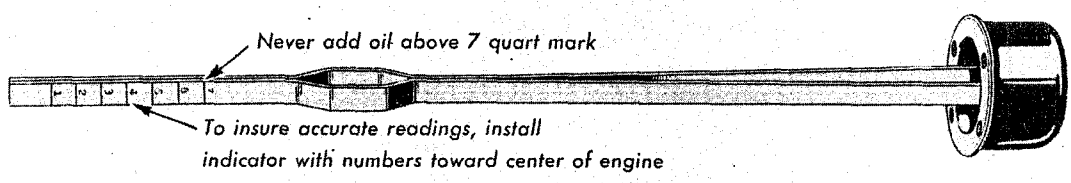


Fig. 38 Oil Level Indicator

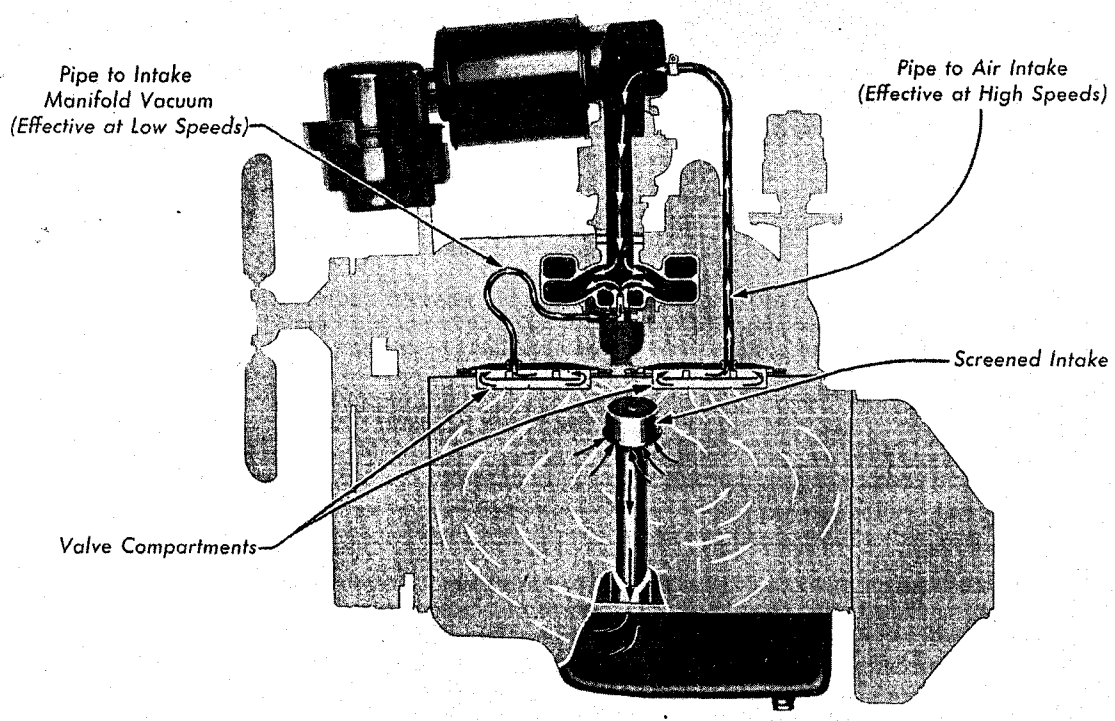


Fig. 39 Crankcase Ventilating System

Plate 37. Oiling System Details—Series 37-50, 60, 65, 70, 75

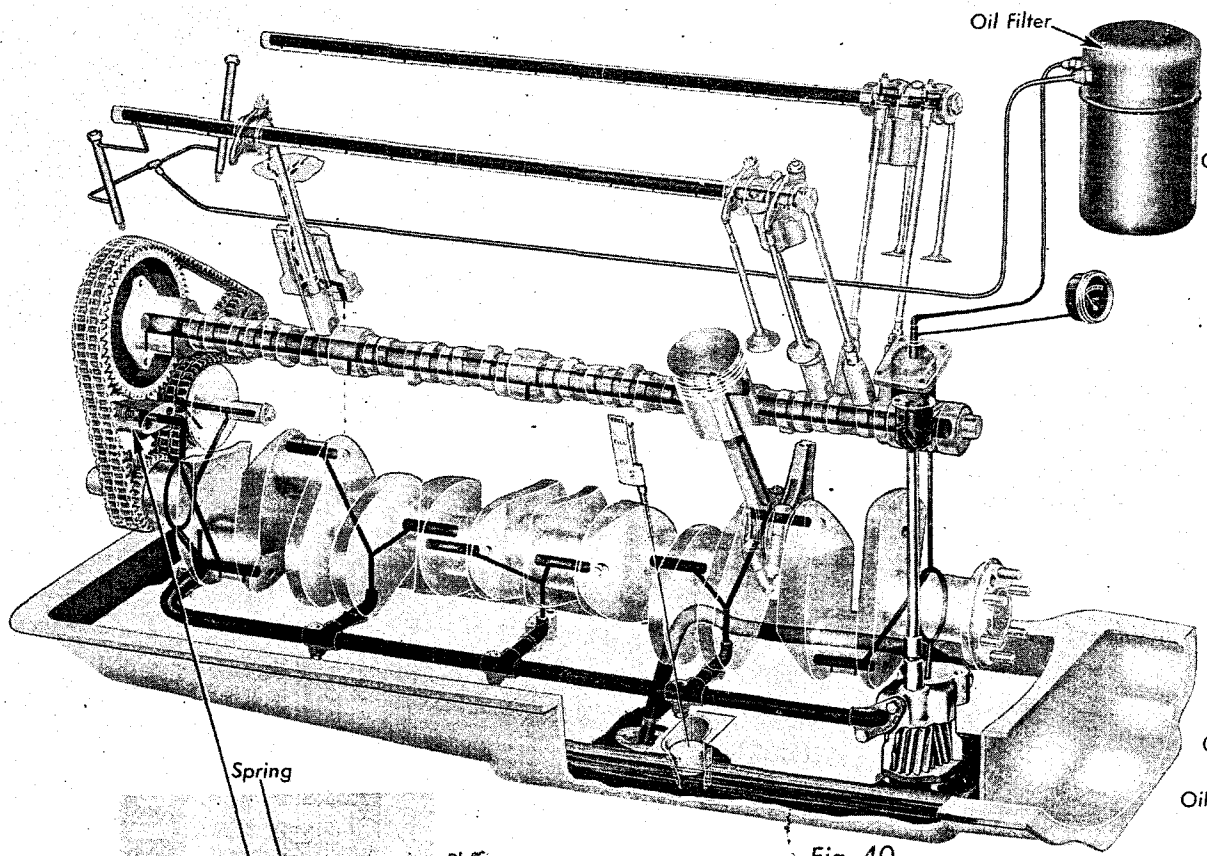


Fig. 40
Engine Oiling System
Series 37-90 Shown, Typical of
37-85

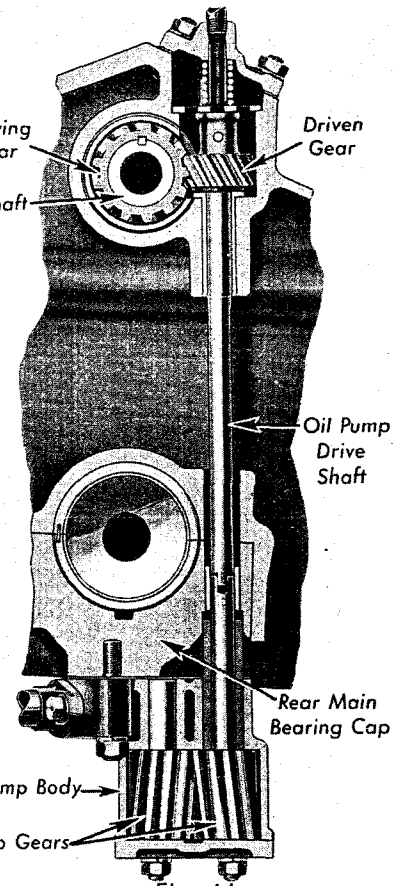


Fig. 41
Sectional View of Oil Pump Drive

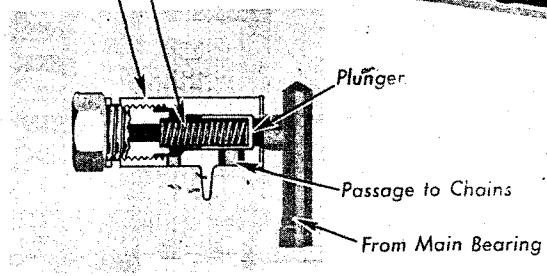


Fig. 42
Sectional View of Oil Pressure Regulator

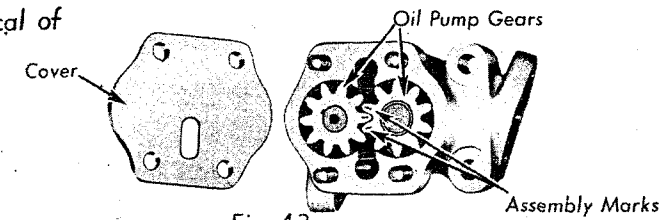


Fig. 43
Bottom View of Oil Pump with Cover Removed

Plate 38. Engine Oiling System—Series 37-85 and 90

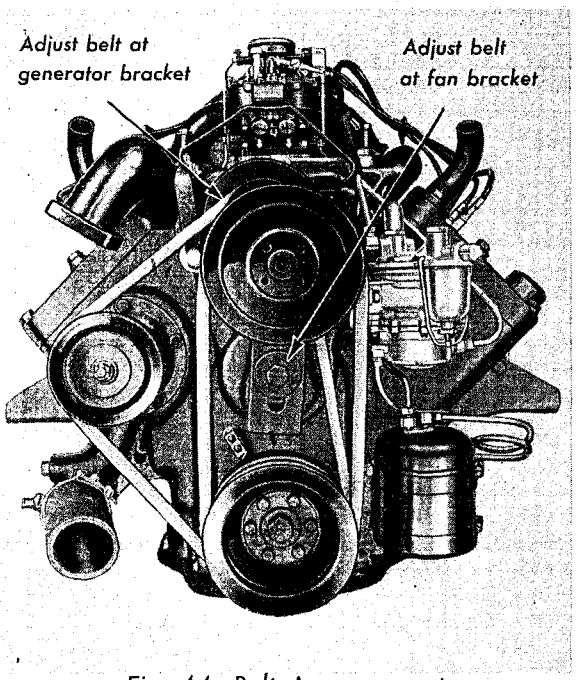


Fig. 44 Belt Arrangement
Series 37-50, 60, 65, 70 and 75

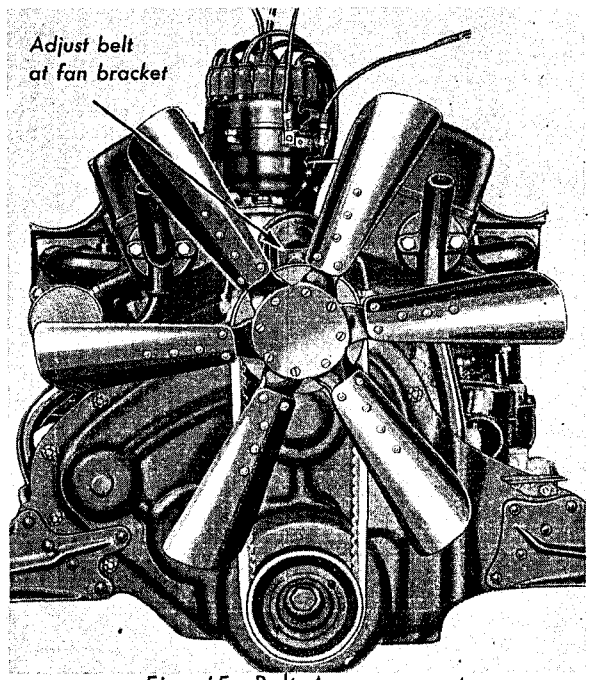


Fig. 45 Belt Arrangement
Series 37-85 and 90

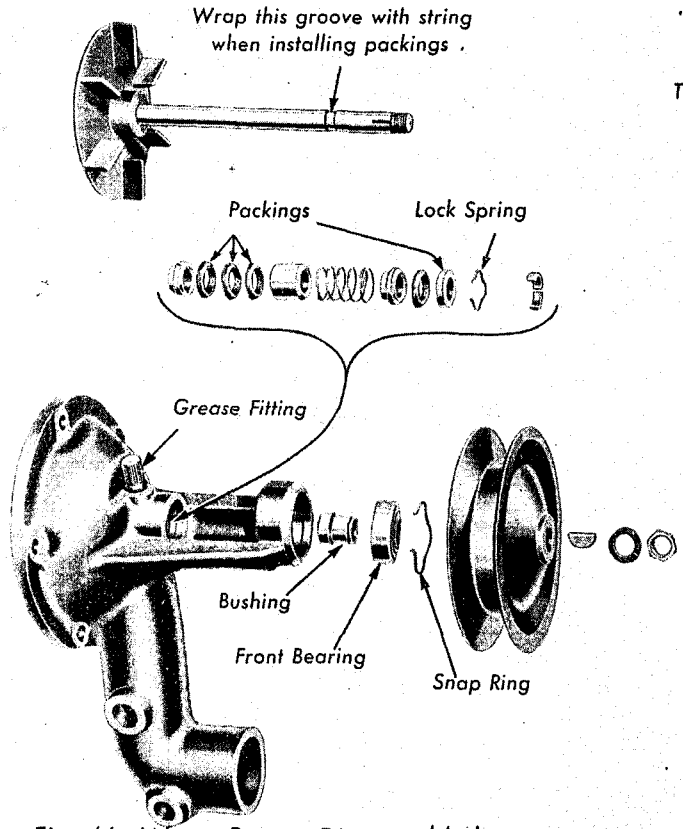


Fig. 46 Water Pump—Disassembled
Series 37-50, 60, 65, 70 and 75

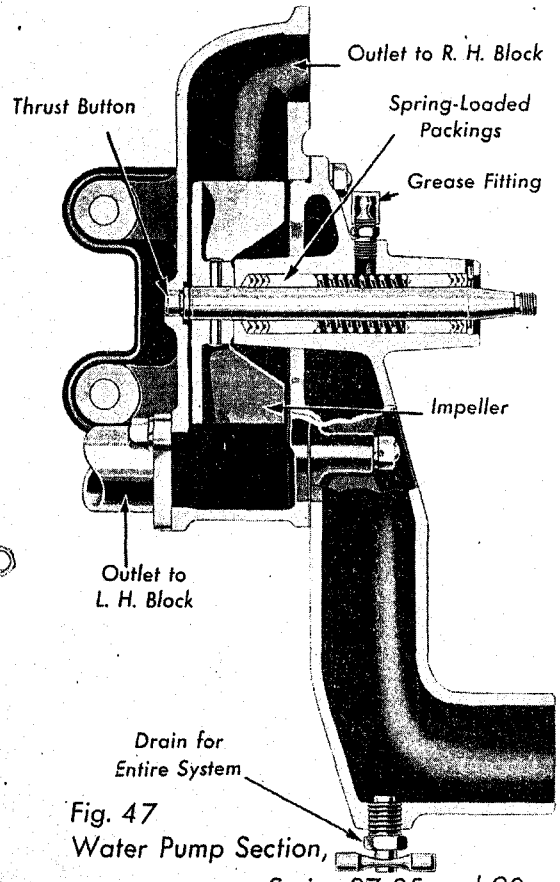


Fig. 47
Water Pump Section,
Series 37-85 and 90

Plate 39. Cooling System Details

As these particles accumulate, the screen becomes clogged, restricting the flow of oil and permitting the settlings in the pan to be stirred up and carried through the oiling system. This material, being grit or metal particles, is highly abrasive and capable of causing excessive wear in the engine unless removed.

It is a good plan, when the oil pan is down for periodic cleaning, to inspect the connecting rod and crankshaft bearings.

Copper mesh air cleaners are used at the crankcase ventilation air intake on all series engines. On series 37-50, 60, 65, 70 and 75 engines, this intake is at the engine oil filler. On series 37-85 and 90 engines, the intake is a separate housing at the left front of the engine. This copper mesh should be cleaned by submerging in gasoline, shaking out and dipping in engine oil—every time the oil pan is cleaned. Series 37-85 and 90 intakes are thermostatically controlled and care should be taken not to damage this unit when servicing the cleaner.

27. Fan and Generator Belt Adjustment

The fan belt adjustment on all 37-series cars is the same. All belts should be adjusted very carefully as a slightly loose adjustment will cause the driven units to slip excessively and to become noisy at high speeds; a tight adjustment will set up strains in the belt, shortening its life, and cause bearing wear.

The fan belt adjustment on all series cars is obtained by loosening the pulley retaining nut and moving the fan assembly up and down. The belt driving the generator and water pump on 37-50, 60, 65 and 75 cars is adjusted by raising or lowering the generator on its bracket.

A correctly adjusted belt should have a ***slight*** amount of looseness or slack in it when moved back and forth with the fingers. A new belt should always be adjusted tighter than a used one as it will stretch a little in service.

28. Water Pump Service

The water pump packings and bearings on all 37-series engines are lubricated every 1000 miles with water pump grease (G-13). The only other attention required by the packings is replacement when they are worn out.

Disassembly of the series 37-50, 60, 65, 70 and 75 water pump for replacement of parts is performed in the following manner: (Water pump off car).

1. Remove belt pulley.
2. Remove snap ring.
3. Push impeller rearwards and remove split washer in back of front bearing.
4. Remove lock spring at front end of rear bushing.
5. Remove impeller and shaft.
6. Remove rear bushing assembly toward front, being careful not to lose any parts.
7. Remove front bearing by forcing it out toward the front.
8. Remove bushing from front bearing.

Reassembly, in general, is the reverse of the disassembly operations. To assemble the pump packings on the shaft, install pilot, Tool No. J-831, on the end of the shaft and insert in the pump body. Also wind string around the recess near the end of the shaft to present a smooth surface on which to slide the packings.

Then install the bushings and packings on the shaft and slide them into position in the pump housing. Coat the chevron packings with water pump grease (G-13) before installing. Install the center bushing with the grooved side toward the rear packing.

Disassembly of the series 37-85 and 90 water pump will be apparent from the cross section illustration. Plate 39, Fig. 47.

29. Correcting "Ping" in High Compression Engines

The power and efficiency of the engines used in the 37-series cars are due in large measure to the high compression ratios of these engines. This high compression requires, as the price of its efficiency, careful attention to the problem of "spark knock" or detonation, and especially, accurate ignition settings.

Detonation occurring upon rapid acceleration at low speeds and disappearing at about 15 miles per hour, is normal and indicates that the engine is performing at top efficiency. No attempt should be made to eliminate it. Excessive detonation is abnormal, however, and indicates inefficient operation and sluggish performance.

To test a car for detonation, run it at various speeds in high gear and accelerate suddenly to put the engine under heavy load. Detonation is usually apparent only under load. Note whether the "pinging" is a well-defined tap or knock from only one or two cylinders or whether it is coming from all cylinders.

If it is evident that the pinging occurs only in one or two cylinders, it may be the result of faulty spark plugs or a hot spot in the combustion chamber. Check and clean the spark plugs first, replacing any that are badly worn. If this does not correct the ping, inspect the combustion chambers for sharp projections of carbon or metal which might become overheated and cause pre-ignition. Remove any such projections.

If the pinging is obviously occurring in all cylinders, the difficulty will be found in the ignition timing adjustment, in the accumulation of carbon, or improper carburetion. See Plates 40 and 41. The ignition timing should be checked to make sure it is not too far advanced. This can be done best with the use of a Synchroscope.

30. Removing Carbon

The most satisfactory way of removing carbon from automobile engines is by scraping, and this is

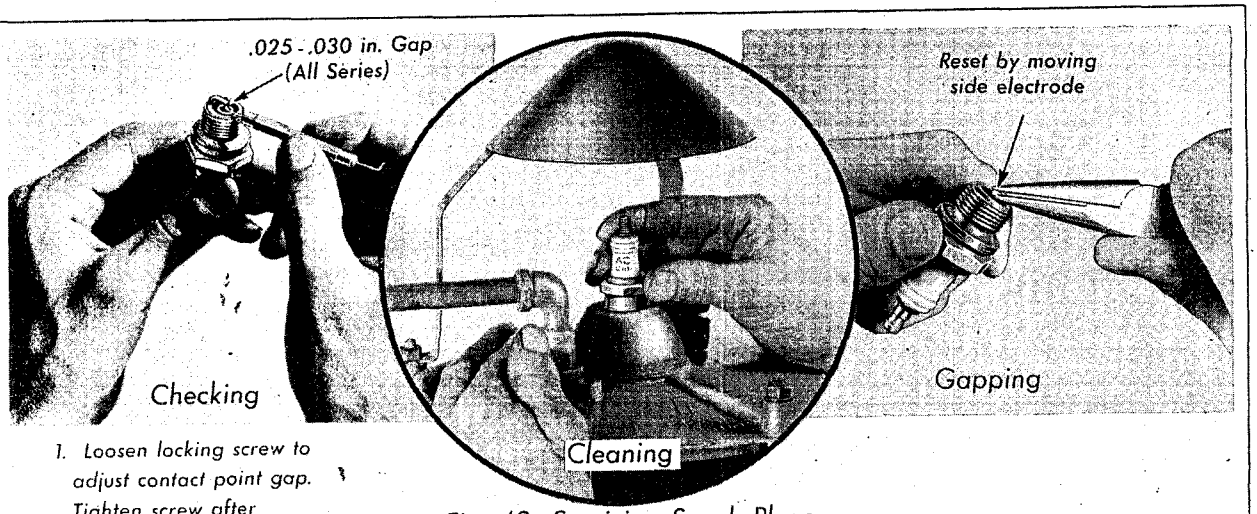


Fig. 48 Servicing Spark Plugs

1. Loosen locking screw to adjust contact point gap. Tighten screw after adjustment is made.

2. Turn eccentric screw to adjust contact point gap.

3. Rotate distributor housing until contacts just separate with end of rotor in line with No. 1 insert in distributor cap and IG/A mark opposite pointer. Hold cam against direction of rotation to eliminate backlash.

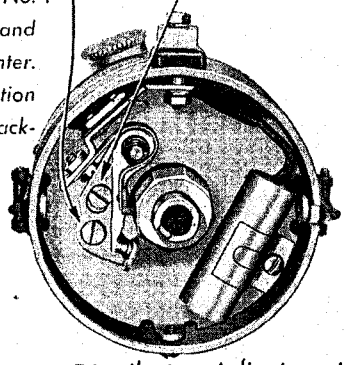


Fig. 49 Timer-Distributor Adjustments
Series 37-50, 60, 65, 70 and 75

1. Loosen locking screws to adjust contact point gaps. Tighten after adjustment is made

2. Turn eccentric screw to adjust contact point gap on each side.

3. Rotate distributor housing until stationary contacts just separate with end of rotor for L.H. cylinders in line with No. 1 insert in distributor cap and IG/A mark for No. 1 cylinder opposite pointer.

4. Loosen locking screws to synchronize moveable contacts.

5. Turn eccentric screw to synchronize moveable contacts

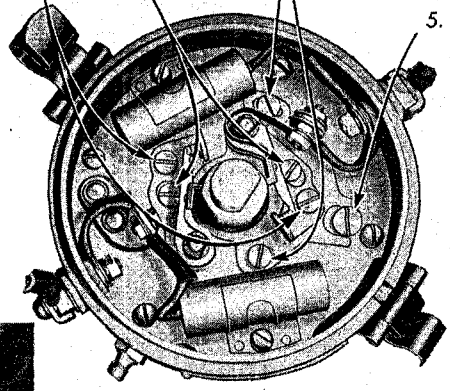
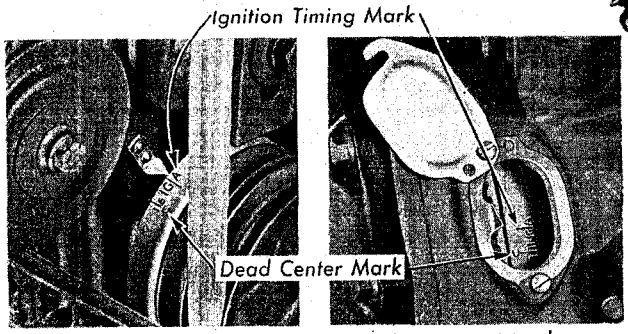


Fig. 50 Timer-Distributor Adjustments
Series 37-85 and 90

Contact Point Gap	
Series 37-50, 60, 65, 70, 75	.012 - .018"
Series 37-85	.018 - .024"
Series 37-90	.014 - .018"



Timing Marks Series 37-50, 37-60, 65, 70 and 75

Timing Marks Series 37-85 and 90

Distributor Rotor
Series 37-85

Plate 40. Ignition Adjustments

the only method that is recommended for series 37-50, 60, 65, 70 and 75 engines. On series 37-85 and 90 engines, however, the labor involved in removing the cylinder heads with the overhead valve mechanism sometimes makes scraping impractical.

Burning the carbon, if properly done, will give good results on these engines at a much lower cost to the owner. Particular care must be taken, while burning the carbon, to prevent injury either to the valves or the external fittings on the engine. The proper procedure is as follows:

1. Remove the spark plug wires and the distributor cover, or use a suitable asbestos covering to protect them during the burning operation.
2. Remove all spark plugs.
3. ***Important.*** Make sure the valves are both closed in the cylinder being burned. If the valves are not closed, they are likely to become overheated and warp.

Note: The only positive way to make sure the valves are closed is to use a test light and crank the engine to the firing point on that cylinder.

4. Allow the carbon to burn slowly until it has all been burned. Quick burning will do only a partial job. The rate of combustion can be controlled by the proper regulation of the oxygen supply to the combustion chamber.
5. Burn out the left hand cylinders first, in the order in which they fire; then burn the right hand cylinders.

31. Ignition Adjustments

Detailed instructions on spark plugs, contact points and ignition timing are given in Plates 40 and 41. Note that, in adjusting spark plugs, only a round wire feeler gauge of the "go" and "no-go" type is recommended as no other type of gauge gives the same accurate results.

32. Lubrication of Distributor

In addition to the lubrication of the distributor drive shaft bearing every 1,000 miles, the distributor advance mechanism requires occasional attention to assure free operation.

A felt wick has been placed in the center of the timer cam on 37-series V-8 and V-12 engines for lubrication purposes. Engine oil should be applied to this wick every 3,000 miles or at least every time the distributor cap is removed for any service attention.

An oil cup for advance mechanism lubrication is provided on the distributor used on series 37-90 engines, to which a few drops of engine oil can be applied every 1,000 miles

The application of a slight amount of vaseline to the timer cam whenever the distributor is disassembled is also beneficial in preventing excessive wear of the rubbing blocks.

33. Removal and Installation of Distributor and Distributor Drive Shaft

The construction of the timer-distributor unit of 37-series V-8, V-12 and V-16 engines is illustrated in Plate 41.

When the distributor drive shaft and gear on V-8 engines is removed or installed, particular care must be exercised to get the driven gear meshed with the camshaft gear in the proper position, otherwise, it will be impossible to time the engine correctly.

To install a distributor drive shaft on 37-series V-8 cars, first turn the crankshaft to the firing center for No. 1 cylinder. Then mesh the distributor driven gear with the driving gear on the camshaft so that the slot in the upper end of the drive shaft coupling is offset toward the left hand or the rear side of the engine. In other words the narrow part of the coupling at the slot should be to the left or rear.

Note: Care should be exercised when making this installation to make sure that the drive shaft extending down to the oil pump is properly lined up. Otherwise, damage might result from pushing the pump shaft through the pump cover.

On V-12 and V-16 engines, the fuel pump should also be removed before removing the distributor drive mechanism to prevent any interference between the fuel pump drive shaft and the distributor drive shaft.

The procedure for installing the distributor drive shaft is similar to the procedure for V-8 engines, except that the distributor driven gear should be meshed with the driving gear on the camshaft so that the slot in the upper end of the shaft is offset toward the front of the engine, or so that the narrow part of the coupling at the slot is at the front.

34. Replacing V-8 Distributor Drive Idler Gear Support

The idler gear that drives the distributor and oil pump drive shaft on series 37-50, 60, 65, 70 and 75 engines is carried on a support fastened to the rear end of the crankcase.

To remove the support:

1. Remove the flywheel housing, the left rear valve tappet assembly and the idler gear.
2. Remove the retaining screw from the top of the housing.
3. Push the support out toward the rear of the car.

Reverse the above procedure for installation, exercising care to force the locking screw down tight while tapping the pilot lightly with a hammer.

35. Removing Ignition Coil

The ignition coil on all 37-series V-8 engines is located on the engine side of the dash. On V-12 cars the ignition coils are mounted on a carrier bracket across the radiator tie rods just back of the upper tank. On V-16 cars the ignition coils are mounted in a carrier bracket at the back of the upper radiator tank.

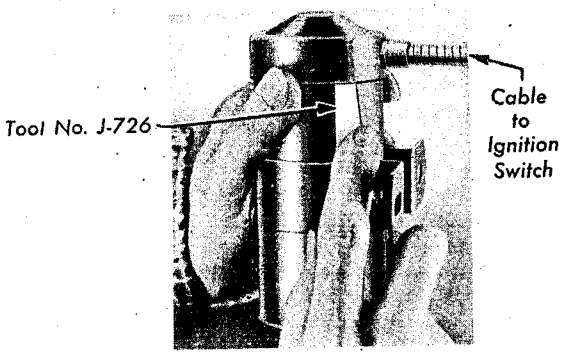


Fig. 51 Removing Coil Top Cover
All Series

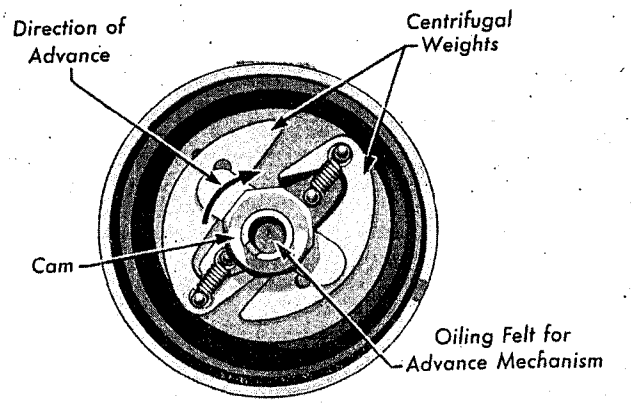


Fig. 52 Centrifugal Advance Mechanism
Series 37-50, 60, 65, 70, 75
Typical of Series 37-85 and 90

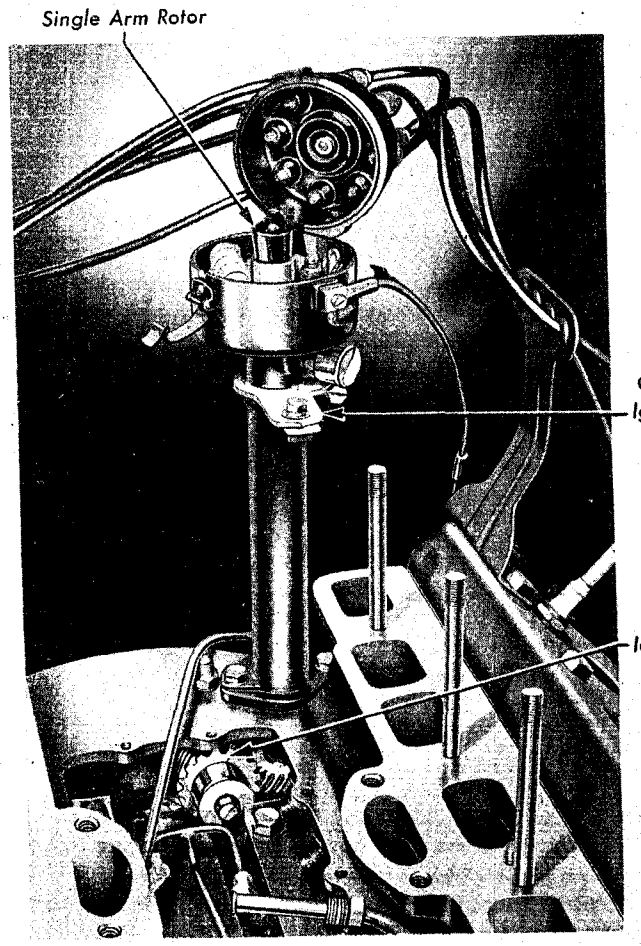


Fig. 53 Distributor and Oil Pump
Drive Mechanism
Series 37-50, 60, 65, 70, 75

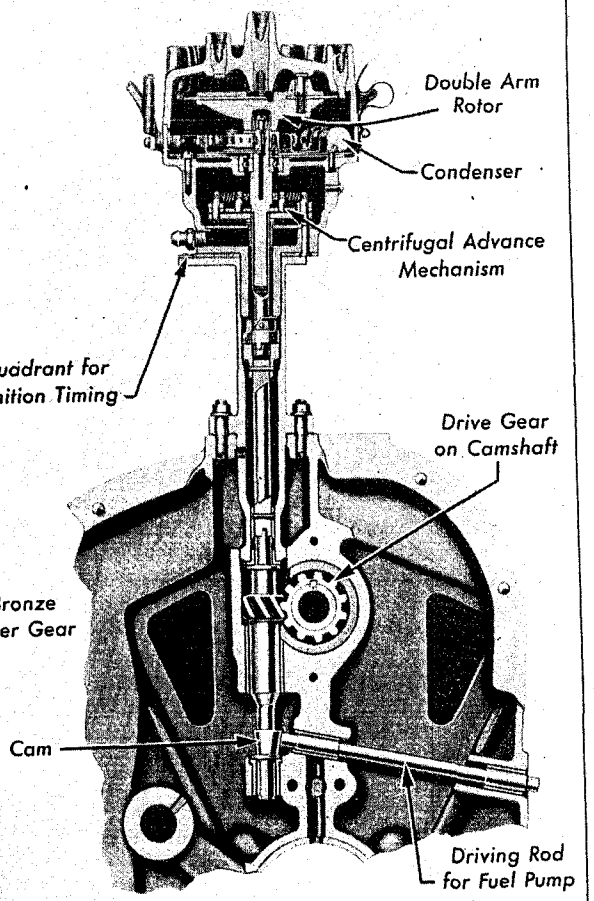


Fig. 54 Distributor and Fuel Pump
Drive Mechanism
Series 37-85
Typical of Series 37-90

Plate 41. Ignition Distributor and Coil

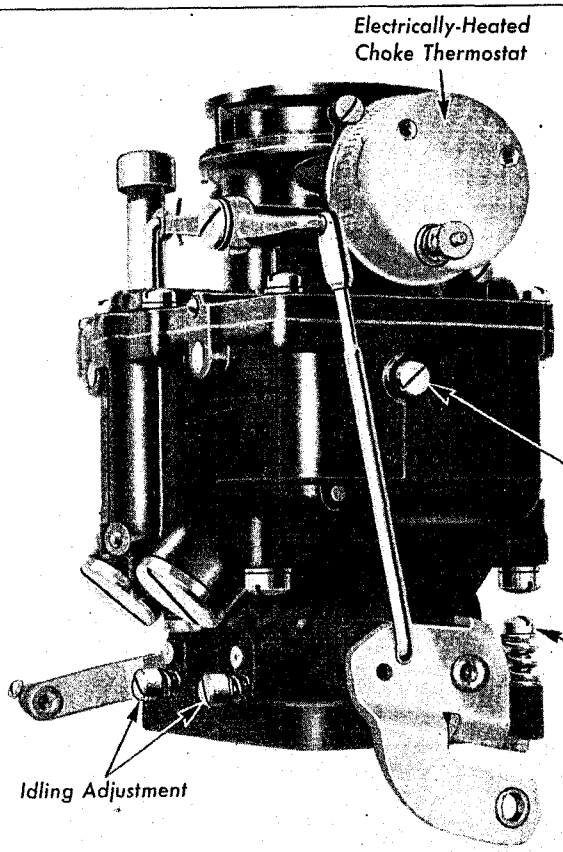


Fig. 55 Stromberg Carburetor

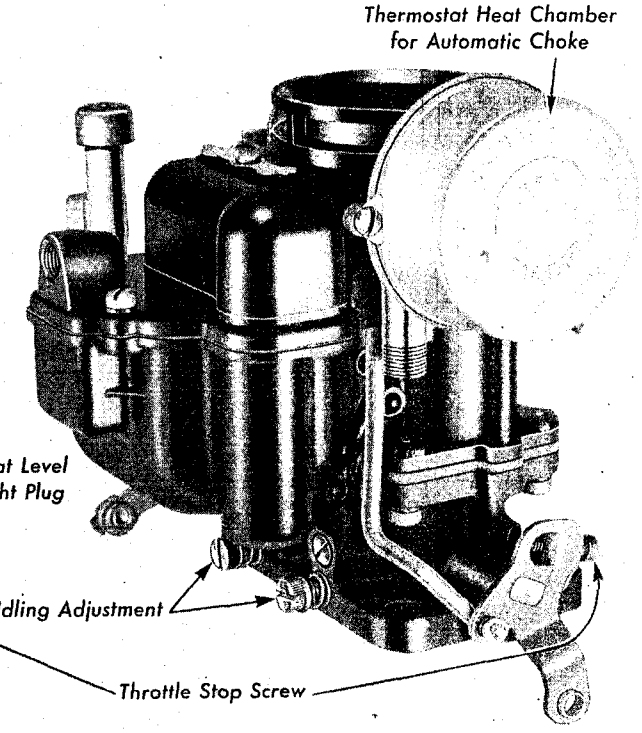


Fig. 56 Carter Carburetor

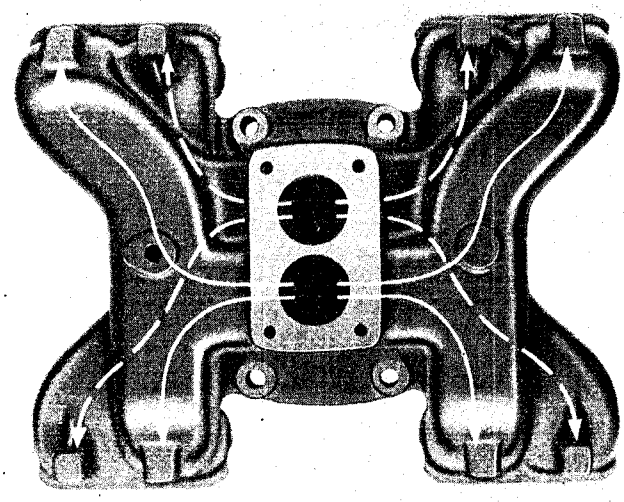


Fig. 57 Intake Manifold

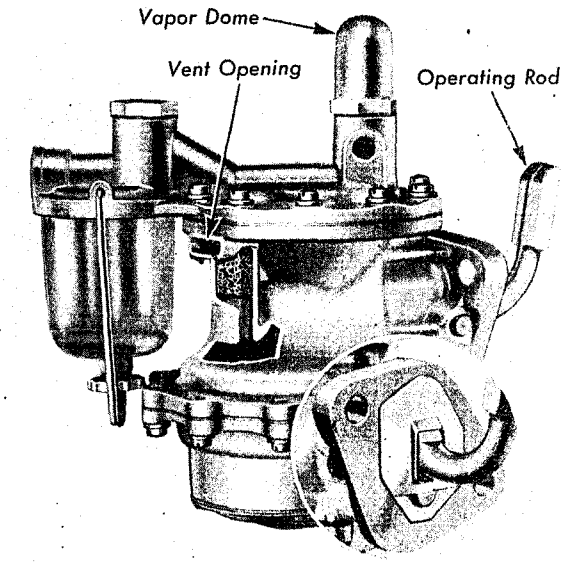


Fig. 58 Combination Fuel and Vacuum Pump

Plate 42. Carburetor Details—Series 37-50, 60, 65, 70, 75

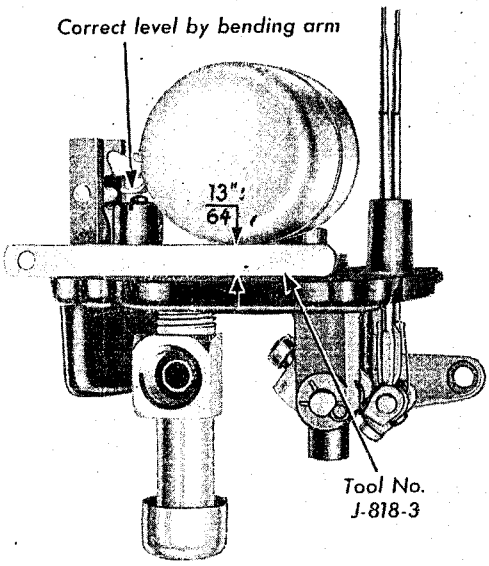


Fig. 59 Checking Float Level

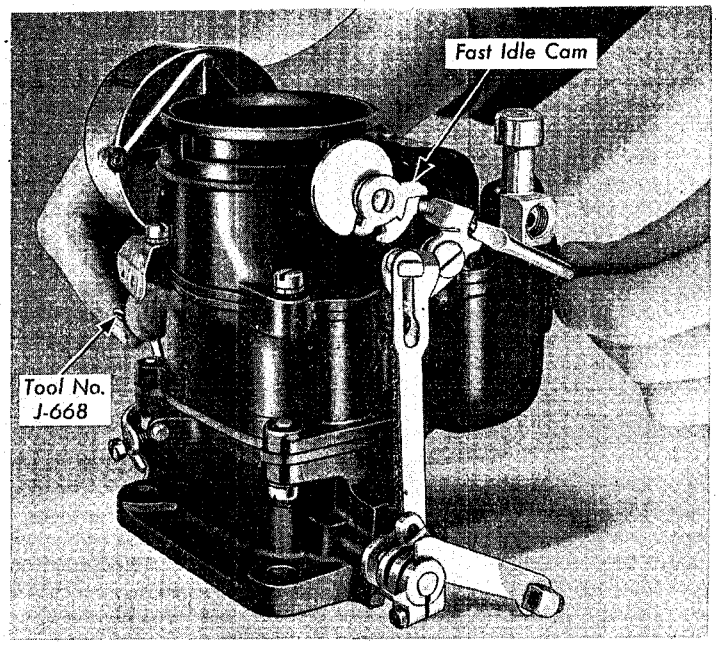


Fig. 60 Adjusting Fast Idle

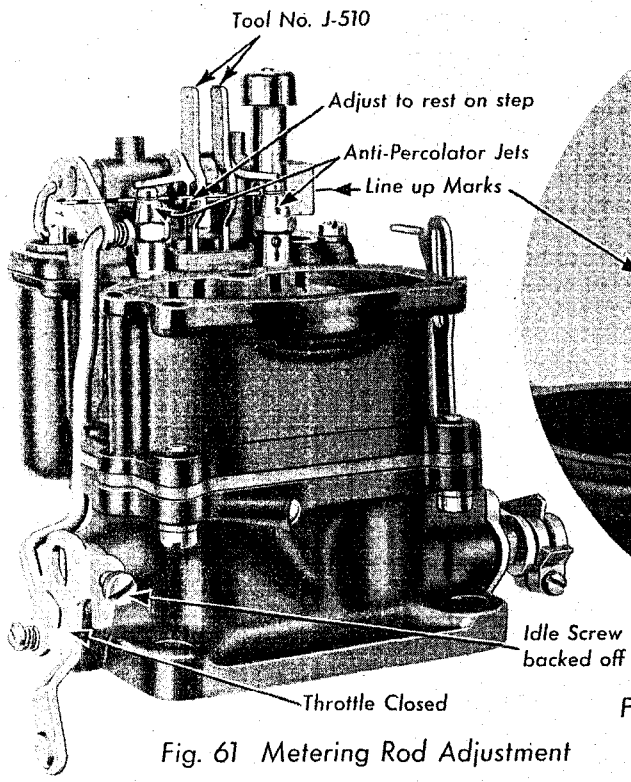


Fig. 61 Metering Rod Adjustment

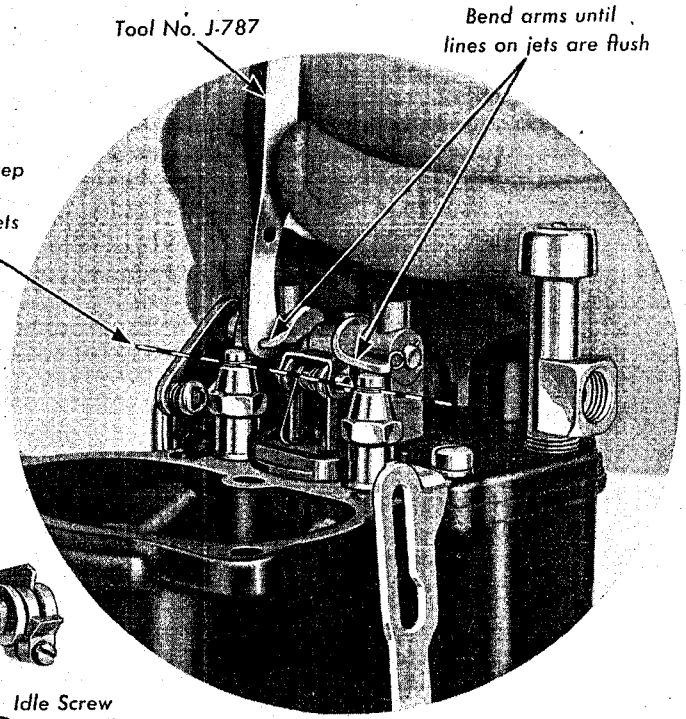


Fig. 62 Equalizing Anti-Percolator Jets

Plate 43. Carter Carburetor Adjustments

The construction of the coil itself is the same on all series. In every case the ignition coil cover must be removed and the ignition cable wire disconnected at the coil before the ignition coil itself can be removed. The general procedure is as follows:

1. Disconnect high tension wire at coil.
2. Disconnect primary wire at coil.
3. Loosen clamp bolts holding coil to dash or mounting bracket.

Note: Slide bracket toward rear off coil body on 37-85 and 90.

4. Insert Tool J-726 between coil body and cover as shown in Plate 41, Fig. 51. Revolve coil clockwise and cover counter-clockwise and remove cover.
5. Disconnect ignition switch wire at coil.

Installation is the reverse of removal, except that no special tools are required.

36. Carburetor Adjustment

Series 37-50, 60, 65, 70 and 75—Two different makes of carburetors were used on the 37-series V-8 engines. Stromberg carburetors were used on all Cadillac V-8 engines and both Stromberg and Carter carburetors used on LaSalle V-8 engines.

While the two makes of carburetors are very similar in operation and performance, their fundamental design is different, and the following procedures are given to guide you in servicing either make of carburetor.

Stromberg Carburetor

Idling Adjustment

1. Run engine until it is thoroughly warm and choke valve is wide open.

2. Set throttle stop screw so that car runs approximately 6 m. p. h. in high gear on level road. See Plate 42, Fig. 55.

3. Adjust the two idle adjustment screws so that the engine runs smoothly without loping or stalling at this speed. See Plate 42, Fig. 55.

Note: Turn screws clockwise to lean the mixture and counter-clockwise to enrich the mixture. If a good idle is not obtained, remove the idle adjusting screws and check to make sure that no dirt has accumulated around the adjusting screw seats.

Float Level Adjustment

The float level should be set to $\frac{5}{8}$ inch below the top surface of the float chamber.

This level corresponds to the lower level of the sight plug when the engine is idling, and may be checked without disassembling the carburetor.

Important: The float level can be checked only while the engine is running. Do not, however, start the engine while the carburetor cover is removed because a backfire might cause a serious fire or injury.

If the float level requires resetting, bend the float lever arm to the desired position. This should not be necessary, however, unless the carburetor has been tampered with or roughly handled.

Automatic Choke Thermostat Adjustment

To adjust the electrically-heated thermostat for the automatic choke, proceed as follows:

1. Remove the thermostat case and bring the temperature of the thermostat spring to approximately 70°F. At this temperature the inside of the hook for the thermostat spring should coincide with the zero marking on the case.

Note: This step is very important and especially so in case a new thermostat or other new parts have been installed for any reason. One graduation on the thermostat case should be allowed for each 5° variation in temperature if the setting is made at temperatures other than 70°F.

2. Install the thermostat case on the carburetor so that the hook for the thermostat spring comes in contact with the pin on the choke shaft lever without any tension when the choke valve is in the wide open position.

3. Check the zero location marking on the thermostat case which should now coincide with the marking on the carburetor body.

4. Turn the thermostat case to the rich side from the zero marking on the case until the star stamped during the original setting by the factory is opposite the marking on the carburetor body. Then firmly tighten the retaining screws to hold the adjustment.

Carter Carburetor

Idling Adjustment

The procedure given for making the idling adjustment on the Stromberg carburetor will also apply to the Carter carburetor. See Plate 42, Fig. 56.

If any difficulty is encountered in securing a good idle, the adjusting screws should be checked to make sure that no dirt has accumulated around the adjusting screw seats or that the low speed jet tubes are not clogged. The tubes should also be seated air-tight in the body casting.

Float Level Adjustment

1. Remove air horn assembly and float bowl cover and disengage metering rods by removing metering rod arm pin.
2. Invert float bowl cover, holding needle seat away and float in horizontal position.
3. Measure distance between metal rim for cover gasket and nearest point of float, as shown in Plate 43, Fig. 59.
4. Bend lip of float lever if measurement shows improper setting. The correct float level setting is $\frac{13}{64}$ inch.

Note: Tool J-818-3 is convenient for measuring this distance.

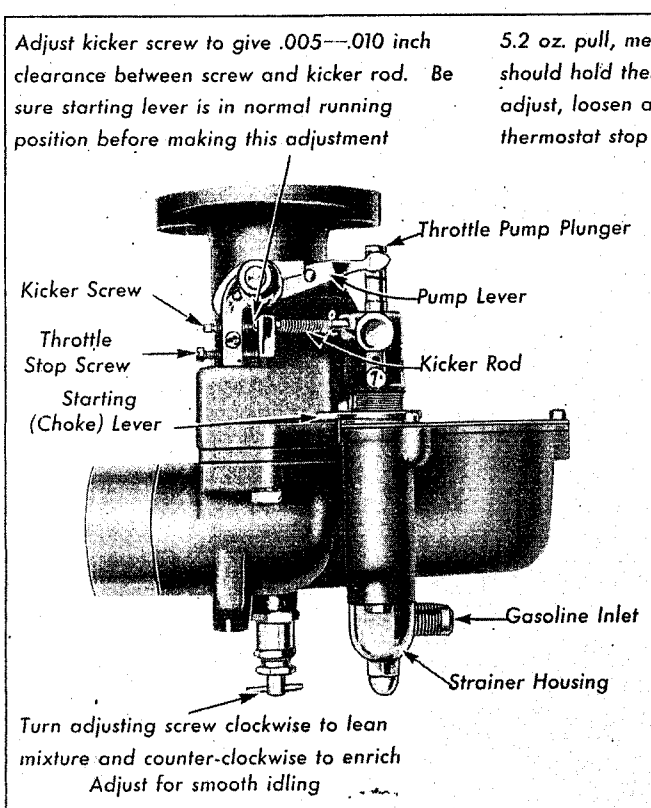


Fig. 63 Carburetor Adjustments

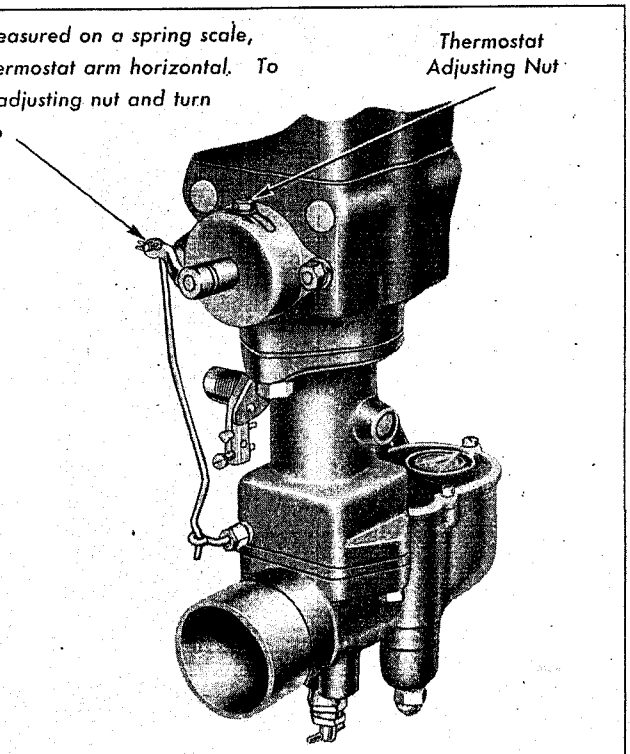


Fig. 64 Thermostat for Semi-Automatic Choke

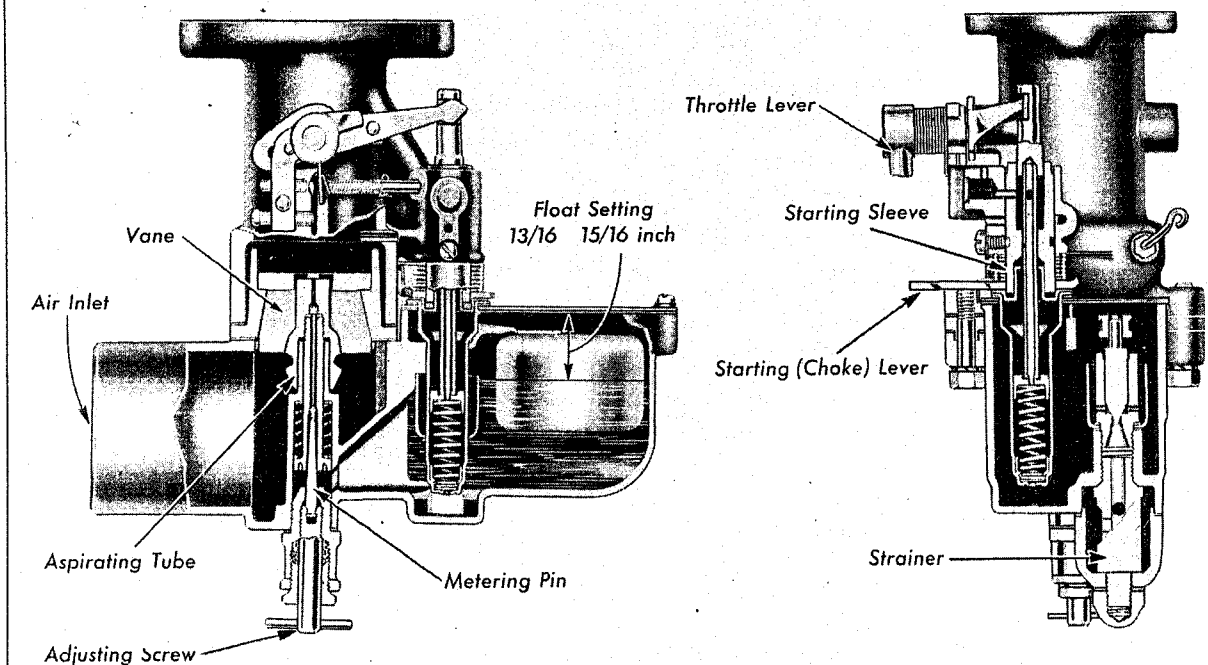


Fig. 65 Carburetor Cross Sectional Views

Plate 44. Carburetor Adjustments—Series 37-85 and 90

Automatic Choke Adjustment

Except for a check of the moving parts to see that they operate freely and an occasional cleaning of the hot air line, no adjustment of the automatic choke control unit should be necessary. If the initial and part throttle running mixture is too lean or too rich, revolve the thermostat housing as indicated on the housing face.

Accelerating Pump Adjustment

Adjustments are provided for a short and a long pump stroke: A short stroke to be used for hot temperatures and a long stroke to be used for extremely cold temperatures.

Note: Lubricate countershaft that operates accelerating pump every 6,000 miles. Shaft is lubricated under the grease cup cover on the float bowl housing.

Increased resistance on the foot throttle indicates a clogged pump jet. Pump jets and check valves should be removed and cleaned. All jets and valves must be seated gasoline-tight when replacing. Poor acceleration may be due to a loose plunger, a worn or damaged plunger leather, or a partly plugged jet. If necessary, replace the plunger spring and leather, making sure that the nut inside the plunger cup is screwed down tight to avoid air leaks. Use Tool J-507 for replacing plunger in cylinder.

Metering Rod Adjustment

1. Remove air horn and automatic choke assembly by removing two air horn attaching screws and one screw under choke valve on inside, and disconnect upper end of throttle connector rod.

2. Back out throttle lever adjusting screw so that throttle valves close tight.

3. Remove pin spring from metering rod pins and slide the pin out of the metering rod arms, taking care that pin spring and metering rod springs are not damaged in any way. Lift out metering rods and remove retainer plate by loosening small screw. Remove the two small discs beneath this plate.

4. Insert two metering rod gauges, Tool J-510, in place of the metering rods, seating tapered end in metering rod jets. Put metering rod pins in place. Check position of metering rod pins which should now rest lightly on lower end of notch in gauge with the throttle fully closed and the upper end of the connector rod centered in its hole in the pump arm. Bend throttle connector rod to secure proper adjustment, if above conditions are not met.

5. Remove gauge and replace metering rods and discs, and connect metering rod spring. Place small amount of graphite grease in holes so that the metering rod arm operates freely.

Anti-Percolator Adjustment

1. Set throttle valve to give .020 inch clearance between edge of throttle valve and throttle bore on side opposite port, using Tool J-512.

2. Adjust metering rod arms so that there is .005 to .015 inch clearance between the lip and the valve stem of each unit, taking care that both valves are adjusted equally.

Note: Do not disturb setting of metering rods during this adjustment.

3. Check adjustment after metering rods are installed as a final check on the work.

Slow and Fast Idle Adjustment

1. Make sure that correct slow idle adjustment (6 m. p. h.) has been made.

2. With the fast idle screw resting against the high lobe of the fast idle cam, check the clearance between the throttle lever adjusting screw and the carburetor casting stop, as shown in the illustration. Plate 43, Fig. 60.

3. Adjust clearance to final setting of .030 inch for correct operation.

Dechoking Adjustment

1. Check distance between upper edge of choke valve and the wall of the carburetor air horn when the dechoking device is open.

2. Measure opening which should be approximately $\frac{9}{64}$ inch and bend lip on fast idle connector rod that contacts the choke trip lever, if it is necessary to change position of valve.

37. Install New Rivet When Reassembling V-8 Carburetors

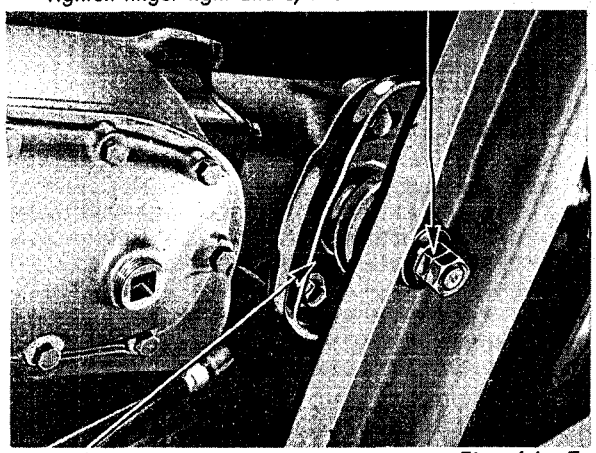
Whenever a Stromberg carburetor is disassembled for cleaning or servicing and the split rivet connecting the choke and the vacuum cylinder linkage is removed, ***install a new split rivet,*** Part No. 1422729, when the carburetor is reassembled.

The use of a new rivet is important because otherwise, there is danger of the used rivet breaking off, going through the carburetor, and causing considerable damage to the engine.

38. Carburetor Adjustment

Series 37-85 and 90—The carburetors used on series 37-85 and 90 engines have only one adjustment, the metering pin, which is raised or lowered by screwing it into or out of the fuel orifice. See Plate 44. Turning the pin clockwise moves the pin upward into the orifice and makes the mixture leaner; turning it counter-clockwise increases the orifice opening and makes the mixture richer.

It is necessary, when adjusting these carburetors, to make the semi-automatic choke thermostats inoperative. Simply warming up the engine is not enough because raising the hood cools the thermostats enough to apply the choke slightly. Whenever the carburetor is to be adjusted, therefore, the connection to the automatic choke should be blocked down so that the choke is in the fully "off" position.



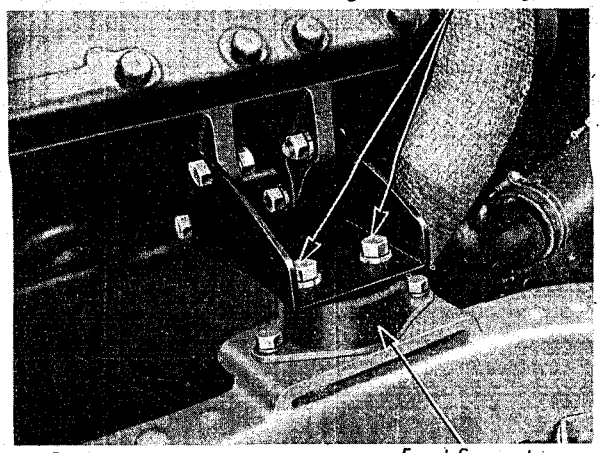
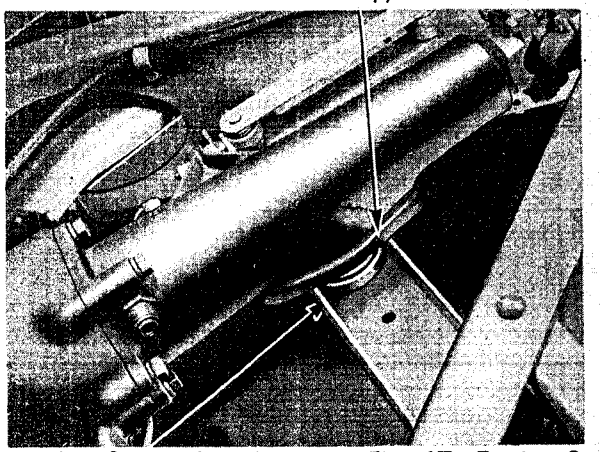


Fig. 66 Engine Supports
Series 37-50, 60, 65, 70, 75



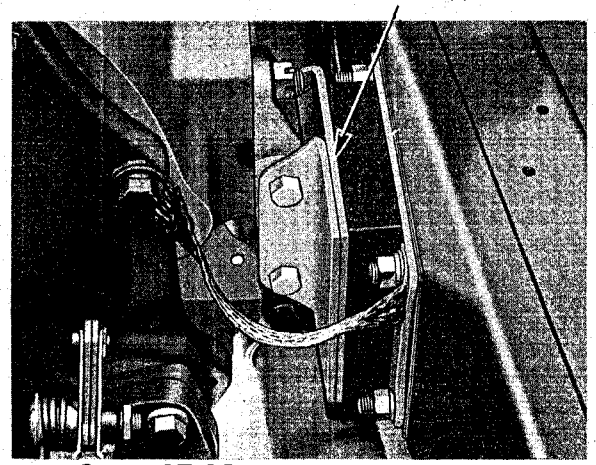
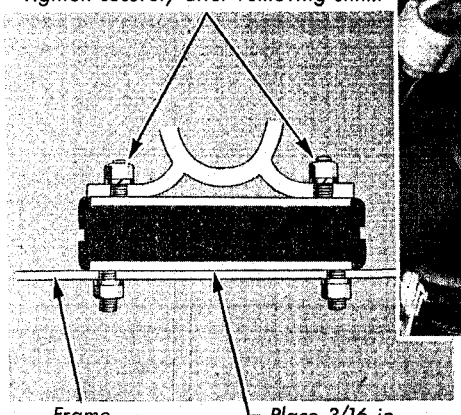
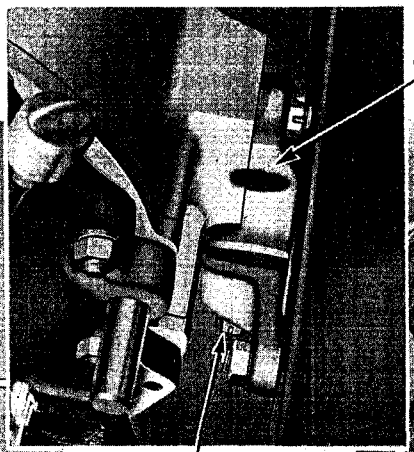


Fig. 67 Engine Supports Series 37-85
(Front Support not Shown—Similar to 37-90)





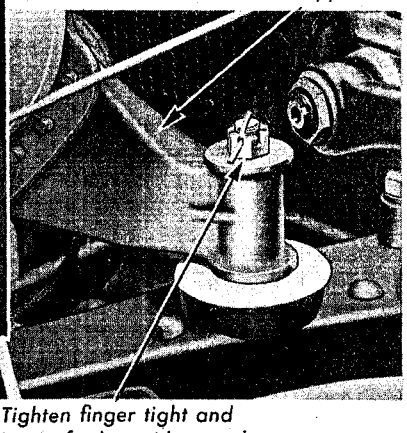


Fig. 68 Engine Supports Series 37-90

Plate 45. Engine Support Adjustments

Another precaution that should be observed in adjusting these carburetors is to make sure that the hand choke control is fully released by seeing that the choke lever on the carburetor is up against the stop.

Failure to observe these precautions will result in an overlean mixture, which will invariably manifest itself in backfiring in the muffler. In any instances of back-firing, therefore, the first thing to be done is to readjust the carburetor with the thermostat blocked open, and the hand choke fully released.

The idle speed of the engine should be set by means of the throttle adjusting screws to a speed of approximately 320 R. P. M.

After the carburetor has been satisfactorily adjusted in the idling position to a speed of approximately 320 R. P. M., the adjusting screw should be turned slightly more toward the rich side but not more than ¼ of a turn. The car operates more satisfactorily on a slightly rich mixture than on a lean mixture, and this additional ¼ of a turn toward the rich side will help to prevent any possibility of popping back.

After the throttle stop screw adjustment is completed the automatic choke connection should be released. The thermostat should not be tampered with. It is properly adjusted at the factory and ordinarily requires no further adjustment. If it has been tampered with, however, it can be adjusted by loosening the adjusting nut and sliding the thermostat stop until a pull of 5.2 ounces is required to hold the thermostat arm in a horizontal position. This should be done at a temperature of 70°F.

In case of continued popping back with the carburetor and the choke controls properly adjusted, the cause will usually be found in the contact points or in the ignition timing. In retiming the ignition, the flywheel timing indicator should be set on or slightly ahead of the IG/A mark. It should not be set behind the IG/A mark nor any more than ¼ in. ahead of the mark.

39. Equalizing Carburetor Adjustment

Series 37-85 and 90—The adjustments of the two carburetors on the series 37-85 and 90 engines should be equalized to secure smooth running of the engine. The best method to follow is to use an equalizing gauge. The gauge is connected to the intake manifolds after the vacuum lines are disconnected. The throttle rod must also be disconnected from the right-hand carburetor.

A preliminary adjustment of the metering pins and throttle on both carburetors is then made to bring the idling speed at approximately 320 R. P. M. To determine whether or not the engine is running at the correct idling speed, remove the oil filler cap from one of the valve covers and hold a finger on one of the valve rocker arms so that the movements of the rocker arm may be counted. At 320 R. P. M. the valve will open forty times in fifteen seconds.

Make sure that the gauge hangs straight and check the level of the mercury in the tube. When the metering pins and throttle stop screws are properly adjusted, both columns of mercury should be at the same height and the engine should run smoothly at 320 R. P. M.

If the columns of mercury are not at the same level and the engine speed is too fast, reduce the speed by backing off the throttle stop screw on the side on which the mercury column is the lower. If the speed is too slow, turn the throttle stop screw in a little on the side on which the mercury column is higher.

Adjust the right-hand throttle control rod to exactly the right length so that the clevis pin can be slipped into place without changing the engine speed.

A further check should be made on the throttle adjustment by running the engine at approximately 1000 R. P. M. and noting the mercury level in the gauge. If the columns are not practically level, a slight readjustment of the right-hand throttle control rod will be necessary. Finally, run the engine again at idling speed and check the mercury columns again. A very slight readjustment of the throttle control rods may be necessary to bring them to the proper level again.

If an equalizing gauge is not available, the following method may be used to equalize the carburetor adjustment.

Disconnect the coil wire for the right-hand cylinder block. Adjust the metering pin of the left-hand carburetor in the same manner as when using mercury tube and set the throttle stop screw so the engine will just turn over without stalling.

Then disconnect the coil wire for the left-hand cylinder block and adjust the metering pin and the stop screw on the right-hand carburetor in a similar manner. With the metering pins and throttle stop screws on both carburetors properly adjusted, the engine should idle at about 320 R. P. M.

The foregoing adjustment may be slightly rich when all cylinders are operating. To correct this, it may be necessary to screw up slightly each metering pin adjustment. While testing the car on the road the above adjustments should be rechecked to be sure they are satisfactory.

40. Cleaning Carburetor Air Cleaner

The filtering unit of the carburetor air cleaner on all 37-series cars should be serviced every 2,000 miles or oftener if extreme dust conditions are encountered. The correct procedure for servicing the cleaners on the different models is as follows:

Oil Bath Type Air Cleaner—Used on Series 37-60, 65, 70, 75, 85, and later 37-50 cars.

1. Remove cleaner from car.
2. Loosen cap screw at top of cleaner and remove cover.
3. Remove wire mesh unit and metal screen from reservoir.
4. Pour the oil out of the reservoir and remove all sludge or dirt deposits from screen and reservoir.
5. Clean all parts thoroughly with gasoline, taking particular care to wash all accumulated dirt and dust out of the wire mesh.
6. Dry all units thoroughly with air and install the reservoir and metal screen.
7. Pour one pint of S. A. E. 50 engine oil (S. A. E. 40 for winter temperatures) in the reservoir.
8. Reassemble cleaner and install on car.

Note: No oil should be poured on the wire mesh of this type cleaner.

Dipped Filter Air Cleaner—Used on Series 37-90 and first 37-50 cars.

1. Remove cleaner from car.
2. Disassemble cleaner and remove gauze unit.
3. Clean all parts thoroughly with gasoline, taking particular care to wash all accumulated dirt and dust out of gauze unit.
4. Dry all units thoroughly with air.
5. Dip the gauze unit in S. A. E. 50 engine oil and drain or shake out any excess oil from unit.
6. Reassemble cleaner and install on car.

41. Installing Exhaust Manifold Gaskets

Exhaust manifolds are subject to such extreme variations in temperature that the metal expands and contracts to a considerable degree. This condition makes the manifolds "Creep" on the gaskets—a condition which has no undesirable effect unless the bolts are drawn up too tight.

Manifold bolts need not be extremely tight. They should be tightened while the engine is running and should be drawn up just enough to stop all exhaust leaks. If the bolts are tightened too securely, the "creeping" of the manifold may rip the gasket and permit it to burn out.

The possibility of intake and exhaust gaskets blowing out can be greatly reduced by coating them with gasket paste (See Note 15) before installing. This treatment makes it easier for the manifold to expand and contract without pulling or wrinkling the gasket.

42. Servicing Fuel and Vacuum Pumps

The service operations that can be performed on the fuel and vacuum pumps without special tools are the cleaning of the filter and replacement of the filter parts, the vapor dome, and the inlet and outlet valves. Under no circumstances should either of the pump housings be disassembled unless the necessary special tools for reassembly are available.

Service on the fuel pumps or vacuum pumps, whether of single unit or separate type, can be obtained from A. C. service stations, where special tools and spare parts are at hand. Distributors who wish to make repairs in their own stations can purchase the necessary tools at an A. C. service station. Others may keep a spare pump of each type in stock for exchange to assure prompt service.

43. Adjusting Engine Supports

Series 37-50, 60, 65, 70 and 75—The *front* engine supports of 37-series V-8 engines do not require any adjustment; simply draw the support bolts up tight enough to hold the engine in position on the rubber cushion.

The rear engine support should be tightened finger tight, and then drawn up ¾ of a turn further with a wrench and locked in position. See Plate 45, Fig. 66.

Series 37-85—On the 37-series V-12 engine with a five point mounting, the front engine supports should be tightened first. Next, the rear engine support under the transmission extension should be tightened finger tight, and then, drawn up ½ turn further with a wrench and locked in position. And then the intermediate engine supports should be tightened as a final step. See Plate 45, Fig. 67.

Series 37-90—On the 37-series V-16 engines, the procedure for adjusting the engine supports, as shown in Plate 45, Fig. 68, is as follows:

1. Place engine weight on front and rear supports.
2. Tighten nuts on front support through bolts until lower retainer contacts with rubber, then draw up nut ½ turn further and lock in position.
3. Leaving support loose on frame cross member, tighten through bolt in intermediate engine support just enough to take up clearance between rubbers and retainers.
4. Install shims under rear engine support to raise the rear end of the engine until, with the weight of the engine on the rear support, the bolts holding the intermediate support bracket to the frame sidebar can be installed without any binding whatsoever.

Note: Insert shims between sidebar and support casting, if needed to prevent cocking of the through bolts.

5. Tighten the bolts holding the intermediate support bracket to the frame securely with the engine raised as explained.
6. Remove the shims from under the rear engine support and tighten support to cross member.
7. Tighten nuts on through bolt in intermediate engine supports to take up all clearance of parts, and then draw up 2 turns further and lock in position.

ENGINE

Specifications

Subject and Remarks	37-50	37-60, 65 70, 75	37-85	37-90
Angle between cylinder blocks	90°	90°	45°	45°
Bore	3 3/8"	3 1/2"	3 1/8"	3"
Compression ratio—				
Standard	6.25-1	6.25-1	6.00-1	6.00-1
Optional	5.75-1	5.75-1	5.65-1	5.65-1
Compression pressure in lbs. per square inch—				
At 1000 R. P. M.	155	170	145	154
At 3200 R. P. M.	.....	.....	160	172
Horsepower—				
Rated (taxable)	36.45	39.20	46.9	57.6
Developed at 3600 R. P. M.	.....	.....	150	185 at 3800
Developed at 3400 R. P. M.	125	135	.....	.....
Stroke	4 1/2"	4 1/2"	4"	4"
Piston displacement in cubic inches	322	346	368	452
Points of suspension, number	3	3	5	5
Valve arrangement	L-head	L-head	Overhead	Overhead
Engine number location—				
37-50, 60, 65, 70, 75—on crankcase at rear of left cylinder block parallel to the dash.				
37-85, 90 upper surface of generator drive chain housing on right hand side of engine.				
Camshaft				
Bearing clearance—				
New limits	.0027-.0037"	.0027-.0037"	.0011-.0026"	.0011-.0026"
Worn limits, not over	.005"	.005"	.005"	.005"
Bearing out of round, not over	.002"	.002"	.005"	.005"
Diameter and length of bearing journals—				
No. 1 (front)	2.4071-2.4078" x 25/32"	2.4071-2.4078" x 25/32"	1.999-2.000" x 3"	1999.-2.000" x 3"
No. 2	2.4071-2.4078" x 13/16"	2.4071-2.4078" x 13/16"	2.1264-2.1271" x 1 3/8"	2.1264-2.1271" x 1 3/8"
No. 3 (rear on 37-60, 65, 70, 75)	2.0009-2.0016" x 15/16"	2.0009-2.0016" x 15/16"	2.1264-2.1271" x 1 3/8"	2.1264-2.1271" x 1 3/8"
No. 4 (rear on 37-85)	.....	.....	2.1264-2.1271 x 2 15/16"	2.1264-2.1271" x 1 3/8"
No. 5 (rear or 37-90)	.....	.....	.....	2.1243-2.1250" x 2 15/16"
End play in camshaft	.....	.....	.005-.015"	.005-.015"
New limits	.....	.....	.020"	.020"
Worn limits	.....	.....	4	5
Number of bearings	3	3		
Chains				
Camshaft chain—				
Adjustment	None	None	Automatic	Automatic
Number of links	62	62	110	110
Pitch	3/8"	3/8"	3/8"	3/8"
Type—				
Morse No.	3682RX	3682RX	766 Duplex	766 Duplex
Whitney No.	.....	.....	.....	.....
Width	1 1/4"	1 1/4"	1 1/2"	1 1/2"
Connecting Rods				
Clearance—				
Piston pin (see Note 10)	.0004" press in rib end .0000" other end	.0004" press in rib end .0000" other end	.0004" press in locked end .0000" free end	.0004" press in locked end .0000" free end
Lower bearing and crankpin (See Note 5 and 6)				
New limits	.0015-.0025"	.0015-.0025"	.001-.0025"	.001-.0025"
Worn limits	.006"	.006"	.006"	.006"
Diameter and length of connecting rod bearings	2.460 x 2 1/32"	2.460 x 3 1/32"	.....	.....
End play on lower bearings	.003-.006"	.003-.006"	.004-.007"	.004-.007
Type of bearing used	Shell	Shell	Spun	Spun
Crankshaft and Main Bearings				
Crankpin diameter	2.4590-2.4595"	2.4590-2.4595"	2.4995-2.5000"	2.4995-2.5000"
Crankpin out of round, not over	.002"	.002"	.002"	.002"
Clearance—main bearings (See Note 2)—				
New limits	.0015"	.0015"	.001"	.001"
Worn limits, not over	.004"	.004"	.004"	.004"

ENGINE

Specifications—(Cont'd)

Subject and Remarks	37-50	37-60, 65 70, 75	37-85	37-90
Crankshaft and Main Bearings—(Cont'd)				
Diameter and length of main bearing journals—				
No. 1 (front)	2½ x 1 1/16"	2½ x 1 1/16"	2 5/8 x 2 5/16"	2 5/8 x 2 5/16"
No. 2	2½ x 1 5/32"	2½ x 1 5/32"	2 5/8 x 1½"	2 5/8 x 1½"
No. 3	2½ x 1 31/32"	2½ x 1 31/32"	2 5/8 x 1½"	2 5/8 x 1½"
No. 4	.....	.....	2 5/8 x 3 11/16"	2 5/8 x 1½"
No. 5	.....	.....	.....	2 5/8 x 3.69"
End play in crankshaft—				
New limits	.001-.005"	.001-.005"	.001-.005"	.001-.005"
Worn limits, not over	.010"	.010"	.010"	.010"
Main bearing journals out of round, not over	.002"	.002"	.002"	.002"
Harmonic balancer	No	Yes	Yes	Yes
Number main bearings	3	3	4	5
Lubrication				
Crankcase capacity	7 qts.	7 qts.	9 qts.	10 qts.
For detailed lubrication recommendations, see Lubrication Section, Page 169.				
Oil filter	Yes	Yes	Yes	Yes
Oil Pump				
Backlash between spiral drive gears, not over	.018"	.018"	.018"	.018"
Clearance between—				
Bushing and drive shaft.				
New limits	.001-.0025"	.001-.0025"	.001-.0025"	.001-.0025"
Worn limits, not over	.010"	.010"	.010"	.010"
Pump body and gears.				
New limits	.0025-.0085"	.0025-.0085"	.0025-.0085"	.0025-.0085"
Worn limits, not over	.010"	.010"	.010"	.010"
End play in pump gears.				
New limits	.002-.004"	.002-.004"	.002-.004"	.002-.004"
Worn limit, not over	.015"	.015"	.015"	.015"
End play in spiral gear on drive shaft.				
New limits	.003-.010"	.003-.010"	.009-.015"	.009-.015"
Worn limits, not over	.015"	.015"	.020"	.020"
End play in accessory idler gear.				
New limits	.002-.006"	.002-.006"	.....	.....
Worn limits, not over	.010"	.010"	.....	.....
Oil Pressure Regulator				
Adjustment	None	None	None	None
Clearance between valve plunger and housing.				
New limits	.003-.005"	.003-.005"	.003-.006"	.003-.006"
Worn limits, not over	.008"	.008"	.008"	.008"
Pressure, normal at 60 M. P. H.	30 lbs.	30 lbs.	30 lbs.	30 lbs.
Idle	15 lbs.	15 lbs.	14 lbs.	14 lbs.
Spring.				
Free length (approx.)	2 25/64"	2 25/64"	1 13/16"	1 13/16"
Pressure, compressed to 1⅜"	5½-6 lbs.	5½-6 lbs.	.....	.....
Pressure, compressed to 1⅝"	.....	.....	12 oz. to 1 lb.	12 oz. to 1 lb.
Valve opens at	30 lbs.	30 lbs.	8 oz. 14 lbs.	8 oz. 14 lbs.
Pistons and Cylinders				
Cylinder bore out of round, not over	.0005"	.0005"	.0005"	.0005"
Taper	.000"	.000"	.000"	.000"
Piston clearance (see Notes 11 and 12)				
Top of land	.023"	.025"	.019"	.018"
Bottom of skirt	.0019"	.0021"	.0020"	.0018"
Cylinder bore—standard	3.3745-3.3765"	3.5005-3.5025"	3.1250-3.1270"	3.0005-3.0025"
Piston diameter—standard	3.3726-3.3746"	3.4979-3.4999"	3.1234-3.1254"	2.9984-3.0004"
Piston diameter—oversize				
.003" oversize	3.3761-3.3776"	3.5014-3.5029"	.....	.....
.005" oversize	3.3781-3.3796"	3.5034-3.5049"	3.128-3.130"	3.003-3.005"
.010" oversize	3.3831-3.3846"	3.5084-3.5099"	.....	.....
.015" oversize	3.3881-3.3896"	3.5135-3.5149"	3.138-3.140"	3.013-3.015"
Oversize cylinders are honed to fit the pistons with which they are supplied (See Note 12).				
Piston Pins				
Clearance between—				
Pin and bushing.				
New limits	.0002-.0008"	.0002-.0008"	.0002-.0008"	.0002-.0008"
Worn limits	.0015"	.0015"	.0015"	.0015"
Diameter—Standard	⅞"	⅞"	⅞"	⅞"

ENGINE

Specifications—(Cont'd)

Subject and Remarks	37-50	37-60, 65 70, 75	37-85	37-90
Piston Rings				
Clearance between ring & sides of grooves in piston—				
New limits.				
Compression rings	.0015-.0028"	.0015-.0028"	.0015-.0028"	.0015-.0028"
Oil rings	.0013-.0026"	.0013-.0026"	.0013-.0026"	.0013-.0026"
Worn limits, not over	.004"	.004"	.004"	.004"
Gap between ends—				
New limits.				
Compression rings	.007-.012"	.007-.012"	.007-.012"	.007-.012"
Oil rings	.007-.015"	.007-.015"	.007"-.015"	.007-.015"
Worn limits, not over	.025"	.025"	.025"	.025"
Number of compression rings	2	2	3	3
Number of oil rings	2	2	1	1
Width of rings—				
Compression	1/8"	1/8"	3/32"	3/32"
Oil	5/32"	5/32"	5/32"	5/32"
Valve Mechanism				
Clearance between—				
Camslide and guide.				
New limits	.001-.0025"	.001-.0025"	.001-.0025"	.001-.0025"
Worn limits, not over	.005"	.005"	.005"	.005"
Camslide roller and pin.				
New limits			.0017-.003"	.0017-.003"
Worn limits, not over			.004"	.004"
Valves, Exhaust				
Clearance between—				
Stem and guide.				
New limits	.002-.0033"	.002-.0033"	.001-.0025"	.001-.0025"
Worn limit, not over	.005"	.005"	.005"	.005"
Stem and camslide (See Notes 20 to 23).	.030 Min.-.070	.030 Min.-.070	.040 Min.-.070	.040 Min.-.070
Head diameter—overall	1.626-1.636"	1.626-1.636"	1.384-1.390"	1.384-1.390"
Length—overall	5 33/64"	5 33/64"	6 9/64"	6 9/64"
Lift	.345"	.345"	.347"	.347"
Seat angle	45°	45°	45°	45°
Seat Width	5/64"	5/64"	5/64"	5/64"
Seat eccentricity, not over (Total indicator reading).	.002"	.002"	.002"	.002"
Stem diameter	.3405-.3415"	.3405-.3415"	.3392-.3397"	.3392-.3397"
Valves, Inlet				
Clearance between—				
Stem and guide				
New limits	.001-.0023"	.001-.0023"	.001-.0015"	.001-.0015"
Worn limit, not over	.006"	.006"	.006"	.006"
Stem and camslide (See Notes 20 to 23)	.030 Min.-.070"	.030 Min.-.070"	.040 Min.-.070"	.040 Min.-.070"
Head diameter—overall	1.876-.1886"	1.876-1.886"	1.509-1.515"	1.509-1.515"
Length—overall	5 33/64"	5 33/64"	6 9/64"	6 9/64"
Lift	.335"	.335"	.347"	.347"
Seat Angle	45°	45°	45°	45°
Seat Width	5/64"	5/64"	5/64"	5/64"
Stem diameter	.3415-.3425"	.3415-.3425"	.3392-.3397"	.3392-.3397"
Valve Springs				
Free length—				
Inner valve spring			1.961"	1.961"
Outer valve spring	2.210"	2.210"	2.215-2.235"	2.215-2.235"
Pressure in pounds—				
Inner spring compressed to 1 3/4" (Valve closed)			19.5	19.5
Inner spring compressed to 1 7/16" (Valve open)			51.5	51.5
Pressure in pounds—				
Outer spring compressed to 1 15/16" (Valve closed)	66	66	50	50
Outer spring compressed to 1 9/16" (Valve open)	145	145	115 5	115.5
Spring must not show any set when compressed with coils touching.				
Valve Timing				
Intake opens—on top dead center	T. D. C.	T. D. C	T. D. C.	T. D. C.
Intake closes—after bottom center	42° A. B. C.	42° A. B. C.	44° A. B. C.	44° A. B. C.
Exhaust opens—before bottom center	52° B. B. C.	52° B. B. C.	39° B. B. C.	39° B. B. C.
Exhaust closes—after top center	10° A. T. C.	10° A. T. C.	5° A. T. C.	5° A. T. C.

ENGINE

Specifications—(Cont'd)

Subject and Remarks	37-50	37-60, 65 70, 75	37-85	37-90
Cooling				
Fan				
Belt—				
Length—center to center	11½"	11½"	13¾"	14"
Width	1 11/64"	1 11/64"	7/8"	7/8"
Type	34° Vee	34° Vee	34° Vee	34° Vee
Blades—				
Pitch at tip of blade (spiral blades)	2⅛"	2⅛"	2⅛"	1 15/16"
Number used	6	6	5	6
Diameter	18"	18"	18¾"	20¾"
Ratio of fan R. P. M. to engine R. P. M.	.95-1	.95-1	.92-1	.9-1
Hose Connections				
Cylinder block to radiator (top), 2 used				
Diameter, inside	1¼"	1¼"	1¼"	1¼"
Length	10¾"	10¾"	7⅝"	9⅛"
Radiator to water pump—				
Diameter, inside	2"	2"	1¾"	1¾"
Length	7"	7"	4"	4"
Radiator (See Page 165)				
Water Pump				
Clearance between—				
Impeller and pump body.				
New limits	.055-.070"	.050-.070"	.070-.085"	.070-.085"
Worn limit, not over	.080"	.080"	.095"	.095"
Pump shaft and bushings				
New limits	.001-.0025"	.001-.0025"	.001-.003"	.001-.003"
Worn limit, not over	.005"	.005"	.005"	.005"
Rear				
New Limits	.001-.0025"	.001-.0025"	.001-.0025"	.001-.0025"
Worn limit, not over	.005"	.005"	.005"	.005"
End play in pump shaft				
New limits			.0065-.025"	.0065-.025"
Worn limit, not over			.050"	.050"
Packing spring				
Free length	1¼"	1¼"	1¾"	1¾"
Pressure in lbs. compressed to ½"	2½-3 lbs.	2½-3 lbs.		
Pressure in lbs. compressed to 1⅜"			2-2½ lbs.	2-2½ lbs.
Springs must show no set when compressed with coils touching.				
Ignition				
Coil				
Delco-Remy type number	539-C	539-C	553-E	553-E
Distributor				
Delco-Remy type number	665-G	665-G	667-C	4118
Angle between contact arms			22½°	22½°
Contact point gap	.0125-.0175"	.0125-.0175"	.018-.024"	.014-.018"
Firing order				
Note: Cylinders are numbered from the front. The left front cylinder is No. 1 on all 37-series engines.				
Radial (side) play in distributor shaft ball bearing, not over			.002"	.002"
Spark advance (degrees on flywheel)				
Manual advance on distributor	20°	20°	20°	20°
Automatic (Max.)	22°	22°	38°	34°
Vacuum advance	None	None	None	None
Tension of contact arm spring in ounces	17-21	17-21	17-21	17-21
Timing mark (IG1A) ahead of center	5°	5°	10°	4°
Spark Plugs				
A. C. type number (Blue Top)	Type 45	Type 45	Type 84	Type 84
Gap	.025-.027"	.025-.028"	.025-.027"	.025-.027"
Thread	Metric 14 mm.	Metric 14 mm.	Metric 18 mm.	Metric 18 mm.
Ignition Switch				
Delco-Remy type number,	431-L	435-K, 435-H	435-J	431-F

ENGINE

Specifications—(Cont'd)

Subject and Remarks	37-50	37-60, 65 70, 75	37-85	37-90
Carburetion				
Air cleaner and intake silencer, make	A. C.	A. C.	A. C.	A. C.
Clean every 2000 miles.				
Feed—				
(Mechanical pump)	A. C.	A. C.	A. C.	A. C.
Carburetor—				
Float level setting	5/8" Stromberg	5/8"	13/16-15/16"	13/16-15/16"
Fuel level below top surface of bowl.	13/64 Carter			
Make	Stromberg	Stromberg	Det. Lub.	Det. Lub.
Model	AA-25	AA-25	51	51
Size	1 1/4"	1 1/4"	1 1/2"	1 1/2"
Make	Carter			
Model	WDO-3745			
Size	1"			

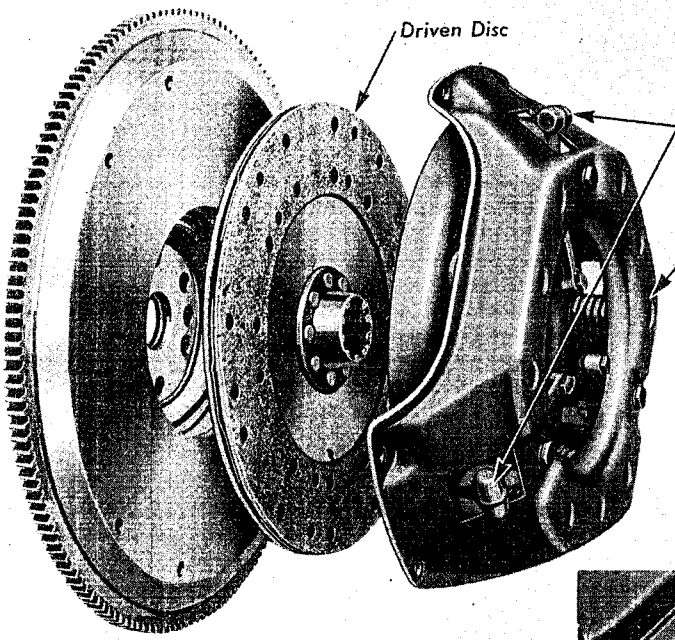


Fig. 1 Exploded View of Clutch Typical of all Series (Except 37-90)

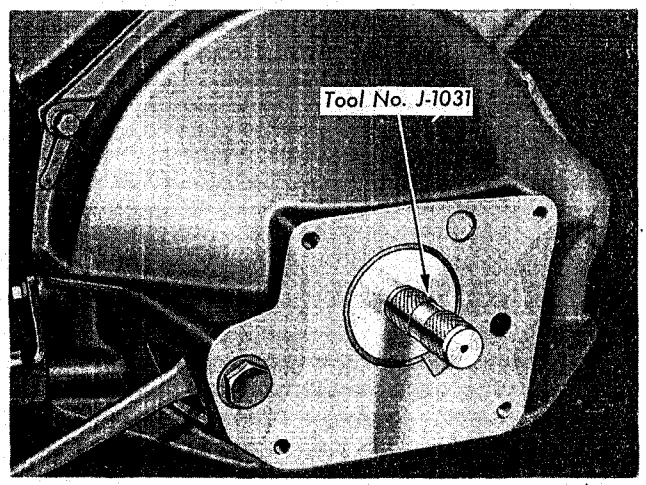


Fig. 2 Aligning Clutch Driven Disc Series 37-50, 60, 65, 70, 75, 85

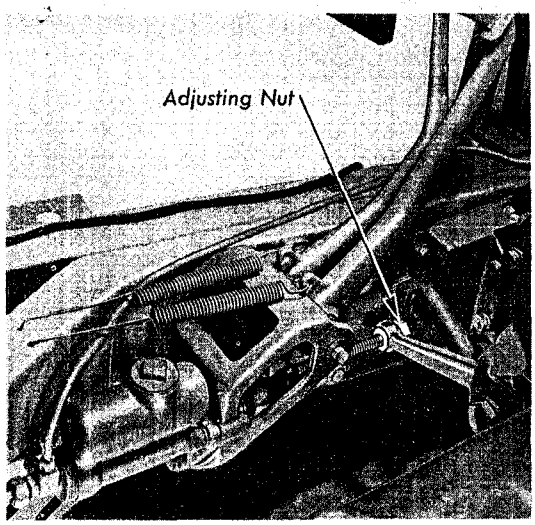


Fig. 3 Clutch Pedal Adjustment, Series 37-85 Typical of 37-50, 60, 65, 70, 75

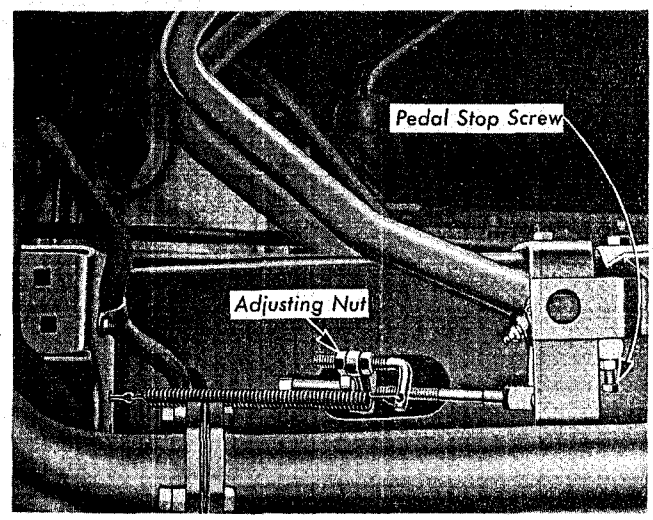


Fig. 4 Clutch Pedal Adjustment Series 37-90

Plate 46. Clutch and Pedal Connections

CLUTCH

General Description

The clutches used on series 37-50, 60, 65, 70, 75 and 85 cars are all similar in design although the size of the driven disc varies according to the particular requirements of the car in which they are used. The sizes are given in the Specification Table, page 116.

These clutches are of the semi-centrifugal, single dry plate, type. Coil spring vibration dampeners are used in the driven discs on series 37-50, 60, 65, 70 and 75 clutches. Small centrifugal weights are cast integral with the clutch release levers to provide increased pedal pressure as the engine speed increases, thus giving low pedal pressure at low engine speeds and a minimum of clutch slippage at high engine speeds.

An exploded view of this type of clutch is shown in Plate 46, Fig. 1.

The clutch used on series 37-90 Cadillac V-16 cars is of the dry disc type, but of a different design than the clutches used on the other 37-series cars. This clutch has three driving plates and two driven discs as shown in the illustration, Plate 47, Fig. 5. The center driving plate carries four driving studs which extend through both the front and rear plates. The rear plate is a part of the spring pressure plate assembly which also includes the release mechanism. A four point contact is made with the driving plate, and a double-lever release mechanism is used to insure uniform engagement of the clutch over the entire surface of the facings.

The method of mounting the clutch on the flywheel is as follows: Series 37-50, 60, 65, 70, 75 and 85 clutches are piloted on screws having close fitting shoulders extending into counterbores in the flywheel. Series 37-90 clutches have the center plate piloted by four bosses.

Service Information

1. Clutch Pedal Adjustment

The free travel of the clutch pedal on all 37-series cars should be maintained at from 7/8 to 1 1/8 inches. The procedure for making these adjustments is shown in Plate 46.

2. Lubrication of Clutch Release Bearing and Sleeve

The clutch release bearing on series 37-50, 60, 65, 70 and 75 cars is a permanently sealed ball bearing which does not require lubrication in service.

In case a squeak should develop at the clutch release bearing, however, both the bearing and the sleeve may be lubricated by removing the lower part of the flywheel housing, taking out the lubrication plug in the clutch release bearing sleeve, installing a lubrication fitting and applying wheel bearing grease to the assembly.

Note: Rotate bearing on sleeve when performing this operation, and always reinstall lubrication plug after completing the job.

The construction of the clutch release bearing and sleeve on series 37-85 cars is similar to that of the V-8 cars, excepting that an alemite fitting is used in the clutch release bearing sleeve instead of a plug. Also, the plug is reached through a breather cover at the top of the bell housing instead of through a bottom cover as on the V-8 cars.

The clutch release bearing on series 37-90 Cadillac V-16 cars, is lubricated by turning down the grease cup on the end of the lubrication extension on the right hand side of the clutch housing. This cup should be turned down and refilled with wheel bearing grease every 6,000 miles.

3. Removal of Clutch from Car

Series 37-50, 60, 65, 70, 75 and 85—

The procedure for removing the clutch on the 37-series V-8 and V-12 cars is as follows:

1. Disconnect the front universal joint and remove the transmission as explained in Note 10, Page 125.

2. Remove the clutch housing pan.

Note: This step is unnecessary on series 37-85 Cadillac V-12 cars.

3. Mark the flywheel and clutch pressure plate assembly so that the parts can be reassembled in the same position on the flywheel and thus retain proper balance.

4. Loosen the six retaining screws that hold the clutch on the flywheel, a turn or two at a time, until the spring pressure is released. (This should be done carefully to prevent springing the flanged edge of the cover plate).

5. Remove the six retaining screws, the clutch assembly, and the driven disc from the flywheel.

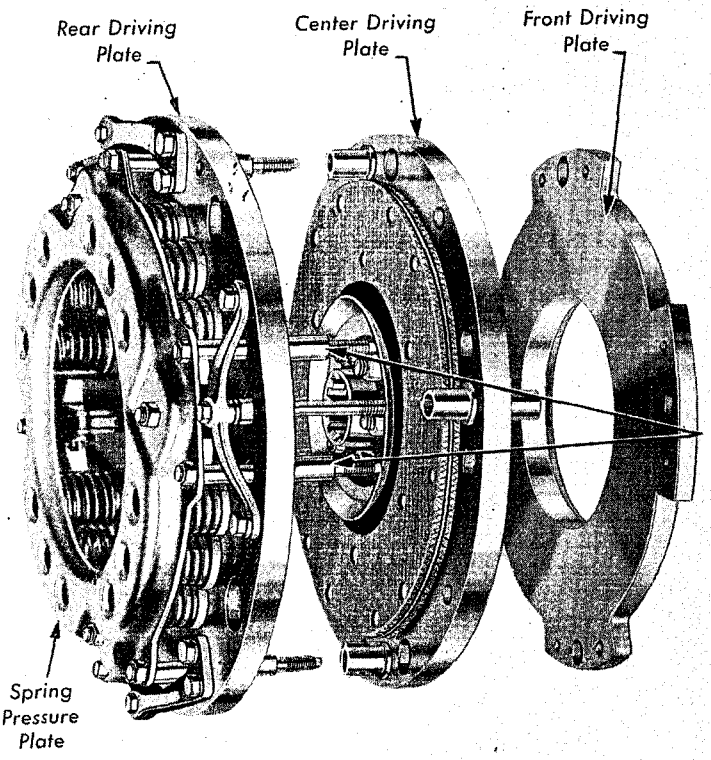


Fig. 5 Exploded View of Clutch

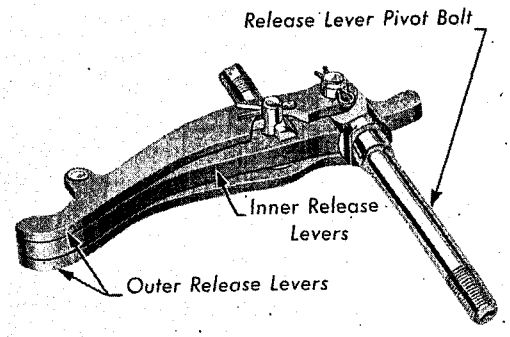


Fig. 6 Clutch Release Lever Assembly

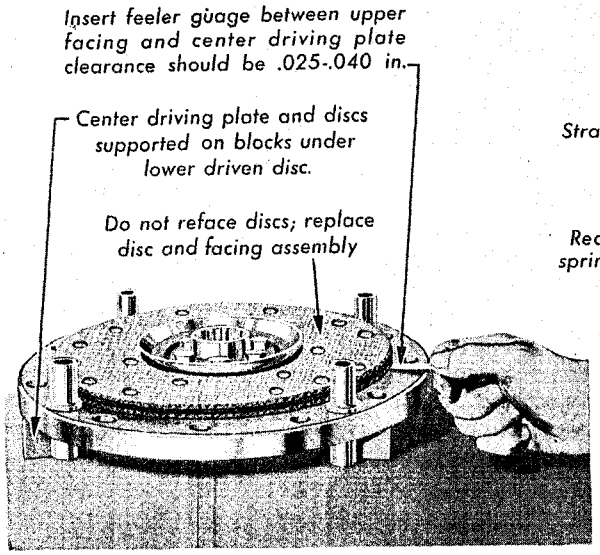


Fig. 7 Measuring Clearance Between Clutch Facing and Center Driving Plate

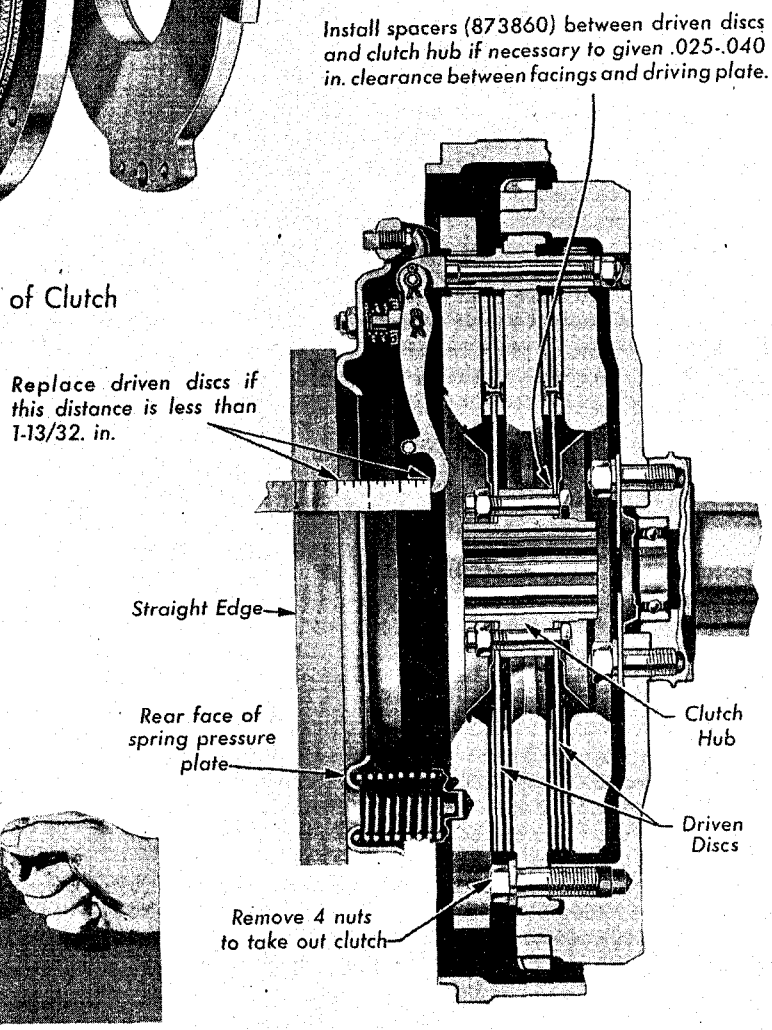


Fig. 8 Measuring Driven Disc Wear

Plate 47. Clutch Adjustments—Series 37-90

Series 37-90—

The procedure for removing the clutch on the 37-series Cadillac V-16 is as follows:

1. Disconnect the front and rear universal joints and remove the transmission as explained in Note 10, Page 125.

2. Remove the four retaining nuts that hold the clutch on the flywheel.

3. Remove clutch assembly from flywheel.

4. Installing Clutch in Car

The clutch is installed in the reverse order of its removal as explained in Note 3.

When installing the clutch on series 37-50, 60, 65, 70, 75 and 85 cars, it is important to locate the clutch in the correct position according to the marking made on the flywheel and pressure plate assembly. On these cars, it is also important to install the driven disc with the side on which the cushion springs project toward the transmission. The disc is also marked "FLYWHEEL SIDE" to indicate its correct position on the flywheel.

Always inspect the clutch disc facings carefully before installing a clutch and replace them if they are badly worn, glazed, oil soaked, or otherwise in unsatisfactory condition for further use.

Be sure also to line up the clutch driven disc with the pilot bearing using aligning arbor, Tool No. J-1031, before tightening the clutch retaining screws. Tighten the retaining screws securely before removing tool. On series 37-85 cars use this same tool to align the flywheel housing after installation of the clutch on the flywheel in order to secure proper alignment between the clutch hub and the transmission clutch connection shaft.

Note: On Series 37-90 cars, the entire clutch assembly comes off as a complete unit and alignment of the driven discs is not disturbed except when the clutch assembly itself is disassembled.

If a new clutch disc or transmission is installed, movement between the splines in the hub of the clutch disc and clutch connection shaft must be free to prevent any spinning action in the clutch. Lubriplate or graphite applied to the splines will aid in the proper assembly of these units.

After the transmission and floor boards have been installed, always check the clutch pedal free play, explained in Note 1, as a final check on the completed job.

Caution

Under no circumstances allow the transmission to hang in the clutch assembly when removing or installing the transmission as this would bend or otherwise damage the driven disc.

Do not put oil or kerosene in the clutch.

Keep the clutch facings dry and free from oil.

5. Disassembly of Clutch Pressure Plate Assembly

The following is a procedure for disassembling the clutch pressure plate assembly of all 37-series cars, except the 37-90, V-16, which is serviced in the field in complete assemblies only.

1. Place the pressure plate assembly on an arbor press with a block under the spring pressure plate, so arranged that the cover is left free to move down.

2. Place a block or bar across the top of the cover, resting it on the spring bosses, and place the assembly under compression.

3. Remove the retaining screws which hold the clutch release levers in place.

4. Slowly release the pressure from the press and remove the spring cover.

5. Remove the springs and the clutch release levers by removing the clutch release lever pivot pins and disassembling the yokes and rollers.

6. Reassembly of Clutch Pressure Plate Assembly

1. Place pressure plate in arbor press and set the clutch springs on it in a vertical position, seating them on the small bosses.

Note: Inspect the springs carefully and replace them in complete sets if they show signs of having been overheated. If the springs have been overheated, they will show a pronounced blue color, indicating the temper has been drawn, or else the paint will be burned off the springs. If the heating has continued long enough, the springs will have a dark gray color, indicating that the temper has been entirely removed from them.

2. Reinstall the clutch release levers in the reverse order of removal.

3. Lay the cover on top of the assembled parts, taking care the clutch levers are in position and that the tops of the pressure plate springs are properly seated under the seats in the cover.

4. Lay a bar across the cover and slowly compress the assembly, making sure that the pressure plate lugs are guided through the proper holes in the cover.

5. Screw the adjusting nuts down flush with the top of the bolts.

6. Release and apply pressure on the assembly several times so that all moving parts will settle into their working position.

7. Remove pressure plate assembly from the press and adjust clutch release levers as explained in Note 7.

7. Adjustment of Clutch Release Levers

The only accurate method to adjust the clutch release levers when required on 37-series V-8 and V-12 cars, is by the use of a clutch lever adjusting disc, Tool No. J-685.

The procedure for adjusting the clutch release levers is as follows:

1. Place adjusting gauge in the flywheel in the position normally occupied by the driven disc.

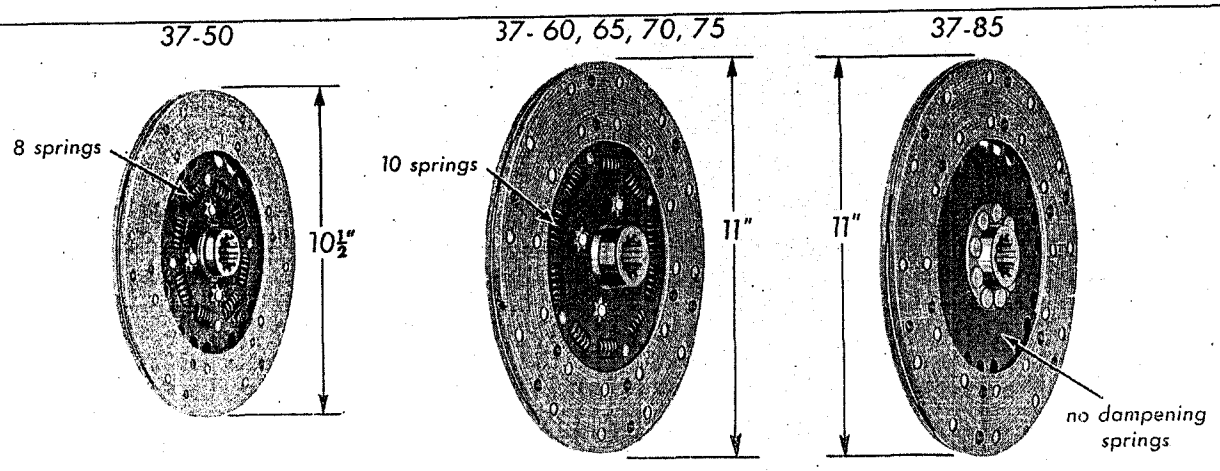


Fig. 9 Clutch Driven Disc Identification

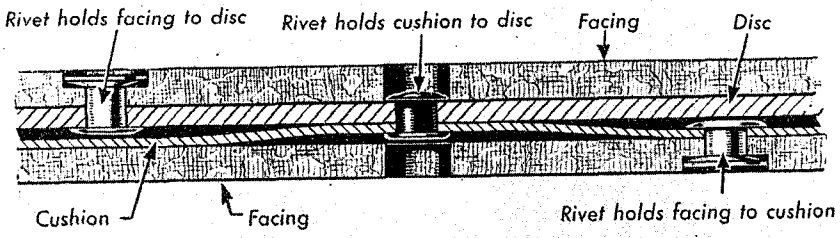
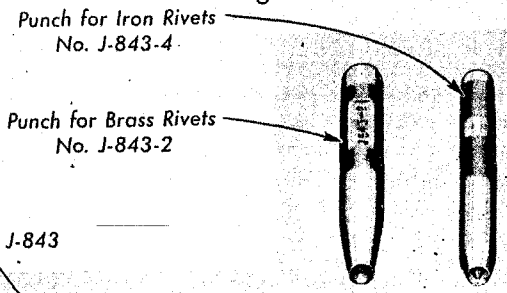


Fig. 10 Clutch Disc Section



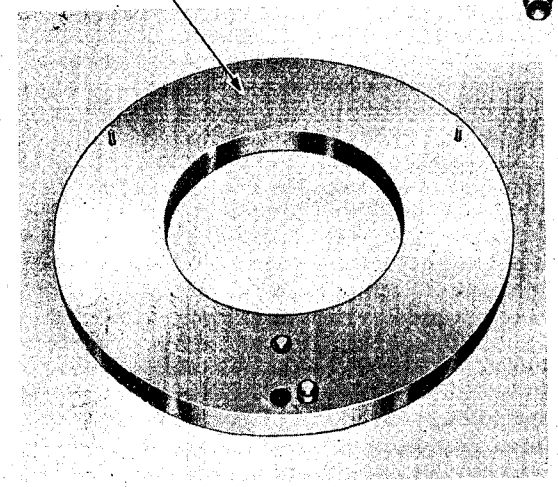


Fig. 11 Clutch Disc Riveting Tool

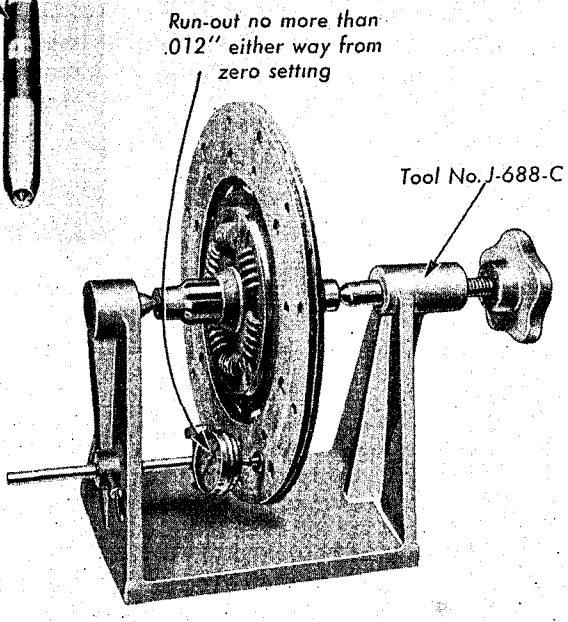


Fig. 12 Checking Clutch Disc Run-out

Plate 48. Clutch Disc Service

2. Mount pressure plate assembly on the flywheel, turning the holding screws a turn or two at a time so as not to spring the cover.

Note: Be sure to center gauge plate properly.

3. Lay a short straight edge (approximately 3 inches long) across center boss of gauge as a guide for positioning clutch levers.

4. Turn clutch release lever adjusting nuts until each lever has been adjusted to the same height. The setting should not vary over .005 inch between one lever and the other.

5. After adjustment has been completed, lock the adjusting nuts securely.

6. Remove gauge and reinstall clutch with driven disc.

8. Refacing Clutch Driven Disc

Clutch facings are available from the factory for installation on clutch driven discs with the following special tools: Riveting plate, Tool No. J-843 with Riveting Punches, and Clutch Driven Plate Indicating Fixture, Tool No. J-688-C.

The procedure for refacing is as follows:

1. Remove clutch assembly and clutch driven disc from car as explained in Note 3.

2. Disassemble the worn facings from the disc by center punching the iron rivets on the rivet side, spot drilling with a $\frac{3}{16}$-inch drill, and punching out the rivets.

Note: This will remove the facing with cushion segment attached which may be discarded.

3. Remove the other facing by punching out the brass rivets, and discard the facing.

4. Place the new plain facing on the flywheel side of the disc and insert the brass tubular rivets, two at a time, in the countersunk holes with the head on the facing side. Then locate the disc on the riveting plate, Tool No. J-843, with the two pins through the rivet holes to line up the facing and the heads of two rivets resting on the anvils. Rivet securely, using Tool No. J-843-2. Repeat this operation until all of the brass rivets are in place.

Note: The rivets should not extend through the disc more than $\frac{1}{32}$" after riveting.

5. Next attach the facing with the cushion segment to the disc with the soft iron rivets by placing a rivet on each anvil and riveting the cushion segment to the disc with the facing side down. Install two rivets at a time, turning the unit 60° on the plate for each installation until all the rivets are in place.

Note: Use Tool No. J-843-4 to install these rivets, taking proper care to line-up the holes properly in the segment plate and driven disc before riveting. The disc should be held down tightly and the rivets hammered down carefully so that the disc will not be distorted.

6. After the installation of the facings has been completed, the clutch driven disc and facings should be checked with Clutch Driven Plate Indicating Fixture, Tool No. J-688-C to make sure that the run out of the assembly does not exceed .012 inch either way from the zero setting of the indicator when the facings are revolved in the fixture. (See Plate 48, Fig. 12).

Note: This operation is important because excessive run-out will result in spinning clutch.

9. Replacement of Clutch Discs Series 37-90—

It is not necessary, after the transmission is removed, to remove the 37-90 clutch to determine whether or not new facings are required. The thickness of the clutch facings can be determined by measuring the distance from the ends of the clutch levers to the rear of the pressure plate, as shown in Plate 47, Fig. 8. If this distance is less than $1\frac{13}{32}$-inch, both driven discs should be replaced.

Removal of the discs is accomplished, after taking out the clutch, by disassembling the two driven discs from the clutch pressure plate assembly (See Fig. 5) and then removing the discs from the hub:

Note: Do not attempt to disassemble the pressure plate assembly. Special tools are necessary for its reassembly and it should be serviced only as a unit.

Two complete discs with facings should be replaced, and no attempt made to reface 37-90 discs. When reinstalled, there should be .025 to .040 inch clearance between the center plate and the facings, measured as shown in Fig. 7. Use spacer 873860 if necessary to secure the correct clearance.

10. Lubrication of Clutch Connection Pilot Bearing

Whenever the transmission and clutch assembly on any Cadillac or La Salle car is removed for any reason, it is important that the clutch connection pilot bearing should be inspected to make sure that it is in good condition and adequately lubricated.

This bearing should always be lubricated lightly with wheel bearing grease, if removed from the car at any time, but too much lubricant should not be used because of the possibility of grease reaching the clutch plates.

Insufficient lubricant may result in seizing and turning in the race which would cause rapid wear on the shaft and on the gear teeth in consequence of the whip.

11. Removal of Locking Pins When Installing New Clutches

Clutches, as furnished by the Parts Division, are provided with three locking pins or blocks, one at each clutch release lever.

When the clutch is installed and the cover plate tightened in position, these pins or blocks are released. ***It is extremely important that these pins be removed;*** otherwise, they will drop into the clutch housing and may cause considerable damage when the car is put into operation.

12. Removal of Transmission

Extreme care must be taken when removing any transmission in connection with clutch or other work, to support the rear end and hold the transmission in perfect alignment with the clutch until the clutch connection shaft has been pulled all the way out of the clutch hub.

If the rear end of the transmission is allowed to drop down or is raised too high while the clutch connection shaft is still in the clutch hub, the clutch driven disc will be sprung out of shape.

Specifications

Subject and Remarks	37-50	37-60, 65, 70, 75	37-85	37-90
Clearance between—				
Hub and splines on clutch connection shaft				
New Limits	.0005-.002"	.0005-.002"	.0005-.002"	.0005-.002"
Worn limit, not over	.005"	.005"	.005"	.005"
Disc Facings—				
Area—total square inches	106.8"	123.7"	123.7"	123.7"
Diameter inside	6½"	6½"	6½"	6½"
Diameter outside	10½"	11"	11"	11"
Number used	2	2	2	2
Thickness	.135-.139"	.135-.139"	.135-.139"	.135-.145"
Material	Woven	Woven	Woven	Woven
Driven disc with facings—				
Number used	1	1	1	2
Number of dampener springs required	8	10	None	None
Thickness (overall)				
New limit	.350-.360"	.350-.360"	.350-.360"	.325-.335"
Worn limit, not under	.275"	.275"	.275"	.275"
Pedal (clutch) free play	⅞-1⅛"	⅞-1⅛"	⅞-1⅛"	⅞-1⅛"
Pressure springs—				
Number used	9	9	9	12
Color	Yellow	Yellow	Yellow	Brown
Free length—minimum	2 5/16"	2 5/16"	2 5/16"	2⅞"
Compression pressure compressed to 1 11/16 in.	145-150 lbs.			
Compression pressure compressed to 1 9/16 in.		145-150 lbs.	145-150 lbs.	90-96 lbs. at 1 3/32"
Release Bearing—				
End play, not over	.008-.010"	.008-.010"	.008-.010"	.008-.010"
Type	Ball	Ball	Ball	Ball
Spring retracting for clutch pedal—				
Free length inside loops	9¾"	9¾" (37-60) 8 5/16" (37-65, 70, 75)	7 11/16"	8 5/16"
Type	Dry Plate	Dry Plate	Dry Plate	Dry Plate

TRANSMISSION

General Description

Synchro-mesh transmissions of two different types are used on the 37-series cars. An inertia type transmission, as shown in Plate 49 is used on Series 37-50, 60, 65, 70, 75 and 85 cars. In this transmission, synchronizing drums are controlled by detent springs mounted on the high and intermediate speed coupling. A rocking yoke type transmission, as shown in Plate 50, is used on the 37-90, V-16.

The synchronizing mechanism in both types consists primarily of two cone-type friction clutches, one for second gear and one for high gear. Each clutch is comprised of a sliding bronze drum, a steel cone on the gear, and a sliding gear coupling.

Inertia Type Transmission

The most important features of construction in the inertia type transmission are as follows. The use of helical gears in all speeds. The location of the transmission cover at the bottom of the transmission case. The location of the shifter shafts at the side instead of the top of the transmission. The use of three large ball bearings and a small roller bearing at the front to support the main shaft. The use of needle roller bearings at the countershaft supports. The use of a pin type synchronizing unit. A cross section view of this transmission is shown in Plate 49.

The synchronizing drums in this transmission are controlled by flat springs mounted in slots in the sliding gear coupling, and the cam action of the pins connecting the high and the intermediate drums. When shifting gears, the drum is moved into contact with the cone and held there during the synchronizing period by the action of the pins compressing the springs. Further movement of the gear shift lever brings the sliding coupling into mesh internally with the transmission gear and completes the shift.

Rocking Yoke Type Transmission

The principal features of construction in the rocking yoke type transmission are shown in Plate 50. In this transmission helical gears are used in all forward speeds. The main shaft and transmission extension are supported by three large ball bearings and a small roller bearing at the front end of the shaft as a pilot bearing. The constant-mesh gears on the main shaft are supported by tapered roller bearings. The countershaft is supported at each end by large ball bearings.

The synchronizing drums in this transmission are operated by yokes pivoted on eccentrics which are fastened to adjusting quadrants on the outside of the transmission case. Moving these quadrants up or down shortens or lengthens the yoke travel. Movement of the yokes is controlled by cams machined on the shifter shaft. These cams engage the rollers of the two oil-controlled plungers in the yokes.

Propeller Shaft Extension

A propeller shaft extension housing is fitted to the rear of the transmission on all 37-series cars. This extension housing permits the use of a shorter propeller shaft, having less whip and requiring less clearance under the body. It also is used as the rear support for the power plant.

The V-16 is the only 37-series car using a transmission extension shaft, as this extension is integral with the main shaft on series 37-50, 60, 65, 70, 75 and 85 cars.

Service Information

1. Transmission Lubricant

It is important to use the right kind and amount of lubricant in the transmission at all times. The recommended lubricant for all season use in all 37-series Cadillac or LaSalle transmissions is S. A. E. 90 gear lubricant or S. A. E. 90 mild E. P. lubricant. This grade is preferable to the S. A. E. 160 formerly recommended for summer use, although S.A.E. 160 can be used the year around in warm climates.

Do Not Use Hypoid Lubricants in the Transmission.

The transmission lubricant level must be inspected every 3,000 miles and lubricant added as required. The transmission case must be drained, flushed, and refilled with fresh lubricant every 6,000 miles.

The capacities of 37-series transmissions are as follows:

Series 37-50, 60, 65, 70, 75 and 85—2½ pts.
Series 37-90 —4½ pts.

The transmission filler plug is on the right hand side on 37-series V-8 cars, and on the left hand side on V-12 and V-16 cars.

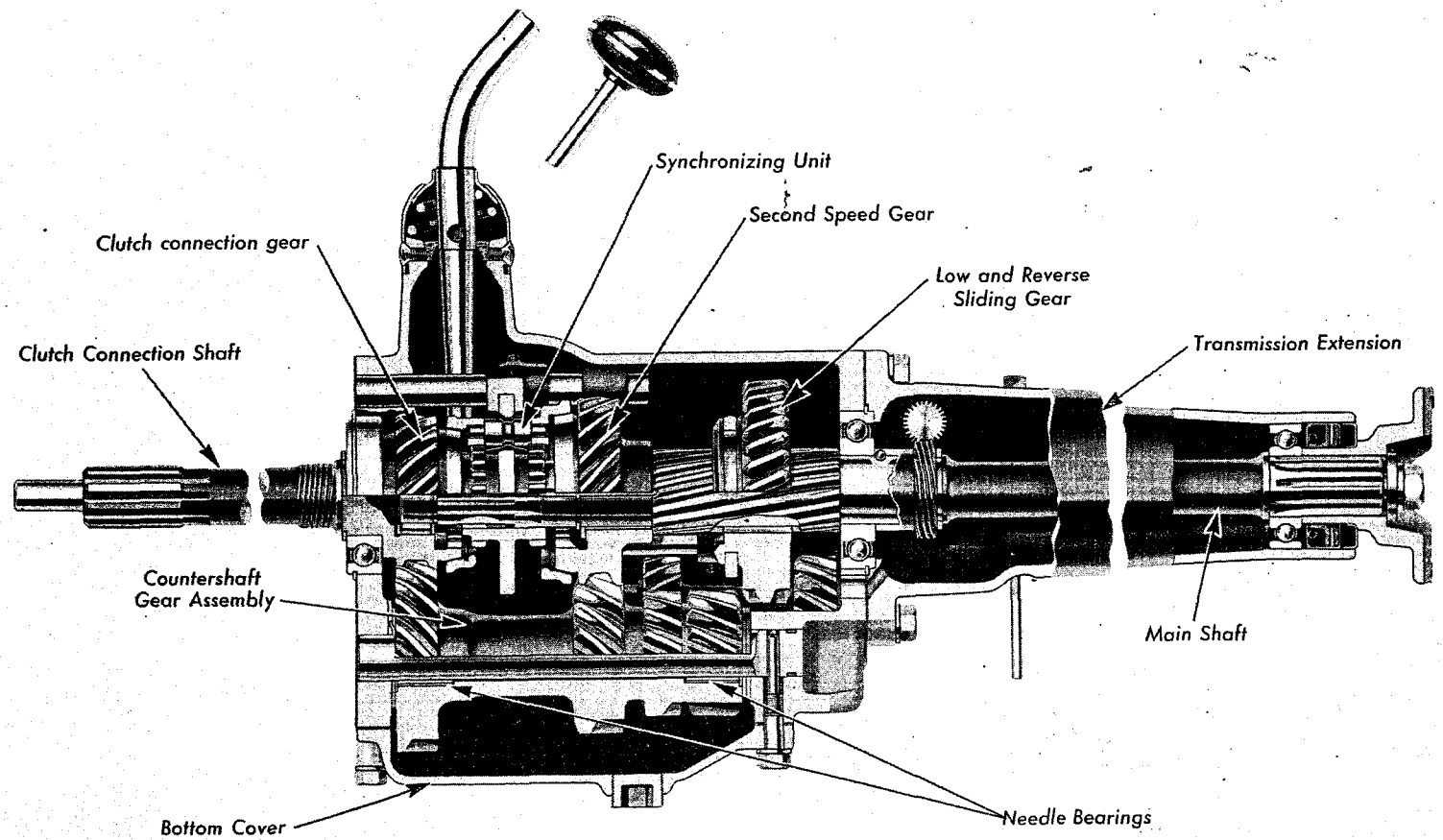


Plate 49. Transmission Cross Section—Series 37-50, 60, 65, 70, 75, 85

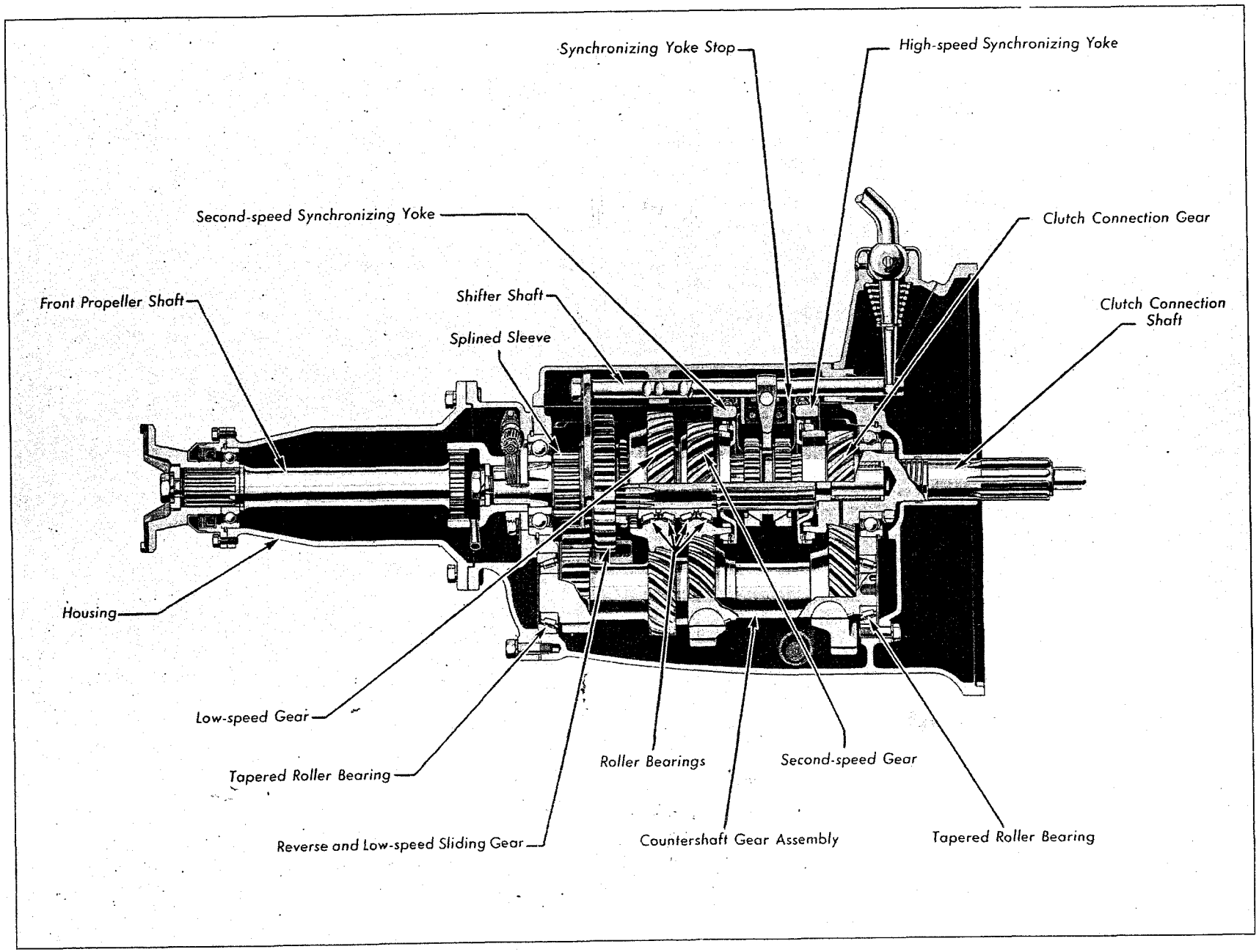


Plate 50. Transmission Cross Section—Series 37-90

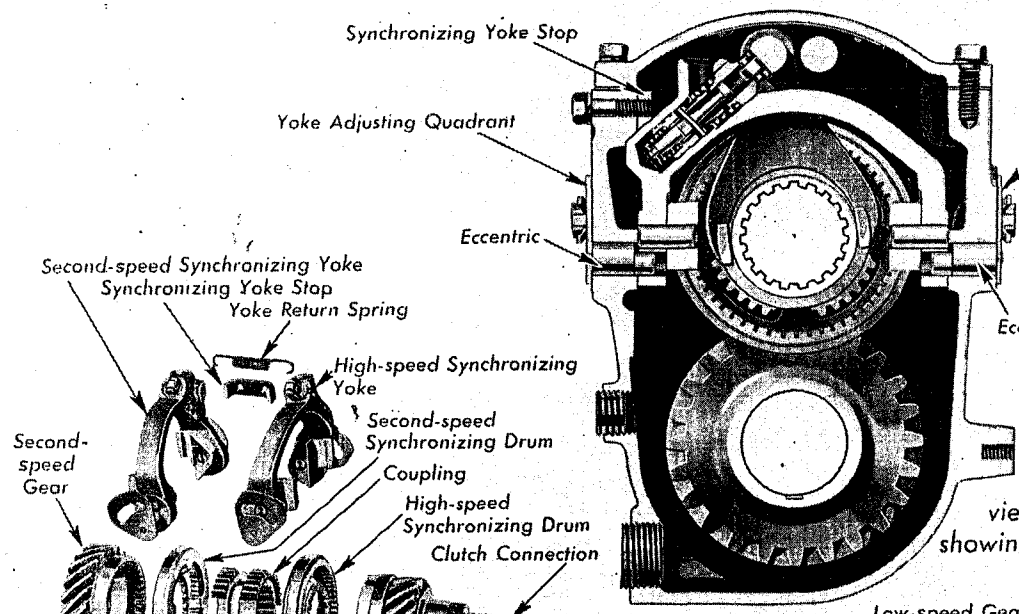


Fig. 1
Cross-sectional view of transmission showing yoke eccentrics

Fig. 2
Exploded View of Transmission Synchronizing Mechanism

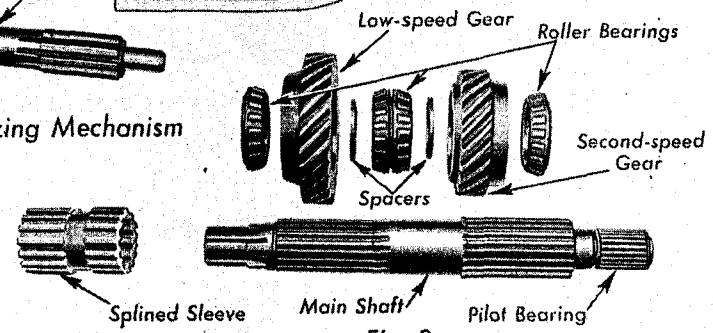


Fig. 3
The second-and low-speed gears run on tapered roller bearings

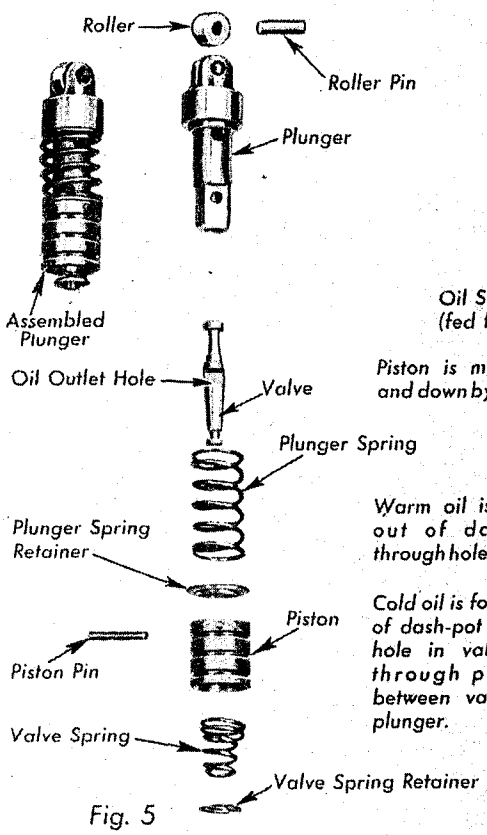


Fig. 5
Plunger Unit

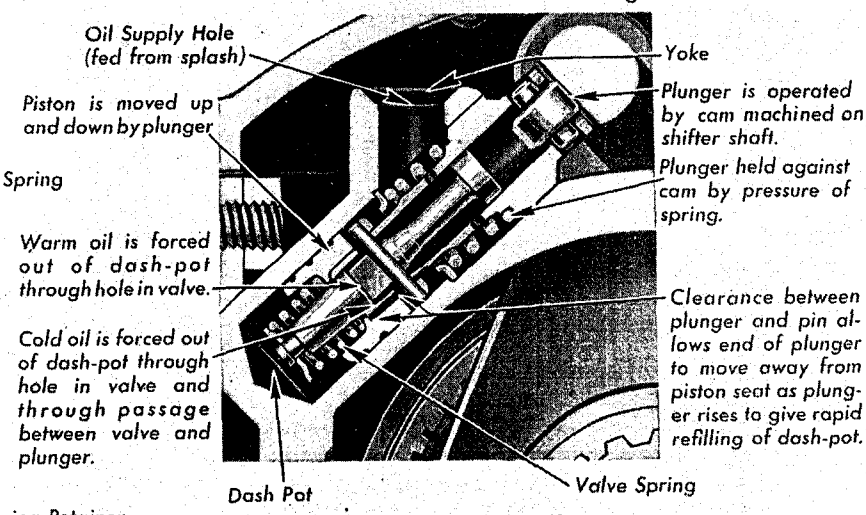


Fig. 4
Dash-pot Plunger in Normal Position

Plate 51. Transmission Synchronizing Mechanism—Series 37-90

2. Correction of Gear Clash

Gear clash when shifting into **low** is usually due to incomplete clutch disengagement or to the driver's failure to wait long enough for the gears to stop spinning before shifting after disengaging the clutch. This is not a transmission fault and can be corrected only by proper driving instruction.

Gear clash when shifting into **high** or **second** speed with series 37-50, 60, 65, 70, 75 and 85 transmissions is usually due to weak detent springs. This condition can be corrected by installing three new detent springs, part No. 1419424. These springs may be installed without disassembling the synchronizing unit.

Gear clash when shifting into **high** or **second** with series 37-90 transmissions is usually due to incorrect yoke travel. The remedy is to check the yoke travel and adjust to $\frac{3}{32}$-$\frac{5}{32}$ inch as outlined in Plate 52.

3. Transmission Slipping Out of Gear

Series 37-50, 60, 65, 70, 75 and 85

Cases of the transmission slipping out of high gear on series 37-50, 60, 65, 70, 75 and 85 cars may be due to the following conditions:

1. A misaligned or wrinkled gasket between the transmission and the clutch housing. The remedy is correct installation of a new gasket.

2. Improperly machined bosses on the high speed synchronizing drum, which may tilt the shifting flange and cause the sliding gear coupling to work out of mesh. The remedy is replacement of the synchronizing assembly.

Slipping out of second gear on these same series cars may be caused by:

1. A broken snap ring for the second speed gear. The remedy is to install a new snap ring, taking care to remove all pieces of the broken ring before making the installation.

2. Insufficient relief between the main shaft splines and the sliding gear coupling to provide proper and complete engagement with the transmission gears. The remedy is to replace the main shaft.

Series 37-90

Slipping out of high gear on series 37-90 cars may be due to:

1. Misalignment of the transmission, due to a variation in the crankcase bell housing. This can be corrected by refacing the bell housing as explained in note 14.

2. Transmission sticking on guide pins. Inspect the dowel pin holes in the transmission case to make certain that the pins do not contact with the transmission when in position but serve simply as guide pins when assembling. If the pins do bind, the holes in the transmission case should be enlarged.

Slipping out of second gear on series 37-90 is usually caused by incorrect adjustment of the bearings for the transmission gears.

Proper adjustment of the bearings for the low and intermediate transmission gears on series 37-90 cars is maintained by means of spacers on the transmission main shaft between the two tapered roller bearings for each gear. (See Plate 51, Fig. 3).

Any looseness that might develop at this point would have a tendency to cause slipping out of gear in low or intermediate gear.

Correction should be made by:

1. Making sure that the main shaft assembly retaining screw is securely tightened.

2. Making sure that the tapered roller bearings are in proper adjustment.

The low and intermediate gears should have a slight drag. If the bearings are loose, dress down both spacers between the bearings until a slight drag is felt on the gears. In case a spacer is unintentionally dressed down too much, a new spacer must be used, of the required thickness.

The dressing down operation may be performed by laying a sheet of emery paper on a piece of glass or on a surface plate and moving the spacer about on it in a circular motion. The thickness of the spacer should be gaged with a micrometer to make sure it is the same at all points.

4. Transmission Sticking in Second Gear—Series 37-50 to 85 incl.

Trouble caused by the transmission sticking in second gear is ordinarily due to the shifting flange catching on the ends of the synchronizing pins. The remedy is replacement of the complete synchronizing unit with a new one having the latest type synchronizing pins with chamfered ends as shown in Plate 54, Fig. 14.

5. Noise on Reversing—Series 37-50 to 85 incl.

A snapping noise coming from the transmission when a car is being reversed is due to loose splines in the universal joint yoke at the rear end of the main shaft.

This condition can be corrected, in many instances, by tightening the screw that holds the yoke in place, as this will often take up enough play to insure quiet operation. If this does not remedy the condition, it will be necessary to replace the yoke.

6. Shifter Lever Rattle—Series 37-50 to 85 incl.

A rattle in the transmission shifter lever is usually due to a weak or improperly installed shifter lever spring.

The remedy for this is to install a new spring in the position shown in Plate 54, Fig. 15. Use spring part No. 1420183, for all 37-series inertia type transmissions. Use pin, part No. 1420200, for series 37-50, 60 and 85 transmissions; and pin, part No. 1422110 for series 37-65, 70 and 75 transmissions.

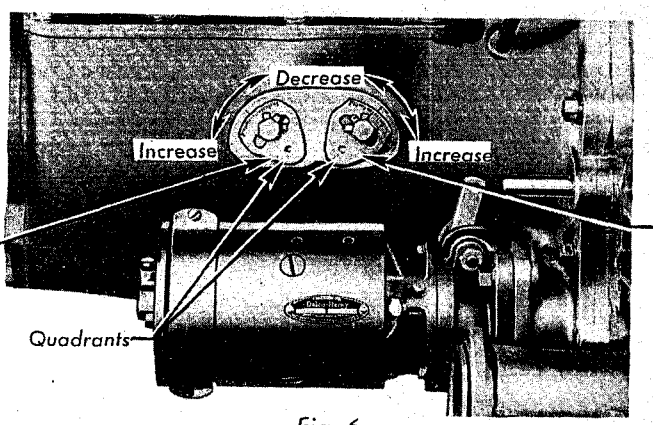
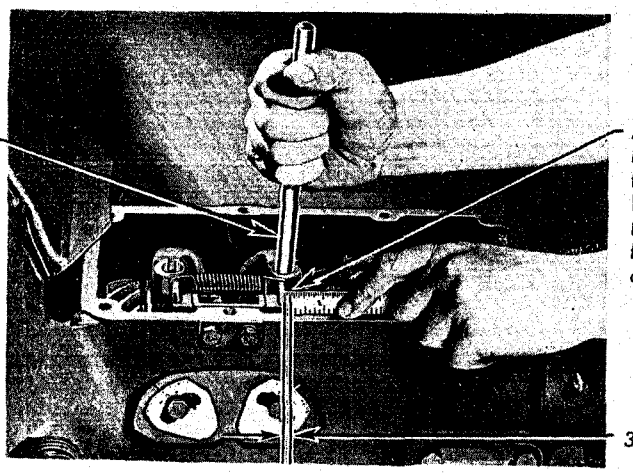


Fig. 6
Quadrants for adjusting yoke travel

To adjust yoke travel, move two quadrants for each yoke equal distances and locate them in same position to keep yoke pivots in proper alignment.

Use pry bar with shoulder to prevent burring edges of oil supply hole. Use just enough pressure to engage drum with cone.



Measure travel of yoke from neutral to extreme rear position to determine clearance between rear drum and cone. Repeat in opposite direction on front yoke for front drum and cone.

3/32—5/32 in. Travel.

Fig. 7
Measuring Yoke Travel

Remove transmission cover to check yoke travel. Adjust yoke travel by moving quadrants as shown in Fig. 6

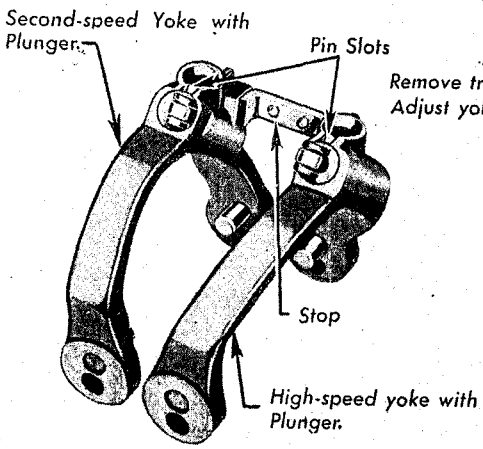


Fig. 8
Yoke Assembly

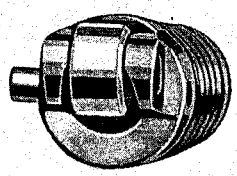


Fig. 9
Plunger Unit

Plate 52. Transmission Adjustments—Series 37-90

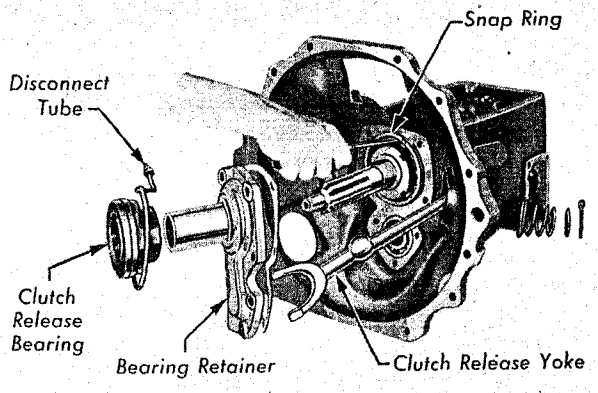
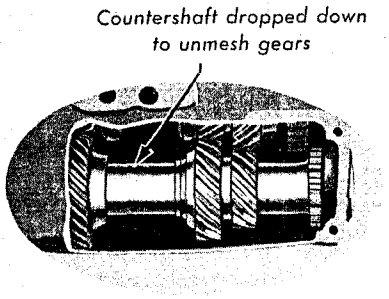


Fig. 10 Disassembly of Clutch Release Mechanism



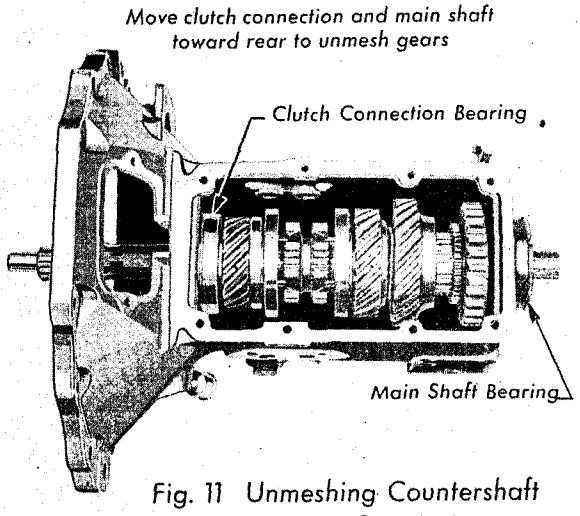


Fig. 11 Unmeshing Countershaft Gears

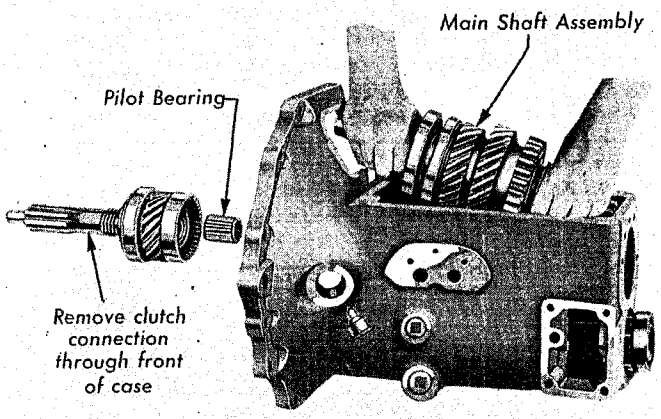


Fig. 12 Removing Main Shaft

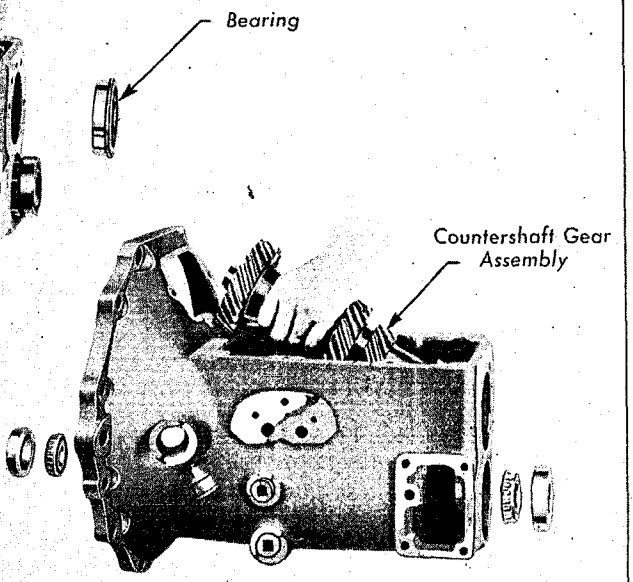


Fig. 13 Removing Countershaft

Plate 53. Transmission Disassembly—Series 37-90

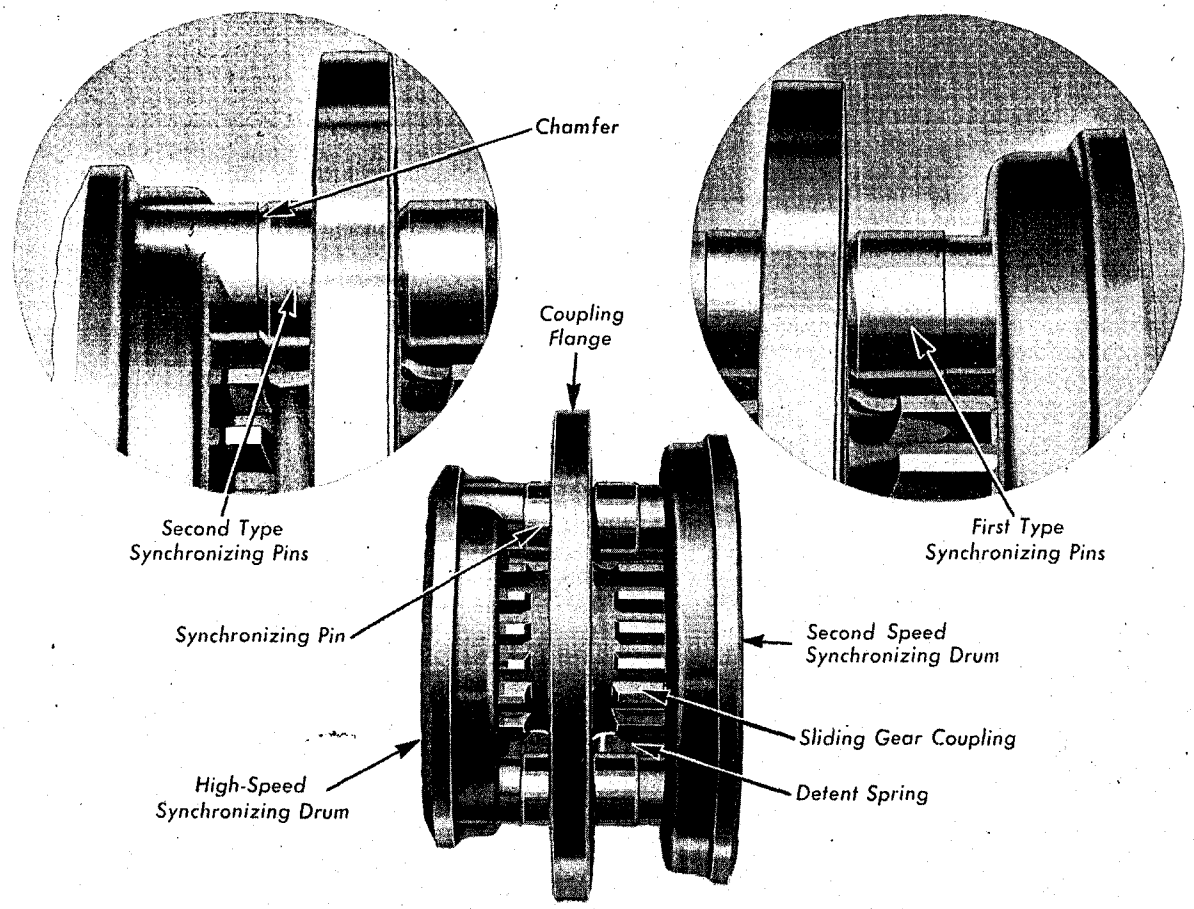


Fig. 14
Synchronizing Mechanism

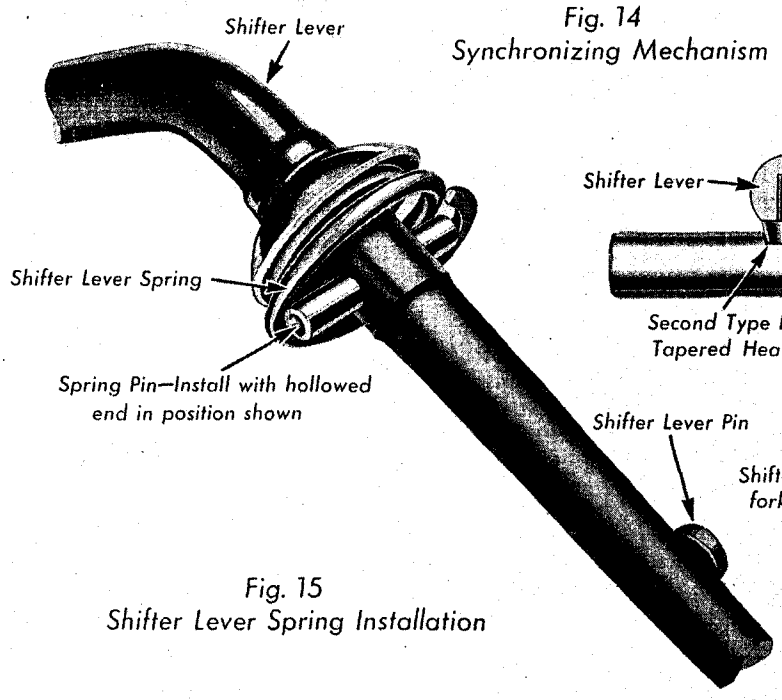


Fig. 15
Shifter Lever Spring Installation

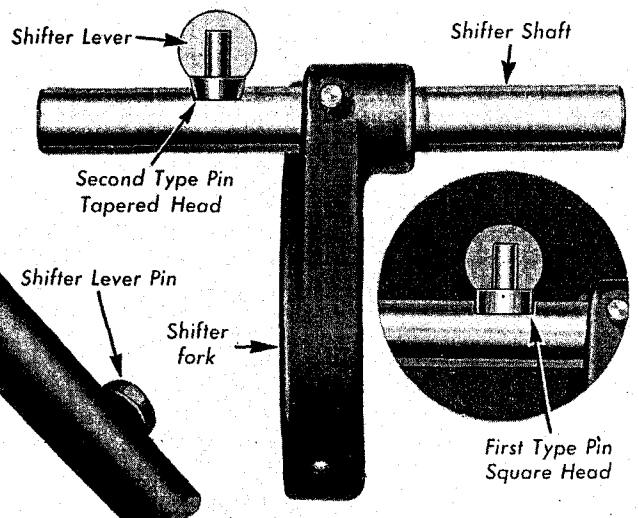


Fig. 16 Shifter Lever Pins

Plate 54. Transmission Service Operations—Series 37-50, 60, 65, 70, 75, 85

Note: Be sure to install pin 1422110 with the hollowed end under the spring coil as shown.

On the first series 37-65, 70 and 75 transmissions, a somewhat larger pin, was used, and this pin must always be used for replacement on these early shifter levers.

7. Tapered Shifter Lever Pin—Series 37-50 to 85 incl.

Two types of shifter lever pins as shown in Plate 54, Fig. 16 have been used in 37-series inertia type transmissions. The first type has a square head that fits into a square slot in the high and intermediate shifter shaft. The second type has a tapered head that fits a tapered slot.

All 37-series V-8 and V-12 replacement transmissions furnished by the Parts Division will have the second type high and intermediate shifter shaft. Whenever a replacement transmission is installed on a car having square head pins, it will therefore be necessary to change the pin in the shifter lever to the second type tapered pin, part number 1422051.

The high and intermediate shifter shaft and fork is furnished as a complete assembly, part No. 3502513, and in the event it is necessary to replace either one, the complete shifter shaft and fork assembly must be replaced.

8. Hard Shifting—Series 37-50 to 85 incl.

Hard shifting into low or reverse may be caused by:

1. The pin for the high and intermediate shifter shaft may not release completely from the slot.

2. The driver may not move the gear shift lever far enough to the left.

The difficulty can be corrected in either case by installation of the second type tapered pin, shaft, and fork, as explained in Note 7.

9. Noisy Speedometer Gear—Series 37-50 to 85 incl.

Gear noise from the general area of the transmission may be due to the speedometer drive gears. Dimensional changes have been made in the speedometer pinion and pinion shaft to remedy this condition. In instances of complaint, it is necessary to replace both the speedometer pinion and the pinion shaft, and it may also be necessary in some cases to change the speedometer driving gear on the main shaft. Second type parts only are furnished by the Parts Division under the following numbers:

		Part No.
Pinion Shaft	All Series	1419361
" , 19 tooth	Series 37-50	1421921
" , 18 "	" 37-60	1421922
" , 20 "	" 37-65, 70	1294543
" , 22 "	" 37-75, 85	553733
Driving Gear	" 37-50, 60, 65, 70, 75, 85	1420213

10. Removal of Transmission from Car—Series 37-50, 60, 65, 70, 75 & 85

1. Place car on blocks.

2. Remove floor boards.

3. Place jack under engine oil pan near drain plug, using a wooden block to prevent damage to oil pan. See Plate 55, Fig. 17.

4. Disconnect drive shaft at front universal joint.

5. Disconnect transmission extension at engine rear support.

6. On series 37-65, 70, 75 and 85, disconnect engine support stabilizer on right hand side of transmission by removing pin at forward end.

7. Disconnect brace for exhaust pipe from transmission case.

8. Remove cross member that carries engine rear support.

Note: Four bolts are used at each end on 37-50 and 60 cars; two at each end on series 37-65, 70, 75 and 85.

9. Disconnect the speedometer cable.

10. Loosen transmission cap screws and, while supporting the transmission at the rear end so that the clutch connection shaft can be kept in line in the clutch hub, slide the transmission back.

11. As soon as the transmission has been moved back enough to permit access to the drain hole for the clutch connection shaft bearing, plug this hole with a 1/4 inch cork to prevent loss of lubricant.

12. Remove transmission from car.

Series 37-90—

1. Disconnect front and rear universal joints and remove entire propeller shaft.

2. Remove front floor boards.

3. Remove clip holding brake vacuum booster line to transmission top.

4. Disconnect wire connections and remove starter.

5. Remove clutch connection from yoke.

6. Remove supporting frame cross member.

7. Remove the front propeller shaft and housing from transmission.

Note: Insert small cork in oil hole at rear of transmission case, to prevent loss of transmission lubricant while removing transmission from car.

8. Remove **all** bolts holding transmission to flywheel housing.

9. Remove the transmission by pulling it straight back until the clutch connection shaft is all the way out of the clutch hub. Pilots guide the transmission during its removal to prevent springing the clutch discs.

11. Installation of Transmission in Car

The procedure to be followed when installing a transmission in a 37-series Cadillac or LaSalle

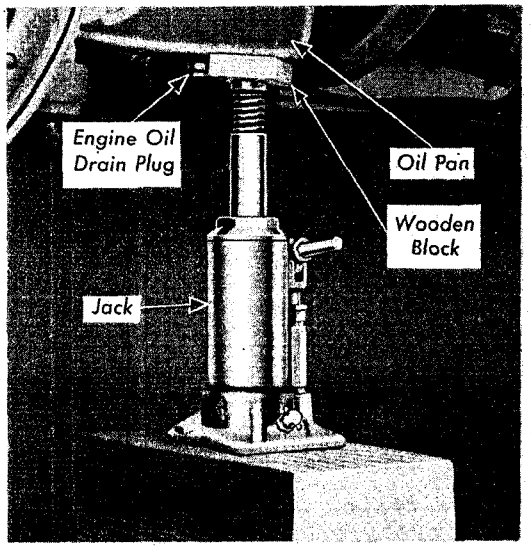
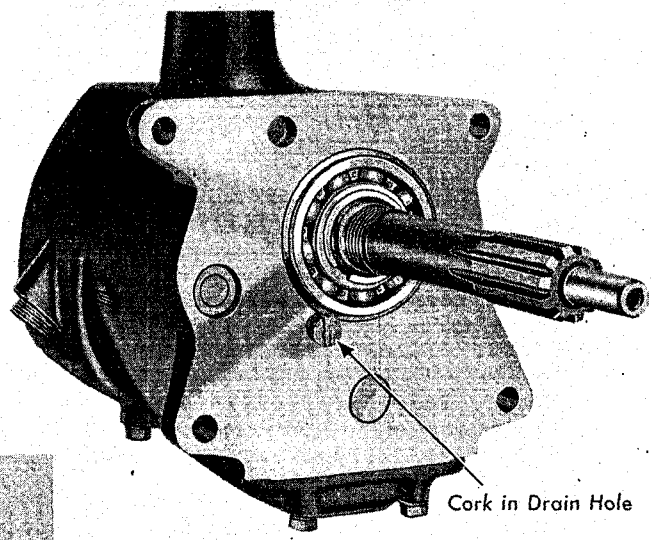


Fig. 17 Supporting Engine Before Transmission Removal

Fig. 18 Plugging Lubricant Drain Hole When Removing Transmission



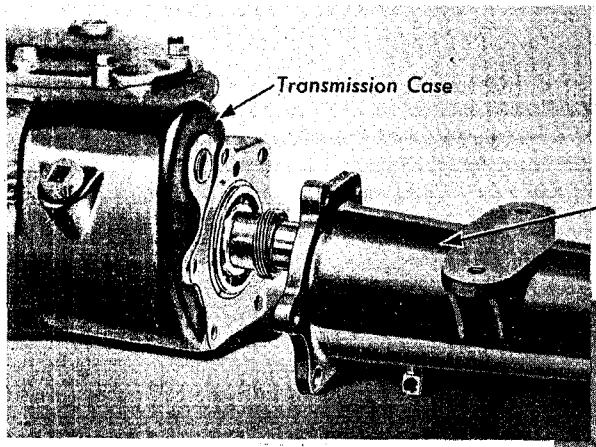


Fig. 19 Removing Transmission Extension

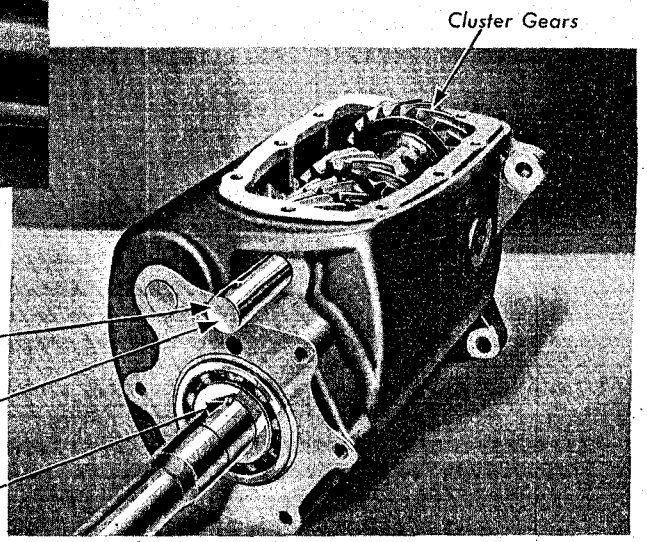


Fig. 20 Removing Countershaft and Cluster Gears

Plate 55. Transmission Disassembly—(I)—Series 37-50, 60, 65, 70, 75, 85

car is the reverse of the procedures given for removal of transmission from car in Note 10, with the following precautions:

Series 37-50, 60, 65, 70, 75 and 85

1. Shift transmission into reverse before attempting installation.

2. Remember to remove cork from drain hole for clutch connection bearing just before installation.

3. Support the transmission at the rear while installing, so that the clutch connection shaft will be kept in exact alignment with the clutch hub.

Series 37-90

When the front propeller shaft and housing is removed from the V-16 transmission, a cork should immediately be placed in the oil hole in the rear of the transmission to prevent loss of transmission lubricant as explained in Note 10. Be sure that this cork is removed when replacing the front propeller shaft and housing as failure to do this will prevent lubrication of the speedometer gears and the front propeller shaft bearing.

12. Disassembly of Transmission—Series 37-50, 60, 65, 70, 75 and 85

1. Drain lubricant.

2. Remove the two screws holding the shifter lever cap and lift out shifter lever.

3. Remove universal joint flange from rear end of main shaft and extension.

4. Remove cap screws holding extension to case and remove extension and bearing. The bearing can be removed by tapping it off with a soft hammer.

5. Remove locking ring from speedometer drive gear and remove gear from main shaft. Remove ball that keys gear to shaft.

If the ball sticks, turn it down and tap main shaft with hammer.

6. Remove transmission bottom cover.

7. Remove the countershaft, cluster gears, thrust washers, and spacer through the bottom of the case, taking care not to loose any of the needle bearings for the shaft.

Caution: Handle gears and bearings with care to avoid nicks, and protect them against dirt and grit.

8. Remove the pin that holds the low and reverse shifter fork and shaft together, using special tool J-806 to pull pin out through filler plug hole in case, as shown in Plate 56, Fig. 21.

9. Pull low and reverse shifter shaft out of case toward front, using a turning motion to free shaft from locking ball.

Caution: Do not remove ¼-inch pipe plug on the side of the case until after the shifter shafts have been removed.

10. Remove the pin that holds the high and intermediate shifter fork and shaft together, using tool J-1051 to force the tapered pin out of its hole, applying the hammer and punch from the under side, as shown in Plate 56, Fig. 22.

11. Remove high and intermediate shifter shaft by pulling shaft out of case toward the front.

12. Remove pipe plug in side of case and take out shifter shaft locking balls, rod and springs.

13. Turn high and intermediate shifter fork half a turn and remove.

14. Remove locking ring for clutch connection shaft bearing.

15. Slide entire main shaft assembly toward rear of case. Pull clutch connection shaft forward as far as possible to free from the main shaft.

16. Rotate the clutch connection gear around the main shaft and remove with bearing through the bottom of the case, as shown in Plate 56, Fig. 23.

17. Remove bearing from clutch connection shaft, using an arbor press, as the bearing is a tight press fit on the shaft.

18. Remove synchronizing assembly from end of main shaft.

19. Remove rear main shaft bearing locking ring.

20. Push main shaft toward front end of case as far as possible and remove locking ring holding intermediate speed gear in position on main shaft, using tool J-1007, as shown in Plate 56, Fig. 24.

21. Remove spacer and slide intermediate and reverse gears off end of main shaft, at the same time taking out the low and reverse shifter fork.

22. Remove main shaft and disassemble rear bearing from shaft, using an arbor press.

23. Remove reverse idler gears and shaft out toward rear and lift gears out of case, along with the bronze thrust washers at each end of gear assembly.

Series 37-90

1. Drain lubricant.

2. Remove two screws holding the shifter lever shroud and plate to the transmission case and lift out the shifter lever assembly.

3. Remove transmission cover and the shifter shaft assembly.

4. Remove the synchronizing yoke quadrants, making sure not to lose any of the small bolts and springs.

5. Lift out the high and second speed synchronizing yokes.

6. Remove grease tube to clutch release bearing by disconnecting it at the housing and the bearing.

7. Remove cotter pin holding the spring and ball cover plate for the clutch release yoke against the housing.

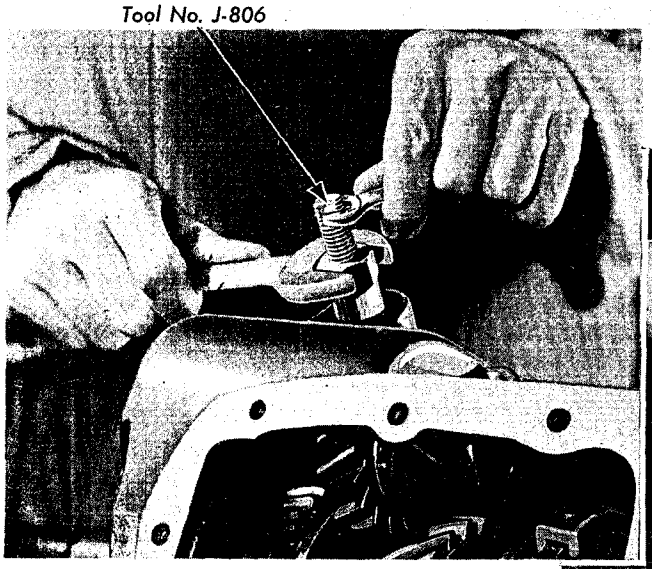


Fig. 21 Removal of Pin for Low and Reverse Shifter Shaft

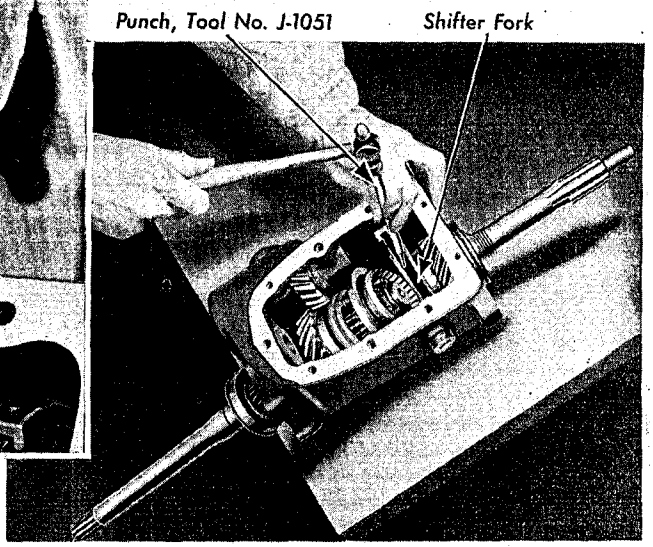


Fig. 22 Removal of Pin for High and Intermediate Shifter Shaft

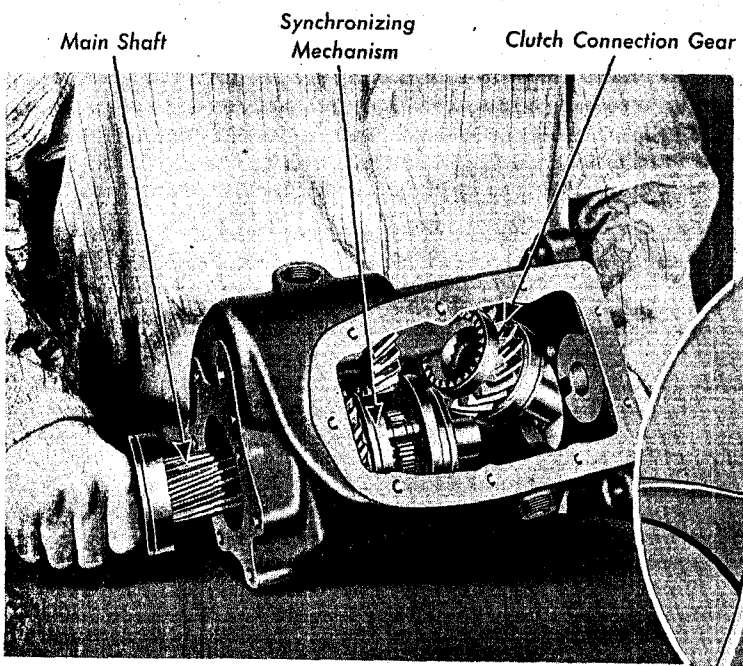


Fig. 23 Removal of Clutch Connection Gear and Bearing

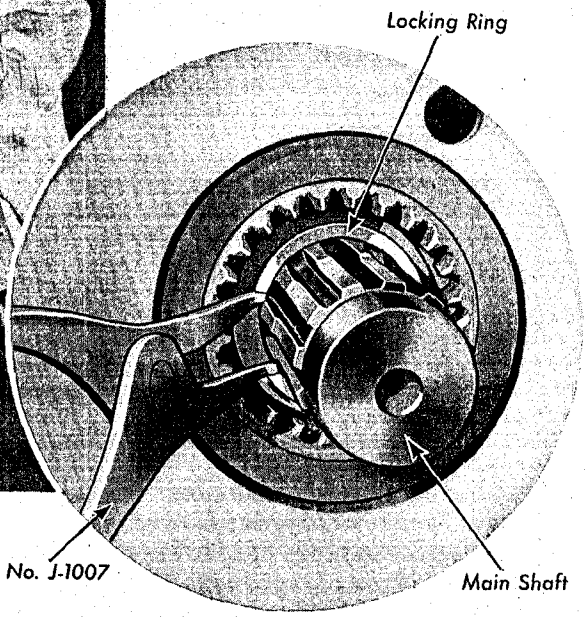


Fig. 24 Removal of Locking Ring for Intermediate Speed Gear

Plate 56. Transmission Disassembly—(II)—Series 37-50, 60, 65, 70, 75, 85

8. Push clutch release yoke inward and forward, thus sliding clutch release bearing off the clutch connection shaft.

9. Remove clutch release yoke.

10. Remove bearing retainer and gasket.

11. Remove cap screw holding the rear extension coupling to the driveshaft and slide the coupling off the rear end of the shaft.

12. Remove speedometer drive housing and gasket.

13. Remove cap over the end of the reverse idler gear and take out locking screw holding reverse idler shaft in place.

14. Pull reverse idler shaft out toward rear by inserting small pin punch through hole in shaft.

15. Lift out idler gear.

16. Remove the cap screw in the rear end of the countershaft holding the retainer washer in place and lift out washer.

17. Tap the front end of the countershaft to push out the rear roller bearing race for the countershaft.

18. Tap the rear end of countershaft to remove front roller bearing race.

19. Allow countershaft to drop down in case, thus throwing gears out of mesh.

20. Remove snap ring and mainshaft rear bearing.

21. Remove snap ring and mainshaft front bearing.

22. Remove clutch connection shaft toward front of case. Do not lose pilot bearing.

23. Pull the mainshaft and gears forward as far as possible and lift assembly out of case through top as shown in Plate 53, Fig. 12.

24. Remove countershaft assembly as shown in Plate 53, Fig. 13.

13. Assembly of Transmission—Series 37-50, 60, 65, 70, 75 and 85

1. Install thrust washers for reverse idler gears, using tool J-1010 to hold forward thrust washer in place during installation, as shown in Plate 57, Fig. 25.

2. Install reverse idler shaft and gear, taking care to line up hole for locking bolt. Be sure shaft gasket is in place.

3. Press rear main shaft bearing into position on shaft and insert shaft in transmission case.

4. Place low and reverse shifter fork in position on low and reverse sliding gear and slide both units into position on main shaft.

5. Install second speed gear, spacer, and locking ring on main shaft, using tool J-1007 for locking ring. ***Use new locking ring.***

6. Pull main shaft bearing to rear of case and install locking ring.

7. Assemble speedometer drive gear on main shaft, making sure ball key is located in slot, after which locking ring is installed, with tool J-1007. ***Use new locking ring.***

8. Pull main shaft toward rear of case as far as possible and install synchronizing unit over end of main shaft.

9. Press clutch connection shaft bearing in place and install main shaft pilot bearing and clutch connection gear in case.

10. Install locking ring on clutch connection shaft bearing.

11. Install high and intermediate shifter fork.

12. Install high and intermediate shifter shaft in case, lining up shifter fork locking pin hole so that pin can be inserted with tool J-1005, as shown in Plate 57, Fig. 27.

13. Drop high and intermediate shifter shaft locking ball, rod and spring in case, using magnetic tool J-1009.

14. Place low and reverse shifter shaft locking ball on top of spring, push down with special tool J-1008, and install low and reverse shifter shaft, as shown in Plate 57, Fig. 28.

15. Install plug in locking ball hole in case.

16. Install low and reverse shifter shaft and lock in position on shifter fork with pin, using tool J-1005.

17. Install spacer and two thrust washers for countershaft in transmission case. The steel spacer goes between the thrust washer and the case.

18. Install needle bearings in countershaft gear assembly, using loading tool J-1006. 26 rollers and one retaining washer belong on each end.

19. Install countershaft gears, using shaft to push out tool J-1006 as shaft is inserted. Be sure shaft gasket is in place and hole for locking screw properly aligned.

Note: Make sure transmission shifts properly before going further with assembly.

20. Install bottom cover, making sure that proper locking bolts for countershaft and reverse idler shaft are correctly installed.

21. Install transmission extension bearing on end of main shaft and install transmission extension.

22. Install universal joint flange.

23. Install gear shift lever, spring and cap. Be sure cork gasket is in place and that transmission is in neutral during this installation.

24. Shift gears a few times to make sure all parts are in proper operating condition and shift into reverse before installing in car to avoid locking in two gears.

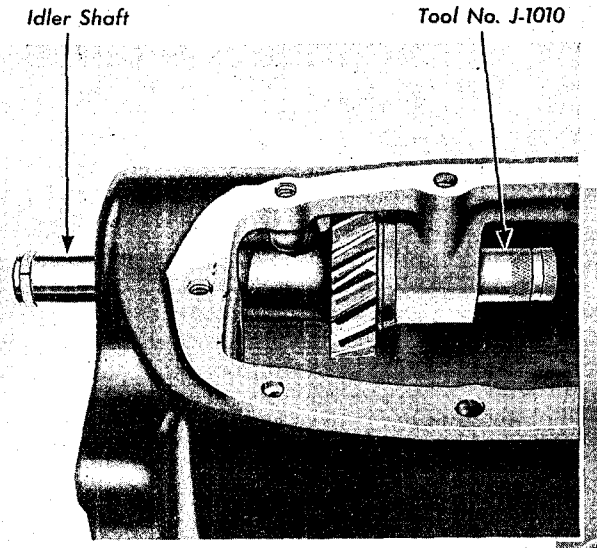


Fig. 25 Installing Reverse Idler Gears

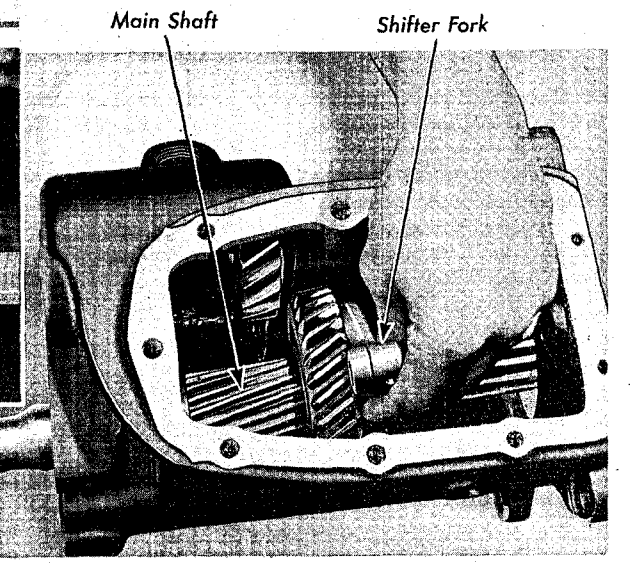


Fig. 26 Installing Low and Reverse Shifter Gear and Fork

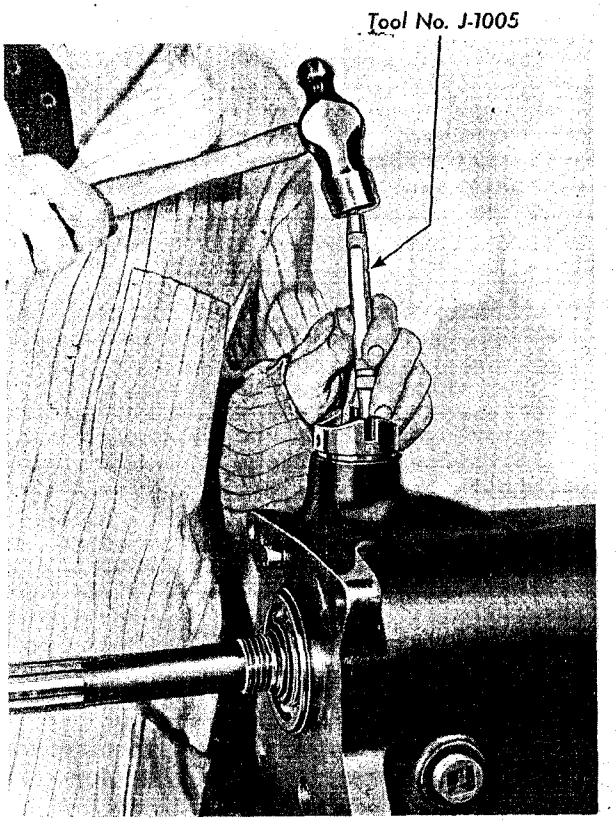


Fig. 27 Installing Pin for High and Intermediate Shaft and Fork

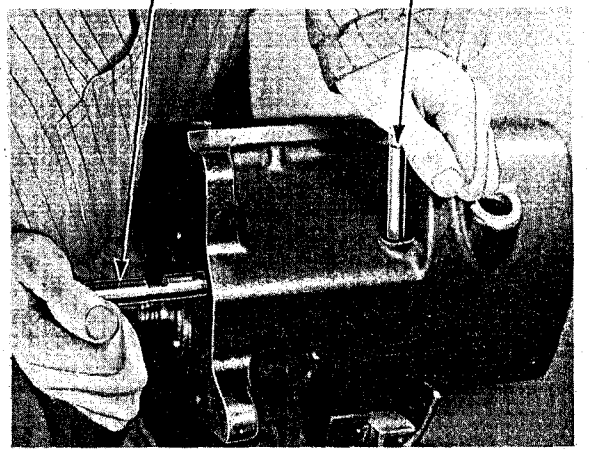


Fig. 28 Installing Low and Reverse Shifter Shaft

Plate 57. Transmission Reassembly—Series 37-50, 60, 65, 70, 75, 85

25. Refill transmission with lubricant.

Series 37-90

The procedure for assembling the transmission is, with the following exceptions, the reverse order of disassembly.

1. Revolve the mainshaft assembly when raising the countershaft into position to make sure the gears mesh smoothly.

2. Move the mainshaft gears into their various positions to make sure the gears mesh properly in each position.

3. Place adjusting quadrants in the middle position of their travel. See Plate 52, Fig. 6.

4. Put gears in neutral position when replacing shifter shaft yokes and cover.

5. Refill transmission with lubricant.

14. Refacing Flywheel Housing—Series 37-90

1. Remove all spark plugs, radiator grille and front bumper.

2. Drill a hole 2 inches in diameter in the splash shield just below the radiator core so that the crank for turning the refacing tool can be inserted in the crankshaft.

3. Remove the floor and toe boards.

4. Remove the transmission as explained in Note 10, Page 125.

5. Remove all transmission studs in flywheel housing and take out pilot studs.

6. Remove flywheel retaining nuts and clutch connection bearing retainer. Put adaptor plate in position, using four flywheel nuts to hold it in place.

7. Install refacing fixture. The mounting holes in this fixture are elongated to permit the fixture to be located so that the cutter bar will have the proper travel to clean up the entire face of the housing when the tool is in the hole nearest the fixture. Be sure the nuts holding this fixture in place are drawn up tight.

8. Install two handles opposite clutch studs in flywheel.

9. Check face of housing by means of tool in cutter bar to find lowest point, and set tool so that it will just clean up surface at this point.

10. The cut should be started at outer edge of starting motor boss on flywheel housing. Feed tool in about one-eighth turn of hand wheel for every revolution of crankshaft.

11. When the cut has been carried in to a point where tool touches transmission pilot flange on flywheel housing, flange should be checked carefully for concentricity with crankshaft. If there are any low spots, they will usually be found at upper part of this flange. Such a condition can be corrected by peening out edge of flange with a hammer.

Note: Care must be taken in performing this operation to prevent breaking or cracking the flange. It should not be necessary to raise the flange at this point more than a few thousandths of an inch and it is not necessary that a full bearing be obtained. A bearing of one-half the depth of the flange is sufficient to hold the transmission case in proper alignment.

12. After peening out low spots, turn flange down to proper diameter, using gauge furnished for checking this point. It is advisable to inspect gauge before each operation to make sure that it has not been damaged by rough handling. The distance between the gauge points should be exactly 14 5/8 in.

Caution: Be careful not to take off too much metal when turning down the pilot flange. If this should occur, it will be necessary to peen out the flange all the way around and then turn it down again to exact gauge size.

15. Speedometer Cable Installation

When reinstalling the flexible speedometer cable used on all 37-series cars, the lower end of the cable must be properly inserted in the transmission or the upper end will protrude enough to put excessive pressure on the speedometer worm, causing binding, noise, and eventually early failure of the flexible cable.

To install the speedometer cable properly, the lower end of the cable must be installed first, after which the upper cable end should extend $\frac{11}{32}$" to $\frac{13}{32}$" beyond the end of the ferrule as shown in the illustration, Fig. 29. If the upper cable end extends beyond $\frac{13}{32}$", it means that the lower cable end is not inserted far enough and trouble will result if the condition is not corrected.

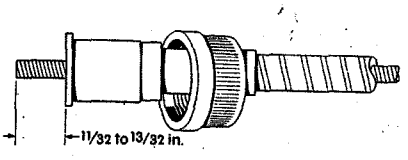


Fig. 29. Speedometer Cable End

TRANSMISSION

Specifications

Subject and Remarks	37-50, 60	37-65 70, 75	37-85	37-90
Gear ratio—				
Low speed	2.39-1	2.39-1	2.39-1	2.40-1
Second speed	1.53-1	1.53-1	1.53-1	1.47-1
High speed	1-1	1-1	1-1	1-1
Reverse speed	2.39-1	2.39-1	2.39-1	2.49-1
Lubrication—				
Lubricant capacity	2½ pts. (lbs.)	2½ pts. (lbs.)	2½ pts. (lbs.)	4½ pts. (lbs.)
Also see Lubrication Section.				
Mainshaft Assembly				
Clearance between—				
Splines on mainshaft and splineways in drums				
New limits	.....	.....	.....	.0065-.009″
Worn limits, not over	.....	.....	.....	.015″
Splines on mainshaft and splineways in sliding gear coupling				
New limits	.0005-.0015″	.0005-.0015″	.0005-.0015″	.0005-.0015″
Worn limit, not over	.005″	.005″	.005″	.005″
Splines on mainshaft and splineways in low and reverse speed gear sleeve.				
New limits	.....	.....	.....	.000-.001″
Worn limit, not over	.....	.....	.....	.003″
Splines on mainshaft sleeve and splineways in low and reverse speed gear.				
New limits	.....	.....	.....	.0005-.0015″
Worn limit, not over	.....	.....	.....	.005″
Splines on mainshaft and splineways in low and reverse gear.				
New limits	.000-.001″	.000-.001″	.000-.001″	.....
Worn limits	.003″	.003″	.003″	.....
Clutch connection shaft out of true not over	.0025″	.0025″	.0025″	.0025″
Main shaft out of true, not over	.0025″	.0025″	.0025″	.0025″
Reverse Idler Gear Assembly				
Clearance between bushing and shaft—				
New limits	.002-.0035″	.002-.0035″	.002-.0035″	.002-.0023″
Worn limit, not over	.006″	.006″	.006″	.004″
End play in gear, not over	.025″	.025″	.025″	.025″
Reaming size for bushing	.877-.879″	.877-.879″	.877-.879″	.938-.939″
Shifting Mechanism				
Clearance between—				
Shifter fork and sliding coupling.				
New limits	.005-.015″	.005-.015″	.005-.015″	.012-.020″
Worn limit, not over	.030″	.030″	.030″	.035″
Shifter fork and shifter gear.				
New limits	.005-.015″	.005-.015″	.005-.015″	.012-.020″
Worn limit, not over	.030″	.030″	.030″	.035″
Shifter shaft lock spring				
Free length (approx.)	2 15/16″	2 15/16″	2 15/16″	1 3/16″
Pressure, compressed to 2¼″	20-23 lbs.	20-23 lbs.	23-23 lbs.	.....
Pressure compressed to ¾	.....	.....	.....	20-23 lbs.
Yoke Assembly				
Clearance between—				
Guide block and drum (R. H. high and L. H. second speeds.)				
New limits	.....	.....	.....	.002-.006″
Worn limit, not over	.....	.....	.....	.010″
Guide block and drum (R. H. second and L. H. speeds).				
New limits	.....	.....	.....	.007-.011″
Worn limit, not over	.....	.....	.....	.015″
Plunger and yoke bore				
New limits	.....	.....	.....	.002-.006″
Worn limit, not over	.....	.....	.....	.008″
Plunger main spring—				
Free length (approx.)	.....	.....	.....	1 1/64″
Pressure in lbs. when compressed to 5/16 in.	.....	.....	.....	24-26
Plunger valve spring—				
Free length (approx.)	.....	.....	.....	5/8″
Pressure in lbs. when compressed to 7/16 in.	.....	.....	.....	2¾-3¼
Yoke return spring—				
Free length inside loops (approx.)	.....	.....	.....	2 3/16″
Tension in lbs. when stretched to 2⅞ in.	.....	.....	.....	8-8½
Yoke throw from neutral to applied position	.....	.....	.....	3/32-5/32″

FUEL TANK AND EXHAUST

General Description

The gasoline tank on all 37-series cars is mounted in the frame with two metal straps, and can be removed from below without disturbing any of the sheet metal parts. The gasoline line to the engine is carried in brackets attached to the left frame side member on all series. The gasoline gauge operates electrically. Details of its operation and servicing are given on page 159 of the Electrical Section.

The exhaust pipe on series 37-50 and 60 cars passes down from the manifold at the front of the right-hand cylinder block below the engine side pan and then to the rear along the right frame side member. The cross-over for the left-hand cylinder bank is just in back of the carburetor. A single muffler is used on these models.

On series 37-65, 70 and 75 cars, the exhaust pipe passes down from the manifold at the rear of the right-hand cylinder block below the engine side pan and then to the rear along the right frame side member. The cross-over is at the same place as on series 37-50 and 60 cars. Two mufflers connected in tandem are used on these models.

The exhaust system on series 37-85 cars is similar to that of the series 37-75 cars except that the cross-over for the left-hand cylinder bank is at the rear of the cylinder block instead of in a central location.

On series 37-90 cars, two entirely separate exhaust systems are used, one for each cylinder bank. Each of these systems includes an exhaust manifold, an exhaust pipe, a muffler, a tuning chamber, and a tail pipe. The exhaust manifold is in three sections to allow for expansion.

The exhaust pipes on all series are covered with a heavy asbestos insulation to prevent excessive heat under the hood or in the body, and to muffle exhaust noises. Rubber cushions are used between the muffler supports and the frame on all models to prevent exhaust vibrations from being transmitted to the body.

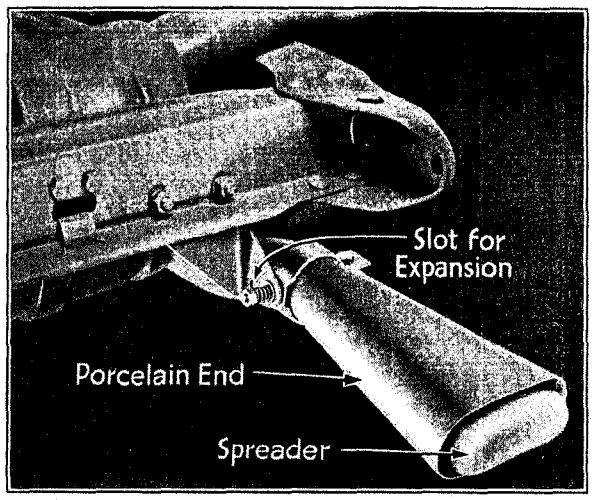


Fig. 1. Exhaust Pipe Mounting

The exhaust systems of all 37-series cars, except the V-16, include a new type mounting bracket which permits the muffler and tail pipe to slide endwise as the system expands or contracts during various temperature changes. This device is illustrated in Fig. 1, and tends to eliminate any snapping noise in the exhaust system due to the above changes in temperature and physical conditions.

The tail pipe end on all series cars is porcelain enameled to prevent rust.

Service Information

1. Removal and Installation of Gasoline Tank

Series 37-50 and 60

To prevent any possibility of breaking off the filler neck for the gasoline tank on series 37-50 and 60 cars, the following procedure should be followed when removing the gasoline tank on these models:

1. Drain gasoline tank.
2. Remove short filler neck extending through the fender and its rubber grommet from car.
3. Raise rear end of car from floor with chain fall.
4. Move tail pipe to right of car, away from tank.
5. Remove the filler neck clamp at the frame.
6. Disconnect the gasoline line
7. Remove the gasoline tank support straps
8. Move tank rearward and lower the front end to disconnect the gasoline gauge wire on the float unit.
9. Remove tank from car. See Fig. 2.

FUEL TANK AND EXHAUST

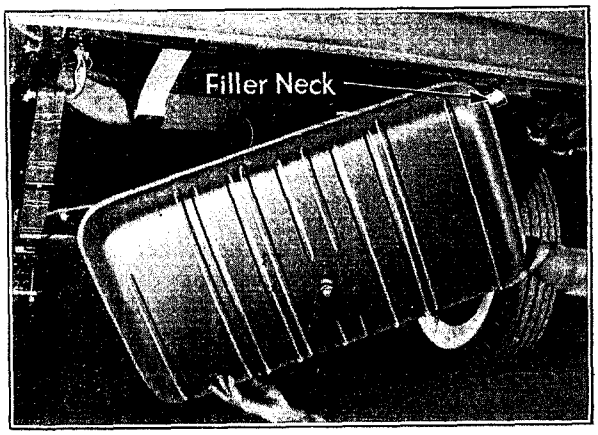


Fig. 2. Removing Gasoline Tank

The reverse of this procedure should be followed when installing the gasoline tank.

Note: A piece of Scotch Tape should be placed over the mouth of the filler neck to insure that no dust or dirt enters the filler neck and tank during installation.

2. Crackling Noises in Manifolds

Some V-16 engines when new give out a crackling noise after a long run when the ignition is shut off. This noise will be heard only in some new engines and is caused by the contraction of the manifold sections as the exhaust manifolds cool. This condition will not injure the engine and is automatically eliminated after the manifolds and blocks have taken a permanent set.

To correct this condition, smooth up the faces and corners of the manifold flanges with emery paper and spread thinly a paste made up of graphite and oil, over the contacting surfaces. Finally pull up the flange nuts tightly but without excessive strain.

3. Installing Manifold Gaskets

Exhaust manifolds are subject to such extreme variations in temperature that the metal expands and contracts to a considerable degree. For this reason, care should be exercised not to draw the manifold bolts up too tight.

The manifold bolts should be tightened while the engine is running and should be drawn up just enough to stop all exhaust leaks. Also, the bolts attaching the exhaust system brackets to the mufflers or pipes should be so located in the slots of the brackets that expansion can take place ***rearward.***

4. Blowing Out of Manifold Gaskets and Correction

In case of persistent blowing out of the manifold gaskets, the bearing surfaces of the manifolds should be carefully checked for warpage with a straight edge.

The most satisfactory remedy for correction of this trouble, if found to be due to excessive warpage, is replacement of the manifolds.

Specifications

Subject and Remarks	Series		
	37-50, 60	37-65, 70, 75, 85	37-90
Gasoline tank capacity	22 gal.	25 gal.	30 gal.

STEERING GEAR

General Description

Four different type worm and double roller steering gears are used on the 37-series cars. Each type has a different mounting arrangement and housing design. On series 37-50 and 60 cars, the steering gear is mounted on the inside of the frame sidebar, the roller shaft extends from the bottom of the steering gear housing, and the pitman arm operates a cross-mounted drag link, as shown in Plate 59.

On series 37-65 and 70 cars, the steering gear is mounted on top of the frame sidebar, the roller shaft extends inward, and the pitman arm operates a longitudinal drag link, as shown in Plate 59.

On series 37-75, 85 and 90 cars, the steering gear is mounted on the top and outer side of the frame sidebar, the roller shaft extends inward, and the pitman arm operates a longitudinal drag link. A unique construction feature on the series 37-75 and 85 steering gears, however, is that two universal joints are used to connect the steering shaft and the worm shaft of the steering gear.

All 37-series cars, except the 37-50 and 60 series, have needle bearings at the top and bottom of the knuckle pins to minimize steering friction.

The worm in all 37-series steering gears is of the hour glass type. It operates the sector through a double tooth roller that is carried on two rows of ball bearings, with the bearing cones held in the forked end of the sector by the roller bolt, as shown in Plate 58, Fig. 1. These bearings take both the radial and thrust load. The worm is mounted between two tapered roller bearings. Roller bearings are also used on the roller shaft on series 37-65, 70, 75, and 85 steering gears. A cross section view of the series 37-90, steering gear is shown in Fig. 2.

The steering connections include the steering gear arm, the steering connecting rod, an intermediate steering arm, and two tie rods. The tie rods are connected to the steering arms in the wheel and knuckle assembly.

Service Information

1. Steering Complaints

The diagnosis chart in the Front Suspension section, page 41, should always be referred to when correcting complaints regarding steering or front wheels. This gives complete procedures in proper order. The following suggestions apply especially to steering:

In case of complaints on hard steering, first check the front tires to see that they are properly inflated and installed correctly to preserve proper wheel balance. Check the wheel balance and adjust as necessary.

Hard steering is caused more often by incorrectly adjusted steering linkage and connections than by improper steering gear adjustment. Before adjusting the steering gear, therefore, be sure to check the steering knuckles and connections to make sure that they are not too tight. The construction and the manner of adjusting the steering connections on all 37-series cars are shown in Plate 58. If these operations do not correct the difficulty, the steering gear should be readjusted.

2. Steering Gear Adjustments

Illustrated information pertaining to all 37-series steering gear adjustments is given in Plate 59.

The detailed procedures to be followed in making these adjustments on the various 37-series cars are given below to further simplify the handling of these service operations.

Series 37-50, 60, 65 and 70

1. Back off worm adjustment lock nut and adjusting screw at bottom of housing. Use Tool J-1032 on 37-50 or 60; J-1053 on 37-65 or 70.

2. Back off roller adjustment lock nut. Turn adjusting screw in against roller shaft until all play is taken up and a slight binding is felt when turning steering wheel with roller off high spot. Back off adjusting screw just enough to free adjustment and tighten in position with lock nut.

3. Turn steering wheel 1½ to 2 turns to right or left so roller turns free in worm. Then, adjust screw at bottom of housing until a pull of 1 to 1¼ lbs. at rim of steering wheel is necessary to move wheel around. Tighten worm adjustment lock nut and recheck pull.

4. Loosen eccentric adjustment lock screw. Turn quadrant on eccentric sleeve to adjust backlash between worm and roller until a pull of 2 to 2½ lbs. at rim of steering wheel is necessary to move wheel over high point of worm. Tighten locking screw and recheck pull.

Series 37-75, 85 and 90

1. Loosen clamp screw for worm adjusting nut and back off nut slightly.

STEERING GEAR

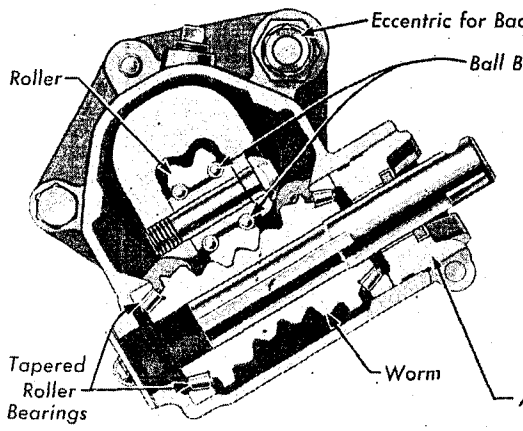


Fig. 1 Sectional View of Steering Gear Series 37-75 and 85

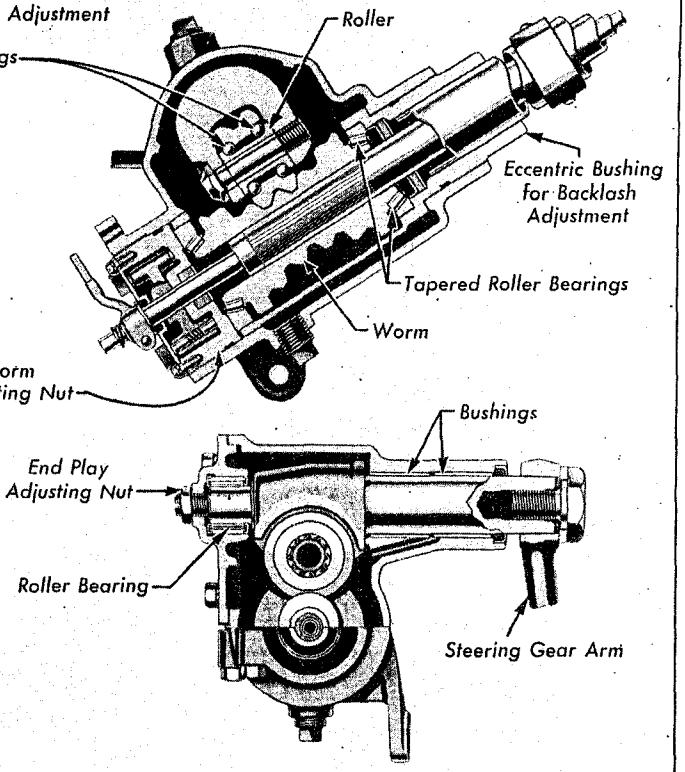


Fig. 2 Sectional View of Steering Gear Series 37-90

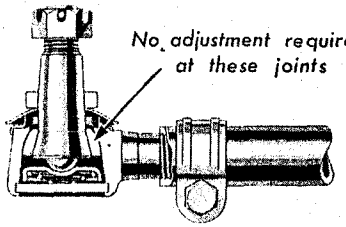


Fig. 3 Steering Tie Rod End Series 37-50 and 60

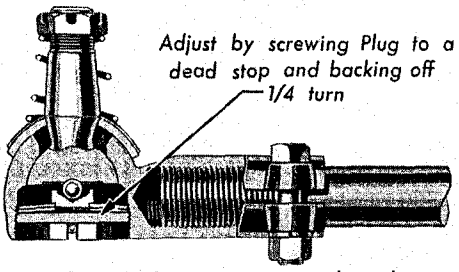
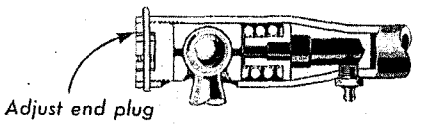


Fig. 4 Steering Tie Rod End Series 37-65, 70, 75, 85 and 90



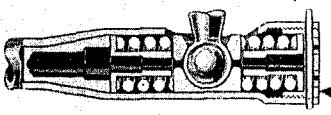
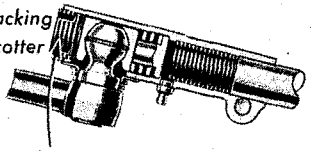


Fig. 5 Steering Connecting Rod Series 37-65 and 70 Typical of Series 37-50 and 60



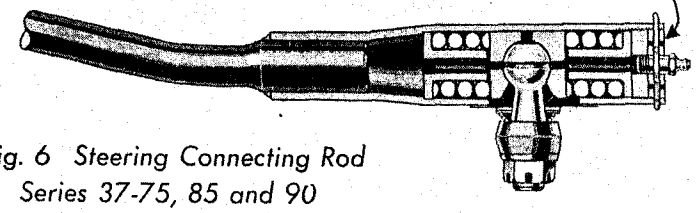


Fig. 6 Steering Connecting Rod Series 37-75, 85 and 90

Plate 58. Steering Gear and Connections

2. Turn adjusting screw for roller shaft in against roller until all play is taken up, and slight binding is felt when turning steering wheel with roller off the high spot. Then back off enough to free adjustment.

3. Turn steering wheel to extreme right and tighten worm adjusting nut until a pull of 1 to 1¼ lbs. at the rim of the steering wheel is necessary to move wheel to the left. See Plate 59. Check pull after tightening clamp bolt.

4. Turn eccentric to adjust backlash between worm and roller until a pull 2 to 2½ lbs. at rim of steering wheel is necessary to move wheel over high point of worm, and lock in position.

Note: Use two wrenches to unlock eccentrics, and hold both while turning bushing.

When adjusting new gears used less than 1000 miles, the adjustment limits should be ¼-½ lb. greater than specified in the foregoing recommendations. This applies to all cars.

3. Removal of Intermediate Steering Arm

Series 37-50 and 60

Removal

1. Remove plug from front end of steering connecting rod.

2. Disconnect steering connecting rod from pivot ball at intermediate steering arm.

3. Disconnect tie rods at intermediate steering arm.

4. Remove fulcrum bolt from intermediate steering arm bracket assembly on rear of front frame cross member.

5. Remove intermediate steering arm.

Note: To remove and replace the bushing from the intermediate steering arm use tool J-979. This tool also facilitates the burnishing of the bushing after it has been replaced in the arm.

Installation

The reverse order of operations will serve as a guide for installation. In tightening the nut on the fulcrum bolt, care should be exercised not to draw the nut too tight. Moderate tightening of the bolt is all that is necessary. See Note 8.

Series 37-65, 70, 75, 85 and 90

Removal

1. Disconnect steering connecting rod from steering gear arm.

2. Loosen clamp screw on steering connecting rod at intermediate steering arm ball joint assembly.

3. Remove steering connecting rod by unscrewing the rod from steering arm ball joint assembly.

4. Disconnect tie rods at other end of intermediate steering arm by removing nut holding pivot ball assembly to arm.

Note: It is necessary to use special Tool No. J-624A to remove tapered shank of the pivot ball from the steering arm when performing this operation.

5. Remove intermediate steering arm bracket assembly by removing the four bolts holding assembly to frame cross member.

6. Place assembly on bench and remove retaining nut from fulcrum bolt.

7. Remove bolt, intermediate steering arm, and bearings to complete disassembly.

Note: Use a press to remove bolt, if necessary.

Installation

The reverse order of operations will serve as a guide for installation of this unit.

When installing the intermediate steering arm, it is important to make sure that the ball bearings are properly lubricated with (G-12) wheel bearing grease before installation. Also, when tightening the nut on the fulcrum bolt, care should be exercised to draw the nut up just enough to remove all perceptible play in the bearings without causing them to bind.

4. Removal of Steering Universal Joints

Series 37-75 and 85

To remove the universal joints and shaft used in the series 37-75 and 85 steering column, proceed as follows:

1. Loosen the clamps at the upper universal joint, the lower joint, and the steering worm shaft.

2. Slide the shaft as far as possible up into the upper universal joint. This will permit removing the lower universal joint from the steering gear worm shaft, after which the upper end of the shaft can be removed from the upper universal joint.

To reinstall, insert the shaft in the upper universal joint and then attach the lower joint to the steering gear, reversing the procedure followed in removal.

Tighten first the clamp that holds the lower joint to the steering worm shaft. Then tighten the clamp at the upper universal. This clamp fits into a notch in the upper end of the shaft. Finally, tighten the clamp at the lower end of the shaft. This clamp tightens into a groove, so that the shaft will be adjustable for minor variations.

Tighten these clamps securely. Use a socket wrench with a handle at least eight inches long, and apply it sturdily. Do not use an ordinary open-end wrench as this will not permit the application of sufficient force.

5. Removal of Steering Gear Arm

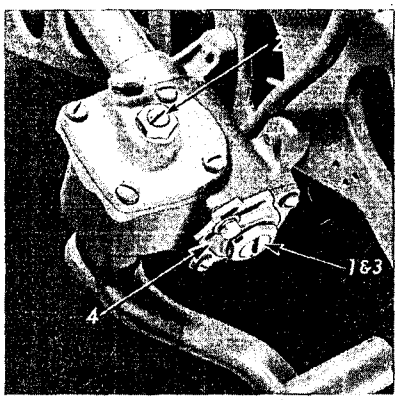
Series 37-75 and 85

Less time will be required to remove the steering gear arm (pitman arm) from the steering gear of series 37-75 and 85 cars, if the complete steering gear housing is first removed from the frame, and then the steering gear arm removed from the roller shaft.

The procedure for removal of the steering gear housing from the frame is as follows:

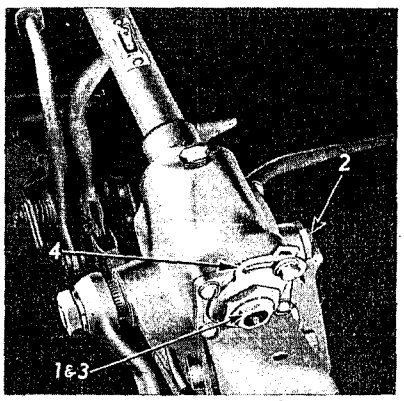
1. Remove the splash pan around the steering gear.

STEERING GEAR



Series 37-50 and 60 Steering Gear

1. *Back off worm adjusting nut slightly after loosening lock nut or clamp bolt. Use tool J-1032 for Series 37-50 and 60. Use tool J-1053 for Series 37-65 and 70.*
2. *Turn adjusting screw in against roller until all play is taken up, and slight binding felt when turning steering wheel with roller off high spot; then back off just enough to free adjustment.*

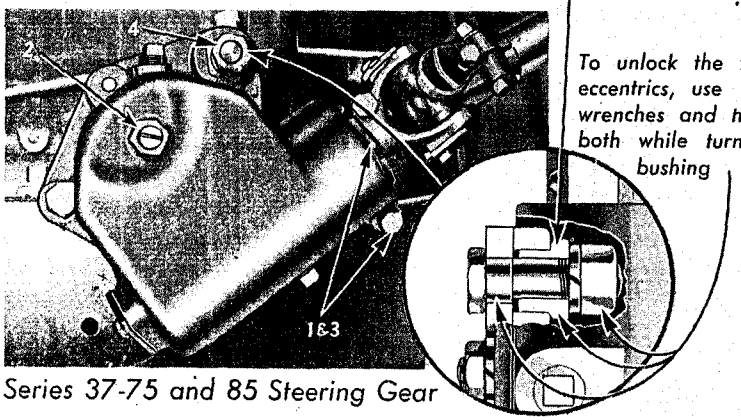


Series 37-65 and 70 Steering Gear

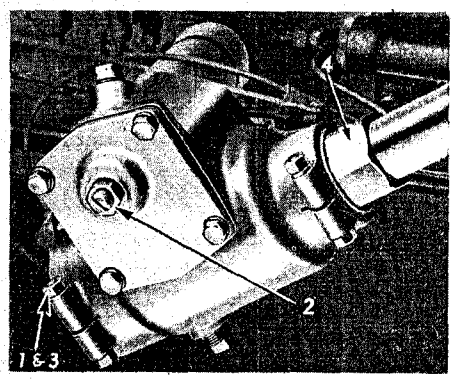
3. *Turn steering wheel 1 1/2 to 2 turns to right or left so roller turns free in worm, and tighten worm adjusting screw until a pull of 1 to 1 1/4 lbs. at rim of steering wheel is necessary to move wheel over high spot of worm. Check pull after tightening lock nut or clamp bolt. With new gears used less than 1,000 miles, a pull of 1 1/4 to 1 1/2 lbs. should be necessary.*

4. *Turn eccentric to adjust backlash between worm and roller. Pull on steering wheel should be 2 to 2 1/2 lbs. with roller on high point on worm. With new gears used less than 1,000 miles, a pull of 2 1/2 to 3 lbs. should be necessary.*
Backlash between worm and roller should be approximately the same with the steering wheel turned within one revolution from either extreme position.

Loosen nut 1/6 turn to adjust bushing



Series 37-75 and 85 Steering Gear



Series 37-90 Steering Gear

Keep pull tangent to wheel

If front wheels do not point straight ahead when roller is on high point of worm, adjust the steering connecting rod end, or the tie rods until straight ahead position is obtained.

Checking pull necessary to turn steering wheel

Tire Inflation Pressure
(Front and Rear)

La Salle
Series 37-50 26

Cadillac
Series 37-60 26
Series 37-65 & 70 . . . 28
Series 37-75 & 85 . . . 32
Series 37-90 36
(Minimum—Cold)

Plate 59. Steering Gear Adjustments

2. Disconnect the steering connecting rod from the steering gear arm.

3. Disconnect the lower universal joint from the steering gear worm shaft.

4. Loosen the steering gear from the frame and remove it from the car.

6. Correction of Steering Column Misalignment

Series 37-50, 60, 65 and 70 cars

In the event that it should be necessary to realign the steering column on series 37-50, 60 65 or 70 cars, the desired alignment may be secured by the use of spacers placed between the instrument board and the steering column support bracket for up and down adjustment and between the steering gear housing and the frame on either the front bolt or the rear bolts for sidewise adjustment.

The parts required for making this adjustment are as follows: Spacer, Part No. 1419066, Series 37-50 and 60; Spacer, Part No. 405554, Series 37-65 and 70; and Washer, Part No. 871588, Series 37-50, 60, 65 and 70.

Misalignment of the steering column is not readily apparent but when making steering adjustments it is a simple matter to remove the support bracket cap and note the position that the steering column assumes. Misalignment is most apt to be of a sidewise nature, i. e., the column runs either to the right or to the left of the support bracket. Up and down misalignment is not so prevalent and is easier to correct.

To correct sidewise alignment, use washer, Part No. 871588, on either the front bolt or the rear bolts holding the steering gear housing to the frame. If the steering column goes to the left of the support bracket, a washer should be placed under each of the rear bolts. If the column goes to the right, a washer should be placed under the front bolt.

When the steering column is too low for the support bracket, the condition can be remedied by putting a spacer, or spacers, between the instrument panel and the support bracket, thus lowering the bracket to meet the steering column.

7. Steering Pivot Springs

During the production of 37-50 and 60 cars, a change was made in the tension of the two springs in the steering connecting rod at the steering gear arm pivot. The second type springs are longer and heavier than those previously used.

In the event of a slight chucking noise in the steering system of early cars when driving over rough roads, the installation of the second type springs will eliminate the noise. Only second type springs are furnished by the Parts Division under part number 263699.

8. Tightening Steering Arm Bolt Eliminates Rattle

Series 37-50 and 60

In the event of a slight rattle occurring in the steering system on series 37-50 and 60 cars, the intermediate steering arm should be checked for looseness.

Looseness at this point is generally caused by the pivot pin being loose and moving up and down on the steering arm bolt. In most cases, merely tightening the bolt at the bottom of the front cross member will eliminate the rattle.

The bolt must not be drawn up too tight, however, as there is danger of stripping. Where moderate tightening of the bolt does not eliminate the rattle, it will be necessary to install an additional shim, Part No. 1300203, at the bottom of the steering arm pivot pin before tightening the bolt. See Fig. 7.

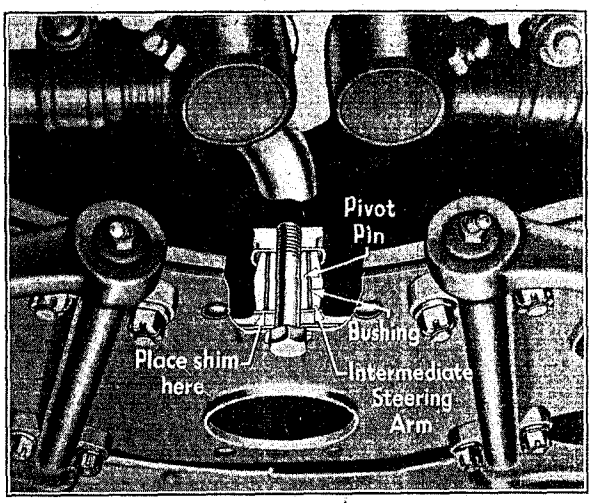


Fig. 7. Shimming Intermediate Steering Arm.

STEERING GEAR

Specifications

Subject and Remarks	37-50	37-60	37-65, 70	37-75, 85	37-90
Spring at ball joint at steering gear end of steering connecting rod—					
Free length	15/16"	15/16"	1 19/64"	1 1/2"	1 1/2"
Pressure compressed	420-500 lbs. at 7/8"	420-500 lbs. at 7/8"	450-550 lbs. at 1 5/32"	500-550 lbs. at	500-550 lbs. at 1 9/32"
Spring at ball joint at intermediate steering arm end of steering connecting rod—					
Free Length	3/4"	3/4"	3/4"	3/4"	1 1/16"
Pressure compressed to 31/64"	250-300 lbs.	250-300 lbs.	250-300 lbs.	250-300 lbs.	250-350 lbs. at 7/8"
Spring at ball joint of steering tie rods—					
Free height	15/32"	15/32"	Flat type	Flat type	Flat type
Pressure compressed to 3/16"	135-165 lbs.	135-165 lbs.	220-270 lbs. at .010" flat	220-270 lbs. at .010" flat	220-270 lbs. at .010" flat
Steering Gear					
Make	Saginaw	Saginaw	Saginaw	Saginaw	Saginaw
Type	Worm and double roller	Worm and double roller	Worm and double roller	Worm and double roller	Worm and double roller
Steering Ratio					
Steering gear ratio	19-1	19-1	22-1	24-1	24-1
Steering Wheel					
Diameter	18 1/2"	18 1/2"	18 1/2"	18 1/2"	18 1/2"
Turning Radius					
Radius of circle made by outer tire wall of front tire—					
Right	20 ft.	20 ft.	21 1/2 ft.	24 ft.	23 1/2 ft.
Left	20 ft.	20 ft.	21 1/2 ft.	23 1/2 ft.	23 1/2 ft.

WHEELS

General Description

Disc wheels are used on all 37-series cars, except the V-16, which has wire wheels equipped with metal wheel disc covers. The tire sizes, tire ply, and inflation pressures are given in the specification table, page 142

Drop-center rims are used on all series. Large size, snap-on type hub caps are used on all series, except the V-16, which has a screw type cap. Wheel disc covers are available as an accessory on all series cars, except the V-16, upon which they are standard equipment. Two attractive wheel disc designs of similar construction are used, one for La Salle and one for Cadillac V-8 and V-12 cars. When wheel discs are used no hub cap is required because the hub cap is then integral with the disc.

The spare wheel and tire are carried in the bottom of the trunk on all sedan bodies having a built-in trunk, excepting fenderwell jobs. The spare wheel and tire are carried on an exposed tire carrier at the rear of all bodies without built-in trunks, except on 37-50 and 60 convertible sedans which have a right hand fenderwell as standard equipment. The spare tire and wheel are carried under the rear deck on coupe models.

In order to simplify jacking up the car, jack pads are provided on the rear springs and at the lower front suspension arms of all series cars.

Service Information

1. Dismounting and Mounting Road Wheels

The following procedure must be used when dismounting road wheels in order to get the wheel through the openings in the streamlined fenders:

1. Place jack under jack pad.

   Note: The jack in this position will raise the car first, allowing the wheel to drop below the fender opening.

2. Raise the wheel only enough to clear the road—2 or 3 inches.

3. Remove wheel mounting bolts, lift wheel off mounting stud, and drop wheel to road. The wheel ordinarily cannot be pulled straight out.

4. Turn the wheel slightly inward at front and roll out toward rear.

   Note: In removing a front wheel, it may be easier to turn in at rear and roll out toward front.

When reinstalling a wheel, roll it in under the fender from the rear, and lift it up onto the hub, hanging it on the mounting stud. Then insert the mounting bolts.

2. Interchanging Tires

Normal tire wear is uneven between the front and rear wheels because of the difference in the functions of the front and rear tires. Tire wear can be reduced to a minimum by changing the type of use and the direction of rotation at regular intervals.

It is advisable, therefore, to interchange the tires as rights and lefts and between front and rear; that is, the right front tire should be interchanged with the left rear and the left front with the right rear.

This interchange has the advantage of reversing the direction in which the tire turns at the same time that its position on the car is changed, and equalizes the wear by subjecting all tires to equal amounts of all types of wear.

3. Wheel Run-Out and Eccentricity

The wheels or tires should not run-out (wobble) more than $\frac{3}{32}$ inch as measured on the side walls of the tire when it is properly inflated. Run-out is the result of a bent wheel, an improperly mounted wheel, or looseness in the wheel or knuckle bearings or the steering connections. These parts should be checked for correct adjustment, proper alignment, and wear whenever excessive run-out is encountered.

The wheels and tires should also run concentric with the steering knuckle spindle within $\frac{1}{16}$ inch measured on the outer edge of the tire, in the center of the tread. Eccentricity in excess of this amount can often be corrected by deflating the tire and changing its position on the wheel.

Wheel run-out, eccentricity, and balance are closely associated with steering complaints and with front wheel alignment. Further information on these conditions will be found under "Front Wheel Alignment," Page 27.

4. Balancing Tires and Wheels

Tires are balanced to offset the weight of the valve stem and, if removed, the tube should be reinstalled in its original position with the valve stem in line with the balancing mark on the outside of the casing, otherwise tire and wheel will be unbalanced.

The wheel itself should be in proper balance. An out-of-balance wheel can be corrected by the use of detachable balancing weights, supplied by the factory Parts Department. The weights are placed on the light side of the wheel and as nearly under the center of the tire as possible.

To balance a wheel, first remove it from the axle and clean out the grease from the bearings. Mount it upright on a suitable stand (a steering spindle clamped in a vise will do) and test by rotating it slowly, allowing it to stop itself. When the wheel stops, the heavier point will be at the bottom. Mark this point and also the uppermost point; then turn the wheel until these points are in a horizontal position. Install balancing weights on the light side until the wheel balances in the horizontal position.

This operation should be performed with the tire on the rim. If the tire was off, it will have to be installed as recommended above, and the balance rechecked. The wheel bearings should then be repacked with wheel bearing grease and the wheel reinstalled.

5. Wheel Bearing Adjustment and Lubrication

The front wheel bearings on all series cars require repacking with wheel bearing grease and readjustment every 6,000 miles. In lubricating these bearings, always use grease meeting the G-12 specifications. The bearings should be liberally coated with grease, but there is no necessity for filling the hub completely, as it is only necessary to see that all parts of the bearings are lubricated.

In adjusting the front wheel bearings, first make sure that the wheel is all the way on the spindle. Then tighten the adjusting nut securely, using a wrench with a handle 8 or 9 inches long, at the same time rotating the wheel to seat all parts. After a thorough tightening, back off the nut 1/12 turn (½ flat). If the cotter key cannot be installed in this position, loosen the adjusting nut until it can be installed.

Caution: When adjusting the front wheel bearings, care should be taken not to mistake play in the knuckle bolt for play in the wheel bearings.

The rear wheel bearings on all series cars are of the self-lubricating type and require no adjustment. These bearings are packed with lubricant and permanently sealed at assembly. Since this lubricant is intended to last for the life of the bearings, no provision is made on the car for lubricating them. No attempt should be made to remove these bearings for lubricating purposes.

6. Installation of Rear Wheel Bearings Series 37-50 and 60

When installing the rear wheel bearings on the axle shafts on 37-50 and 60 cars, the bearing must be correctly located. On cars of later production, the bearing is installed flush against the locating shoulder.

On a few of the first cars, however, the axle shaft does not have the shoulder, and the bearing must be driven on the shaft just far enough to allow $\frac{5}{32}$″ between the bearing and the inner edge of the hub.

All axle shafts supplied by the Parts Division for service use are of the later type with the locating shoulder for the bearing.

7. Removal of Wheel Disc Covers

The wheel disc covers on all 37-series cars, except the V-16, snap into place on the wheel the same as snap-on hub caps. To remove these covers, a tool shaped something like a bent screw driver should be inserted between the wheel rim and the disc cover and rocked slightly to pry off the disc. One of these tools is included in the tool kit of each new car shipped from the factory with wheel disc covers. Additional tools, if required, can be secured from the Parts Division under part number 1420594.

Specifications

Subject and Remarks	Series					
	37-50	37-60	37-65, 70	37-75	37-85	37-90
Rims						
Type	Drop center	Drop center	Drop center	Drop center	Drop center	Drop center
Diameter	16″	16″	16″	16″	16″	17″
Width	4½″	4½″	4½″	5″	5″	4.19″
Tires						
Inflation pressure	26 lbs.	26 lbs.	28 lbs.	32 lbs.	32 lbs.	36 lbs.
Size	7.00 x 16″	7.00 x 16″	7.50 x 16″	7.50 x 16″	7.50 x 16″	7.50 x 17″
No. of plys	4	4	4	6	6	6

CHASSIS SHEET METAL

General Description

This section covers such sheet metal parts as the hood, radiator shell, fenders, running boards and splash pans. These parts are constructed so that they can be serviced individually without the necessity of removing complete assemblies.

Service Information

1. Removal and Installation of Hood

The hood may be removed in the following manner on all 37-series cars:

1. Remove the nut and lock washer from the stud on the rear hood bracket.

2. Remove the two bolts at the front hood bracket that fasten the tie rods, radiator assembly, and hood bracket together.

3. Lift hood, slide hinges off hood brackets, and remove hood from car.

Installation—of hood is performed by reversing the above steps.

2. Hood Alignment

The tie rod adjustment nuts at each side of the dash on 37-series cars hold the radiator in position only.

Proper hood alignment must be made by loosening all of the front fender and running board bolts (except series 37-50 running boards) and shifting the entire fender and running board assembly on the frame until the correct alignment with the respect to the hood and cowl is secured. Vertical alignment is then secured by loosening the radiator mounting stud underneath the front cross member and placing shims between the radiator and the cross member until the correct alignment with respect to the hood and radiator shell is obtained.

3. Removal and Installation of Radiator Ornament and Vane

Removal or installation of the radiator ornament used on the 37-series cars is merely a matter of removing or installing the three nuts and lock washers which hold the base of the ornament body to the radiator shell.

On the first 37-series Cadillac cars, the glass vane in the radiator ornament was locked in place with an Allen set screw. Due to the fact that this screw sometimes came loose in service, a later design employing a pin, spring, lockwasher and fillister head screw, as shown in Fig. 1, was adopted on later cars.

In the event that the glass vane works loose, or it becomes necessary to replace the vane in the 37-series Cadillac radiator ornament for any reason, the second type locking equipment should be installed. The procedure for removal or installation is apparent from Fig. 1. The following parts required to make this change may be secured from the factory Parts Division:

1 Brass Plug	1422545
1 Spring	1424086
1 Lockwasher	120423
1 Fillister Head Screw	890104

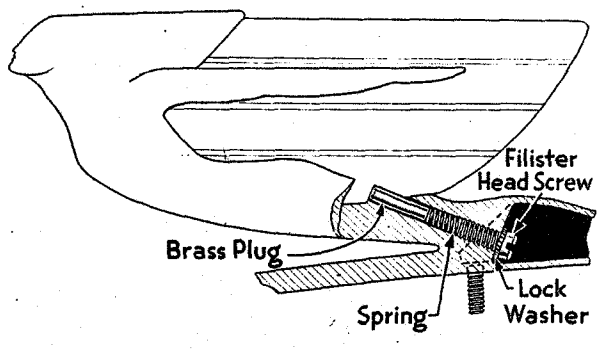


Fig. 1. Radiator Ornament Installation

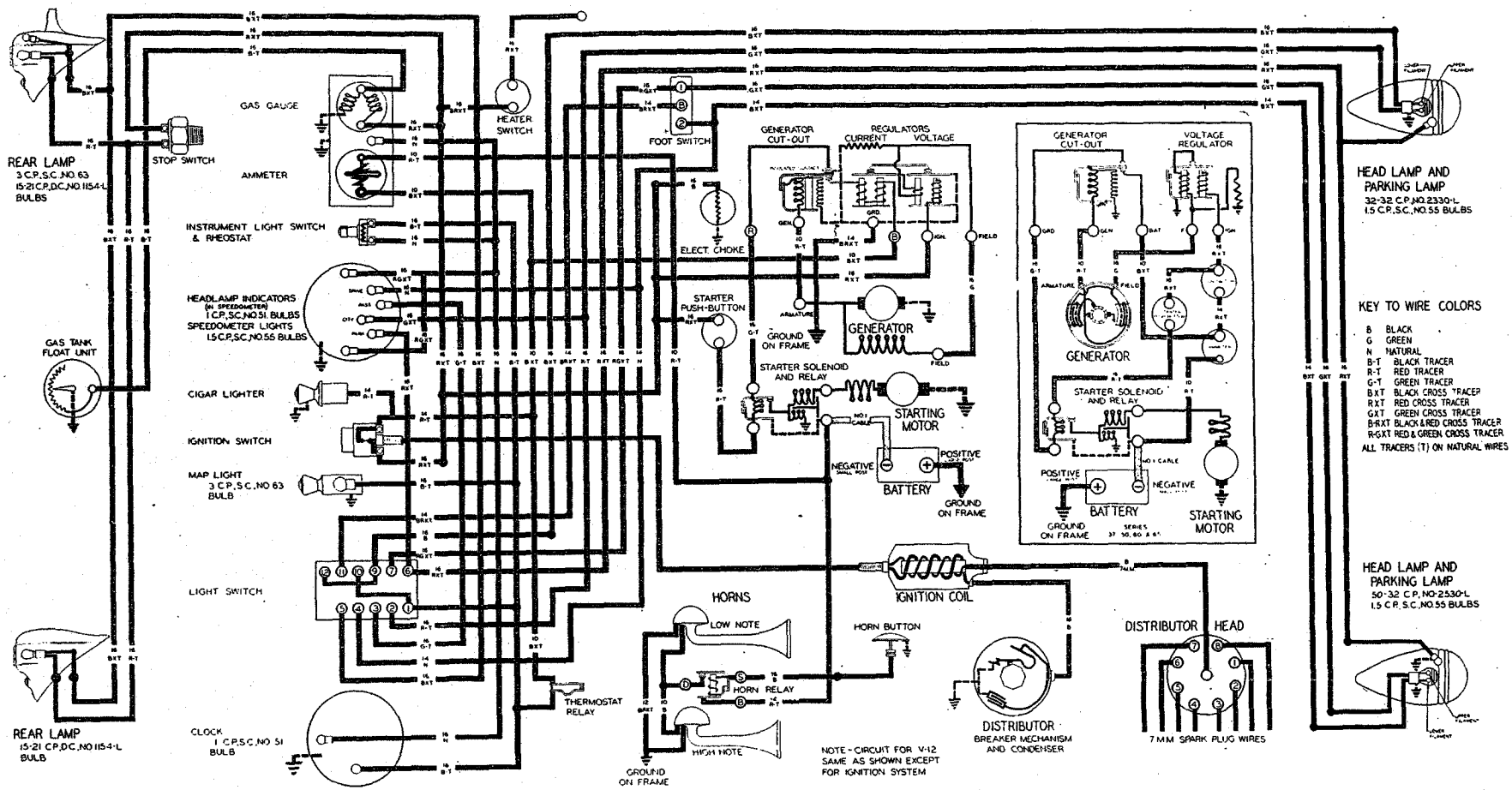


Plate 60. Wiring Diagram—All Series

ELECTRICAL

General Description

The electrical systems of all 37-series cars are of the same general arrangement and design, differing mainly in the types of generator charging circuits used. The batteries of the various series are of the same type but differ in size and capacity.

GENERATOR CIRCUIT

Two types of generator circuits are used. One type, employing a generator with a fixed 3rd brush and a voltage regulator, is used on series 37-50, 60 and 65 cars. The other circuit, of the current controlled, voltage-regulated type, is used on series 37-70, 75, 85 and 90 cars. Figures 6 and 7 of Plate 62 are diagrams of the two circuits.

Generator—Series 37-50, 60 and 65

A Delco-Remy generator Model 918-C is used on series 37-50, 60 and 65. This generator has a high charging rate which is controlled by a vibrating voltage regulator. The charging rate of the generator is limited by a non-adjustable third brush and the voltage is controlled by the voltage regulator. Openings in the rear of the generator allow air to be drawn through the generator to the front where it is expelled by a rotary fan which is a part of the generator pulley.

Voltage Regulator Unit

The voltage regulator unit consists of a cutout relay and vibrating voltage regulator which are mounted on a metal base and covered by a metal cover to keep out dust, dirt, moisture, etc. This regulator assembly is mounted on the left hand side of the engine side of the dash.

The purpose of the cutout relay is to break the circuit between the battery and the generator when the generator voltage is less than the battery voltage in order to prevent the battery from discharging through the generator. In addition to this, the relay controls the ammeter in the instrument cluster which indicates whether the generator is charging or the battery discharging.

The vibrating voltage regulator controls the output of the generator. It decreases the charging rate of the generator automatically when the battery approaches a charged condition, by allowing a resistance to be cut into the field circuit of the generator. When the lights or other electrical loads are turned on, the charging rate will increase to take care of them, up to the maximum output of the generator. The generator output, therefore, is dependent upon the voltage setting of the regulator, the connected load, and the condition of charge of the battery. A low output with a fully charged battery indicates that the regulator is working properly.

Generator—Series 37-70, 75, 85 & 90

A Delco-Remy generator, Model 961-K, is used on series 37-70 and 75. Series 37-85 and 90 uses a Model 933-M generator, which is similar in design but ventilated in a different manner.

The generators used on series 70 and 75 are ventilated by a stream of air being drawn through from the back of the generator by a rotary fan which is part of the generator pulley. The generator used on series 85 and 90 is ventilated by means of an air horn which is located on the top of and toward the front of the generator field frame, and an outlet tube which is located at the rear bottom of the field frame.

The generator on series 70 and 75 is belt driven and is located in the V of the engine. The generator on series 85 and 90 is chain driven and is located on the lower right hand side of the engine. Aside from these differences, the generators used on series 37-70, 75, 85 and 90 are essentially the same. They are known as "Peak Load" generators, having both current and voltage regulation.

Regulator Unit

The Delco-Remy regulators in the charging circuit are made up of three separate units—a cut-out relay, a current regulator, and a voltage regulator. All of these units are mounted on a single base and are enclosed by a dust and moisture proof metal cover. This assembly is mounted on the left hand engine side of the dash (right hand side on series 37-90).

The cut-out relay is similar to the conventional cut-out relay except that the series windings are heavier in order to adequately carry the high current output of the generator.

The central unit of the regulator assembly is the current regulator, which is composed of a heavy winding in series with the generator charging circuit. The contact points are normally held in a closed position due to the tension of the armature spring. When the generator output reaches a predetermined value, the magnetic pull on the armature overcomes the spring tension and the contact points open, inserting a high resistance into the field circuit of the generator.

The voltage regulator unit is similar to the current regulator except that one of the cores is wound with a large number of turns of small wire connected between the ground and the "off" side of the ignition switch. The current in this winding varies with the battery voltage. Whenever the battery voltage reaches a predetermined value, the magnetic pull on the armature overcomes the spring tension and the contact points open,

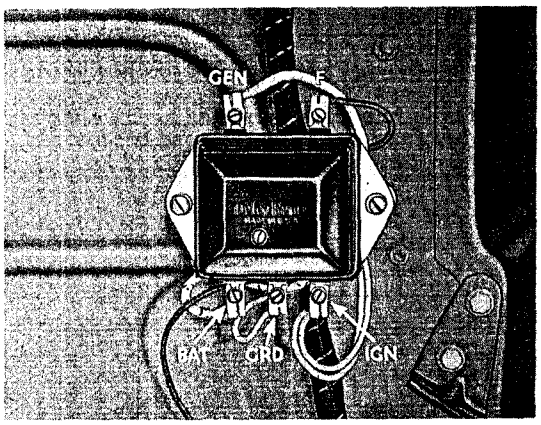


Fig. 1 Generator Regulator Mounting
Series 37-50, 60 and 65

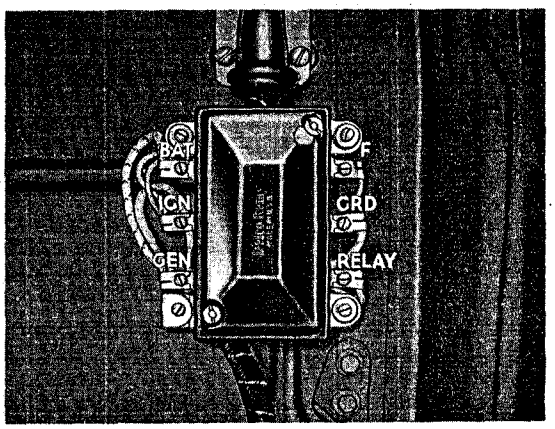


Fig. 2 Generator Regulator Mounting
Series 37-70, 75 and 85
Typical of Series 37-90

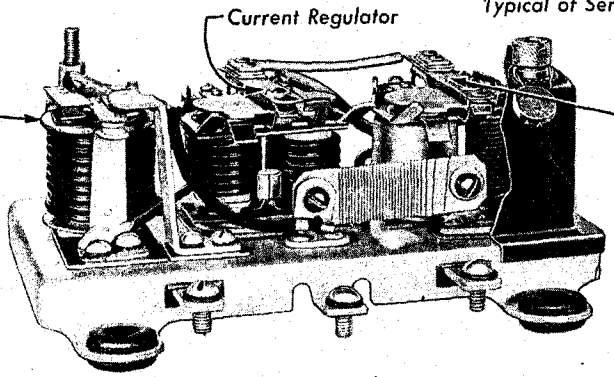


Fig. 3 Current Regulator Unit
Series 37-70, 75 85 and 90
(Series 37-50, 60 and 65 similar except for Current Regulator)

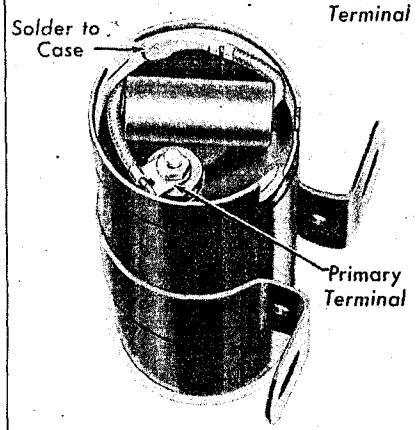


Fig. 4
Radio Condenser
Mounting
on Ignition Coil

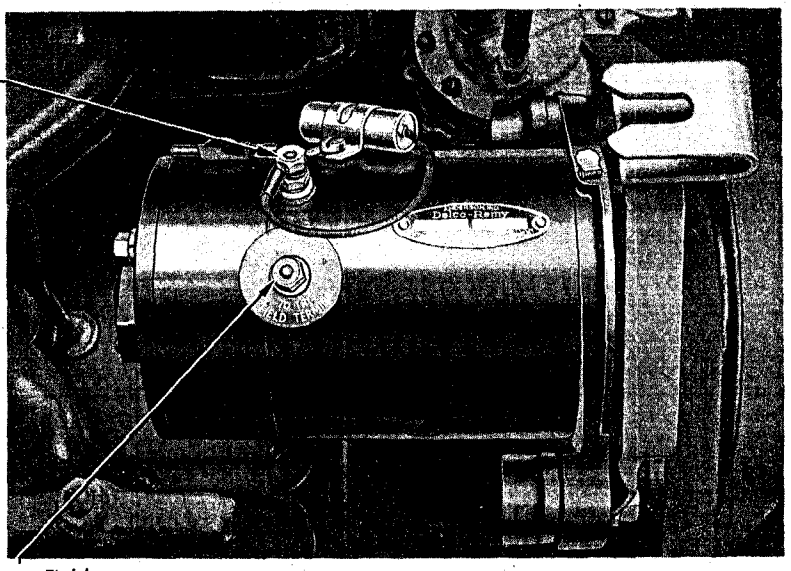


Fig. 5
Radio Condenser Mounting on Generator
(Viewed from Above)

Plate 61. Generator and Regulator Mountings

inserting a resistance into the field circuit of the generator.

All of the current and voltage regulators are properly adjusted, tested, and sealed at the factory and should require no attention in service excepting that the external connections should be tight and clean. If abnormal conditions arise, the regulators should be checked thoroughly as explained in Note 6.

STARTING CIRCUIT

The starting motor is mounted just in front of the flywheel housing at the right side of the engine on 37-50, 60, 65, 70 and 75 cars, and in back of the flywheel housing at the right side of the transmission case on 37-85 and 90 cars. The series 85 and 90 starting motor operates through double reduction gears.

The starting motor is operated by a push button on the dash, by means of a solenoid, relay and switch mounted together on the starter housing. The solenoid engages the starter pinion with the flywheel gear before the cranking current is turned on.

The starter is connected back to the generator in such a way that when the generator is charging, a reverse current flows through the cut-out relay, breaks the circuit, and prevents starter engagement. The ignition switch is connected in series with the relay so the ignition must be turned on before the starter can be operated.

The solenoid serves two purposes. It operates both the starter gear shifting mechanism and the starting current switch. When sufficient current is passed through the windings, the plunger is moved first to engage the starter pinion with the flywheel ring gear and then to close the switch contacts.

BATTERY

The battery capacities are as follows: 110 ampere hours for series 37-50, 60 and 65, 130 ampere hours for series 37-70 and 75, 160 ampere hours for series 85, and 190 ampere hours for series 90. The battery is carried beneath the front seat on the left hand side of the car on all V-8 and V-12 cars. The battery is located beneath the hood alongside of the right front fender on the V-16. The positive terminal is grounded on all series.

LIGHTING SYSTEM

The lighting system provides headlamps with three driving beams, parking lights in the headlamps, and two rear lamps, each containing a driving and a signal light and fitted with reflex buttons in the lamp bases.

"Multi-beam" headlamp equipment is provided, having non-interchangeable right and left lenses used with specially designed reflectors and two-filament prefocused bulbs. There are three different beams obtainable with these headlamps:

1. An upper beam produced by the lower filaments of both lamps which is used for country driving.

2. A beam for country passing produced by lowering the right headlamp beam only.

3. A beam produced by the upper filaments of both lamps which is used for city driving.

The headlamps on series 37-50, 60, 65, 70, 75 and 85 are controlled by two switches, a hand controlled button on the dashboard at the right of the driver and a foot operated selector switch on the floorboard to the left of the clutch pedal. The hand controlled button has three positions to provide the various beams as shown in Figure 28. The headlamp indicators in the speedometer face show at all times the beam in use.

The foot operated selector switch is operative in two positions to provide the selection of either the "city" or the "passing" beam with the driving beam. This arrangement has been incorporated to permit the use of the city beam when passing cars on winding roads, because under these conditions the passing beam would cause glare. See Figure 28.

The light switch is located at the bottom of the steering column on series 37-90 cars and is operated by a lever in the center of the steering wheel. Series 37-90 cars have a light relay located on the front motor support to facilitate proper functioning of the "passing" beam in various positions of the selector switch.

The foot selector switch on all series cars for export purposes is only operative in one position. It may be used in the "bright" beam position to obtain the "city" beam when passing a car on the road. All series export cars are also equipped with fender lights and Expolyte headlamps. These special head lamps require the use of a 30-20 watt, 6-8 volt bulb.

Thermostat relays are placed in the lighting circuits of all 37 series cars to safeguard the car against damage due to electrical shorts. When a short occurs in the circuit, the current increases to a point where the heat created will cause the relay to open, breaking the circuit. When the current stops, the relay cools and closes, causing current to flow again. This opening and closing of the relay causes the lights to flicker but will not allow the current to increase to a point where excessive heat would be developed and cause damage to the lighting circuit.

The thermostat relays on series 37-50, 60, 65, 70, 75 and 85 cars are located on the light switch and connected in series with it. The thermostat relays on series 37-90 cars are located on the hand brake bracket under the left hand side of the dash.

These relays should open in 1 minute when subjected to 38 amperes at 70° F.

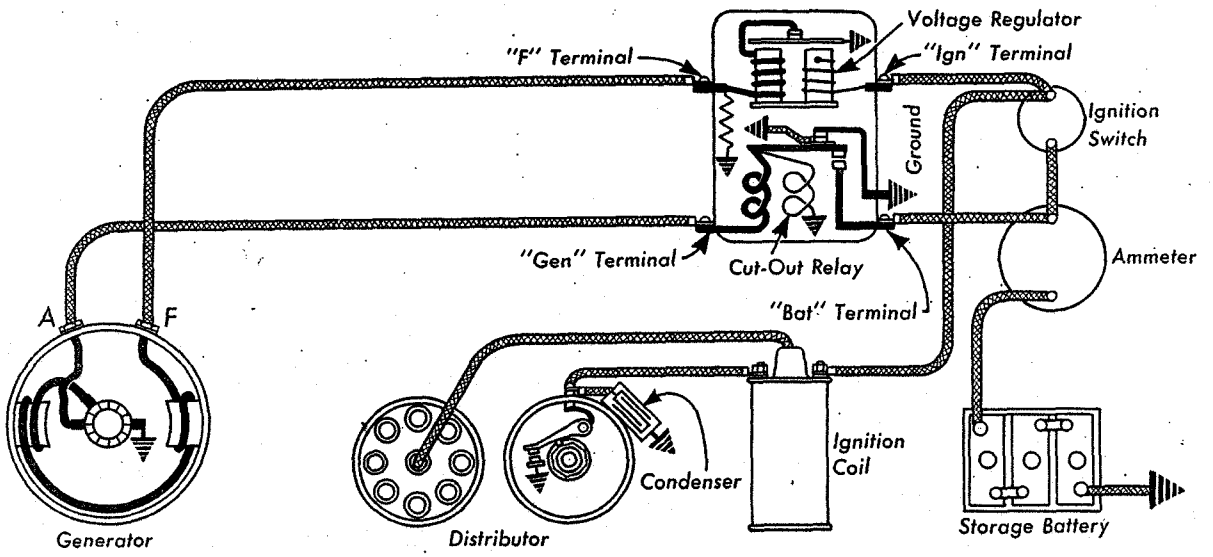


Fig. 6 Generator Charging Circuit—Series 37-50, 60 and 65

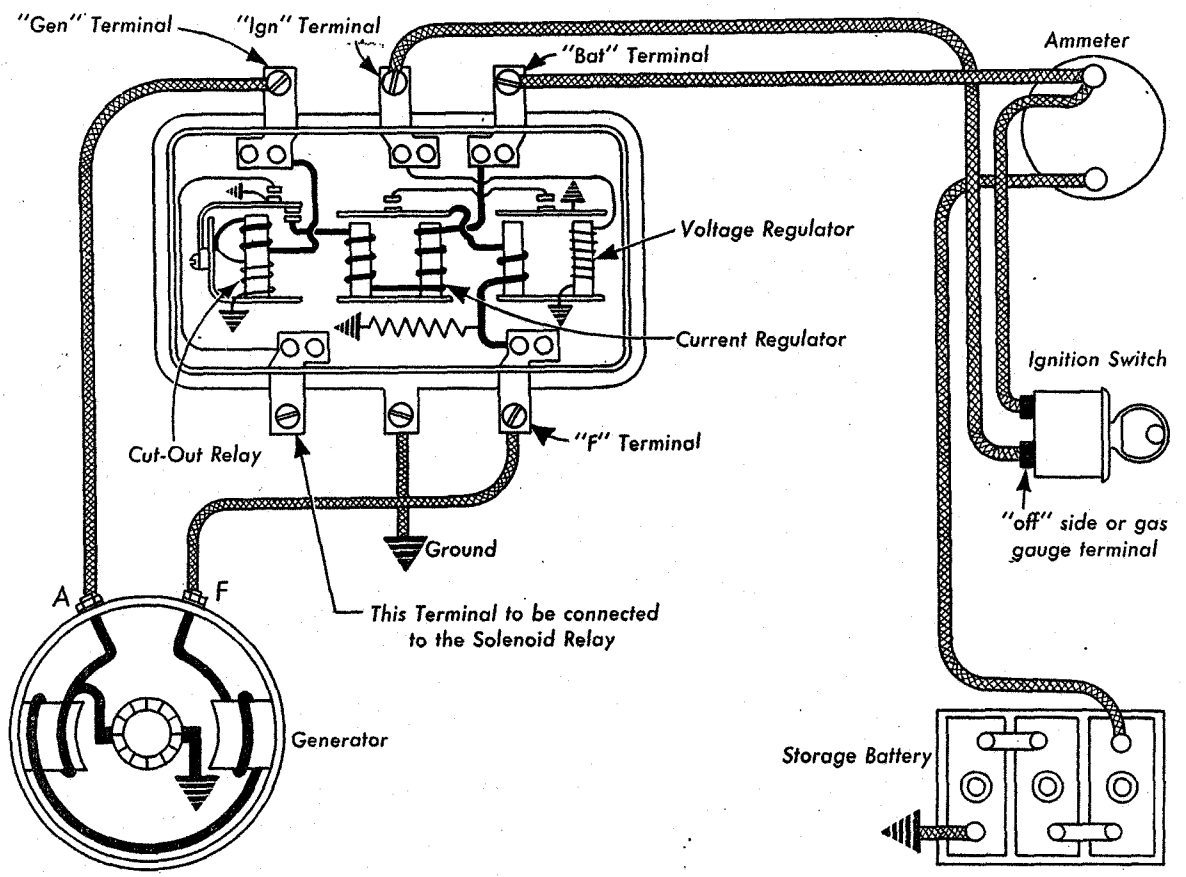


Fig. 7 Generator Charging Circuit—Series 37-70, 75, 85 and 90

Plate 62. Generator Charging Circuits

HORNS

Twin air-tone horns, matched in tone, are used on all series cars. They are mounted by means of a bracket and are cushioned in rubber. The bracket is attached to the back of the air cleaner on all 37 series V-8 cars, between the radiator tie rods on series 37-85 cars, and to the engine side of the dash on series 37-90 cars. The horn button, when depressed, permits a light current to pass through a relay which is mounted on the horn support bracket, and this in turn closes the circuit for the heavier current that operates the horns.

GASOLINE GAUGE

The gasoline gauge is electrically operated. The dash unit consists principally of two coils spaced 90° apart with an armature and pointer assembly mounted at the intersection of the coil axes. An inertia dampener is provided on the armature assembly to prevent vibration of the pointer on rough roads.

The tank unit is essentially a rheostat, actuated by a float in the tank. A cork washer, held by a calibrated spring, prevents any slight float movement from appearing on the dash unit indicator. When the tank is empty, the rheostat in the tank unit is completely grounded. See Fig. 33. All current through the dash unit then flows through the coil at "empty" side of indicator and the pointer is pulled to the "empty" mark.

As fuel is added, the float assembly rises. This moves the contact brush in the rheostat, introducing resistance into the circuit so that part of the current flows through the other coil and the pointer is attracted away from "empty" to a position of balance between the two coils.

The gauge is compensated for temperature variation and is not affected by variation in battery voltage. It is connected in series with the ignition switch so that there is no discharge of current when the ignition switch is turned off. The ignition must be switched on to read the gauge.

Service on the gauge can be obtained at United Motors Service and A. C. Service Stations. Service information is given in Notes 20 and 21.

INSTRUMENT PANEL

The instrument panel on series 37-50 and 60 is an integral part of the body. The instrument panel on series 37-65, 70, 75 is a single die casting with mountings and arrangements as shown in Plate 67, Fig. 30 and 31. The translucent dials are lighted from behind by lamps having a rheostat to control the light intensity. Series 37-85 cars have a similar instrument panel but have a choke button which is located to the left of the steering wheel.

The general arrangement and mounting of the instruments on the instrument panel of series 37-90 car is different than the other series cars and is shown in Plate 67, Fig. 32.

Service Information

GENERATOR CIRCUIT

Although two distinct types of generator circuits are used, the following information applies to all 37-series cars.

1. Disconnecting Wires in Generator Circuit

Whenever disconnecting any wires in the generator circuit, the starter circuit, or any wires in the harness opening at the regulator box, the battery **must be disconnected first of all.**

This precaution is necessary to prevent any possibility of the loose connections being grounded in a way that will reverse the generator polarity —a condition which may cause serious damage to the charging circuit, as explained in Note 5.

2. Running Generator on Open Circuit

Never run or test the generator on open circuit. If it should ever be necessary to operate the engine without the battery connected, the generator must be grounded or both generator and regulator will be damaged. This can be done by connecting a "jumper" wire between the GEN and the GROUND terminals in the regulator.

3. Generator Circuit Difficulties

Charging circuit difficulties are of two types—instances where the generator will not charge at all, and instances of the charging rate being too high or too low. If the generator will not charge, check the following items in order:

1. Check the regulator unit to make certain that the terminal marked GRD is properly connected to a good ground. All connections in the charging circuit must, of course, be clean and tight, but this ground connection is of particular importance.

2. If the car is radio-equipped, remove the radio condenser from the generator. An intermittent short in the condenser may be the cause of the difficulty, but in any event it is advisable to have the condenser disconnected when making tests.

3. Test to make certain that the generator polarity is not reversed. If the polarity is reversed it will be necessary to service the regulator unit and to correct the generator polarity. See Note 5.

4 Ground the regulator terminal marked "F" temporarily and gradually increase the engine speed to determine if the generator can produce its rated output.* (See Specifications Page 163).

Note: Do not drive the generator at high speed while making this check, or damage may result, as there is no regulation whatever with this hook-up.

*As measured on a precision ammeter.

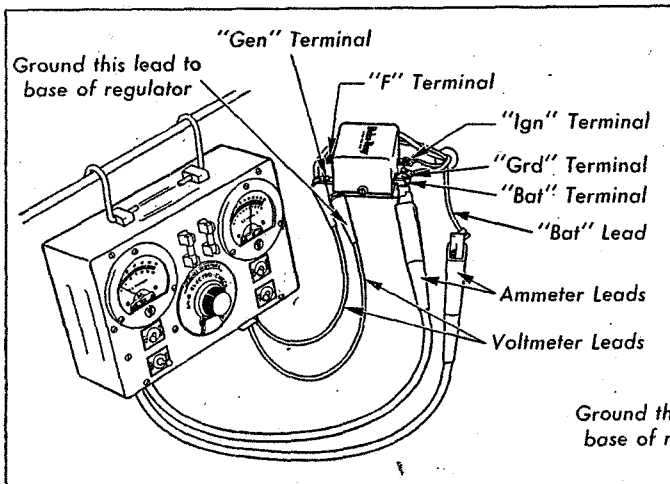


Fig. 8 Connections for Checking Cut-Out Relay

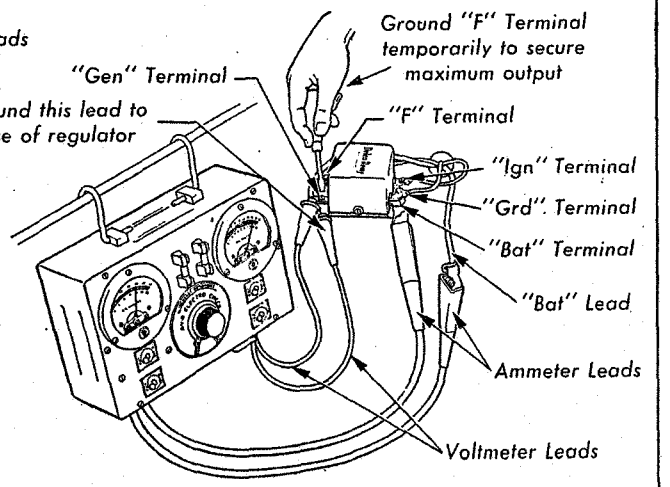


Fig. 9 Connections for Checking Generator Output

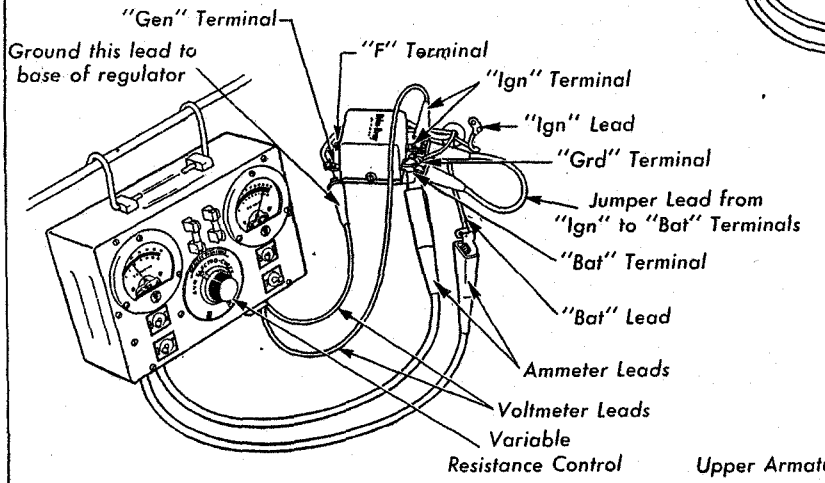


Fig. 10 Connections for Checking Regulator Operating Voltage

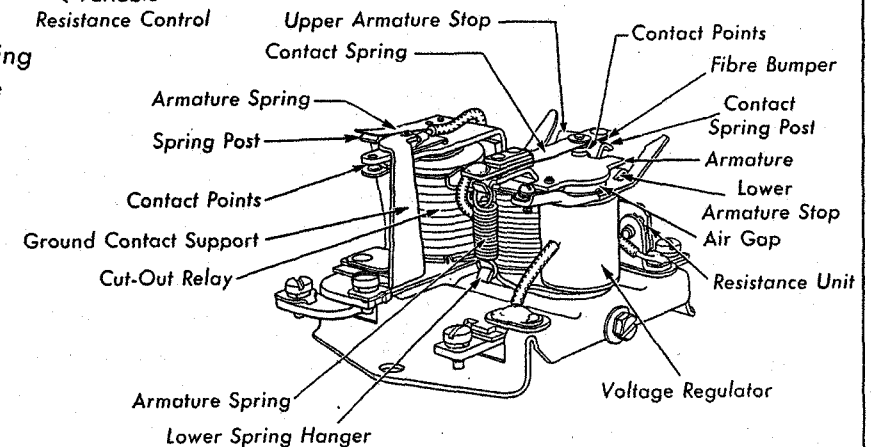


Fig. 11 Regulator Unit

Plate 63. Regulator Tests and Adjustments—Series 37-50, 60, 65

If the generator charges satisfactorily with the "F" terminal grounded, the trouble is probably in the regulator, particularly the cut-out relay. and the regulator should be replaced or adjusted. See Note 6.

5. If the generator does not charge with the "F" terminal grounded, remove the lead from the GEN terminal and strike it against a ground, such as the motor block, while the "F" terminal is still grounded. If no spark occurs, the trouble will be in the generator. If a spark does occur, the regulator is at fault.

If the generator charging rate is too high or too low, investigate the following:

1. A high charging rate may be caused by a shorted battery.

2. A low charging rate may be caused by a loose connection in the charging circuit, sulphated battery plates or other high resistances.

3. Oxidized points in any of the regulator units will cause a high resistance which may result in a low charging rate and a discharged battery.

Oxidized points may be caused by an incorrectly installed radio condenser (Note 4), running the engine with the generator polarity reversed (Note 5) or excessive sparking at the points.

Excessive sparking at the contacts and erratic operation may be due to low tension on the upper contact spring or a misalignment of contact points. Excessive sparking may in time oxidize the contacts sufficiently to cause high resistance and prevent the generator from charging.

The effect of oxidization on the contact points may be determined without breaking the regulator seal. To do this:

1. Disconnect the lead from the "IGN" terminal on the regulator and connect the ammeter test leads as shown in Plate 63, Fig. 10 and Plate 64, Fig. 14.

2. Run the engine at a low speed until 4 or 5 amperes output is being obtained.

3. Ground the "F" terminal of the regulator and note the difference in the ammeter reading. If the reading is 2 or more amperes higher with the "F" terminal grounded, it indicates an excessive amount of oxide on the contact points of the current or voltage regulator units or both.

Note: The generator speed must be held constant and the reading taken as soon as the ammeter needle maintains a steady position.

Oxidized contacts should be cleaned with a thin fine-cut contact file. The file should not be allowed to become greasy and should not be used to file other metals. The contact points can be cleaned without disturbing the regulator setting if care is taken to avoid bending the contact springs excessively.

Note: Use the file sparingly on the small contact as the actual contact material is only a few thousandths of an inch thick. Never use sandpaper or emery cloth for cleaning contacts.

4. An incorrect charging rate not caused by any of these conditions can be corrected by resetting the current and voltage regulators.

4. Installing Radio Condensers

When installing a radio suppression condenser on the generator be sure that it is connected to the generator armature terminal. On series 37-50, 60, 65, 70 and 75 cars this terminal is the left terminal on top of the generator. On series 37-85 and 90 cars this terminal is on the commutator end frame. The generator field terminal is located on the top of the generator on all 37 series cars and has a warning tag to caution against connecting the condenser to it, as this would result in rapid oxidization of the regulator contact points.

5. Generator Polarity Reversal

A "Reversed Pole" generator is one in which the magnetic poles of the field windings have become reversed. When this occurs, it causes excessive arcing across the contact points of the cut-out relay, with the result that the points will eventually become fused together.

This condition can be detected by observing the action of the car ammeter. If the generator poles have been reversed, the ammeter pointer indicates a heavy discharge and the pointer will fluctuate violently with the engine running, or may indicate a steady discharge with the ignition shut off. A rapid and complete discharge of the car battery will follow.

If the lower end of the current regulator ground wire—which is carried in the wiring harness that extends from the regulator box on the dash down to the starting motor—is permitted to touch the battery terminal at the starter, or if any live wire of the electrical circuit is grounded even momentarily while the regulator ground wire is disconnected, the generator polarity will become reversed.

This condition can be avoided by remembering to **disconnect the battery** every time that electrical connections are to be disturbed. The battery is the first point to be disconnected and the last to be reconnected.

In cases where the generator has become reversed in polarity, as indicated above by the ammeter, two correctives are required: The generator polarity must be reversed back to normal, as explained below, and the current regulator must be serviced or replaced. This requires inspection of the cut-out relay contact points. If they are only slightly burned, they can be cleaned up with a fine cut contact file. If they are badly burned or fused, the entire regulator unit must be replaced.

After servicing the regulator, the correct polarity of the generator magnetic field can be assured by shorting from the battery terminal across to the generator terminal on the current regulator box while the battery is connected. The two ter-

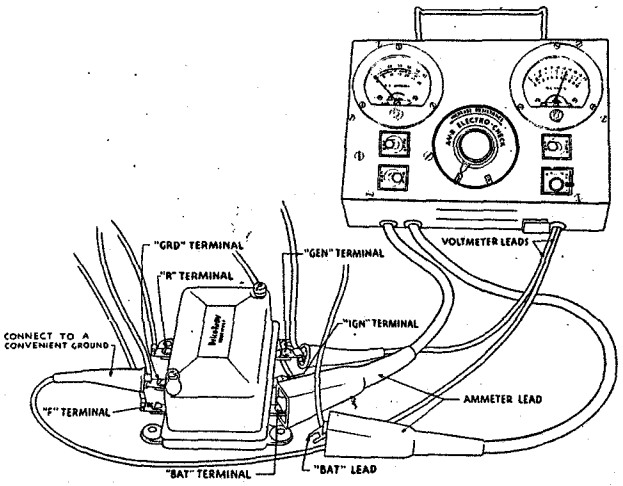


Fig. 12 Connections for Checking Cut-Out Relay

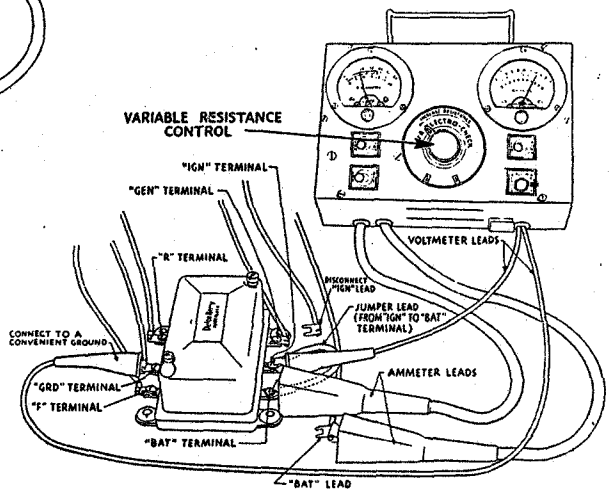


Fig. 13 Connections for Checking Voltage Regulator

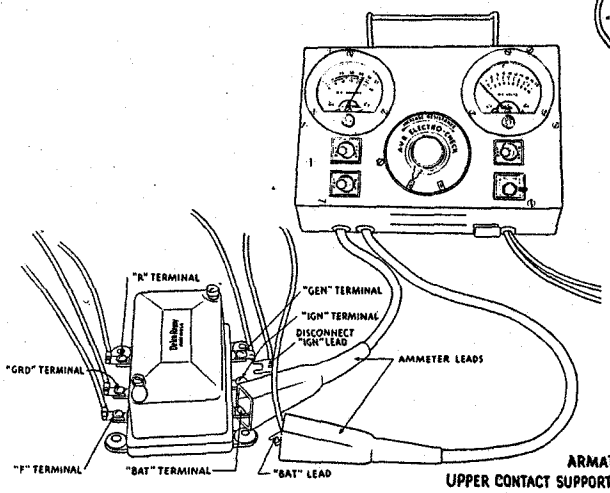


Fig. 14 Connections for Checking Current Regulator

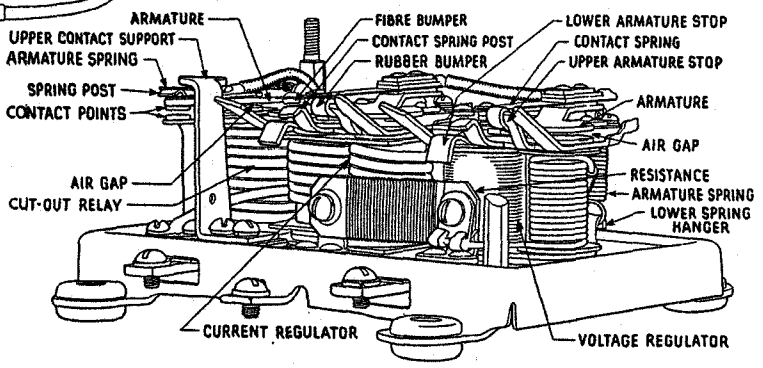


Fig. 15 Regulator Adjustments

Plate 64. Current Regulator Tests and Adjustments—Series 37-70, 75, 85 and 90

minals to be connected are indicated in Plate 62. Connecting these terminals with the bare ends of a short piece of heavy insulated wire for just a moment is all that is required.

6. Regulator Checking and Adjustments

Note: The following service operations on the regulator should be performed only by an experienced electrical workman having access to an adequate assortment of feeler gauges and suitable precision voltmeters and ammeters. The illustrations and instructions given apply to the AVR Electro-Check, but they apply equally well to the use of precision electrical equipment in motor analyzers or separate mountings.

Cutout Relay—The procedure for checking and adjusting the cut-out relay unit is similar on all series although different regulator assemblies are used.

To check the cutout relay, connect the voltmeter leads to the regulator as illustrated in Plate 63, Fig. 8 and Plate 64, Fig. 12. Figure 8 illustrates set-up for checking regulator unit used on series 37-50, 60 and 65 cars, while Fig. 12 illustrates set-up for checking regulator unit used on series 37-70, 75, 85 and 90. Gradually increase the engine speed and note the voltage at which the cut-out relay points close. This should be from 6.5 to 7 volts for series 37-50, 60 and 65 and from 6.8 to 7.3 volts for series 37-70, 75, 85 and 90.

With the ammeter leads connected as shown in Figs. 8 and 12, gradually decrease the engine speed and note the reverse current at which the contact points open. This should be from 0 to 3 amperes.

If the readings do not come within the foregoing limits, check the adjustment of the air gaps and point openings. The air gap should be .018 to .022 inch measured between the armature and the core with the contact points closed on all series. The air gap may be adjusted by loosening the two screws on the back side of the relay and moving the armature up or down as required.

Measure the point opening with the armature in the up position. Adjust the point openings by bending the ground contact support that carries the upper auxiliary contact. Only a very slight amount of bending is required. The opening should be from .018 to .025 inch on all series.

The closing voltage can be adjusted by bending the spring post to increase or decrease the tension of the armature spring. Increasing the spring tension increases the closing voltage and decreasing the spring tension decreases the closing voltage.

Voltage Regulator—To check the voltage at which the regulator is operating, disconnect the "IGN" lead from the regulator and place a jumper lead from the "IGN" to the "AMM" or "BAT" terminals and connect the ammeter and voltmeter leads to the regulator as illustrated in Figs. 10 and 13.

Gradually increase the engine speed until the generator is charging 8-10 amperes at a generator speed of 2000-3000 R. P. M. After the regulator has reached its proper temperature, retard the speed of the generator until the cut-out relay contact points open. Then increase the generator speed to 2000-3000 R. P. M. and with a generator output of 8-10 amperes, check the voltage at which the voltage regulator unit is operating (regulator cover must be in place). Always decrease the engine speed until the cut-out points open after making voltage adjustments before taking the final voltage reading.

Note: Voltage regulator readings must be checked both cold (70°F.) and hot (150°F. or very hot to the hand) to be sure that it is properly adjusted.

In order to maintain the 8-10 ampere output while making this check it is recommended that a variable resistance of approximately .25 ohms be used in the charging circuit. This resistance must be connected in series at the "AMM" or "BAT" terminal of the regulator with a jumper lead from the "AMM" or "BAT" terminal to the ignition terminal as illustrated in Figs. 10 and 13. (IGN lead must be disconnected while making this check). If the charging rate is less than 8 amperes with all of the resistance out of the circuit, turn on the lights in order to maintain the output while making the check.

The voltage is regulated by slightly bending the spring hanger to which the lower end of the spiral spring is attached. Increasing the spring tension increases the voltage at which the regulator operates and decreasing the tension decreases the voltage at which the regulator operates.

If when adjusting the regulator to the proper voltage, it is found that the spiral lower spring does not have enough tension to hold it in place, reduce the tension of the upper contact spring—but not less than the low limit specified.

Other voltage regulator adjustments are made as follows:

Air Gap—With the fibre bumper barely touching the contact spring post, check the air gap between the armature and the center of the core. This gap should be from .060 to .070 inch on all series.

Adjust the air gap by bending the contact spring post. If it is impossible to secure the proper cold and hot regulator voltages, the air gap may be decreased to lower the cold setting with respect to the hot setting or increased to raise the cold setting with respect to the hot setting.

To check the contact point opening, hold the armature down against the lower stop and measure the contact point opening. Vary the point opening by adjusting the lower armature stop. The opening should be from .015 to .025 on all series.

Current Regulator—(Series 37-70, 75, 85 and 90 only)—Remove the jumper lead and with the "IGN" lead disconnected from the regulator,

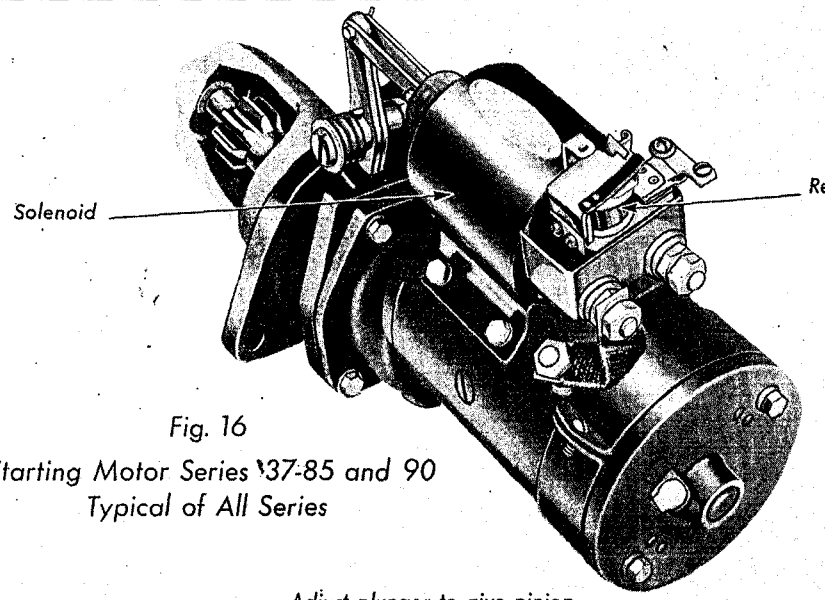


Fig. 16
Starting Motor Series 37-85 and 90
Typical of All Series

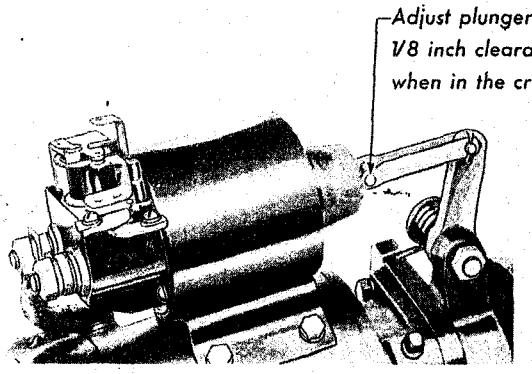


Fig. 17
Starting Motor Solenoid Control

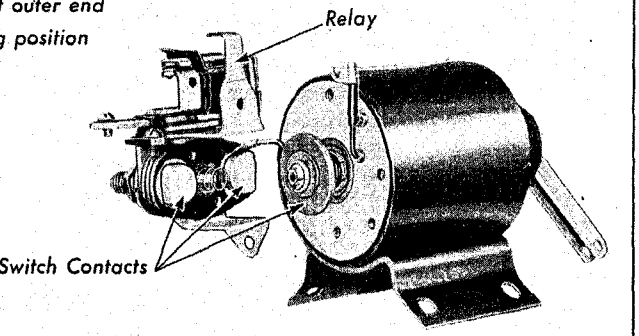


Fig. 18
Solenoid and Starter Switch

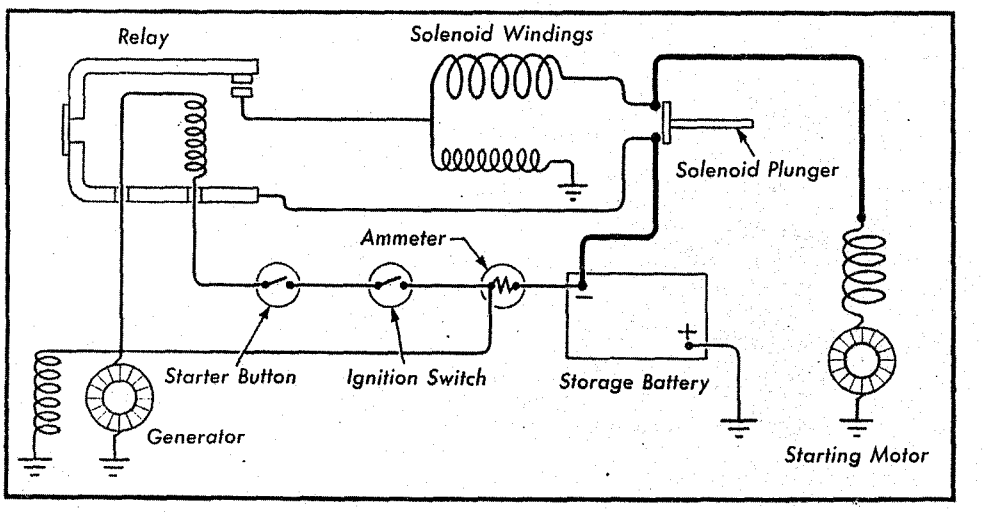


Fig. 19 Starting Motor Circuit

Plate 65. Starting Motor

connect the ammeter to the regulator as shown in Fig. 14. Turn on the lights and gradually increase the speed of the generator until the output remains constant. Under this condition, the output of the generator will be the amount for which the current regulator is adjusted.

Note: It is not absolutely necessary to turn on the lights when checking the current regulator but, in case the battery is fully charged, it will prevent excessively high voltage within the electrical system while making this check.

The current setting is adjusted by bending the lower spring hanger. Increasing the spring tension increases the current setting and decreasing the tension will decrease the current setting.

The air gap, point opening, etc. are adjusted in the same manner as described under Voltage Regulator. Also see specification table.

Gap Between Fibre Bumper and Contact Spring Post—When the armature is up, check the gap between the fibre bumper and its stop. Adjust the upper armature stop to obtain the correct gap. This gap should be .008″-.013″.

Contact Point Spring Tension — Contacts should be adjusted to meet squarely and with a pressure of 3½ to 6 ounces. (Check pressure at the instant that the points separate, using a spring scale of the type used for checking distributor contact arm tension). Adjust this pressure by slightly bending the contact spring carrying the upper contact.

7. Removal of Generator

The generator on series 37-50, 60, 65, 70 and 75 cars is located in the Vee of the engine and can be removed as follows:

1. Raise hood (left side preferable).
2. Disconnect all wires leading from generator.
3. Remove generator supporting bolts.
4. Lower generator and remove belt from generator pulley.
5. Remove air cleaner bottom cover and brace. (This is now held by a wing nut on top of air cleaner).
6. Loosen clamp holding air silencer and cleaner assembly to the carburetor and shove the assembly to one side, making room for the removal of the generator.
7. Remove generator.

To replace the generator on series 37-50, 60, 65, 70 and 75, the reverse of the above operations are followed.

The generator on series 37-85 and 90 is chain driven and is located on the right hand side of the engine. The water pump drive shaft is connected to and driven by the armature shaft. The generators on series 37-85 or 90 cars are removed as follows:

1. Raise hood (right side).
2. Remove water pump drive shaft.
3. Disconnect wires leading from generator.
4. Remove generator breather pipe and horn. (The breather pipe is screwed into the bottom of the generator and can be removed from underneath the side-pan by getting a hold of the longer side with an adjustable wrench and screwing out).
5. Remove bottom bolt which, together with two nuts on top, holds generator.

Note: To remove this bolt, a $\frac{9}{16}$″ socket wrench (about 1 ft. long) with a sliding "T" is used. On series 37-85 the carburetor must be removed in order to use this wrench and remove the bolt.

6. Remove two retaining nuts at top.
7. Remove generator by pulling straight back until it is free from driver.

The reverse operations are followed when replacing a generator on series 37-85 and 90 cars.

STARTING CIRCUIT

8. Correcting Starter Solenoid Difficulties

The solenoid starter is so designed that after the generator is charging, there is no possibility of the starter engaging while the engine is running, even if the starter button is accidentally depressed. There are two conditions, however, that may cause accidental starter engagement.

1. The idling speed may be so low that the generator is not charging. In order to assure against starter difficulties, the idling speed should always be set high enough to keep the ammeter indicating on the "charge" side.

2. There may be a short in the wire from the starter relay to the generator regulator. This short may occur at the relay cover or anywhere in the wiring harness, and must be located with a test light. In case of a "floating ground" it may be necessary to move the wiring harness at various points to produce the ground.

In case the starter engages as soon as the ignition is turned on, either the starter switch button is sticking or there is a short in this circuit.

9. Solenoid Plunger Adjustment

The only adjustment on the starting motor assembly is that of the solenoid plunger to secure the proper mesh of the starting pinion with the flywheel ring gear. To make this adjustment:

1. Remove the starter from the engine.
2. Remove the pin in the upper end of the shifting yoke.
3. Push the solenoid plunger all the way in the solenoid and move the pinion all the way out to what would be the cranking position if the starter were mounted, taking out all backlash in the shifting mechanism.
4. Move the pinion ⅛ inch back toward the disengaged position and adjust the stud in the solenoid plunger until the pin may just be inserted at the forward end of the slot. See Plate 65.

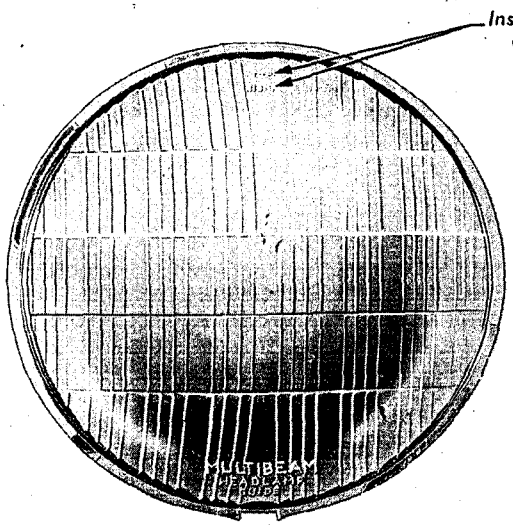


Fig. 20 Headlamp Lens

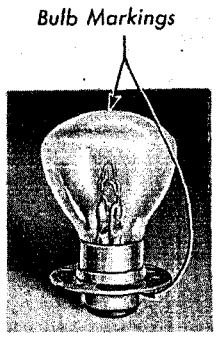


Fig. 21 Prefocused Bulb

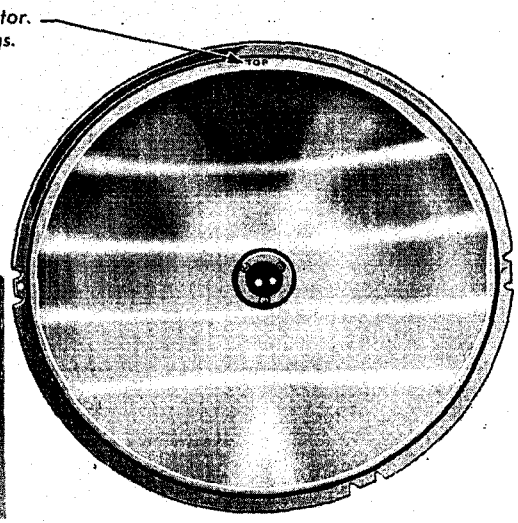


Fig. 22 Headlamp Reflector

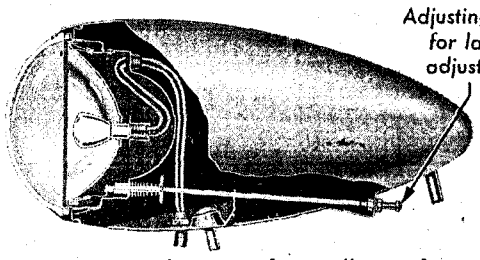


Fig. 23 Sectional View of Headlamp from Top

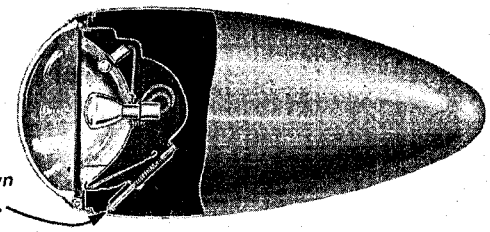


Fig. 24 Sectional View of Headlamp from Side

Fig. 25 Correctly Aimed Upper Beam of Left Headlamp with Lens

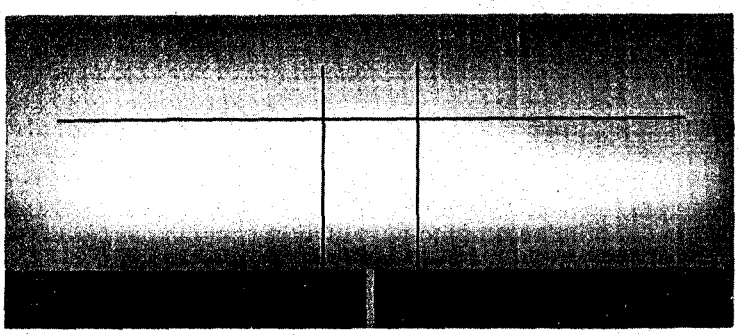


Fig. 26 Correctly Aimed Upper Beam of Right Headlamp with Lens

Plate 66. Headlamp Adjustment

If any further difficulty is encountered with the starter motor it should be removed and replaced by another starter assembly.

STORAGE BATTERY

10. Adding Water to Storage Battery

The correct level for the battery electrolyte is just below the bottom of the filler tubes. If the liquid comes above the bottom of the tubes it may be forced up and overflow because of pressure generated within the battery by its "gassing."

Inspect the battery every 1000 miles during the winter and every 500 miles (or every two weeks) during the summer, to make sure the electrolyte is up to the proper level. Only distilled water kept in a glass, rubber or porcelain lined container, should be used to replace liquid lost through evaporation.

If electrolyte has been lost through overflow or spilling, it should be replaced by a competent battery repair man.

11. Battery Cable Terminals

The battery cables should be kept tight at all times and the battery terminals should be kept clean and free from corrosion. Warm water, poured slowly over corroded battery terminals will dissolve the copper sulphate that has been deposited so that it can be brushed off and flushed away easily.

The terminals and battery posts should be wiped with a cloth saturated with household ammonia or a solution of water and bicarbonate of soda (baking soda). These alkaline solutions will neutralize any acid that may be present on the parts to be cleaned. Do not allow any of the alkaline solution to get into the cells of the battery.

After the parts are cleaned they should be given a heavy coat of vaseline or grease to retard further corrosion.

The positive (large) post is grounded on all 37 series cars.

12. Battery Electrolyte Tests

The electrolyte (battery solution) should be tested with a hydrometer. The specific gravity as registered by the hydrometer should be 1.270 to 1.300 at 70° F. when the battery is fully charged. A gravity reading of 1.150 or below indicates that the battery is entirely discharged.

Whenever a reading under 1.250 at 70° F. is due to a temporary abnormal demand for current through excessive use of lights or starter, the charging rate should be sufficient to bring the battery up to a fully charged condition again. If the electrolyte tests below 1.200 at 70° the battery should be recharged from an outside source.

13. Battery Removal

The battery is located under the left hand side of the front seat on series 37-50, 60, 65, 70 and 75 cars and may be removed by loosening the support bolts from the under side of the car, removing the seat and the battery cover, and lifting it out from above.

The battery is in the same position on series 37-85 cars but is removed by lowering the battery and box to the floor after the box has been unfastened. The procedure for removing the battery from V-12 convertible cars differs slightly from that used to remove the battery from V-12 closed models. In both cases the battery is removed from beneath, but the addition of frame supports on the convertible bodies makes it necessary to remove the inside battery support rod before the battery can be lowered.

The battery is located in a metal container bolted to the frame alongside of the right front fender on series 37-90 cars. To remove the battery from this series car, first remove the dust cover by removing the nuts from the outer side of the box. Next remove the two cap screws holding the battery box straps to the frame, then lift the battery enough to unhook it from the frame, move it toward the outside of the car enough to clear the frame and lower the battery out of the car. Due to the weight of the batteries used on series 37-85 and 90 cars, it is advisable that two men be assigned to this job.

LIGHTING SYSTEM

14. Replacing Headlamp Bulbs

The prefocused headlamp bulbs used with the Multibeam lamps are installed in the reflector in a similar manner to the conventional bayonet type bulbs. They are pushed on the retaining pins and rotated slightly clockwise to lock them in position.

It is important that all three pin heads project through the bulb collar slots and that the collar rests flat against the bulb seat before the bulb is turned to lock it in position. When removing the bulb it should be tipped or rocked slightly before it is turned counter-clockwise.

The parking bulbs in the headlamps are removed by merely pushing in and rotating them counter-clockwise and replaced by pushing in and rotating clockwise.

In replacing bulbs it is important to use bulbs manufactured by the approved bulb suppliers or furnished by the factory Parts Division. Only prefocused bulbs with the G. E. or Mazda trademark should be used.

15. Cleaning Headlamps

The headlamps require periodic cleaning and occasional readjustment. To clean the headlamps, remove both headlamp doors and clean the lenses with alcohol inside and out. Wipe all dust from the reflectors and, if necessary, polish them with a soft rag dipped in a mixture of lampblack and alcohol.

In polishing reflectors, always rub from the center outward in straight lines. Do not polish reflectors with a circular motion, because the fine circular lines break up the light rays and reduce the illumination.

Replace any gaskets that are damaged or do not fit properly. Replace any bulbs that are burnt out or show signs of blackening. Try the lighting switches in all positions and see that all bulbs burn properly.

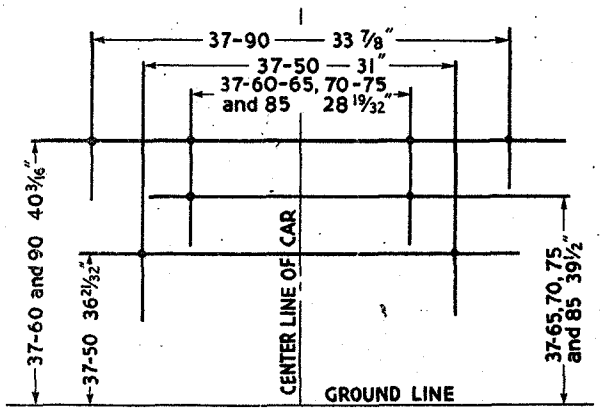


Fig. 27. Headlamp Aiming Diagram

16. Headlamp Adjustment

Two adjusting screws on each headlamp provide for accurate aiming of the headlamp beam on all 37 series cars except the 37-90. On all V-8 and V-12 cars the position of the headlamp beam may be moved to the right or to the left by turning the side adjustment screw located inside the radiator shell. The beam may be raised or lowered by turning an adjustment screw located in a depression in the bottom of the lamp body.

The horizontal adjustment of series 37-90 lamps depends on the correct mounting of the lamps. The vertical adjustment is similar to the other 37 series cars, the reflector being tilted by means of a scerw in the bottom of the lamp body.

The headlamp beams are to be aimed with the lens and door in place in order to avoid the possibility of adjustment being changed when the door is reinstalled. Most accurate aiming can be secured with headlamp testing equipment. Several types of equipment now available commercially will do a most satisfactory job.

If testing equipment is not available the lights can be aimed using a screen drawn up according to the dimensions given in the illustration in Fig. 27. The procedure when using the screen is as follows:

1. Place the car on a level floor 25 feet from the screen.
2. With the lens and doors in place, switch the headlamps to the "driving" position and cover one lamp.
3. Tighten or loosen the adjusting screws to give the correct beam pattern as shown in Figs. 25 and 26.
4. Repeat the procedure on the other headlamp, meanwhile covering the one already adjusted.

When replacing the headlamp bulbs there is a possibility that the adjustment may be changed. Therefore, when a new bulb is installed, the headlamp adjustment should be checked after the door has been reinstalled.

17. Headlamp Misalignment

Misalignment of the headlamps is often caused by workmen pushing against the headlamps when moving the car. The headlamps should never be used for this purpose.

18. Headlamp Lens Removal and Replacement

To remove the headlamp lens from all 37 series cars, the following procedure should be followed:

1. Loosen clamp screw which is accessible in a depression in the bottom of the door.
2. Remove door by pulling frame outward at the bottom and lifting from locator at top.
3. Remove two wire retaining clamps located inside of door frame.
4. Remove lens.

To replace headlamp lens reverse the above procedure, making sure that the top of the lens (marked) is at the top and that the door is replaced with the clamp toward the bottom.

HORNS

19. Adjusting Horns

The air-tone horns used on Cadillac and La Salle are adjusted for tone at the factory and ordinarily

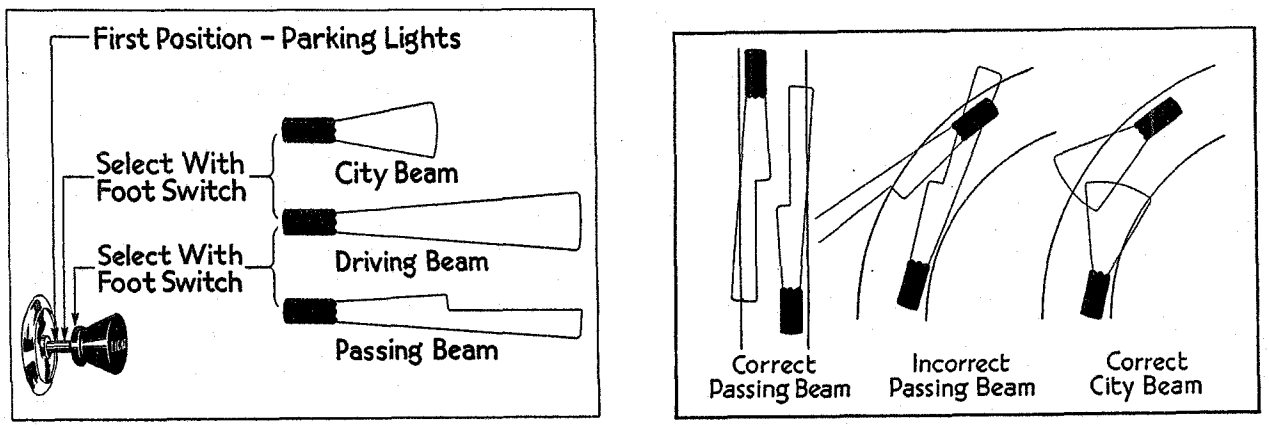


Fig. 28. Headlamp Beams and Their Use

will not require readjustment unless they have been tampered with. In cases of poor horn tone, the difficulty will ordinarily be found to result from one of the following causes:

Low Battery—Make sure that the battery is in good condition and fully charged also that the battery connections are clean and tight.

Poor Electrical Contacts — Check the contacts to make sure they are not burned or dirty.

Horn Relay Faulty—Make sure the relay is operating properly.

Projectors Interchanged—The projector and power unit must be properly matched. The short projector should be installed on the power unit marked "S" the long projector on the unit marked "L". These markings appear on the front of the power unit cover. See Fig. 29.

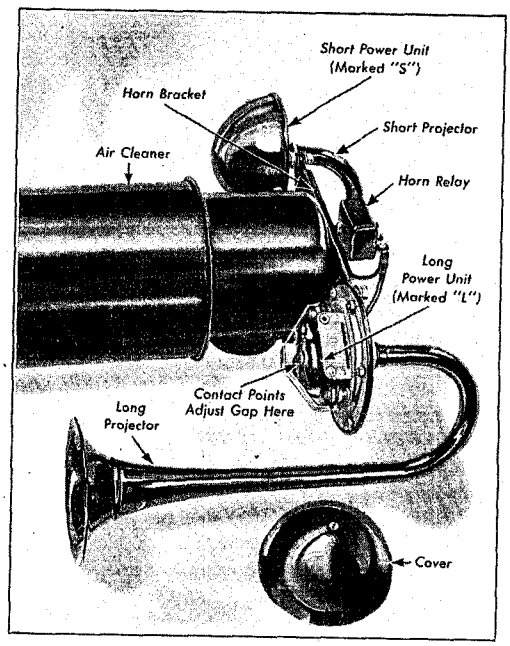


Fig. 29. Horn Relay and Adjustments

In most cases, a defect in the tone can be corrected by checking the above points. If not, the air gap between the armature and the field should be checked as a last resort. This gap requires extremely accurate setting and should not be touched until all other possibilities have been exhausted.

If the air gap is out of adjustment, it should be set parallel within .003 inch and to the following limits:

Low note..... .045 to .050 inch
High note..... .036 to .040 inch

GASOLINE GAUGE

20. Locating Gasoline Gauge Trouble

Does Not Register When Ignition Switch Is Turned "ON"

1. This may be caused by break in line between dash unit and ignition switch.

Gauge Shows "Full" Under All Conditions

1. This may be caused by break in line between dash unit and tank unit. To remedy this, check line and all connections.

2. Tank unit burned out. Replace tank unit.

3. Tank unit improperly "grounded" due to loose mounting screws or paint under the screw heads.

Tighten screws holding the tank unit. "Ground" the tank to the chassis and test.

Gauge Shows "Empty" Under All Conditions

1. This may be caused by wires being reversed on dash unit. To correct this trouble, reattach wires to proper terminals.

2. Dash unit not "grounded." Ground or replace dash unit.

3. Lead to tank unit grounded or tank unit rheostat continually grounded.

Gauge Inaccurate Throughout Entire Range

This condition may indicate the need for readjustment of the lock screw for the magnetic coils operating the needle. The lock screw is on the bottom of the dash unit on the left hand side. To readjust, loosen the screw and re-set to the correct readings. It is, of course, necessary to have a float unit in the circuit and to recheck the readings by filling the tank.

In some instances, incorrect readings are due to a bent float arm. The remedy in this case is bending the arm back to its normal position.

The work in locating the trouble will be considerably simplified if an extra tank unit is available as this can be connected up temporarily with the gauge by a short piece of wire, and grounding the body tank unit to the chassis. The float can then be moved to the "Full" and "Empty" positions. If the dash unit indicates the corresponding positions, the trouble is confined to the tank unit and wiring.

21. Removing Tank Unit

To remove the tank unit proceed as follows:

1. Remove tail pipe brackets.
2. Disconnect gas line.
3. Loosen gas tank straps and drop gas tank.
4. Disconnect wire from unit.
5. Remove unit.

Caution: Do not lubricate either the dash or tank units. No lubrication is necessary in the dash unit and the bearings in the tank unit are automatically lubricated by the splash of gasoline.

When connecting wires to dash unit, make certain that the wire which leads to the tank unit does not come in contact with the ammeter connection or the terminal on dash unit marked "ignition" as this may result in damage to the tank unit rheostat.

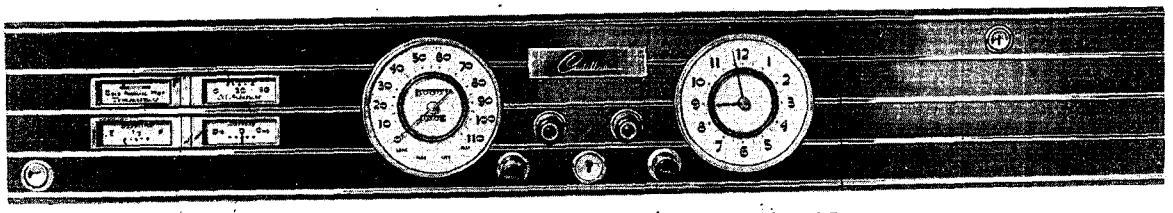


Fig. 30 Instrument Panel—Series 37-65
Typical of All Series, except 37-90

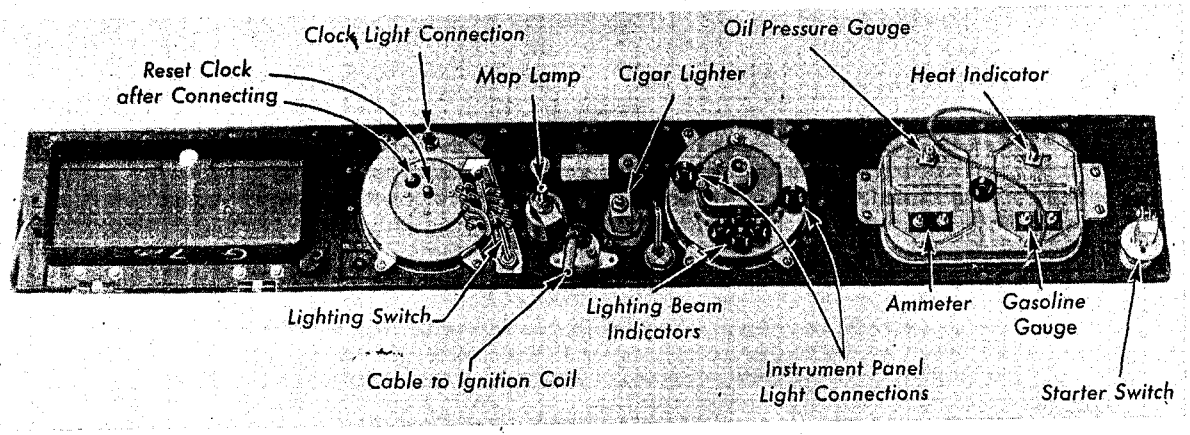


Fig. 31 Instrument Panel, Rear View

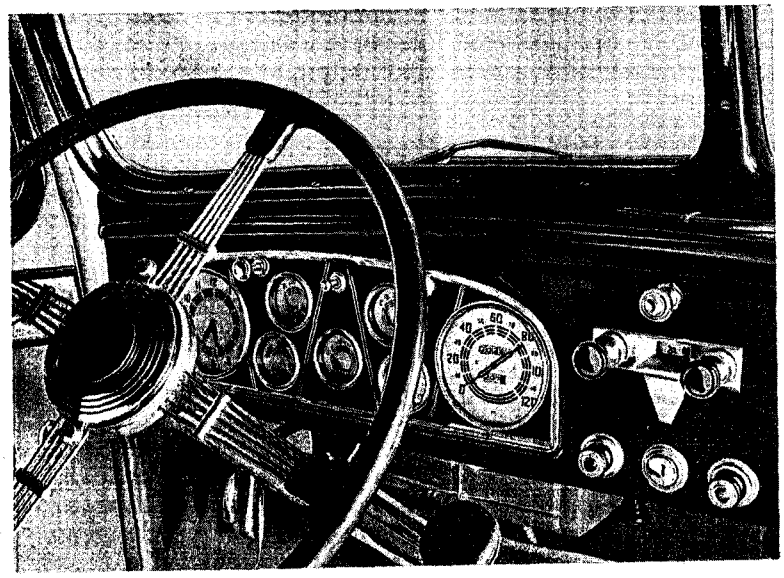


Fig. 32 Instrument Panel—Series 37-90

Plate 67. Instrument Panels

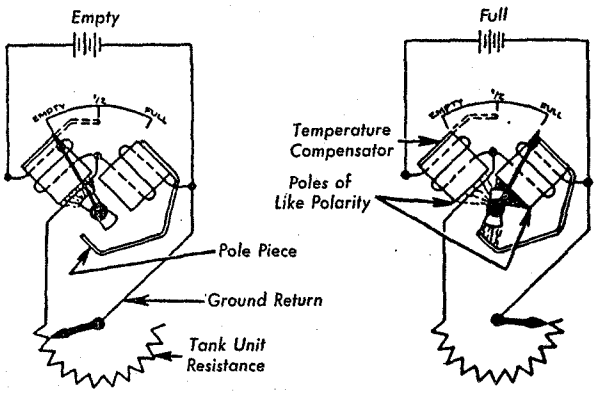


Fig. 33. Gasoline Gauge Operation

OTHER ELECTRICAL UNITS

22. Dictograph Phone Replacement

The phone units in Fleetwood Imperial and Town cars are installed in matched pairs. If it is ever necessary to replace either unit, they should both be removed and a new matched pair installed in their places.

In the event of weak signals with a pair known to be properly matched, check carefully for loose connections and possible shorts or grounds in the wiring caused by staples or tacks.

23. Radio Installation Precautions

Installation instructions provided with the Cadillac Master and Standard Radios contain ample information for correct installation. The following precautions are repeated, however, as they have an important bearing on the operation of the entire electrical system.

Radio suppression resistors must be installed on the spark plug wires and the ignition coil secondary wire, and condensers on the generator armature terminal and the coil primary terminal. No condenser is needed for the electric-wound clock as it does not radiate interference.

To install the condenser in the coil remove the coil end cover with Tool No. J-726 and install as shown in Plate 61, Fig. 4. Attach the eye-terminal to the primary terminal of the coil, and solder the flat-tip terminal to the coil case.

The generator condenser should be installed as shown in Plate 61, Fig. 5. Make certain that it is connected to the generator terminal and not to the field terminal, otherwise serious damage to the current regulator may result.

A rasping noise occurring in the radio at low engine speeds is not likely to be the result of improper suppression but is probably the result of loose brushes in the generator. This difficulty should be corrected at the source immediately, as loose brushes may damage the current regulator.

24. Installing Electrical Accessories

When installing additional electrical equipment, such as heaters, spot lights and cigar lighters, they should be connected so that they will not interfere with the operation of the thermostat relay (the "fuse" of the lighting system), yet so that the new circuit will also be protected by the relay.

Equipment of this sort should ordinarily be connected to the open terminal on the thermostat relay, which is mounted on the back of the instrument panel. If the owner installs so much electrical equipment that the total normal load causes the relay to vibrate, it will be necessary to connect some of the equipment direct to the discharge side of the ammeter. Equipment so connected will not have circuit breaker protection.

25. Removing Oil Gauge

When removing oil pressure gauge, first disconnect the battery lead at the ammeter in order to avoid the possibility of damage due to a short at the ammeter connections.

Bulb Data Chart

Location	Voltage	Candle Power	Contact	Mazda No.
Headlamps—				
Right	6-8	50-32	Double	*2530-L
Left	6-8	32-32	Double	2330-L
Rear Lamp (signal & drive)	6-8	3-21	Double	1154-L
Dome Light	6-8	15	Single	87
Quarter Light	6-8	15	Single	87
Map Light	6-8	3	Single	63
License Illuminating Bulb	6-8	3	Single	63
Fender Lamp	6-8	3	Single	63
Parking Lamp in Headlight	6-8	1.5	Single	55
Instrument Lights	6-8	1	Single	51
Headlamp Indicators in Speedometer	6-8	1	Single	51
Radio Dial	6-8	1	Single	51
Clock Lamp	6-8	1	Single	51

*In states where the 50 C. P. headlight bulbs are prohibited, 32 C. P. bulb No. 2330-L is installed in place of 2530-L when the car is shipped from the factory.

ELECTRICAL

Specifications

Subject and Remarks	37-50	37-60, 65	37-70, 75	37-85	37-90
Battery					
Delco type number	17 KW	17 KW	17 DW	21 DW	25 AW
Capacity ampere hour—					
20 hour rate	110	110	130	160	190
20 min. rate	131	131	156	195	234
Charging rate on bench					
Start in amperes	10	10	10	10	10
Finish in amperes	8	8	8	8	8
Plates, number of	17	17	17	21	25
Terminal grounded	Positive	Positive	Positive	Positive	Positive
Voltage—rated	6	6	6	6	6
Generator Regulators and Relay					
Current regulator					
Air gap between armature and center of core			.070-.080"	.070-.080"	.070-.080"
Contact spring tension			3.5-6 oz.	3.5-6 oz.	3.5-6 oz.
Contact gap (point opening) with armature down			.015-.025"	.015-.025"	.015-.025"
Gap between fibre bumper and contact spring stop			.008-.013"	.008-.013"	.008"-.013"
Cut-out relay—					
Air gap between armature and center of core	.018-.022"	.018-.022"	.018-.022"	.018-.022"	.018-.022"
Hold contact points together lightly while measuring air gap.					
Contact gap (point opening)	.018-.025"	.018-.025"	.018-.025"	.018"-.025	.018-.025"
Operation					
Contacts close—No. of volts approximately	6.5-7	6.5-7	6.8-7.3	6.8-7.3	6.8-7.3
At corresponding car speeds in M. P. H.	9	9	6	8	8
Contacts open—at discharge in amperes (reverse current)	0-3	0-3	0-3	0-3	0-3
Voltage regulator—					
Air gap between armature & center of core	.060-.070"	.060-.070"	.060-.070"	.060-.070"	.060-.070"
Contact gap (point opening)	.015-.025"	.015-.025"	.015-.025"	.015-.025"	.015-.025"
Generator speed for taking voltage reading in R. P. M. (8-10 ampere flow)	2000-3000	2000-3000	2000-3000	2000-3000	2000-3000
Voltage setting					
Closed circuit reading in volts					
At 70°F	7.55-7.85	7.55- 7.85	7.55-7.85	7.55-7.85	7.55-7.85
At 150°F	7.45-7.55	7.45-7.55	7.45-7.55	7.45-7.55	7.45-7.55
Do not set voltage on open circuit. Generator output should be 8-10 amperes.					
Delco type number for complete current regulator, voltage regulator, and cut-out relay unit			5518	5518	5518
Delco type number for voltage regulator and cut-out	5517	5517			
Gasoline Gauge					
Calibration					
Resistance in ohms					
Low float level (empty)	.0-.5	.0-.5	.0-.5	.0-.5	.0-.5
High float level (full)	29.6-31.3	29.6-31.3	29.6-31.3	29.6-31.3	29.6-31.3
Make	A. C.	A. C.	A. C.	A. C.	A. C.
Type number	1515442	1515442	1515420	1515420	1515059
Generator					
Delco-Remy type number	918-C	918-C	961-K	933-M	933-M
Armature—					
Commutator out of round, not over	.002"	.002"	.002"	.002"	.002"
End-play in ball bearing (side movement between races) not over (See Note 23)	.012"	.012"	.012"	.012"	.012"
Charging rate, maximum. in amps.	31	31	26	26	26

ELECTRICAL

Specifications—(Cont'd)

Subject and Remarks	37-50	37-60, 65	37-70, 75	37-85	37-90
Generator—(Cont'd)					
Armature speed for normal charging rate—					
Constant rate about R. P. M. on all series cars	.....	.....	1600 R.P.M. or 18 M.P.H.	1600 R.P.M. or 22 M.P.H.	1600 R.P.M. or 23 M.P.H.
Measured with testing ammeter at generator terminal					
Current regulation—					
All models—Shunt, wound generator					
Ratio of generator R.P.M. to engine R.P.M.	2-1	2-1	1.8-1	1.4-1	1.4-1
Starts to charge (cut-out contacts close) at armature speed in R.P.M.	760	760	700	620	620
Horn					
Delco-Remy (Airtone) type No.	K33-D	K33-D	K33-D	K33-B	K33-B
Air gap between armature and field core—					
Low note	.045-.050″	.045-.050″	.045-.050″	.045-.050″	.045-.050″
High note	.036-.040″	.036-.040″	.036-.040″	.036-.040″	.036-.040″
Current consumption in amperes at 6 volts	24-28	24-28	24-28	24-28	24-28
Number used	2	2	2	2	2
Lights					
Bulb data—See bulb Chart, Page 161					
Headlamp lens diameter	6½″	6½″	6½″	6½″	7″
Switches—					
Delco-Remy type number Lighting	480-S	480-S	480-S	480-S	487-H
Starting Motor					
Delco-Remy type number	727-V	727-V	727-V	580	580
Lock torque in ft.-lbs.	16	16	16	35	35
Lock amperage	600	600	600	600	600
Lock voltage	3	3	3	3	3
Armature—					
Clearance between shaft and bearings (bushings), not over	.010″	.010″	.010″	.010″	.010″
Commutator out of round, not over	.002″	.002″	.002″	.002″	.004″
End play, not over	.030″	.030″	.030″	.030″	.030″
Brushes—					
Number used	4	4	4	6	6
Gear ratios—					
Ratio between armature pinion and driven gear on sliding pinion shaft	.....	.....	.....	1.6-1	1.6-1
Ratio between sliding gear and flywheel	.....	.....	.....	12.5-1	12.5-1
Ratio between armature pinion and flywheel	17.3-1	17.3-1	17.3-1	21-1	21-1
Gears—					
Number of teeth in armature pinion	.....	.....	.....	15	15
Number of teeth in driven gear on sliding gear shaft	.....	.....	.....	25	25
Number of teeth in sliding gear	9	9	9	9	9
Number of teeth in flywheel gear	156	156	156	113	113
Number of poles	4	4	4	6	6
Relay—					
Air gap between armature and core	.008-.012″	.008-.012″	.008-.012″	.008-.012″	.008-.012″
Hold contacts together lightly while measuring air gap					
Contact gap (point opening)	.035-.045″	.035-.045″	.035-.045″	.035-.045″	.035-.045″

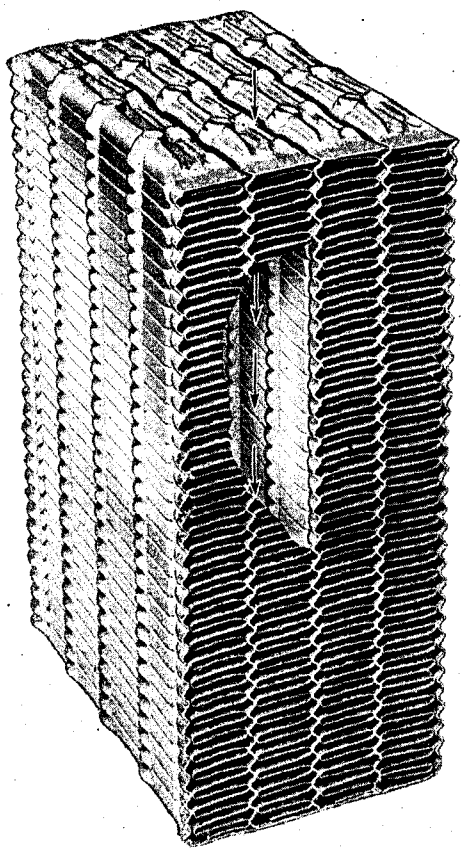


Fig. 1 Radiator Core Section
Typical of All Series

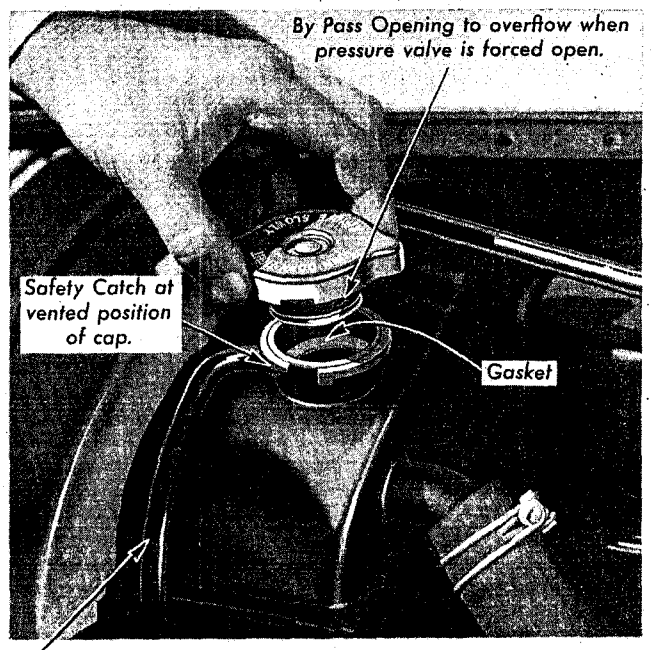


Fig. 2 Radiator Filler Cap and Overflow
Typical of All Series

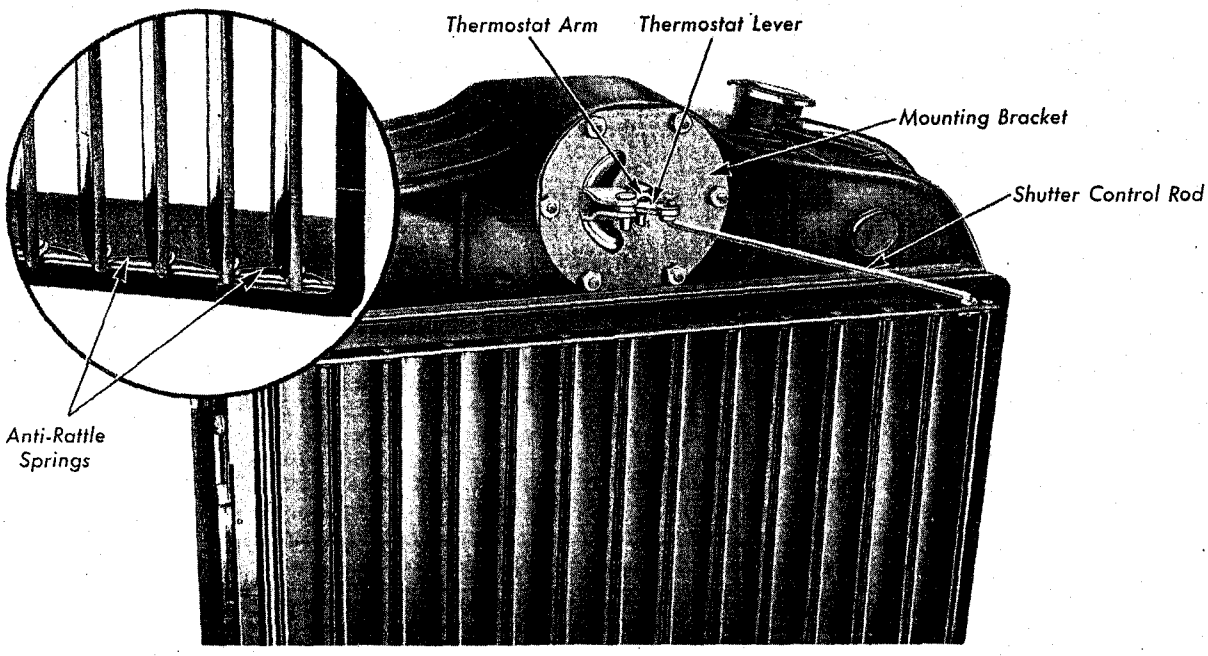


Fig. 3 Radiator Thermostat and Shutter-Control
Typical of All Series

Plate 68. Radiator and Shutters

RADIATOR

General Description

The radiator on all 37-series cars is of all-copper cellular construction. The water passages are wide and straight with smooth interiors permitting free cooling liquid flow and efficient cleaning of the radiator. Full bonded fin construction is employed, with louvres cut in the fins to increase the heat dissipating capacity.

A one-piece die cast chromium plated grille is used on all 37-series cars, except the V-16. A built-in chromium plated grille is used on series 37-90 cars. All radiators have thermostatically controlled shutters installed just ahead of the radiator core.

A pressure-operated vent valve is contained in the radiator filler cap on all cars. Fluid must pass through this valve in order to reach the overflow pipe. As a pressure of about 4 lbs. is required to open this valve, the boiling point of the solution is raised and there is less likelihood of loss of cooling solution, particularly volatile anti-freezes.

Service Information

1. Removing Radiator Cap

The radiator cap used on all 37-series cars is of the bayonet type with a safety catch.

To remove the cap, it is first rotated toward the left until the stop is reached. In this position the cooling system becomes vented to the atmosphere. The cap should be left in this safety position until all pressure or steam has been relieved. The cap is then removed by further rotation to the left. When reinstalling cap, be sure to turn **all the way** to the right.

2. Cooling Liquid Level

The cooling system should be filled to a level approximately one inch below full. This means that solution will be visable just above the baffles in the radiator tank. In order to avoid excessive expansion losses, it should not be filled higher than this level.

3. Radiator Rust Preventive

To safeguard the cooling system against excessive formation of rust and scale, with the resultant radiator plugging and heavy solution losses, some form of rust preventive should be used the year around. Cadillac PH-7 is recommended for this purpose as it gives a triple action —both rust and scale formation are greatly retarded and at the same time a cleaning action takes place. Most inhibitors serve as rust preventives only, but may be used as a substitute for PH-7. Any good inhibitor is better than using none at all.

It is important not to use too much inhibitor or to use two different types at the same time. Many anti-freeze solutions, particularly the non-volatile types, contain a rust inhibitor and when these anti-freezes are used, no other inhibitor should be added.

4. Draining Cooling System

The location and the number of cooling system drain plugs in the engines of 37-series Cadillac and LaSalle cars are as follows:

The 37-50, 60, 65, 70 and 75 engines have drain valves at the bottom of each cylinder group and one below the water pump, all three of which must be opened to drain the engine completely.

The 37-85 and 90 engines have only one drain valve, located just below the water pump.

Always have the engine hot when draining the cooling system.

5. Cleaning the Cooling System

The cooling system should be flushed every 6,000 miles to prevent excessive accumulation of sediment and scale. Reverse flow flushing with compressed air and hot water should always be employed. To perform this operation, proceed as follows:

1. Disconnect the lower hose from the radiator and attach the flushing hose to the radiator outlet.

2. Apply the water under pressure, but be sure that the pressure does not exceed 20-25 lbs.

3. Continue the flushing operation until the water runs clean from the lower hose connection.

In case of severe clogging, the radiator must be treated with a good cleaner in addition to the flushing operation. To do this, add a can of Cadillac PH-7, cover the radiator and shutter openings and run the engine at a speed slightly above idling for 90 minutes and at a temperature just below actual boiling point. If PH-7 is not available, the above procedure should be repeated for 30 minutes with a solution to which one pound of washing soda (sal soda) and two quarts of kerosene have been added. This latter procedure is especially effective for removing oily grease accumulation in the cooling system. After this cleaning operation, the radiator should be thoroughly flushed in the usual manner.

There may be some instances in which these operations will not be sufficient to clean the radiator thoroughly. In these cases it will be neces-

sary to disassemble the radiator top tank and rod out the water passages of the core.

Note: Overheating blamed on clogged water passages is often due to clogged air passages. No radiator cleaning job is complete unless dirt, bugs and leaves have been cleaned out of the grille and from the air passages within the radiator core. This operation is best performed by directing compressed air at the rear face of core.

6. Anti-Freeze Recommendations

Denatured alcohol, methanol, distilled glycerine, and ethylene glycol are the most commonly used anti-freeze solutions.

Certain precautions are always necessary when using anti-freeze solutions. Alcohol and methanol solutions must be watched closely to guard against loss by evaporation and against damage to the car finish by solutions or vapors. Glycerine and ethylene glycol solutions have a tendency to loosen rust and scale and to leak out of partially tightened connections, and on this account necessitate thorough cooling system conditioning before they are installed.

Alcohol and methanol solutions have, for all practical purposes, the same specific gravity and they may be tested with the same hydrometer and may be mixed in the same solution. In making these tests, both the temperature and the specific gravity must be taken into consideration.

Glycerine and ethylene glycol (Prestone) should be used in accordance with instructions and in the proportions recommended by the anti-freeze manufacturer. Ordinarily they should not be mixed with other solutions. No additional rust inhibitor should be added when the anti-freeze contains an inhibitor. Many branded alcohol anti-freezes and most non-volatile anti-freezes contain rust inhibitors.

Whenever anti-freeze is to be installed, inspect the entire cooling system carefully. All hose connections and gaskets should be tight and in good condition. Deteriorated hose or broken gaskets should be replaced. A careful inspection of the water pump, radiator and fan belt is also important. The cooling system thermostat and shutter mechanism should always be tested for proper operation.

7. High Reading Thermostat

In areas where extreme cold weather is encountered, it may be necessary to install a special high reading thermostat in order to secure satisfactory results from a hot water heater, if one is used in the car. The operating temperatures for both standard and high reading thermostats are shown in the table.

Thermostat Operating Table

	La Salle V-8	Cadillac V-8 & V-12	Cadillac V-16
Standard Thermostat			
Starts to Open	148–153° F.	148–153° F.	134–142° F.
Fully Open By	170° F.	170° F.	154° F.
High Reading Thermostat			
Starts to Open	163–168° F.	163–168° F.	156–164° F.
Fully Open By	185° F.	185° F.	176° F.

Note: Only non-volatile anti-freeze solutions are satisfactory for use with these special thermostats.

8. Correction of Cooling System Water Loss

In cases of continuous water loss from the cooling system of 37-series cars, the following possible sources of trouble should be carefully checked as a means of locating and correcting the difficulty:

1. Improper Seating of Radiator Filler Cap—If the radiator filler cap is not properly installed so that it is ***completely turned all the way to the right,*** water loss may occur on quick or high speed stops because of the surging of the water in the system and improper sealing of the pressure cap. Be sure the filler cap is properly installed.

2. Air Leaks in the Cooling System—If air leaks develop at the hose connections or the water pump, water loss will occur because the air pressure in the system will force the water out the overflow pipe. The remedy is to make sure that the hose connections and the water pump packings and shaft are air-tight under all operating conditions. Air leaks at these points are more liable to develop at high engine speeds.

3. Cylinder Head Gaskets Leak Under Power—Water loss may occur on account of small leaks developing under power at the cylinder head gaskets. The remedy for this condition is proper sealing of the gaskets and tightening of the cylinder heads. Broken or otherwise damaged gaskets should, of course, be replaced.

4. Overheating of the Engine—This condition will cause the water in the cooling system to boil away and may be due to any one or all of the following causes: Inoperative or ***weak*** radiator thermostat. Improper cylinder head gaskets which would prevent proper cooling system circulation and produce hot spots in the engine. Retarded spark. Improper valve timing. Dirty air cleaner which would give improper fuel mixture. Clogged radiator core due to bugs, insects, etc., that have been caught in the radiator. Clogged radiator core passages due to rust and scale formations or other foreign matter in the cooling system.

The correction of the above difficulties is obviously a matter of corrective service or replacement of inoperative or defective parts.

9. Replacing Radiator Thermostat

The radiator thermostat used on all 37-series cars can be removed through the front of the car after taking off the radiator grille. It is not necessary to remove the radiator shell, except on series 37-90.

When reinstalling the thermostat, connect the shutter control rod as shown in Plate 68 Fig. 3.

10. Removal and Installation of Radiator Core

The following procedure covers the removal of the radiator on series 37-50, 60, 65, 70, 75 and 85 cars:

1. Drain coolant from system.

Note: Remove radiator cap to facilitate fast draining.

RADIATOR

2. Remove hood from car.

3. Take off radiator to dash brace rods.

Note: On 37-50 cars there are two braces which run from the sides of the shell to the underside of the top radiator tank which must be removed. On 37-85 series cars the horn assembly and ignition coils must be removed from the tie rods and the temperature gage bulb must be removed from the fitting in the top tank.

4. On all V-8 cars loosen carburetor silencer and slide it back out of the way.

5. Remove fan assembly complete.

6. Loosen radiator hoses at radiator fittings.

7. Remove the three $\frac{5}{16}$" screws from each side of the anchorage that holds the core in the radiator shell.

8. Slide the headlamp wires out of the slots in the fiber shields on the sides of the anchorage.

9. Slide top of radiator backward sufficiently to allow the radiator to be lifted out of the car.

10. Remove shutters and thermostat after radiator is on the bench.

To reinstall radiator, follow the above procedure in the reverse order.

Note: Care should be taken that the back face of the core is not allowed to rub against any part of the engine when the radiator is being removed or installed. A flat metal plate 18" x 20" is strongly recommended as a protecting shield for the core face.

The following procedure covers the removal of the radiator on series 37-90 cars:

1. Drain coolant from system.

2. Remove hood from car.

3. Disconnect radiator to dash tie rods and rod passing in back of radiator for casing support.

4. Loosen hose connections to the radiator.

5. Remove all screws holding the front fenders to the running boards and to the body.

6. Remove the nut that holds the radiator cradle to the cross member of the frame.

7. Lift the entire assembly of front fenders, radiator casing and grille, and the radiator from the car at one time.

8. Remove the core from the shell. To do this, remove the screws that hold the core to the shell, and the four screws on each side that run through the fender braces to the radiator cradle.

9. With the core assembly thus separated from the shell the following work may be done on the bench.

10. Remove cross brace from front side of cradle.

11. Remove shutters and thermostat.

12. Take out the two fillister head screws on each side of the anchorage that hold the core in the cradle.

To reinstall the radiator, follow the above procedure in the reverse order.

Specifications

Subjects and Remarks	Series			
	37-50	37-60, 65 70, 75	37-85	37-90
Radiator				
Area of radiator core in square inches	405	414	414	504
Capacity of cooling system	6¼ gals.	6¼ gals.	4¼ gals.	6 gals.
Manufacturer's number, location. Rear of lower tank on R. H. side.				
Water temperature control	Thermostat and shutters	Thermostat and shutters	Thermostat and shutters	Thermostat and shutters
Hose connections				
Cylinder block to radiator (top 2 used)				
Diameter, inside	1¼"	1¼"	1¼"	1¼"
Length	10¾"	10¾"	7⅝"	9⅛"
Radiator to water pump				
Diameter, inside	2"	2"	1¾"	1¾"
Length	7"	7"	4"	4"

Lubrication Schedule

Cadillac and LaSalle

CHECK THE OIL LEVEL EVERY 100 TO 150 MILES, AND ADD OIL IF THE INDICATOR SHOWS BELOW "FULL" THIS IS ESPECIALLY IMPORTANT ON CARS DRIVEN AT HIGH SPEEDS.

					LUBRICANT	LUBRICATION NO. AND MILEAGE AT WHICH DUE											
						1	2	3	4	5	6	7	8	9	10	11	12
						1000	2000	3000	4000	5000	6000	7000	8000	9000	10000	11000	12000
LUBRICATION NOS. 6 AND 12	LUBRICATION NOS. 3 AND 9	LUBRICATION NOS. 2, 4, 6, 8 AND 10	LUBRICATION NOS. 1, 5, 7 AND 11	ADD ENGINE OIL AS NECESSARY	ENGINE OIL	O		O		O		O		O		O	
				STARTER AND GENERATOR OIL CUPS	ENGINE OIL	O	O	O	O	O	O	O	O	O	O	O	O
				DISTRIBUTOR OIL CUP (V-16 ONLY)	ENGINE OIL	O	O	O	O	O	O	O	O	O	O	O	O
				"OIL CAN" LUBRICATION (SEE NOTE 10)	ENGINE OIL	O	O	O	O	O	O	O	O	O	O	O	O
				DISTRIBUTOR SHAFT GREASE CUP (V-8 ONLY)	WATER PUMP LUBRICANT	O	O	O	O	O	O	O	O	O	O	O	O
				WATER PUMP	WATER PUMP LUBRICANT	O	O	O	O	O	O	O	O	O	O	O	O
				GREASE GUN CONNECTIONS (SEE NOTE 9)	CHASSIS LUBRICANT	O	O	O	O	O	O	O	O	O	O	O	O
				†REAR AXLE—CHECK LEVEL AND ADD LUBRICANT AS NECCESARY	HYPOID GEAR LUBRICANT	O	O	O	O	O	O	O	O	O	O	O	O
				CLUTCH RELEASE FORK (V-16 ONLY)	WHEEL BEARING GREASE	O	O	O	O	O	O	O	O	O	O	O	O
				BODY HARDWARE (SEE NOTE 17)	LIGHT OIL	O	O	O	O	O	O	O	O	O	O	O	O
				*STORAGE BATTERY	DISTILLED WATER	O	O	O	O	O	O	O	O	O	O	O	O
				RADIATOR LIQUID	WATER OR ANTI-FREEZE	O	O	O	O	O	O	O	O	O	O	O	O
				TIRE INFLATION		O	O	O	O	O	O	O	O	O	O	O	O
			DRAIN AND REPLACE ENGINE OIL		ENGINE OIL		O		O		O		O		O		O
			**CLEAN FILTER IN FILLER CAP (V-8 ONLY)				O		O		O		O		O		O
			**CLEAN CARBURETOR AIR CLEANER				O		O		O		O		O		O
		†† TRANSMISSION—CHECK LEVEL AND ADD LUBRICANT AS NECESSARY			E. P. GEAR LUBRICANT			O			O			O			O
		STEERING GEAR—ADD LUBRICANT			STEERING GEAR LUBRICANT			O			O			O			O
		DISTRIBUTOR CAM WICK (EXCEPT V-16)			ENGINE OIL			O			O			O			O
	ENGINE OIL FILTER—CHANGE										O						O
	FRONT WHEEL BEARINGS (SEE NOTE 11)				WHEEL BEARING GREASE						O						O
	CLUTCH RELEASE BEARING (V-16 ONLY)				WHEEL BEARING GREASE						O						O
	SPEEDOMETER DRIVE CABLE (SEE NOTE 13)				ENGINE OIL						O						O
	UNIVERSAL JOINTS (V-16 ONLY)				CHASSIS LUBRICANT						O						O
	BRAKE ASSISTER (V-16 ONLY)				SPECIAL FLUID						O						O
**SHOCK ABSORBERS—ADD FLUID					SPECIAL FLUID						O						O
**FLUSH COOLING SYSTEM AND ADD INHIBITOR											O						O
**CLEAN OIL PAN AND SCREEN									EVERY 12,000 MILES								O

*IN SUMMER INSPECT BATTERY EVERY 500 MILES OR AT LEAST EVERY 2 WEEKS.
**RECOMMENDED BUT NOT INCLUDED IN REGULAR LUBRICATION OPERATIONS.
†CHANGE REAR AXLE LUBRICANT EVERY 6000 MILES. USE ONLY APPROVED HYPOID LUBRICANT. (SEE NOTE 3).
††CHANGE TRANSMISSION LUBRICANT EVERY 6000 MILES. (SEE NOTE 4)

Plate 69. Lubrication Schedule

LUBRICATION

Service Information

1. Engine Oiling System

The oiling systems of the various 37-series engines are described in the Engine Section, and are illustrated in Plates 36 and 38.

Engine Oil Recommendations—Engine oil recommendations are the same for all 37-series engines, and are given in the Chart on page 170.

Engine Oil Capacities—The engine oil capacities of the various 37 series cars are as follows:

Series 37-50, 60, 65, 70 and 75 . . 7 quarts
Series 37-85 . . . . . 9 quarts
Series 37-90 . . . . . 10 quarts

Engine Oil Changes—The engine oil in all 37-series engines should be drained and the engine refilled with fresh oil of the recommended grade, (See Page 170), every 2000 miles. At the same time the oil is changed the copper gauze in the engine oil filler cap of all 37-series V-8 engines, should be cleaned in gasoline and dipped in S. A. E. 50 engine oil. This does not apply to series 37-85 and 90 engines, on which the crankcase ventilating intake is a separate unit and requires cleaning only when the oil pan is cleaned.

Engine Oil Filter—The oil filter used on all 37 series cars is of the cartridge type. The complete filter should be replaced every 6,000 miles.

Engine Accessories—Engine accessories requiring lubrication include the generator and starting motor, which are fitted with oil cups for engine oil, the water pump, the timer-distributor, and the carburetor air cleaner, which are covered in Notes 5, 6, and 18. The fan on all 37-series engines has permanently sealed bearings which do not require lubrication in service.

2. Cleaning Oil Pan and Screen

Cleaning of the engine oil pan and screen is recommended on all series engines at 12,000 mile intervals.

All of the engine oil passes through the oil pan and screen before reaching the oil pump. Foreign matter that may be in the oil is both screened out and permitted to settle out at this point so that the oil reaching the pump is quite free from abrasive particles.

As these particles accumulate, the screen becomes clogged, restricting the flow of oil and permitting the settlings in the pan to be stirred up and carried through the oiling system. This material, being grit or metal particles, is highly abrasive and capable of causing excessive wear in the engine unless removed.

It is a good plan, when the oil pan is down for periodic cleaning to inspect the connecting rod and crankshaft bearings.

3. Rear Axle Lubrication

Only Approved Hypoid Differential Lubricant should be used in the rear axles of all 37-series Cadillac and LaSalle cars.

The use of proper grades of lubricant and the regular inspection of the lubricant level is an important service requirement. The list of approved lubricants for use in these cars is available from the factory Service Department. ***The recommended inspection period is every 1,000 miles,*** and an approved Hypoid Lubricant should be added at each inspection, if necessary, to bring the level up to the filler plug.

The rear axle must be ***drained, flushed*** and ***refilled with fresh lubricant of the correct grade every 6,000 miles.***

Note: When flushing out the differential case, the following precautions should be noted:
1. **Do not flush the axle with steam.** Use either flushing oil or kerosene.
2. Never refill rear axle without first flushing out old lubricant.

4. Transmission Lubrication

The use of extreme pressure (E. P.) lubricants is recommended for all 37-series transmissions. Only lubricants meeting the General Motors specifications, particularly with regard to corrosion should be used. The correct specification is S. A. E. 90 EP for all year use, although S. A. E. 160 lubricant may be used in warm climates if desired.

The lubricant should be drained and replaced with fresh lubricant every 6,000 miles.

5. Water Pump Lubrication

The water pump on all 37-series cars is equipped with one covered lubrication fitting at the water pump packing side of the impeller housing. The cover should be removed and water pump grease (G-13), applied every 1000 miles on all series.

Cross section views of all 37-series pumps are shown in Plate 39. The ball bearing used at the forward end of the water pump shaft on the V-8 engines is a permanently sealed bearing which does not require lubrication in service.

6. Timer—Distributor Lubrication

In addition to the lubrication of the distributor drive shaft bearing every 1,000 miles, the distributor advance mechanism requires occasional attention to assure free operation.

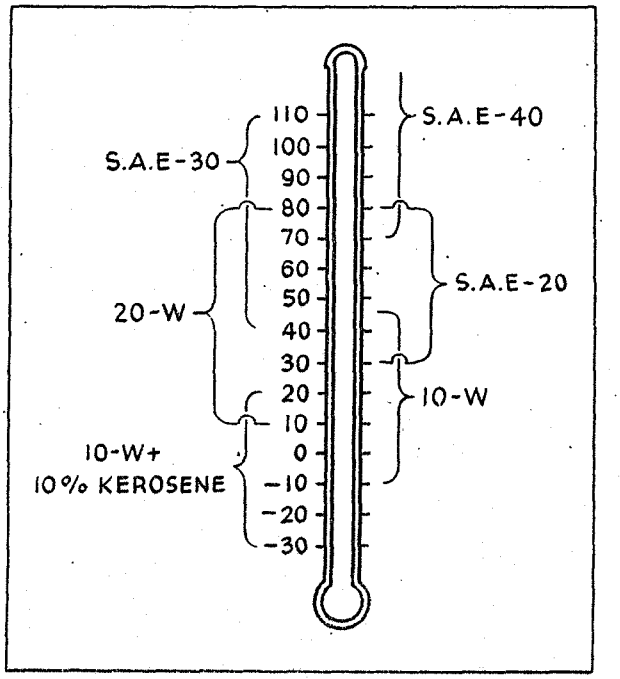
During ***warm*** weather, engine oil can be selected upon the basis of the type of driving. For moderate driving, SAE 30 oils should be used. For high speed driving, heavy duty oils of SAE 40 or 50 grade will provide better oil mileage than will the lighter grade.

During ***cold*** weather, engine oil selection should be based primarily upon easy starting characteristics, which depend upon the viscosity (fluidity) of the oil at low temperatures. The diagram at the right indicates the temperature ranges within which each grade can be relied upon to provide easy starting and satisfactory lubrication.

Only 20 W and 10 W oils are suitable for use when weather conditions are below 30° F. The reason for this is that the viscosity limits of 20 W and 10 W are taken at a temperature of 0° F., whereas those of SAE 20, 30, and 40, all of which are summer grade oils, are taken at a temperature of 130° F.

When the crankcase is drained and refilled, the oil should be selected, not on the basis of the existing temperature at the time of change, but on the anticipated minimum temperature for the period during which the oil is to be used. Otherwise, starting difficulty will be experienced at each sudden drop in temperature.

Heavy duty oils may be used in cold weather if the car is kept in a heated garage or if the heavy duty oil has a cold viscosity sufficiently low to avoid



Winter oils should be selected on the basis of the lowest temperature expected

hard starting. Otherwise, 20 W or 10 W oils must be used and the oil level checked more frequently on high speed drives, as the rate of consumption will be higher than at moderate speeds.

Specifications covering the composition and quality of engine oils can be secured on request to the factory Service Department.

Viscosity Number	VISCOSITY (SAYBOLT UNIVERSAL)					
	0° F.		130° F.		210° F.	
	Min.	Max.	Min.	Max.	Min.	Max.
10-W (*)	5,000	10,000	.....	.....	.....	.....
20-W (**)	10,000	40,000	.....	.....	.....	.....
S. A. E. 20	.....	.....	120	185	.....	.....
S. A. E. 30	.....	.....	185	255	.....	.....
S. A. E. 40	.....	.....	255	.....	.....	75

*Sub-zero pour point.

**Zero pour point.

Plate 70. Engine Oil Recommendations

Note: A grease cup is provided for drive shaft bearing lubrication on V-8 engines, and a pressure fitting on V-12 and V-16 engines.

On all 37-series cars, except the V-16, a felt wick is located in the center of the timer cam to provide a means of lubrication for the distributor advance mechanism. The wick is accessible after removal of the distributor rotor, and engine oil should be applied to the wick every 3,000 miles, or at least, every time the distributor cap is removed for service attention.

An oil cup is provided for this purpose on series 37-90 distributors, and on these cars, a few drops of engine oil should be applied every 1,000 miles.

The application of a slight amount of petrolatum to the timer cam whenever the distributor is disassembled is also beneficial in preventing excessive wear of the rubbing blocks.

7. Universal Joint and Propeller Shaft Spline Joint Lubrication

The universal joints on all 37-series cars, except the V-16, are packed at assembly and do not require lubrication in service unless disassembled.

The propeller shaft spline joint on all 37-series cars, however, must be lubricated with chassis lubricant every 1000 miles.

On all 37-series cars, except the V-16, lubrication of the splines is provided for by a lubrication fitting in the propeller shaft at the spline joint.

On series 37-90 cars, both the universal joint cross and the spline joint are provided with screw plugs for lubrication fittings. A pressure fitting should be substituted for the screw plug in the spline joint and chassis lubricant applied every 1000 miles. The screw plug in the universal joint should, likewise, be removed and chassis lubricant applied every 6,000 miles.

Always be sure to replace the screw plug after performing these operations.

8. Steering Gear Lubrication

Special steering gear lubricant, meeting the S-200 specifications, is required for use in the steering gears of all 37-series cars. The lubricant level should be inspected every 3000 miles and additional lubricant added to bring the level to the filler plug opening. As this lubricant is suitable for all season use, there is no necessity for draining and replacing, except in the event of steering gear disassembly.

9. "Grease Gun" Connections and Lubrication

Lubrication fittings for use of a grease gun are used whenever practical on the engine and chassis of all 37-series cars.

All of the points on the car that are provided with grease gun connections should be lubricated every 1000 miles.

The location of these points may be found by inspection or by looking at a Cadillac-LaSalle Lubrication Chart. They include such points as the following: knuckle pins, suspension arm connections, steering connections, propeller shaft spline joint, rear spring shackles, shock absorber links, rear spring bolts on series 37-50 and 60 cars, distributor drive shaft on series 37-85 and 90 cars, pedal shaft on series 37-65, 70, 75, 85 and 90 cars, brake shafts, parking brake cables and stabilizer linkage on series 37-90 cars, etc.

10. "Oil Can" Lubrication

There are a number of points on the engine and chassis which, although not provided with a lubrication fitting, will operate more freely if given regular oiling.

Most important of these points are the hand brake cables, levers and brackets, and the clutch release connections, and pedal felts and shaft on series 37-50 and 60. Engine oil should be applied to these points with an oil can every 1,000 miles to assure free operation.

The throttle and choke connections on the dash and the engine, including the rocker shafts for these connections on series 37-85 and 90 should also be lubricated with a few drops of engine oil every 1000 miles.

11. Wheel Bearing Lubrication

The front wheel bearings on all series cars require repacking with wheel bearing grease and readjustment every 6,000 miles. In lubricating these bearings, always use grease meeting the (G-12) specifications. The bearings should be liberally coated with grease, but there is no necessity for filling the hub completely. It is only necessary to see that all parts of the bearings are lubricated.

In adjusting the front wheel bearings, first make sure that the wheel is all the way on the spindle. Then tighten the adjusting nut securely, using a wrench with a handle 8 or 9 inches long, at the same time rotating the wheel to seat all parts. After a thorough tightening, back off the nut 1/12 turn (½ flat). If the cotter key cannot be installed in this position loosen the adjusting nut until it can be installed.

The rear wheel bearings on all series cars are of the self-lubricating type and require no adjustment. These bearings are packed with lubricant and permanently sealed at assembly. Since this lubricant is intended to last for the life of the bearings, no provision is made on the car for lubricating them. No attempt should be made to remove these bearings for lubricating purposes.

12. Lubricating the Front Suspension System

The threaded pins and bushings of the front wheel suspension system require thorough lubrication, with the weight of the car off the bearings, to assure adequate lubrication until the next 1,000 mile lubrication.

When lubricating these parts, therefore, the front end of the car must be lifted with a jack placed under the center of the front cross member, so that the car is supported at the frame, and the front suspension system entirely relieved of weight.

The front end of the car must be lifted by the frame in order to secure thorough lubrication of the front suspension bearings.

13. Speedometer Drive Cable Lubrication

Disconnect the speedometer drive cable at the speedometer and apply a few drops of engine oil to the upper end of the cable each 6,000 miles. Do not use too much oil, as this may cause faulty operation of speedometer brought about by an oversupply of lubricant.

14. Rear Spring Lubrication

The rear springs of series 37-50 and 60 cars are of advanced design having waxed liners between each spring leaf as shown in Plate 20, Fig. 9 of the Rear Suspension Section. These springs require no lubrication in service. Do not attempt to lubricate them.

The rear springs on all of the other 37-series cars have grease-packed spring covers which may be lubricated, if necessary, in the following manner:

1. Disconnect shock absorber links.

2. Raise the rear end of the car with overhead hoist or chain fall until all weight is taken off rear springs.

3. Install the clamp (Tool No. J-595) over one of the spring covers with the lubricant outlet fitting entering the hole in the under side of the cover, and screw the injector tip in until it has fully penetrated the inner canvas covers.

4. Apply a grease gun filled with graphite lubricant (G-15) to the connection in the clamp and force the lubricant into the spring cover.

5. At the same time, insert a large screw driver in the end of the spring, cover and pry the second leaf away from the eye leaf to permit the lubricant to flow between the leaves.

6. Apply lubricant until it seeps out at both ends of the cover.

If it should seep steadily out at the large end and not appear at the spring eye end, a clamp should be applied to the large end to prevent further flow while the lubricant is being forced to the spring eye end.

If the lubricant seeps out between the sections of the cover, the tool has not been inserted through the canvas. The tool must penetrate the inner canvas covers.

Caution: Do not let the car down while the injector tip is inserted, otherwise the tip will be broken off by the end of the nearest leaf.

7. Upon removing the clamp, plug the hole with one of the special buttons furnished with the tool. Install the button by simply tapping in place with a light hammer.

15. Clutch Release Bearing Lubrication

The clutch release bearing on all 37-series cars, except series 37-90, is packed at assembly with sufficient lubricant to last the life of the part, and lubrication in service is not required under ordinary conditions.

In the event of squeaks after a long period of use, however, the plug in the clutch release bearing sleeve should be removed, a lubrication fitting installed, and wheel bearing lubricant (G-12), applied to the bearing and sleeve sparingly.

Note: Be sure to reinstall lubrication plug after completing this operation.

The clutch release bearing on all V-8 cars can be reached after removing the bottom of the clutch housing. On V-12 cars, the bearing is accessible through the hand hole in the top of the flywheel housing.

On the series 37-90 cars, an external lubrication fitting is provided for lubricating the clutch release bearing. It is located at the right hand side of the flywheel housing, and consists of a plain grease cup which should be turned down, refilled with G-12 wheel bearing lubricant, and turned down a few turns every 6,000 miles.

16. Lubricating Clutch Connection Pilot Bearing

Whenever the transmission and clutch assembly on any Cadillac or La Salle car is removed for any reason, it is important that the clutch connection pilot bearing should be inspected to make sure that it is in good condition and adequately lubricated.

This bearing should always be coated with wheel bearing lubricant (G-12) if removed from the car at any time, but too much lubricant should not be used because of the possibility of grease reaching the clutch plates.

Insufficient lubricant may result in seizing and turning in the race which would cause rapid wear on the shaft and on the gear teeth in consequence of the whip.

LUBRICATION

17. Body Hardware

Lubrication of the body hardware is an important part of each 1,000 mile lubrication operation. The following items should be performed:

1. Lubricate the hinge pins sparingly with stainless oil.

2. Apply a small amount of petrolatum to the door lock bolts and striker plates.

18. Cleaning Carburetor Air Cleaner

The filtering unit of the carburetor air cleaner on all 37-series cars should be serviced every 2,000 miles, or oftener, if extreme conditions are encountered.

The procedure to be followed in taking care of this work is given in Note 40 of the Engine Section.

19. "Approved" Lubricants

Nine different types of lubricants (not including engine oil) are required for satisfactory lubrication of the 37-series Cadillac-LaSalle cars. These lubricants are listed according to specification number in the accompanying chart.

The factory does not, as a rule, issue lists of approved lubricants or approved engine oils, based upon trade names. Neither are facilities available for the testing of samples of commercial lubricants, with the exception of Hypoid Differential Lubricants, on which a list is at present available.

The factory does, however, issue detailed refiners specifications covering all of the different types of lubricants which must be used in the cars, and these specification sheets are available upon request to the Factory Service Department.

In purchasing lubricants on specification, purchases should be made only from suppliers who can guarantee their product to meet the specifications. Many suppliers can furnish test data on their products. In instances where it is advisable to test lubricants, local testing laboratories can usually perform this work for a nominal fee.

20. Storage Battery

The correct level for the battery electrolyte is just below the bottom of the filler tubes. If the liquid comes above the bottom of the tubes it may be forced up and overflow because of pressure generated within the battery by its "gassing."

Inspect the battery every 1,000 miles during the winter and every 500 miles (or every two weeks) during the summer, to make sure the electrolyte is up to the proper level. Only distilled water or fresh water kept in a glass, rubber or porcelain lined container, should be used to replace liquid lost through evaporation.

If electrolyte has been lost through overflow or spilling, it should be replaced by a competent battery repair man.

Lubricant Specifications

A-90-H. L.—Hypoid Differential Lubricant	Rear Axle Lubricant
A-80-H. L.—Hypoid Differential Lubricant	Rear Axle Lubricant (Use below—10°F.)
A-90-E. P.	Transmission Lubricant
G-2½B	Brake Plate Grease
G-10	Chassis Lubricant
G-12	Wheel and Clutch Release Bearing Grease
G-13	Water Pump Grease
G-15	Graphite Grease for Spring Leaves
S-200	Steering Gear Lubricant
C-60	Soluble Oil for Cooling System

Lubricant Capacities

Subject and Remarks	LaSalle	Cadillac			
	37-50	37-60 37-65	37-70 37-75	37-85	37-90
Crankcase (Engine Oil)	7 qts.	7 qts.	7 qts.	9 qts.	10 qts.
Transmission	2½ pts.	2½ pts.	2½ pts.	2½ pts.	4½ pts.
Rear Axle	5 pts.	5 pts.	5 pts.	5 pts.	6 pts.
Steering Gear	¾ pt.	¾ pt.	½ pt.	½ pt.	½ pt.