

CADILLAC

Details of Construction

Type 59



Edited by the Engineering Department of
THE CADILLAC MOTOR CAR COMPANY
DETROIT, MICHIGAN, U. S. A.

The Cadillac Motor Car Company and the Cadillac Car

Capital employed—more than \$20,000,000.	Number of machines used in manufacturing—more than 3,500.
Number of cars produced—more than 190,000.	Number of special tools, dies, jigs, etc.—more than 60,000.
Value of cars produced—more than \$465,000,000.	Number of commercial tools, etc.—more than 500,000.
Number of Eight-Cylinder cars produced—more than 110,000.	Number of mechanical operations on parts of Type 59 car—accurate to the one thousandth part of an inch—more than 1,000.
Value of Eight-Cylinder cars produced—more than \$325,000,000.	Number of operations accurate to the one-half-thousandth part of an inch—more than 300.
Area of new plant, in square feet—2,100,000 (48 acres).	
Number of employees—more than 7000.	

Examples of Cadillac Initiative

First motor car manufacturer to adopt the Johansson Gauge system. These gauges are accurate to the one hundred-thousandth part of an inch. They are used as master gauges to check up the snap, plug and other gauges which are used in testing and proving the accuracy in dimensions of all important parts entering into the Cadillac car.

First to produce a standardized car—a car in which all parts of a kind are like all other parts of the same kind, down to the thousandth of an inch accuracy, where such limits are desirable. Cadillac is still the most thoroughly standardized car in the world.

First to produce a truly high-grade car at a moderate price.

First to introduce an electrical system of cranking and lighting.

First to develop the V-type high speed high-efficiency automobile.

First to develop and inaugurate thermostatic control of circulating cooling medium in motor car engines.



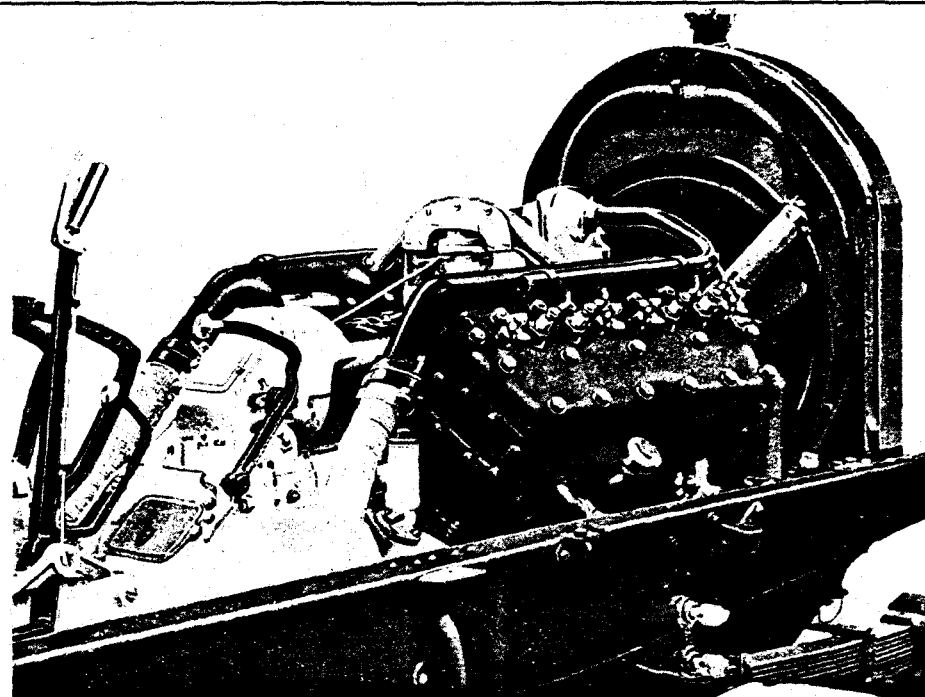
THE character of an automobile is a reflection of the ideals of its manufacturer. A person seeking a concrete expression of these ideals in the finished product, will find them indelibly imprinted in the three elements of materials, design and workmanship. The quality of an automobile may, therefore, be judged by the degree of its approximate perfection in goodness of materials, correctness of design and accuracy of workmanship.

The ideal method of forming a judgment by this standard is a trip through the factory where the automobile is built. In this way the seeker after goodness and dependability may examine the steel, the leather, the wood and the other raw materials from which

the automobile is fashioned. He may look closely into the details of construction and grasp the reasons for a particular engineering or body design. He may be a first hand witness of the accuracy and precision and painstaking skill with which the craftsman transforms the crude materials into the finished motor car.

Mechanically-minded men, from all over the world, have come to the Cadillac works and have found a system of human control over mechanical mediums almost unbelievably close and smooth and fine.

For those who cannot come to see with their own eyes the processes of Cadillac manufacture this book has been prepared as a guide to the details of Cadillac construction.



The Engine

THE V-type multi-cylinder engine is no longer a novel departure in the automotive world. More than one hundred ten thousand eight-cylinder Cadillac engines, alone, are demonstrating its efficiency as an automobile power plant.

Its success is due to something more than a mere multiplication of cylinders. New principles of design and radical departure from former four cylinder practice are showing definite points of superiority as a method of automobile propulsion.

Among the advantages which are recognized to accrue from increasing the number of cylinders are the following.

Impulses Frequent

1. More even turning movement, resulting from more frequent power strokes. In a four-cylinder engine turning

force is being exerted on the crankshaft approximately seventy-five per cent of the time, the momentum of the rotating parts carrying it the remainder of the cycle. In the eight-cylinder engine the impulses *overlap*, so that not only is turning effort exerted on the crankshaft continuously, but for approximately fifty per cent of the time two or more cylinders are delivering power simultaneously. The result is a very flexible power plant which meets the slow speed requirements of modern city traffic without gear shifting, and which has fluent power for rapid acceleration to extreme speeds.

Light Reciprocating Parts

2. Low rate of wear and tear because of the less severe impulses and the reduction of inertia forces, resulting from the lighter reciprocating parts.

Higher Engine Speed

3. Higher engine speed, also made possible by the lighter reciprocating parts, and resulting in the development of a greater amount of power for the same displacement.

High Compression—High Efficiency

4. A greater efficiency made possible by carrying higher compression. One of the important efficiency factors is

the compression pressure, which is, however, limited in practice by pre-ignition. The easier cooling of the smaller pistons of the eight-cylinder engine allows an increase in the compression pressure, without the rise in temperature from which pre-ignition results.

Short Engine, Roomy Body

5. Shortest possible engine of any of four or more cylinders with equal stroke and piston displacement—an advantage accentuated in the Cadillac by the use of opposite rather than staggered cylinders.

*Crankshaft and Camshafts
Four Cylinder Construction*

6. Most simple crankshaft and camshaft construction of any engine of more than four cylinders, all the throws being in one plane.

Clean Valve Channel Very Accessible

7. Very clean valve channel, making for special accessibility of the valves, and providing room for the carburetor, motor generator and distributor without crowding. It has a ninety-degree angle, since the angle between the cylinder blocks in a V-type motor with equally spaced impulses is dictated by the number of cylinders, the angle and accessibility decreasing with an increase in the number of cylinders.

These seven outstanding advantages have been accomplished in the Cadillac eight-cylinder V-type engine with a maximum of simplicity and a minimum of parts. It is reassuring to note the complete absence of any tendency toward unnecessary mechanical complication for the sake of freshening sales arguments by the appeal of the unique.

With the benefit of a large experience in the building of more than 90,000 eight-cylinder automobiles, the remarkable degree of refinement in design and manufacture is logical and most marked.

The bore and stroke of the Cadillac eight-cylinder engine are 3 $\frac{1}{8}$ by 5 $\frac{1}{8}$ inches. The piston displacement is 314 cubic inches.

The engine design is such that very nearly maximum turning power is delivered over a wide range of speeds, resulting in a torque curve with an unusually flat peak.

Crankshaft

THE Cadillac crankshaft is a chrome nickel steel forging machined all over. Careful design, a fine choice of materials and beautiful machine work give it strength, accuracy and balance.

Short Shaft—Large Bearings

One of the principal determinants of its rigidity and strength is the favorable relation of bearing surface to unsupported length, made possible by the eight-cylinder V-type design. The length of the crankshaft between the outer ends of the forward and rear main bearings is only twenty-six and one-sixteenth inches, nine and three-quarters of which comprises the three main bearings. The maximum length between bearings is only eight and one-fourth inches.

No other known type of automobile engine of four or more cylinders having equal piston displacement and stroke, will permit so short and rigid a crankshaft construction. In fact, the crankshaft design in four and eight-cylinder engines is identical in number of throws, but the smaller cylinder bore of the latter makes possible a shorter shaft. By placing the cylinders in the two cylinder blocks directly opposite each other and using the forked connecting rod design, this advantage has been realized in the fullest possible measure.

Notwithstanding the fact that the chrome nickel steel of the crankshaft has a tensile and shearing strength double that of the usual carbon steel, the shaft has been given the large diameter of two inches. Its ample diameter and length of its bearing area eliminate noticeable engine vibration even at high speeds.

The forged steel flywheel is bolted and dowel-pinned to the flange on the rear end of the crankshaft. Gear teeth, with which the starter gear meshes, are cut on its circumference. Unnecessary weight is eliminated by six holes cut in its web.

The crankshaft, the flywheel and the clutch ring, which bolts to the flywheel, are accurately balanced.

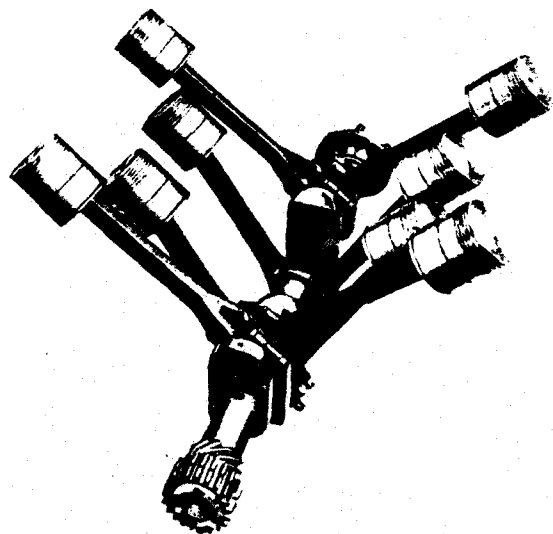
The three main bearings, on which the crankshaft is supported, are of phosphor bronze, lined with special Cadillac bearing metal. In boring the inside of the bronze bearings, the tool leaves a grooved surface which effects an intimate union between the bearing metal and the bronze backing when the former is cast.

Connecting Rods

THE connecting rods, which transform a maximum thrust of approximately one and one-fourth tons per explosion on each piston, into the power of a smoothly rotating crankshaft, are drop forged from special formula steel, and finished over their entire surface, reducing inactive weight to a minimum, and insuring uniformity.

The connecting rods from cylinder blocks on each side of the valve channel connect with the four-throw crankshaft, the bearings of each throw taking care of the ends of connecting rods from opposite cylinders. To make it possible for opposite connecting rods to use the same bushing, one rod has a forked end, the end of the straight rod from the opposite cylinder fitting within the fork arms.

The bushing clamped in the forked rod has its bearing on the crankshaft, and the end of the straight rod has its bearing on the center portion of this bushing, upon which it oscillates. The angle of oscillation of the straight



Assembly of crankshaft, pistons and connecting rods

connecting rod on the bushing is only from thirty-two to thirty-three degrees. The piston end of each rod is bushed with a phosphor bronze bearing, pressed into it.

The rods have I-sections with the web of the "I" in the plane of lateral motion. Where stress can be depended upon to remain in one plane, as in the case of the connecting rod, this shape is the lightest and strongest possible.

The ratio of rod length to stroke is especially great. Obviously the thrust of a long rod is more nearly direct than that of a short one, the angle of a long connecting rod with the line of centers being less at all points in the stroke. In thus reducing angularity by the use of a long rod, the thrust against the cylinder walls is appreciably less than with a shorter connecting rod design.

The connecting rods exemplify Cadillac manufacturing precision. The machining and finishing of one pair of connecting rods and

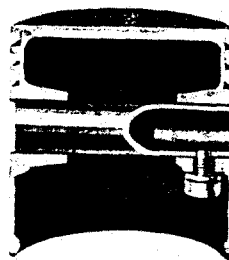
pistons involve three hundred thirty-six operations. Two dimensions are held within the limits of three ten-thousandths of an inch; four within one-half thousandth of an inch; thirty-nine within one one-thousandth of an inch; twenty-eight within two one-thousandths of an inch and more than fifty within ten one-thousandths of an inch. More than two hundred gauges and micrometers are used to insure that the pistons and connecting rods conform to the dimensions specified on the drawings.

Pistons

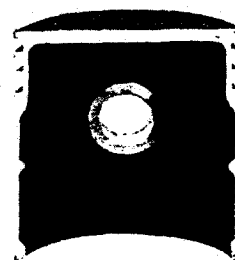
THE high speed and smooth running of the Cadillac eight-cylinder V-type engine are due principally to the reduction of inertia forces accomplished by the use of lighter reciprocating parts. In the pistons especially is evidenced the elimination of unnecessary weight, made possible by the less severe impulses and smaller cylinders which accompany the multi-cylinder design.

When one considers that in the modern multi-cylinder engine at high speed each piston travels at a tremendously high velocity and stops and starts more than eighty times per second, the relationship between speed and weight of the reciprocating parts becomes clear.

The pistons are of unusually light design, the entire eight pistons weighing no more than two pistons of the average four-cylinder engine with equal piston displacement. It is worth noting that in effecting this remarkably light design Cadillac engineers have adhered strictly to the use of the metals which have been scientifically demonstrated to be best adapted to the requirements. Gray cast iron of Cadillac special formula is used. An interesting step is the annealing process, by which any



Sectional view of piston, showing wrist-pin



Piston, section at right angles to wrist-pin

internal strains which may have been left in the casting are relieved. The bearing surface of the pistons is ground to a limit of the one-thousandth part of an inch.

Three concentric piston rings are carried above the wrist-pin. Each ring has two small grooves cut in its circumference which entrap lubricating oil, rendering the seal against compression leakage more effective.

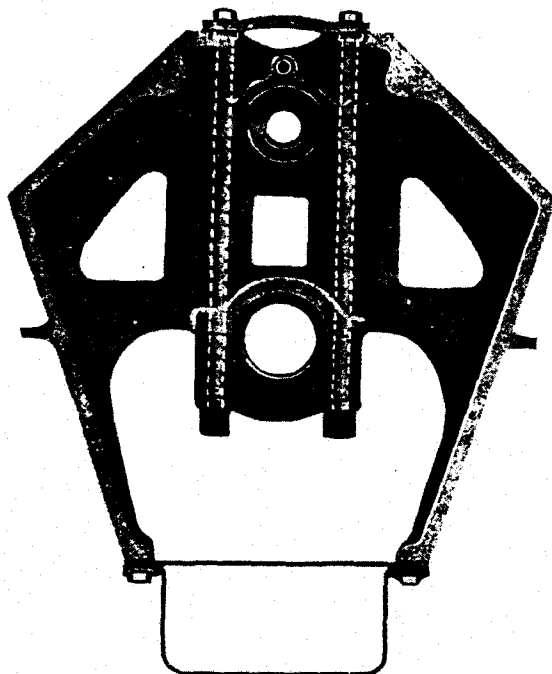
The wrist-pin is supported by bosses. A locking screw in one boss securely holds the wrist-pin from turning in the piston or moving longitudinally. The pin is of nickel steel, case hardened and ground to the limit of three ten-thousandths of an inch.

Crankcase

THE most striking characteristic of the Cadillac crankcase, or engine base, is its weight efficiency, with ample strength, rigidity and stability, and but a fraction of the size and weight which might be expected for an engine of the power of the Cadillac.

The material employed is a special copper alloy aluminum, with a strength-to-weight ratio more than twice that of an iron casting.

The design is such that "lazy weight" is reduced to a minimum, the same metal efficiently serving to resist stress and to enclose the crankshaft and camshaft.



Sectional view of crankcase. The dotted lines show the eleven-inch through bolts

Seven ribs brace the deep walls of the crankcase and support the crankshaft and camshaft bearings. The center and rear crankshaft bearings are supported by two ribs each.

The crankshaft bearing caps are not simply bolted to the supporting ribs, but are held in place over the bearings by through-bolts, eleven inches long, which pass between the ribs to the very top of the crankcase and share with it the tensile stress imposed by both the dead and live load of the crankshaft.

The crankcase is closed at the top by the coverplate which also serves to support the valve rocker arms; at the front by a coverplate, which also acts as one point of support for the engine; and at the bottom by a pressed steel oil pan. The rear end of the crankcase

is closed by a coverplate, just forward of the flywheel. Ventilation is provided by breathers attached to the underside of the cylinder blocks.

The Cadillac engine is supported at three points—two points at the rear of the crankcase, and the ball and socket joint on the front cover plate.

Cylinder Blocks

Cadillac cylinders are cast en bloc, in fours, with detachable heads. Both inlet and exhaust valves are on the same side of the combustion chamber—commonly known as the L-head arrangement.

Each cylinder block includes water jacketing, intake manifolds and valve spring compartments.

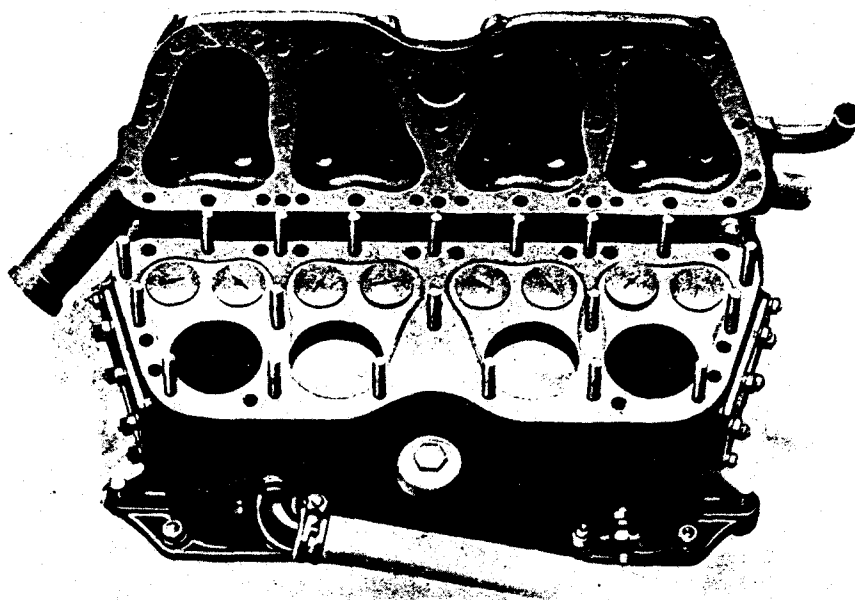
This construction has distinct merits. It is compact: the L-head arrangement permits all of the valve mechanism to be placed on the same side of the cylinder block. It is simple: the exposed water and gas connections are few. It is light and permits great accuracy in the alignment of cylinders.

Detachable Heads

The separately cast head members permit the accurate profiling of the combustion chambers. This results in more uniform compression, and the smoothly machined surface reduces the tendency of carbon to adhere. Every part of the cylinder or combustion chamber with which the exploding gas comes in contact is machined.

Valve caps for access to the valves being unnecessary, the spark plugs are set directly in the head and surrounded immediately by the water jacketing.

The accessibility to combustion chambers and valves, made possible by the detachable



Side view of engine, showing detachable head removed from right hand cylinder block

head construction, is highly appreciated from the standpoint of engine service.

Casting of the cylinder heads separately renders it possible in manufacturing to have access to both ends of the cylinder bore, permitting use of the plug gauge in both ends of the cylinder. Greater accuracy is the result.

Each cylinder head is secured to the block by twenty studs. The surfaces of the block and the head are ground, and between them is a copper-covered asbestos gasket, which prevents the leakage of gas or water. Openings in the gasket permit the free passage of water from the cylinder block to the cylinder head.

A gray cast iron of Cadillac special formula gives the proper even distribution of carbon particles necessary for the glass-like surface of the cylinder walls.

The cylinder block casting itself is an ingenious piece of work, made possible by advanced

foundry methods. The ends of the blocks have large openings, closed by coverplates. These openings make it possible rigidly to support the core at each end when casting, thereby insuring uniformity in the thickness of the cylinder walls.

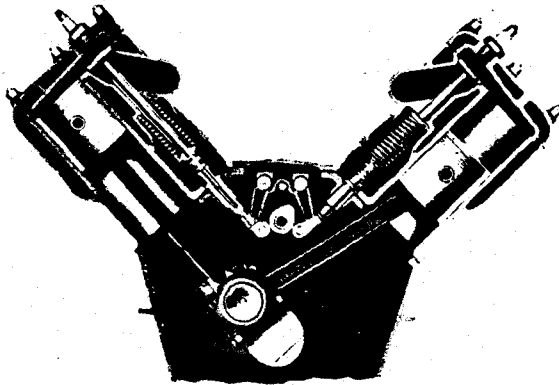
Constant precautions are taken to insure that the cored water passages are cast clean and without obstructing projections.

Both left and right blocks are cast from the same patterns, and with the exception of the water connections are interchangeable.

Each cylinder block is bolted to the aluminum crankcase with ten studs, dowel-pins insuring the accurate location of the blocks.

Valve System

THE Cadillac eight-cylinder V-type design permits a simple and unusually quiet valve mechanism. The single camshaft has but



Sectional view through intake valves, showing details of valve system

eight cams, each operating two of the sixteen valves. It is positioned directly above the crankshaft, and driven from it by a silent chain. Its six bearings constitute more than one-third of its overall length.

The camshaft is a drop forging with integral cams. To eliminate weight, as far as consistent with required strength, the shaft is hollowed. Each valve is actuated by a rocker arm, carrying a hardened steel roller which rides upon the cam. The rocker arms are pendant from shafts, supported from the underside of the crankcase top coverplate. They are bushed with replaceable bronze bearings.

The motion of the valve rocker arms is transmitted to hardened steel pushrods with adjustable tappets, and passed on to the valve stems.

The Cadillac poppet valves are forged from high quality tungsten steel. They are of integral design, as contrasted with the built-up construction with a separate stem.

The diameter of the valve opening is approximately one and eleven-sixteenths inches.

The valve stems have their bearings in guides four and a half inches long, pressed into the cylinder blocks. This length prohibits even the possibility of destructive wear at this point.

The valve springs are of the highest quality tempered spring steel. They exert their pressure upon valve feet which are held in place by split tapered collars, that fit into grooves cut in the lower end of the valve stems. This refinement facilitates the removal of valves or valve springs.

The valve springs and push rods are protected by four coverplates, which are readily accessible from the ninety-degree valve channel.

The valves are easily timed by reference marks stamped on the rim of the flywheel and an indicator attached to the crankcase.

The Exhaust System

Two Manifolds—Two Mufflers

EACH block of four cylinders has its individual exhaust system, insuring the rapid conduction of the spent gases away from the cylinders.

The hot gases released by the exhaust valves enter the exhaust manifolds, one of which is bolted to each cylinder block, and pass through asbestos-covered pipes to the mufflers.

The two mufflers, one suspended from each sidebar, effectively silence the explosions of the eight cylinders. Through a patented design, back pressure is reduced to a minimum. Their construction is such that they may be easily disassembled.

Tail pipes conduct the exhaust gases from the mufflers to the extreme rear of the car.

Timing Chain Adjustment

SILENT timing chains have been used on Cadillac engines since the 1912 season. They have the advantage of being quieter than the gears which they replace, and they retain this quietness throughout their life. The chain adjustment provided on the Type 59 engine adds to the life and efficiency of Cadillac timing chains.

Operation

The two camshaft gears rotate on two cylindrical surfaces mounted eccentrically on a hollow support, which projects from the front of the crankcase. This support is clamped in position by means of a toothed clamping collar on the rear side of the crankcase wall.

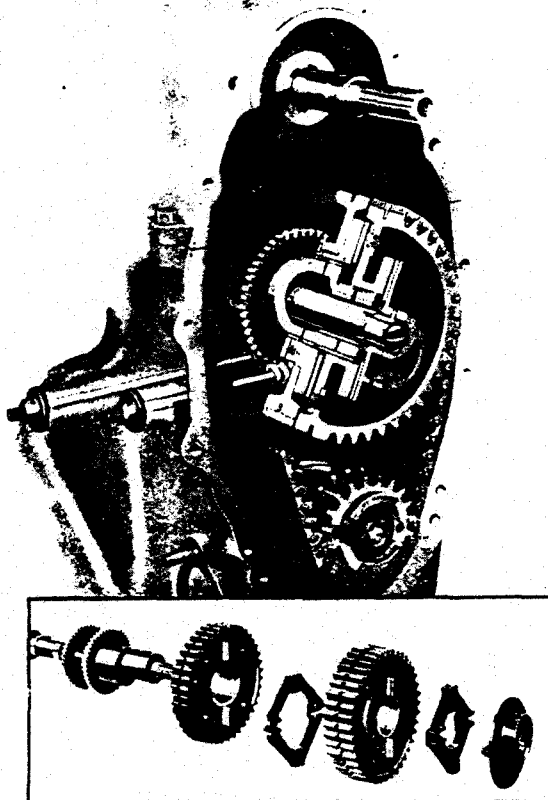
A toothed adjusting flange provided on the hollow support just in front of the crankcase wall, makes it possible to turn the support, after the clamping collar is loosened. The clamping collar and the adjusting flange are each operated and controlled from the outside of the crankcase by means of a shaft and a worm gear.

The front end of the camshaft passes through and has its bearing in the hollow support for the camshaft gears.

Universal Drive

The forward camshaft gear is driven by a silent chain from the crankshaft sprocket. The camshaft is driven from the forward camshaft gear through a universal cross and a driver plate splined and pinned to the front end of the cam shaft. Another universal cross drives the rear camshaft gear which in turn drives, through a silent chain, the fan and generator shaft.

Since the camshaft gears are set eccentrically on their support, the center distances between crankshaft and camshaft gears, also between camshaft and fanshaft gears, may be changed, within limits, to take up slack in the chain. By means of this mechanism, it is possible to compensate for chain wear which would naturally result after a long period of service.



Timing chain adjustment showing parts and how they function

The Fuel System

FAVORABLE location of the storage tank and positive transfer of the fuel to the carburetor, at the rate required, are the principal reasons behind the adoption and continued use of the pressure feed system in Cadillac cars.

Tank Convenient

By placing the tank at the rear of the frame the supply of fuel may be more easily replenished, greater freedom of body design is possible the factor of safety is greater and the passengers are relieved of fuel odors usually attendant to the forward location of the tank.

Positive Fuel Supply

The ready flow of fuel to the carburetor is positively assured by a pressure on the contents of the tank of between one and two pounds per square inch *above* atmospheric pressure. There is no dependence upon pressures *below* atmospheric, or upon an auxiliary tank.

The air pressure which forces the gasoline from the tank to the carburetor is furnished by an air compressor, supported on the front coverplate of the engine, and driven by an eccentric on the camshaft.

A pressure relief in the air line prevents the pressure from rising above a predetermined point. This precaution is especially valuable to users of the volatile "casing-head" gasoline.

An auxiliary air pump and a gauge which indicates the pressure in the gasoline line are located on the instrument board.

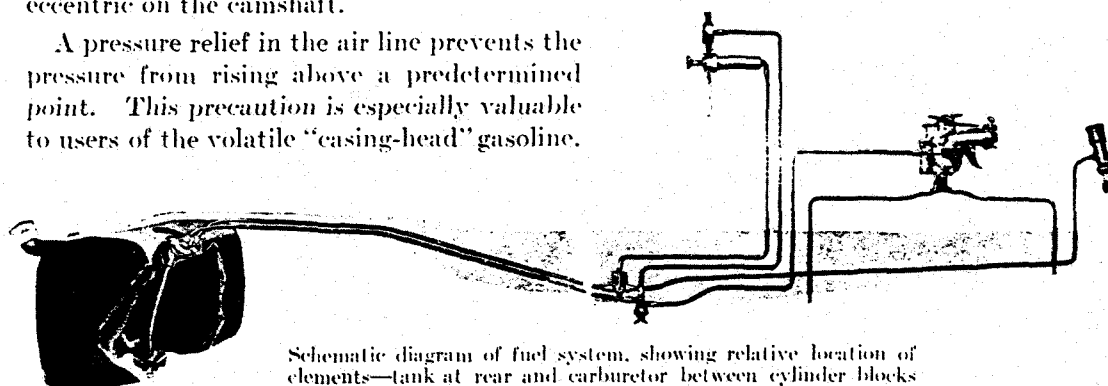
Tank Holds Twenty Gallons

The twenty-gallon tank is of terne-plate steel, rectangular in section. Its interior is trisected by two baffle partitions, which minimize splashing of the contents. Its size gives an ample touring radius; a gauge, illuminated by the tail light, registers the contents in gallons.

The tank is filled conveniently through a large inlet, covered by a filler cap, which may be easily applied and removed by hand. A thumbscrew of convenient size at the top of the cap easily makes possible an air-tight joint.

Fuel Strained

Thorough cleansing of the fuel affords maximum protection against the admission of impurities of water into the carburetor. Two settling chambers and three strainers between tank and carburetor purify the engine fuel before it enters the mixing chamber. This is especially appreciated when one is at the mercy of the roadside fuel station.



Schematic diagram of fuel system, showing relative location of elements—tank at rear and carburetor between cylinder blocks

Carburetor

Cadillac Designed and Built

IN its design, the Cadillac carburetor has been properly considered as functionally an integral part of the power plant. It is designed by Cadillac engineers to meet every requirement of the Cadillac eight-cylinder V-type engine, and is manufactured in the Cadillac factory.

Engine flexibility is due not only to the continuous torque made possible by the eight-cylinder design, but to the quick responsiveness of the carburetor in supplying the correct fuel mixture for varying loads and speeds.

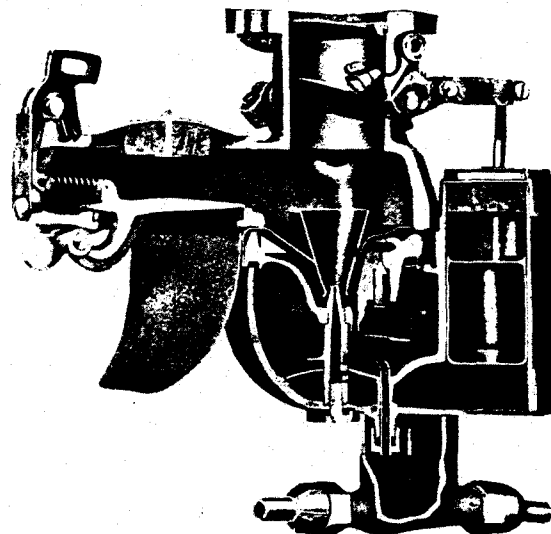
The use of fuel in the Cadillac carburetor is surprisingly efficient, the practical limit of economy being *in-built* as an element of the design, eliminating so-called "vaporizers," and "gas-saver" accessories. Eight cylinders do not mean fuel extravagance.

The carburetor, located between the cylinder blocks, is of the float-feed, single-jet type, but with a number of exclusive features.

The float bowl is directly under and concentric with the mixing chamber. With this construction the float maintains the fuel in the spraying nozzle at the proper level, no matter at what angle the car is driven. Consequently the mixture is not affected as it is liable to be when the float bowl is located at one side of the mixing chamber.

The primary air intake is an oblong-shaped opening in the side, from which the current of air is deflected to the bottom of the funnel-form strangle-tube. The Venturi effect of the latter gives the intruding air the high velocity necessary to atomize the fuel and thoroughly charge the air with fuel particles.

The auxiliary air supply, by which the cor-



Sectional view of carburetor, showing throttle pump, concentric float chamber, swinging air valve and automatic throttle

rect mixture is automatically maintained at all speeds and throttle openings, is controlled by a leather-seated swing valve, governed by an adjustable spring, under light tension.

Automatic Leaning Device

The mixture is further controlled by an automatic leaning device. It is the operation of this device which escapes the rich period to which many carburetors are subject. This is effected in the following manner:

Attached to the right hand end of the throttle shaft is a shutter which covers a slot in the side of the carburetor body, whenever the throttle is opened to the point where the mixture tends to become rich. When this slot is covered, a passage is formed from the mixing chamber to the carburetor bowl, resulting in lowering the atmospheric pressure in the latter, and causing less fuel to be fed through the spraying nozzle. An adjusting screw regulates opening of this

passage, and thereby the proportion of fuel in the mixture, when the port is open.

Enrichment of the mixture, for starting, is accomplished by increasing the tension of the auxiliary air valve spring. Control is by a lever on the steering column.

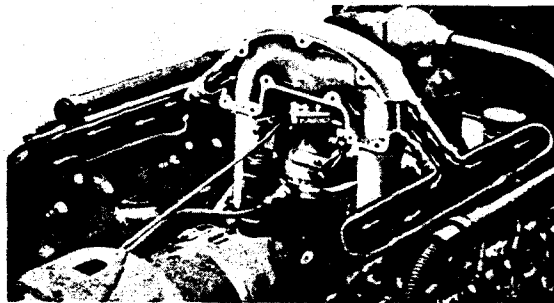
Throttle Pump for Quick Acceleration

The requirement for a mixture of additional richness at the moment of acceleration is met by a plunger pump, operated from the throttle shaft, forcing the necessary extra fuel through the spraying nozzle. When the throttle is opened slowly this device has no effect on the amount of fuel fed into the mixing chamber, but when the accelerator pedal is depressed quickly the pump operates in the manner described. A larger spraying nozzle would admit sufficient fuel at the moment of acceleration, but provides too large an opening for other conditions.

Beside the usual butterfly throttle valve a second valve, under spring tension is placed just above the main throttle to prevent the fluttering of the auxiliary air valve when running slowly with the throttle wide open.

Exhaust Heated Intake

COMPLETE vaporization of the present low grade gasoline is provided for in the Cadillac



Intake header is heated direct from exhaust manifolds.

lac engine by an exhaust heated intake manifold.

The gasoline now obtainable does not vaporize readily, having a tendency to condense and cling in drops on the walls of an intake manifold and leak past the pistons, destroying the lubricating qualities of the oil in the crankcase. The practice of supplying hot air to the carburetor serves to vaporize the gasoline more thoroughly. Heated air however, is thin, and lacks the power contained in an unheated mixture.

The Cadillac intake manifold is jacketed immediately above and beyond the carburetor. By the application of heat at this point that part of the mixture which normally would condense and lodge as vapor on the walls of the intake manifold comes in contact with a warm surface and remains a part of the explosive mixture which enters the cylinders. Moving swiftly through this heated area the volume of mixture as it comes from the carburetor is not affected in temperature.

The method of applying exhaust heat to the intake manifold walls is efficient and direct. The outward passage of gases sets up in the exhaust manifolds an alternate condition of high and low pressure. Successive explosions in the Cadillac engine occur in opposite cylinder blocks so that when the pressure is high in one manifold it is low in the manifold opposite.

A passage connecting the two manifolds also incloses the intake header. The difference in pressure sets up a surging action between the two manifolds which draws the hot exhaust gases through the passageway as soon as the engine is started. This immediate application of heat at the vital point in the fuel system gives good carburetion in a cold motor almost instantly.

The Ignition System

NO matter how precise the results of carburetion, power cannot be developed from a correct fuel mixture unless ignited in the cylinders without fail and at the proper instant. For this reason, no other part of the automobile has been the subject of so much research as the ignition system, and none has so bewildered and mystified the driver of a car.

Simple—Reliable

The Cadillac engine has a single ignition system of the Delco high tension type, a simple high grade and reliable design embodying the following elements:

A source of current—the generator, or, at low speeds, the storage battery.

An ignition timer, which interrupts the low tension current at the proper instant to

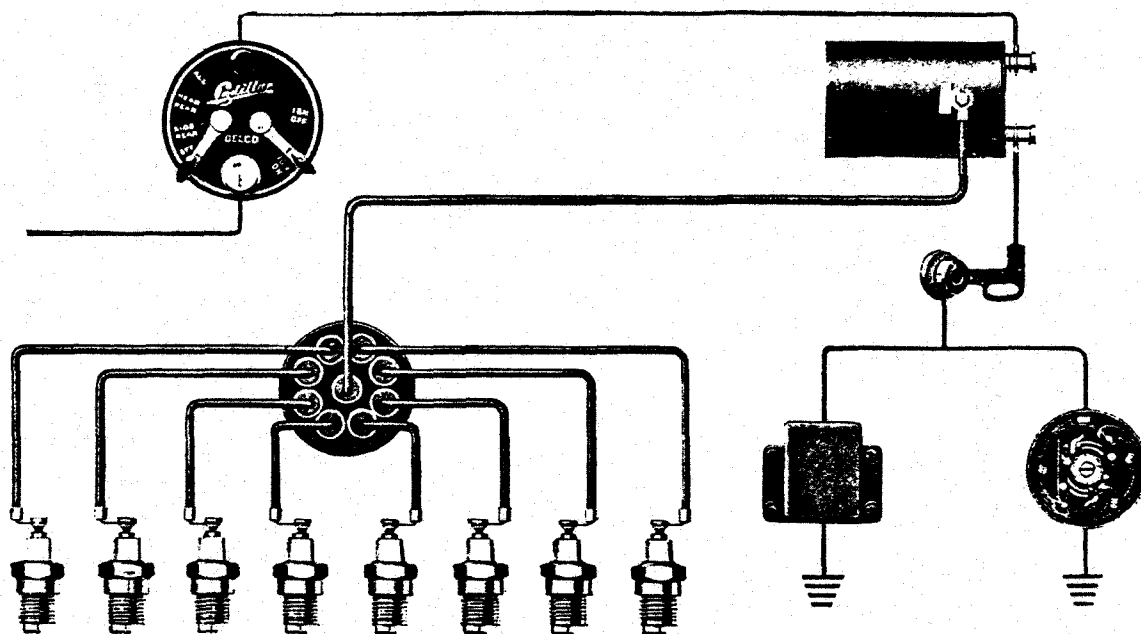
produce a spark in the high tension circuit.

An induction coil, transforming the primary current of six volts into one of sufficient voltage to jump between the points of the spark plugs.

A condenser, which assists the induction coil to raise the voltage, and which protects the contact points of the ignition timer against burning.

A high tension distributor, which directs the distribution of the high tension current to the spark plugs in the respective cylinders.

A resistance unit, which protects the ignition coil and timer contacts from injury should the ignition circuit remain closed for any considerable length of time with the engine not running.



Elements of ignition system, showing its simplicity. Source of current, storage battery and motor generator.

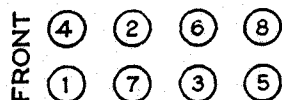
Structurally, the ignition timer, the distributor, the condenser and the resistance unit constitute a single assembly, which is bolted to the rear of the fanshaft housing.

Double Set of Contact Points

The ignition timer, which is driven by a vertical shaft through spiral gears from the fanshaft, has two sets of contact points. These share between them the current which would otherwise pass through one. The tendency to spark and corrode the points is ordinarily proportional to the amount of current passing through them. Thus, the use of two sets greatly adds to the life of each.

The primary current is interrupted by the timer contacts four times for each revolution of the engine, producing at each break of the primary current a high tension current, which is directed by the distributor to spark plugs in the respective cylinders. The distributor is located directly above the timer, and on the same shaft.

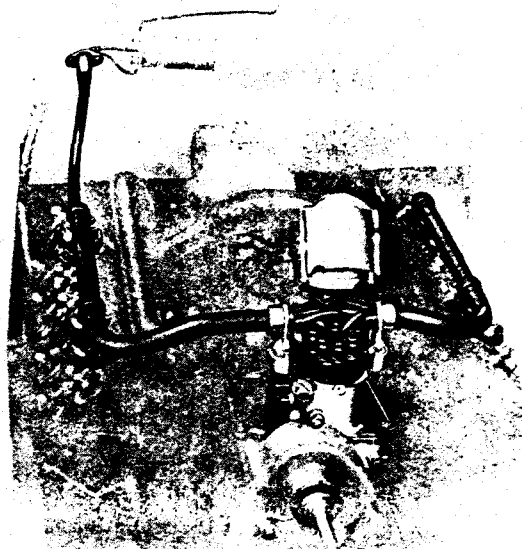
The firing order of the cylinders is as follows:



Automatic Spark Control

One of the many steps taken by the Cadillac to make driving entirely pleasurable, free from constant attention to details, is the automatic spark control, which relieves the operator of practically all spark lever manipulation. A ring type centrifugal governor is a part of the timer assembly. The ring changes its angle with the speed of the engine, advancing or retarding the position of the timer cam relative to its driving shaft.

The wiring of a car, if not thoroughly protected, even beyond all apparent need, will prove a source of constant annoyance and expense through current leakage. The wiring which, in the Cadillac, carries the high tension current to the spark plugs, is housed in brass



Timer distributor, condenser and resistance form one easily accessible unit

tube conduits, with black nickel finish. The ignition cables are visible only at points of connection to the spark plugs. Cores of the cables are concentrically stranded copper wires tinned, and built up with a wall of extra grade insulating rubber, to the diameter of three-eighths of an inch.

The Cooling System

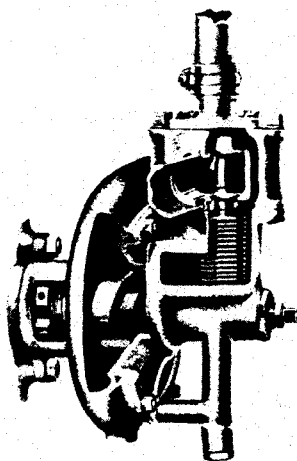
THE temperature of the Cadillac engine is maintained at the point of maximum efficiency and smooth running by water forced circulation, thermostatically controlled. The cooling system is thus considered not alone with respect to the prevention of over-heating, but with a view to obtaining uniformity of temperature for all conditions. Cooling efficiency and reliability have been a determining factor in the sale of many Cadillac cars.

The water jackets are cast integral with the cylinder blocks, and with the detachable cylinder heads. The construction also provides for an unrestricted waterway around the combustion chambers and valves. Removable plates at the ends of the cylinder blocks permit the flushing out of the passage for any possible sediment.

Two Pumps

Circulation of water through the radiator and water jackets is maintained by two centrifugal pumps, one for each block of cylinders, located at the front end of the engine.

The impellers are connected by a cross shaft, driven from the crankshaft by helical gears just forward of the front main bearing. The flow of water in the jackets follows the natural convection currents. The hottest



Water pump assembly showing pump impeller, thermostat and the valve which it controls.

water, which surrounds the combustion chambers in the head, is thus the first to be removed to the radiator, and cooled.

Thermostatic Control

Thermostatic control of motor temperature was developed and first employed by the Cadillac Company.

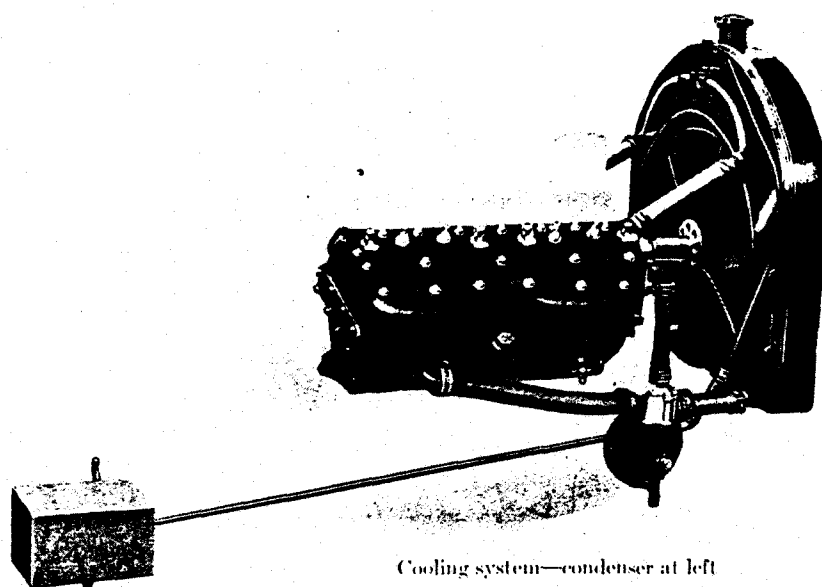
A balanced valve and a thermostatic member are housed and mounted on each pump. The thermostat itself, is a bellows-like container, partly filled with a liquid which, when heated, is transformed into a gas. The resulting pressure elongates the thermostat, forcing the valve from its seat.

Connections to the thermostat housings allow the pumps to draw water from the radiator and the cylinder blocks.

When the engine is cold, the thermostat valves are closed, and the supply from the radiator is cut off. The water then is circulated only through the water jackets of the cylinder heads. Because of the fact that the amount of water to be heated is relatively small, the temperature of the cylinders and intake manifold quickly rises to the point at which the engine operates best.

As soon as the temperature of the water in the water jackets reaches the predetermined point, the thermostats force open the valves and allow only sufficient cooled water from the radiator to enter to keep the temperature down to the predetermined point.

Chilling of the engine by cold air from underneath is prevented by the long splash pan, which extends from the radiator the entire length of the engine.



Cooling system—condenser at left

Radiator Construction

The copper tubular and plate radiator embodies but four elements—the upper and lower tanks, the vertical tubes, and the horizontal plates. The construction is such that there is a positive metallic connection between each tube and each plate, insuring the rapid conduction of heat away from the tubes.

Two heavy spiral springs absorb any strains which might be transmitted to the radiator from the frame. The strainer in the filler cap is easily removable for cleaning.

A six-bladed fan is driven at engine speed from the camshaft, by a silent chain. A friction clutch, under spring tension, allows the fan to slip at high speeds.

The capacity of the system is approximately five and one-fourth gallons.

Condenser Holds Winter Solution

A condensing device, protected by patent rights, renders it possible to use with safety

the inexpensive alcohol solution as an anti-freezing cooling medium. A condenser of simple construction is attached to the frame, and is connected by a tube to the overflow which runs from the upper tank of the radiator.

Alcohol vapor driven out of the solution by heat, as well as any water vapor, is restored to liquid form in the condenser. When the radiator cools, the vacuum produced by the contraction of its contents automatically causes surplus liquid in the condenser to return under atmospheric pressure to the radiator.

Another result, a by-product, but nevertheless appreciated, is the conservation of the contents of the cooling system when simply water is used. It is not an unusual occurrence for condenser-equipped Cadillacs to be driven very long distances in warm weather and under heavy loads without appreciable diminution of the water supply.

The Engine Lubricating System

Pressure Circulating System

THE engine is lubricated by the pressure circulation system, employing a gear pump. As contrasted with delivering oil in measured quantities at the bare rate of consumption, the principle is that of a continuous circulation between the moving surfaces in contact.

The oil supply is carried in the pressed steel reservoir, which closes the under side of the

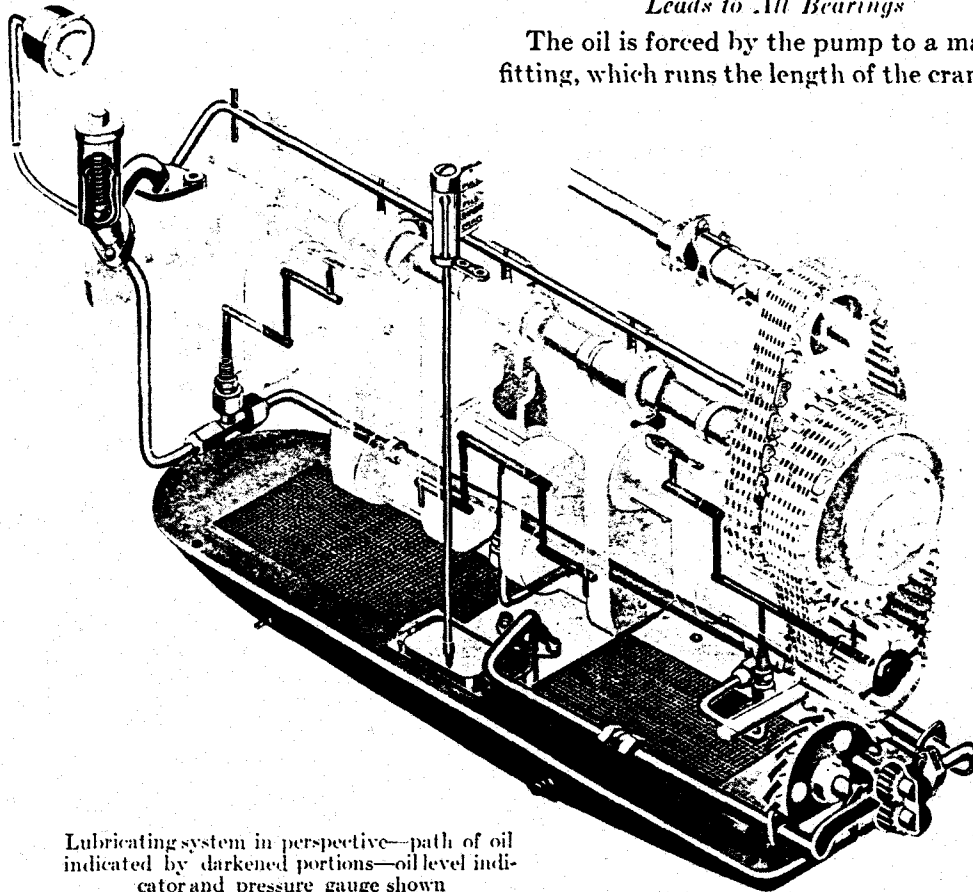
crankcase. Baffle plates divide the reservoir space into three compartments to prevent splashing.

Gear Pump

The gear pump is driven from the water pump shaft through helical gears. The pump draws its supply from the central and deepest compartment of the oil pan, insuring that the suction pipe is immersed in oil, regardless of the angle of the car.

Leads to All Bearings

The oil is forced by the pump to a manifold fitting, which runs the length of the crankcase,



Lubricating system in perspective—path of oil indicated by darkened portions—oil level indicator and pressure gauge shown

above the oil pan, and at the left. Leads to each of the main bearings from this manifold circulate oil to all crankshaft bearings.

Oil passages drilled through the crankshaft conduct the oil from the main bearings to the connecting rod bearings. Oil forced from the connecting rod bearings is thrown by centrifugal force onto the cylinder walls and pistons lubricating both the cylinders and wrist-pins.

Pressure Regulated

The pressure under which the oil is forced to the main and connecting rod bearings is controlled by a ball valve pressure regulator, located just behind the right hand block of cylinders. This regulator prevents the oil pressure from becoming excessive at high engine speeds, a condition which would cause oil to be thrown onto the cylinder walls in unnecessary quantities. It also insures positive lubrication at low speeds.

A gauge on the instrument board, connected to the pressure regulator housing, indicates the oil pressure.

Overflow oil from the regulating valve, forced into a manifold, above and parallel to the camshaft, is a source of supply for the camshaft bearings, the front end chains, chain adjusting mechanism and the gasoline system air pump. A by-pass permits the flow of oil to these parts at low engine speeds.

Hollow Crankshaft

The six camshaft bearings receive oil through ducts leading from the overflow tube.

The front end of the manifold tube is provided with two nozzles which deliver oil to the front end chains through holes in the rim and flange of the double sprocket on the camshaft. Lubrication is also supplied to the camshaft driving chain through a hole in the crankshaft sprocket. This hole connects with an oil duct in the crankshaft.

The helical gear on the pump shaft receives lubrication from the end of the crankshaft.

Valve Lubrication

The valve rocker arms are lubricated by oil entrained in cup-like depressions at their upper ends. Ports in the crankcase are provided to allow oil vapor to enter the valve compartments for valve stem lubrication.

All oil drains back into the reservoir through a fine wire gauze, interposed between the crankcase and the reservoir space.

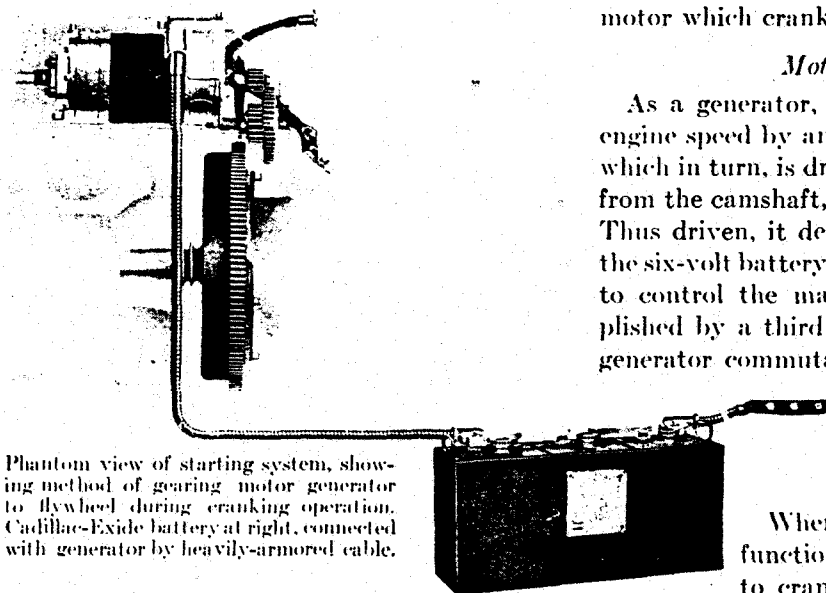
Oil may be added conveniently through a filling well in the housing enclosing the fan-shaft driving chain, accessible by raising the right hood panel. The well is provided with a strainer, and closed with a threaded cap. Capacity of the system is one and one-half gallons.

An oil level gauge is fastened to the top coverplate of the crankcase, at the right of the carburetor.

The Starting and Lighting System

Starting, Lighting and Ignition, Cadillac-Deleo

THE Cadillac-Deleo starting and lighting system is the result of eight years of effective co-operation between the Dayton Engineering Laboratories Company and the Cadillac. The single unit system, first installed on the 1912 Cadillac as standard equipment, is continued in the current model car as the most efficient type, lending itself most readily to compact design.



Phantom view of starting system, showing method of gearing motor generator to flywheel during cranking operation. Cadillac-Exide battery at right, connected with generator by heavily-armored cable.

Single Unit, Single Wire System

The units of the starting system include a source of current supply—a generator; a means of storing the current generated—a storage battery; and a method of applying the current to crank the engine—a motor. The motor and generator functions are combined in one unit—a motor-generator.

A single wire system connects the different units, the circuit being completed through the frame. The principal components of the motor-generator are the field and the armature. There are two windings on the armature and four field coils. One winding of the armature and two of the field coils are connected so as to form a shunt wound generator which furnishes current for charging the battery and for lighting, ignition, horn, etc. The other windings are connected so as to form a series wound motor which cranks the engine.

Motor Generator

As a generator, the armature is driven at engine speed by an extension of the fanshaft, which in turn, is driven through a silent chain from the camshaft, at the front of the engine. Thus driven, it delivers current for charging the six-volt battery. The necessary regulation to control the maximum current is accomplished by a third or auxiliary brush on the generator commutator. The position of the third brush is such that the maximum charging rate is delivered at average driving speeds.

When acting as a motor, the sole function of the motor-generator is to crank the engine. The armature is then geared to the flywheel by idler gears, which are meshed upon pressing the conveniently located starter button. Through the reduction gears the motor cranks the engine at eighty to ninety revolutions per minute under normal conditions. The hub of the larger idler gear contains an over-running clutch, which prevents the armature from being driven at an excessively high speed the

instant after the engine is running under its own power, and before the starter button is released.

The starter button also breaks the circuit between the generator windings and the storage battery, and completes the motor circuit by lowering the motor brushes onto the commutator. Meshing of the starter gears is facilitated by the slow rotation of the armature of the motor-generator, which begins as soon as the ignition lever on the switch is turned to the "on" position.

The Storage Battery

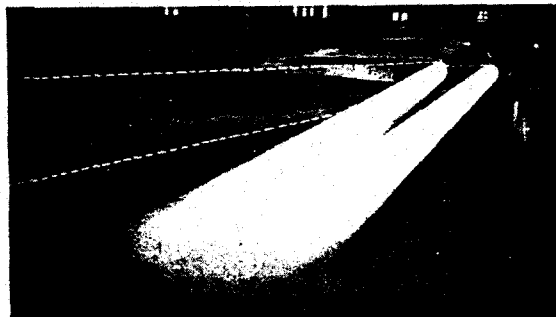
The Cadillac Exide storage battery will give reliable and uninterrupted service and long life, having an overload capacity enabling it to perform without strain the sudden and severe task repeatedly imposed upon it in cranking an engine. Design and construction are particularly stout, heavy plate wood and rubber separators giving it a life, when properly cared for, that is equal to any other part of the car.

Tilting Headlamp Reflectors

ELECTRIC lighting was adopted first as standard equipment on the 1912 Cadillac. It follows naturally that Cadillac should lead in eliminating headlight glare which is objectionable.

Three principles of eliminating glare are in common use. The first of these, commonly known as "dimmers," eliminates glare by reducing the quantity of light at its source.

The second, known as diffusion, breaks up the parallel pencil rays from the parabolic reflector and spreads them in all directions.



With the reflectors tilted down the light hits the road at a distance of seventy-five feet. Dotted line shows the direction of the light when the reflectors are up. The light then illuminates the road three hundred feet ahead.

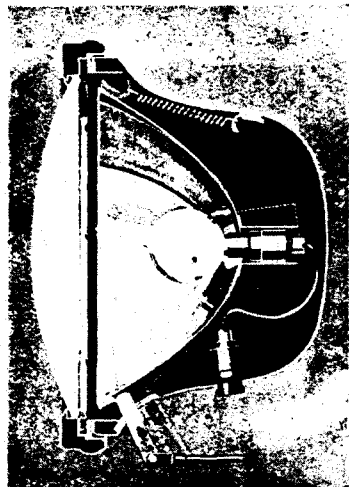
The third, the principle of deflection, bends the parallel rays toward the ground by means of prisms in the lenses.

Each has its serious objection. Dimming devices eliminate glare but reduce the amount of light at the very moment, when passing another car, the driver needs to see the road before him and the ditch. Diffusing lenses break up the light and spread it in all directions, accentuating rather than eliminating the quality they wish to correct. Prism lenses deflect the light to the road for passing other cars, but limit its effective range to a short distance ahead of the car.

Ideal road lighting must satisfy two distinct and separate sets of conditions. For passing other cars lights should be bright enough to show the road immediately in front and the right hand ditch, yet be so directed as to keep out of the eyes of the approaching driver. At other times they should be out ahead, picking up the road well in front of the car.

Cadillac headlights meet these two conditions, not by changing the quantity or quality of the headlight needed for night driving, but

by tilting the headlight reflectors when approaching another vehicle so that all the light is directed down on the road for seventy five feet ahead, well out of the eyes of the approaching driver.



Sectional view of headlamp—dotted lines show tilted position of reflector, which is pivoted on trunnions

In the tilted position Cadillac headlights satisfy the legal requirements in many states where the law specifies that there be no direct rays showing forty two inches above the ground at a distance of seventy-five feet ahead of the car.

In the judgment of engineers this device, standard equipment on the Cadillac, provides the most satisfactory and practical solution of the glare difficulty.

A supplemental advantage, resulting from the tilting of the reflectors, is the illumination of the road immediately in front of the car when rounding a turn or topping a hill.

The Lights and Horn

A SINGLE wire system supplies current to the lights, one side of each lamp socket being grounded.

The headlamps, sidelamps, tail and speedometer lamps are controlled by a single lever from the ignition and lighting switch on the instrument board. The tail and speedometer lamps are connected in series, conveniently enabling the operator to tell from the speedometer lamp whether or not the tail lamp is lighted. They are operated by both the lighting switch and separate push button for illuminating the front compartment when entering the car. The socket for the portable lamp is located within convenient reach, just back of the instrument board.

Open and closed bodies, in addition, are provided with full lamp equipment.

The horn, of the vibrator motor type, is mounted on the left hand side of the car just back of the front fender. The horn button on top of the steering column is sensitive and certain in making contact, either lateral or downward pressure producing the signal.

Protection is afforded to the ignition, lighting and horn circuits by circuit breakers, which have well known and distinct advantages over fuses, commonly used. One protecting the horn, portable lamp and tonneau lamp circuits is known as a lock-out circuit breaker. In case of a "ground" in any of these circuits the breaker opens and remains open until the "ground" is removed. The ignition and remaining lamp circuits are protected by a Schwartz vibrating circuit breaker which produces a vibrating sound, should a "ground" occur in any of these circuits.

A Weston ammeter indicates the rate of charge or discharge of the storage battery.

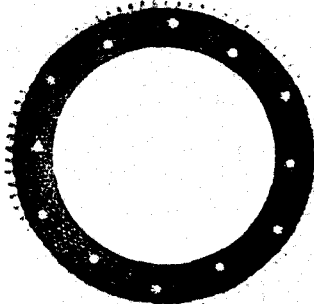
The Power Transmission System

THE driver of a Cadillac car is seldom conscious of the mechanism by which the power of the engine is made applicable in tractive effort at the rear wheels. Easy clutch operation and infrequent and smooth gear shifting absolve his mind from any annoying thought of the process.

The principal elements of the power transmission are:—a multiple-disc, dry plate clutch; a sliding gear, gearset of the selective type; a tubular propeller shaft with two universal joints; and a Timken full-floating rear axle. Clutch and transmission form a unit with the power plant.

Clutch

The clutch has seventeen steel plates: nine plain driven discs and eight driving discs faced on both sides with an asbestos friction fabric. The advantage of attaching the friction material to the driving discs rather than the driven discs, is that unnecessary and undesirable weight is thereby avoided in the latter, thus decreasing their tendency to spin under their own momentum when the clutch is disengaged.



One of the eight-clutch driving discs—eighty-one driving teeth

The periphery of each driving disc is serrated in the form of gear teeth, of ten pitch, which mesh with similar teeth on the inner surface of the clutch driving ring, bolted to the fly-wheel. The effect produced by this method of driving the clutch

is that of eighty-one driving keys and as many keyways, greatly reducing the load on each key.

The thrust of a three hundred pound coil clutch spring, which forces driving and driven disks tightly together, is taken by a ball-thrust bearing.

Careful compounding of leverage has made the clutch pedal release astonishingly smooth and easy.

Gearset

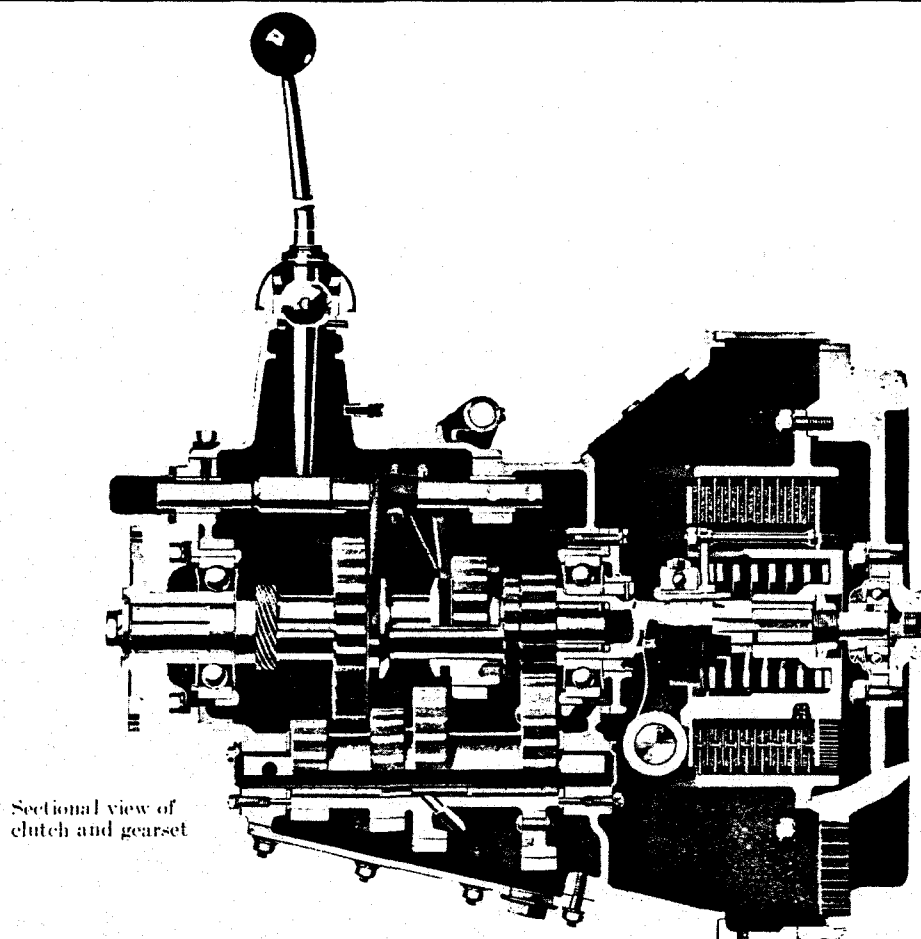
The Cadillac selective gearset provides for three speeds forward and one reverse. The gears and shafts are chrome nickel steel forgings, heat-treated. The gears are accurately machined to the proper tooth forms, and the ends of the teeth are backed off, permitting easy and quiet gear-shifting. Wide gear faces distribute tooth pressure over an ample area to minimize frictional wear.

The meshing of the gears is controlled by a centrally located control lever. The ball handle is well up under the driver's right hand. First and second gears are very quiet. Third or high speed is direct from engine to rear axle.

The clutch shaft and main transmission shaft revolve on ball bearings. To allow differential motion between the clutch shaft and the transmission shaft, when other than direct drive is in use, the front end of the transmission shaft revolves on a Hyatt flexible roller bearing, housed in the rear end of the clutch shaft.

The countershaft revolves on two roller bearings on a stationary tubular shaft.

Positive lubrication for the countershaft roller bearings is uniquely provided by the rotation of a metal spoon on the intermediate gear, impelling the lubricant through a tube to the bearings.



Sectional view of clutch and gearset

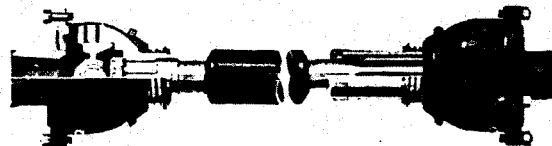
A spiral gear mounted on the main transmission shaft drives a gear keyed to the end of the flexible speedometer drive shaft. In this position the speedometer drive receives constant lubrication and is protected, as well, from roadside dust and dirt.

Propeller Shaft

THE propeller shaft between the transmission and the rear axle is of seamless drawn steel tubing. Universal joints fitted at each end provide for the flexible drive, which is made necessary by constantly changing align-

ment, due to play of the springs. The forward joint is telescopic, being provided with a sliding connection to accommodate longitudinal play.

Both universal joints are housed in pressed steel casings, to exclude dust and retain the lubricant.



Forward universal joint is telescopic

The Rear Axle

THE rear axle carries the weight of the car independently of its transmission of power to the rear wheels, a construction usually designated as full-floating. The load is taken by the pressed steel, tube-shaped housing. Into the ends of this pressing, chrome nickel steel sleeves are riveted and welded. The wheel bearings are mounted upon these sleeves.

The transmission of power and the gear reduction are accomplished by the helical bevel gear and pinion, and the two live axle shafts. The pinion gear is a nickel steel forging.

Helical bevel gears insure a degree of quietness impossible with straight-tooth gears. They are cut and fitted to each other in pairs in the Cadillac factory. Pinion gear and shaft are integral, being supported on each side of the gear by taper roller bearings. The

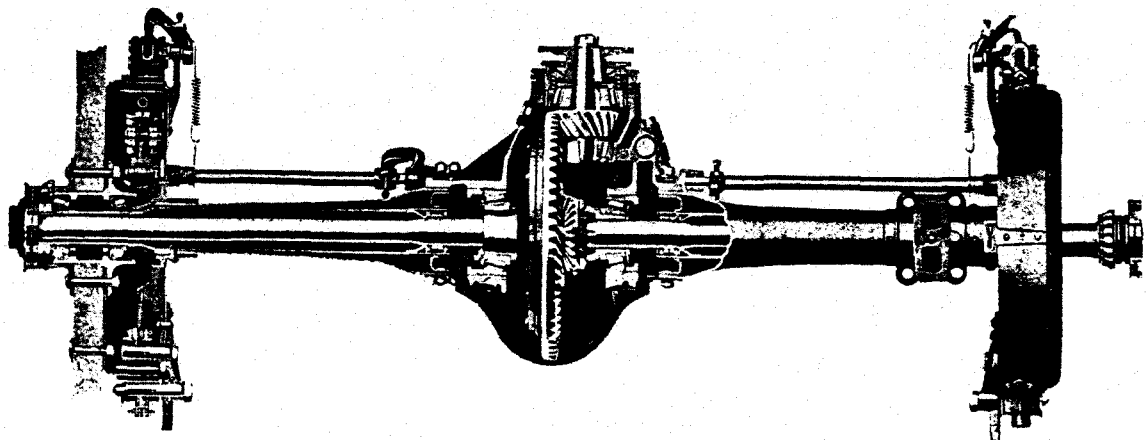
differential is of the bevel gear type. Both gears and pinion bearings are mounted in a carrier, which forms the front cover of the rear axle housing.

The two shafts, which drive the wheels from the differential, are chrome nickel steel, with the integral driving clutches at the outer ends. The clutches consist of six lugs machined on the outer ends of the shafts, fitting into corresponding slots machined in the hubs of the rear wheels.

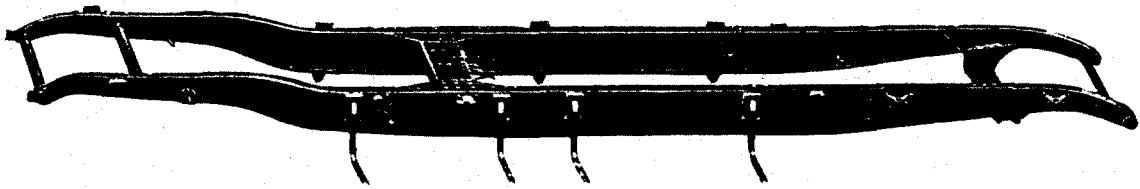
A spring locking ring in an annular groove prevents lateral motion between each wheel hub and the driving lugs.

The spring seats, by which the load of the car is carried on the rear axle, are free to oscillate on the axle housing.

The torque is absorbed, not by the springs, but by a sturdy torque arm fastened to the central cross member of the frame.



Full-floating rear axle with helical bevel driving gears and adjustable taper roller bearings



Frame with five cross members and side bars with maximum depth of seven inches

Frame and Running Gear

CADILLAC engineers have not been content to allow only an ample factor of safety in the frame. They have designed a foundation on the basis of rigidity. Body and chassis, as a result, have an increased length of life.

The sidebars have a long deep channel section through the center, where the stress is most severe, and a wide top flange. There is a gradual reduction in the section toward each end with a moderate kick-up at the rear.

The sidebars are rigidly tied together by five cross members:—a central cross member of channel section; the cross member for the front engine support; and three additional cross members of steel tubing. The central cross member, to which the forward end of the torsion arm is attached, is riveted securely to the sidebars by both web and flanges, the joints at the sidebars being reinforced by gusset plates.

The tubular cross members are located, one between the front outriggers, another just forward of the gasoline tank, and the third at the extreme rear end of the frame. It is axiomatic among engineers that a tubular member is the lightest possible for resisting torsional and indeterminate bending strains.

The holes in the sidebars for the brackets and other attachments are drilled on giant

multiple-spindle drill presses, with fixtures which insure correct location.

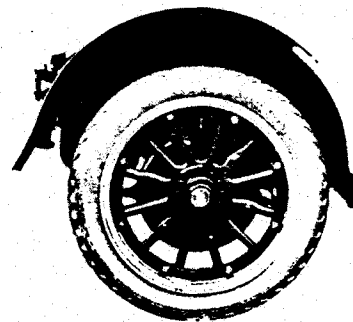
The Wheels

Safety will impress the purchaser or prospective purchaser as the primary consideration in the design and construction of Cadillac wheels.

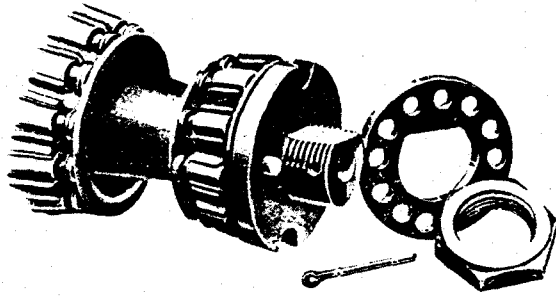
They are of the artillery type, with twelve spokes in each wheel. The best selected hickory, thoroughly seasoned, composes the spokes and felloes.

The spokes are of especially large elliptical section, being one and one-fourth by one and three-fourths inches at the smallest point, which is at the felloe.

The felloe is shod with a steel band, sherardized to prevent rust. Instead of a simple hoop



The Cadillac wheel is conspicuous for its sturdy cross section



Locking-on device for front wheel and bearing adjustment.

covering the periphery, the felloe band is of a stout right angle section, covering also the outer side surface of the felloe, and serving as a substantial reinforcement.

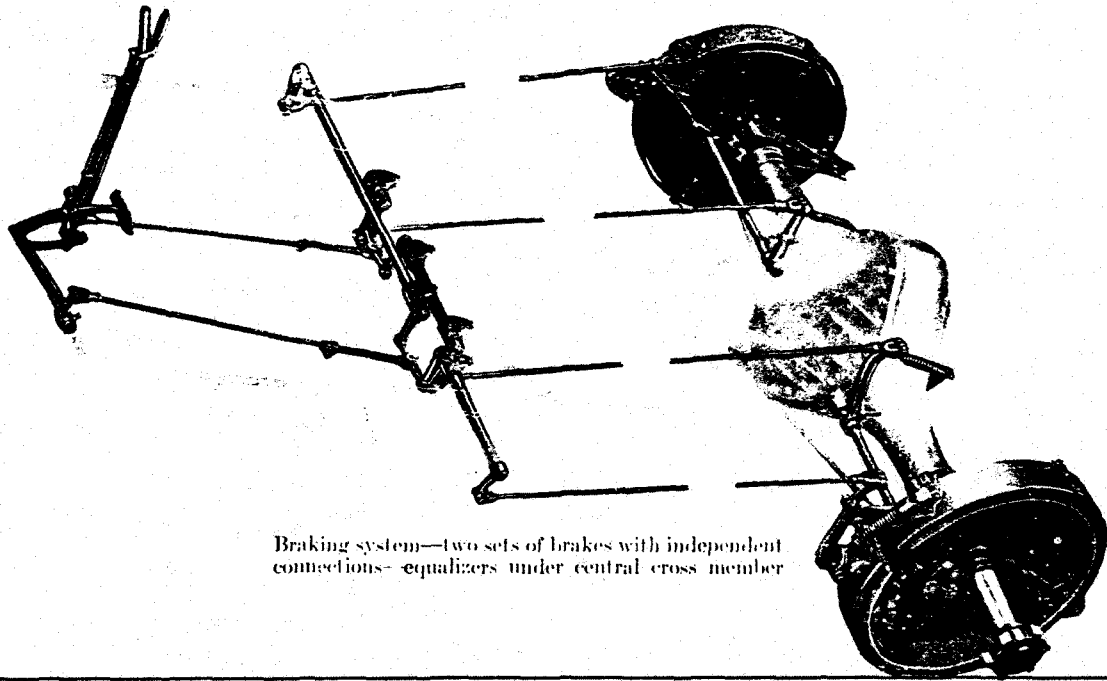
Each hub comprises two pressed steel flanges, the inner flange being integral with the hub core. Bolts through the wood spider at each joint between the abutting ends of the spokes hold the flanges firmly in place. The wheels revolve upon adjustable roller bearings.

The consideration of safety has been given unusual attention in the device used for locking on the front wheels. An adjusting nut for the bearings carries a stud which keys it to a lockwasher. This lockwasher has a D-shaped hole, which fits the spindle and positively prevents the turning of the adjusting nut. A locknut holds the lockwasher firmly against the adjusting nut.

The Front Axle

THE front axle is a one-piece drop forging of chrome nickel steel. It is of I-beam section, heavily ribbed at the yoked ends, where the spindles are pivoted.

The spindles are also drop forgings of chrome nickel steel. They taper toward the outer end, where the strain is least. Next to the knuckle, where the cantilever action brings the most severe strain, the spindle has an especially large section.



Braking system—two sets of brakes with independent connections—equalizers under central cross member

The Braking System

CADILLAC braking should be considered as a phase of control rather than simply a means of bringing the car to a stop. Either hand or foot brakes may be applied easily with sufficient pressure to lock both wheels, but this characteristic in no way compromises the smoothness with which the car decelerates when the brakes are lightly applied.

There are in the Cadillac two independent sets of brakes. The foot, or service, brake-bands contract on the external surface of a brake drum bolted to each rear wheel. The hand brakes expand within the drums.

Connections to both systems equalize the tension on the brake pull rods. The drums

are gripped with practically the same pressure, reducing the tendency to skid on slippery roads. The equalizing rocker shafts are located under the central cross member of the frame, and are journaled in self-lubricating bushings. The pull rods actuating the external brakes are outside of the frame, and connect the equalizing rocker shafts directly to the levers on the brake-bands.

Brake-band lining is replaceable heat resisting friction fabric. The pressed steel brake drums are seventeen inches in diameter, and two and one-half inches wide. The total braking surface is more than five hundred square inches.

The Steering System

THE first surprise of driving a Cadillac is the unusual pliancy with which it is maneuvered in traffic; the second comes after the first day of continuous touring, when the operator finds himself unexpectedly unfatigued. The acquisition of a Cadillac car has revived interest in touring in many people for whom automobiling may have lost some of its fascination, or who had resigned the driver's seat to a chauffeur.

The steering gear is of the worm and sector type. The worm is machined from a solid bar of steel and is keyed to the steering staff, which is a length of seamless steel tubing. The worm is supported in the steering gear housing by plain bearings, which take the radial load, and adjustable ball bearings, which take the thrust. The latter are adjustable.

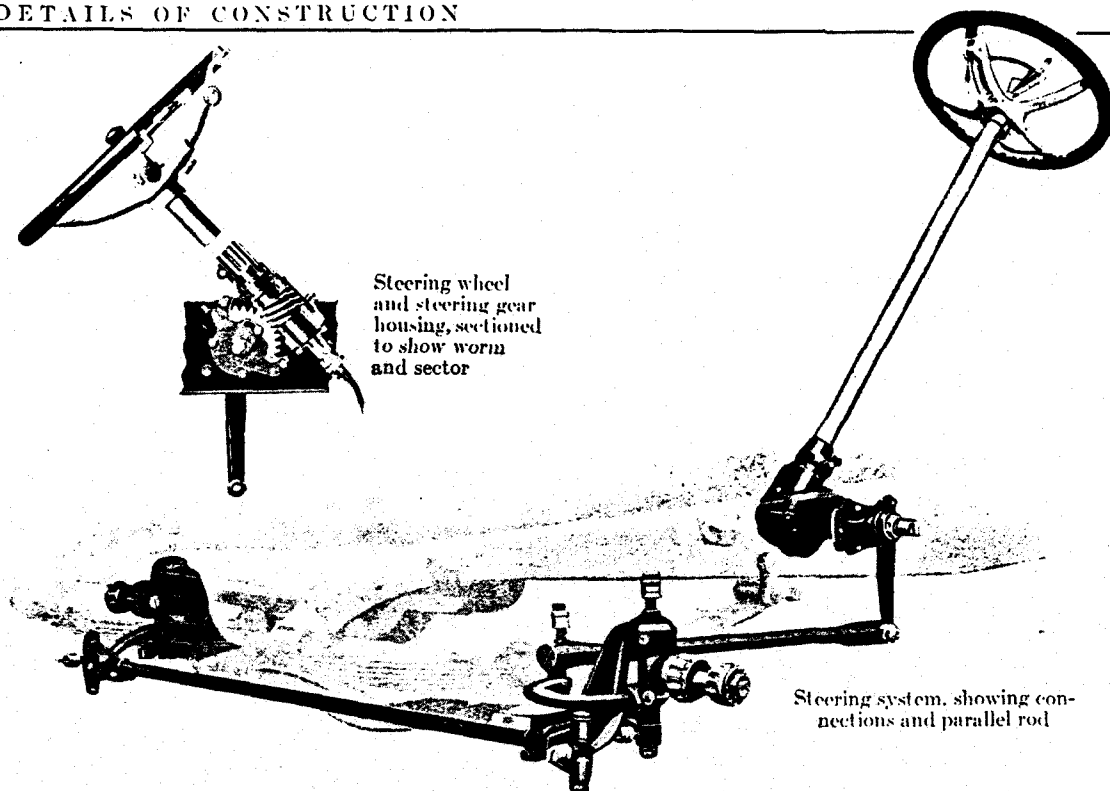
The sector is machined from a single drop forging of nickel steel. The sector teeth do not follow the true arc of a circle, the center teeth

being at a slightly greater radius than those at the ends. The center teeth perform the greater service, inasmuch as the car is normally in an approximate straight-ahead position. Adjustment of the position of the sector relative to the worm may be readily made.

The sector shaft has the unusual diameter of one and three-eighths inches, and bearing length of more than five inches. End play may be taken up by an adjustment on the inner coverplate of the housing.

The steering gear housing is bolted to the web of the sidebar. In addition to supporting the worm and sector, it serves as a container for steering gear lubricant.

The sector shaft is tapered and serrated at the outer end to receive the steering arm, which carries at its lower end the ball for the rear joint of the steering connecting rod. This ball is not forged integrally with the arm; for



safety, the construction is that of a separate ball anchored in a tapered socket; forged separately this part is given a fibre structure of more uniform texture.

The tubular steering connecting rod, between the steering gear arm and the front axle, has a ball and socket joint at each end. One-half of each bronze socket is fixed, and the other half is held in position by a coil spring, which automatically compensates for wear.

The spindle arms of generous dimensions, are forged of chrome nickel steel. As a check on their correct composition and heat treatment, a small nipple is forged on the arms, later to be removed and examined.

The tubular parallel rod is located in front of the axle, and is threaded at each end into the yokes which receive the steering arms, permit-

ting adjustment for aligning the front wheels.

The safety and ease with which the Cadillac is steered is due in no small measure to the use of roller bearings at the upper end of the spindles.

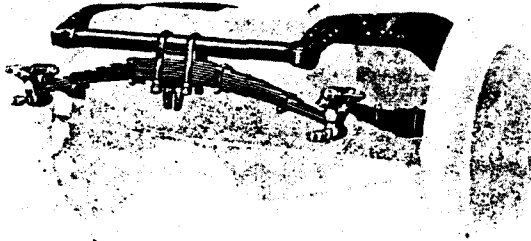
A slight caster effect, in which the reaction of the road on the front wheels automatically tends to keep them in the straight-ahead position, contributes further to the ease and safety of steering.

The aluminum spider of the eighteen-inch steering wheel is hinged to the hub forging, allowing it to drop downward, facilitating entrance or exit at either side. A spring thumb latch holds the wheel rigidly in position for use.

The turning radius of the 132 inch chassis is forty-five feet, six inches to the left, and forty-four feet, eight inches to the right.

The Spring System

THE three-quarter platform construction is a distinguishing Cadillac mark to the eye of the man on the street. It is visual evidence of the consideration and care which has been given to Cadillac riding comfort.



Semi-elliptic spring construction in front and three-quarter platform suspension at rear

The front springs are semi-elliptical, and three semi-elliptical units, arranged on the platform principle, comprise the rear suspension system. The combined length of all five units is more than nineteen feet.

Rear axle driving torque is transmitted by a substantial torque arm to the chassis frame. Relieved of this function the rear springs are left free to cushion the body against road shocks.

Unusual precautions have been taken against spring breakage. The spring leaves are silico-manganese steel, heat treated to give maximum life in service. The length of the springs, and the width and thickness of the plates composing the spring leaves have been accurately determined by a careful consideration of the work to be done, and the deflections required. Springs periodically taken from stock are completely deflected hundreds of thousands of times.

The inside surfaces of spring perches and clamping blocks are machined to the normal curvature of the springs.

The spring eyes are lined with phosphor bronze bushings, bearing on shackle bolts with the unusually large diameter of three-fourths of an inch. The shackles, in which these bolts are journaled, have uncommonly large bearing surfaces.

The shackles, which permit the free elongation of the springs, are steel forgings. The connections at the rear ends of the rear side spring permit a universality of action between these and the rear cross spring.

Cadillac Bodies

A separate Cadillac plant is devoted to the building and finishing of Cadillac bodies. The same sort of thought and care which enters into the building of the Cadillac chassis is here given to the construction of bodies.

Characteristic qualities of sturdiness and long life are built into the framing and joining of Cadillac bodies. Selected hardwoods, heavy gauge steel and aluminum panelling, more than a dozen coats of varnish and enamel and the finest coach fittings are used to make bodies that will outlast the long life of the Cadillac chassis.

The Cadillac general catalog tells, in detail, the story of Cadillac body building and describes, in text and pictures, the fittings and appointments of the current Cadillac models. The nearest Cadillac representative will be glad to furnish you a copy of this book.

Specifications in Brief

Type 59 Cadillac Eight Cylinder Chassis

Details of the standard Cadillac body types are contained in a general catalog

ENGINE—Eight-cylinder V-type, high speed, high efficiency. Unit engine and transmission, three-point suspension. Cylinders cast in two blocks of four cylinders each, with integral water jackets and valve chambers; detachable heads. Three and one-eighth inch bore by five and one-eighth inch stroke. Piston displacement, 314 cubic inches. Crankcase, aluminum copper alloy. Tungsten steel valves. Valve mechanism enclosed. Three-bearing crankshaft, two inches diameter, of chrome nickel alloy steel, special heat treated. Main and connecting rod bearings of liberal dimensions, Cadillac special bearing metal, with bronze reinforcement. Single camshaft, six bearings. Camshaft and generator shaft driven by silent chains.

HORSEPOWER—N. A. C. C. rating 31.25.

COOLING—Water forced circulation. Jackets cast integral with cylinders, liberal water circulating space. Two centrifugal pumps, one for each block of cylinders, insuring proper water distribution. Radiator, Cadillac tubular and plate type. Fan driven by silent chain from camshaft. Water temperature governed by Sylphon thermostats.

IGNITION—Cadillac-Deleo, improved system. Current supplied by generator and battery.

LUBRICATION—Automatic pressure feed by gear pump. Oil forced to crankshaft and connecting rod bearings.

CARBURETOR—Cadillac, designed especially for this engine, insuring uniform gas distribution and maximum efficiency. Auxiliary air control to facilitate starting. Intake pipe, exhaust and hot water jacketed.

CLUTCH—Multiple disc, dry plate type; seventeen high carbon steel plates, 7 $\frac{3}{4}$ inches diameter. Driving plates are faced with wire mesh asbestos. Exceptionally soft and velvety in operation.

TRANSMISSION—Copper alloy aluminum case. Selective type sliding gear, three speeds forward and reverse. Chrome nickel steel gears and shafts.

CRANKING DEVICE—Cadillac - Deleo, improved, patented.

STORAGE BATTERY—Exide manufacture, designed especially for Cadillac; heavy plates.

DRIVE—Tubular shaft. Two universal joints, the forward telescopic, each enclosed in housing and running in lubricant.

BRAKES—One internal and one external brake direct on wheels, 17-inch x 2 $\frac{1}{2}$ -inch drums. Exceptionally easy of operation. Both equipped with equalizers.

STEERING GEAR—Cadillac patented worm and worm gear sector type, adjustable, with ball thrust bearings. 18-inch steering wheel with corrugated walnut rim, aluminum spider. Steering wheel hinged to swing downward, facilitating entrance to front seats.

FRAME—Channel section, carbon steel, maximum depth, 7 inches; width 30 inches in front, 33 inches in rear; three tubular and two pressed steel cross members.

WHEELS—Wood, artillery type, rotating on Timken bearings, fitted with demountable rims for straight side tires, special large steel hub flanges and substantial spokes.

CONTROL—Center control. Gear change lever and hand brake in center, set well forward, yet within easy reach. Service brake, foot lever. Clutch, foot lever. Throttle accelerator, pedal button with foot rest. Throttle and spark levers at steering wheel. Throttle auxiliary air control, hand lever on steering column.

FUEL SYSTEM—Twenty-gallon tank with gauge, at rear of chassis. Fuel forced by air pressure to carburetor.

AXLES—Rear, Cadillac Timken full floating type; Timken bearings; special alloy steel live axle shafts. Spiral type bevel driving gears, machined with accuracy. Front axle, drop forged, special alloy steel, I-beam section with integral yokes and spring perches; drop forged tie rod ends and steering spindles, the latter fitted with Timken bearings at the upper ends.

TREAD—56 inches.

SPRINGS—Front, semi-elliptic, 42 inches long by 2 inches wide; rear, three-quarter platform; sides, 54 inches long by 2 inches wide. Rear cross, 39 $\frac{1}{2}$ inches long by 2 inches wide.

PRICES—On automobiles and parts are net, F. O. B. Detroit. No allowance will be made for any part of standard equipment if ordered omitted.

NOTE—The Cadillac Motor Car Company reserves the right to make changes or improvements at any time without thereby incurring any obligations either to install same on cars previously sold, or to install the old part, which has been changed, improved or omitted, on new cars subsequently sold.

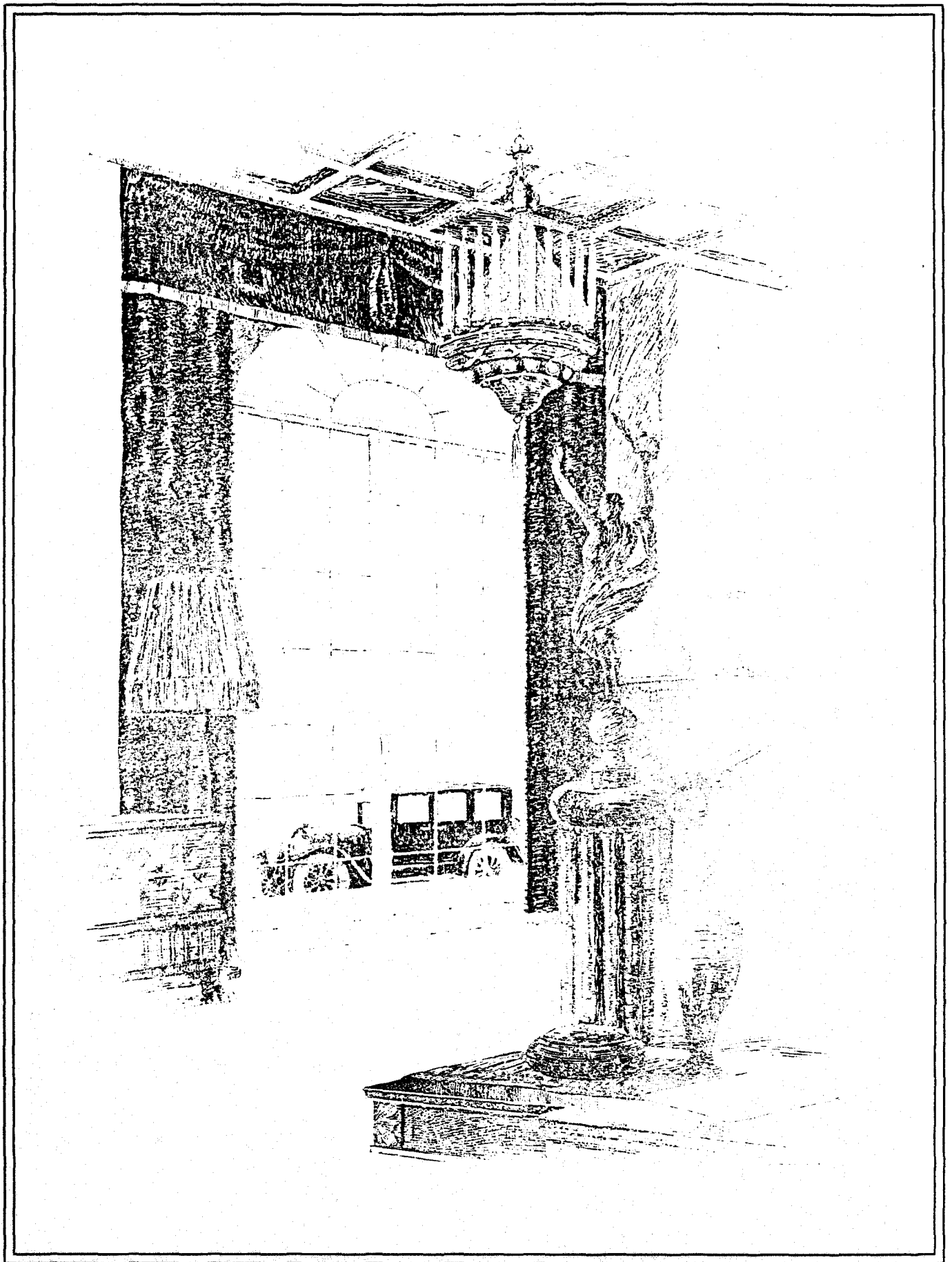
The CADILLAC MOTOR CAR

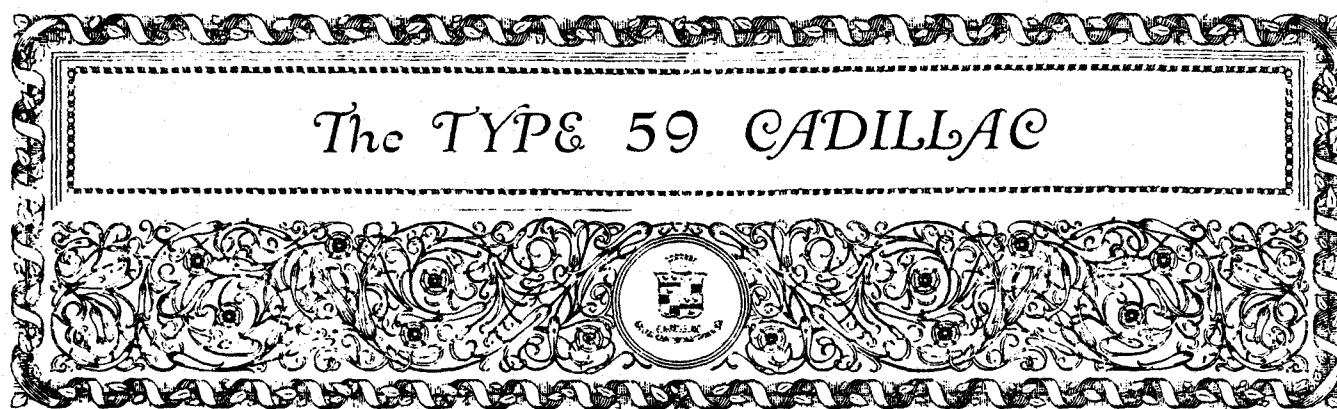
*A presentation of the Type 59 CADILLAC MOTOR CAR, in
Closed and Open Models, as designed and produced by the
CADILLAC MOTOR CAR COMPANY*

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



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THE goodness of the Cadillac is not to be denied. More than a hundred thousand satisfied owners are today testifying to the wonderful service of their eight cylinder Cadillacs. The newest Cadillac re-emphasizes the fine qualities of those which have gone before.

The type 59 Cadillac represents the logical development of the eight cylinder principle to meet present motor-ing requirements. There is nothing freakish, or untried, or unusual about it. It embodies and expresses the best thought and the best practice of more than seven years' concentra-tion on one type.

The added exterior beauties are plain-ly apparent—but the greater beauties are those which await you in an ease of control, and a softness of operation, beyond our ability to describe.

Body lines are a little straighter, a little smoother, without losing those

elements of the conservative which still make Cadillacs, of two or three or more years back, so presentable.

Such mechanical differences as there are will be evidenced in a refinement of Cadillac qualities,—a readier re-sponse from a cold motor, great steady-ness at even high speeds, a greater accessibility for necessary adjustments.

These progressive improvements re-emphasize the Cadillac reputation for uniform goodness and dependability.

This catalog in picture and text covers the appearance and details of the 8 standard Cadillac body styles. Another book, "Details of Construc-tion," is edited by the Cadillac En-gineering Department. Those who are mechanically inclined will find in it a clear and untechnical statement of the principles used in the design and manufacture of the Cadillac eight cylinder chassis. A copy of it will be mailed on request.

The Seven Passenger Touring Car

THE desirability of the seven-passenger Cadillac, as a family car, expresses itself in many different ways, one or another appealing to every member of the household.

The clean, straight smoothness of body lines, the nice tailoring of top and side curtains, to fit, are satisfying at the first glance. Details confirm this pleasant first impression. Seats, front and rear, are deep and wide. The upholstery is extra heavy dull finish black leather, very durable and laid in plaits over many small spiral springs. For threatening weather, storm curtains swing with the doors.

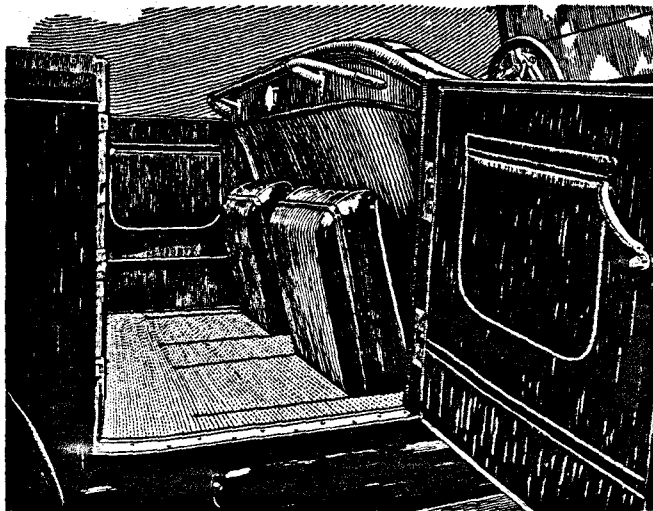
The windshield is of water-tight construction having a fixed lower glass, ventilation being provided by a Cadillac design cowl ventilator.

A 132-inch wheel base eliminates body overhang at the rear and allows a very roomy tonneau, also adding to the riding comfort of ten-inch upholstery. Extra seats are high backed and well cushioned. There is a tonneau light and a long robe rail.

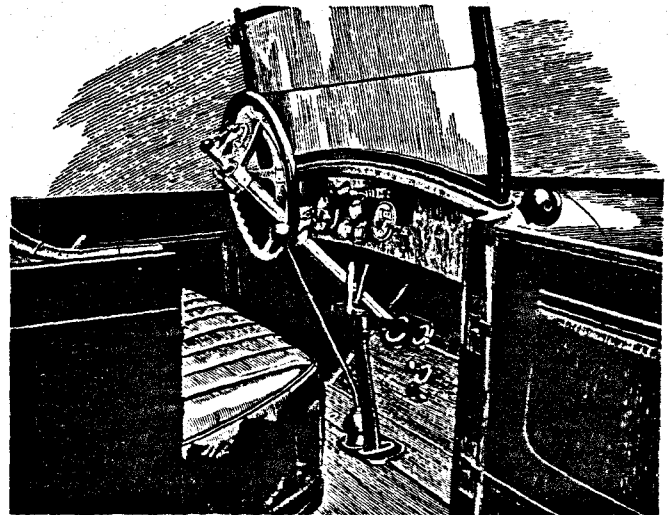
Next to its acceptable appearance, the women of the family will most enjoy Cadillac easy control. With velvet clutch action, easy gear shifting, flexible steering and smooth brakes, no added strain or anxiety is attached to driving in traffic.

The car will go where you guide it without fatiguing effort.

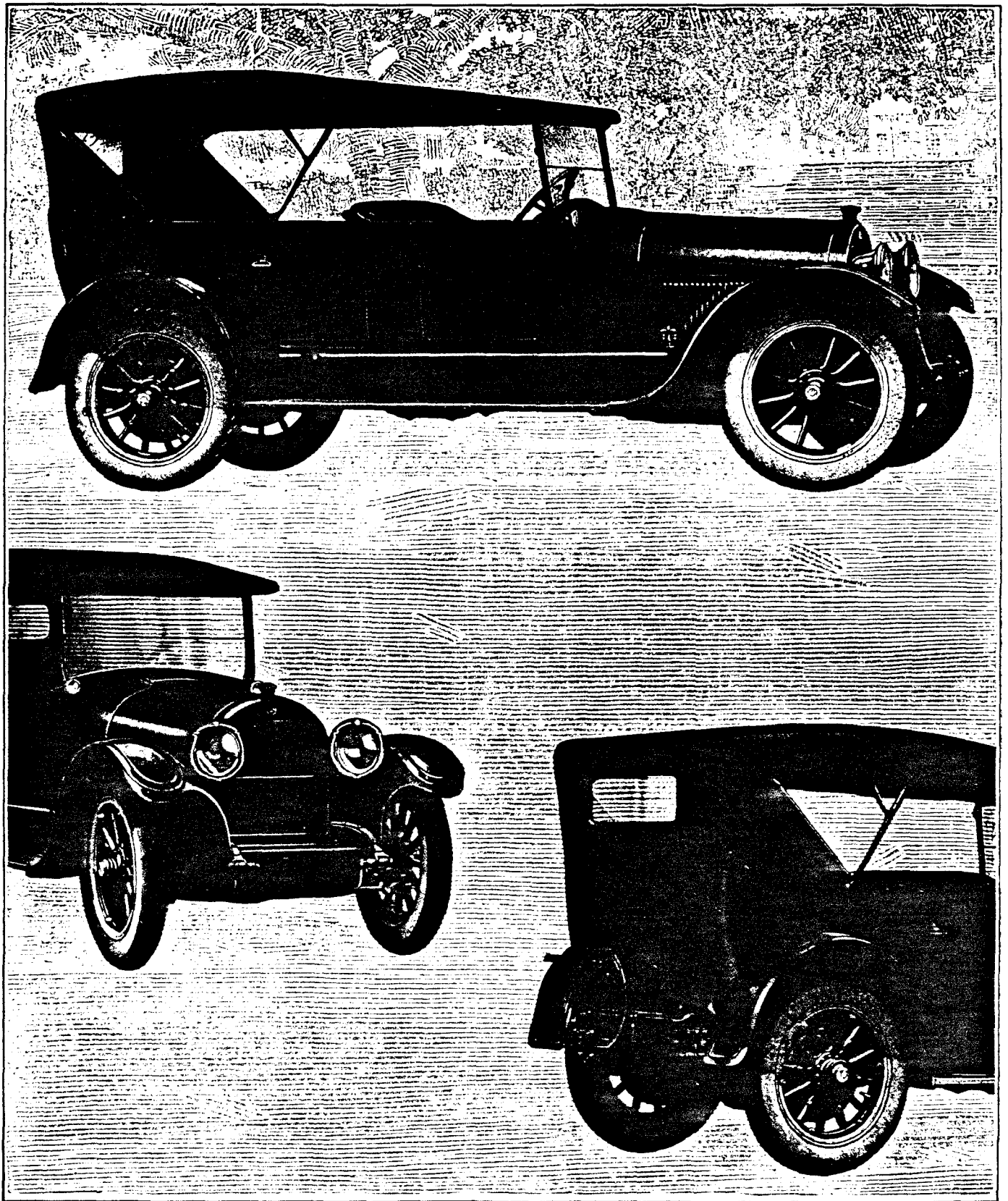
Comfortable, roomy, good looking and easily handled, the seven-passenger car epitomizes the good qualities on which Cadillac reputation is built.



A LONG, substantial robe rail and a tonneau light are details of the Seven-Passenger rear compartment. Extra seats are well upholstered. Upholstering is extra heavy, dull finish, black leather. Ample door pockets are convenient for stowing guide books and other conveniences requisite for a long journey.



CONVENIENT to eye or hand or foot, Cadillac levers are so placed as to make driving control virtually instinctive. Steering wheel, gearshift, clutch and brake pedals, which operate without useless friction, take the fatigue out of a long, hard drive. Ammeter, oil and gasoline pressure gauges tell what your motor is doing without lifting the hood.



The Seven Passenger Touring Car

Sizable may well describe the Touring Car. It is ample in power, in comfort, in good looks and the roominess of its seven-passenger body.

The Four Passenger Phaeton

HE WHO puts a premium on appearance, on style, on rapid pickup, fast road work and the pleasant intimacy of a small party will get the most enjoyment from the Cadillac four-passenger.

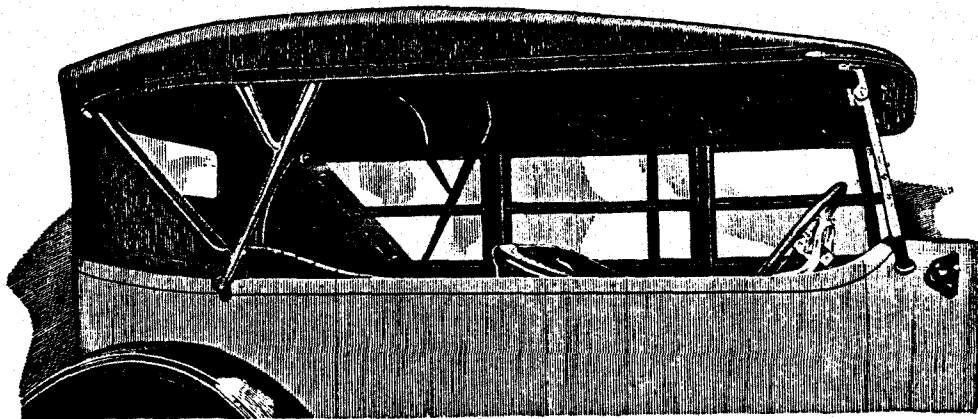
Light and compactly built on the 125-inch chassis, it is roomy for four persons and remarkably comfortable at even the unusual speeds of which the chassis is capable.

One of the good features of the four-passenger is the tonneau. It makes possible a door adjacent to every seat, for getting in or out, without crowding any one, or interfering with the companionability of a small car.

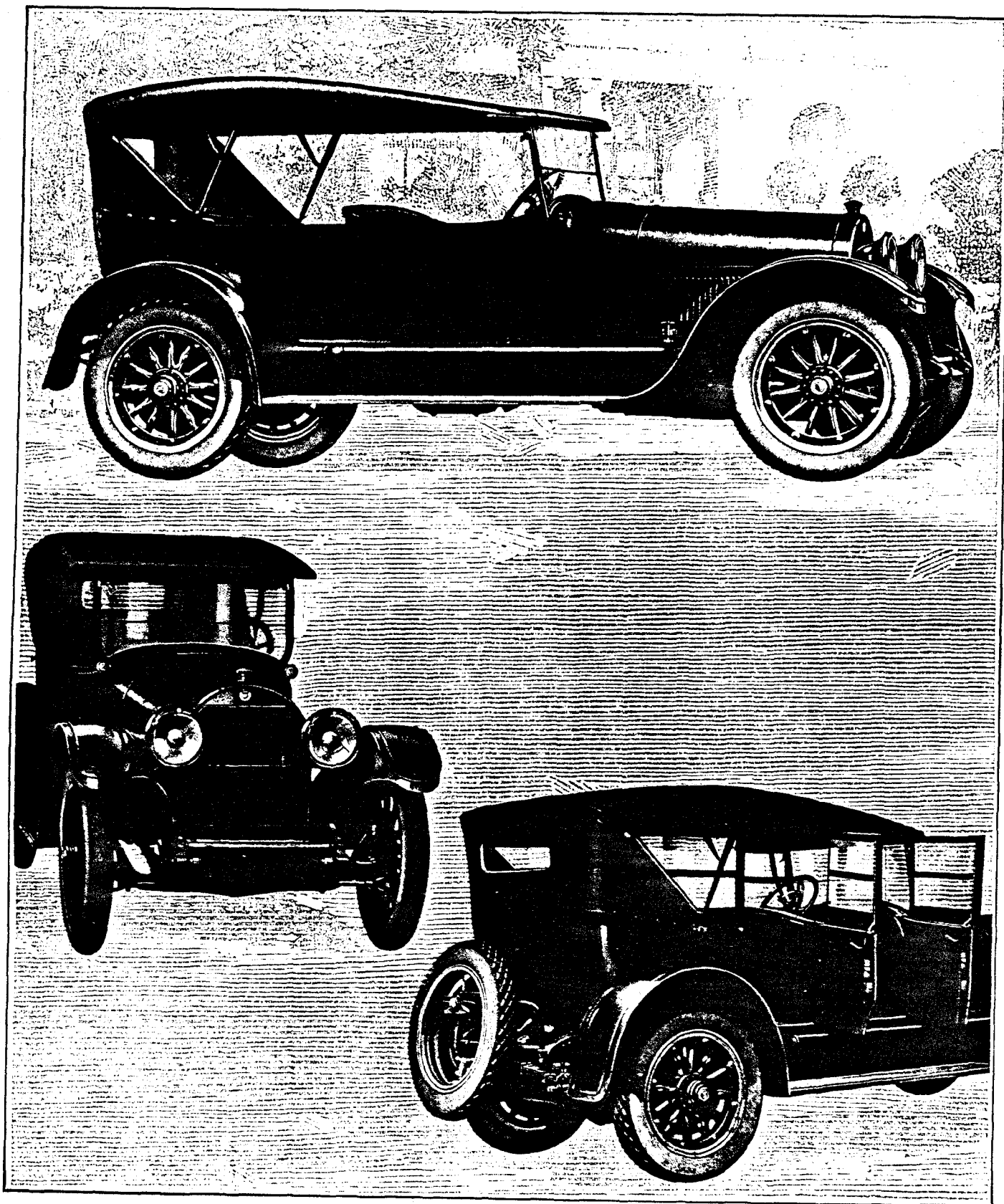
The top is coated weatherproof fabric, full lined with tan whipcord and fitted

with curtains to match. Curtains are carried in an envelope stowed in a pocket back of the front seat, and are tailored to a smooth fit. Quickly adjusted to swing with the doors, they furnish complete shelter, and plenty of warmth for cold weather. The windshield is of water-tight construction, having a fixed lower glass. Ventilation for the forward seats is provided by a Cadillac design cowl ventilator.

The four-passenger Cadillac is exceptionally good looking. Never freakish, it adapts itself readily to the needs of a small family. It is very comfortable for a small touring party. Upholstering is heavy, bright enameled, black leather. Standard body finish is Cadillac blue.



HEAVY, black, coated weatherproof fabric is used for Cadillac top covering. A tan whipcord top lining conceals the bows inside. Curtains of the same materials are tailored to a snug fit. They swing on door brackets attached without tools.



The Four Passenger Phaeton

The Phaeton satisfies the man who makes of his motoring a sport and a hobby. He likes its good looks and dependability. It is faster than even he cares to travel.

The Two Passenger Roadster

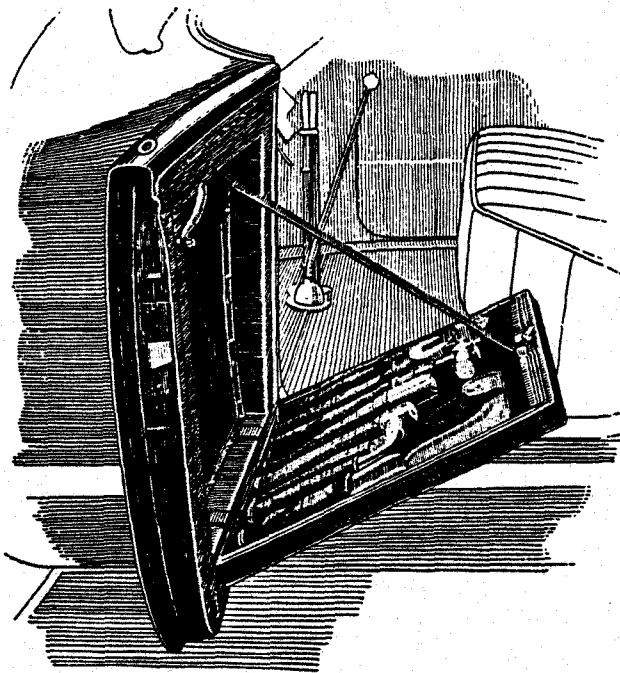
FOR the professional man, or the man who does his day's work from his car, the Cadillac roadster is capable of any amount of rough, hard work and fast driving. It is dependable, too, for year-round service.

The two-passenger body is swung low on the 125-inch wheel base. A snug-fitting top and water-tight windshield, as well as close-fitting storm curtains, give the user the protection of a closed car. Ample storage space behind the front seat, as well as under the deck aft, makes room for personal and business extras. The port covering the rear compartment conceals an emergency seat for two. One key controls the switch, tool lock on the

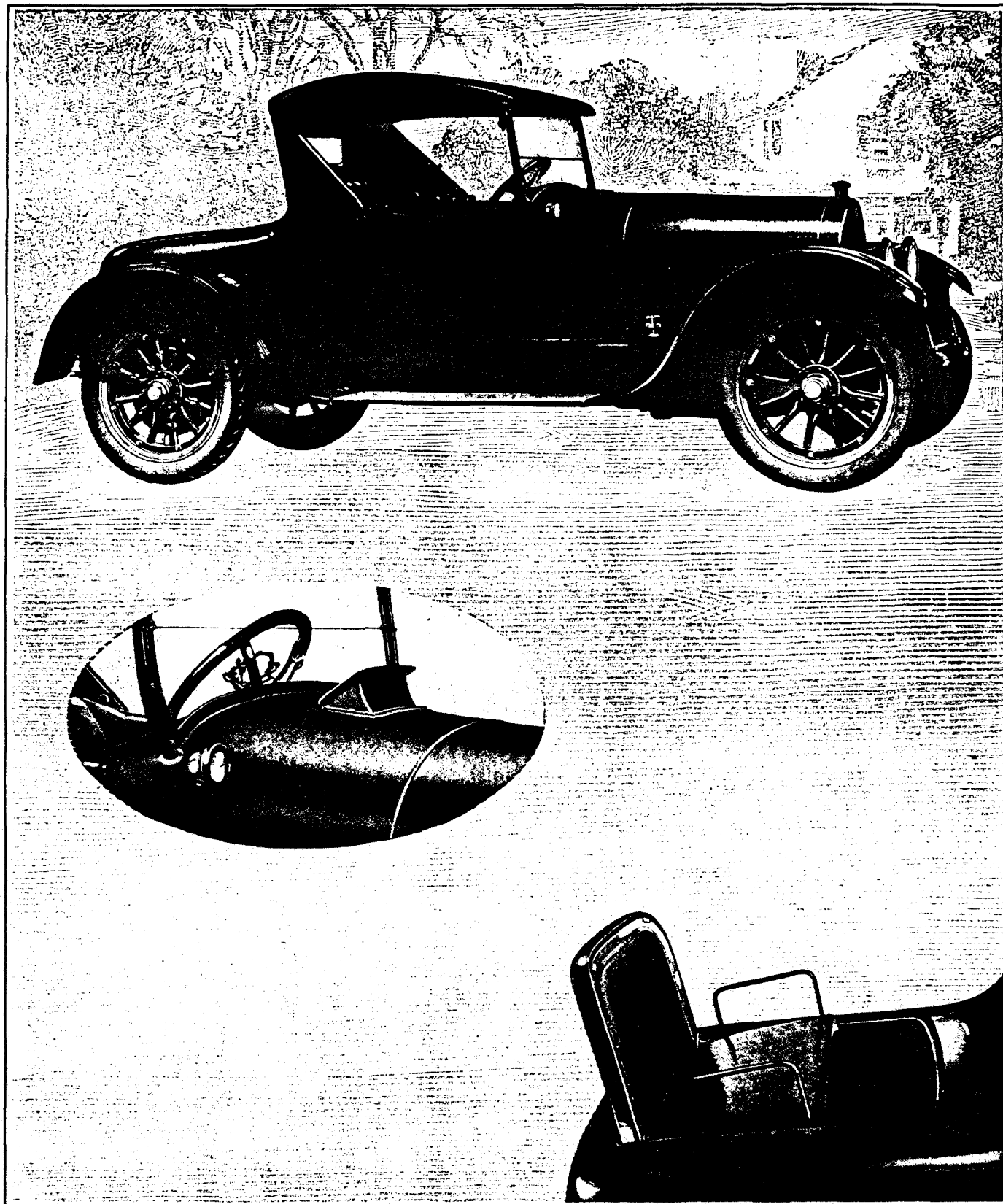
left-hand door and under the seat, as well as the tire lock at the rear. A tire carrier for two extras is clear of the rear luggage compartment.

The roadster is a match for the four-passenger in fleetness and good looks. Carefully balanced and light in weight, it emphasizes the fine performance of the Cadillac chassis. You may expect the unusual from such a car, and it will live up to any reasonable expectation.

Standard finish is Cadillac blue with black trimmings. Upholstering is bright enameled black leather over deep nested coil springs. A variety of special colors from which one may choose makes a distinctive finish possible, if so desired.



Change a tire, set a nut, tighten a bolt? Blind groping for dirty tools has no fair place in comfortable motoring. Cadillac tools are stowed away, clean and orderly, in the left-hand front door pocket under a lock turned by a universal switch key.



The Two Passenger Roadster

The Roadster is a practical car for a busy man. It gives him all-weather comfort and transportation; something more dependable than racy lines and a casual means of getting about.

CADILLAC COACH WORK

PERMANENCE in Cadillac body construction begins with the chassis frame. The side members are channel sections with a maximum depth of seven inches, heavy gauge carbon steel. They are joined by five cross members,—two pressed steel sections and three tubular, splined at the ends.

The frame, thus substantially braced, forms a rigid bed for the body proper.

Body sills and side posts are very stout. The materials used are first grade hard woods.

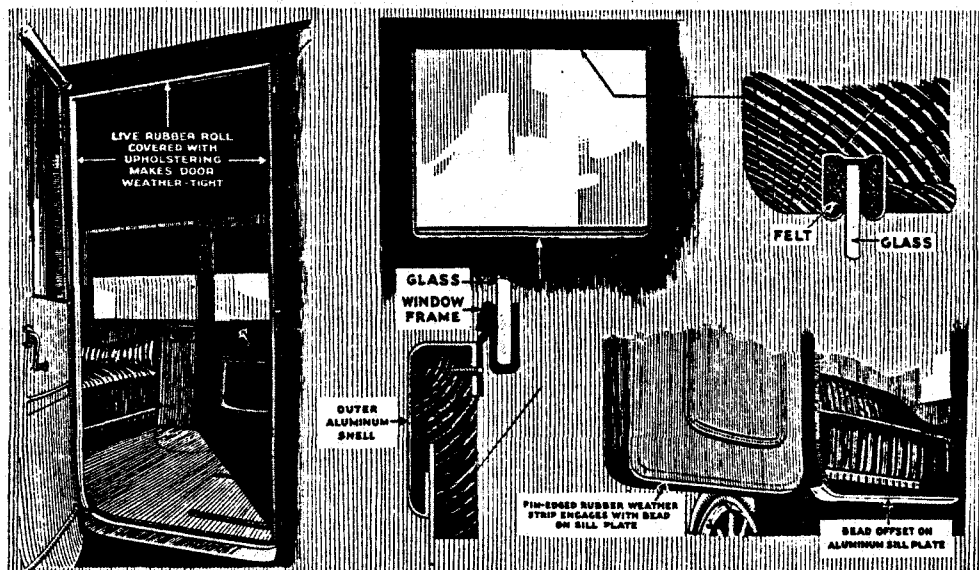
Sills and posts have a substantial cross section. All joints are mortised, screw-fastened and glued, as well as reinforced by steel brackets where necessary. Diagonal steel bracing is used on doors and in other places where desirable.

Sheet steel is used for panelling on the open cars. Closed cars are 14-gauge sheet aluminum throughout.

The metal in each case is shaped and applied in a few large sheets, the seams afterward being welded so that the body covering, when complete, is practically one piece.

Roofs on the closed cars are one-piece aluminum, provided with a drip moulding at the front and sides.

After welding, sand blast and file and emery are applied to obtain a smooth surface, free from grease or dirt. On this is spread more than a dozen coats of primer and filler and varnish. Baked and rubbed and seasoned, each finished Cadillac car presents a glistening weatherproof finish to roadside sand and dust and dirt.



CADILLAC closed cars are weather and rattle proof. Doors close against live rubber rolls at sides and top, and a rubber fin against the sill plate stops the draughts at the bottom. Windows are set in felt lined steel sash. Doors close against adjustable, rubber bumpers. Lower windshield glass is water-tight. A cowl ventilator is provided. It is controlled from the dash.

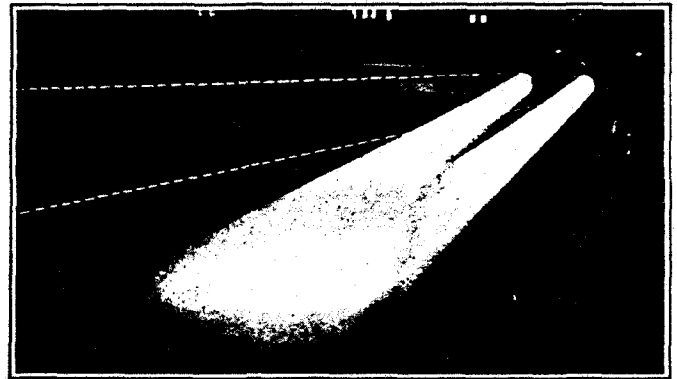
CADILLAC TILTING HEADLIGHTS

ELECTRIC headlights appeared first, as standard equipment, on the 1912 Cadillac. It is only natural, too, that Cadillac should take the lead in eliminating headlight glare.

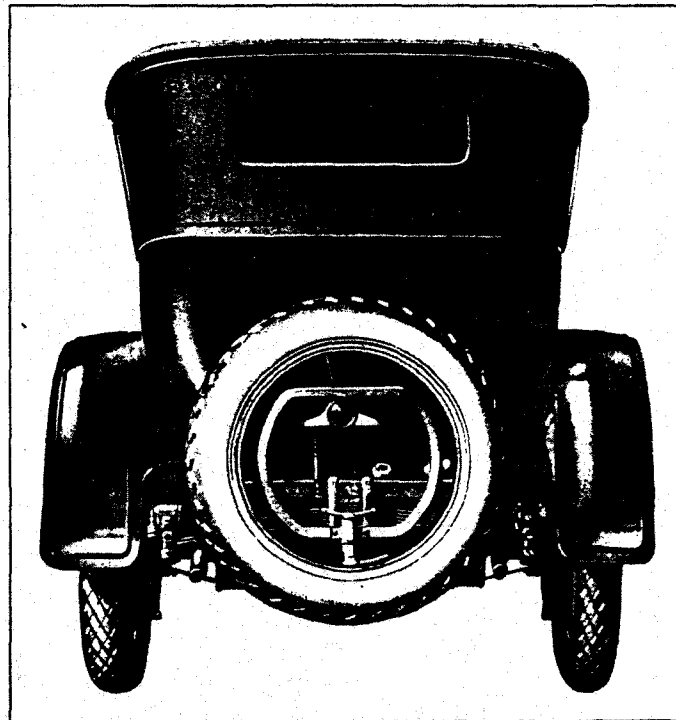
Cadillac tilting headlights are controlled by the driver with a lever on the steering column. They eliminate glare, not by reducing the light at its source, or by changing its form, but by diverting the headlight beam.

Tilting headlights have other advantages. They may be tilted to show the road directly in front at a turn, or to light the down grade when topping a hill. In

the normal position they give abundant illumination for three hundred feet ahead.



CADILLAC tilting headlight reflectors throw a driving light where you want it: on the road a few feet ahead of the car, and out of the eyes of approaching motorists, when you are passing someone; and then three hundred feet ahead of you, picking out a strange road on a dark night.



A WIDE, plate glass window gives the driver full survey of the road behind. Tires carried at the rear keep the running boards clean. Tire irons, locked by the switch key, accommodate two extras. Tail light has license bracket.

The Four Passenger Victoria

ONLY those who own a Cadillac Victoria can appreciate its wide utility. Many a professional man would find himself lost without one. Busy women, with a daily round of home and social duties, find it indispensable. Its roominess is unappreciated till four are seated comfortably. A week end trip is often necessary to fully appreciate its touring comfort.

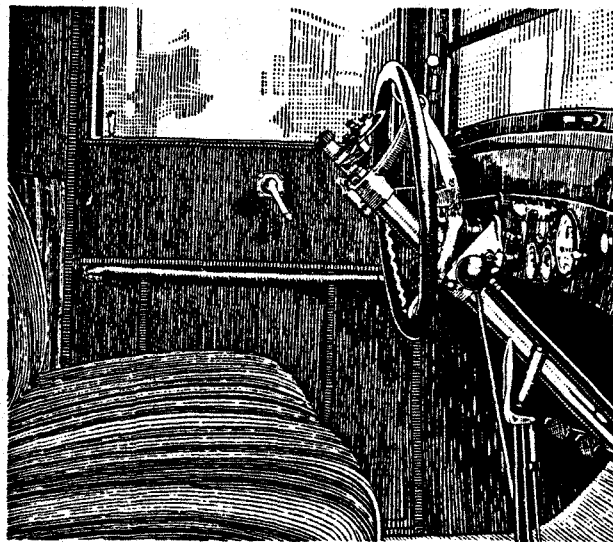
It handles easily in traffic, without being so small as to be inconvenient. It has style and individuality, and above all, Cadillac dependability.

The body panelling is 14-gauge sheet aluminum throughout. The interior is finished in the finest all wool upholstering fabrics the market affords. The driver's seat, a little forward of the rear cushion, is conveniently reached through the left hand door and well arranged for clear

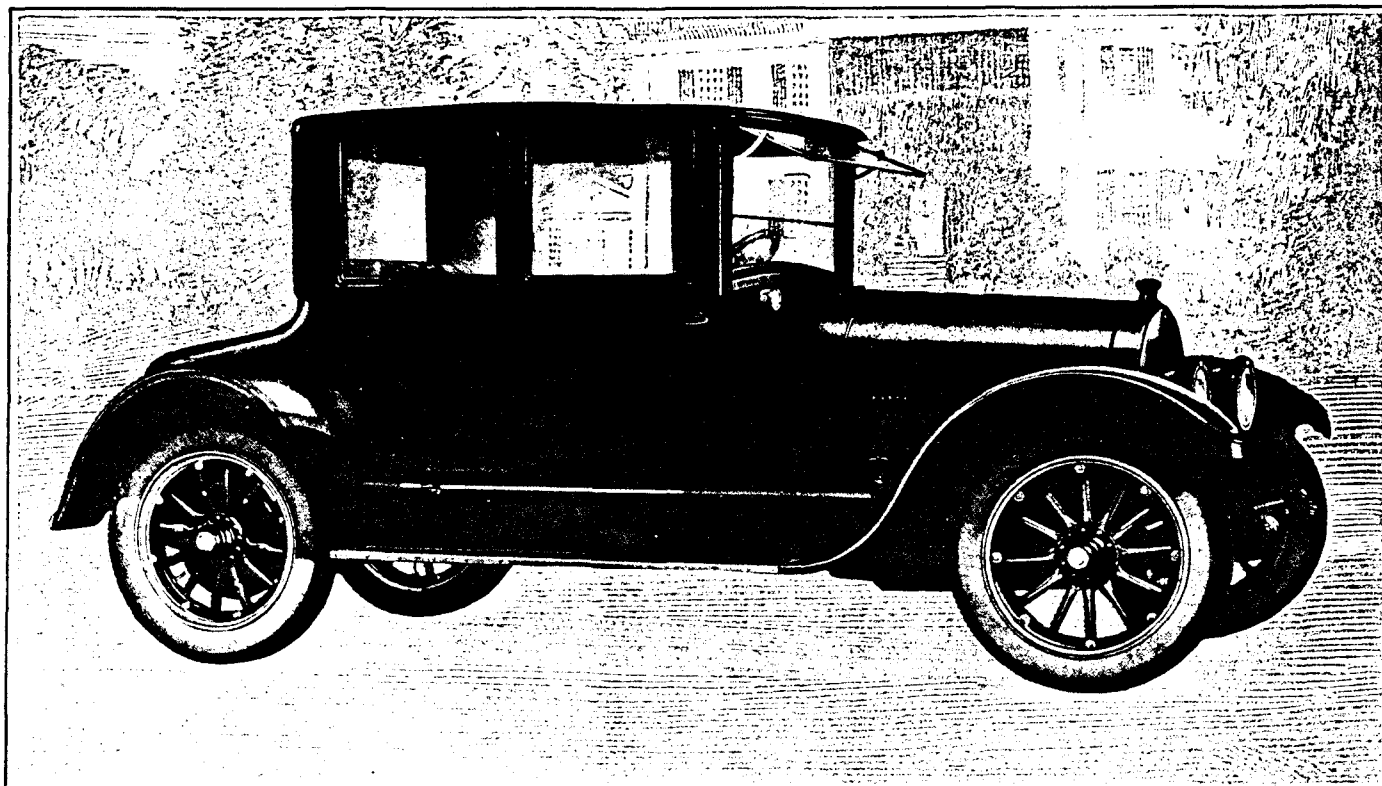
vision. The seat to the rear is amply wide for two. An extra folding seat, stowed away under the dash, is well upholstered and fitted with arm rests. Taffeta sunshades, over the rear and rear quarter windows, give privacy and protection from the sun. Corner reading lamps and cigar lighter are standard equipment.

As a personal car the Victoria finds much deserved favor among women. Closed car protection and the compactness of a roadster make it very suitable for all year service for town or suburban use. Expanding to seat four, it lends itself well to small evening parties or week end trips.

Selection from a variety of fine wool fabrics permits the owner to express her own individuality in the interior decoration.

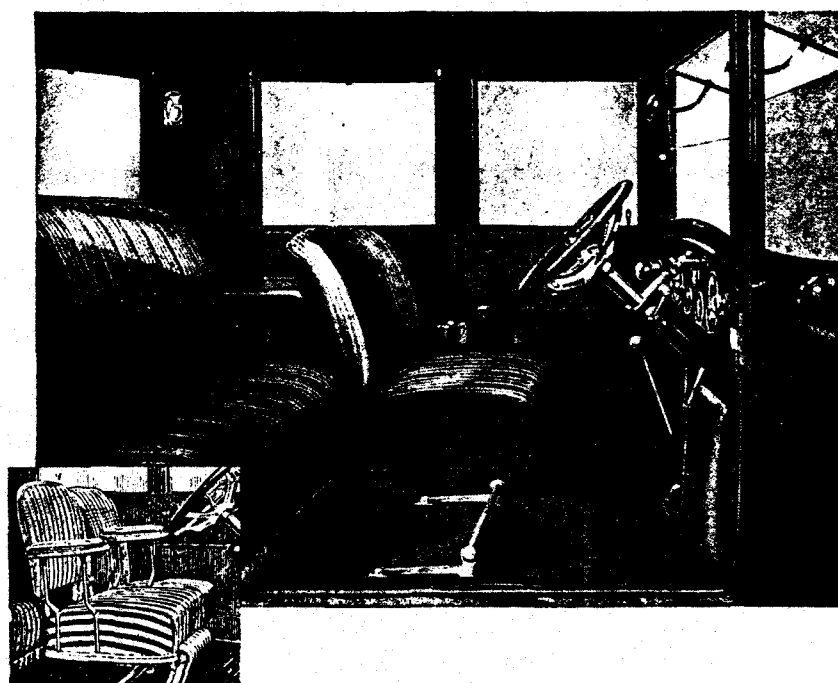


The tilting steering wheel gives a clean aisle way to the driver's seat through either front door



The Four Passenger Victoria

The Victoria is surprisingly roomy. Beside comfortable seats for four, there is storage space behind the driver's seat and under the deck at the rear.



With its upholstered cushion back and arms, the Victoria extra seat is more than a makeshift. It is a comfortable place for a grown-up fourth, as well as little son or daughter.

The Five Passenger Sedan

A SEDAN type of closed body needs several features to bring its users perfect satisfaction.

Four doors, for convenient entrance to any seat, are now recognized by automobile builders as essential for both comfort and convenience. To make this construction practical, great care has been taken to have the doors on Cadillac enclosed cars both wind and water-tight. They close against live rubber cushions at sides and top. A rubber fin at the bottom meets the metal sill plate.

For all-year-round service, window spaces are large, and window panes adjustable. Mechanical lifts operate the door windows, which lower flush with their sills. The rear quarter windows lower three quarters of the way.

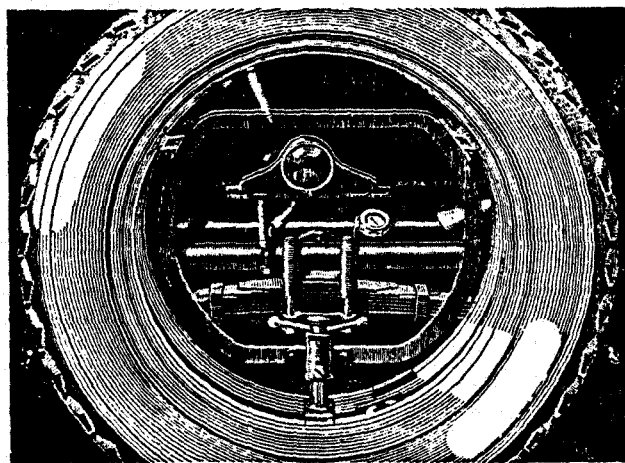
The rear cushion of the Cadillac Sedan seats three. It is fitted with arm rests, upholstered in the same material as the cushions. Finest grade upholster-

ing fabrics are laid in plaits over deep coil springs, for great riding comfort. As in all Cadillac closed models, the side and head linings are upholstered in plain materials of a color and quality to match the seat cushions. The color of the floor covering also harmonizes with the rest of the interior.

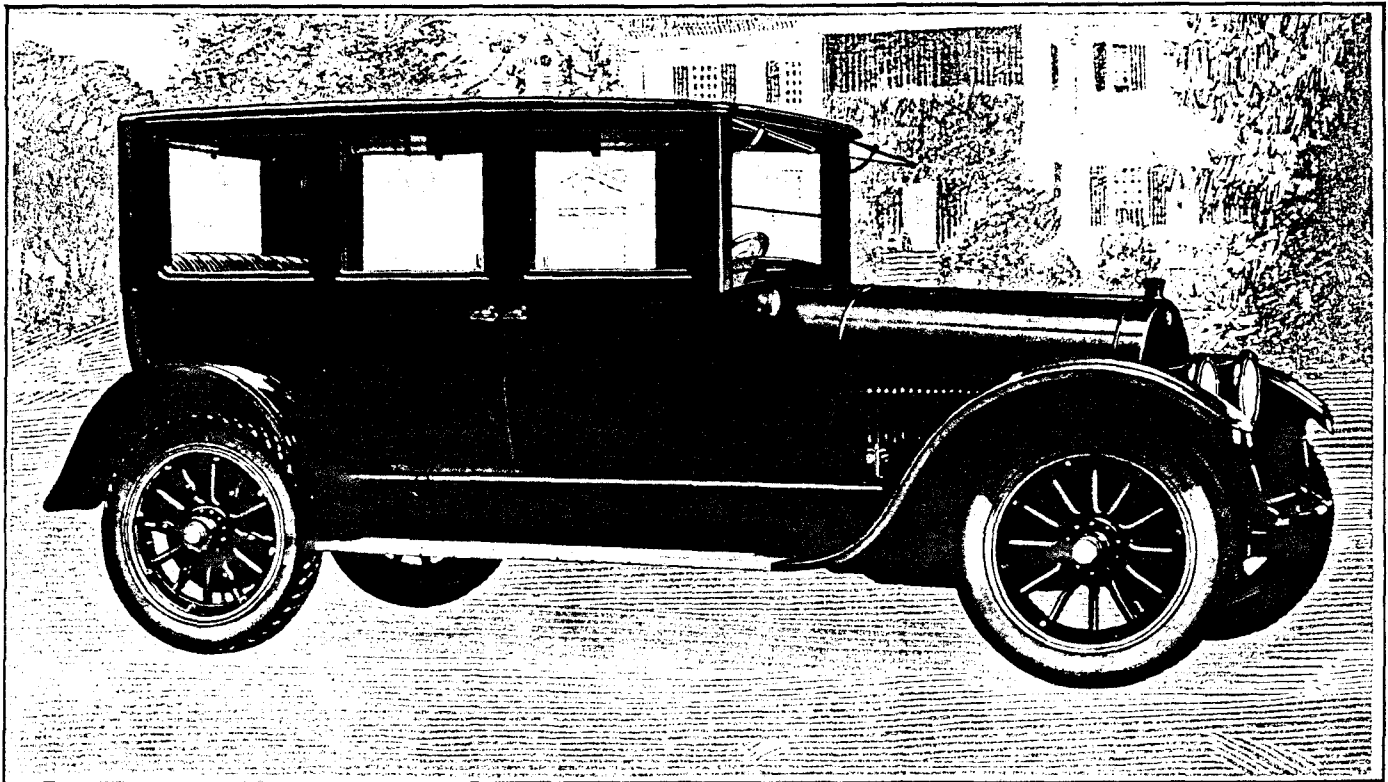
Vanity case, ash receiver, cigar lighter, foot hassock and robe rail, door pockets and quarter reading lights as well as a dome light add their part to the comfort of the Sedan for touring, or as a town car for the woman who drives.

Door handles, window lifts, lamps and other appointments of Empire design, with a dull platinum finish, give a pleasant decorative touch to the smooth interior upholstery.

When you are thinking of the Sedan, bear in mind, too, Cadillac's easy handling qualities that make it a practical woman's car.

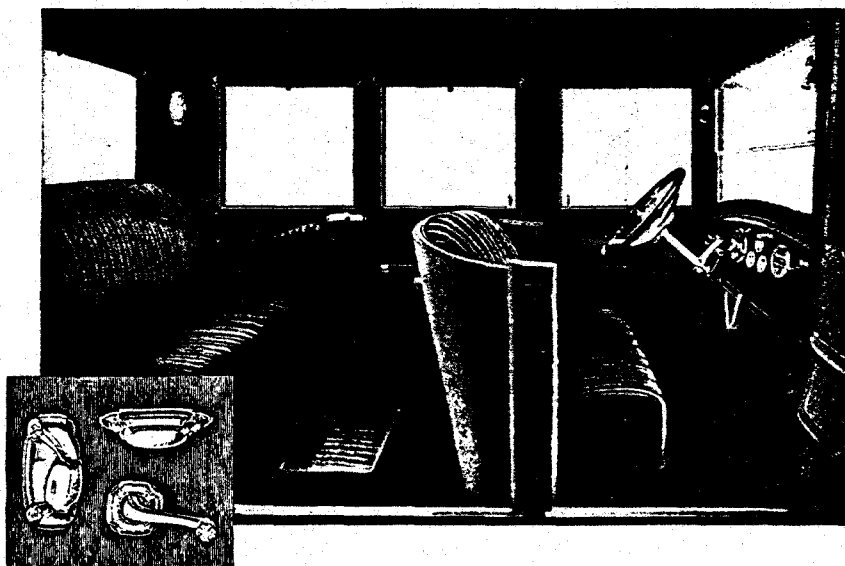


The new Cadillac tire irons will give a thief a hard struggle. A heavy bolt, flanged to fit a tire rim, is screwed down tight and locked through its center by a steel lug, which keeps it from turning. The switch key fits the tire lock. The tail lamp is fitted to hold a license plate, and is designed also to illuminate the gasoline gauge.



The Five Passenger Sedan

The Sedan appeals to more than a woman's vanity. Four wide doors and details, such as arm rests, foot hassock and deep upholstery invite comfort.



From the reign of the first Napoleon come the rosettes and fasces that decorate Cadillac closed car fittings.

The Seven Passenger Suburban

CONSIDER the Suburban as a year-round family car. It is commodious, really roomy for seven people, or a large touring party and its paraphernalia. The 132-inch wheel base permits a long rear compartment and the use of generous sized, well upholstered extra seats. The greater convenience of the driver is considered in the tilt of the front seat, and the position of driving controls, to minimize the fatigue of long trips. Entrance is direct and easy to any place in the car through four wide doors. A third rain vision glass is provided for the windshield.

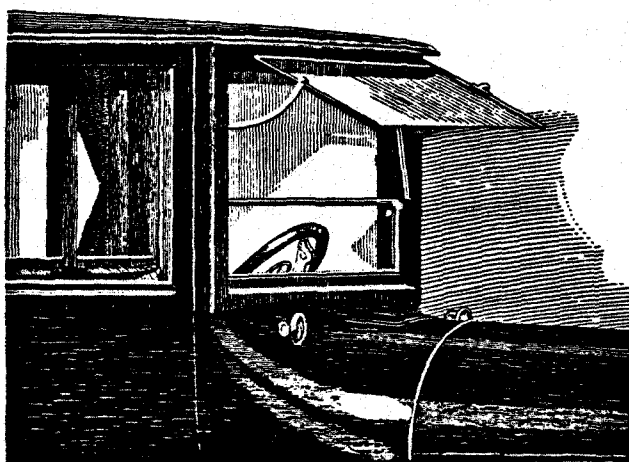
For the long drive there is, too, a foot hassock, arm rests for the rear seats, vanity case and ash receiver, as well as taffeta sunshades on the rear doors, rear and rear quarter windows.

For ventilation, the door windows lower flush with their sills on mechanical lifts. The rear quarter windows lower

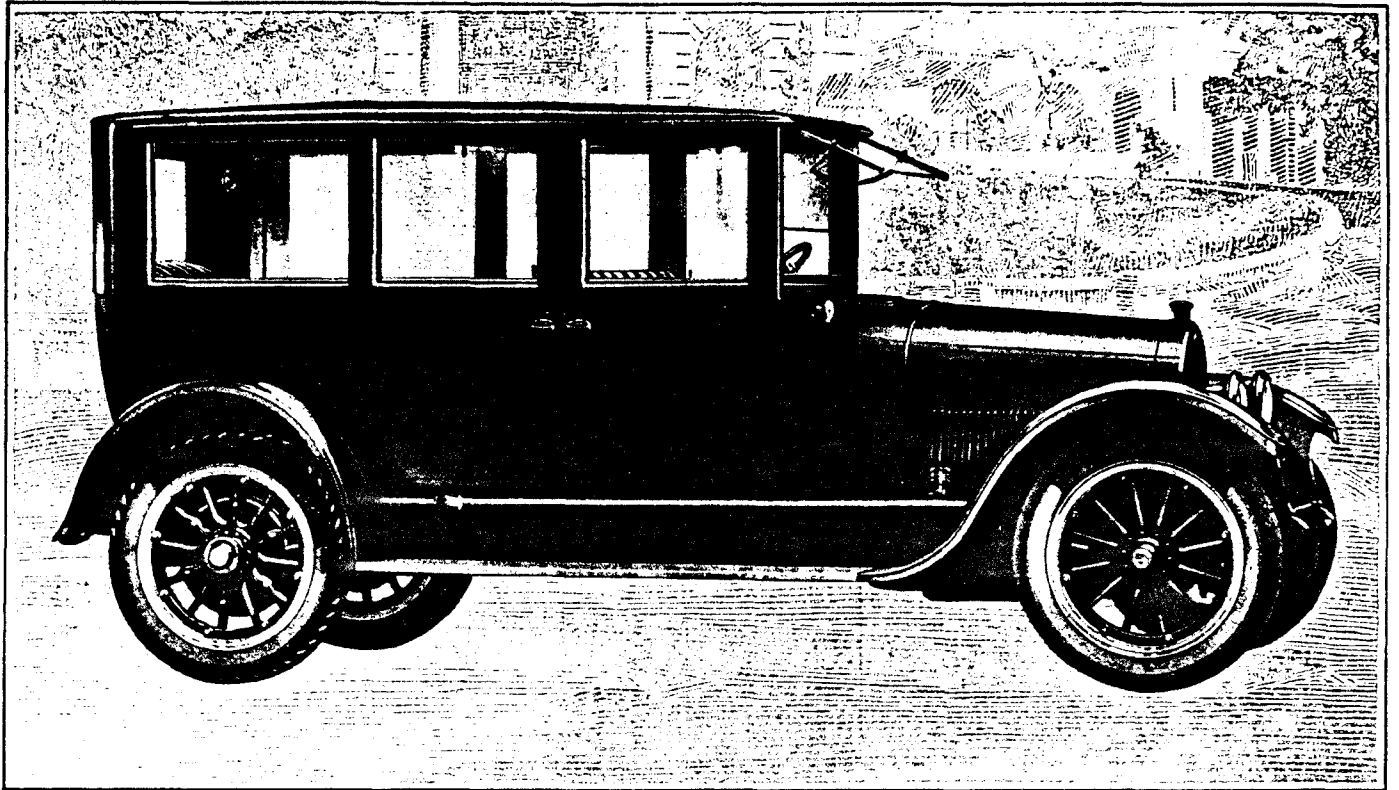
more than three quarters of the way and a ventilator in the cowl, controlled from the dash, provides fresh air for those in front.

Upholstering materials are chosen from the finest grade fabrics the market affords. Side and head lining are of materials harmonizing in color and pattern with the covering for seat cushions and backs. A thick felt pad over the roof supports, prevents the drumming of the solid aluminum roof. For ornament the metal appointments, lamps, window lifts, etc., are of dull platinum finish, being designed after the Empire period in decoration.

Easy Cadillac gear shift and steering controls, as well as the wide hospitality which the car makes possible, account for the popularity of the dependable Cadillac Suburban with the many members of a typical, prosperous American family.

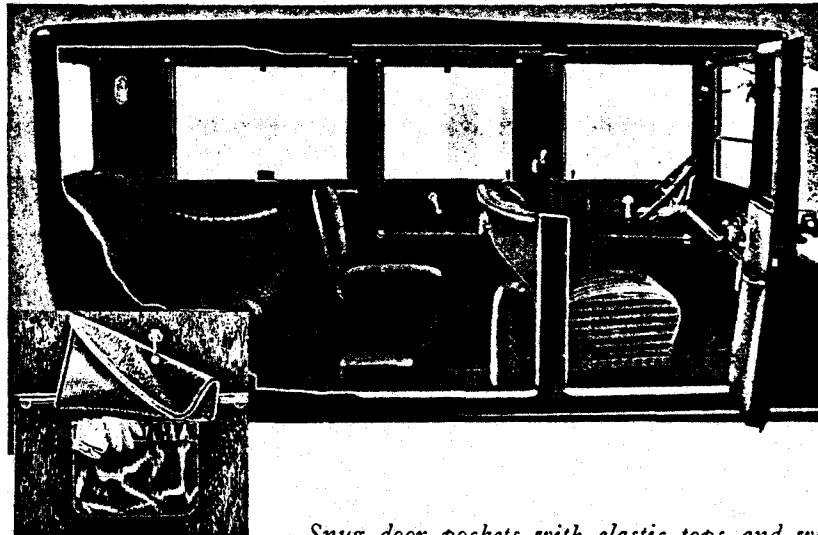


The extra pane, in the upper part of closed car windshields, keeps the vision glass dry and clear. Those who drive in wet weather fully appreciate this feature.



The Seven Passenger Suburban

The Suburban carries the flavor of old-fashioned hospitality. It is comfortable, roomy, amply powered; sufficient for the family group with many friends.



Snug door pockets with elastic tops and weighted flaps are a convenient place to stow parcels, or tuck away veil, gloves or the other vanities that go with party clothes

The Standard Limousine

CHOICE of a Cadillac Limousine is largely a matter of personal taste. The more conservative limousine model, with the driver's seat under the roof, pleases some. There is to choose, too, the fully enclosed Imperial Limousine, for its impressive exterior, or in deference to the comfort of an old family servant.

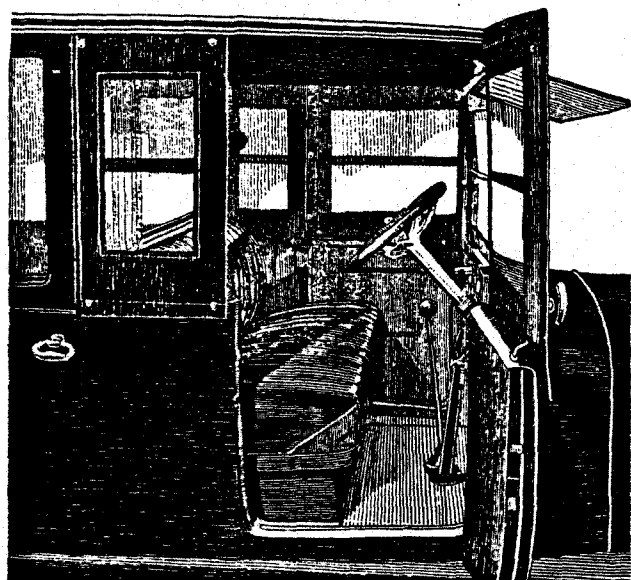
Beyond the importance of a good chassis, two or three considerations are of the utmost importance in the choice of a limousine. Extreme comfort is something that everyone has a right to expect from this type of car. It is the factor above all others which makes the chauffeured car worth while.

Quietness is one reason for limousine comfort, a long wheel base, the source of another. Cushions, built up from many deep coil springs, and arm rests make up still another comfort.

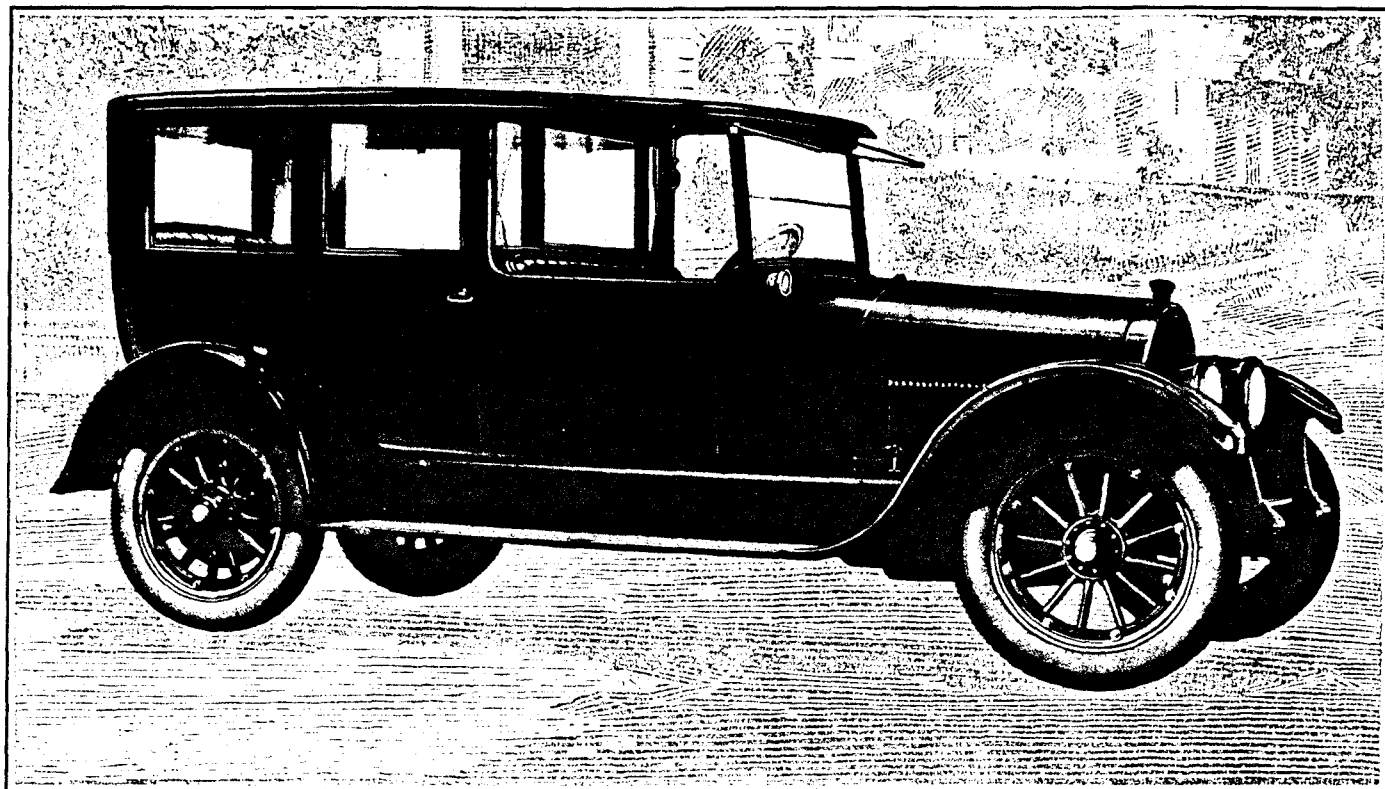
Upholstering fabrics are high grade material, the best the market affords. Seat covering, side and head lining, are harmonious in color and design. A heavy felt pad, under the aluminum roof panel, silences the drumming often noticeable from that source.

A hassock is provided in place of the usual foot rail. Sunshades on the windows break the daylight glare and give an added privacy, when desired. Lights, a dome lamp and two quarter reading lamps, furnish pleasant night illumination.

Vanity box and ash receiver of inlaid mahogany, on either side of the car, lend a decorative touch to the interior, as well as being added conveniences. Decorative, too, are the metal fittings, dull platinum finished, and cut in the patterns of the French Empire.

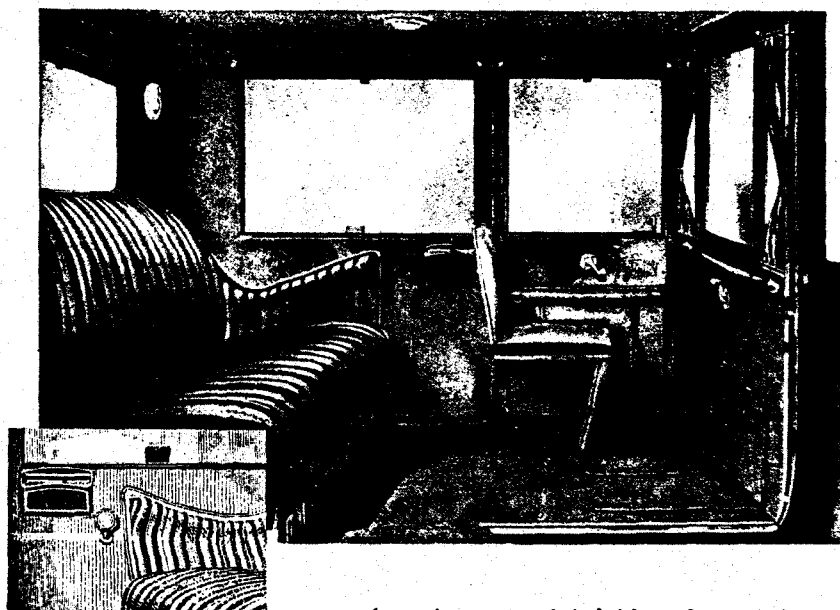


Side curtains tailored to fit and swinging with doors, as well as a three-piece windshield and cowl ventilator, help to keep a Cadillac chauffeur comfortable and contented. Chauffeurs, too, appreciate the little trouble the Cadillac mechanism gives them.

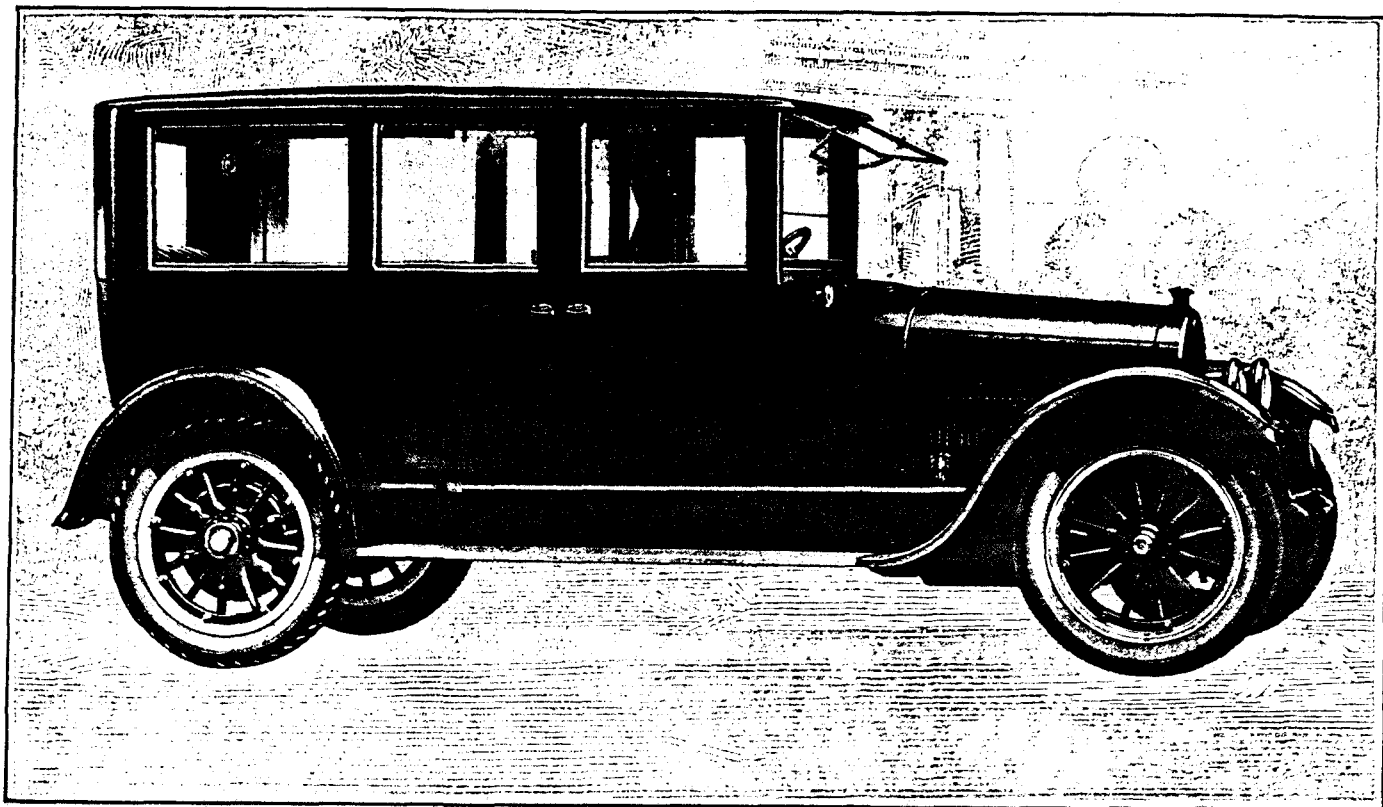


The Standard Limousine

The Limousine is dignified, quiet, comfortable, roomy. It is finely balanced as to line and beautifully finished, besides being a thoroughly dependable means of transportation.



A vanity case of inlaid mahogany is an appointment of the closed cars. It contains a hand mirror, memorandum pad and pencil and card case. An ash receiver with electric cigar lighter in a case to match, is on the opposite side of the car. A substantial chauffeur's telephone magnifies the speaking voice, when talking to your driver.



The Imperial Limousine

The Imperial, for formal functions, is as exclusive as you please; or is somewhat more informal, with the owner driving and the center window down.

IN EXTERIOR APPEARANCE, the Imperial Limousine has the smooth lines and impressive outward appearance of the Suburban model.

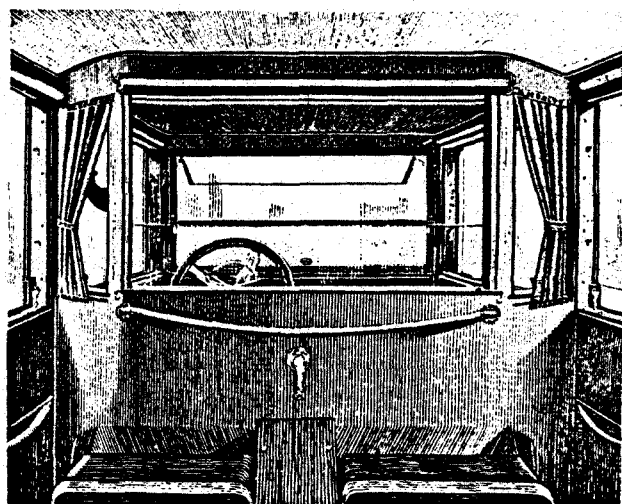
The feature of this car is the enclosed chauffeur's compartment. A wide center window, back of the front seat, may be lowered, converting the body into a single compartment carriage for touring.

The forward seat is well arranged for the convenience of an owner driver and his guest.

The front compartment is finished in bright enameled black leather, woodwork being dull ebony to match.

The dependable, even performance of a Cadillac Limousine will increase your

own satisfaction in your investment, as well as make your chauffeur's work easy.



The big center window in the Imperial Limousine lowers well down, making it comfortable for long tours, or family parties when the owner drives. In outward appearances, the Imperial Limousine has all the distinction of the Suburban.

CADILLAC EIGHT CYLINDER CHASSIS

A full and interesting description of the Cadillac eight cylinder engine and chassis is contained in the Cadillac mechanical catalogue, "Details of Construction"

ENGINE—Eight-cylinder V-type, high speed, high efficiency. Engine and transmission built in unit, three-point suspension. Cylinders cast in two blocks of four cylinders each, with water-jackets and combustion chambers integral; detachable heads. Three and one-eighth inch bore by five and one-eighth inch stroke. Piston displacement, 314 cubic inches. Crankcase, aluminum, copper alloy. Tungsten steel valves. Valve mechanism enclosed. Three-bearing crankshaft, two inches diameter, of chrome nickel alloy steel, special heat treated. Main and connecting rod bearings of liberal dimensions; Cadillac special bearing metal, with bronze reinforcement. Single camshaft, five bearings. Camshaft and generator shaft driven by silent chains from crankshaft; front end chains adjustable.

HORSEPOWER—N. A. C. C. rating 31.25.

COOLING—Water, forced circulation. Jackets cast integral with cylinders, liberal water circulating space. Two centrifugal pumps, one for each block of cylinders, insuring proper water distribution. Radiator, Cadillac tubular and plate type. Fan driven by silent chain from camshaft. Water temperature governed by Syphon Thermostats.

IGNITION—Cadillac-Delco, improved system. Current supplied by generator and battery.

LUBRICATION—Automatic pressure feed by gear pump. Oil forced to crankshaft and connecting rod bearings.

CARBURETOR—Cadillac, designed especially for this engine, insuring uniform gas distribution and maximum efficiency. Auxiliary air control to facilitate starting. Intake pipe, exhaust heated.

CLUTCH—Multiple disc, dry plate type; seventeen high carbon steel plates, $7\frac{3}{4}$ inches diameter. Driving plates are faced with wire mesh asbestos. Exceptionally soft and velvety in operation.

TRANSMISSION—Selective type sliding gear, three speeds forward and reverse. Chrome nickel steel gears and shafts. Aluminum case.

CRANKING DEVICE—Cadillac-Delco, improved, patented.

STORAGE BATTERY—Exide manufacture, designed especially for Cadillac; heavy plates.

PRICES—On automobiles and parts are net, F.O.B. Detroit. No allowance will be made for any part of standard equipment if ordered omitted.

DRIVE—Tubular shaft. Two universal joints, the forward telescopic, each enclosed in housing and running in lubricant.

BRAKES—One internal and one external brake direct on wheels, 17-inch x $2\frac{1}{2}$ -inch drums. Exceptionally easy of operation. Both equipped with equalizers.

STEERING GEAR—Cadillac patented worm and worm gear sector type, adjustable, with ball thrust bearings. 18-inch steering wheel with corrugated walnut rim, aluminum spider. Steering wheel hinged to swing downward, facilitating entrance to front seats.

FRAME—Channel section, carbon steel, maximum depth 7 inches; width 30 inches in front, 33 inches in rear; three tubular and two pressed steel cross members.

WHEELS—Wood, artillery type, rotating on Timken bearings, fitted with demountable rims for straight side tires; special large steel hub flanges and substantial spokes.

CONTROL—Center control. Gear change lever and hand brake in center, set well forward, yet within easy reach. Service brake, foot lever. Clutch, foot lever. Throttle accelerator, pedal button with foot

rest. Throttle and spark levers at steering wheel. Throttle auxiliary air control, hand lever on steering column.

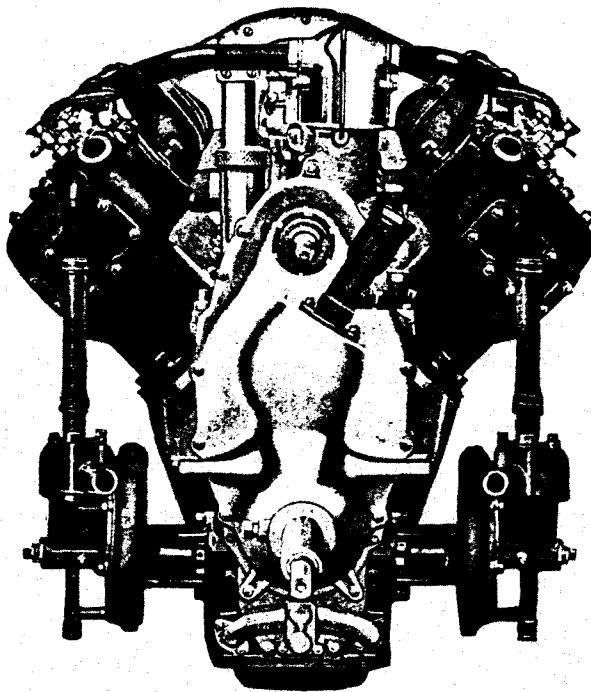
FUEL SYSTEM—Twenty-gallon tank with gauge, at rear of chassis. Fuel forced by air pressure to carburetor.

AXLES—Rear, Cadillac Timken full floating type; Timken bearings; special alloy steel, live axle shafts. Spiral type bevel driving gears, machined with accuracy. Front axle, drop forged, special alloy steel, I-beam section with integral yokes and spring perches; drop forged tie rod ends and steering spindles, the latter fitted with Timken bearings at the upper ends.

TREAD—56 inches.

SPRINGS—Front semi-elliptic, 42 inches long by 2 inches wide; rear, three-quarter platform; sides, 54 inches long by 2 inches wide. Rear cross $39\frac{1}{2}$ inches long by 2 inches wide.

NOTE—The Cadillac Motor Car Company reserves the right to make changes or improvements at any time without thereby incurring any obligations either to install same on cars previously sold, or to install the old part, which has been changed, improved or omitted, on new cars subsequently sold.



BODY SPECIFICATIONS and DETAILS

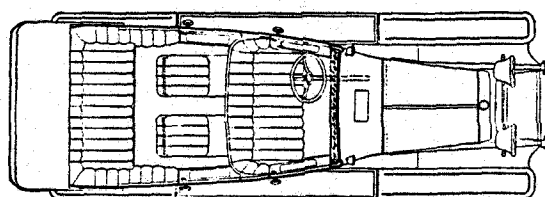
TYPE 59 CADILLAC—ALL CARS

Standard Combination Clock and Speedometer with trip reset. Ammeter, oil and gasoline pressure gauges.
Dash Dash control for cowl ventilator; combination switch for lights and ignition; auxiliary air pump.
Equipment Headlight titling lever and auxiliary air valve lever for starting, on steering column; conventional spark and throttle controls; horn button at top of steering column; tilting steering wheel.

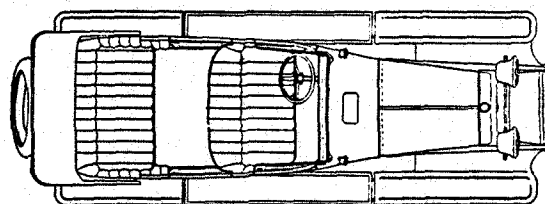
Special Colors Upon sufficient notice, cars may be finished in special colors approved by the manufacturer, at an additional charge.

OPEN CARS

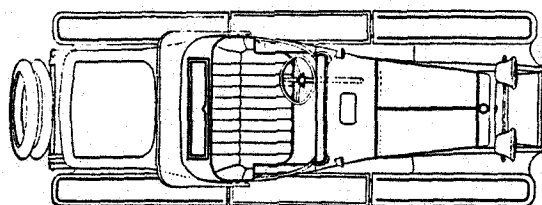
MODEL	SEATING	WHEELBASE	TIRES	STANDARD FINISH	UPHOLSTERING	STANDARD EQUIPMENT
<i>Touring Car</i>	7 Persons 2 front seat 3 rear seat 2 auxiliary seats	132 inches	35 x 5 Goodyear or U. S. fabric Front—plain tread Rear—all- weather tread	Brewster Green— Black trimmings on body rail, fend- ers, radiator, dust shields, hub caps and lamps. Body and wheels striped.	Extra heavy dull fin- ish long grain black leather laid in plaits over deep nested coil springs on seat cushions and backs.	—all open cars TOP—Heavy weather- proof fabric covered; full khaki whipcord lining, covering top bows; rear curtain has quarter wings and plate glass window; $\frac{3}{4}$ area of side curtains transparent; double lower flaps and tagged for position; door brackets easily placed, permit curtains to swing with doors.
<i>Phaeton</i>	4 Persons 2 front seat 2 rear seat	125 inches	34 x 4½ Goodyear or U. S. fabric Front—plain tread Rear—all- weather tread	Cadillac Blue—Black trimming on lamps, radiator, fenders, dust shields and hub caps. Body and wheels striped.	Heavy bright enam- eled black leather laid in plaits over deep nested coil springs on seat cushions and backs.	LAMPS—Five road lamps; two headlamps with tilting reflectors; two side lights, tail light with license hold- er; dash lamp; handy lamp with cord; ton- neau lamp in touring car and phaeton.
<i>Roadster</i>	2 Persons in front seat (Auxiliary seats for 2 in rumble)	125 inches	34 x 4½ Goodyear or U. S. fabric Front—plain tread Rear—all- weather tread	Cadillac Blue—Black trimming on lamps, radiator, fenders, dust shields and hub caps. Body and wheels striped.	Heavy bright enam- eled black leather laid in plaits over deep nested coil springs on seat cushions and backs.	



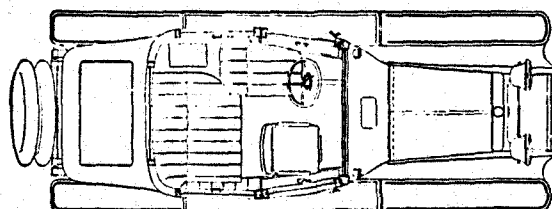
Seven-Passenger Touring Car



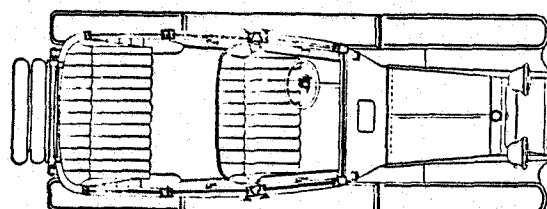
Four-Passenger Phaeton



Two-Passenger Roadster



Victoria



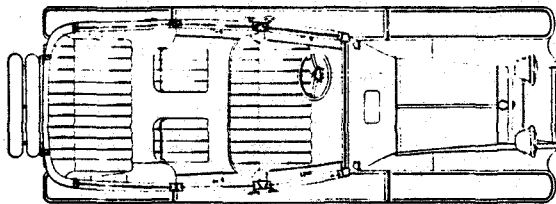
Sedan

ENCLOSED CARS

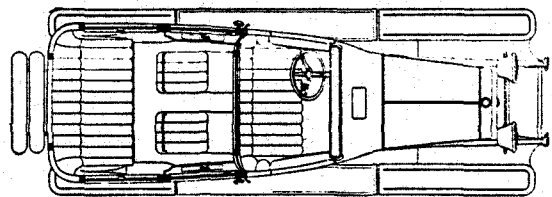
Standard Finish Victoria and Sedan—Brewster Green; Suburban—Brewster Green or Black; Limousine and Imperial—Black; upper body, radiator, fenders, dust shield, lamps and hub caps trimmed in black.

Upholstery Choice of patterns and fabrics from best materials the market affords. Top and head lining in colors and patterns to harmonize with material on seat cushions and backs. Same material used to cover door pulls and robe rail as well as blind tacked for trimming.

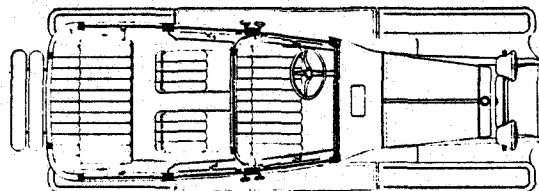
MODEL	SEATING	WHEELBASE	TIRES	APPOINTMENTS	LIGHTING	STORAGE
<i>Victoria</i>	4 Persons Driver 2 rear seat 1 extra seat	125 inches	34 x 4½ Goodyear or U. S. fabric Front—plain tread Rear—all- weather tread	Foot rail; arm rests on folding seat; taffeta roller sunshades on side and rear windows. Outside key locks both doors; cowl ventilator controlled from dash; electric cigar lighter.	Corner lamps in rear quarters; dash lamp; handy lamp on cord; tilting headlight re- flectors.	Compartment in rear of driver's seat entered through top; large rumble in rear, waterproof lid in top. Two door pockets.
<i>Sedan</i>	5 Persons 2 front seat 3 rear seat	125 inches	34 x 4½ Goodyear or U. S. fabric Front—plain tread Rear—all- weather tread	Taffeta roller sunshades on rear doors, rear and rear quarter windows; robe rail; foot has- sock; key locks on front doors; inside thumb locks on rear doors; cowl ventilator con- trolled from dash; vanity case and ash receiver; electric cigar lighter.	Dome light in ceil- ing; corner read- ing lamps in rear quarters; dash lamp; handy lamp with cord; tilt- ing headlight reflectors.	Under front and rear seats; four door pockets; robe rail.
<i>Suburban</i>	7 Persons 2 front seat 3 rear seat 2 auxiliary seats	132 inches	35 x 5 Goodyear or U. S. fabric Front—plain tread Rear—all- weather tread	Taffeta roller sunshades on rear doors, rear and rear quarter windows; robe rail; foot has- sock; key locks on front doors; inside thumb locks on rear doors; cowl ventilator con- trolled from dash; vanity case and ash receiver; electric cigar lighter.	Dome light in ceil- ing; corner read- ing lamps in rear quarters; dash lamp; han- dy lamp with cord; tilting headlight re- flectors.	Under front and rear seat; four door pockets; robe rail.
<i>Limousine</i>	5 Persons and Driver 3 rear seat 2 auxiliary seats	132 inches	35 x 5 Goodyear or U. S. fabric Front—plain tread Rear—all- weather tread	Taffeta roller sunshades for rear compartment windows; draw shades on curved quarter win- dows; foot hassock; robe rail; vanity case, ash receiver, elec- tric cigar lighter, chauffeur's telephone, key locks for R. H. doors; double floor covering, rubber mat and fabric carpet.	Dome light in ceil- ing; corner read- ing lamps in rear quarters; dash lamp. Tilt- ing headlight re- flectors; handy lamp with cord.	Under front and rear seats, two door pockets; robe rail.
<i>Imperial Limousine</i>	(Extra seat beside driver)					



Suburban



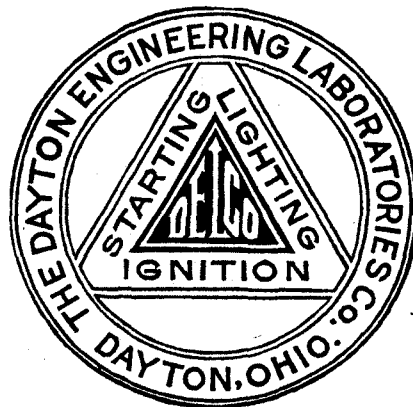
Standard Limousine



Imperial Limousine

DELCO PIECE PARTS CATALOG CADILLAC

1920 MODEL



FIRST EDITION

The
Dayton Engineering Laboratories Co.
Dayton, Ohio

THE DELCO system is the pioneer in the Electric Starting, Lighting and Ignition field. Throughout the entire period of electrical development it has led the way.

Our Research and Experimental laboratories have placed DELCO equipment foremost in the Starting, Lighting and Ignition Field.

Practically without exception, the cars with DELCO Equipment stand foremost in their class.

Intelligent automobile buyers have learned that the automobile manufacturer who uses DELCO Equipment is the manufacturer who places QUALITY before PRICE.

When Piece Parts are required use only genuine DELCO PARTS. Parts made in our factory are tested mechanically and electrically. Order Piece Parts from our authorized service representatives by giving the Piece Parts numbers shown in this Catalog.

There is one reason for Delco success---and that is Delco performance.

TERMS

Remittance must accompany the order in the form of draft, money order or cash, by registered mail. Personal checks will not be accepted.

If remittance does not accompany the order, shipment will be made C. O. D., or sight draft attached to bill-of-lading.

INDEX

On page iv is an index of the motor car models, by years, showing the electrical system for each model. Following the Index of Motor Car Models are listed the units in numerical order.

TO FIND PIECE PARTS IN CATALOG

Refer to index beginning on page iv and select the system for which the piece part is required. The complete pieces of apparatus which make up the electrical system are listed under each model. When a complete system is not listed, only the parts shown were furnished by Delco.

Preceding the description of piece parts, on the page shown under the name of the complete piece of apparatus, its illustration will be found. From the illustration and description, select the part required. If a part is first identified on the illustration, it may be located in the description.

HOW TO ORDER PARTS

(A mistake and delay in filling an order for parts may keep an automobile out of service for a longer time than is necessary. It is often difficult to fill orders for piece parts. To avoid delay and mistakes, give all or as much as possible, of the information requested below.)

In the description of the piece parts, the numbers in the column at the extreme left of each page are the piece numbers of the parts.

The numbers in the third column represent the quantity of each piece part required in the assembly under which it is listed. (These numbers do not necessarily represent the quantity of each piece part required for the complete piece of apparatus.)

On all orders, the piece number, name of piece and quantity of parts wanted on the order, should be given. However, if there is any doubt regarding the correctness of the piece number of the part required, send a sketch and explain where the part is used, or send in the old part as a sample, transportation charges prepaid. (Unless instructions accompany to return the sample, it will be scrapped.)

In addition to the above, give the name, year, model, and serial number of the car for which the piece parts are required. Also give the serial number or date, and number of the complete piece of apparatus in which the part is to be used.

Write plainly the name and address to which the shipment is to be made. Give shipping instructions, i. e. freight, express, parcel post insured.

In all cases where the serial number of the complete piece of apparatus is furnished with the order for repair parts, parts will be shipped to serial number, regardless of whether the part number given is correct or not.

If parts are wanted for stock only, it is unnecessary to give serial number.

STORAGE BATTERIES

We do not sell storage batteries or storage battery parts. All orders for batteries or their parts must be placed with the storage battery manufacturers or their representatives.

CLAIMS FOR SHORTAGE, DAMAGE AND ERROR

Claims for shortage or errors in packing must be made immediately upon receipt of the shipment, and must be accompanied by the original packing slip.

Claims for damage or shortages during transfer should be filed with the transportation company by the Consignee. Our responsibility ceases upon delivery of the shipment to the transportation company. The transportation company's receipt for the shipment is evidence that they have received the shipment as billed, and in good condition.

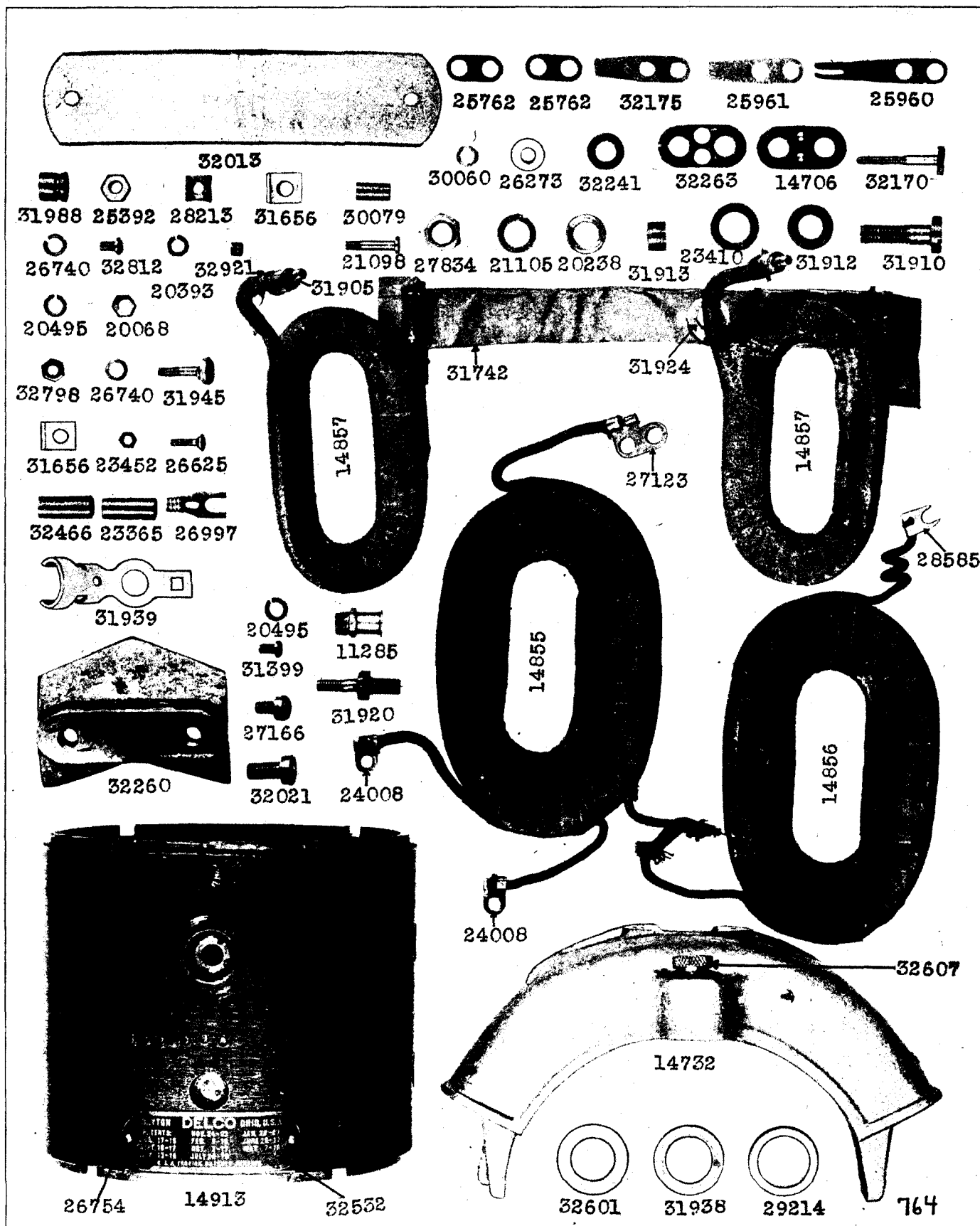
INDEX OF 1920 CADILLAC MODELS USING DELCO EQUIPMENT

CADILLAC 1920 MODEL 59

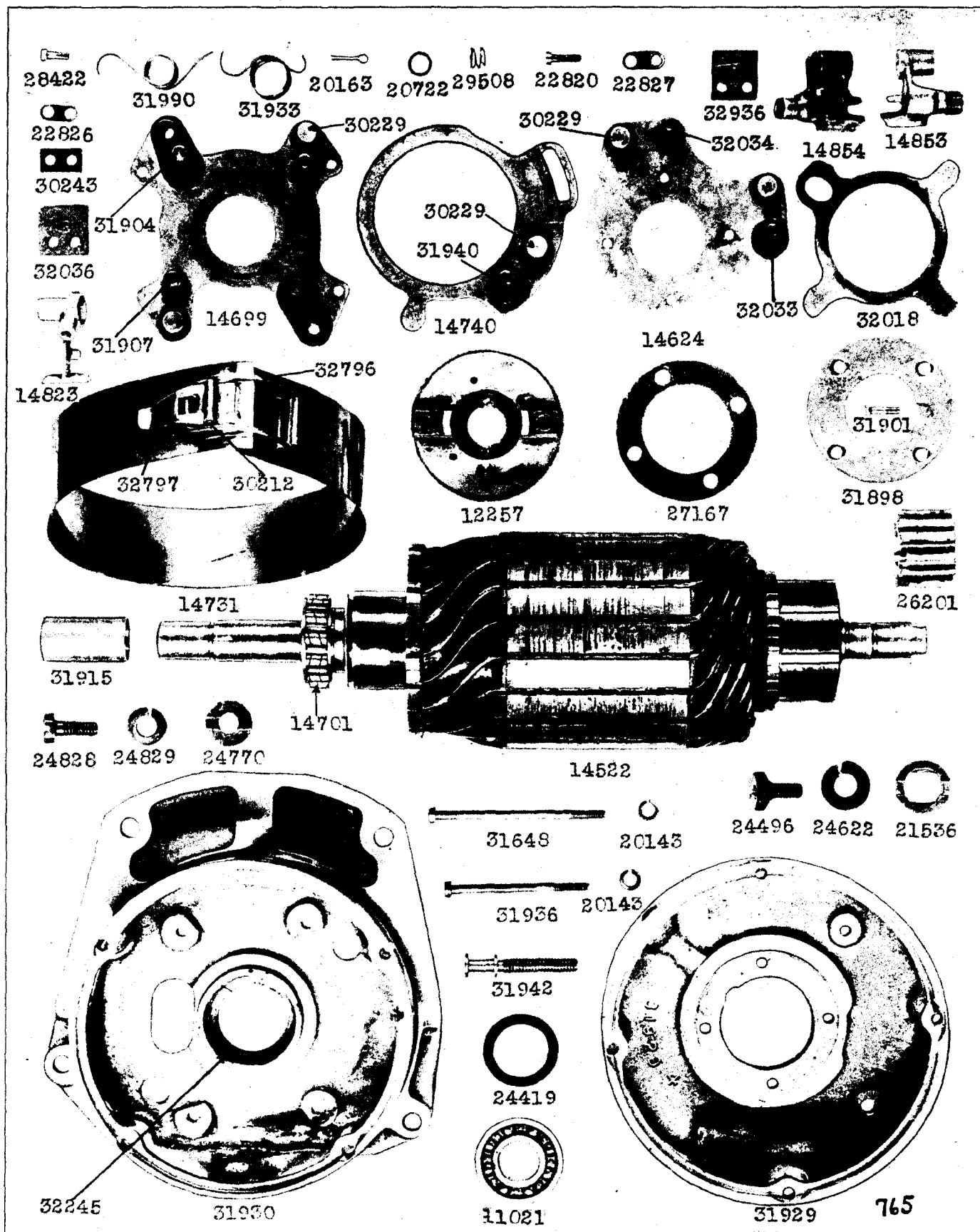
Delco System No. 291

No. 162	MOTOR GENERATOR
No. 1150	COMBINATION SWITCH
No. 2115	IGNITION COIL
No. 5206	DISTRIBUTOR
No. 5742	CIRCUIT BREAKER
No. 12677	MOTOR CLUTCH

PIECE PARTS CATALOG



No. 162 MOTOR GENERATOR



No. 162 MOTOR GENERATOR

PIECE PARTS CATALOG

No. 162 MOTOR GENERATOR

Piece Number	NAME OF PART	Quantity Required
162	MOTOR GENERATOR COMPLETE	1
14913	Frame Assembly for Motor Generator (Includes next two Items)	1
32532	Name Plate for Motor Generator.....	1
26754	Pin for attaching Name Plate.....	2
32260	Pole Piece for Frame.....	4
32021	Screw for attaching Pole Piece.....	7
31920	Stud Screw for attaching Pole Piece.....	1
14857	Motor Field Coil Assembly (Includes next Item)	2
31905	Stud for connecting Motor Field Coil.....	1
31924	Connector for connecting Motor Field Coil.....	1
31742	Insulator for Connector 31924.....	1
14855	Generator Field Coil Assembly (On same side as Generator Switch (Includes next 2 Items)	1
27123	Clip for connecting Coils to Generator Switch.....	1
24008	Clip for connecting Field Coil to Brush Plate.....	2
14856	Generator Field Coil Assembly (Opposite Field Coil Assembly 14855 (Includes the next Item)	1
28585	Clip for connecting Field Coil to Brush Plate.....	1
31910	Motor Terminal Stud.....	1
31912	Insulating Washer for Terminal Stud 31910 (Outside).....	1
28410	Insulating Washer for Terminal Stud 31910 (Inside).....	1
20238	Plain Washer for Terminal Stud 31910.....	1
31913	Insulating Bushing for Terminal Stud 31910.....	1
21105	Lock Washer for Nut 27834.....	2
27834	Nut for Terminal Stud.....	2
31929	End Frame for Generator end of Armature Shaft.....	1
11021	Ball Bearing Assembly	1
14740	Third Brush Arm Plate Assembly (Includes the next 7 Items)	1
31940	Stud for Third Brush Arm.....	1
32147	Insulating Bushing for Stud 31940.....	1
29240	Insulating Washer for Stud 31940.....	2
20238	Plain Washer for Stud 31940.....	1
30229	Stud for Third Brush Arm Spring 30241.....	1
30241	Bushing for Stud 30229.....	1
30227	Insulating Washer for Stud 30229.....	1
14624	Generator Brush Arm Plate Assembly (Includes the next 8 Items)	1
32033	Stud for Generator Brush Arm (Grounded).....	1
32034	Stud for Generator Brush Arm (Insulated).....	1
32147	Insulating Bushing for Stud 32034.....	1
29240	Insulating Washer for Stud 32034.....	2
30238	Plain Washer for Stud 32034.....	1
30229	Stud for Generator Brush Arm Spring.....	2
30241	Insulating Bushing for Stud 30229.....	2
30227	Insulating Washer for Stud 30229.....	2
24419	Felt Washer for Ball Bearing Assembly 11021.....	2
31898	Retainer for Ball Bearing Assembly 11021.....	1
31901	Screw for attaching Retainer 31898.....	4
31945	Screw for locking Third Brush Plate.....	1
26740	Plain Washer for Screw 31945.....	1
32798	Lock Washer for Screw 31945.....	1
20068	Nut for Screw 31945.....	1
31942	Screw for adjusting Brushes.....	1
14823	Generator and Third Brush Arm Assembly	3
32036	Brush for Generator and Third Brush Arm.....	3
30243	Stop for Brush Arm.....	3
22826	Lock Plate for Screw 28422.....	3
28422	Screw for attaching Brush 32036.....	6
31990	Spring for Generator Brush Arm (Large).....	3
29508	Tension Spring for Generator Brush Arm (Small).....	3
20722	Plain Washer for retaining Springs 29508.....	3
20163	Cotter Pin for retaining Springs 29508.....	3
31930	Motor End Frame.....	1
14701	Inner Race and Rolls Assembly for Drive end of Armature Shaft	1
32245	Outer Race for Inner Race and Rolls Assembly 14701.....	1
32170	Generator Switch Terminal Stud.....	2
32920	Lock Plate for Switch Terminal Stud.....	1
32263	Insulator for Stud 32170 (Next to end Frame).....	1
30079	Insulating Bushing for Stud 32170.....	2
32241	Insulating Washer for Stud 32170.....	2
26273	Plain Washer for Stud 32170.....	2
28213	Nut for Stud 32170.....	2

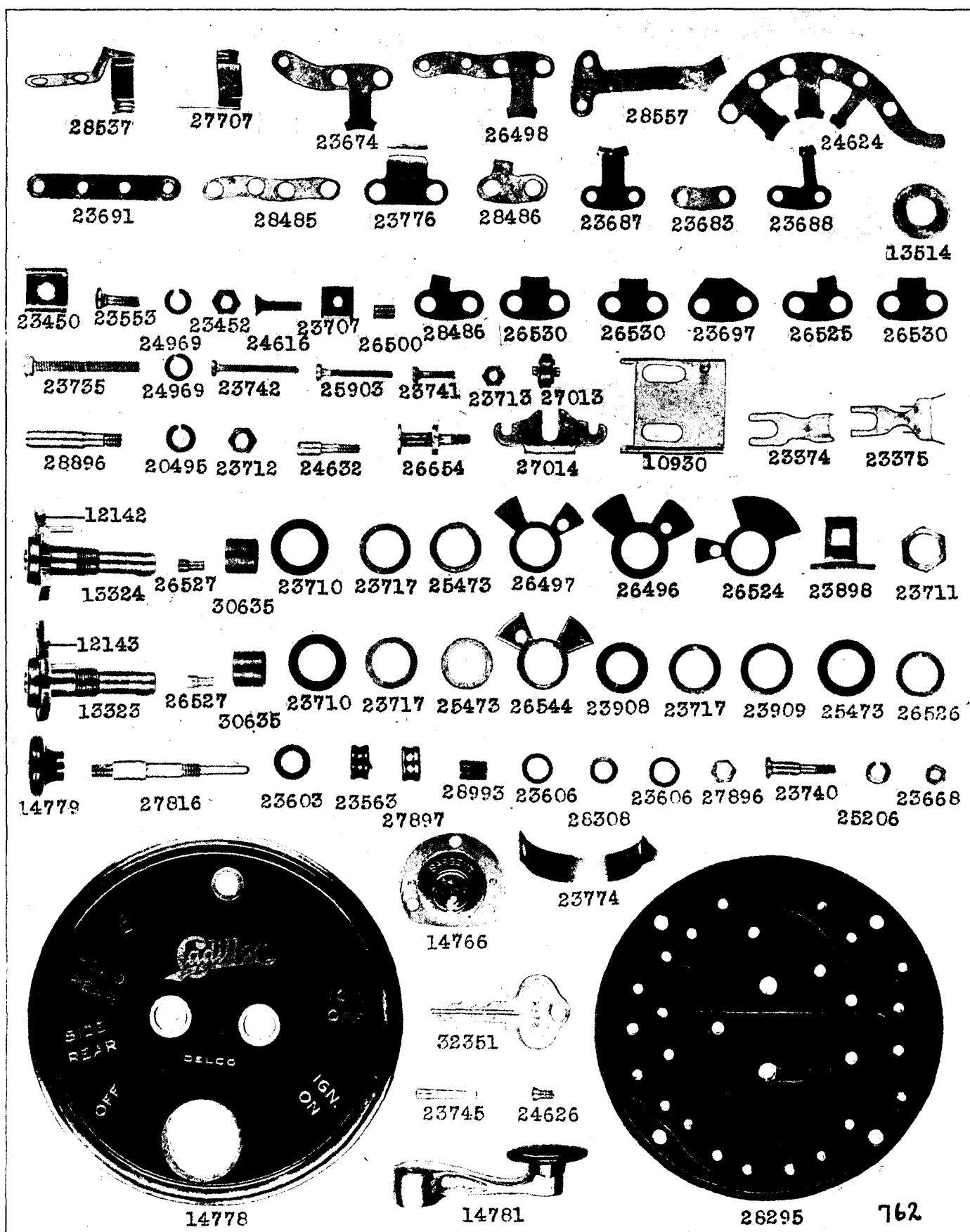
No. 162 MOTOR GENERATOR (Continued)

Piece Number	NAME OF PART	Quantity Required
31656	Clip for Stud 32170.....	2
30060	Lock Washer for Stud 32170.....	2
25392	Nut for connecting Generator Lead to Stud 32170	2
14706	Insulator Assembly for separating Studs 32170	1
14699	Motor Brush Plate Assembly..... (Includes the next 8 Items)	1
31907	Stud for Motor Brush Arms (Grounded).....	2
31904	Stud for Motor Brush Arm (Insulated).....	2
30229	Spring Stud for Grounded Motor Brush Arm Spring.....	2
30241	Insulating Bushing for Stud 30229.....	2
30227	Insulating Washer for Stud 30229.....	2
30140	Insulating Bushing for Stud 31904.....	2
32017	Insulator for Stud 31904.....	4
31901	Plate for retaining Insulated Brush Arm Studs 31904.....	4
14852	Motor Brush Arm Assembly (Insulated).....	2
14853	Motor Brush Arm Assembly (Grounded).....	1
14854	Motor Brush Arm Assembly (For Generator Switch).....	1
32936	Brush for Motor Brush Arms.....	4
22820	Screw for attaching Brushes 32936.....	8
22827	Lock Plate for Screw 22820.....	4
31933	Brush Arm Springs (For Grounded Motor Brush Arm).....	2
32255	Brush Arm Springs for Insulated Brush Arms.....	2
29508	Tension Spring for Motor Brush Arm.....	4
20722	Plain Washer for Springs 29508.....	4
20163	Cotter Pin retaining Tension Springs 29508.....	4
14522	Armature Assembly	1
32601	Spacing Washer for Armature Shaft (Drive end).....	1
32528	Washer for Armature Shaft.....	1
32529	Washer for Armature Shaft.....	1
32530	Fibre Plug for End Housing.....	1
31938	Spacing Washer for Armature Shaft (For Roller Bearing (Inner).....	1
20214	Washer for Armature Shaft (Next to Generator Clutch).....	1
29886	Washer for Armature Shaft (For Roller Bearing Outer).....	1
31915	Sleeve for Armature Shaft (Next to Pinion).....	1
26201	Pinion for Armature Shaft.....	1
21536	Clamp Washer for Pinion.....	1
24496	Screw for retaining Pinion.....	1
24622	Lock Washer for Screw 24496.....	1
20068	Nut for attaching Field Coil Stud.....	2
20495	Lock Washer for Nut 20068.....	2
31988	Bushing for Insulating Field Coil Stud on Motor Brush Plate.....	2
32018	Lifting Plate for Motor Brushes.....	1
20492	Screw for attaching Plate 32018.....	4
20495	Lock Washer for Screws 20492.....	4
31648	Screw for attaching Motor End Frame.....	4
20143	Lock Washer for Screws 31648 and 31946.....	8
31936	Screw for attaching Generator End Frame.....	4
26740	Lock Washer for Screw 31936.....	4
12257	Generator Clutch Assembly..... (Includes the next 8 Items)	1
12256	Generator Clutch Shell and Cam Assembly.....	1
26109	Shell for Clutch Shell and Cam Assembly 12256.....	1
28952	Roll for Clutch Shell and Cam Assembly.....	3
20017	Plunger for Roll.....	3
20024	Spring for Plunger.....	3
23983	Binding Spring for Generator Clutch Assembly.....	1
27167	Coupling for Generator Clutch Assembly.....	1
27166	Screw for attaching Coupling 27167.....	3
11285	Oil Assembly for Drive end of Generator.....	1
24770	Clamp Washer for Generator Clutch.....	1
24828	Screw for retaining Generator Clutch.....	1
24829	Lock Washer for Screw 24828.....	1
31399	Screw for attaching Brush connecting Lead.....	2
20495	Lock Washer for Screw 31399.....	2
25762	Insulated Plate for Generator Switch Arm (Short).....	2
32175	Insulator for Switch Arm (Long) (Old Style).....	1
25960	Contact for Generator Switch.....	1
25961	Support Plate for Switch Contact.....	1
32257	Bushing for Screw 26068 (Old Style).....	2
32169	Locking Plate for Screw 26068 (Old Style).....	1
26068	Screw for attaching Switch Contacts (Old Style).....	2
32921	Bushing for Screw 21098.....	2
21098	Screw for attaching Switch Contacts.....	2
20790	Plain Washer for Screw 21098.....	2
20393	Lock Washer for Screw 21098.....	2

PIECE PARTS CATALOG

No. 162 MOTOR GENERATOR (Continued)

Piece Number	NAME OF PART	Quantity Required
14732	Top Cover Assembly	1
	(Includes the next 2 Items)	
32289	Insulator for Top Cover.....	1
26320	Rivet for attaching Insulator 32289.....	2
32607	Nut for attaching Top Cover Assembly.....	1
32608	Plain Washer for Nut 32607.....	1
14731	Cover Band Assembly	1
	(Includes next 3 Items)	
32796	Clamp Spring for Cover Band.....	1
32797	Latch for Cover Band.....	1
30212	Pin for attaching Latch.....	1
32013	Cover Strap for Generator (Lower).....	1
32812	Screw for attaching Strap 32013.....	2
26740	Lock Washer for Screw 32812.....	2
31939	Motor Terminal Clip.....	1
26997	Generator Terminal Clip (Open).....	3
23365	Fibre Ferrule for Clip 26997.....	2
31656	Clamp Clip for connecting Motor Generator.....	1
26625	Screw for Clamp Clip 31656.....	1
20393	Lock Washer for Nut 23452.....	1
23452	Nut for Screw 26625.....	1
32466	Fibre Ferrule for Clip 26997.....	1



No. 1150 COMBINATION SWITCH

PIECE PARTS CATALOG

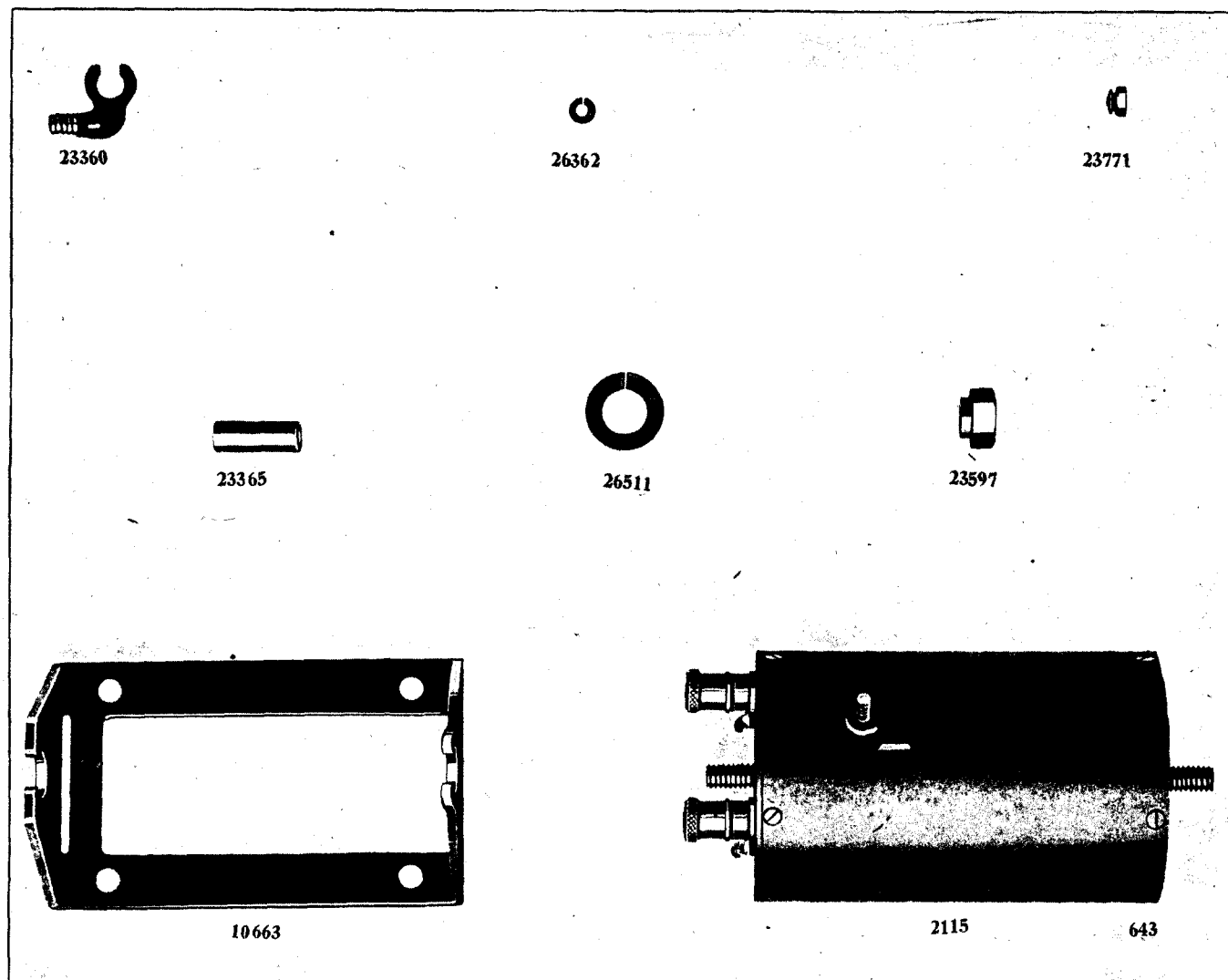
No. 1150 COMBINATION SWITCH

Piece Number	NAME OF PART	Quantity Required
1150	COMBINATION SWITCH	1
14777	Housing Assembly Complete..... (Includes the next 11 Items)	1
14778	Housing Assembly	1
14779	Button Assembly for Plunger Assembly 13086.....	1
28308	Insulating Washer for Plunger Assembly 13086.....	1
13086	Plunger Assembly Complete	1
	(Includes the next 7 Items)	
27816	Plunger for Plunger Assembly 13086.....	1
23563	Insulating Collar for Plunger 27816.....	1
28003	Insulating Bushing for Plunger 27816.....	1
27897	Contact Collar for Plunger 27816.....	1
23606	Plain Washer for Nut 27896.....	1
23603	Insulating Washer for Contact Collar 27897.....	1
27896	Nut for Clamping Plunger Assembly 13086.....	1
23808	Terminal Post for connecting Switch.....	1
23553	Screw for retaining Terminal Clip 23450.....	1
23452	Nut for Screw 23553.....	1
24969	Lock Washer for Nut 23452.....	1
23450	Clip for Terminal Clip 23374.....	1
13290	Blade Assembly Complete (Ignition)..... (Includes the next 15 Items)	1
13323	Stud Assembly	1
12143	Stop Wheel Assembly	1
26527	Insulating Bushing for Stop Wheel Assembly 12143.....	1
30635	Insulating Bushing for Stud Assembly 13323.....	1
26497	Blade for Blade Assembly 13290 (Lower).....	1
26524	Blade for Blade Assembly 13290 (Upper).....	1
26496	Insulator between Blade 26497 and 26524.....	1
23710	Insulating Washer for Blade 26497 and 26524.....	2
23717	Plain Washer for Stop Wheel Assembly 12143 (Thick).....	2
25473	Plain Washer for Stop Wheel Assembly 12143 (Thin).....	1
23908	Plain Washer for Blade 26524 (Thick).....	1
23711	Nut for Clamping Blade Assembly 13290.....	1
26526	Lock Washer for Nut 23711.....	1
23909	Plain Washer for Nut 23711.....	1
25473	Plain Washer for Blades 26524 (Thin).....	1
13291	Blade Assembly Complete (For Lighting)..... (Includes the next 13 Items)	1
13324	Stud Assembly	1
12142	Stop Wheel Assembly	1
26527	Insulating Bushing for Stop Wheel Assembly 12142.....	1
30635	Insulating Bushing for Stud Assembly 13324.....	1
26544	Blade for Blade Assembly 13291.....	1
23717	Plain Washer for Stop Wheel Assembly 12142 (Thick).....	1
25473	Plain Washer for Stop Wheel Assembly 12142 (Thin).....	1
23710	Insulating Washer for Blade 26544.....	2
25473	Plain Washer for Blade 26544 (Thin).....	1
23908	Plain Washer for Blade 26544 (Thick).....	1
23909	Plain Washer for Nut 23711.....	1
26526	Lock Washer for Nut 23711.....	1
23711	Nut for Clamping Blade Assembly 13291.....	1
14766	Lock Assembly for Switch..... (Includes the next Item)	1
32351	Key for Lock Assembly 14766 (Give Series No. of Lock.....	2
24626	Screw for retaining Lock Assembly 14766.....	3
10930	Tumbler Assembly for Locking Blade Assemblies 13290 and 13291.....	1
14781	Lever Assembly for operating Blade Assemblies.....	2
23745	Screw for retaining Lever.....	2
27014	Roller Bracket for retaining Roller 27013.....	1
27013	Roller for Blade Assemblies 13290 and 13291.....	2
23774	Spring for Roller Bracket 27014.....	2
23776	Spring for Tumbler Assembly 10930.....	1
28295	Mounting Plate for Switch.....	1
23674	Brush for Terminal No. 5 (Lower).....	1
23687	Brush for Terminals No. 2, 3, 5, 6 (Upper).....	4
23688	Brush for Terminal No. 1 (Upper).....	1
28537	Brush for connecting Terminal No. 8 and Blade Assembly.....	1
24624	Brush for Terminals No. 1, 2 and 3 (Lower).....	1
26498	Brush for Terminals No. 6 and 7 (Lower).....	1
25903	Screw for retaining Terminals No. 1, 2, 3, 5, 6 and 8.....	12
26500	Insulating Bushing for Screw 25903.....	10

No. 1150 COMBINATION SWITCH (Continued)

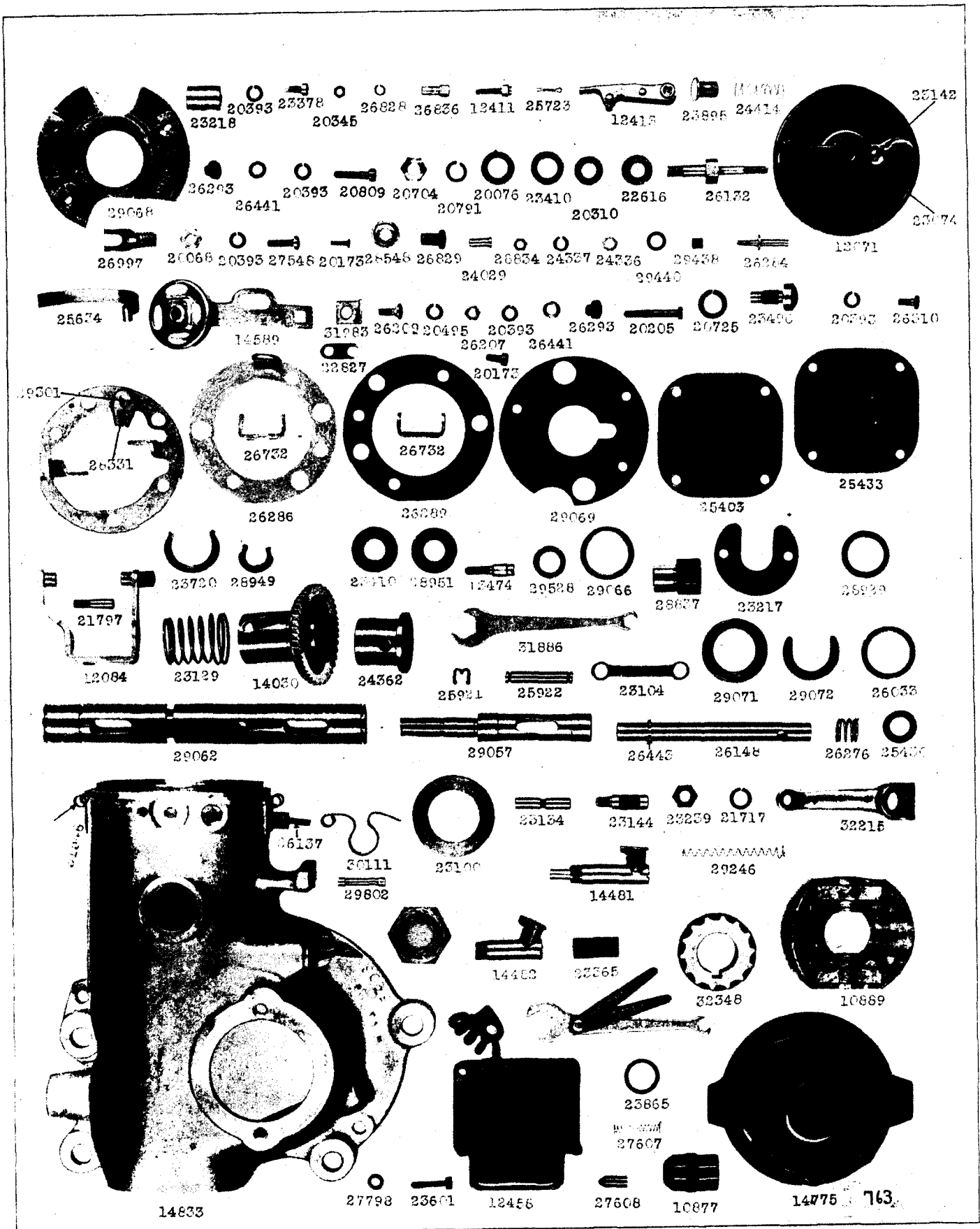
Piece Number	NAME OF PART	Quantity Required
26525	Insulating Plate for Terminals No. 1 and 8.....	5
26530	Insulating Plate for Terminals No. 2, 3, 5 and 6.....	11
28483	Insulating Bushing for Terminal No. 3 (Not shown in Illustration).....	2
28486	Separator Plate for Terminal No. 8.....	2
28537	Contact Spring for connecting Terminal No. 8 and Plunger Assembly 13086...	1
27707	Contact Spring for connecting Plunger Assembly 13086 and Terminal No. 9...	1
23741	Screw for retaining Contact Spring 27707 and Terminal No. 4.....	4
23740	Screw for retaining Tumbler Assembly 10930.....	2
23683	Plate for retaining Screws 23741 on Terminal No. 4.....	1
23697	Insulating Plate for Terminal No. 6 under Brush 26498 (Large).....	1
28485	Plate connecting Terminal No. 3 and Contact Spring 28537.....	1
23713	Nut for Screws 23740, 24632 and Stud 26654.....	5
23668	Nut for retaining Screw 23742.....	2
26654	Stud for retaining Roller Bracket 27014.....	1
25206	Lock Washer for Nut 23713.....	5
20495	Lock Washer for Nut 23712.....	2
24969	Lock Washer for Screw 23735.....	4
23735	Screw for retaining Housing Assembly.....	4
23707	Nut for Screw 24616.....	1
24616	Screw for retaining Spring 23774.....	1
23742	Screw for retaining Brushes 23674 and 24624 (Short).....	2
24632	Stop Screw for Blade Assemblies.....	2
26523	Screw for retaining Terminal No. 7 (Not shown in Illustration).....	2
31009	Spacing Washer for Blade Assemblies.....	2
28896	Stud for retaining Blade Assemblies.....	2
23712	Nut for retaining Stud 28896.....	2
23691	Terminal Plate under Terminal Plate No. 4.....	1
23374	Terminal Clip for connecting Switch (Small).....	7
23375	Terminal Clip for connecting Switch (Large).....	2

PIECE PARTS CATALOG



No. 2115 IGNITION COIL

Piece Number	NAME OF PART	Quantity Required
2115	IGNITION COIL COMPLETE	1
	(Includes the next 4 Items)	
32115	Nut for High Tension Terminal.....	1
26362	Lock Washer for Nut 23771.....	1
23597	Nut for retaining Bracket Assembly 10663.....	2
26511	Lock Washer for Nut 23597.....	2
23360	Terminal Clip for connecting Ignition Coil 2115.....	1
23365	Fibre Ferrule for Terminal Clip 23360.....	1
10663	Bracket Assembly for mounting Ignition Coil 2115.....	1



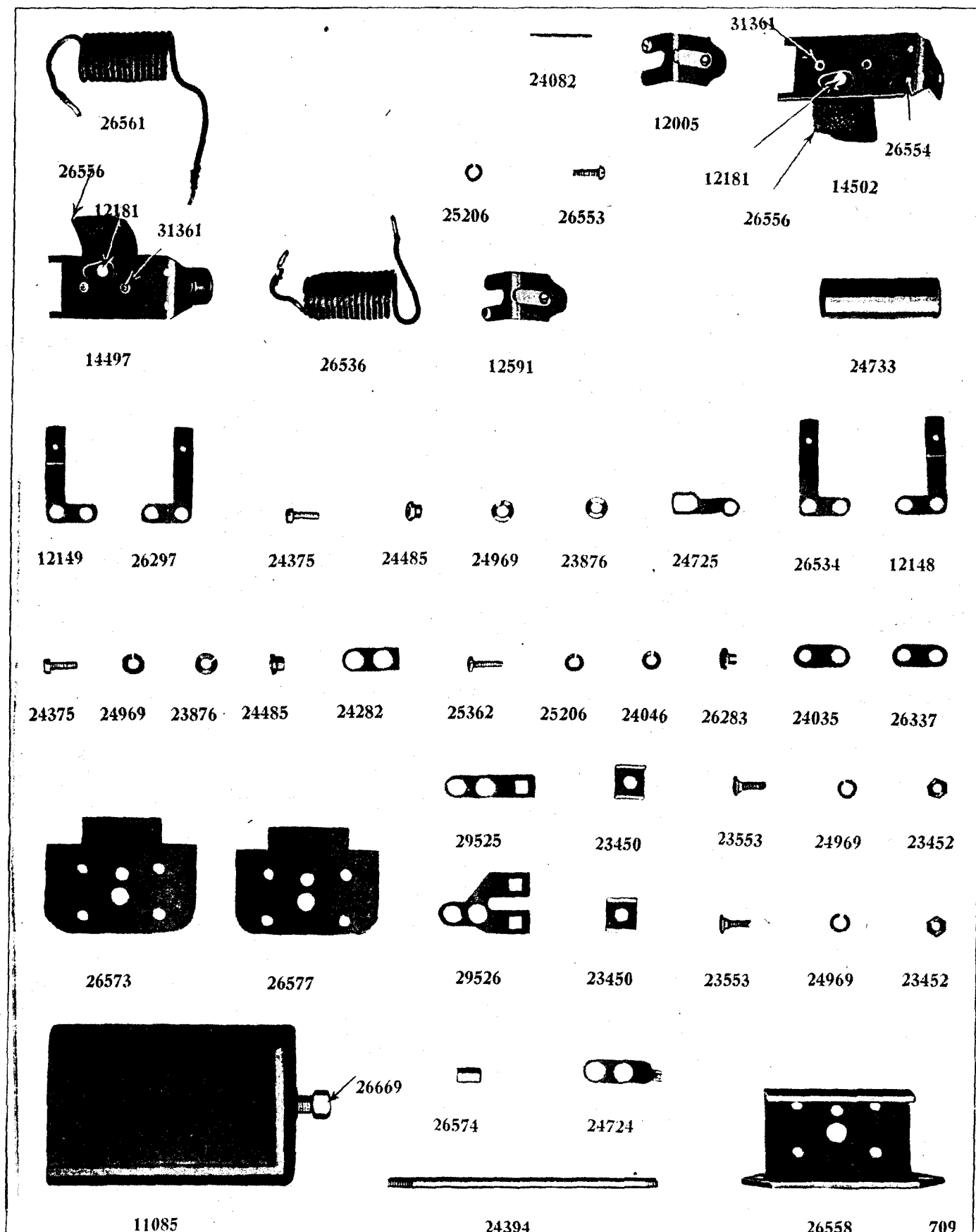
No. 5206 DISTRIBUTOR

Piece Number	NAME OF PART	Quantity Required
5206	DISTRIBUTOR	1
14833	Distributor Housing Assembly	1
	(Includes the next 8 Items)	
31546	Clip for retaining Clamp 30111	1
30111	Clamp for retaining Distributor Head	1
29802	Pin for retaining Clamp 30111	1
25049	Rivet for retaining Clip 31546 (Not shown in Illustration)	3
26137	Stud for Resistance Unit Guide	1
28206	Name Plate for Distributor (Not shown in Illustration)	1
26754	Pin for retaining Name Plate 28206 (Not shown in Illustration)	2
12075	Breather Nut Assembly Complete	1
26732	Stop for Advance Yoke Assembly	1
20173	Screw for retaining Stop 26732	2
22827	Lock Plate for Screw 20173	1
13511	Inner Shaft and Bearing Assembly Complete	1
	(Includes the next 3 Items)	
13342	Ball Bearing Assembly for Distributor (Upper) (Not shown in Illustration)	1
29057	Inner Shaft for Distributor	1
29066	Plain Washer for Ball Bearing Assembly 13342	1
30298	Plain Washer for Ball Bearing Assembly 13342 (Used when necessary instead of 29066)	1
28929	Washer (felt) for Ball Bearing Assembly 13342 (Upper)	1
29528	Spacing Washer under Cam 28837 (When necessary)	1
28951	Collar retaining Washer 29066	1
28949	Clip retaining Collar 28951	1
29069	Retainer for Ball Bearing Assembly 13342 (Upper)	1
29068	Plate under Retainer 29069	1
26289	Insulator for Plate 26286	1
26286	Connector Plate for Contact Plate Assembly 13514	1
13514	Distributor Contact Plate and Oil Spout Assembly Complete	1
	(Includes the next 2 Items)	
28331	Oil Spout for Contact Plate Assembly 13514	1
29301	Rivet for Oil Spout 28331	1
26284	Stud for Mounting Contact Arm Assemblies	2
29438	Insulating Bushing for Stud 26284	2
29440	Insulating Washer for Stud 26284 (Upper)	2
24336	Plain Washer for Stud 26284	2
24337	Lock Washer for Nut 28834	2
28834	Nut for attaching Stud 26284	2
12411	Contact Screw Assembly	2
26828	Nut for Contact Screw Assembly (Small)	2
20345	Lock Washer for Nut 26836	2
26836	Nut for Contact Screw Assembly (Large)	2
20809	Screw for attaching Plate Assembly 13514 (Short)	1
20393	Lock Washer for Screw 20809	1
26441	Plain Washer for Screw 20809	1
26293	Insulating Bushing for Screw 20809	1
29062	Outer Shaft for Distributor	1
29072	Clip for retaining Washer 29066	1
26033	Plain Washer for Spring 23129 (Upper)	1
23129	Spring for Outer Shaft 29062	1
24362	Advance Collar for Outer Shaft 29062	1
25922	Pin for Advance Collar 24362 and Governor Ring Assembly 10889	2
25921	Clip for retaining Pin 25922	4
23104	Advance Arm for Advance Collar 24362	2
10889	Governor Ring Assembly for Distributor	1
23496	Screw for attaching Governor Ring Assembly 10889	2
20725	Lock Washer for Screw 23496	2
14030	Distributor Shaft Pinion and Hub Assembly	1
	(Includes the next 3 Items)	
27548	Screw for attaching Plate 23217	2
20393	Lock Washer for Screw 27548	2
24029	Dowel Pin for Distributor Shaft Pinion and Hub Assembly 14030	1
23217	Plate for Distributor Shaft Pinion and Hub Assembly 14030	1
23100	Advance Ring for Outer Shaft 29062	1
23134	Pin for retaining Advance Ring 23100	1
23218	Clamp for Pin 23134	1
23378	Screw for Clamp 23218	1
20393	Lock Washer for Screw 23378	1
23720	Clip for retaining Washer 29071	1
29071	Plain Washer above Lower Distributor Shaft Bearing	1
14589	Resistance Unit Assembly for Distributor	1
26209	Screw for retaining Clip 31983	1
20393	Lock Washer for Nut 26207	1
31983	Clip for retaining Terminal Clip 26997	1

No. 5206 DISTRIBUTOR—Continued

Piece Number	NAME OF PART	Quantity Required
26207	Nut for Screw 26209.....	1
12458	Condenser Assembly Complete (Includes the next 2 Items)	1
23601	Screw for attaching Condenser Assembly 12458.....	4
27798	Bushing for Screw 23601.....	4
12084	Advance Yoke Assembly for Distributor	1
26148	Shaft for Advance.....	1
32215	Advance Lever for Shaft 26148.....	1
26443	Clip for retaining Spring 26276.....	1
23144	Screw for Advance Lever 32215.....	1
23239	Nut for Screw 23144.....	1
21717	Lock Washer for Nut 23239.....	1
20205	Screw for attaching Plate Assembly 13514 (Long).....	2
20393	Lock Washer for Screw 20205.....	2
26293	Insulating Bushing for Screw 20205.....	2
26441	Plain Washer for Screw 20205.....	2
29072	Clip for retaining Bearing (Lower).....	1
26033	Plain Washer above Clip 29072.....	1
12413	Contact Arm Assembly for Distributor	2
25723	Cotter Pin for retaining Contact Arm Assembly.....	2
25634	Spring for Contact Arm Assembly 12413.....	2
28548	Plain Washer for Nut 26208.....	1
26132	Stud for mounting Resistance Unit.....	1
22616	Plain Washer for Stud 26132 (Outer).....	1
20068	Nut for retaining Resistance Unit.....	1
20495	Lock Washer for Nut 26208.....	1
20076	Insulating Washer for Stud 26132 (Outer).....	1
22738	Insulating Bushing for Stud 26132 (Not shown in Illustration).....	1
23410	Insulating Washer for Nut 20704.....	1
20310	Plain Washer for Nut 20704.....	1
20791	Lock Washer for Nut 20704.....	1
20704	Nut for Stud 26132 (Inner).....	1
28837	Cam for operating Contact Arm Assembly.....	1
13474	Screw Assembly for retaining Cam 28837	1
21797	Screw for Advance Yoke Assembly 12084.....	1
25430	Felt Washer for Advance Shaft 26148.....	1
26276	Spring for Advance Shaft 26148.....	1
26829	Insulating Bushing for Resistance Unit.....	1
14482	Oiler Assembly for Distributor (Upper)	1
14481	Oiler Assembly for Distributor (Lower)	1
29074	Wick for Oiler Assembly 14481 (Not shown in Illustration).....	1
29246	Spring for Wick 29074.....	1
12071	Distributor Rotor Assembly Complete (Includes the next 4 Items)	1
23074	Connector for Distributor Rotor Assembly 12071.....	1
23142	Screw for retaining Connector 23074.....	1
23895	Brush for Rotor Assembly 12071.....	1
24414	Spring for Brush 23895.....	1
25405	Cover Plate for Housing Assembly (Lower).....	1
25433	Gasket for Cover Plate 25405.....	1
26310	Screw for attaching Cover Plate 25405.....	4
20393	Lock Washer for Screw 26310.....	4
26997	Terminal Clip for connecting Distributor.....	1
23365	Fibre Ferrule for Terminal Clip.....	1
10877	High Tension Terminal Assembly No. Blank	1
10878	High Tension Terminal Assembly No. 1	1
10879	High Tension Terminal Assembly No. 2	1
10880	High Tension Terminal Assembly No. 3	1
10881	High Tension Terminal Assembly No. 4	1
10882	High Tension Terminal Assembly No. 5	1
10883	High Tension Terminal Assembly No. 6	1
10884	High Tension Terminal Assembly No. 7	1
10885	High Tension Terminal Assembly No. 8	1
23865	Rubber Washer for High Tension Terminal Assemblies.....	9
14775	Distributor Head Assembly Complete (Includes the next 2 Items)	1
27608	Plunger for Distributor Head Assembly 14775.....	1
27607	Spring for Plunger 27608.....	1
12741	Distributor Wrench Assembly (With Gauge)	1
27987	Distributor Wrench (Plain).....	1
32348	Spiral Gear for Driving Spiral Gear 26151.....	1

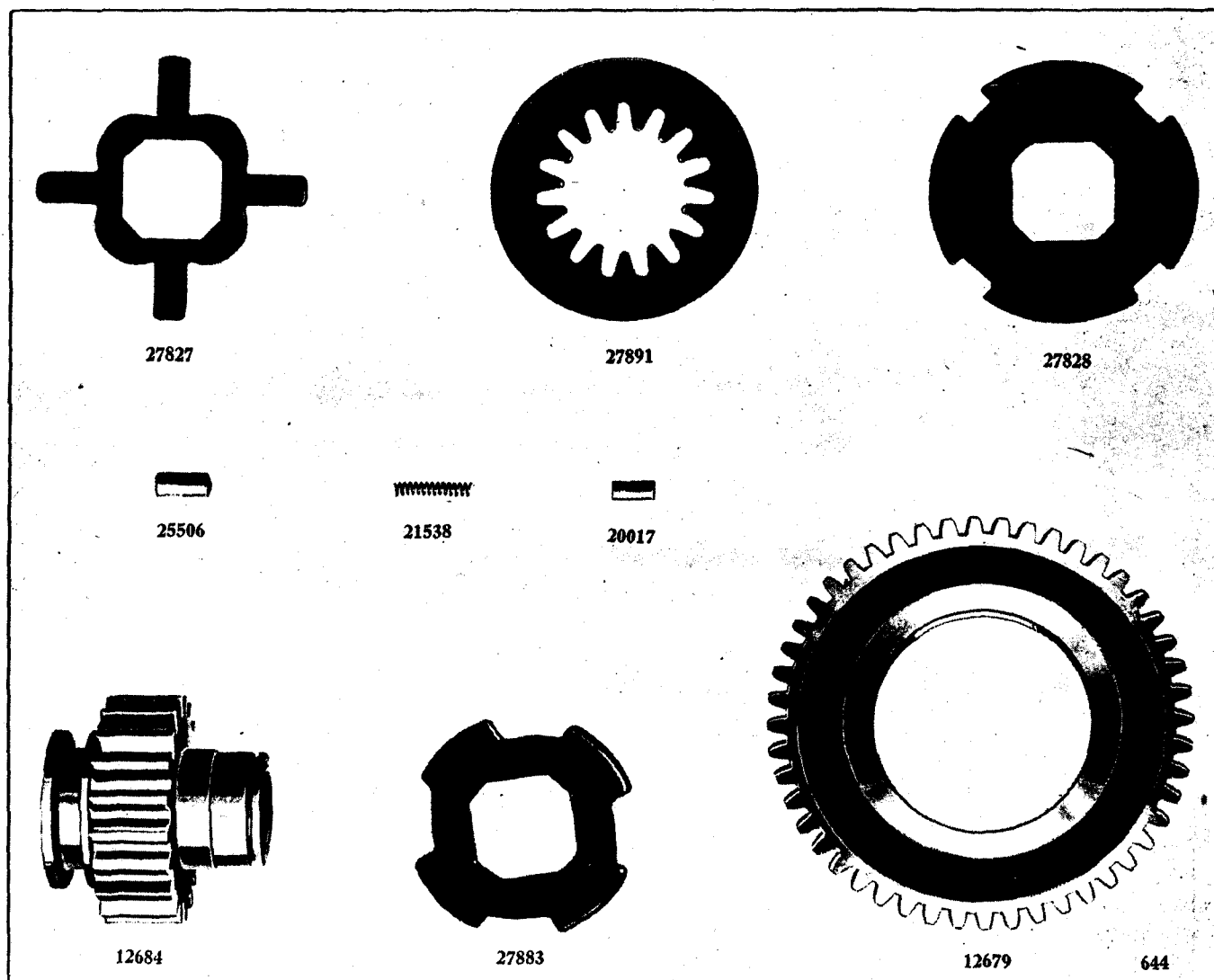
PIECE PARTS CATALOG



No. 5742 CIRCUIT BREAKER

Piece Number	NAME OF PART	Quantity Required
5742	CIRCUIT BREAKER COMPLETE	1
26558	Bracket for mounting Circuit Breaker.....	1
24304	Pin for retaining Shell Assembly 11085.....	1
29525	Terminal Post (Single).....	1
29526	Terminal Post (Double).....	1
23553	Screw for retaining Clamp 23450.....	4
23452	Nut for Screw 23553.....	4
24969	Lock Washer for Nut 23452.....	4
23450	Clamp for retaining Terminal Post.....	4
24375	Screw for retaining Terminal Posts 29525 and 29526.....	4
24969	Lock Washer for Screw 24375.....	4
23876	Plain Washer for Screw 24375.....	4
24485	Insulating Bushing for Screw 24375.....	4
26574	Insulating Bushing in Bracket 26558 for Coils 26561 and 26536.....	1
26573	Mounting Plate for Shell Assembly 11085 (Large).....	1
26577	Mounting Plate for Shell Assembly 11085 (Small).....	1
24724	Terminal Plate for connecting Coils 26536 and 26561.....	1
24282	Insulator for Terminal Posts 29525 and 29526.....	3
11085	Shell Assembly Complete	1
	(Includes the next 2 Items)	
26669	Nut for Shell.....	1
24389	Plain Washer for Nut 26669.....	1
26536	Coil for Vibrating Relay.....	1
26561	Coil for Lock Out Relay (Outer).....	1
24733	Insulating Sleeve for Coil 26536.....	1
12591	Armature Assembly for Vibrating Relay	1
12005	Armature Assembly for Lock Out Relay	1
24082	Pin for attaching Armature Assemblies 12005 and 12591.....	2
26297	Spring for operating Armature Assembly 12005.....	1
26534	Spring for operating Armature Assembly 12591.....	1
12148	Contact Spring Assembly for Vibrating Relay (Upper Contact)	1
12149	Contact Spring Assembly for Lock Out Relay (Upper Contact)	1
24035	Insulating Plate for Contact Spring Assemblies 12148 and 12149 (Thick).....	2
26337	Insulating Plate for Contact Spring Assemblies 12148 and 12149 (Thin).....	2
24725	Terminal Plate for connecting Terminal Posts 29525 and 29526 to Contact Spring Assemblies 12148 and 12149.....	2
24375	Screw for retaining Terminal Plate 24725.....	2
24969	Lock Washer for Screw 24375.....	2
23876	Plain Washer for Screw 24375.....	2
24485	Insulating Bushing for Screw 24375.....	2
25362	Screw for retaining Contact Spring Assemblies 12148 and 12149.....	4
25206	Lock Washer for Screws 26553 and 25362.....	8
24046	Plain Washer for Screw 25362.....	4
24081	Insulating Bushing for Screw 25362.....	1
26553	Screw for retaining Bracket Assemblies.....	4
14502	Bracket Coil and Contact Assembly	1
	(Includes the next 3 Items)	
12181	Terminal Assembly (Lower Contact)	1
31361	Rivet for retaining Terminal Assembly 12181.....	2
26556	Insulator for Terminal Assembly 12181.....	1
26554	Bushing for Bracket Assembly.....	1
14497	Bracket Core and Contact Assembly	1
	(Includes the next 3 Items)	
12181	Terminal Assembly (Lower Contact)	1
26556	Insulator for Terminal Assembly 12181.....	1
31361	Rivet for retaining Terminal Assembly 12181.....	2
23374	Terminal Clip for connecting Circuit Breaker (Small) (Not shown in Illus- tration).....	2
23375	Terminal Clip for connecting Circuit Breaker (Large) (Not shown in Illus- tration).....	2

PIECE PARTS CATALOG



No. 12677 MOTOR CLUTCH

Piece Number	NAME OF PART	Quantity Required
12677	MOTOR CLUTCH ASSEMBLY COMPLETE.....	1
12684	Pinion Assembly	1
12679	Gear Assembly	1
27891	Retainer for Roll 25506 (Inner).....	1
27828	Retainer for Roll 25506 (Outer).....	1
27827	Retainer for Motor Clutch Assembly 12677.....	1
27883	Cam for Gear Assembly 12679.....	1
25506	Roll for Cam 27883.....	4
20017	Plunger for Roll 25506.....	4
21538	Spring for Plunger 20017.....	4