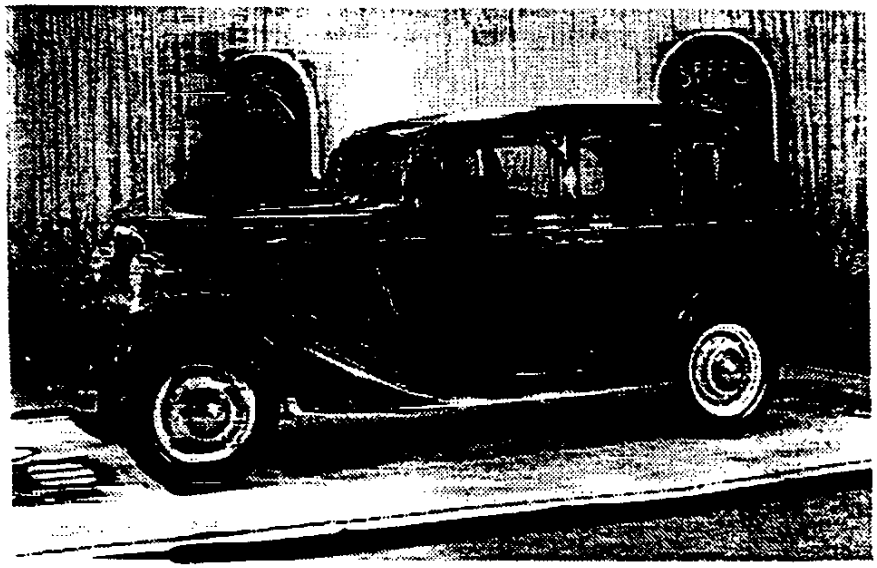
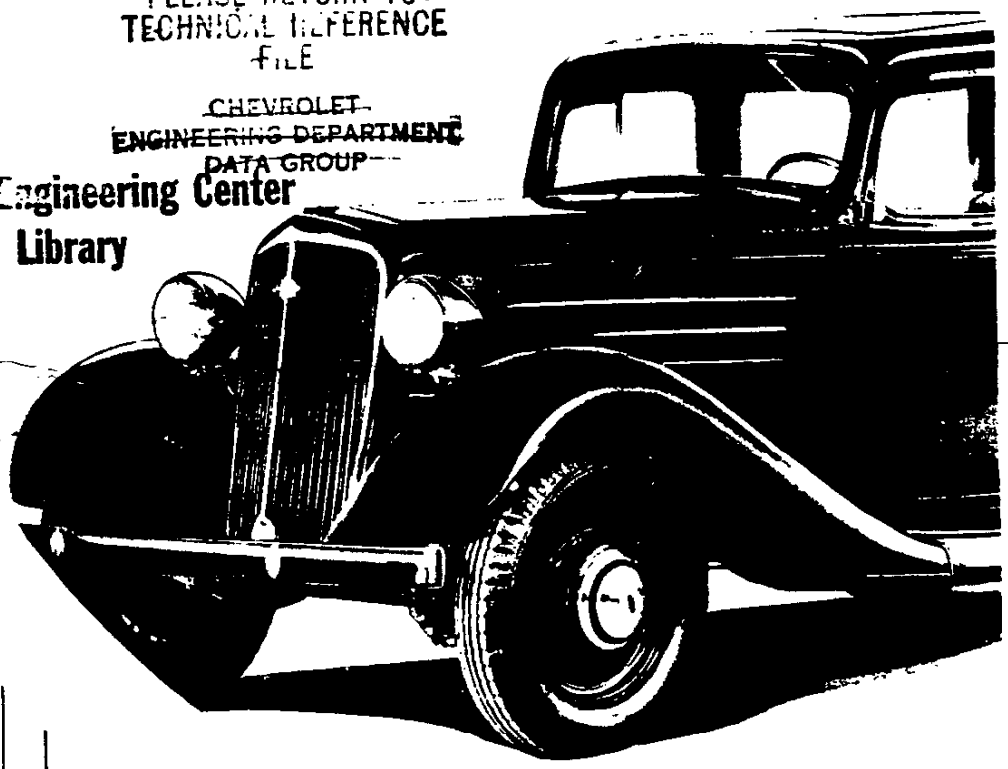
CHEVROLET



1934 Chevrolet, 4-dr. sedan, JAC

1934



chevrolet

1934

passenger car engineering features

INTRODUCTION

The 1934 line of Chevrolet passenger cars includes the Master models and the Standard models as in 1933.

The 1934 Master Chevrolet is longer, roomier, more powerful, smoother and more quiet than its 1933 predecessor. The wheelbase is 112 inches, an increase of 2 inches. The engine is placed 2 inches farther forward in the chassis. The four inches of additional space gained by these changes is disposed so as to give slightly more space for the engine, more space for the front seat occupants and considerably more space for the rear seat passengers. The diagrams on the next page show the redistribution of space.

In appearance, the 1934 Master models are also improved. The sleekness which has characterized all recent Chevrolet models is further accentuated in the 1934 product by the actual length increase plus the treatment of the sheet metal appearance parts which further add to the appearance of great length.

The increased power delivered by the new Marine head engine improves the flashing performance and the many engine refinements, combined with many chassis improvements, insure extremely quiet operation. The introduction of independent front wheel suspension, combined with improved rear spring suspension, gives a remarkably smooth ride, isolating passengers of both front and rear seats from road shocks.

In the design and development of the 1934 Master models, particular attention has been given to driver and passenger comfort and every effort has been made to eliminate the sensations of both sound and feeling which might prove annoying to the motorist.

The chart on page 7 gives the major dimensions and features of Chevrolet passenger cars from 1927 to 1934. It is intended to show the constant progress in the development of the product.

The 1934 Standard models reflect many of the improvements which are incorporated in the Master line. They have the same general appearance which characterizes the longer, larger Master models. The [illegible] increased to 56 inches at both the front and rear, providing greater body width which insures increased comfort. Many of the engine features which contribute to the quietness and smoothness of the Master models are also incorporated in the Standard models.

In the following detail description of feature improvements, the Master and Standard models are handled separately; the Master models being discussed in the first section of the book, while the second section is devoted entirely to features of the Standard models.

This book of Chevrolet engineering features is compiled for the purpose of providing authorized persons in the Chevrolet organization with advance information concerning the 1934 Passenger models. This information is strictly confidential and is not intended for publication. Only those features which are new for 1934 or were added late in the 1933 season are described in detail.

The following data were collected somewhat in advance of production and are up-to-date as of December 1, 1933. No revisions will be made in this book to cover subsequent changes. Complete specifications will be available later in different form.

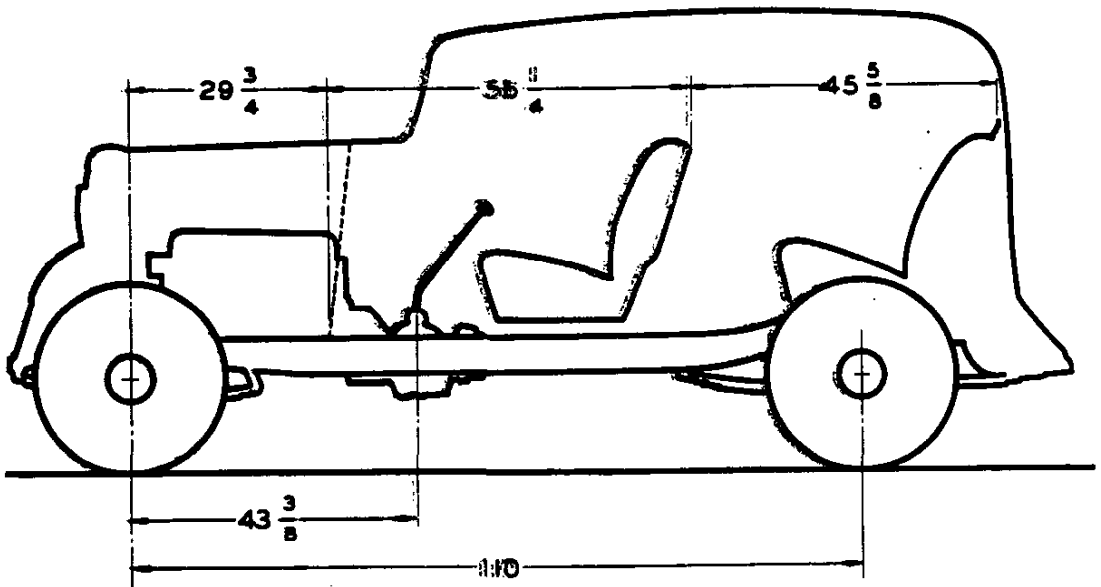
This book No. 36 is issued to

MR. D.S. Taylor

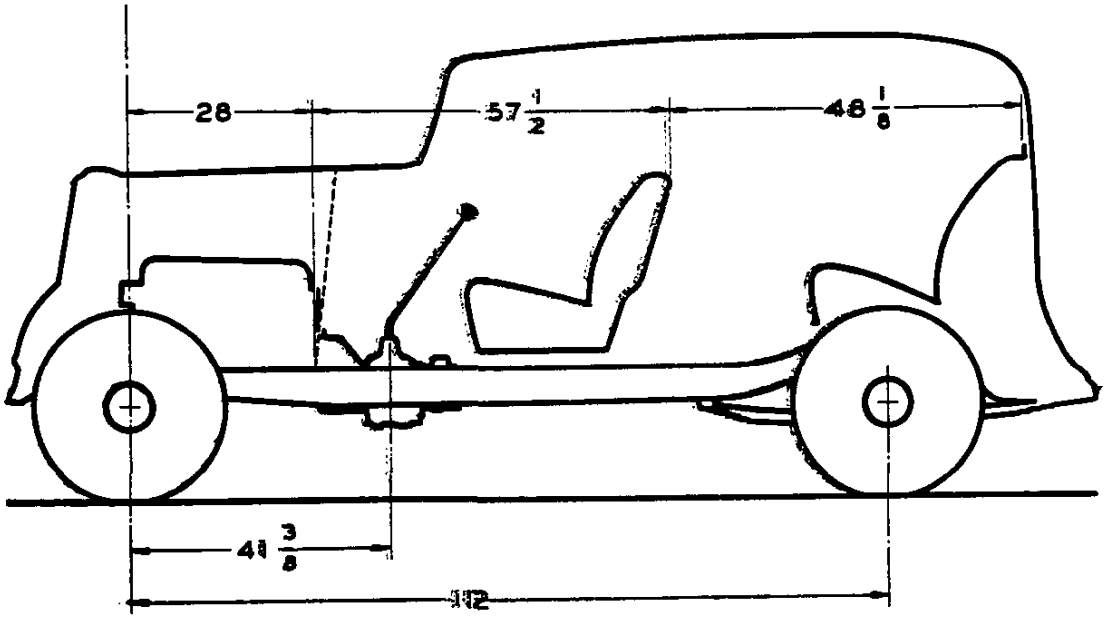
and is intended for his use only.

CHEVROLET MOTOR COMPANY
ENGINEERING DEPARTMENT

December
Fifteenth
1933



1933



1934

NEW FEATURES IN THE 1934 MASTER MODELS

FRAME

1. Longer wheelbase.
2. New "YK" frame construction.
3. Increased frame rigidity.
4. Double channel section at the front end.
5. Flanged box-section ahead of dash.
6. Improved double gusset and tie at cowl support.
7. Box-section tunnel at second cross member junction.
8. Deeper, channel section second cross member.
9. Triangular braces at second cross member.
10. Increased front end rigidity, due to king pin support.
11. Side rails spread for improved front bumper mounting.
12. 125% more rivets used in the frame structure.
13. Improved body bracket mounting.
14. Improved steering gear mounting.
15. Improved battery hanger.

FRONT WHEEL SUSPENSION

16. Independent front wheel suspension.
17. Improved riding qualities.
18. Elliot type steering.
19. Larger diameter king pins.
20. Needle bearings at king pins.
21. Larger king pin thrust bearing.
22. More stable steering control.
23. Lower front spring rate.
24. Built-in double-acting front shock absorbers.
25. Adjustment to compensate for height variations.
26. Needle bearings on wheel support shaft.
27. Needle bearings at spring seat.
28. Fluid reservoir to supply shock absorbers
29. Threaded radius rod bearings.

REAR SPRING SUSPENSION

30. Improved spring grading.
31. Improved spring lubrication.
32. Spring covers added as standard equipment.
33. Improved lock-type rebound clips.
34. Rubber mounting at front ends of rear springs.
35. Improved, threaded rear spring shackles.
36. Improved rear spring rubber bumpers.

REAR AXLE

37. Increased spring seat centers.
38. Increased wheel bearing centers.
39. Improved brake and wheel load distribution.
40. Stronger axle housing cover.
41. Tubular propeller shaft.
42. Additional bearing at front of torque tube for universal joint.
43. Stronger axle shaft.

BRAKES

44. Double-articulated brakes, front and rear.
45. Longer lower brake shoes.
46. Dirt shields added.
47. Improved brake lining.
48. More rigid brake drums.
49. Simplified brake linkage.
50. Cable-operated rear brakes.

EXHAUST SYSTEM

51. Smaller, heavier exhaust pipe.
52. Improved diffusion type muffler.
53. Larger, longer tail pipe.
54. Improved, insulated exhaust system mounting.

ENGINE

55. Increased power.
56. Improved performance.
57. Smoother and quieter operation.
58. Better fuel economy.
59. Marine head design.
60. Higher volumetric efficiency.
61. Larger inlet ports.
62. Larger exhaust ports.
63. Water control nozzles added.
64. Thicker cylinder head gasket.
65. Improved cam contours.
66. Larger diameter camshaft.
67. Increased exhaust valve lash.
68. Tappet springs added.
69. Improved push rod seats.
70. Increased valve opening.

71. Improved lubrication of valve mechanism.
72. Larger diameter rocker shafts.
73. Larger inlet and exhaust valves.
74. Wider valve seats.
75. Larger diameter valve stems.
76. Normalized exhaust valves.
77. Lighter valve spring pressure.
78. Thicker, high carbon valve stem key.
79. Heat treated valve spring cap.
80. Cylinder bore micromatically honed with fine grit hones.
81. Narrower compression rings.
82. Improved piston relief contour.
83. Tempered piston pins.
84. More sensitive harmonic balancer.
85. Improved by-pass oil screen.
86. Beaded timing gear cover.
87. Push rod cover insulated by rubber grommets.
88. Rocker cover insulated by rubber grommets
89. Improved fuel distribution in inlet manifold.
90. Insulator added between carburetor and manifold.
91. Counterweighted heat control.
92. More durable manifold gaskets.
93. Larger air cleaner.
94. Improved carburetion.
95. Improved distributor action.
96. Increased vacuum spark advance.
97. Air bleed to control range of vacuum advance.
98. Improved Octane Selector.
99. More compact fuel pump.
100. Increased starting gear ratio.
101. Stronger flywheel.
102. Provision for improved timing adjustment.
103. Improved cushion-balanced engine mountings.

CLUTCH

104. Stamped cover.
105. Improved pressure plate.
106. Balanced pressure levers.
107. Increased clutch disc spring pressure.
108. Improved clutch pedal linkage.

TRANSMISSION

109. Improved performance.
110. Increased durability.
111. Rubber gearshift knob.

UNIVERSAL JOINT

112. Adjustable seal at rear of torque ball.

STEERING

113. Improved steering geometry.
114. Ball bearing roller sector steering gear
115. Increased steering gear ratio.
116. Longer, stronger pitman arm.

CONTROLS

117. Independent hand throttle control.
118. Improved Starterator pedal position.
119. Improved control pipe attachment.
120. Increased hand brake lever spring tension.

WHEELS AND TIRES

121. Larger section tires.
122. Wider drop-center rims.
123. Angle tire valves with improved dust cap.
124. Larger hub cap.

SHEET METAL

125. Improved frontal appearance.
126. Increased radiator slope with sharper "V" shape.
127. Emblem mounted lower on grille.
128. Radiator splash guard integral with fenders.
129. Front fenders extend farther over tires.
130. Deeper front fender crowns.
131. Deeper front fender skirts with sharper corners.
132. Tapered front fender bead.
133. Shallow hood ledge "valley".
134. Longer hood with improved appearance.
135. Streamlined horizontal hood louvres.
136. Improved stabilized fender and radiator mounting.
137. Longer, wider running boards.
138. Deeper rear fender crowns and skirts.
139. Baffle added under rear fender tail.
140. Continuous bright moulding added along running boards.

ELECTRICAL EQUIPMENT AND INSTRUMENTS

141. Fifteen plate battery.

142. Improved "Tri-tray" head lamps.
143. Prefocused head lamp bulbs.
144. Generator output regulated to lamp load.
145. Horn mounted under hood.
146. Improved horn button.
147. Improved ignition switch and lock.
148. Improved instrument arrangement.
149. Larger speedometer.
150. Walnut finish on panels and control buttons.
151. Large, locked glove compartment added.
152. Improved instrument lighting.

RADIATOR

153. Copper radiator core.
154. Improved radiator core mounting.
155. Baffle chamber added to upper tank.
156. Stronger radiator shell tie bar ahead of core.

TOOLS

157. Improved "hydraulic" lubricating system.
158. Improved jack.

WHEEL CARRIER

159. Neater, more rigid fender well wheel carrier.

CLOSED BODIES

160. Increased body length.
161. More leg room in front and rear seats.
162. Wider front doors.
163. More leak-proof windshield closure.
164. Cowl ventilator opens toward rear and deflects air to sides.
165. Wider front No-Draft Ventilators (Sedan, Coupe).
166. Deflectors added above front N.D. Ventilators.
167. Improved door dovetails.
168. Steel striker plates with more contact area.
169. Half-round, spring-seated lock bolts.
170. Adjustable brace added in front doors.
171. More rigid door hinges.
172. Neater, streamline outside door handles.
173. Improved door lock.
174. Improved window and ventilator cranks.
175. Arm rest added on left front doors.
176. Ash receiver at back of Sedan front seat.
177. Spring steel front seat guides (Sedan and Coupes).
178. Improved cushion construction.
179. Stronger body structure.
180. Neater head lining attachment.
181. Improved body insulation.
182. Improved floor mat.

OPEN BODIES

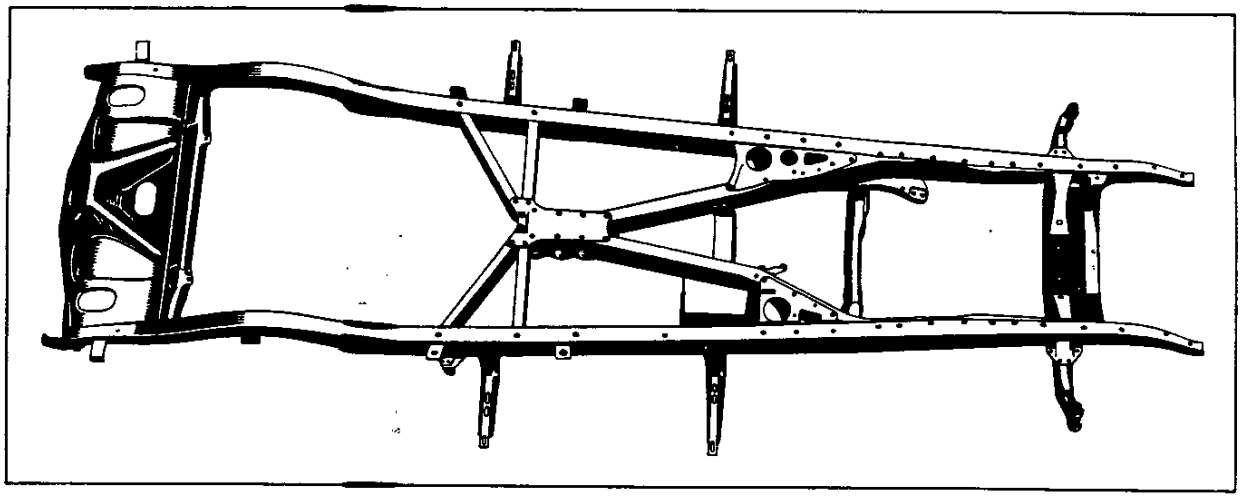
183. More attractive Sport Roadster.
184. Increased leg room in rumble seat.
185. Longer top.
186. Wider windshield.
187. Softer cushions.

SEDAN DELIVERY

188. Beaver-tail shape at rear.
189. Increased leg room.
190. Improved appearance.
191. Larger loading space.
192. Longer advertising panels.
193. Wider front doors.

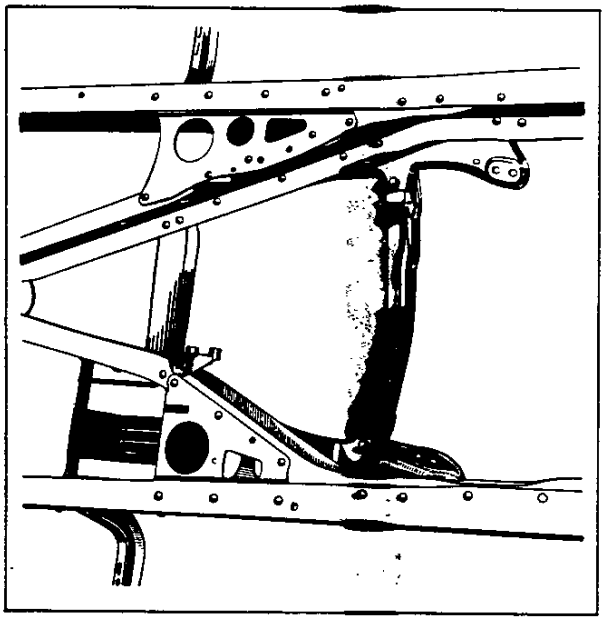
PROGRESS CHART

YEAR	1934	1933	1932	1931	1930	1929	1928	1927
WHEELBASE	112	110	106 3/16	106 9/16	106 1/2	106 1/2	106 1/2	102 5/8
TREAD- FRONT	54 1/2	57 5/16	57 5/16	56 1/4	56 1/2	56	56	56
TREAD- REAR	57 9/16	57 5/16	57 9/16	57 9/16	56 1/2	56	56	56
COACH CURB WEIGHT - LBS.	3105	2900	2775	2695	2625	2610	2435	2260
FRAME TYPE	'X' UNIT AND 4 CROSS MEMBERS	5 CROSS MEMBERS	5 CROSS MEMBERS	4 CROSS MEMBERS	4 CROSS MEMBERS	4 CROSS MEMBERS	4 CROSS MEMBERS	4 CROSS MEMBERS
FRAME OVERALL LENGTH	160	157 1/16	152 3/16	152 3/16	150 5/8	150 5/8	150 5/8	146
SIDE MEMBER SECTION	5 1/4 x 2 3/8 x 3/16 PLUS SUB FRAME	5 1/4 x [illegible] = 3/16	5 x 2 1/4 x 3/16	5 x 2 1/4 x 3/16	4 1/2 x 1 1/2 x 3/16	4 1/2 x 1 1/2 x 3/16	4 1/2 x 1 1/2 x 3/16	4 1/2 x 1 1/2 x 5/32
FRONT WHEEL SUSPENSION	INDEPENDENT	I BEAM & SEMI-ELLIPTIC SPRINGS	I BEAM & SEMI-ELLIPTIC SPRINGS	I BEAM & SEMI-ELLIPTIC SPRINGS	I BEAM & SEMI-ELLIPTIC SPRINGS	I BEAM & SEMI-ELLIPTIC SPRINGS	I BEAM & SEMI-ELLIPTIC SPRINGS	I BEAM & SEMI-ELLIPTIC SPRINGS
KING PIN KNUCKLE BEARINGS	12S NEEDLES	ROLLED BRONZE	ROLLED BRONZE	ROLLED BRONZE	ROLLED BRONZE	ROLLED BRONZE	ROLLED BRONZE	ROLLED BRONZE
KING PIN THRUST BEARINGS	15 BALLS	14 BALLS	14 BALLS	14 BALLS	14 BALLS	14 BALLS	14 BALLS	STEEL WASHER
SHOCK ABSORBERS	HYDRAULIC FRONT- DOUBLE ACT. REAR- SINGLE ACT.	HYDRAULIC FRONT- SINGLE ACT. REAR- SINGLE ACT.	HYDRAULIC FRONT-SINGLE ACT. REAR- SINGLE ACT.	HYDRAULIC FRONT-SINGLE ACT. REAR- SINGLE ACT.	HYDRAULIC FRONT-SINGLE ACT. REAR- SINGLE ACT.	TENSION PLATES	TENSION PLATES	NONE
REAR SPRING FRONT BUSHINGS	RUBBER	BRONZE	BRONZE	BRONZE	BRONZE	BRONZE	BRONZE	BRONZE
REAR SPRING SHACKLES	THREADED	SELF-ADJUSTING	SELF-ADJUSTING	SELF-ADJUSTING	SELF-ADJUSTING	PLAIN	PLAIN	PLAIN
REAR SPRING COVERS	METAL-FABRIC LINED	NONE	NONE	NONE	NONE	NONE	NONE	NONE
REAR AXLE RATIO	4.111	4.111 3/8	4.10	4.10	4.10	3.82	4.18	3.82
PROPELLER SHAFT	TUBULAR	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID
BRAKES- TYPE	SYMMETRICAL SHOE DOUBLE ARTICULATED	ARTICULATED SHOE	ARTICULATED SHOE	ARTICULATED SHOE	ARTICULATED SHOE	FRONT-INT.EXP. REAR- EXT.CONT.	FRONT-INT.EXP. REAR- EXT.CONT.	FRONT- NONE REAR- EXT.CONT.
PARKING BRAKES	CUT-IN SERVICE SHOES	CUT-IN SERVICE SHOES	SEPARATE 4 SHOE	SEPARATE 4 SHOE	SEPARATE 4 SHOE	SEPARATE INTERNAL BANDS	SEPARATE INTERNAL BANDS	SEPARATE INTERNAL BANDS
FRONT BRAKES- SIZE	12 x 1 3/4 INT.	12 x 1 3/4 INT.	11 1/2 x 1 1/2 INT.	11 1/2 x 1 1/2 INT.	11 1/2 x 1 1/2 INT.	10 1/2 x 1 1/2 INT.	10 1/2 x 1 1/2 INT.	NONE
REAR BRAKES- SIZE	12 x 1 3/4 INT.	12 x 1 3/4 INT.	11 1/2 x 1 1/2 INT.	11 1/2 x 1 1/2 INT.	11 1/2 x 1 1/2 INT.	11 x 2 EXT.	11 x 2 EXT.	11 x 2 EXT
SERVICE BRAKE LINING AREA	170.2 SQ.IN.	126.4 SQ IN	100.5 SQ.IN.	100.5 SQ.IN.	100 5 SQ.IN.	175 SQ.IN	185.7 SQ.IN	131.6 SQ IN
PARKING BRAKE LINING AREA	170.2 SQ.IN.	126.4 SQ.IN.	27.1 SQ.IN.	27.1 SQ.IN.	27.: SQ IN	60 SQ.IN.	60 SQ IN.	60 SQ.IN.
MUFFLER TYPE	1 TUBE, REVERSE FLOW RUBBER MOUNTED	RESONANCE RUBBER MOUNTED	BAFFLE SOLID MOUNTED	BAFFLE SOLID MOUNTED	BAFFLE SOLID MOUNTED	BAFFLE SOLID MOUNTED	BAFFLE SOLID MOUNTED	BAFFLE SOLID MOUNTED
ENGINE-NUMBER OF CYLINDERS	6	6	6	6	6	6	4	4
PISTON DISPLACEMENT-CU.IN.	206.8	206.8	194	194	194	194	170.9	170.9
COMPRESSION RATIO	5.45	5.20	5.20	5.00	5.07	5.02	4.50	4.33
MAX.BRAKE HORSEPOWER AT RPM	80 at 3300	65 at 3200	60 at 3000	50 at 2600	50 at 2600	46 at 2600	35 at 2200	27 at 1900
MAX.TORQUE- FOOT POUNDS	150	146	130	124	124	124	108	103
ENGINE RPM AT MAX.TORQUE	800 - 2200	1000 - 2800	800 - 2000	800	900	1000	1100	1000
COMBUSTION CHAMBER TYPE	MARINE	VERTICAL POCKET	VERTICAL POCKET	VERTICAL POCKET	VERTICAL POCKET	VERTICAL POCKET	CYLINDER BORE	CYLINDER BORE
CARBURETOR TYPE	DOWNDRAFT	DOWNDRAFT	DOWNDRAFT	UPDRAFT	UPDRAFT	UPDRAFT	UPDRAFT	UPDRAFT
INLET MANIFOLD ARMS- TYPE	'D' SECTION SPIRAL ENDS	'D' SECTION	CYLINDRICAL	CYLINDRICAL	CYLINDRICAL	CYLINDRICAL	CYLINDRICAL	CYLINDRICAL
SPARK ADVANCE CONTROL	CENTRIFUGAL & VACUUM	CENTRIFUGAL & VACUUM	CENTRIFUGAL & MANUAL	CENTRIFUGAL & MANUAL	CENTRIFUGAL & MANUAL	CENTRIFUGAL & MANUAL	MANUAL	MANUAL
MANIFOLD HEAT CONTROL	THERMOSTATIC WITH BALANCE WEIGHT	THERMOSTATIC	MANUAL	NONE	NONE	NONE	NONE	NONE
VALVE TRAIN SPRING	45# AT VALVE 186 AT TAPPET	46.5# AT VALVE [illegible] AT TAPPET	44# AT VALVE NONE AT TAPPET	44# AT VALVE NONE AT TAPPET	44# AT VALVE NONE AT TAPPET	41.5# AT VALVE NONE AT TAPPET	37.5# AT VALVE NONE AT TAPPET	37.5# AT VALVE NONE AT TAPPET
OCTANE SELECTOR	20° RANGE AT DISTRIBUTOR	20° RANGE AT DISTRIBUTOR	NONE	NONE	NONE	NONE	NONE	NONE
HARMONIC BALANCER DIAMETER	6 1/2	6 1/2	6 5/32	6 5/32	6 1/32	NONE	NONE	NONE
HARMONIC BALANCER SPRINGS	96	80	48	40	40	NONE	NONE	NONE
ENGINE MOUNTINGS	5 POINT CUSHION BALANCED	4 POINT CUSHION BALANCED	4 POINT DIAMOND	3 POINT METAL TO METAL	3 POINT METAL TO METAL	3 POINT METAL TO METAL	3 POINT METAL TO METAL	3 POINT METAL TO METAL
CLUTCH TYPE	STAMPED COVER POST DRIVE 9 SPRINGS 3 FINGERS	CAST COVER RADIAL PIN DRIVE 9 SPRINGS 3 FINGERS	CAST COVER RADIAL PIN DRIVE 9 SPRINGS 3 FINGERS	CAST COVER RADIAL PIN DRIVE 8 SPRINGS 4 FINGERS	CAST COVER RADIAL PIN DRIVE 8 SPRINGS 4 FINGERS	CAST COVER RADIAL PIN DRIVE 8 SPRINGS 4 FINGERS	CAST COVER RADIAL PIN DRIVE 8 SPRINGS 4 FINGERS	CAST COVER RADIAL PIN DRIVE 8 SPRINGS 4 FINGERS
CLUTCH DISC MOUNTING AT HUB	SPRING CUSHION	SPRING CUSHION	SPRING CUSHION	SOLID	SOLID	SOLID	SOLID	SOLID
CLUTCH DISC FACING	BRAIDED-MOULDED	BRAIDED-MOULDED	MOULDED	MOULDED	WOVEN	WOVEN	WOVEN	WOVEN
TRANSMISSION TYPE	SYNCRO-MESH SILENT SECOND	SYNCRO-MESH SILENT SECOND	SYNCRO-MESH	PLAIN SPUR GEAR	PLAIN SPUR GEAR	PLAIN SPUR GEAR	PLAIN SPUR GEAR	PLAIN SPUR GEAR
FUEL TANK CAPACITY- GALLONS	14	14	11	11	11	11	10	10
STEERING GEAR TYPE	WORM & R.B. ROLLER SECTOR	WORM & SECTOR	WORM & SECTOR	WORM & SECTOR	WORM & GEAR	WORM & GEAR	WORM & GEAR	WORM & GEAR
STEERING GEAR RATIO	16 : 1	14 : 1	12 : 1	12 : 1	9.5 : 1	9.5 : 1	9.5 : 1	8 : 1
STARTING MOTOR CONTROL	STARTERATOR AND TREADLE	STARTERATOR AND TREADLE	SEPARATE FOOT BUTTON	SEPARATE FOOT BUTTON	SEPARATE FOOT BUTTON	SEPARATE FOOT BUTTON	SEPARATE FOOT BUTTON	SEPARATE FOOT BUTTON
TIRE SIZE	5.50-17	5.25-17	5.25-18	4.75-19	4.75-19	4.50-20	4.50-21	29 x 4.40
RIM SIZE AND TYPE	17 x 3.62 DROP CENTER	18 x 3.00 DROP CENTER	18 x 3.00 DROP CENTER	19 x 3.00 DROP CENTER	19 x 2.75 SPLIT RIM	20 x 2.75 SPLIT RIM	21 x 2.75 SPLIT RIM	21 x 2.512 SPLIT RIM
WHEELS	WIRE	WIRE	WIRE	WIRE	DISC	DISC	DISC	DISC
RADIATOR DESIGN	SLOPING 'V' COMPOSITE FINISH	SLOPING 'V' COMPOSITE FINISH	VERTICAL CHROMIUM PLATED	VERTICAL CHROMIUM PLATED	VERTICAL CHROMIUM PLATED	VERTICAL CHROMIUM PLATED	VERTICAL POLISHED DURALUMIN	VERTICAL POLISHED DURALUMIN
RADIATOR GRILLE	BUILT-IN STAMPING	BUILT-IN STAMPING	BUILT-IN STAMPING	SEPARATE WIRE MESH SPORT MODELS ONLY	NONE	NONE	NONE	NONE
RADIATOR CORE	.25 x .40-V TYPE COPPER	.25 x .40-V TYPE BRASS	34 SEC. 1/8 REX. COPPER	34 Sec. 1/8 REX. COPPER & BRASS	30 Sec. 1/8 REX. BRASS	30 SEC. 1/8 REX. BRASS	27 SEC. 1/8 REX. BRASS	27 SEC. 1/8 REX. BRASS
RAD. & FRONT FENDER MOUNTING	STABILIZED	STABILIZED	STABILIZED	CONVENTIONAL	CONVENTIONAL	CONVENTIONAL	CONVENTIONAL	CONVENTIONAL
WINDSHIELD GLASS TYPE	SAFETY PLATE	SAFETY PLATE	PLATE	PLATE	PLATE	PLATE	PLATE	PLATE
WIND.SLOPE- CLOSED BODIES	17°	17°	10°	7°	7°	11°	11°	0°
CLOSED BODY VENTILATION	FISHER N.D.V. AND REVERSED COWL VENTILATOR	FISHER N.D.V. & COWL VENTILATOR	V.V.WINDSHIELD & COWL VENTILATOR	V.V.WINDSHIELD	V.V.WINDSHIELD	V.V.WINDSHIELD	V.V.WINDSHIELD	V.V.WINDSHIELD



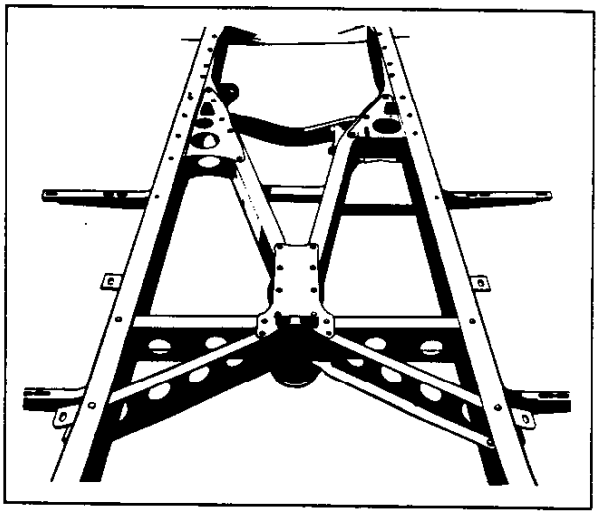
FRAME

The 1934 Master frame is of an entirely new design known as the "YK" type. It consists of two strong side rails, front and rear cross members, engine side support tie bar and a completely new sub-frame member, tied in by strong gusset members and terminating in a braced channel member. In shape, the sub-frame members simulate a letter "Y" and the second cross member with its braces forms a letter "K", from which the frame derives its name. This new frame structure is approximately 20 times as rigid torsionally as the 1933 frame assembly. It was designed to co-operate with the new independent front wheel suspension and consequently it imparts proper support and rigidity exactly where the new suspension requires those properties.

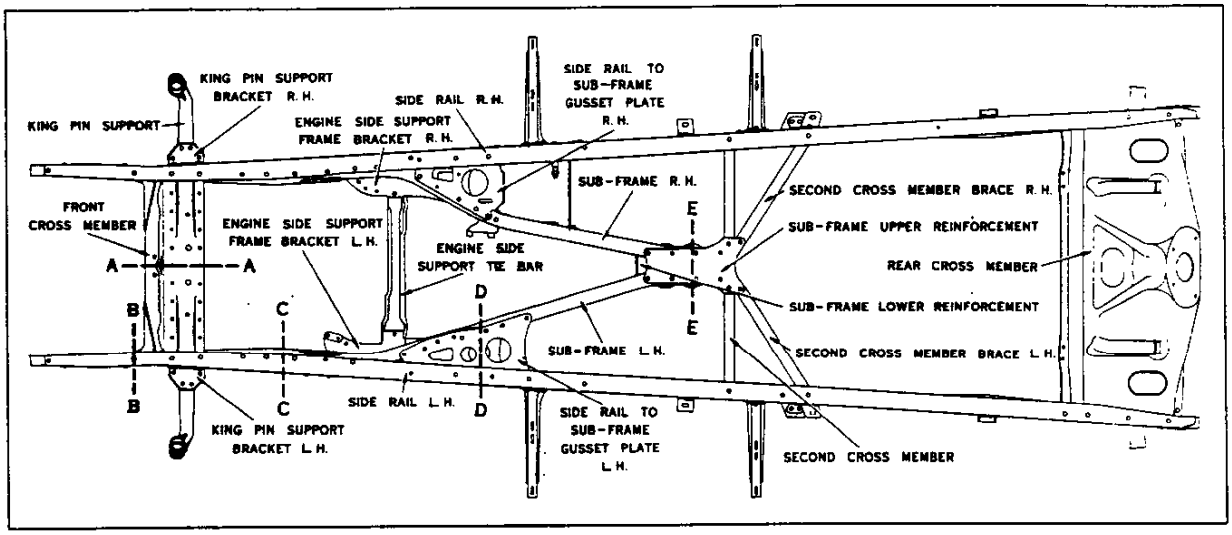


SIDE RAILS

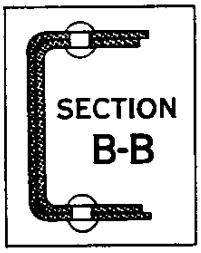
The width of the frame at the rear is the same as formerly, tapering to a slightly smaller width at the front wheel center.

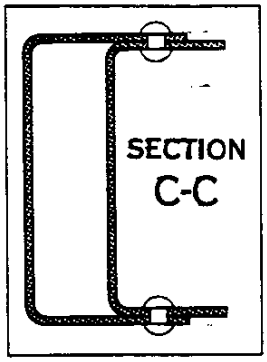


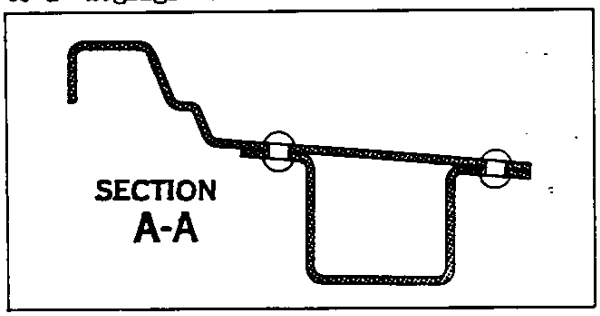
Forward from this point, the side rails spread outward slightly to form supports for the front bumper on much wider centers. The sectional depth and thickness of the side rails remain unchanged, but the shape and width of the flanges are redesigned to meet the requirements of the new structure.

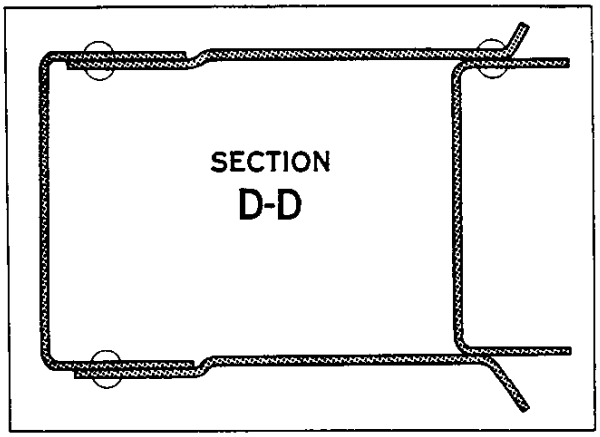


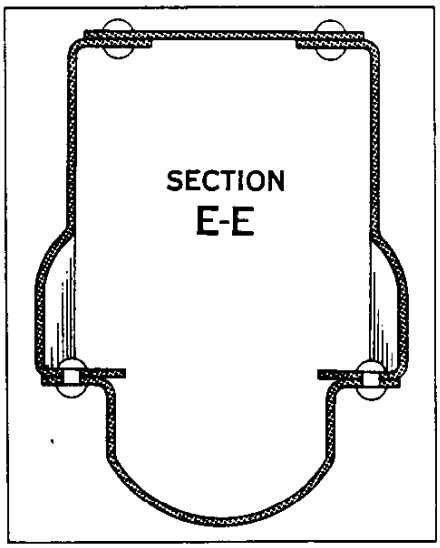
The sub-frame members telescope into the side rail channels at the front cross member, forming a strong channel section having extremely heavy walls. To the rear from their points of support at the front cross member, the forward sub-frame members telescope into the side rails a lesser distance, forming an extremely rigid, flanged, box section. The sub-frame members are securely attached to the side rails by rivets spaced closely together and near the edges of the box section. The flanged box section just forward of the dash location makes the frame exceptionally rigid in the vicinity of the cowl mounting, reducing cowl shake to a negligible extent and preventing cracks in the sheet metal parts. The box sections formed by the sub-frames and the side rails are very well adapted to resist beam loading and to reduce the beam deflection to a considerable extent.



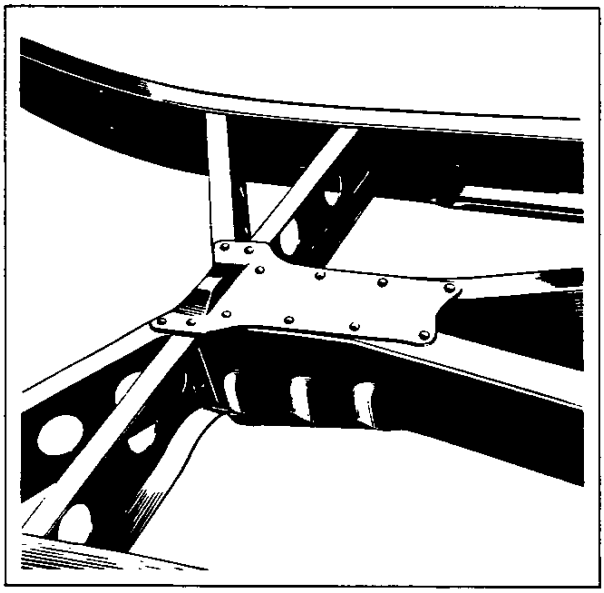


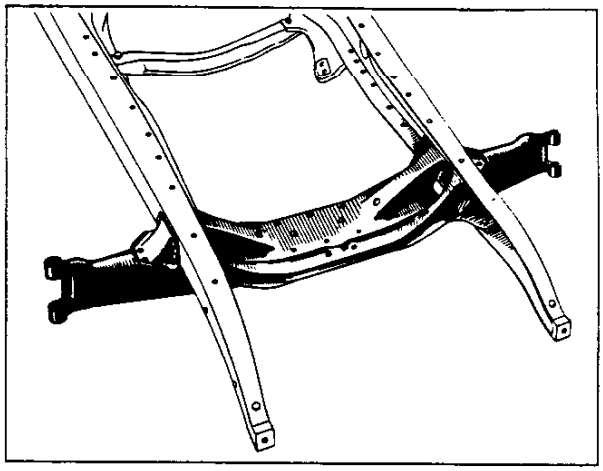






Just rearward from the dash line, the two sub-frame members converge at a greater angle, increasing in section depth toward the rear, where they are secured to the second cross member. The sub-frame members are joined and attached to the second cross member by strong, flanged, "U" section reinforcements at the top and bottom, forming an extremely strong box section. This, in turn, provides a tunnel thru which the propeller shaft passes. The second cross member is of deep channel section with its open side toward the front. At its center, the channel depth is further increased to complete the propeller shaft tunnel. Two deep, channel-section braces extend backward and outward from the center of the second cross member, spreading out to form strong, triangular ties. Just back of the engine side support tie bar, the sub-frame members are further secured to the side rails by strong triangular gusset plates above and below. The sub-frames, combined with the second cross member and its braces, are in such relation as to give this new frame structure strength and rigidity far in excess of the so-called "X" frame. It is not only much stronger torsionally at the center, but it also spreads the torsional load over a much larger area at the side rails thru the sturdy bracing of the "K" member, which is also very effective in providing an exceptionally rigid mounting for the intermediate body brackets at the points of least distortion.





FRONT CROSS MEMBER

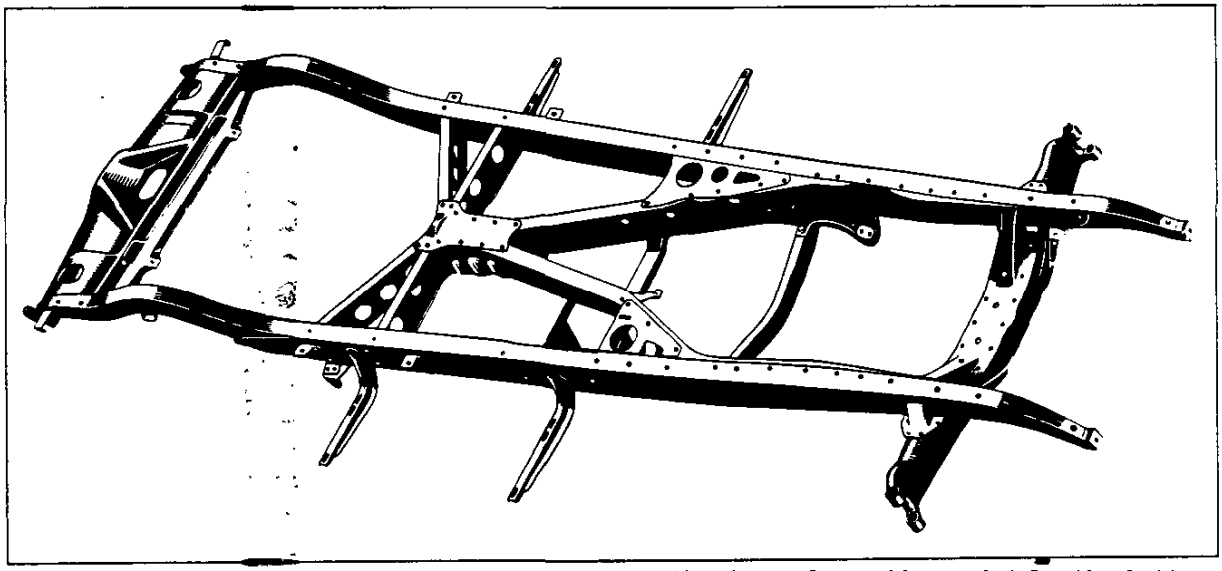
The front cross member is also completely redesigned. It consists of a single steel stamping drawn to a double channel section at its outer ends and blending at the middle to a broad flat section, with its forward edge drawn upward into a single channel on which the fenders and radiator are supported. At its ends, the front cross member is riveted to the upper and lower flanges of the side rails, as well as to the sub-frame members. The rear channel section at the outer ends forms supports for the outer bolts of the front engine mounting units. The inner mounting bolts are located in the central flat portion of the front cross member.

KING PIN SUPPORT

The king pin support cross member cooperates with the front cross member in increasing the rigidity of the frame front end and forms the stationary support for the king pins. This sturdy, composite member replaces the forged front axle I beam used in conventionally sprung jobs. Strictly speaking, from an assembly standpoint, this king pin support member is not a part of the frame assembly, because it is supplied to the assembly plants with the front spring units and wheel spindles attached and it is riveted to the frame at the assembly plants in that condition. However, after assembly, it plays such an important part in the frame structure and is so definitely related to it, that it is described

from its structural relation rather than the assembly relation.

The lower half of the king pin support member is a heavy steel stamping extending across the entire car from king pin to king pin. Except for its outer ends, it is of flanged channel section, varying in depth from 2-3/32 at the center to 4-1/4 under the side rails. At the outer ends, inverted channel members are butt welded securely along the top edges of the support member, forming a complete box section which is extremely rigid torsionally. At each end a stiff angle bracket with a broad rectangular drawn rib attaches to the frame side rail and the king pin support. The king pins are supported in heavy drop forged yokes which are also securely butt welded to the box sections at the ends.



ENGINE SIDE SUPPORT TIE BAR

The engine side support tie bar is also completely redesigned. It is drawn to a flanged channel section and is riveted to the lower flanges of the side rails and the lower gusset plates. This provides an exceptionally strong tie across the frame just back of the dash line which, with the strong gusset construction, increases the transverse strength and rigidity. With the "YK" frame design and the improved five-point cushion-balanced engine mounting, this member is relieved of much of its vertical loading, functioning principally as a transverse tie bar.

At each side of the frame a sturdy drawn steel bracket attaches to the lower flanges of the side rails, the sub-frame members and the tie bar, reinforcing the junctions of these members and providing an ideal mounting point at the side of the engine. A separate stamped steel gusset at each side ties the upper flanges of the side rails and sub-frames together. These four sturdy stampings combine to further increase the strength and rigidity of the frame in the vicinity of the dash. The upper right hand gusset also serves as the forward mounting point for the battery hanger.

Some further idea of the increased strength and structural rigidity of the 1934 frame may be gained from a comparison of the increased number of rivets used to secure the several frame members together. In the 1933 frame, 71 rivets were used, while in the 1934 frame structure, 160 rivets are used, an increase of more than 125 percent.

The radical change in front wheel suspension permits simplification of the brackets at the extreme front ends of the side rails. These malleable iron brackets now serve only to support the bumper and are therefore considerably lighter. Each bracket is attached to the side rail by two rivets, one passing thru both flanges and the other thru the web. Provision is made in these brackets for mounting the bumper at a greater angle.

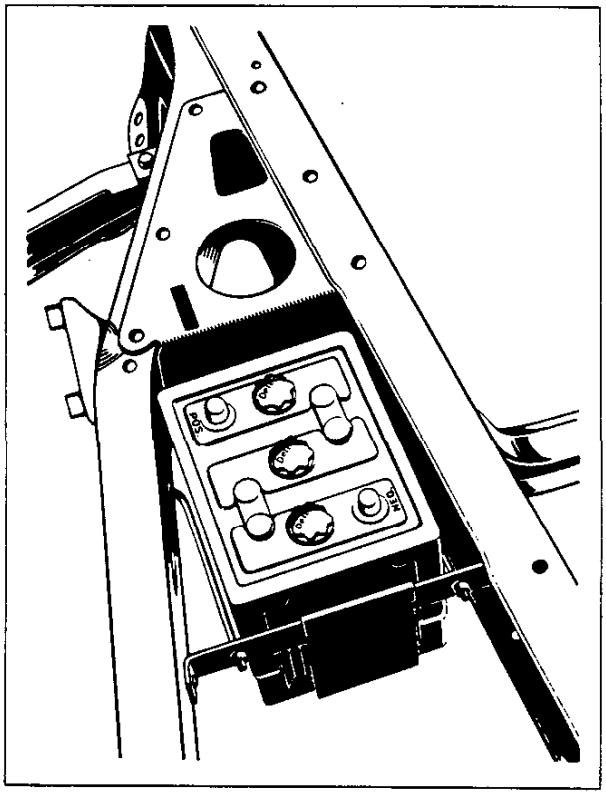
The intermediate body brackets are redesigned to provide a more effective disposition of

rivets and to serve as a brace for the rear spring front hanger. These brackets are attached to the side rail webs by two staggered rivets, the upper one of which also secures the second cross member brace. At their lower ends, flanges are turned outward from each of the body brackets to form an angle support for the rear spring front hangers.

A stamped spacer is added between the side rail and the sub-frame member to provide for the mounting of the steering gear. This spacer permits the attachment of the steering gear inside the sub-frame by means of long bolts extending inward from the outside of the side rail.

Provision is made for mounting the battery hanger strap between the side rail and sub-frame at the right hand side just back of the gusset plate. A rectangular strap extends across the space between the two members forming a support for the rear end of the hanger strap. The rear edge of the sub-frame gusset is bent upward to form the front support. The hanger strap is a simple strip steel cradle with hook ends which engage the front and rear supports. The bottom is corrugated for rigidity and holes are provided for drainage.

The hanger fits the battery case closely, eliminating the necessity for wooden filler strips. At the front side, a corrugated guard is riveted across the outside of the hanger, protecting the battery case from flying stones. Clamp bolts extend from the gusset thru the rear support strap to clamp the battery and its hanger securely in place.



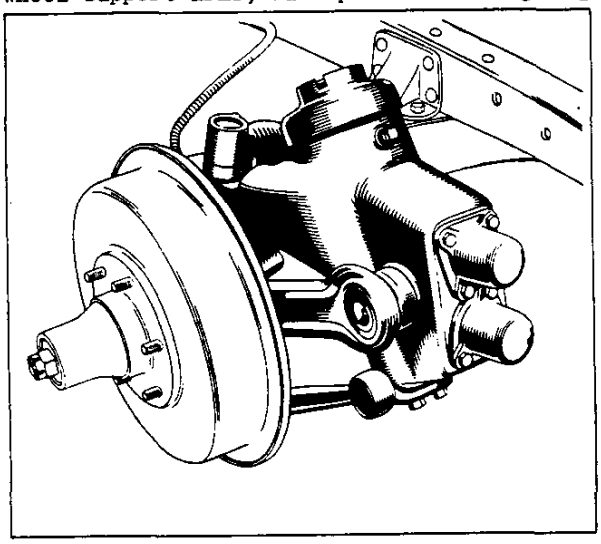
COMPARATIVE SPECIFICATIONS

	1933	1934
Wheelbase	110	112
Overall frame length	157-7/16	159-7/8
Frame width at rear spring horns	44	44
Frame width at front wheel center	28	27-3/4
Frame width at front bumper supports	26	28
Front end kick-up	3/8	11/16
Normal side rail flange width	2-1/4	2-3/8
X member channel section at front	None	3-1/4 x 1-7/8 x 7/64
X member channel section at middle	None	4-15/16 x 1-7/8 x 7/64
Second cross member channel section	2-1/4 x 1-1/2 x 1/8	4-3/4 x 1-1/2 x 3/32
Second cross member brace section	None	4-11/16 x 1-11/32 x 3/32
King pin support channel section at center	None	2-1/2 x 2-3/32 x 5/32
King pin support flange width	None	4-3/4
King pin support section at side rails	None	2-1/2 x 4-1/4 x 5/32
King pin support outer box section	None	4-1/2 x 1-7/8 x 5/32
Left hand engine side support thickness	1/8	5/32
Right hand engine side support thickness	7/64	5/32
Number of rivets in the frame structure	71	160

INDEPENDENT FRONT WHEEL SPRINGING

In the new 1934 Master models, the front wheels are independently sprung. This naturally eliminates the rigid front axle and semi-elliptic springs. In the new suspension, the king pins are mounted in supports which are rigidly attached to the frame.

The front wheels still pivot about the king pins, but the wheel spindles are not mounted directly on the king pin pivots as heretofore. On the king pins, are pivoted instead, the spring housings from which the wheels swing vertically at the ends of strong horizontal arms. Radius rods, below the wheel support arms, also pivot on the spring



housing and the brake flange plate, preventing rotation of the latter.

This suspension, in combination with the rigid "YK" frame construction, permits each front wheel to follow the irregularities of the road, whether they be chuck holes or raised obstructions, without imparting a like movement to the frame, body and passengers.

With conventional spring suspension, it was necessary to use very stiff front springs, in which the load build up per inch of deflection was relatively high, to provide steering stability. This naturally transmitted road shocks to the frame and caused the frame to twist upward or downward at its front end, following the direction of wheel movement thru the action of the very stiff springs. The new, independent wheel suspension, however, permits the use of soft, low rate springs and the retention of steering stability, because the steering connections are held in a fixed position vertically relative to the frame, regardless of the vertical position of the wheels. Thus the front and rear spring deflection rates may be determined strictly on a basis of load and ride requirements, providing comfort for the rear seat passengers at least equal to that enjoyed by the driver and front seat passenger. The improved riding qualities are present at all speeds and under all road conditions, but the greatest improvement is noticeable at high speeds. The built-in steering stability is most noticeable when driving over very rough roads or thru loose gravel.

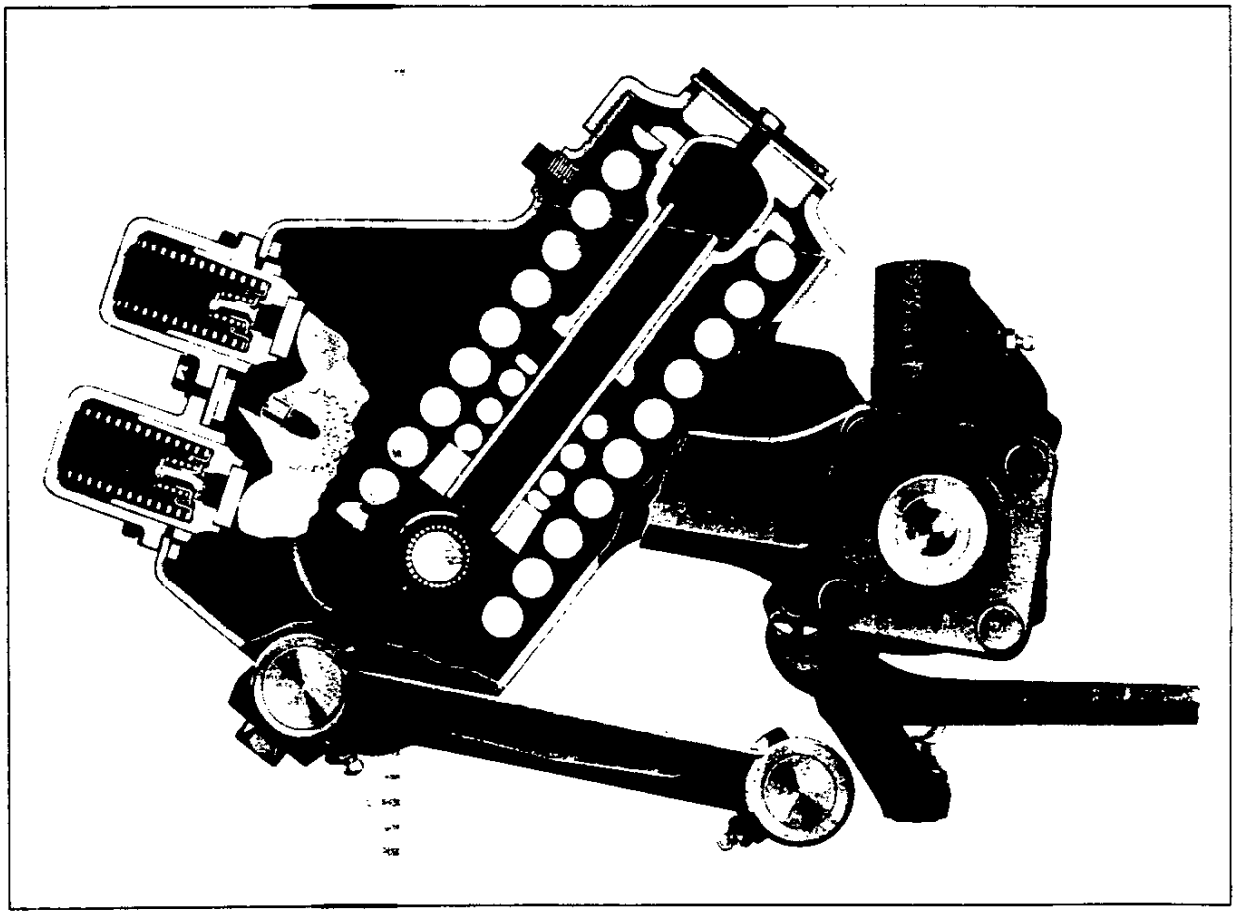
In design, the front spring unit is neat, compact and efficient. The housing is stamped in two halves, securely butt welded along the oblique center line of the cylindrical portion. The rear half terminates in a rectangular drawn arm to which the forged steering knuckle is butt welded. The king pin is locked securely in the single Elliot type knuckle. Needle bearings in the upper and lower support bosses reduce king pin friction to a minimum. A high grade ball thrust bearing is assembled between the steering knuckle and the upper support boss. The combination of these needle bearings and the ball bearing reduces the friction of both radial and thrust loads, insuring free and easy steering. Provision is made for periodical lubrication of the needle bearings and the thrust bearing.

At the bottom of the steering knuckle forging, provision is made for mounting the steering arms on a large diameter taper, keyed to proper position and drawn into the taper by large castle nuts locked by cotter pins. The steering arms are strong rectangular section forgings of alloy steel with balls riveted at their ends on which the steering tie rod and drag link seat. This arrangement of the knuckles and their arms completely isolates the steering control from vertical wheel movement. The steering knuckles, being an integral part of the spring housings, pivot the entire wheel and housing mechanism about the king pins which are rigidly attached to the frame.

At the forward part of the housing, heavy bosses are welded into the side walls, form-

ing supports for the heavy wheel support shaft. Needle bearings at each end of this shaft insure extremely free and easy rotation under all conditions of loading and position. The middle portion of the wheel support shaft is splined for the attachment of a three-armed lever, which is positioned laterally on the shaft by a large diameter screw dowel, the head of which fits closely in holes in the shaft and lever.

The wheel support shaft lever is a strong drop forging of alloy steel carefully heat treated for toughness of the core and hardness at the wear points. This lever combines two arms at the forward side for shock absorber operation and a strong hooked arm at the rear to support the springs. At the spring support arm, a large hardened pin, mounted on needle bearings, passes thru the lever eye. The flattened ends of the pin bear in a strong steel collar, into which a hardened tubular guide is pressed. This tube extends up thru the center of the unit, bearing in a long sleeve at the upper end. A spherical seat is pressed in the top of the sleeve. A large stamped cover is threaded over the outside of the housing at the upper end, seating securely on a metallic gasket. The front wheel load is carried by two heavy coil springs in each unit. Both of these springs are coiled from high-grade spring steel wire, which permits of much more accurate control than the conventional leaf type springs. The larger, outer spring builds up pressure at the wheel at a rate of approximately 115 pounds per inch of travel thru a range of 3-5/8 inches of wheel travel below its normal position to 1-7/8 inches above normal position. Thru the remainder of the wheel travel range of one inch upward, the small inner spring is compressed, building up the pressure at the wheel at a rate of approximately 540 pounds per inch. Both inner and outer springs bear on the lower seat and the upper sleeve. In the cover at the

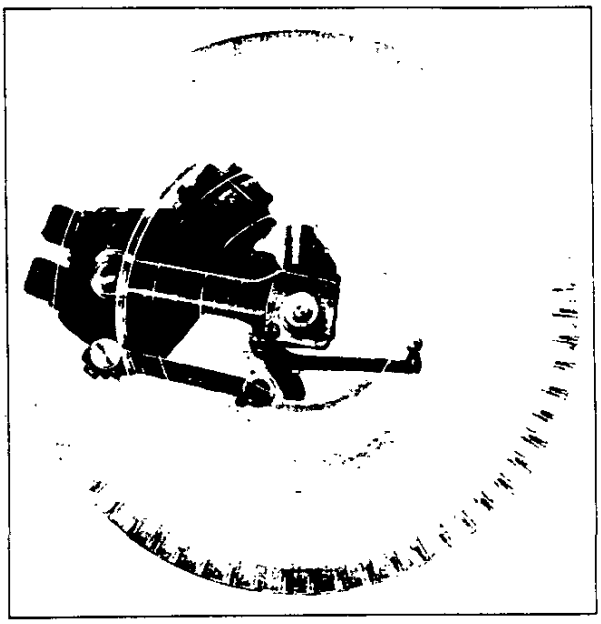


top of the housing, a threaded plug having a spherical seat is screwed down to bear on the mating spherical stamping in the top of the guide sleeve. This threaded plug permits adjustment to compensate for variations which affect the car height. When the proper adjustment is attained, the plug is locked by a stamped lock plate which engages slots in the plug and cover and is secured by a bolt and lockwasher.

At the front of the spring housing, two shock absorber cylinders are bolted. The upper one cushions and retards the upward travel of the wheel and the lower one cushions and retards the downward travel. While these shock absorber cylinders are considerably different from those used in conventional shock absorbers, the pistons, valves and springs are exactly the same as those which have performed so satisfactorily in conventional units.

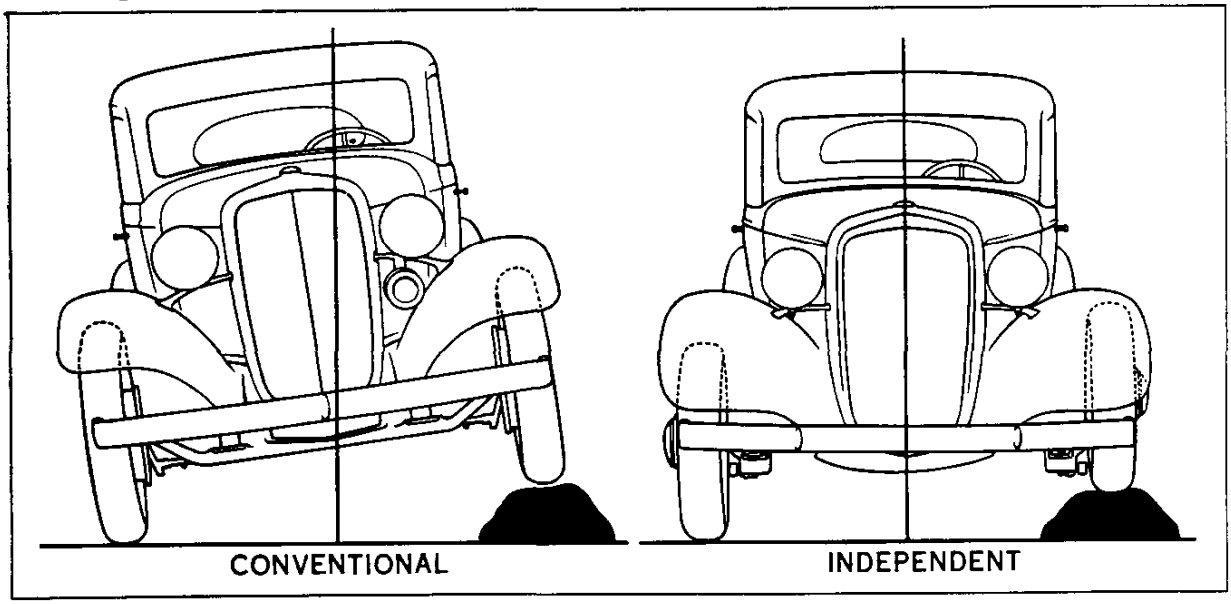
On the outer end of the wheel support shaft, a heavy forged arm is pressed on to tapered serrations under heavy pressure, after which the end of the shaft is peened over to make a definite and permanent attachment. Packing glands are provided at both ends of the wheel support shaft to prevent leakage of the fluid with which the entire housing is filled. This fluid is of the proper viscosity for shock absorber operation.

The wheel spindle is attached at the rear end of the sturdy forged wheel support arm by four large rivets. The support arm is drop



forged from alloy steel heat treated for strength and toughness. It is of "I" section with a thick web and wide flanges.

The brake flange and anchor plates are mounted on a hub, supported on a bushing and oscillating on the spindle as the wheel moves upward and downward thru an arc at the end of the wheel support arm. The bushing flange and a bronze washer take the end thrust. The wheel hub and brake drum are mounted on the spindle with two wheel ball bearings as in a



conventional job.

It is obvious that the rotating tendency of the brake flange plate must be prevented. To this end a strong, forged, "I" section radius rod is pivoted from the bottom of the spring housing and the brake flange plate, setting parallel to the wheel support arm. This maintains the proper geometrical relation between the spring unit and the brake mechanism. The radius rod swings on large diameter threaded pivots at each end. These pivots operate much like the threaded spring shackles permitting free oscillation with very slight lateral movement.

From the foregoing description of the design and operation of the new independent front wheel suspension, it should be quite evident that with this new and revolutionary design, the wheels are free to move upward and downward, following irregularities of the road surface without imparting a like movement to the frame. It should also be evident that the shock of such wheel movement is greatly reduced due to the lower spring rate and that even the slight remaining shock is adequately controlled in both directions by the double-acting shock absorbers. It should further be evident that with this new suspension, steering control is entirely separated from the effects of vertical wheel movement.

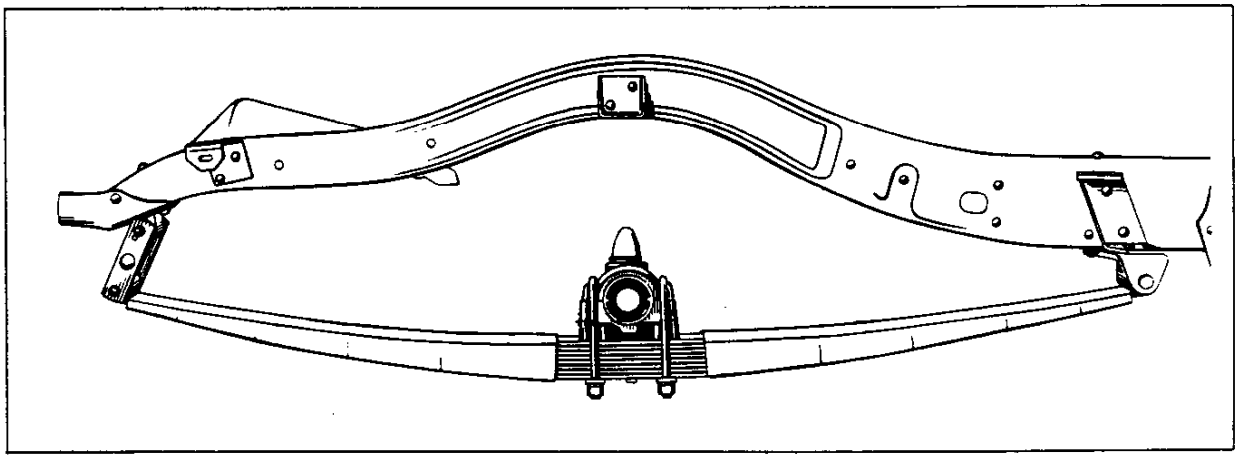
COMPARATIVE SPECIFICATIONS

	1933	1934
Front wheel suspension	Conventional	Independent
King pin diameter	.734	.866
King pin bearings	4 bronze bushings	128 needle bearings
Number of balls in king pin thrust bearing	14	15
Steering arm attachment	2 bolts	Taper, key, nut and cotter
Front spring initial rate per inch	345#	115#
Front spring type	Flat leaf	Round wire coil
Front shock absorber type	Separate unit single acting	Built-in double acting
Compensation for car height variation	None	Threaded plug
Front spring mounting bearings	Bronze bushings	Needle bearings

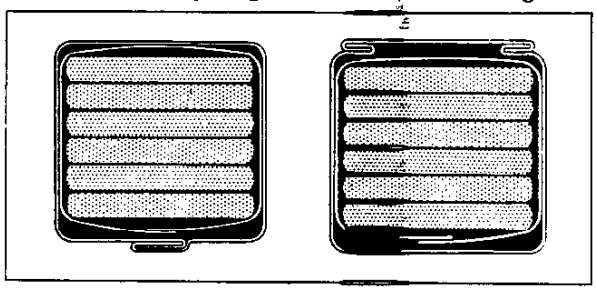
REAR SPRING SUSPENSION

At the rear end of the chassis, the conventional semi-elliptic springs with shackles at the rear end are retained. However, for the various body types, the rate and grading of the springs are revised to conform to the changed load conditions and to cooperate with the new type of front suspension. The mountings of the rear springs are also greatly improved.

The rear springs for the Coach and Town Sedan are lighter and have a lower deflection rate to improve the riding qualities in conformity



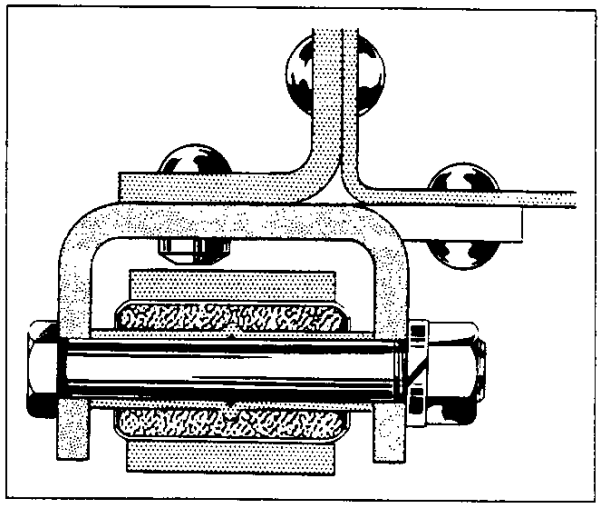
with the load requirements. The springs for the two window coupe are heavier and have a higher deflection rate for the same reason. The rear springs on all closed models are equipped with metal covers as standard equipment. These covers are made of thin gauge terne plate in two halves, each extending from the spring seat to the spring eye. They are jointed at four points to flex with the spring. Before assembling the cover, the spring is coated with grease about 1/8 inch thick. Over this coating the cover is assembled with a canvas lining next to the spring. The canvas lining has



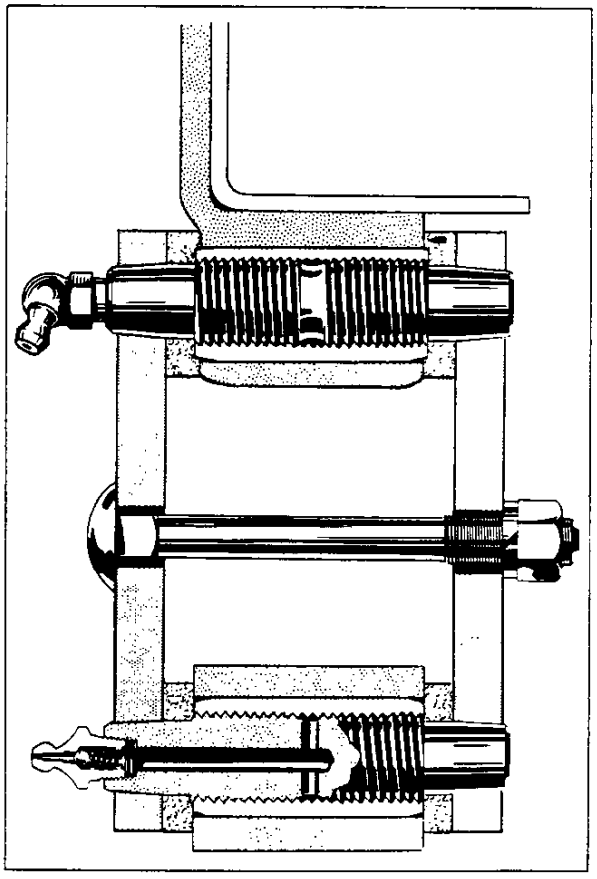
a strip of felt sewed at each end acting as a seal to retain the lubricant. The metal cover, with its liner, fits snugly over the spring and is permanently joined by a lap seam, as shown in the above illustration. These covers improve the riding qualities by keeping the spring rates uniform, maintaining constant lubrication and excluding water and dirt from the joints between the spring leaves. Experience proves that the initial supply of lubricant is effective for a period of at least 1-1/2 to 2 years. When additional lubricant is required, a hole may be punched in the cover and more grease forced in.

The three upper spring leaves are clipped together with improved positively locking clips. These clips surround the three leaves on all sides and have their ends locked together on the bottom by stamped lock springs which snap over projections on the clips. With this type of rebound clips, "fanning" of the spring leaves and the resulting strain on the spring cover is prevented.

The front ends of the rear springs are rubber mounted in "Inlox" bushings, which consist of an internal steel tube having a bead rolled in the center, a tubular outer retainer having rounded ends and rubber securely moulded between these two steel members. The bushing

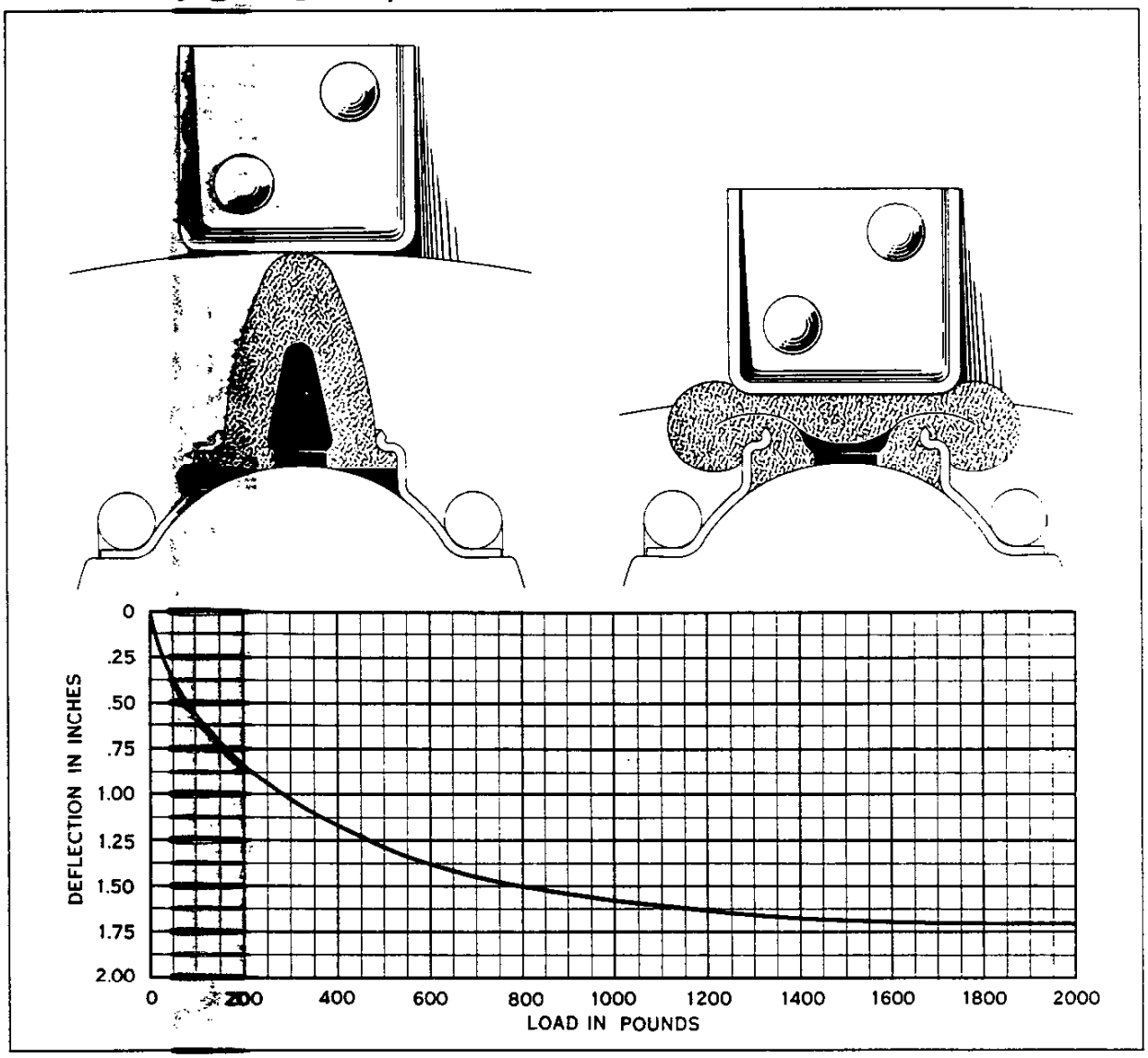


unit is pressed into the spring eye and clamped at the ends of the inner tube in the spring hanger. Both metal members of the unit are held securely in position, all lateral and oscillating motion being taken in the rub-



ber which effectively insulates the spring from the bolt and hanger. Under side loading the lateral flexibility of the rubber relieves the spring leaves of twisting strains. With the elimination of relative motion between metal parts, the need for lubrication is also eliminated, permitting the use of simpler spring bolts.

The rear spring shackles are of the threaded type. In this design, threaded sleeves are pressed into the spring hanger and into the rear eye of the spring. Threaded pins with tapered ends are screwed into the sleeves with each end projecting an equal distance. The shackles are plain, heavy gauge stampings with tapered holes which fit tightly on the tapered ends of the pins. A draw bolt, having a square shoulder under its round head, engages each outer shackle to prevent rotation of the bolt. A nut at the inner side of each inner shackle serves to draw both inner and outer shackle members up snugly on the pins. The pins are drilled from their outer end to the center where a cross hole connects it with the threaded portion. Lubrication fittings are assembled in the end of each central hole to provide for lubrication of the threads. Cork washers are as-



sembled at each end between the shackle and the hanger, and between the shackle and the spring, to retain the lubricant in the threaded portion.

In action, this shackle, being tight on the pin, oscillates it in the thread. Since the angular movement of both the pins in any shackle is practically the same, both screw in and out of their sleeves an equal and very slight amount. This design uses all of the relatively large thread surface for bearing, reducing wear to a minimum and insuring long life of the bearing members. With the increase in bearing surface and the elimination of the oscillating movement at the tapered bearings, side sway is greatly minimized. This also reduces wear and its attendant noise. The sleeves and pins are hardened for durability and the pins are cadmium plated on the threaded portion to prevent rusting.

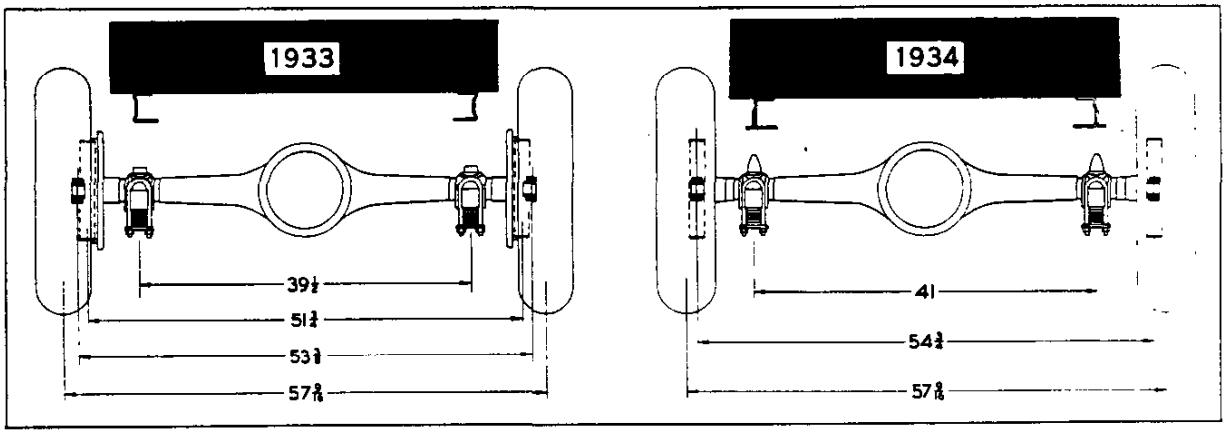
The rubber bumpers, which are assembled over the rear spring seats, are greatly improved in design. As in previous models, these bumpers cushion the shock when the springs deflect sufficiently to permit contact of the bumpers with the frame side rails. Because of their design and material, these bumpers provide a gradual and progressive build up of resistance to vertical frame movement thruout the initial compression of the bumper. They eliminate shock when the springs deflect fully to bumper position. The accompanying diagram shows how the resistance builds up in relation to movement.

COMPARATIVE SPECIFICATIONS

	1933	1934
Rear spring rate (Coa.,Tsed.,Pch)	130# per inch	117# per inch
Rear spring thickness (Coa.,Tsed.,Pch.)	2.072	2.009
Rear spring rate (Cpe 2)	98# per inch	105# per inch
Rear spring thickness (Cpe 2)	1.925	1.708
Rear spring covers	None	Flexible pressed steel, canvas lined
Rebound clip type	Bent over	Locking
Rear spring front bushing	Bronze	"Inlox" rubber
Rear spring front bolt lubrication	Alemite fitting	None required
Rear spring shackle type	Self-adjusting, taper-seated	Threaded

REAR AXLE

The 1934 Master rear axle retains all of the features which have proved so satisfactory during the 1933 season. In addition, the rear spring seats, the wheel bearings and the brakes are spread farther apart, while the tread of 57-9/16 is maintained. The spring seats are spread to a center distance of 41 inches, an increase of 1-1/2 inches. The wheel bearing center distance is increased 1-3/8 inches and the brakes are located



directly in line with the wheel bearings on 51-3/4 inch centers, a spread of 3 inches. This reduces the overhang of both the wheel load and braking load from the bearing center, improving the ride and operation of the brakes and reducing the stress due to the overhanging loads. The increased width between the brake flanges provides additional space for the new body structure.

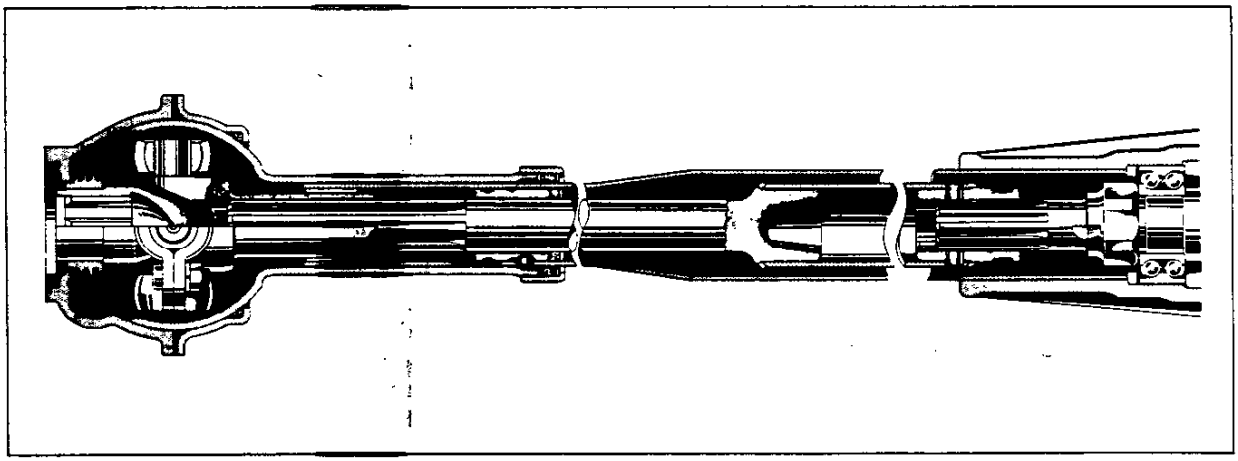
The axle housing cover is stamped from heavier gauge stock, providing greater strength, preventing cover breakage and giving more reinforcement to the housing.

The propeller shaft is of tubular design, which increases its rigidity, due to its larger diameter. Because of its tubular section, the weight is reduced with a consequent reduction in the tendency to "whip" at high speeds. At its front end, a stub shaft of solid alloy steel is pressed into the tubular member and automatically arc welded in place. At the rear end, an internally splined coupling of alloy steel is also pressed into the tube and automatically arc welded. After welding, the machining is completed and the shaft is tested torsionally to insure the efficiency of the welded joints. They must be capable of withstanding a twisting load of 12,000 inch pounds.

The splined coupling at the rear end of the tube fits snugly over the spline of the drive pinion, to which it is secured by a pin passing thru both parts and riveted over at its ends. This prevents longitudinal movement of the propeller shaft on the drive pinion.

At the front end of the torque tube an additional hard bronze bushing is provided, which bears on the shank of the universal joint yoke to insure alignment and to prevent whipping at high speeds. The forward bearing lock sleeve on the pinion shaft is of heavier section and is treated to give greater strength.

The axle shafts are made of high-grade alloy steel which produces a stronger shaft, due to its increased core hardness. The wheel bearing is more securely mounted on the shaft by means of a heavier press fit and increased length of the inner race.



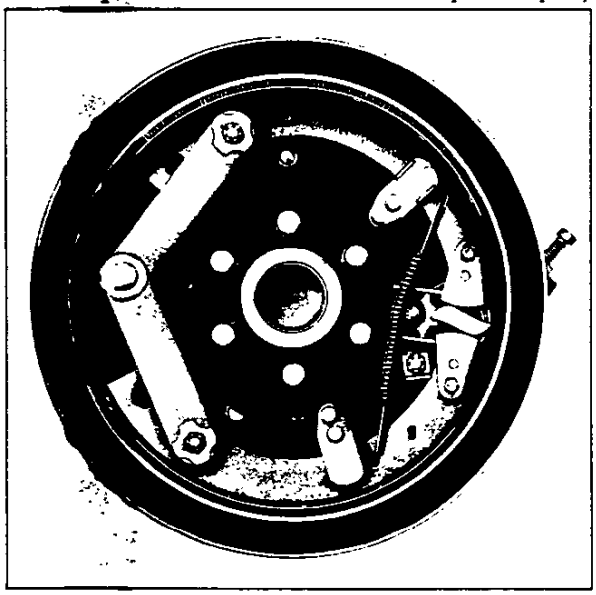
COMPARATIVE SPECIFICATIONS

	1933	1934
Distance between spring seats	39-1/2	41
Brake center distance	51-3/4	54-3/4
Distance between wheel bearings	53-3/8	54-3/4
Axle housing cover gauge	.065	.094
Propeller shaft type	Solid	Tubular
Propeller shaft size	1.057 diameter	1.70 diameter 3/32 wall
Propeller shaft coupling pin diameter	1/4	5/16
Torque tube front bearing	None	Hard bronze

BRAKES

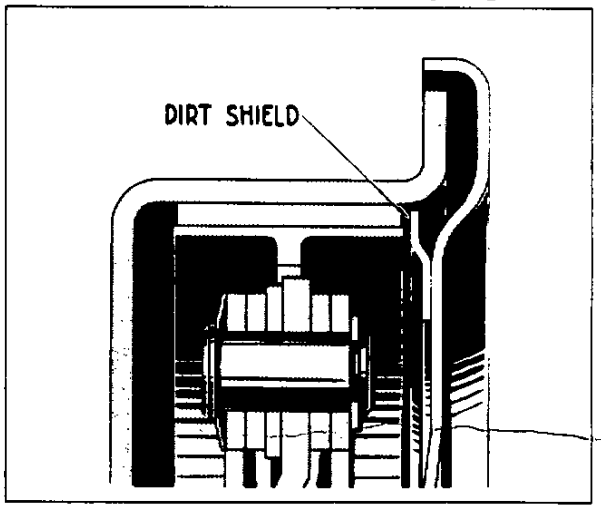
On the 1934 Master models, the front and rear brakes are of the double-articulated shoe type, with both the upper and lower shoes capable of moving on links pivoted at the anchor plates. The additional length of contact surface, produced by the increase in the length of the lower shoes, provides more uniform support for the drums, prevents undue distortion under heavy braking pressure, as well as increasing the braking efficiency. The thermal condition is also improved, because with increased lining contact, the heat generated by braking friction is less concentrated and hence is dissipated more readily. The linings are specially manufactured of improved material which insures more uniform performance under all climatic conditions, eliminating the tendency of the brakes to grab or snatch in damp or cold weather. The linings are moulded to the curvature of the shoes, eliminating the distortion due to after-forming. The greater length of the lower linings increases the total effective braking area to 170.2 square inches.

The articulating links are flat and of thicker stock, providing increased bearing area. The four links of each brake straddle the anchor plate at their central pivot point. The upper links are assembled next to the plate, with the lower links straddling them. At the central pivot point, a light spring washer exerts pressure endwise of the pivot pin, maintaining contact between the parts. A shim is provided, when necessary, to prevent rattle. Both upper and lower shoes are guided, as heretofore, with light tension springs at the upper guide to prevent cocking of the shoes.



The retracting springs, which keep the roller sectors in contact with the cams, are built up of a coil member having the end coils wound to a taper, and a separate hook member pivoting in each end. This insures more accurate alignment of the hook ends.

The central portion of the spring bends slightly around an extension of the centralizer pivot, which extends thru the anchor plate for that purpose. This insures the proper direction of the spring tension. The geometry of the brake mechanism is designed for perfect operation. A heavy four-lobed spring washer



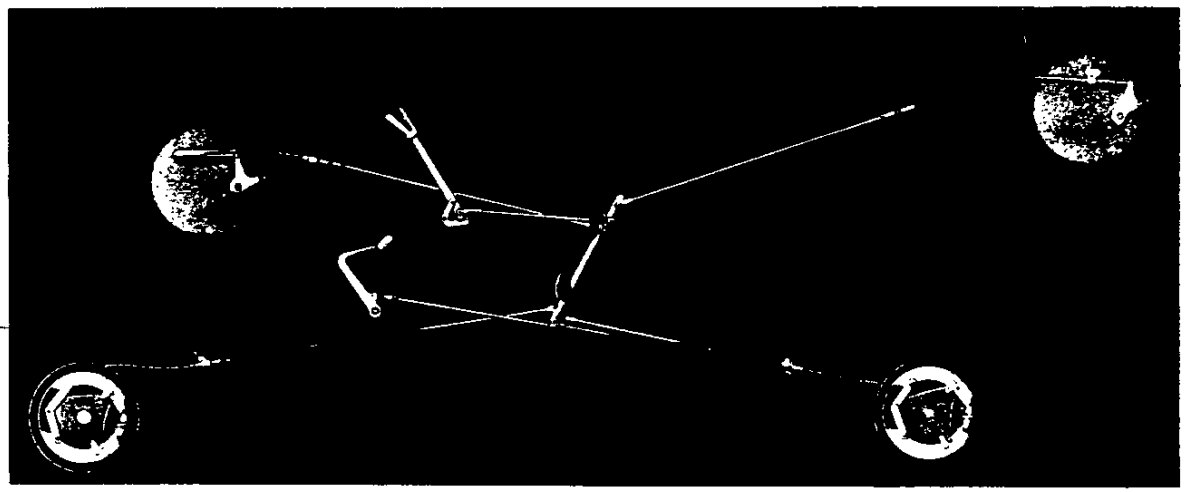
is added at the link pivot of each shoe to maintain the proper friction at the articulated point. The pivot permits the shoe to adjust itself to any change of the co-efficient of friction when braking. The friction in the spring washer maintains this setting, so that when the brakes are applied again, the shoes make proper contact with the drum. This friction also insures that the shoe will pivot at the anchor pin only, thus preventing any drag when the brakes are released. The roller sectors are redesigned by an enlargement of the rolling surface. This larger surface is sufficient to provide for the entire roll of both shoes. While some of this surface is unnecessary, it obviates the

need for right and left hand shoes. This is an important economic feature from a service standpoint. Increased bearing area at the cam shoulder is provided by the full circular collar, which prevents lining powder from entering into the cam bearing. Another important factor in the continued uniform brake performance is the addition of a stamped steel shield fitting closely to the drum, which prevents dirt from entering the brake mechanism.

The new position of the brake drums, already described, permits a reduction in the drum offset. This, combined with the improved brake mounting directly in line with the wheel bearings, reduces deflection of the brakes and hence increases their efficiency.

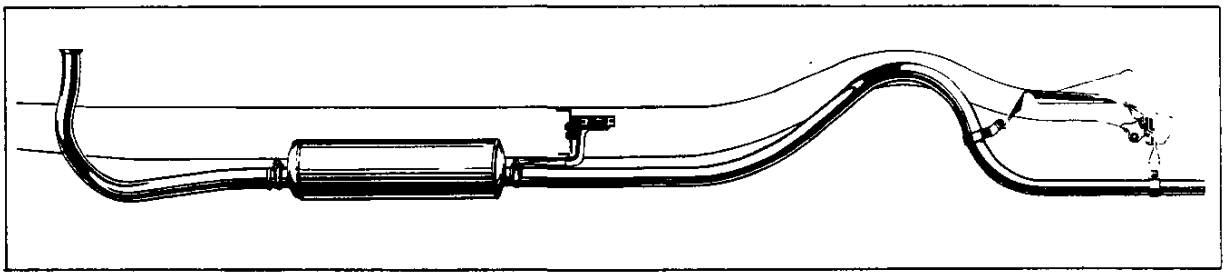
The brake linkage is much simpler and more efficient. It is of the diagonal, full cable control type with a short, rigid cross shaft for both service and parking brake operation. The cross shaft is larger in diameter and shorter, with the six levers, which connect to the foot pedal, the hand lever and the four brakes, securely welded in place. It is rigidly mounted in self-aligning spherical bearings on the sub-frame structure. This strong construction and rigid mounting increases the efficiency of the brakes by reducing deflection to a minimum and so conserving pedal travel. Both braking systems are independent in operation, but the hand brake may be applied to augment the effect of the foot brake system, due to its provision for excess travel beyond the range of the foot brake operation.

The rear brakes are now operated thru cables similar to those operating the front brakes. This insures uniform action of all four brakes and entirely eliminates the effect of axle movement on brake action. The connec- from the pedal and hand brake lever to the cross shaft and from the cross shaft levers to the points where the cables are mounted on the frame are solid rods with strong clevises.



COMPARATIVE SPECIFICATIONS

	1933	1934
Lower shoe length	6-3/16	12-7/32
Lower shoe operation	Pivoted	Articulated
Link thickness	1/8	5/32
Dirt shield	None	Pressed steel
Brake lining type	Semi-moulded flat	Moulded curved
Total brake lining area	128.4 sq.in.	170.2 sq.in.
Number of brake cross shafts	2	1
Brake cross shaft diameter at bearings	7/8	1-1/8
Rear brake connections	Rods	Cables



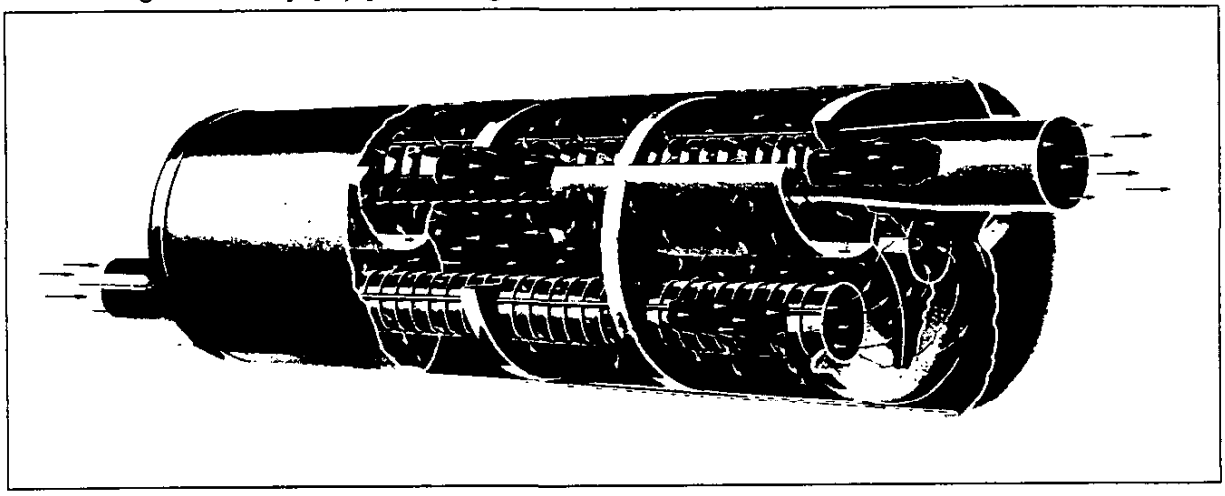
EXHAUST SYSTEM

The design and mounting of the improved 1934 Master exhaust system were developed in connection with the more rigid frame and the more powerful Marine head engine with its improved cushion-balanced mountings. Each of these units must be taken into account in the design of a muffler, its connecting pipes and their means of attachment, because each contributes some important factor in the important overall problem of silencing exhaust gases with minimum back pressure and without imposing undue strains on the joints and connections. In the new exhaust system, these results are attained by careful attention to the details of design, and by exhaustive tests with the related units.

The exhaust pipe is smaller in diameter and is made of heavier gauge tubing with the same type of integral, conical seat at the manifold outlet which has proved so satisfactory in the past. This thicker and smaller pipe is much less susceptible to internal vibrations and hence eliminates any "tinny" noise which might be caused by the vibration of thinner metal. The thicker metal increases the physical strength of the pipe, preventing cracks and breakage. At its rear end, the exhaust pipe fits snugly into the muffler inlet tube and is clamped very securely by means of a sturdy "U" bolt and a stamped steel saddle clamp.

The new improved muffler is of the diffusion type, larger in diameter and somewhat shorter. It consists of three tubes, with twelve surrounding chambers and a common reversing chamber at each end. These elements are so combined that they dampen the vibrations caused by engine pulsations in the exhaust gases, permitting the latter to leave the muffler quietly and freely with a minimum of back pressure.

The outer shell of the muffler is of sheet steel, rolled to form a double wall with the joint securely welded. This deadens any "tinny" sound which might be caused by vibration. The muffler heads are drawn steel stampings securely attached to the shell at each end by rolled lock seams. Five stamped steel baffle plates are welded to the outer shell, producing six separate chambers. At the front end the inlet pipe is butt welded to a flange stamped in the front baffle. At



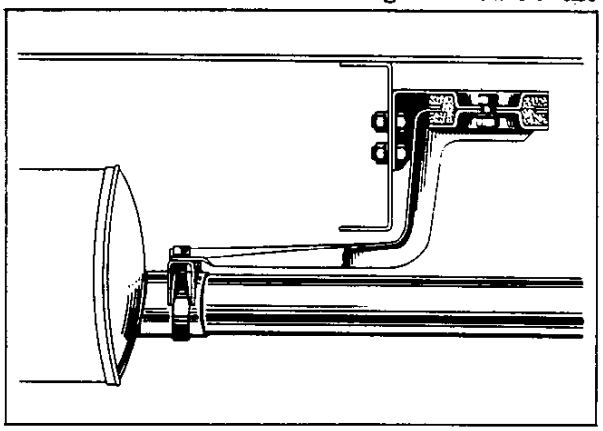
the rear end the outlet pipe is similarly attached to the rear baffle. In each of the four inner chambers a partition is welded, dividing it into three parts, with 12 small holes connecting each section. Three tubes, each having 45 louvres with their edges flaring outward, extend from the front baffle to the rear baffle, opening into the end chambers. The louvres in the inlet and reversing tubes open in the direction of gas flow, while the outlet tube has its louvres opening against the direction of gas flow.

In operation, the exhaust rushes thru the exhaust pipe and into the muffler thru its tapered inlet tube, passing thru the first or lower louvre tube, crashing against the rear head wall. The force of the flow, the small nozzle-like opening into a large chamber and, above all, the crashing against the wall, causes the gas to expand with great turbulence into the chamber, breaking up many of the noise vibrations. From the rear chamber, the gas seeks the only outlet, which is the mouth of the second or reversing tube. It rushes thru this tube to crash against the front head wall, creating further turbulence. Having thus dissipated all of its vibrations, the gas leaves the front chamber by its only exit thru the outlet tube and thence to the tail pipe.

The twelve chambers are all interconnected by means of their perforations and the louvres in the walls of the tubes. As the exhaust gas enters the muffler, some of it passes thru the louvre slots into the chambers, breaking up the vibrations in much the same way that water squirted from a hose nozzle thru a screen loses its force and velocity. The chambers surrounding the tubes act as dead pockets into which the gas expands, further eliminating noise vibrations. In each set of three chambers, the gas enters the first two chambers from the inlet and reversing tubes, breaking up more of its diminishing vibrations as it swirls around, forcing itself thru the perforated walls and mixing with the gas in the other chambers. The reversal of the louvres in the outlet tube prevents the main flow of the gas from entering the last four chambers. Instead, it continues thru the tube to the tail pipe, being joined by the gas from the last four chambers.

After this cycle of crashing, expanding and straining, the gas enters the tail pipe quite free from vibrations and consequently relatively free from noise. With this improved, diffusion type of muffler, the velocity of the gas is reduced very little, if at all, and its real purpose is to separate the vibrations from the gas.

The tail pipe is larger in diameter to reduce back pressure and is much longer. The exhaust system is mounted at four points, the forward mounting located at the exhaust manifold joint, the second mounting at the rear of the muffler, the third mounting attaching the tail pipe at its kickup to the rear cross member and the rear mounting located at the



rear end of the tail pipe. The mounting at the rear of the muffler consists of a channel section saddle welded to an angle section bracket. A "U" bolt clamps the tail pipe around the muffler outlet and up to the saddle, insuring an extremely rigid attachment. The bracket extends toward the rear, attaching to a flanged bracket which bolts to the second cross member of the frame. A thick soft rubber grommet is snapped into a large elongated hole in the support bracket. The grommet is clamped to the cross member bracket by means of a stamped retainer and thru bolt. This completely insulates the muffler and its support bracket from the frame and provides just sufficient flexibility to compensate for the necessary movement of the units. The mounting of the tail pipe kick up to the rear cross member is the same in principle as the former mounting at this point. It prevents the exhaust system from surging forward on sudden stops. The mounting at the rear end of the tail pipe is accomplished by a single clamp bracket also insulated from the frame by a rubber grommet.

COMPARATIVE SPECIFICATIONS

	1933	1934
Exhaust pipe outside diameter	2-1/16	2
Exhaust pipe gauge thickness	.043	.062
Exhaust pipe clamp type	Strap	"U" bolt and saddle
Muffler type	Resonance	Diffusion
Muffler diameter	5	6
Muffler length	29-11/16	23
Tail pipe outside diameter	1-3/4	1-7/8
Tail pipe length	59-11/16	79-1/4

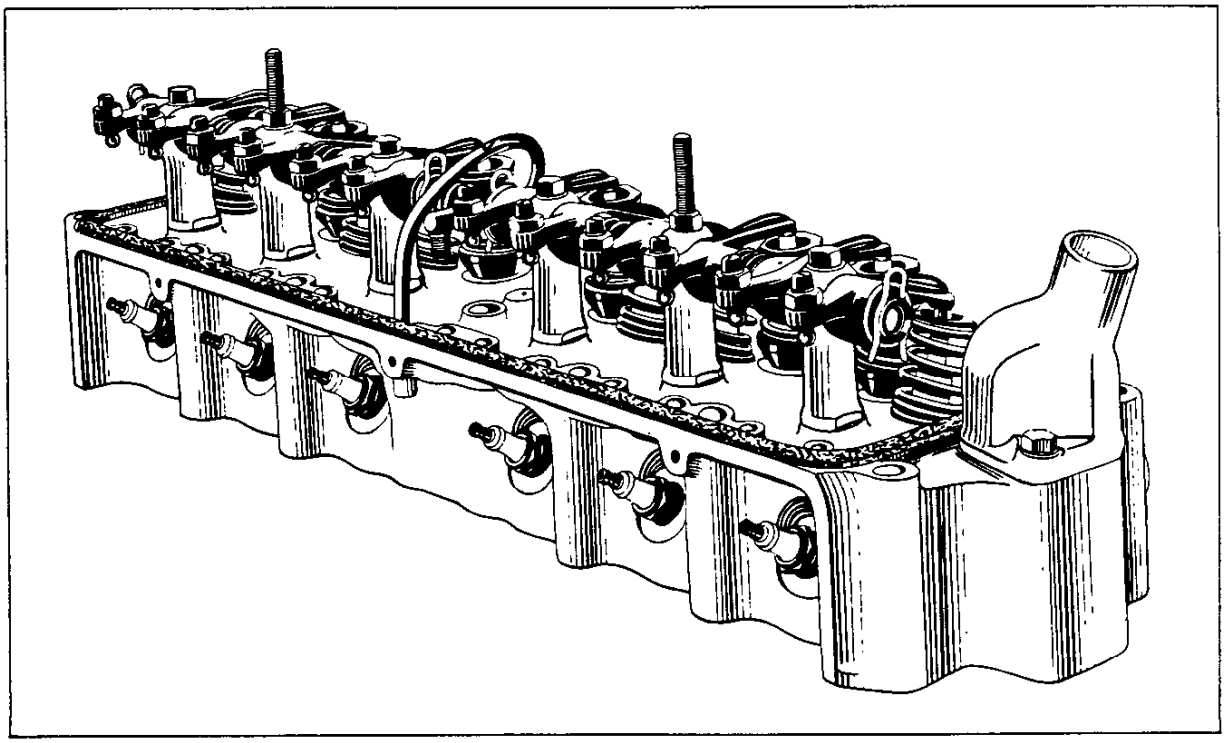
ENGINE

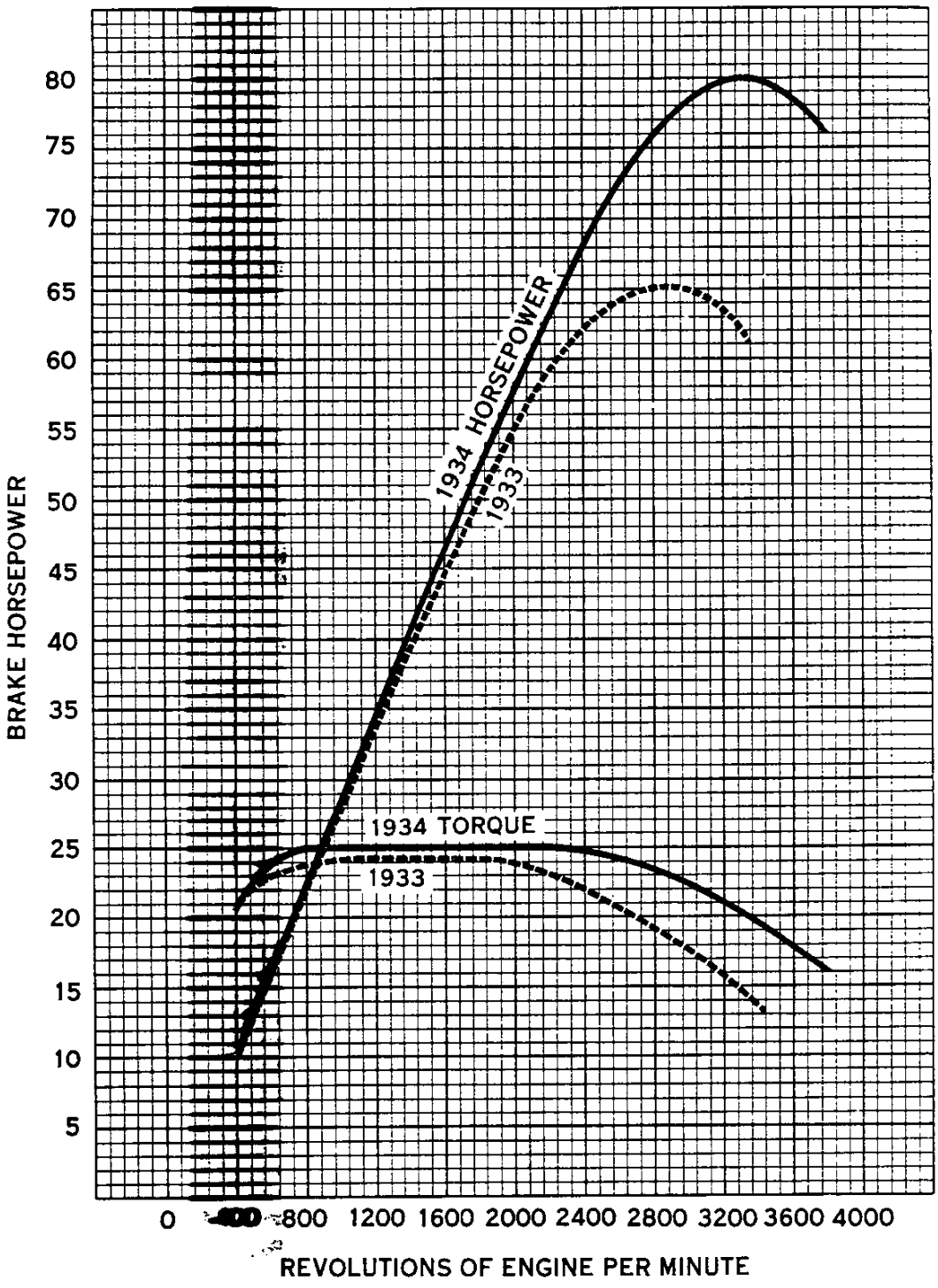
The 1934 Master engine is more powerful, smoother, quieter and more economical. While this engine is not new, as a whole, it incorporates several unique design features and many refinements.

The 3-5/16 bore and 4 inch stroke are retained, but with the same displacement of 206.8 cubic inches more power is developed thruout the speed range, due principally to the improved head design and increased valve size. At 1000 RPM, 28.5 horsepower is developed, increasing to 58 horsepower at 2000 RPM and reaching a peak of 80 horsepower at 3300 RPM. The torque is also increased thruout the speed range. The maximum torque of 150 foot-pounds is delivered thru a speed range from 800 RPM to 2200 RPM.

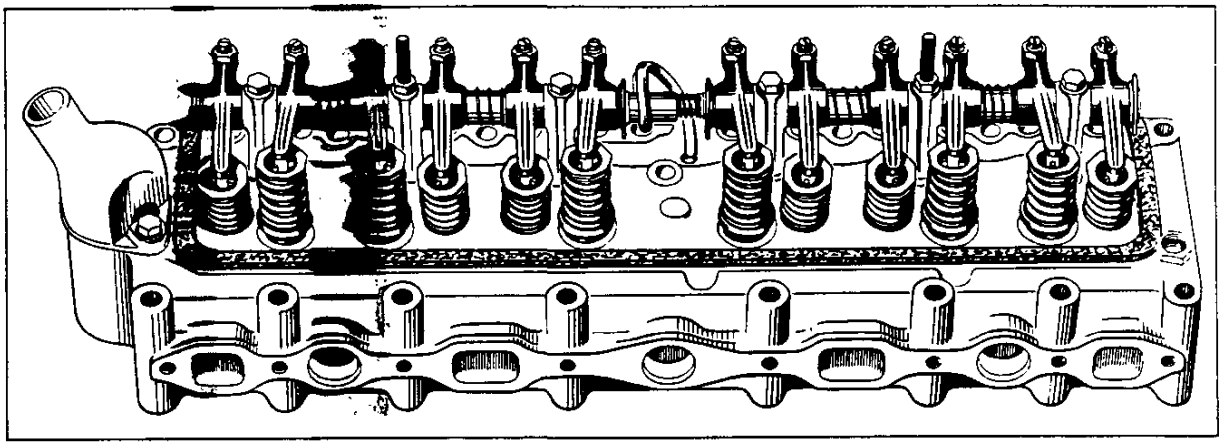
CYLINDER HEAD

One of the most important parts in any overhead valve engine is the cylinder head. It contains not only the combustion chambers and spark plugs, but the valves, inlet ports, exhaust ports and the necessary water passages to maintain the proper temperatures of all these important parts. For this reason, the Chevrolet cylinder head is given a great deal of attention from a standpoint of design, development and test. The 1934





COMPARISON OF POWER AND TORQUE



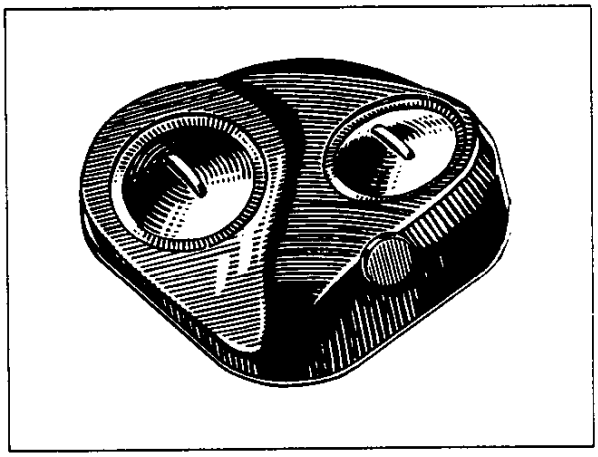
head incorporates design features which have never before been built into a commercial head. The possibilities of this type of head design were discovered three years ago when the Chevrolet engineering organization was asked to design a valve type engine with very small piston displacement and which was required to deliver exceptionally high power. This naturally demanded valves of larger diameter than could be placed in the available space in the conventional manner. The design which accomplished the desired results paved the way for the 1934 Chevrolet Marine head. It is now made available to the public with a background of intensive design and laboratory development, combined with thousands of Proving Ground test miles over a period of three years.

In the past, two outstanding compromises in combustion chamber design have been accepted by automotive engineers as being necessary and unavoidable:-

First:- It has always been believed that detonation and shock control require opposite treatment. That is, when corrections in combustion chamber shape were made to reduce detonation, it has been assumed that the shock characteristics must necessarily become worse.

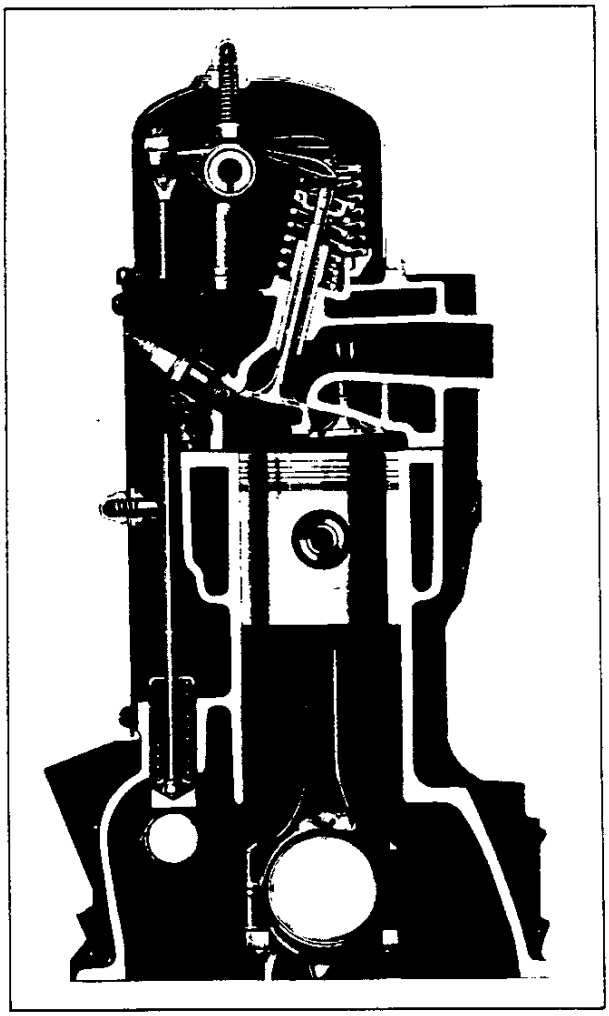
Second:- It was generally believed that when the heat flow within the combustion chamber is corrected for detonation, by making the head of material having high heat conductivity, power and economy losses were a necessary compromise.

In the Chevrolet Marine head, these compromises are overcome. Detonation is controlled by absorbing the heat from the last gas burned. Power and economy are saved by not absorbing heat from the gas which is burned first. This is accomplished by the arrangement of the valves as shown in the following illustration, which represents a plaster cast of the combustion chamber cavity.



It has been conclusively proved that in an internal combustion engine the flame travels from the spark plug gap in ever increasing zones, substantially spherical in shape. The relation of the distance the flame travels to the volume of the gas burned in a given interval, determines the rate of pressure rise. To be smooth and free from both knock and shock, this pressure change must be gradual and uniform.

In the Chevrolet Marine head, the exhaust valve is located relatively close to the spark plug, in the area of the first gas burned. The inlet valve is located at the opposite side of the combustion chamber, farthest from the spark plug, in the area of

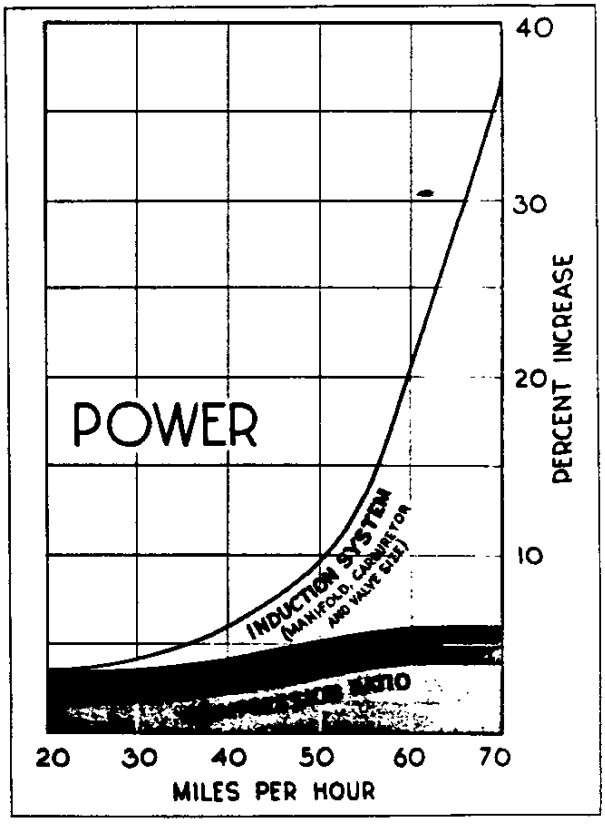


the last gas burned. This serves to control the mixture temperature by allowing the excess heat to pass from the last unburned part of the charge to the cool inlet valve. Thus the entire mixture is conditioned, because the heat absorption is controlled.

Shock control is made possible with detonation control, because the inlet valve is used as a heat absorber and the need for a clearance space which shortens the effective combustion chamber, as in ordinary heads, is eliminated with its attendant harshness. In the Chevrolet design, the full length of the combustion chamber is available for shock control. These design advantages permit an increase in the compression ratio without the difficulties and harshness which usually accompany such an increase.

In addition to its detonation and shock control, the Chevrolet Marine head has the added advantage of high volumetric efficiency. By volumetric efficiency is meant the relation of the volume of gas entering the combustion chamber to the volume of gas swept by the piston. In other words, volumetric efficiency is a measure of the filling ability of the cylinder.

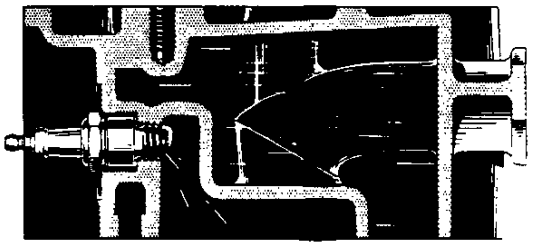
The amount of explosive mixture swept by the piston, traveling thru a certain length of stroke, represents the amount of fuel available. The valving of any engine determines how completely and how effectively the fuel charge is permitted to enter and leave the cylinder. In the Chevrolet Marine head, the valves are large enough and so located that they permit the incoming charge to enter the cylinder, do its work, and leave after its work is done, without restriction, making use of the volume of mixture efficiently and with the least possible disturbance. The following chart evaluates the several factors which contribute to the increased power of the Marine head engine.



The inlet and exhaust ports are also increased in area to insure free, unrestricted flow to the inlet valves and from the exhaust valves, which is also an important factor in attaining high efficiency.

SPARK PLUGS

The spark plugs are located high in the combustion chamber, very close to the exhaust valves. They enter the chamber at an angle



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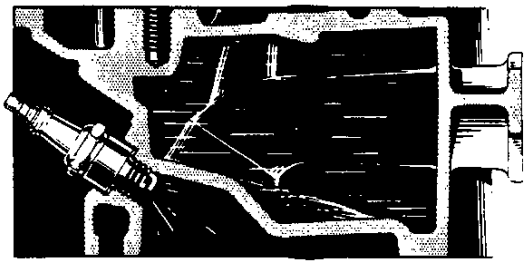
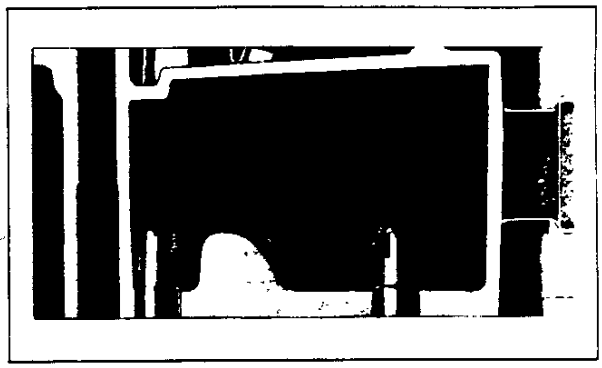


1934

with the spark gap between the electrodes located so that they are always surrounded by fresh explosive mixture at the instant of ignition.

WATER CONTROL NOZZLES

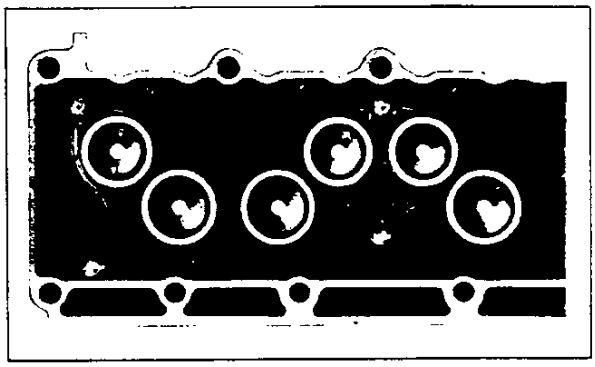
The new Marine head also embodies the results of many years' experience in providing ample water space around the valves and spark plugs in addition to means for most effective delivery and distribution of water. The coldest water in the system is naturally that which has just been pumped back into the cylinder block after circulating thru the radiator. By an entirely new method of distribution control, the coldest water in the system is taken into the cylinder head and directed toward the exhaust valve seats, which are normally the hottest point in the head. This



directional control is accomplished by means of eight small stamped copper nozzles which are pressed into the lower wall of the cylinder head close to the exhaust valve seat walls. These nozzles are of two kinds - one has a single opening and is used at the ends of the head to direct a single stream of water at the single exhaust valves of the end cylinders, and to direct a stream of cold water from the left side of the head between the siamesed exhaust valve seats. The other two nozzles have two openings each. They are located at the right side of the head and direct their water streams directly at the four siamesed exhaust valve seats. Each nozzle has a key drawn longitudinally in its collar to match with corresponding notches in the head to accurately control the direction of the water streams. In addition to directing the flow of relatively cold water to the hot exhaust valve seats, the nozzles also serve to insure better distribution of the bulk of cooling water in the head and to maintain constant circulation.

CYLINDER HEAD GASKET

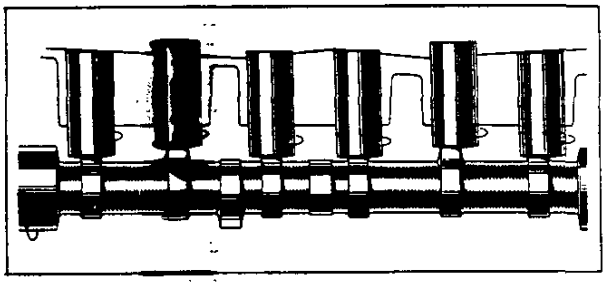
The thickness of the cylinder head gasket is



increased to increase its strength and to facilitate handling. It is made of high-grade asbestos with steel inserts to provide reinforcing strength.

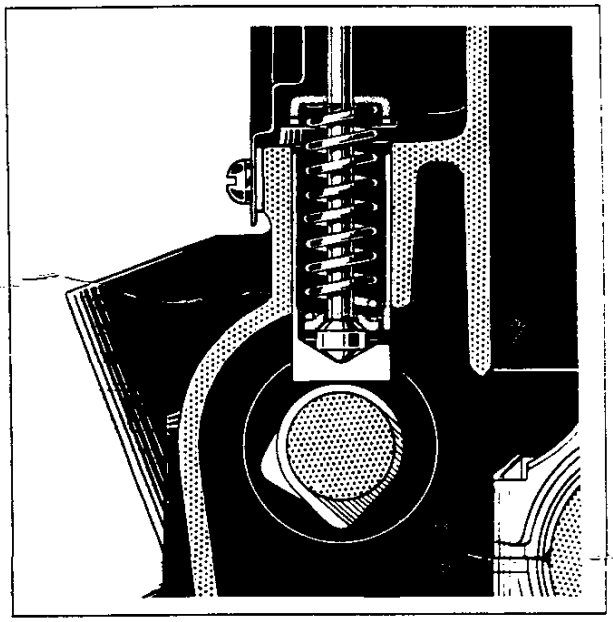
VALVE MECHANISM

The entire valve mechanism has been improved and refined to reduce noise to a minimum and to insure proper valve action. The camshaft diameter between cams is increased to provide greater rigidity with a corresponding increase in the cam base circle diameter. The width of the cams is reduced to 7/16. To insure constant rotation of all tappets in the same direction, the cams are all off-

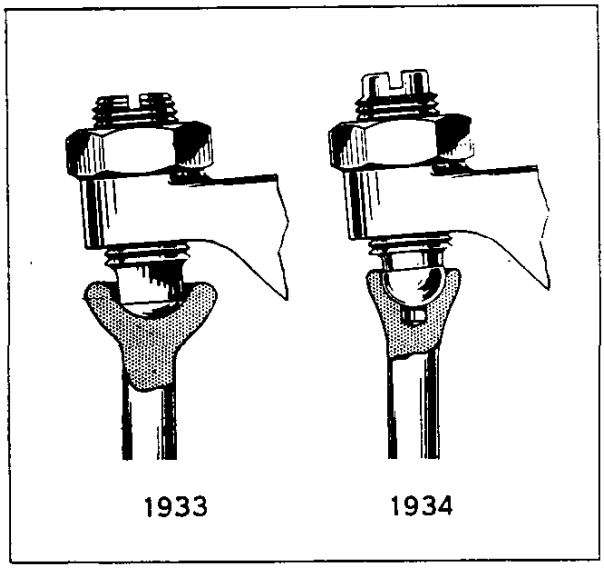


set from the tappet center to a greater amount and toward the front of the engine in each case. The tappet holes in the crankcase are reamed at a slightly greater angle relative to the cam surfaces. The length of the ramp on the exhaust cams is increased, permitting the exhaust valve lash to be increased to .013 when hot. This aids materially in prolonging the life of both valves and seats.

An additional spring is introduced in each valve train. This spring seats on a collar at the lower end of the push rod, while its upper end bears against a retainer stamping bolted to the ledge of the crankcase. Each spring exerts a pressure of 41 pounds between the push rod, tappet and cam surface when the valve is open and 18 pounds when the valve is closed. This spring pressure at the lower end of the valve train maintains constant contact between the operating parts at all speeds and relieves the valve seats and the valve retainer parts at the upper end of the train of some pressure, prolonging their life accordingly. This division of spring load in the valve train is a very important factor in the quiet operation of the valve mechanism and the increased durability of the parts.



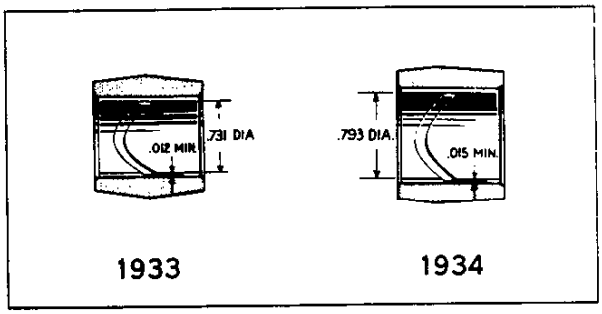
The push rods are of solid bar steel with upset integral ends as heretofore, but much better seating at both ends is assured by the improved quality of the surface finish at seating points. The lower end is larger in diameter with a spherical upper surface to provide a seat for the washer on which the tappet spring rests. At the upper end the spherical cup in which the rocker arm adjusting screw seats is redesigned to fit the screw end more closely. A cavity in the bottom of the cup serves as a reser-



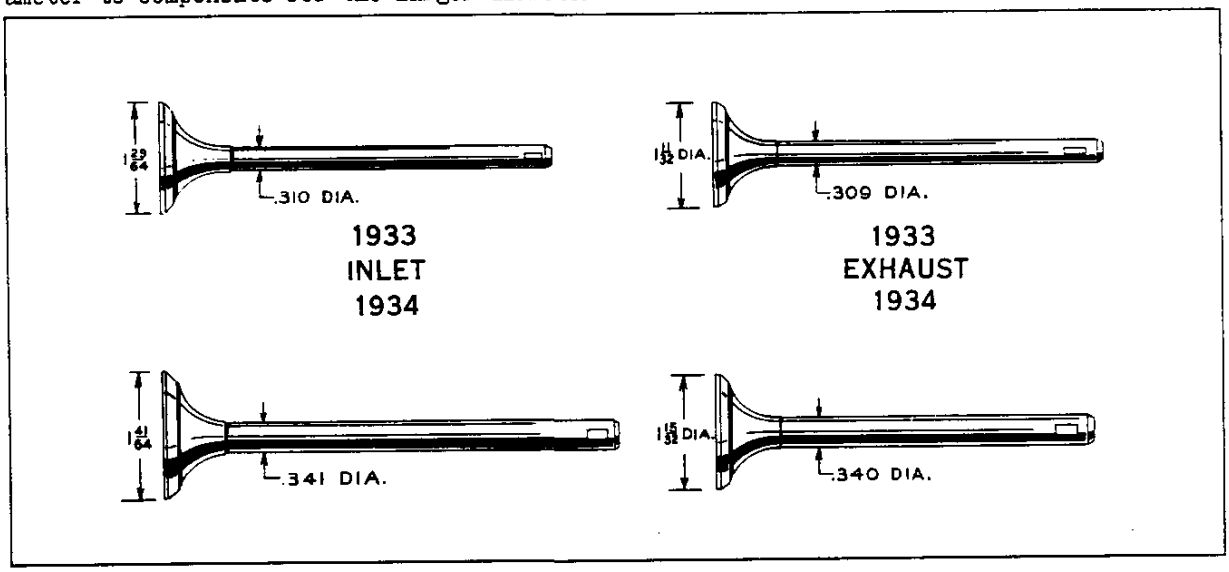
voir for oil. The cup end is blended down to the rod diameter more gradually, increasing the strength of the cup walls and preventing the beginning of cracks. The seating surfaces at both ends of the push rod, in the tappet and on the adjusting screw, are smoother and true to shape, reducing wear and prolonging their life. The lubrication of the upper end is improved by the closer fit around the ball end on the adjusting screw. Due to the new valve spacing and angularity, three different rocker arms are required. The exhaust valve rocker arms for all cylinders are identical, but for the inlet valves the valve end of the rocker arms is offset from the push rod end, necessitating right and left hand arms. The rocker arms are entirely different from the 1933 arms, because of the angularity of the valves. Their sections are much stronger, especially on the push rod end. The rocker arm bushings have slightly deeper grooves to insure better lubrication of the valve mechanism at low engine speeds. The rocker arms and bushings are increased in diameter to compensate for the larger diameter

tion with the angular valve arrangement. The length and width of their bases are also increased slightly, giving better support.

The inlet valves are 3/16 larger in diameter at the head and the exhaust valves are 1/8



larger. These increased diameters provide ample area thru which the fuel mixture and the exhaust gases may pass. The width of the valve seat surface in the cylinder head is also increased. This provides more surface over which the reduced spring pressure is distributed, resulting in longer life of both valves and seats. It is quite obvious that heat can be conducted from the exhaust valve



shafts. While the inside diameter of the shafts is maintained, the outside diameter is 1/16 larger, providing a thicker wall, which increases the rigidity of the entire valve mechanism, increasing the durability of all the parts by reducing bearing loads and consequent wear.

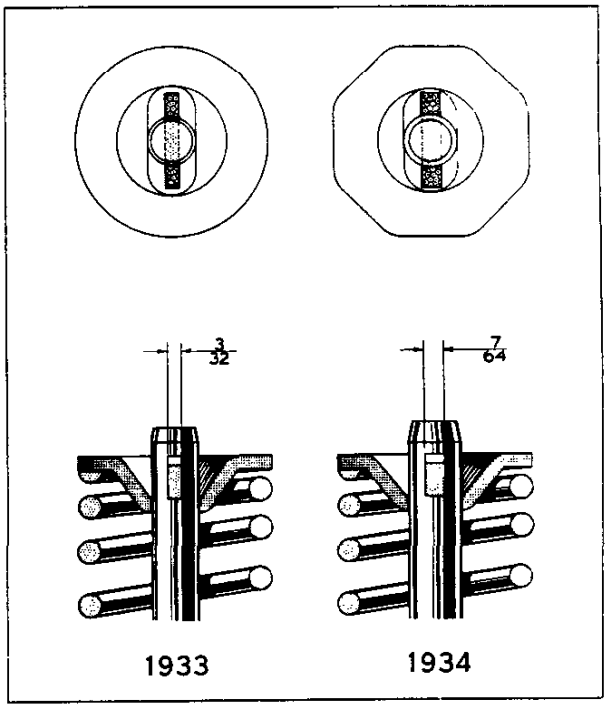
The rocker shaft supports are higher to provide proper rocker arm geometry in connec-

only while it is resting on its seat, and that the flow of heat from it is proportional to the surface in contact. Hence, the larger and wider valve seats permit much better cooling of the exhaust valves. Both the increased diameter and the greater width are effective in this respect, because both tend to increase the contact area. The head of the inlet valve is reduced in thickness,

which also reduces its weight. A normalizing heat treatment is added to the exhaust valves to prevent excessive warpage due to the heat of combustion. The stems of both inlet and exhaust valves are 1/32 larger in diameter. This provides additional guide bearing surface and increases durability. The larger diameter valve stems also have an effect on the quietness of the valve train, because they insure better alignment and, due to their increased rigidity, they reduce operating deflections. The length of the inlet valve guide is increased to provide better support for the stem which must of necessity be longer to reach the lower inlet valve seat thru the deeper head.

The valve springs for the Marine head were very carefully developed to insure positive seating under all conditions and to prevent periodic surge, even at the increased engine speeds. They exert a slightly greater pressure when the valves are open and a considerably lower pressure when the valves are closed. It is this lower pressure that increases the durability of valves and seats. It is made possible by the addition of the tappet springs described before. With this double spring arrangement, the valve springs are required to carry only the inertia loads imposed by the valves and rocker arms, the push rod and tappet inertia loads being taken by the tappet springs. The use of identical springs for both inlet and exhaust valves is made possible by the addition of a spacer at the base of the inlet valve guides which compensates for the greater length of the inlet valve stems.

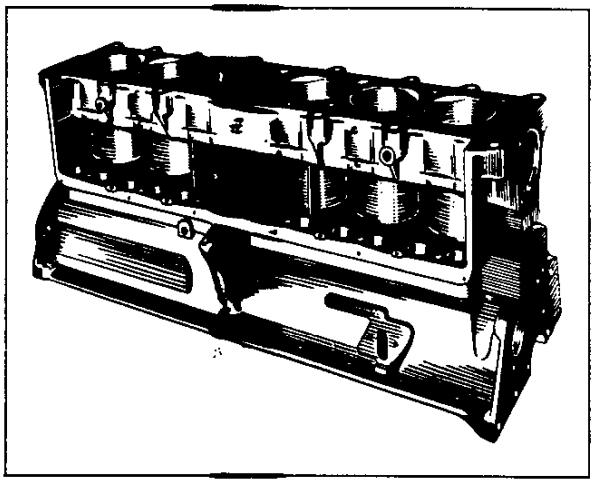
The valve spring retainer parts are reproportioned to balance their strength and to increase their durability. The valve stem key is made of tempered steel having a higher carbon content to reduce wear and to increase its durability. Due to the increased diameter of the valve stems, it is possible to punch a larger key slot in their upper end without reducing the strength at this point. Advantage of this condition is taken in increasing the thickness of the key. This provides increased bearing area in both the valve and the valve spring cap, balancing the load carried by each. The valve spring cap is made more durable by the addition of a heat treatment which presents a hard surface to resist wear, backed up by a fine grained core structure.



From the foregoing detail discussion of improvements in the design and manufacture of the parts which constitute the valve train, it will be appreciated that quietness and durability in a mechanism of this kind are not the result of one big change in design. On the contrary, they are the result of constant and painstaking attention to the minutest of details. Not a single one of the many improvements in the valve train can be pointed out as being the cause of the unusually quiet operation or durability of the 1934 Chevrolet engine. Each detail factor has its bearing on the perfection of the final overall result, and none of them can be omitted without some noticeable effect on the operating conditions. The engineering experience gained in perfecting the new valve mechanism proves, without a doubt, the importance of apparently minor details.

CYLINDER AND CRANKCASE

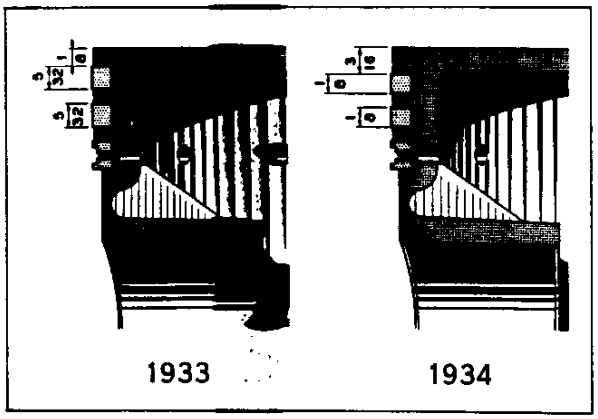
In essentials of design and construction the cylinder and case remains unchanged. However, many minor changes are made necessary to provide for changes in the design of related parts and units. The ribbing on the



right hand side is redesigned to provide for the addition of the tappet springs. The ribs which formerly extended up this side of the cylinder block at #3 and #4 cylinders are each replaced by two shorter ribs straddling the two cylinder barrels. The top of each cylinder bore has a conical relief at one side to clear the inlet valve and to provide for free flow of the fuel mixture. Bosses are added for the throttle control mechanism and the pad on the right side of the crankcase is reshaped to provide for the new fuel pump. An important factor in reducing oil consumption is the honing of the cylinder bores. The hones used are made up of fine grains and their feed is micromatically controlled. This produces a smooth surface, true to size and absolutely round.

PISTONS AND RINGS

The combination of piston and rings has received especially careful engineering consideration during the development of the 1934 engine. Narrower compression rings are located farther from the top of the light cast iron pistons. The narrower ring surface provides a better seal and reduces the required break-in period. The piston skirts are carefully ground to an improved contour to compensate for expansion due to heat. The piston pins are tempered after carburizing to relieve the strains caused by heat treatment and to prevent shrinkage under operating temperatures. In fitting these tempered pins in service, a looser fit is required than with the former untempered pins, because they do not shrink and, consequently, will retain their initial fit for a much longer period.

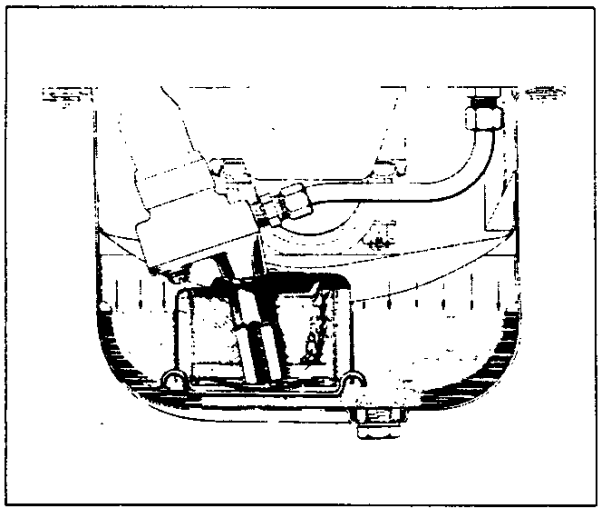


HARMONIC BALANCER

The harmonic balancer is recalibrated to the new engine characteristics, insuring smoother operation and freedom from vibration and over-run roar. Each spring bank includes two additional springs of slightly thinner gauge, producing a tuning of 140 cycles per second. The entire balancer assembly is balanced statically within 1/2 inch ounce.

OILING SYSTEM

During the 1933 season the oil pump screen has been entirely redesigned. It is of the cylindrical, by-pass type. The cylindrical pressed steel cover bolts to the oil pump cover by means of a hollow bolt, the head of which extends to the bottom of the screen and serves as a suction pipe. The cylindrical screen, with its pressed steel bottom and open reinforced top, slips over the suction tube and is held in place by a spring snap-wire which engages a notch in the bottom of the screen and bayonet lock slots in the cover. The screen has a larger area and is easily removed for cleaning. In normal operation, the open top of the screen is above the oil level and oil is sucked into the pump inlet thru the side walls of the screen. In cold weather particles of ice may collect at the screen, clogging it either entirely or partially. Under this condition, suction at the pump, combined with atmospheric pressure in the crankcase, forces the oil thru the by-pass into the screen chamber, thus

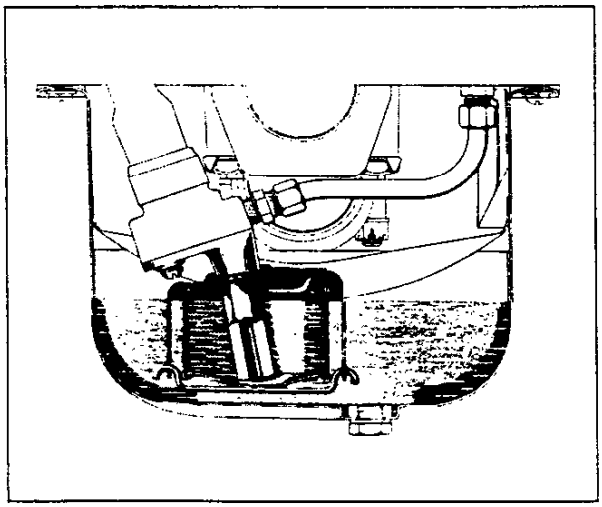


insuring lubrication under all conditions. When the screen surface is freed from the ice or other substance, which may have caused clogging, the oil again resumes its normal course passing thru the screen.

During the 1933 season, the restriction at the lower end of the oil filler and ventilator was reduced to facilitate ventilation and filling.

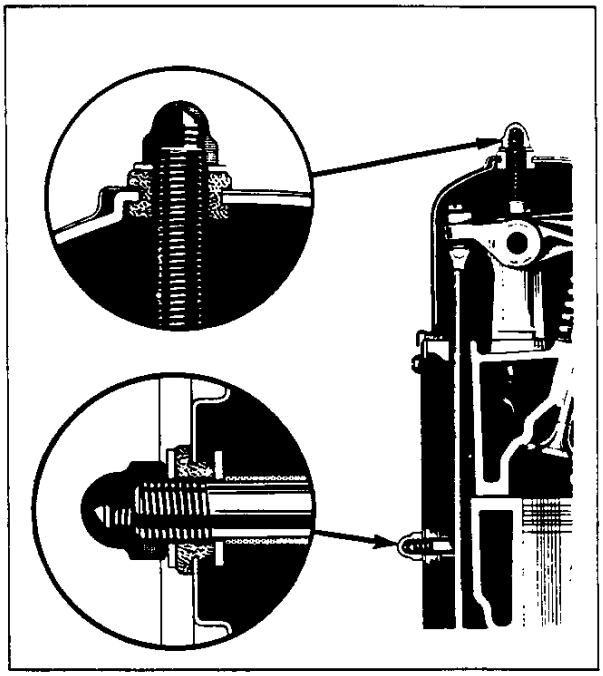
The oil pan is deeper, to compensate for the shallow step at the front end. The new shape at this point is occasioned by the new engine position farther forward in the chassis. The longer front step is provided to assure clearance of the steering tie rod in bumper position.

Oil leakage at the gear cover joint at the front end of the engine is reduced to a minimum by the addition of narrow embossed beads which extend around the entire attaching flange, blending into the bolt bosses. This increases the rigidity of the flange, providing a more effective and leak-proof seal. This permits the use of a harder paper gasket which also improves the seal.



PUSH ROD COVER

The push rod cover is redesigned to provide for the angular position of the spark plugs and to insure clearance for the tappet spring retainer. The edges are stiffened by embossed beads and the center section is stiffened by the intersecting horizontal and vertical ribs. The continuous horizontal rib accents the length of the engine.



To reduce resonance, rubber grommets are added at each of the three studs. The center grommet also prevents distortion of the cover and possible contact between the cover and the push rods with the resulting noise.

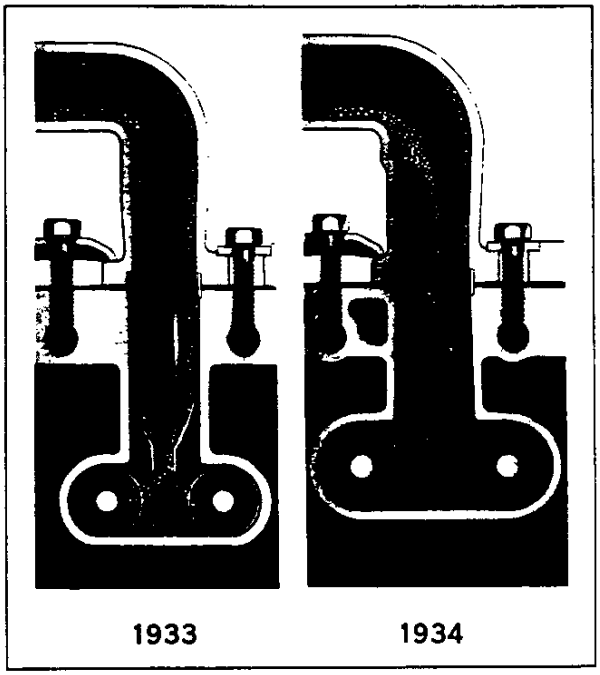
VALVE ROCKER COVER

The valve rocker cover is wider and deeper to fit the new Marine head and its valve mechanism. The three louvres are broader and streamlined in shape. They blend gracefully into

the cover contour, presenting a distinctive appearance. The two studs which fasten the cover are insulated by rubber grommets to prevent resonance.

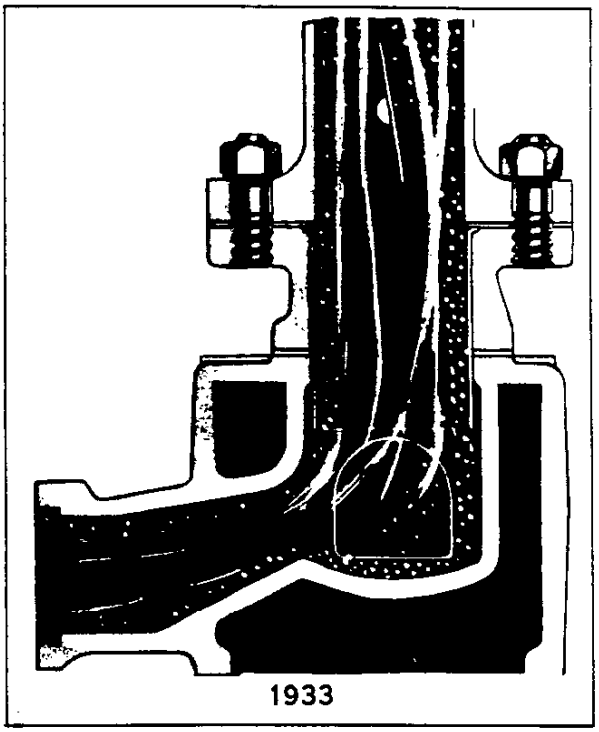
INLET MANIFOLD

An important factor in the improved economy and distribution of the 1934 Master engines is the new inlet manifold. The manifold arms are "D" section as before, with the flat at



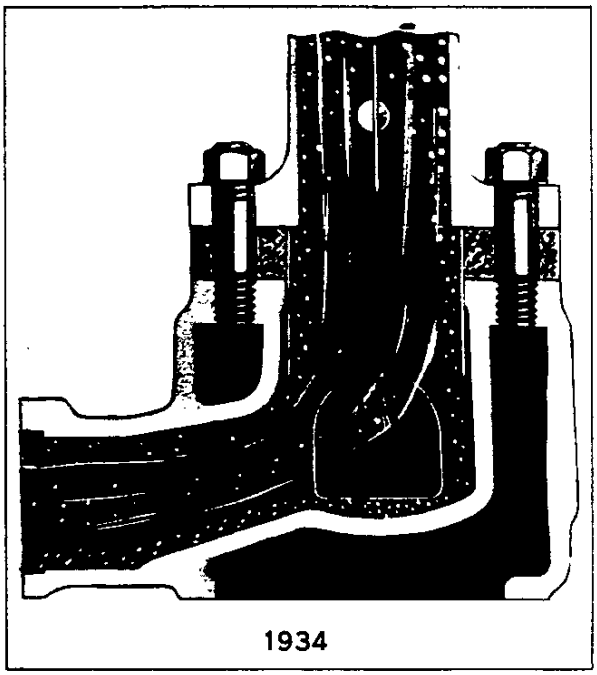
1933 1934

the bottom; and at their ends a spiral trough is cast in their inner surface, producing "Vortex Flow" arms. These spiral troughs pick up the heavy ends of the fuel mixture which liquify on the walls of the manifold at the bend of the end arms. Instead of permitting the liquid particles to follow the wall to the entrance of the inlet ports where they would tend to feed a rich mixture to one cylinder of the end pair and cause unequal distribution, the trough changes their natural course, forcing the liquid fuel particles to the center of the port at the bottom. This forces them into the air stream where they are equally distributed to both the cylinders fed by the end arms. This design feature eliminates the port sleeves and does a better job of equalizing distribution, especially in the higher speed range.



1933

At the center of the inlet manifold the low dividing wall between the main central chamber and the center arm is located farther from the chamber inner wall. This permits



1934

full opening of the throttle valve without causing unequal distribution of the liquid particles of fuel which drip from the edge of the throttle valve. In its new position, the wall acts as a divider, directing a portion of the liquid toward the center port and the remainder to the central catch basin from which it finds its way to the end ports, regardless of the throttle valve position. The full throttle opening, which is available due to this manifold improvement, improves the performance in the lower speed range.

The cast iron riser between the inlet manifold and the carburetor body is replaced by a thick pad of insulating material which restricts the flow of heat from the manifold and so reduces the percolation of the fuel in the carburetor. This aids starting at high temperature when the engine is hot.

The stamped riser sleeve protrudes thru the insulator with its flange resting on the top surface. This prevents the insulating material from disintegrating and being carried into the engine. In designing the insulator and sleeve, provision is made to insure use of the proper combination and for visual external identification of same. The insulator for the Master engine is stamped with an "M" and when this is visible the sleeve within can only be the one which is intended for use on the Master engine.

EXHAUST MANIFOLD

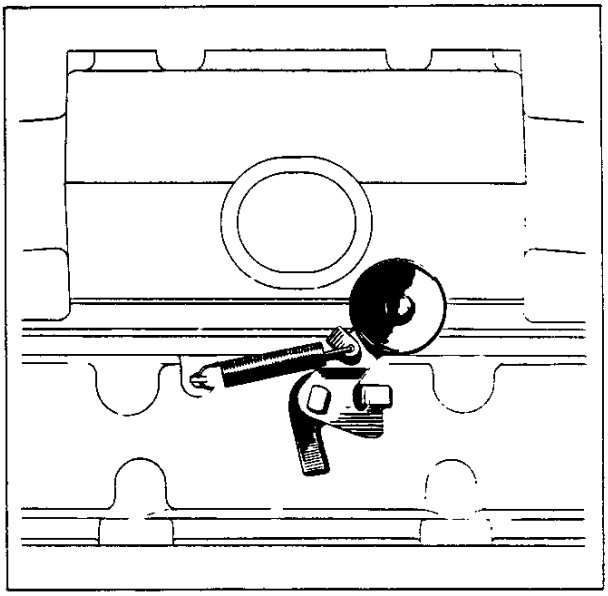
The exhaust manifold ports are relocated and enlarged to agree with the increase in the size of the head ports. Provision is also made for the smaller exhaust pipe.

The heat control mechanism is improved by the addition of a counterweight which cooperates with the return spring to prevent the heat valve from rattling, due to varying pressures within the manifold. An extension is provided on the lever at the inner end of the heat valve shaft, to which the counterweight is riveted.

In the "heat on" position, the return spring supports the counterweight. When the manifold temperature rises sufficiently to rotate the valve toward the "heat off" position, the weight opposes the spring. It moves thru its arc until it passes the center or maximum load position of the spring. It continues to move downward, overcoming the spring pull until the valve lies horizontal in the "heat off" position. The counterweight holds it in this position against the varying internal gas pressure until the changing temperature again causes the thermostat to change the valve position.

The thermostat action is improved by a reduction in the number of its coils and the use of better material.

During the 1933 season, the gaskets, which

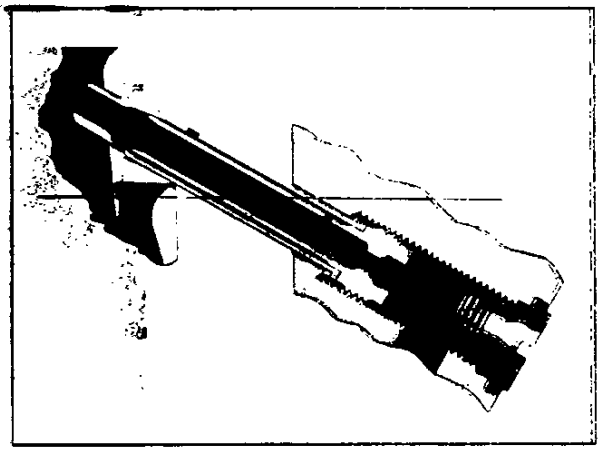


seal the joints between the head and the manifold, were improved by the addition of corrugations between the contact surfaces. These compensate for expansion and contraction of the exhaust manifold, due to temperature changes and prevent leakage and gasket breakage. The gaskets are made of asbestos composition reinforced by a perforated steel facing, which also adds considerably to their durability.

CARBURETOR

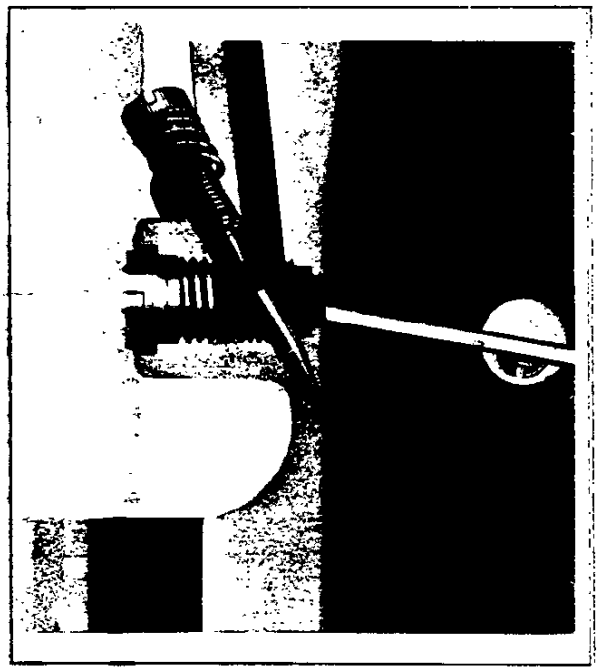
The carburetor is especially designed and calibrated to cooperate with the new inlet manifold to supply the proper fuel mixture for the requirements of the Master engine. In the carburetor, as in the valve mechanism, the improved performance and economy are not due to any drastic redesign, but to a number of detail refinements, which combine to give the desired result.

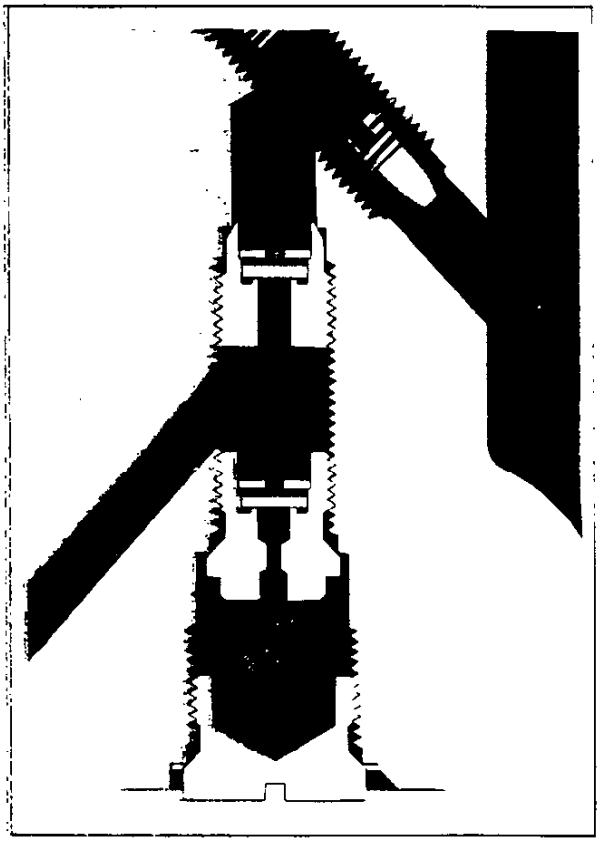
The shrouded nozzle, formed by the two con-



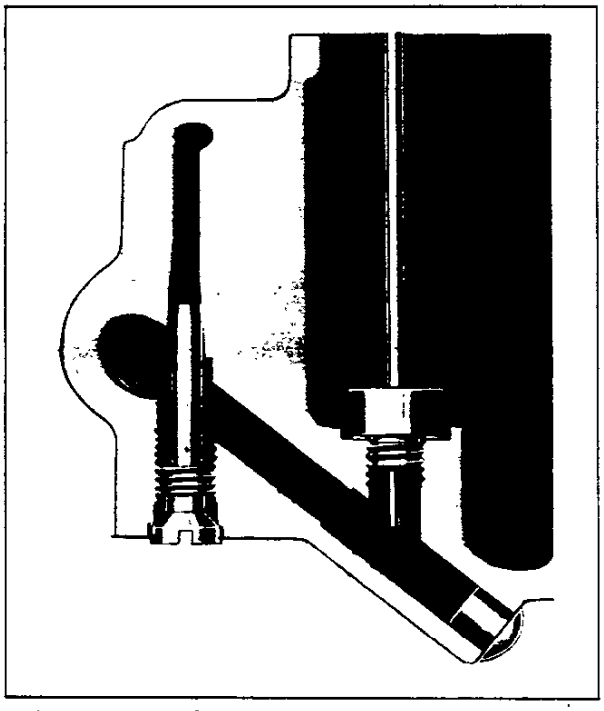
centric nozzle tubes, admits air to the gas stream, insuring more uniform full throttle mixture ratio thruout the speed range. The accelerating pump check valves are hexagonal discs of bakelite held in place by triangular stamped retainers. They insure more prompt pump delivery on acceleration.

The idle adjustment is redesigned in combination with the other carburetor design improvements. Its effect is felt only at speeds below 20 miles per hour. This obviates the danger of affecting the performance and economy thruout the speed range by a misadjustment of the idle setting. The new metering rod and jet are recalibrated to insure better economy by providing for more accurate setting. The carburetor air horn is attached by larger screws to provide a stronger support for the overhanging weight imposed on them by the air cleaner, which is mounted on the air horn. To facilitate starting at extremely low temperatures, the hinged section of the choker valve is permitted to open farther and more freely when fully choked. No manipulation is needed for initial start, as the larger opening permits additional air to be drawn in to allow the engine to run 400 to 600 revolutions per minute for a few seconds, after which the driver can adjust the choke to a position which gives smooth running for driving away.



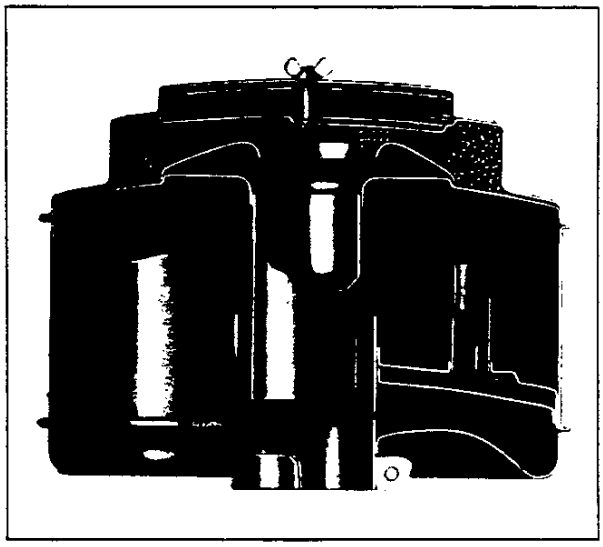


The possibility of a clogged pump jet is greatly reduced by the use of a strainer screen having finer mesh and finer wire. The vent hole in the carburetor bowl cover is increased in diameter to reduce the possibility of percolation. The carburetor body flange is strengthened by the addition of



reinforcing ribs at each side of the attaching bolts. An offset is added to the accelerating pump link to increase its rigidity and to prevent bending under extreme pressures. The bearing in the carburetor body for the throttle shaft is increased in length to increase the durability.

The chart in the opposite column shows the extent to which various factors contribute to the increased fuel economy.

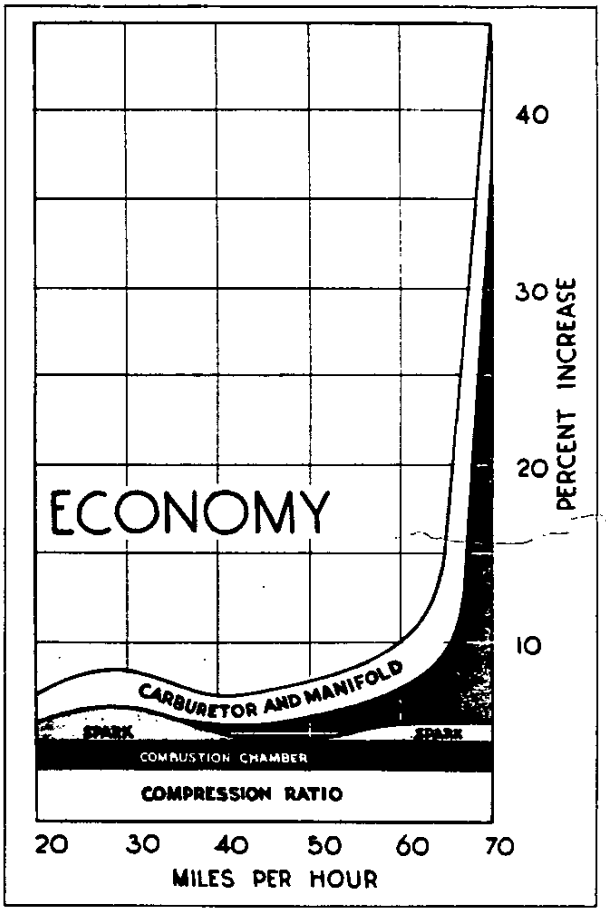


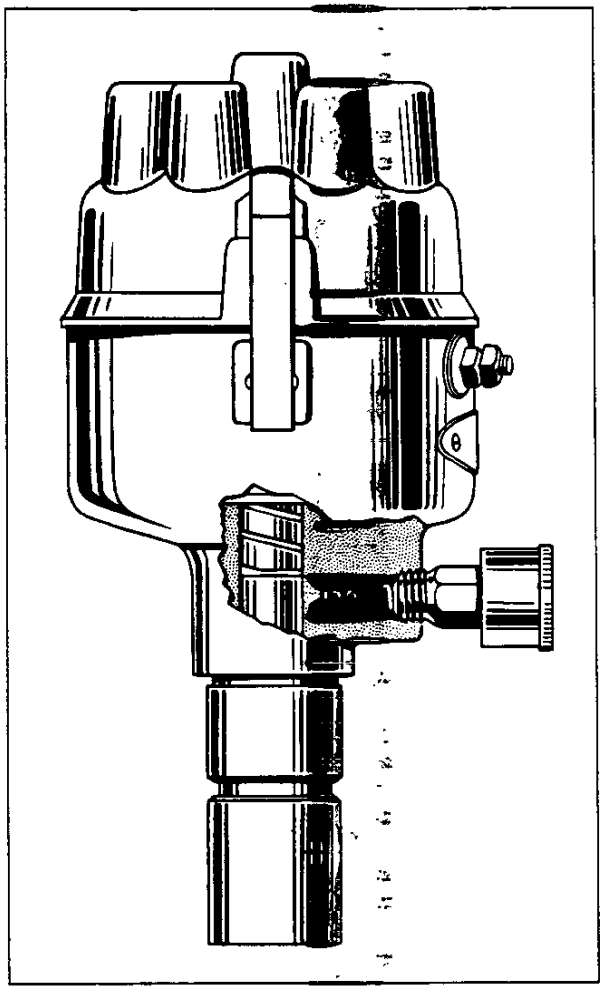
AIR CLEANER AND INTAKE SILENCER

The larger air cleaner and intake silencer includes all of the cleaning, silencing and flame arresting features of the 1933 unit. However, due to the different characteristics of the more powerful, higher speed engine, the silencer is larger in size and reproportioned as to its noise absorbing elements. The six radial ribs stamped in the bottom surface also tend to increase the rigidity of the unit.

IGNITION DISTRIBUTOR

The center about which the distributor cam rotates is fixed by spring pressure applied to the distributor shaft. By this arrangement, the variation in firing between cylinders, caused by excessive clearance due to manufacturing variations or wear, is minimized.



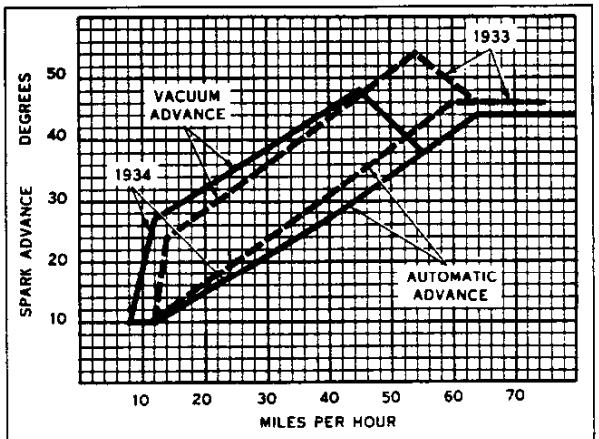


The shape of the governor weights is changed and they are hardened to reduce wear and thus insure more permanent control of the automatic spark advance.

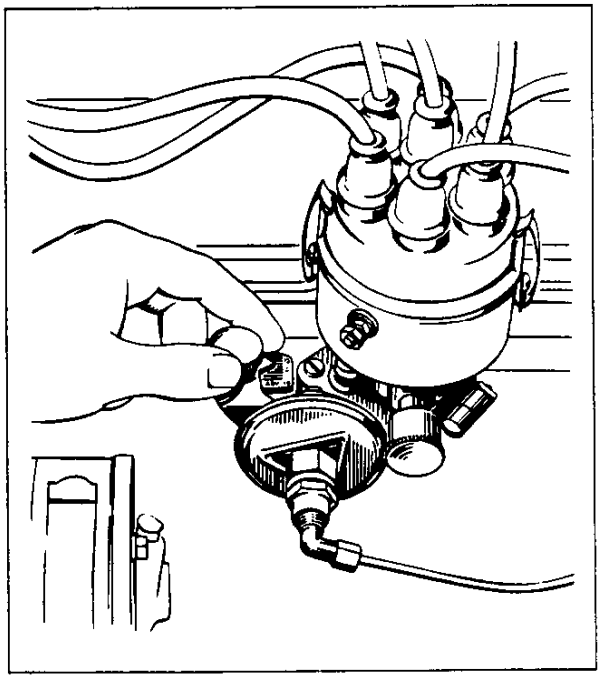
The range of the vacuum spark advance is increased to 17 degrees. While this additional advance is highly desirable and very beneficial in the lower speed range, it is not desirable at high speeds. For this reason an air bleed is provided by means of holes in the carburetor throttle shaft to leak air into the spark control vacuum line at about 40 miles per hour, reducing the advance at that speed. As the throttle is opened, this air leak increases until, at approximately 60 miles per hour, the suction in the vacuum line is entirely broken and the spark advance is controlled entirely by the engine speed thru the centrifugal weights in the distributor. The diagram below shows the spark advance conditions resulting from both the centrifugal and vacuum controls.

OCTANE SELECTOR

The Octane Selector, which has proved to be a very popular economy feature during the 1933 season, is continued on the 1934 models with further improvements. In the new design, a more rigid attachment to the crankcase is provided. This attachment per-



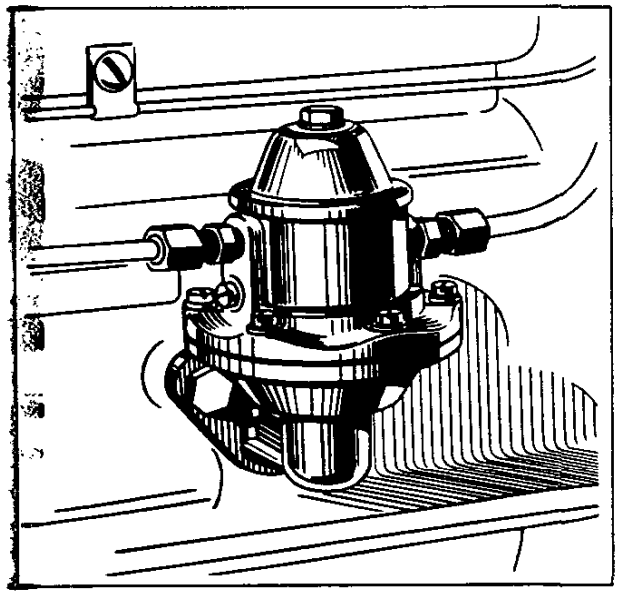
SPARK ADVANCE CURVE



mits simplification of the adjustment. The graduations to indicate proper adjustment are stamped on a separate bracket which is firmly bolted to the crankcase. The advance arm is bolted to the top face of the distributor boss as before, with the diaphragm pivoted about the shank of the distributor body on a sturdy stamped bracket which also includes the adjustment pointer. The former horizontal adjustment, by means of a knurled screw and lock nut, is replaced by a single vertical clamp screw with a round, knurled head. In operation, the adjustment is accomplished by loosening the clamp screw and manually setting the pointer at the proper graduation and tightening the clamp screw.

FUEL PUMP

The fuel pump is improved in both efficiency and appearance by a simplification in design. The filter chamber is located on top of the pump where it is housed in the attractive pressed steel cover. The valves are concealed in this cover where they are safe from tampering. The air dome is thoroughly cleaned



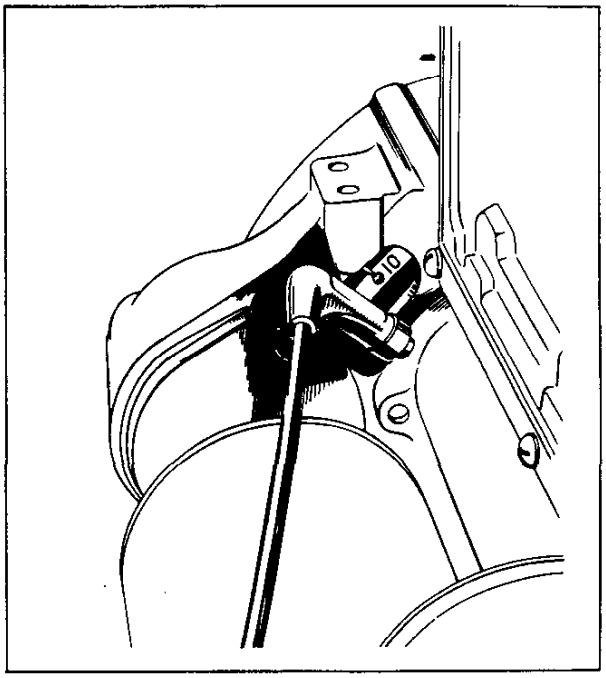
before assembly, thus eliminating soldering flux which might corrode the outlet valve spring. The diaphragm assembly is riveted together to prevent loosening. The mounting flange is smaller, neater and designed to eliminate warpage, thus providing a better oil seal.

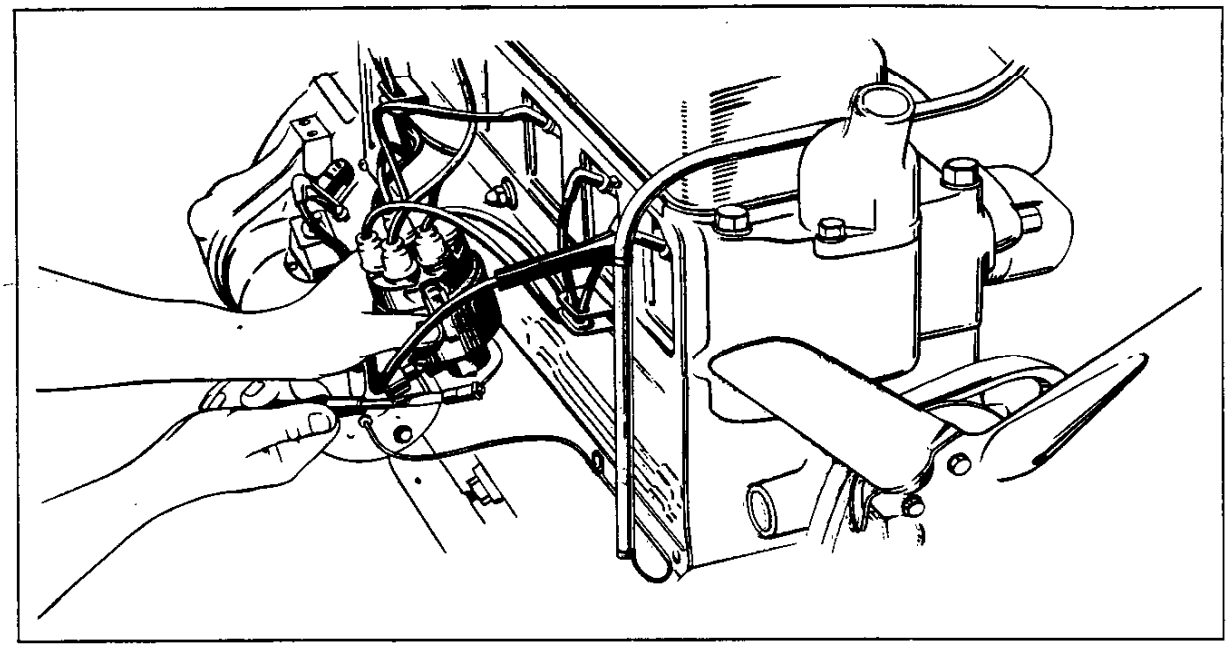
STARTING MOTOR

The starting motor and flywheel combination is improved in design to provide a higher gear ratio for cold starting and to increase the centrifugal strength. The 1934 starter pinion has 9 teeth which engage the 132 teeth of the flywheel ring gear, producing a ratio of 14.6 to 1 as compared with the 1933 ratio of 10.4 to 1. The teeth of the starter pinion and flywheel ring gear are redesigned to insure more quiet operation while cranking. The ring gear is shrunk on the flywheel directly in line with the flywheel web. This tends to reinforce the flywheel and prevent distortion due to heat caused by the friction of clutch engagement. The flywheel is made from better material, which resists bursting, due to centrifugal force at extremely high engine speeds.

NEON TIMING LIGHT

In the 1934 engines, provision is made for more accurate and quicker timing adjustment. An opening is provided in the front wall of the clutch housing in line with the flywheel rim on the right hand side. Instead of the usual timing mark on the flywheel, a bright steel ball is pressed into a hole in the flywheel, lo-





cated so as to line up with the timing pointer at the center of the clutch housing opening when the distributor breaker points break contact.

With this arrangement, it is possible to use the new Neon timing light, which is available to service stations as shop equipment. This light lies just in front of the clutch housing opening with its terminal connected to #1 spark plug.

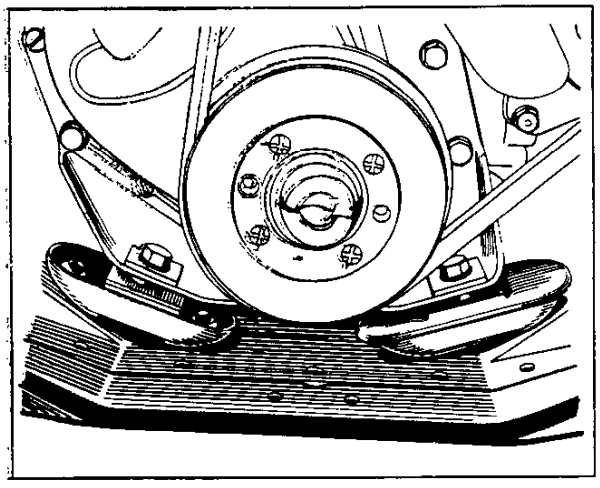
As the engine turns over under its own power at idling speeds, the make and break of contact in the ignition system lights the Neon tube intermittently, producing a stroboscopic effect as it illuminates the timing pointer and ball. The stroboscopic effect makes the ball appear to stand still in relation to the pointer and permits adjustment of the distributor position, while the engine is idling, by rotating the distributor until the ball appears to remain exactly in line with the pointer.

When this adjustment is attained, the distributor may be locked in position with the assurance that the timing is correct. With this arrangement, the mechanic is enabled to obtain much more accurate adjustment with much less difficulty.

The use of the Neon timing light in adjusting the distributor setting on 1934 engines is strongly recommended.

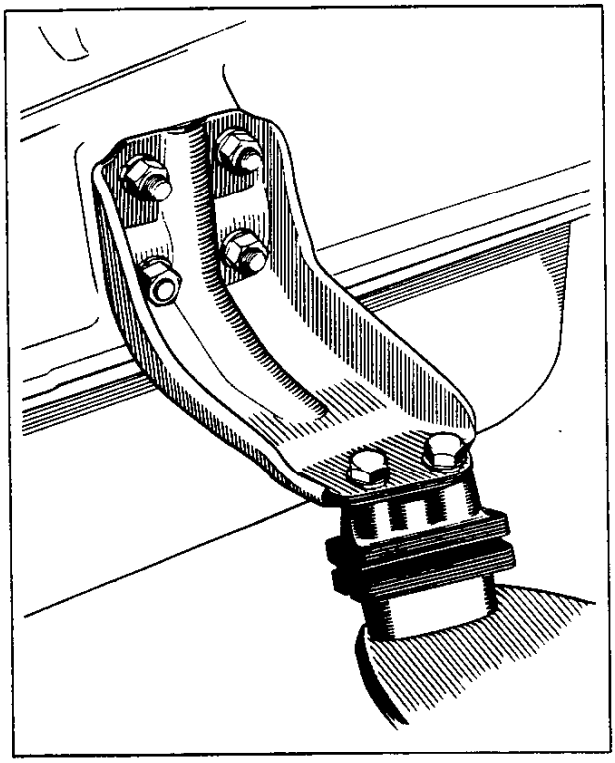
ENGINE MOUNTINGS

The cushion-balanced principle of engine mounting, which provides for movement of the engine about its principal axis and its vertical axis, is retained in the 1934 Master models. The design of the mounting units, however, is revised and modified to cooperate with the more rigid frame structure and the redistribution of load. In the new arrangement, five mounting units are used. Two are located at the front of the engine, two at the sides of the engine toward the rear and one under the rear of the trans-



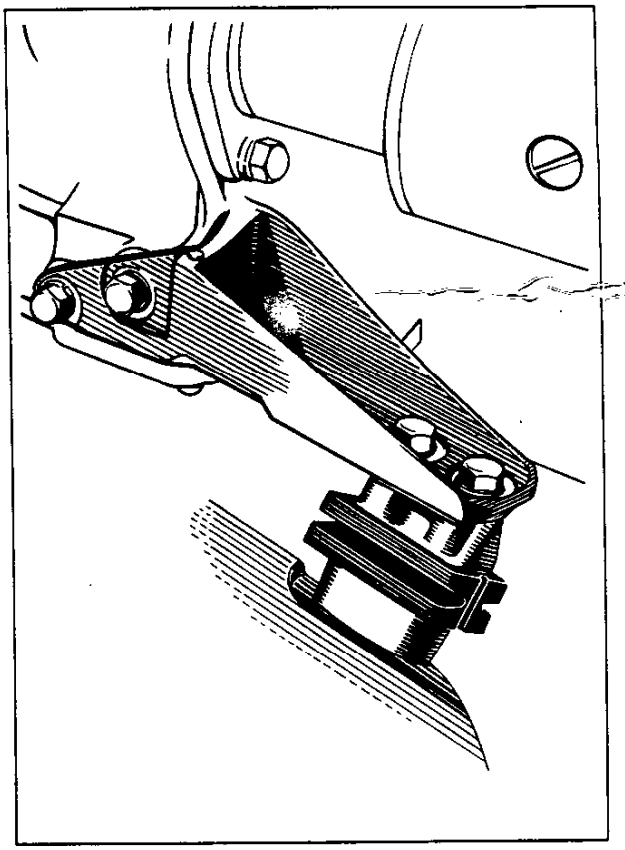
mission. Each unit plays its individual part in permitting the engine to move a limited distance in the directions which its internal forces dictate.

Each of the front mounting units consists of a sturdy steel stamping which bolts to the frame front cross member at two points and has an upturned flange all around to form a protective housing for the rubber. The upper member of the unit is a casting which bolts to the front plate of the engine. Rubber is securely vulcanized between the two metal members and a light stamped cover extends well over the edges of the mounting unit to shed any oil or water which might collect to affect the life of the rubber.

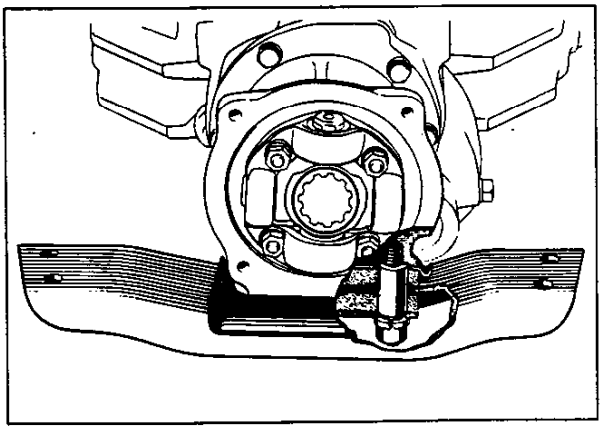


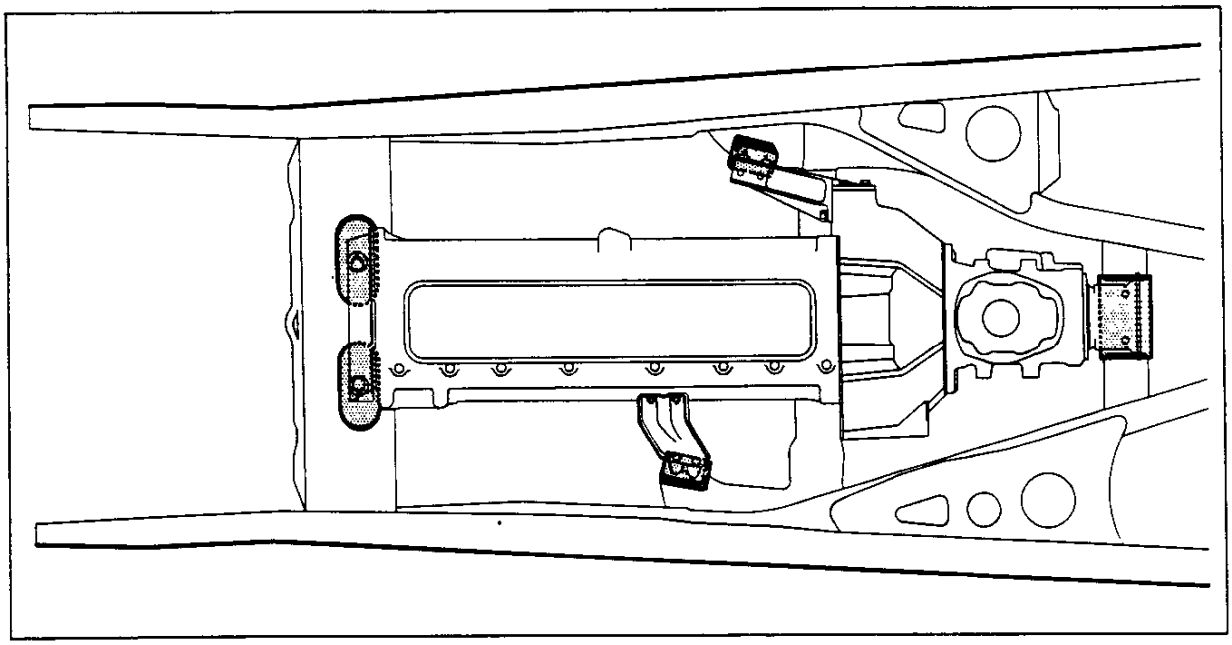
The side mounting units are mounted between the sub-frames and brackets extending from the engine, similar to the 1933 design. The units consist of two castings with rubber vulcanized between. They are rectangular in shape and provide sufficient flexibility to compensate for the engine movement due to torque reaction.

The rear mounting unit consists of a short channel section cross member with rubber vulcanized to its upper and lower surfaces.



This member bolts to the lower flanges of the frame "Y" member and the transmission rests on top of it. Shoulder bolts secure the unit to the transmission case and a stamped cover, bolted over the upper rubber extends well beyond the rubber in all directions and has troughs stamped at its ends to shed oil and water, protecting the rubber and prolonging its life.





COMPARATIVE SPECIFICATIONS

	1933	1934
Maximum horsepower	65	80
Engine RPM at maximum horsepower	2800	3300
Horsepower at 1000 RPM	28	28.5
Horsepower at 2000 RPM	55	58
Maximum torque - foot pounds	146	150
Engine RPM at maximum torque	1000-1800	800-2200
CYLINDER HEAD		
Type	Conventional overhead valve	Marine
Compression ratio	5.2 : 1	5.45 : 1
Inlet port diameter	1-3/16	1-9/32
Exhaust port size	1-1/32 x 1-3/4	1-3/16 x 1-3/4
Spark plug location	In pocket	Near exhaust valve
Cylinder head gasket thickness	.045	.052
Camshaft diameter between cams	1-1/16	1-1/8
Inlet cam base circle diameter	1.235	1.297
Exhaust cam base circle diameter	1.235	1.295
Cam offset from tappet	3/32	1/8
Cam width	1/2	7/16
Tappet angularity in length of case	3/64	5/32
Exhaust cam ramp	30°	40°
Inlet valve clearance (hot)	.006	.006
Exhaust valve clearance (hot)	.008	.013
Tappet spring pressure (valve open)	None	41#
Push rod diameter at lower end	13/32	1/2
Push rod upper seat diameter	.437	.348
Inlet valve lift	.314	.316
Exhaust valve lift	.314	.309

	1933	1934
Rocker arm ratio	1.463 : 1	1.477 : 1
Rocker shaft outside diameter	.729	.790
Inlet valve head diameter	1-29/64	1-41/64
Exhaust valve head diameter	1-11/32	1-15/32
Valve seat width	.030 - .050	.062 - .093
Valve stem diameter	.310	.341
Exhaust valve heat treatment	None	Normalized
Valve spring load with valve open	95#	98#
Valve spring load with valve closed	57#	45#
Valve stem key material	C.R. strip untreated	High carbon tempered flat wire
Valve stem key thickness	3/32	7/64
Valve spring cap treatment	None	Carburized
Compression piston ring width	5/32	1/8
Piston pin treatment	Carburized	Carburized and tempered
Gauge of balancer springs	.015	.014
Total number of balancer springs	80	96
Oil pump screen type	Spherical without by-pass	Cylindrical with by-pass
Oil pump screen area	13.2 sq.in.	14.5 sq.in.
Diameter of lower ventilator hole	1-1/32	1-5/32
Oil pan depth	6-13/32	6-17/32
Push rod cover insulation	None	3 rubber grommets
Rocker arm cover insulation	None	2 rubber grommets
Inlet manifold end arms	"D" section	"Vortex-Flow"
Inlet manifold riser	Cast iron	Insulating material
Heat valve operation	Spring	Counterweight and spring
Carburetor main venturi diameter	1.187	1.250
Carburetor nozzle type	Plain	Shrouded
Accelerating pump check valves	Monel balls	Hex.bakelite discs
Idle adjusting screw diameter	1/4	3/32
Carburetor air horn attaching screws	#10	#12
Choker valve opening at full choke	.010	.072
Strainer screen mesh	90	120
Strainer screen wire diameter	.0052	.0036
Carburetor bowl cover vent hole	.070	.194
Ignition distributor shaft positioning	None	Felt pad and spring
Ignition distributor governor weights	Soft	Hardened
Air cleaner diameter	7-9/16	8-9/16
Air cleaner height	6-3/32	7
Vacuum spark advance	12°	17°
Octane Selector mounting bolts	One	Two
Starter gear ratio	10.4 : 1	14.6 : 1
Number of starter pinion teeth	10	9
Number of ring gear teeth	104	132

CLUTCH

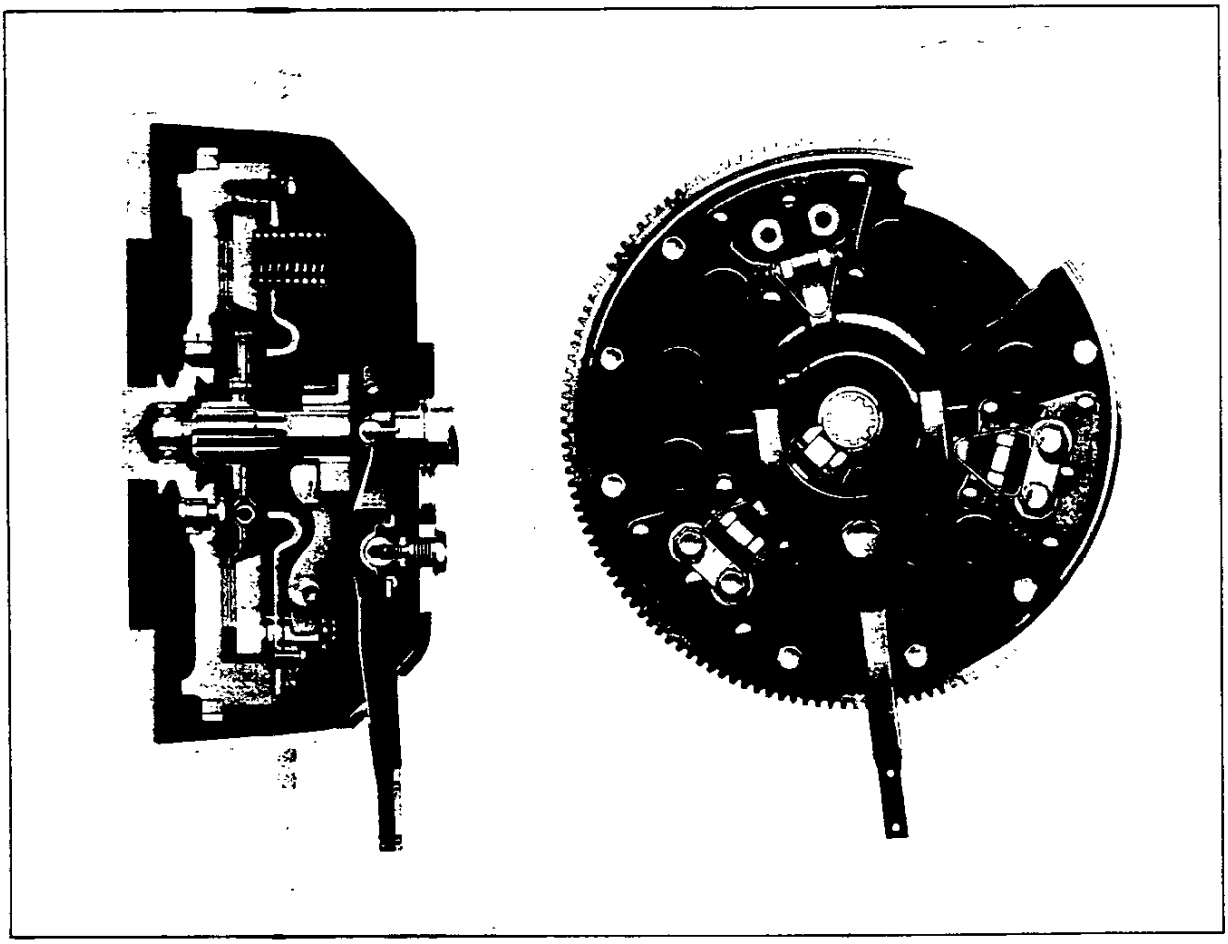
The clutch on the 1934 Master models is entirely new in design. The cover is a sturdy steel stamping with a circular reinforcing rib pressed into its inner edge.

At the three points where the levers are mounted, heavy malleable iron castings are secured by rivets to reinforce the cover at its points of maximum loading. The clutch cover is attached to the flywheel by nine alloy steel bolts.

The drive is taken by posts cast on the pressure plate and accurately milled flat at their adjacent sides to contact the broached edges of holes in the clutch cover. This permits more accurate centering than the radial drive pins used in the previous design. The pressure plate is also entirely new in design with the driving slots omitted, and with better provision for the dissipation of heat by means of deep, short depressions well distributed over the rear surface of the plate.

The pressure levers are sturdy steel forgings carefully designed for strength and weight distribution. This is an important factor in obviating any tendency of the levers to throw out due to the centrifugal action at high speeds. The levers are pivoted on pins which bear in the reinforcements on the outside of the cover. Torsion springs are provided to maintain contact of the pressure levers with the release bearing plate and the bearing plates between the posts of the pressure plate to prevent rattles.

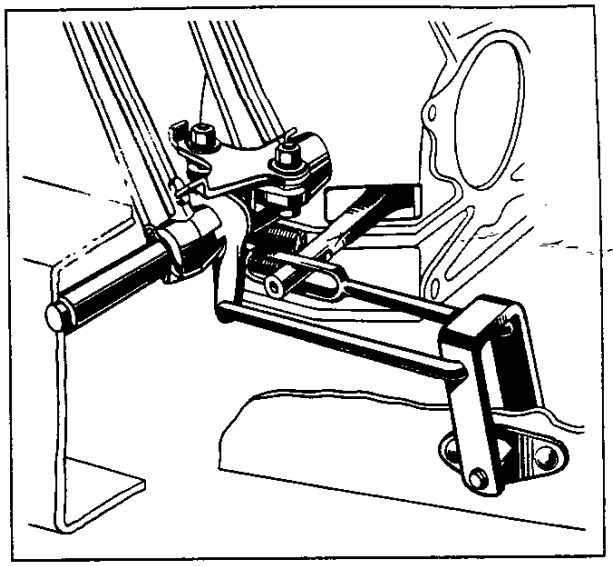
The cushion mounting of the hub in the friction disc is retained with the spring pressure increased to 90 pounds per spring. This new, improved clutch provides softer, smoother engagement, lighter pedal pressure and increased durability.



CLUTCH PEDAL LINKAGE

During the 1933 season, it was proved that with the increased flexibility of the engine mountings some provision must be made to isolate the clutch release mechanism from the effects of engine movement which might, under some conditions, have a tendency to cause partial release and reengagement of the clutch, causing chatter. A system of linkage to accomplish such isolation was provided for 1933 service installations and was later incorporated in production. An improved version of the same design is built into the 1934 Master models.

The clutch and brake pedals are mounted on a common shaft supported from the underside of the left hand sub-frame gusset. A separate lever is pivoted on the pedal shaft, just inboard from the clutch pedal and keyed to it. A connecting link of round steel rod having its ends bent at right angles connects from this pedal lever to the outer arm of a double stamped lever mounted, at some distance back of the pedal shaft, on the sub-frame. From the other arm of this stamped lever, a second connecting link extends forward to connect to the clutch fork by means of an elongated eye formed on the end of the rod and having



a screw adjustment to limit the clearance of the fork in the eye. With this double link mechanism, the pedal and fork are free to move in the direction of engine freedom independently of each other. This eliminates movement of the clutch pedal, except when the pedal is intentionally depressed, and hence any tendency to chatter due to this cause is also eliminated.

COMPARATIVE SPECIFICATIONS

	1933	1934
Cover material	Cast iron	Pressed steel
Number of attaching bolts	6	9
Clutch disc spring pressure	65#	90#
Drive	Radial pins	Pressure plate posts
Clutch fork actuation	Direct	Thru linkage

TRANSMISSION

The 1934 Master transmission is basically the same syncro-mesh unit with silent second which was used during the 1933 season. Several refinements and improvements have been added. While these are of a minor nature, their results are quite noticeable in smoother action, increased durability and improved performance of the unit. In the manufacture of the second and third speed clutch, the first and reverse gear and the clutch gear closer limits and finer finish are maintained.

The gearshift lever length and offset are changed to place the knob in the most comfortable position for shifting and to compensate for the new position of the engine and transmission farther forward in the chassis. The new gearshift knob is made entirely of rubber. The outer surface is of hard rubber with a bright, black finish, while the core is of relatively soft rubber. The threads on the lever are eliminated and the knob pushes tightly on to the shank of the lever. The resilient grip reduces vibration and prevents amplification of noise.

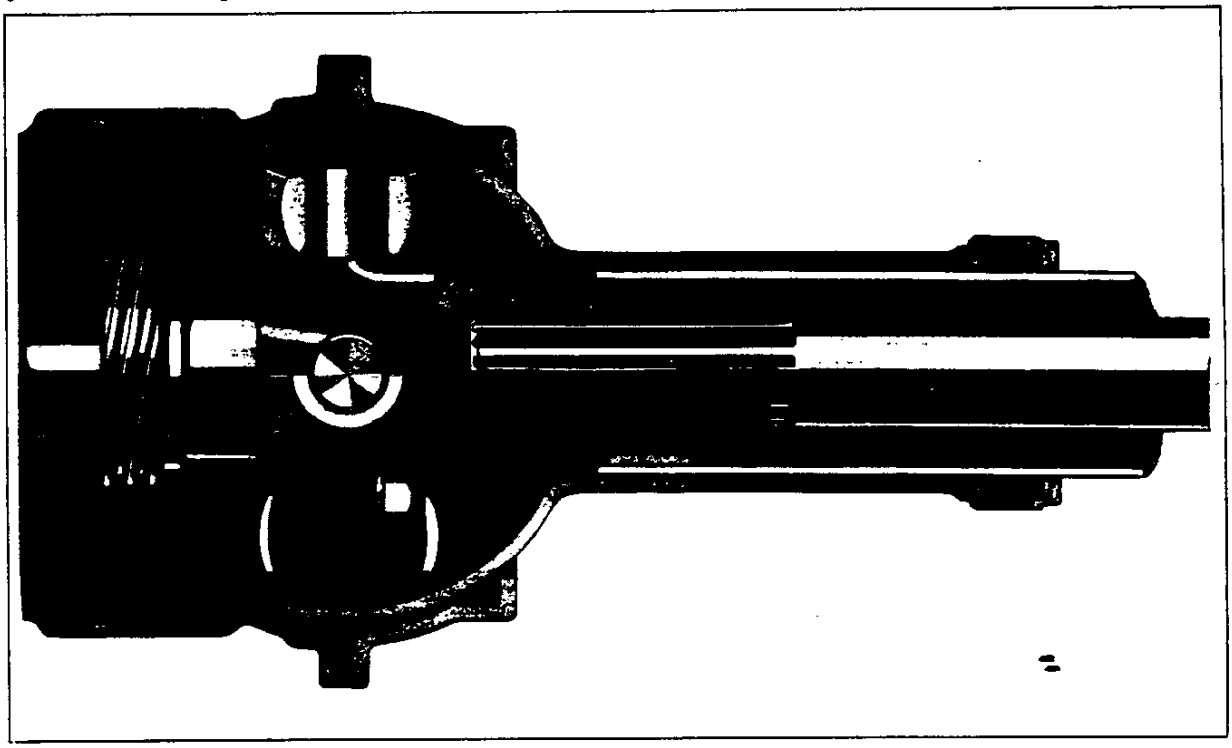
COMPARATIVE SPECIFICATIONS

	1933	1934
Gear shift knob	Bakelite	Hard and soft rubber

UNIVERSAL JOINT

The shank of the rear universal joint yoke is increased in length to provide sufficient bearing surface for the hard bronze bushing which is pressed into the front end of the torque tube to insure alignment and to prevent whipping at high speeds.

The oil seal at the rear end of the universal joint ball is improved. In the new design, the sealing is accomplished by a felt packing ring, which is pressed against the tube and the end of the ball by a threaded sleeve engaging the thread at the end of the ball. Steel washers at each side of the packing protect it from abrasion. The thread permits adjustment to compensate for wear and to insure a perfect seal under all conditions.

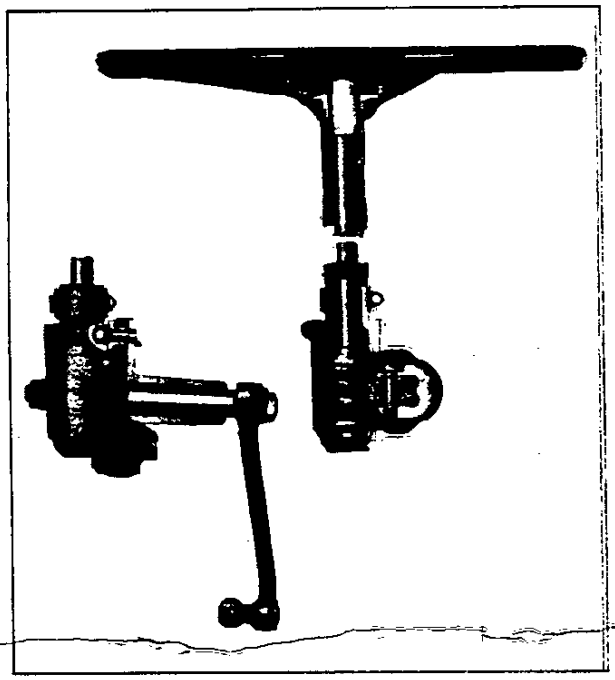


COMPARATIVE SPECIFICATIONS

	1933	1934
Rear universal joint length	3-5/8	4
Universal joint ball seal	Fixed	Adjustable
Seal material	Cork	Felt

STEERING

The steering mechanism on the 1934 Master models is entirely new in design. It is of the ball bearing roller sector type with an hour-glass worm and a gear ratio of 16 to 1. In this type of steering gear, the worm is rotated, as usual, by movement of the steering wheel at the upper end of the worm or main shaft. The sector, however, has the tooth contours turned annularly around its entire circumference, like a roller. In addition to acting as sector teeth, this roller forms the outer race for a two-row ball bearing with twelve balls 7/32" in diameter in each row. The inner race of this bearing is made in two halves, one assembly from each end, held together by a snap ring at the middle. This bearing is pre-loaded to prolong its useful life. The combined ball bearing and roller sector is pivoted on a hardened and ground bolt in jaws at the inner end of the pitman arm shaft. This jaw element is forged integral with the shaft and the jaws



are milled at an angle normal to the worm centerline, corresponding to the lead angle of the worm teeth.

In operation, the rotation of the worm causes the roller sector to move about the center of the pitman arm shaft, naturally imparting this motion to the pitman arm at the outer end of the shaft. The roller sector is free to rotate on its bearings, insuring smooth action with a minimum of friction and wear.

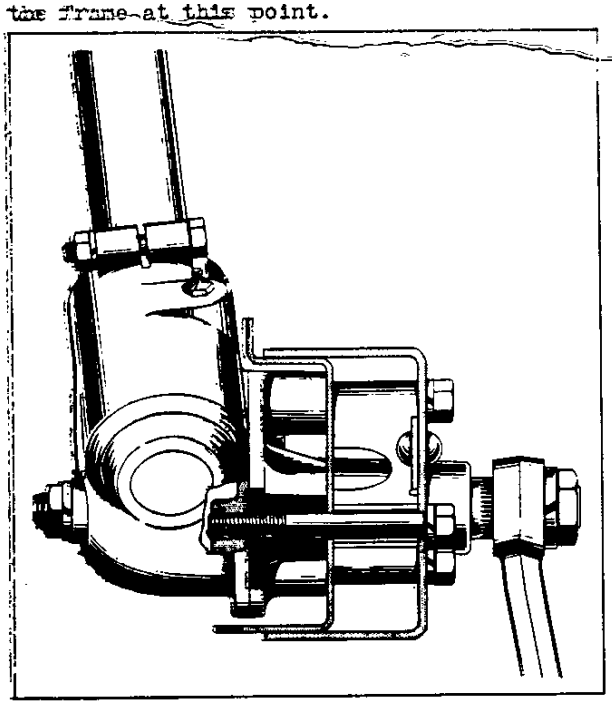
A slightly tighter fit between the worm and the roller sector is provided thru the central range of the worm movement, where most wear occurs, to increase the life of the gears.

The pitman arm shaft bears in longer bronze bushings having oil grooves. The upper roller bearing on the worm is mounted in the adjusting sleeve, insuring more accurate alignment and the addition of an undercut groove at each end of the worm provides for better seating of the rollers.

The pitman arm is longer, to provide proper motion with the new front end steering connections and the increased gear ratio. The section shape of the arm is rectangular and its size is also increased.

The same adjustments, which have proved so satisfactory in the past, are again incorporated in this new steering gear. They provide for wear of the contact members and their bearings.

The mounting of the steering gear to the frame is the same as the former mounting in principle. However, the new frame structure necessitates an arrangement which is quite different in detail. The pitman arm housing has three short, sturdy bosses which mount against the inner surface of the left hand sub-frame. Bolts pass thru the frame side rail and sub-frame, drawing the steering gear up tightly to both members thru the spacer which is built into the frame. This provides a very rigid mounting which not only prevents binding of the steering mechanism, but also adds to the strength of the frame at this point.



COMPARATIVE SPECIFICATIONS

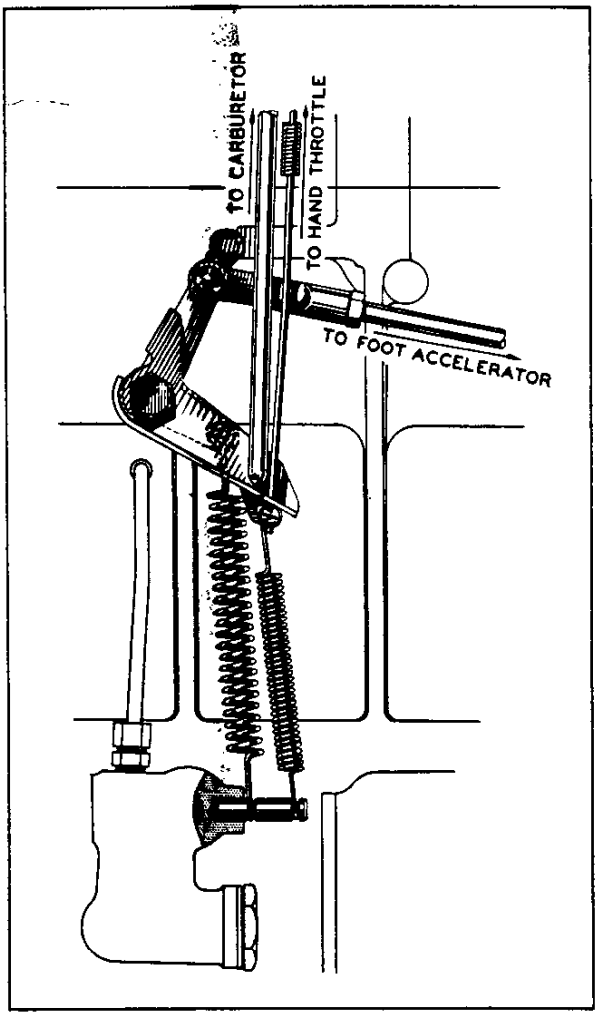
	1933	1934
Steering gear type	Worm and sector	Ball bearing roller sector
Steering gear ratio	14 : 1	16 : 1
Pitman shaft bushing length	1-1/8	1-3/8

	1933	1934
Pitman arm length	7	7-1/2
Pitman arm section at upper end	9/16 x 1-3/8 elliptical	5/8 x 1-3/8 rectangular
Pitman arm section at lower end	9/16 diameter	9/16 x 5/8 rectangular

CONTROLS

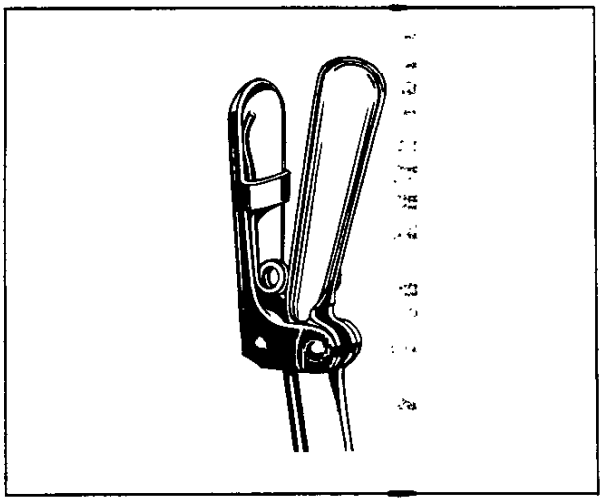
On the 1934 Master models, the Starterator control and hand throttle control are separate and independent and the hand throttle control is more sensitive. This permits operation of the throttle button on the instrument panel without depressing or interfering with the Starterator and also permits a much wider range of button movement.

In the new design, a cast bell crank is mounted on the side of the cylinder block within a stamped lever which is actuated by movement of the bell crank, when the throttle is opened by the Starterator. Two separate retracting springs are provided. The lighter of these is attached to the stamped lever to close the throttle. The lightness of this spring facilitates the sensitive movement of the hand control button and limits the pressure against the throttle stop. The heavier spring operates to return the Starterator control. The throttle rod to the carburetor lever is connected to the stamped lever and is actuated by either the hand control or Starterator. A boss is provided on the cylinder block to act as a definite stop for the accelerator control bell crank in the closed position. The double spring arrangement provides just the right resistance for both hand and foot operation. It permits driving for long periods without tiring the foot and much easier throttle button operation, which permits more accurate setting. In the middle of the 1933 season, the position of the Starterator pedal was improved by moving it farther toward the right, providing a more comfortable foot position and avoiding interference of the foot with the brake pedal in operation.

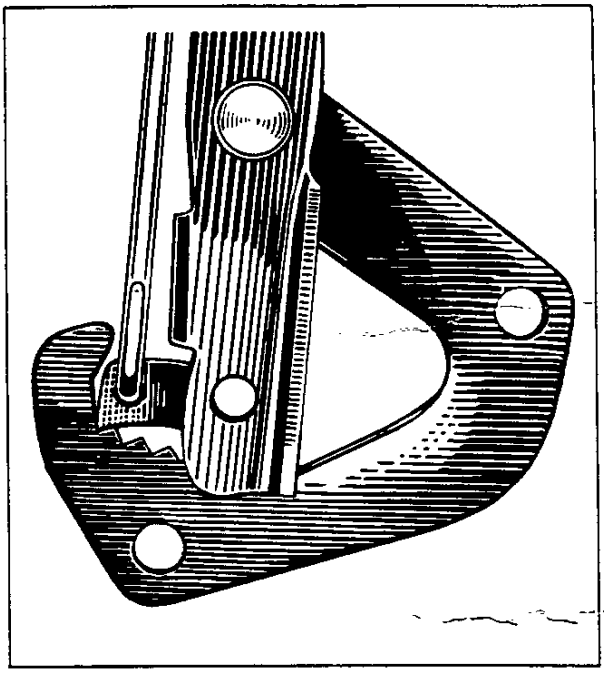


The clips which attach the vacuum control pipe to the carburetor gasoline pipe are redesigned. They snap over the pipes from the side instead of endwise. This insures more secure attachment and permits clipping at right angles where necessary.

The hand brake lever is substantially mounted to the chassis frame thru a cast bracket held to the web and upper flange of the subframe right hand member. It remains stationary thruout the speed range, vibration not affecting it in any way. The hand brake lever itself is redesigned to insure quieter operation and increased strength. The torsion spring at the latch has two coils which increase the pressure, insuring more definite engagement of the pawl and eliminating rattles. The latch is attached to the lever and pawl rod by special screws having



"T" sections under their heads to prevent rotation and insure firm attachment under all conditions. The new shape at the lower end of the hand brake lever prevents cocking or disengagement of the sector and insures proper pawl contact.



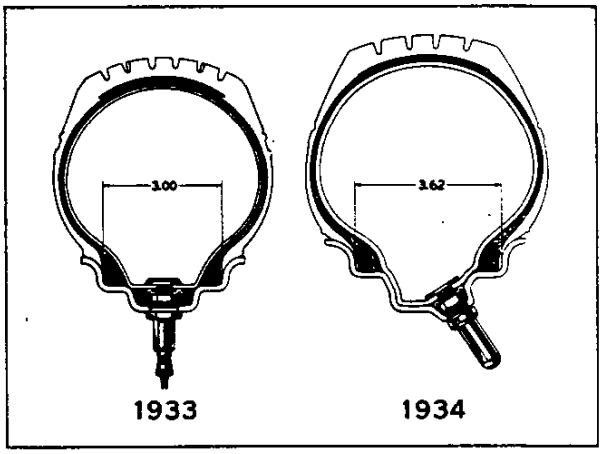
COMPARATIVE SPECIFICATIONS

	1933	1934
Hand and foot throttle control	Inter-connected	Separate
Number of throttle control return springs	1	2
Hand brake lever mounting	On transmission	On frame
Hand brake lever spring coils	1	2
Hand brake lever latch screws	Round head	"T" head

WHEELS AND TIRES

The 1934 Master tires are of larger sectional diameter on smaller diameter rims, presenting a sturdier, more massive appearance. The larger section tires, with their increased air capacity, require lower inflation pressures, providing an easier ride. The increased section also provides a somewhat greater contact area between the tread and the road surface, prolonging the potential life of the tires proportionately. The wheels are of the same sturdy, riveted-spoke construction which has proved so satisfactory in the past. While the number of spokes remains unchanged, the wheels are even stronger than before, because of the smaller rim diameter, which also shortens the spoke lengths. The rim is still of the popular drop center type, but the shoulders of the rim are wider, providing perfect seating for the larger section tire and permitting the mounting of tires up to a maximum size of 6.00-17, 6 ply at the owner's discretion.

The tire valve protrudes from the rim at a considerable angle, insuring accessibility



for checking pressures and for inflating the tires. A dust cap is provided which covers the entire valve stem. This cap is small, neat in appearance and very easy to attach. It consists of an outer cap which encases the entire protruding portion of the tire valve stem, having within it a threaded nut and a rubber seal.

In operation, the inner nut screws down on the valve thread and, when a tight joint is secured, the outer cap may be pushed down into contact with the rim nut. In removing the cap for inspection or inflation, the operation is simply reversed.

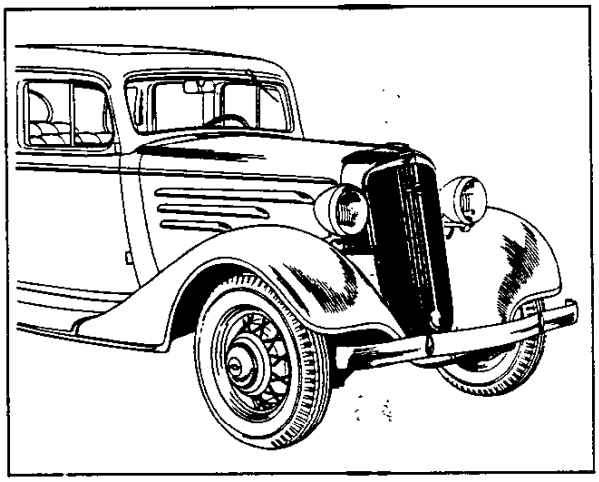
The hub caps are much larger in diameter and depth, presenting a more massive appearance. The cap is well rounded with two step beads at the outer edge and at the center the embossed Chevrolet emblem surrounded by an attractive hammered background.

COMPARATIVE SPECIFICATIONS

	1933	1934
Tire size	5.25-18	5.50-17
Recommended inflation pressure	32#	28#
Rim width at shoulder	3.00	3.62
Tire valve stem	Straight	Angle
Tire valve cap	Screw type	Screw-push type
Hub cap diameter	6-3/4	8-3/4
Hub cap depth	15/16	2-3/8

SHEET METAL

The sheet metal parts of the 1934 Master models are designed along more flowing lines. Every detail of design contributes to the appearance of greater length and tends to cover more of the chassis mechanism than ever before. The radiator sets farther forward on the chassis and slopes backward at a greater angle. The "V" angularity, too, is more pronounced. The radiator shell is finished in body color with a distinctive vertical bar grille set in a narrow chrome plated frame. Alternate bars on this chrome plated grille are enameled black to create a smart but dignified appearance.



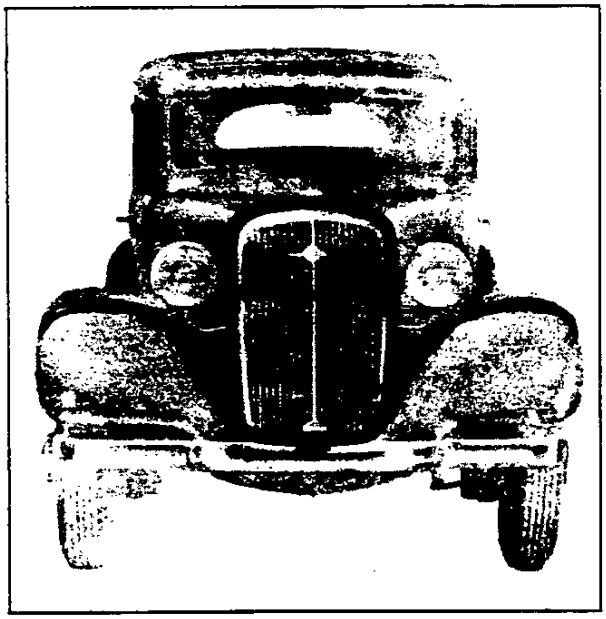
The radiator shell is broader and has a more distinctive shape. The emblem is mounted on an attractive chrome plated disc-like medallion which is enhanced by a slender, tapering horizontal arm at each side. This medallion, in turn, is mounted on the body of the grille, well below the top of the grille frame.

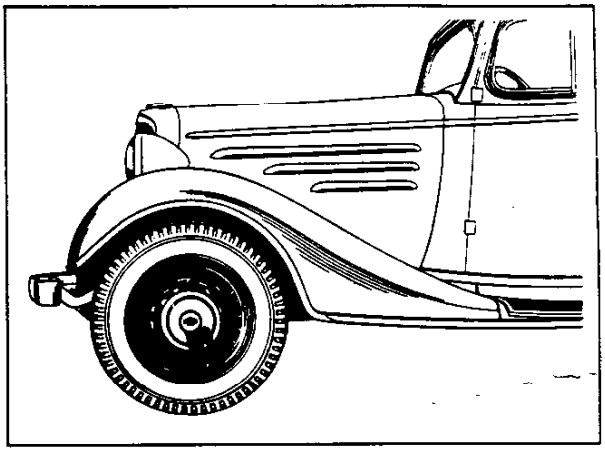
A bright decorative moulding added to each side of the car creates a visual effect of tying the sweeping lines of the sheet metal together, presenting an appearance of smoother

continuity and greater length. It is a half-round moulding of bright, stainless steel, beginning in a "saber" point at the valance of the front fender and continuing in a uniform section to the rear fender where it ends in a spherical shape. It is attached to the front fender valances, the running boards and the rear fenders by twelve twist locks at each side.

The front fenders are broader, deeper and extend farther down over the tires at the front, hiding much more of the chassis mechanism. The fenders meet the radiator shell considerably higher and gracefully follow the grille around the bottom, forming an apron to protect the radiator against splashing. The fender extensions which form this apron are drawn in one piece with the fender. At their central joint, an attractive beaded moulding covers the gap. The outer skirts of the front fenders extend lower and have sharper corners. Like the extensions, they are formed with the fender to give a more uniform appearance.

The moulding along the edges of the front fenders is wider, tapering gradually from the rear edge of the fender, where it forms a background for the brighter side moulding, to a greater width to the corner of the skirt, reducing in width to the wheel center and maintaining a constant width from this point to the joint at the center. A flange



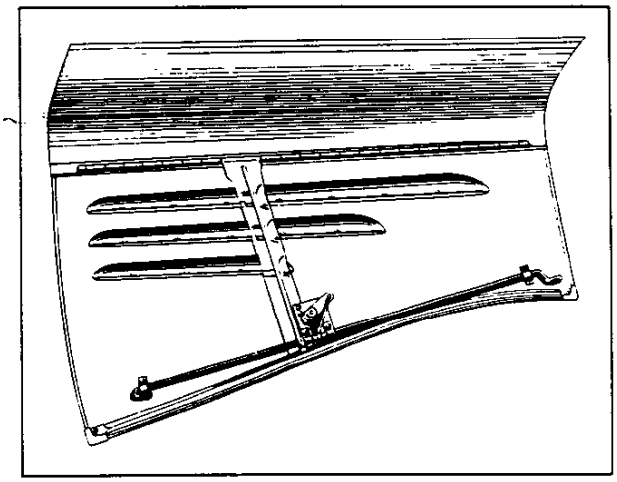


is turned up under the fenders along the edges to provide stiffness and to permit attachment of the several brackets and braces without marring the outer appearance. The front fenders blend gracefully from their crowns to the "valley" at the hood ledge, which is much shallower, presenting a much neater and more graceful appearance. A separate skirt extends from the raised hood ledge to the top of the frame. This member, being invisible due to the higher ledge, is strengthened by stamped ribs and is securely attached by bolts and rivets to the hood ledge of the fenders, the radiator shell and the valance brace. At the latter point of attachment, a reinforcement further increases its strength. At radiator and brace attaching points, anti-squeak is used to prevent noise. The outer skirts or valances of the front fenders are more securely supported by heavier braces which extend to the frame at an angle, attaching it to the side rail web and extending upward to brace the inner skirt.

The stabilized mounting of the front fenders, head lamps and radiator is continued with some design improvements. The support is a heavy, flanged, channel-section stamping mounted on the frame front cross member by two bolts spaced closely together. It is insulated from the frame by rubber cushions above and below the front cross member. The addition of the lower rubber cushion increases the flexibility of the mounting. Fabric shims are provided under the upper rubber cushion. This insures proper relation of the fenders and radiator under all conditions. The radiator is mounted on the support at the

sides instead of at the bottom as heretofore. This improvement results in a stronger, more secure mounting. Separate reinforced arms are bolted to each side of the support for the mounting of the front fenders.

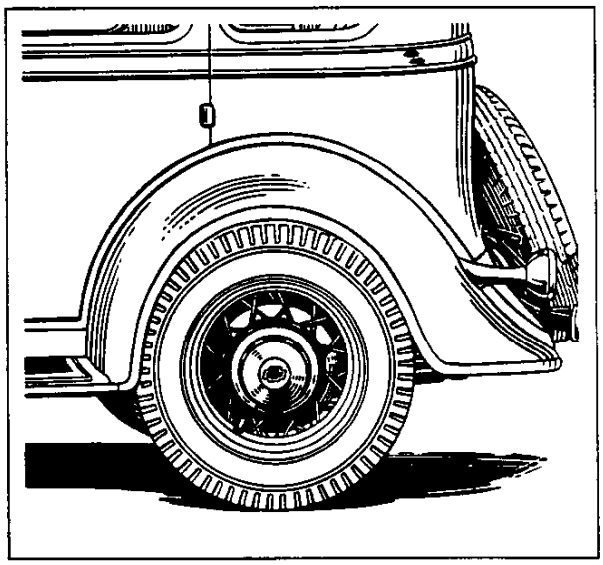
The hood is broader and much longer, extending over the cowl a considerable distance. Because of the shallow "valley" between the hood and the fenders, the side panels are reduced in height and therefore more rigid. A sturdy reinforcing flange is formed along



the lower curved edge of the hood, backing up the wider, tapering bead to further increase the strength and rigidity. A broad pressed steel reinforcement, having a deep channel rib stamped along the middle, reinforces the hood at the central catch to prevent distortion and weave. Three pads of anti-squeak material are securely glued between the side panel and this central reinforcement to prevent rattles and squeaks. Steel-reinforced rubber bumpers are riveted to the front and rear corners of the hood to protect the finish of the cowl and radiator shell when the hood is raised. The single, internal catch at the center of each side panel is stronger because of the increased thickness of the operating lever and smoother in action because of the increased bearing length. The mouldings along the side hinge have a single bead which blends smoothly into the mouldings at the cowl and taper gracefully to a point at the front.

Three tapering, horizontal louvres of varying length extend along the side panels of the hood. Each louvre has a narrow chrome plate moulding along its bottom edge. This louvre treatment lends an air of distinction and accentuates the appearance of great length. To prevent rattling, the two upper louvres are welded to the central vertical reinforcement. The running boards, with integral splash aprons, are of the same general design as formerly. However, to conform to other changes in proportions, they are longer and wider. The curvature and beads are revised to conform to the shape of the front and rear fenders.

The rear fenders are broader, with deeper crowns and a more graceful sweep toward the rear. They present a much smoother and more massive appearance. The outer skirt or valance at the rear is retained, but a baffle is added on the underside of the tail, continuing the circular fender shape to prevent gravel or flying objects from denting the tail of the fender. This baffle also serves to support and brace the valance. The edges of the rear fenders are stiffened by an underturned flange similar to that on the front fenders. Squeaks and rattles are prevented at all of the sheet metal joints by anti-squeak as in the past.



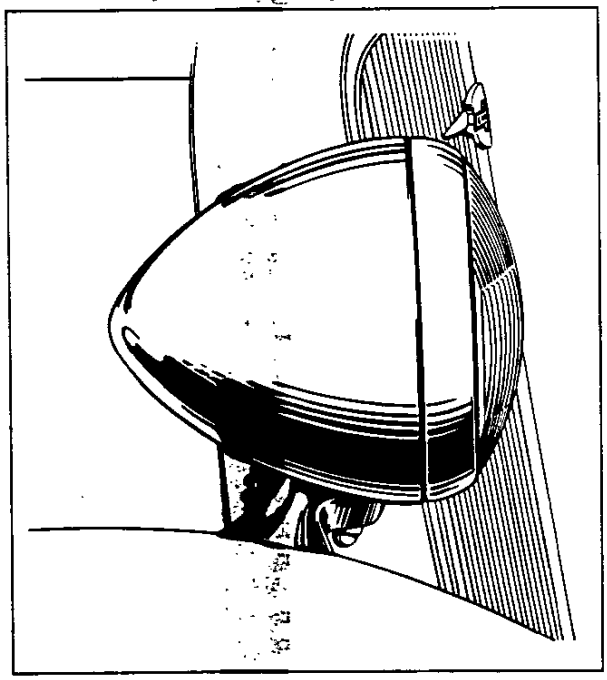
COMPARATIVE SPECIFICATIONS

	1933	1934
Radiator slope	6°	11°

	1933	1934
Radiator "V" angle	142°	135°
Radiator shell width	20-7/8	22-7/8
Radiator shell depth at top	6-1/2	7-1/2
Front fender crown depth	5	5-7/16
Front fender nose above frame	6	1-3/8
Front fender skirt below frame	5-1/16	6-1/8
Front fender skirt corner radius	5	2-9/16
Front fender bead width	3/4	Tapering 1-1/32 to 1-1/2
Front fender edge reinforcement	Wire-rolled in	Flange
Depth of "valley" below top of crown	13-5/8	7-1/8
Front fender valance brace gauge	1/16	3/32
Running board length	46-3/16	49-3/8
Running board width at front	14	14-5/16
Running board bead width	3/4	1
Rear fender crown depth	5-3/8	7-3/16
Rear fender depth at front	2-9/16	5-1/4
Rear fender edge reinforcement	Wire-rolled in	Flange
Running board and fender moulding	None	Stainless steel

ELECTRICAL EQUIPMENT AND INSTRUMENTS

The 1934 Master battery has the same rated capacity as its predecessor, but it has fifteen plates instead of thirteen. The fifteen-plate battery has a higher discharge rate and insures ample current supply over a longer period of time for cold starting. Under this condition, the battery delivers current only until the plates have absorbed all of the electrolyte in the solution which is in direct contact with the plates. With the two additional plates, this absorption requires more time at a given discharge rate, permitting the engine to be cranked continuously for a longer time without discharging the battery.



Interchangeability is maintained by keeping the outside dimensions of the battery the same, so that it fits in the same space as heretofore.

The head lamps are entirely new in design. Their shape and proportions are changed to present an appearance of greater length in harmony with the other appearance features of the car. The diameter is smaller and the length greater. The more convex lenses also add to the longer appearance.

The head lamps are mounted closer to the radiator on sturdy, reinforced, die cast supports of streamline section. These supports extend from their point of attachment on the fenders to the side of the radiator shell. They act as braces in the stabilized front end mounting as heretofore.

The head lamps are of the "Tiltray" type with reflectors having five distinct sections. Each section is scientifically designed to contribute its share to the optically correct vertical distribution of light. The lens is divided into three sections to spread the light horizontally to

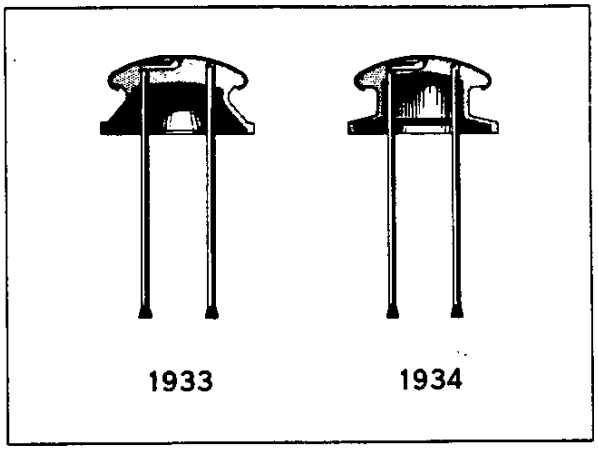
the best advantage. These features, combined with the prefocused bulbs, increase the efficiency of the light output.

The new prefocused bulbs have a flat circular plate, with engagement slots, located very accurately in relation to the filaments. This permits the establishment of a definite and accurate focal length in the manufacture of the bulb and eliminates the necessity for adjusting the focus after assembling the head lamps. The bulbs are held in the reflectors by three small pins which project thru the flat at the apex of the reflector and engage the slots in the bulb collar. The unsymmetrical spacing of the three pins insures proper positioning of the bulbs and the word "Top" stamped on the base of the bulbs gives further indication of the proper position.

The double filament bulb feature functions, as heretofore, with the lower filament located in relation to the reflector, so as to give a driving beam down the road. The upper filament is in such a relation to the reflector as to throw the beam downward just ahead of the car for city driving. In the new head lamps, however, the candlepower of the main driving beam is increased to 32, while the lower beam retains the former 21 candlepower. Separate bulbs for parking are provided, as heretofore.

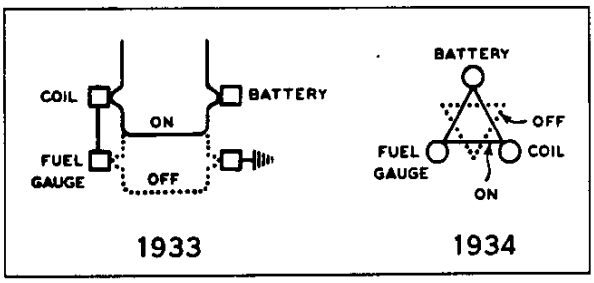
Due to the increased current consumption of the higher candlepower lamp bulbs, the generator is redesigned to charge the battery more uniformly at all speeds and to increase the charging rate when the head lamps are in use. The charging rate, which is relatively high at low engine speeds, tapers off gradually as the engine speed increases, reducing the danger of overcharging the battery. When the head lights are switched off, a resistance is introduced in the generator field, reducing the current output. This resistance unit consists of a small coil mounted on and controlled by the lighting switch. When the head lamps are switched on, the resistance is shorted and the generator output is increased to provide for the increased current demand.

The horn is mounted under the hood on the forward inlet manifold studs. It is of the vibrator type with a long trumpet, thru which a pleasing tone gives ample warning, without startling pedestrians and motorists. The horn button is redesigned to provide more



sensitive control. The soft rubber bellows under the metal button is more flexible, because of its cylindrical section, which terminates in a large, shallow cup base. Flexure occurs at the junction of the base and side walls with very little effort.

The 1934 ignition switch is of the rotary type, with no ground connection. This prevents fires from starting when thieves try to wire around the lock to the ammeter, thereby grounding the wire and building up heat.

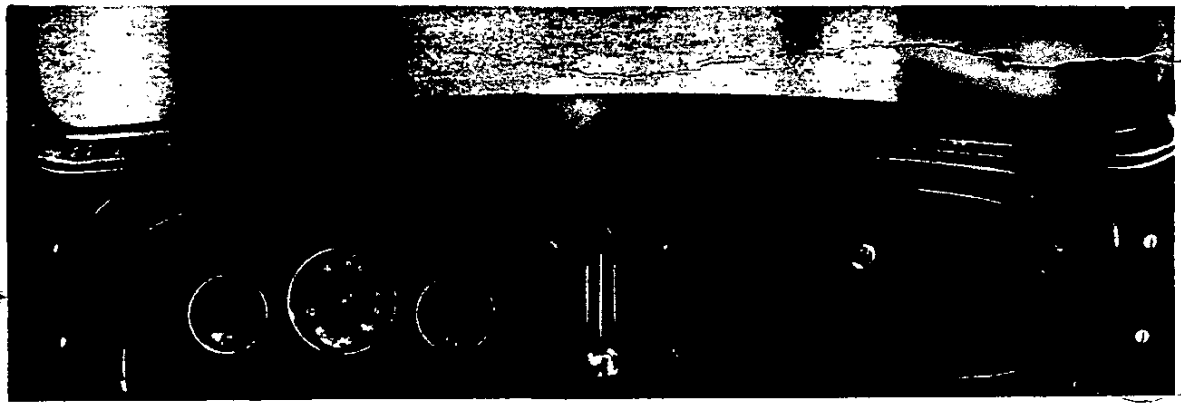


With the new, improved switch, in the off position, there is no connection from the switch to either side of the battery and consequently there is no possibility of building up heat in a wire which might be left connected by a frustrated thief, with the attendant fire hazard. In addition to this safety feature, the lock mechanism is larger, stronger and much more difficult to pick. The lock features are identical with those incorporated in the door locks and are more fully described under body features.

The instrument panel is entirely new and very much improved in design. The instruments are grouped in a separate panel of modified elliptical shape located at the left. At the right, symmetrical with the instrument

group and of identical shape, a storage compartment is added. In the center, the lock and control buttons are grouped in a third panel of modified triangular shape, where they are easily accessible. With this arrangement, the instruments are closer to the driver and therefore easier to read. The instrument panel proper extends across the entire body as before. It is finished in black to form a contrasting background for the instrument carrier panel and the door of the compartment, which are finished to simulate walnut wood and depressed slightly below the face of the main panel. All of the instruments are set deeper in the panel and are narrower on all instruments and covered with clear pyralin. The length of the lighting windows is reduced on the speedometer and increased on the other instruments to also aid in the more effective distribution of light.

At the center of the main instrument panel, a pad of modified triangular shape is raised. The improved ignition switch is mounted at the bottom and the lighting switch, choke and throttle control buttons are mounted at the top in the order mentioned. The control buttons are larger in diameter with the center portion raised. They are of polished bakelite, finished to simulate burl walnut



are surrounded by narrow chrome plated rims of sharp "V" section. The dials of all instruments have a dull black finish at the center surrounded by a shaded black and ivory ring on which the larger figures and bolder graduations appear in ivory. The indicating hands and the lettering at the center of the dials are also ivory. The speedometer, at the center of the instrument carrier, is much larger in diameter. At the left of the speedometer, the gasoline gauge and water temperature indicator are combined. The ammeter and oil gauge are combined at the right. The speedometer lens is more convex to further eliminate glare. The instruments are most effectively illuminated by two bulbs at the back of the carrier, located above and between the three groups and by an improved distribution of light over the surface of each instrument effected by the saucer shape of the new dials. The windows thru which the light shines on the instrument dials with cream letters. The bushing flanges, which secure the controls to the panel, are nickel plated as before. Three narrow, chrome-plated mouldings set vertically in the center of the control panel, adding to the appearance. The storage compartment, built into the right side of the instrument panel, is 6 inches high at the center, 14-1/4 inches in width and has a depth of 7 inches, providing ample space for the many things which are essential to the motorist, such as gloves, maps, papers and small tools. The compartment is closed by a sturdy pressed steel door with a heavy reinforcing wire rolled in around the entire periphery. The reinforcing wire terminates in two hinge hooks at the bottom. The chrome plated knob at the top is provided with a lock barrel and two keys to insure the safety of the contents. The compartment is lined with a cloth-covered waterproof fabric. The instrument panel is well reinforced along its lower edge at both sides.

COMPARATIVE SPECIFICATIONS

	1933	1934
Number of plates in battery	13	15
Head lamp type	Twilite	Tiltray
Head lamp bulb type	Two pin bayonet	Prefocused
Head lamp bulb candlepower	21-21	32-21
Head lamp length	9-1/16	9-13/16
Head lamp diameter	9-1/8	8-13/16
Head lamp lens convex radius	12	6-1/2
Horn location	Outside	Under hood
Horn button diaphragm shape	Deep cone	Shallow cone
Ignition switch type	Grounded	Non-grounded
Ignition switch operation	Push and turn	Rotary
Instrument location	At center	At left
Controls	Scattered	In panel at center
Storage compartment	None	At right
Instrument carrier finish	Striped	Burl walnut
Instrument dial finish	Black-white figures	Shaded-ivory figures
Speedometer dial diameter	3	4-1/8
Speedometer lens curvature	10 Radius	6-1/2 Radius
Location of instrument bulbs	Below	Above
Control button diameter	7/8	1
Control button finish	Black	Burl walnut
Control button lettering	White	Cream

RADIATOR

The radiator core is of the same ribbed, cellular type which has proved so efficient in cooling the 1933 jobs. The increased speed and power output of the new engine, however, requires increased cooling ability in the radiator. Therefore, the core is made entirely of copper, which has the ability to conduct more heat.

Another important factor in the improved cooling of the 1934 Master models is the addition of a baffle chamber in the upper tank. This chamber is of inverted "V" shape and is located at the center of the upper tank around the inlet fitting. At high speed and on heavy-pulls, the water temperature and velocity increases, building up pressure in the baffle chamber. This local pressure forces the hot water to pass downward thru the center passages of the core, where it is cooled most effectively by the fan blast. The hot water in the baffle chamber, which cannot be handled instantly by the center core passages, is discharged thru the ends of the baffle chamber and is diffused by contact with the water in the upper part of the tank, almost eliminating the turbulence in the top tank. The core passages at the sides,

beyond the influence of the baffle action, continue to conduct the water downward from the upper tank by gravity and suction.

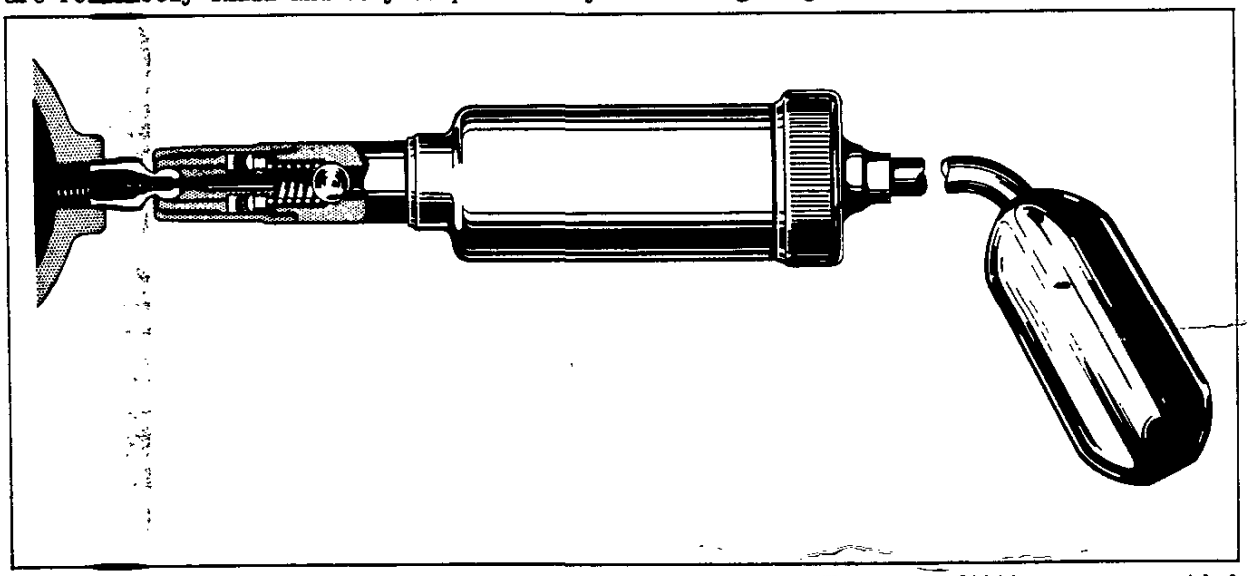
The mounting of the radiator core in the shell is improved. The shell reinforcement is of deep angle section. The upper flange is bolted to the shell at six points and the forward flange is bolted to the side wings attached to the core. The core mounting to the support bracket is at the sides. The tie bar is of heavy stock formed to a "U" section and placed ahead of the radiator core, providing more space at the rear for the fan.

COMPARATIVE SPECIFICATIONS

	1933	1934
Radiator core material	Brass	Copper
Radiator tie bar thickness	1/16	3/16
Radiator tie bar location	Back of core	Ahead of core
Baffle chamber	None	In top tank

TOOLS

During the 1933 season, a new type of chassis lubrication system was adopted. This new and improved means of lubrication is continued in the 1934 models and is known as the "Alemite hydraulic lubricating system". The fittings are relatively small and very compact. They



have a hexagonal shoulder at the middle with a pipe thread at the inner end and a flattened ball at the outer end. Their short, compact proportions insure greater durability, making the fittings less subject to breakage from contact with flying stones, etc. The new ball-end fitting permits the grease gun connector to grasp the fitting with a light spring pressure when the contact is first made, and with a vise-like grip when pressure is applied to the grease. The greater the grease pressure, the tighter the connector grasps the fitting. The new style fittings and the gun, which is supplied with them, make possible the application of much higher pressures to all lubrication points. This provides more effective lubricating, insuring longer life of the bearing parts so lubricated. These new fittings are provided at 19 points on the chassis.

The jack, which is furnished as tool equipment, is strengthened and redesigned to meet the needs of the new chassis. It is low enough and has sufficient lift to jack up both the front and rear ends of the car. In operating this jack at the front end in connection with the new independent wheel suspension, the jack is placed under the king pin support and the entire front end of the frame is lifted. During the first part of

the lift, the wheel will not leave the ground until the frame has been lifted a sufficient distance to bring the stop on the inner lever into contact with the bottom of the front spring housing. At this point, the wheel will begin to leave the ground. The application and operation of the jack at the rear remains as heretofore.

COMPARATIVE SPECIFICATIONS

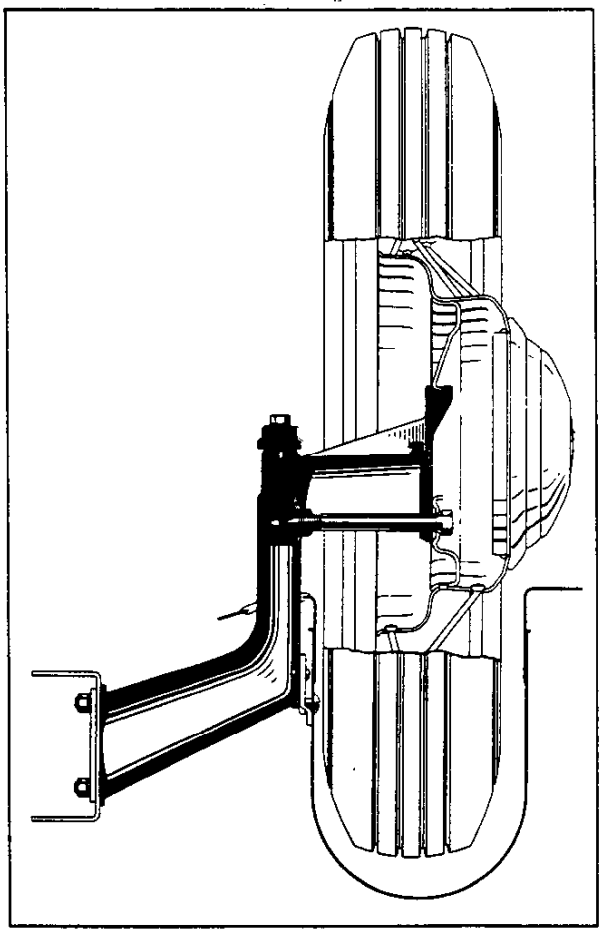
	1933	1934
Type of lubricating fittings	Alemite bayonet	Alemite hydraulic
Jack lift	6	12

WHEEL CARRIER

The spare wheel carrier at the rear is identical with the 1933 carrier with the addition of a spacer which provides clearance for the larger tire.

The side or fender well wheel carrier is improved in strength, appearance and convenience. Instead of being supported by the fender well and its braces, as before, the spare wheel is supported independently from the frame, without contacting the well at any point and without unsightly brace rods. The sturdy support bracket is stamped in halves and securely butt welded together. It is conical in shape with a strong, ribbed four-bolt flange which attaches to the frame side rail. A forged pilot is butt welded to the top of the support. The malleable iron bracket, on which the wheel rests, is of "U" section, well ribbed for strength. This bears on the pilot and is held down resiliently by means of a coil spring, a cap and a bolt. Milled notches are provided in the lower face of the wheel bracket to engage a thru pin in the pilot in two positions. The wheel hub rests in a groove at the top of the bracket and is held firmly to the bracket laterally by a long bolt, having a bevel seated head, which reaches thru the "U" section of the bracket to engage the pilot. A reinforcement riveted to the frame support bracket provides for the bracing of the fender well to the bracket. A rubber grommet seals the hole in the fender thru which the frame bracket projects.

In operation, the new fender well wheel carrier functions as follows:- To remove the wheel and tire, the hub cap is first removed. Then the single bolt which attaches the wheel hub to the carrier is removed. To entirely disengage the wheel from the well, it is necessary only to lift the wheel from the bracket, swinging the bracket to the rear, after which the wheel can be removed as usual.



COMPARATIVE SPECIFICATIONS

	1933	1934
Side wheel carrier mounting	In fender	On frame
Type of mounting	Rigid	Swiveled

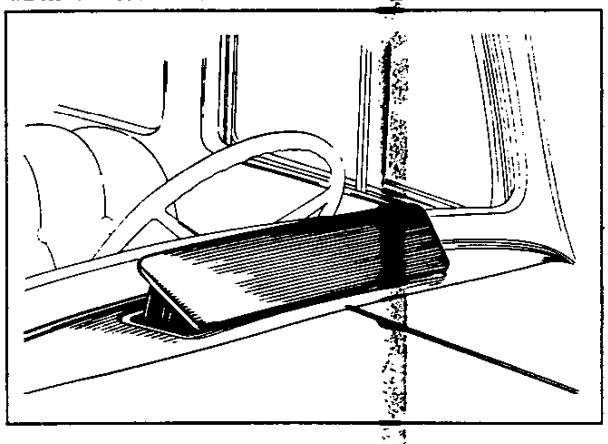
BODIES

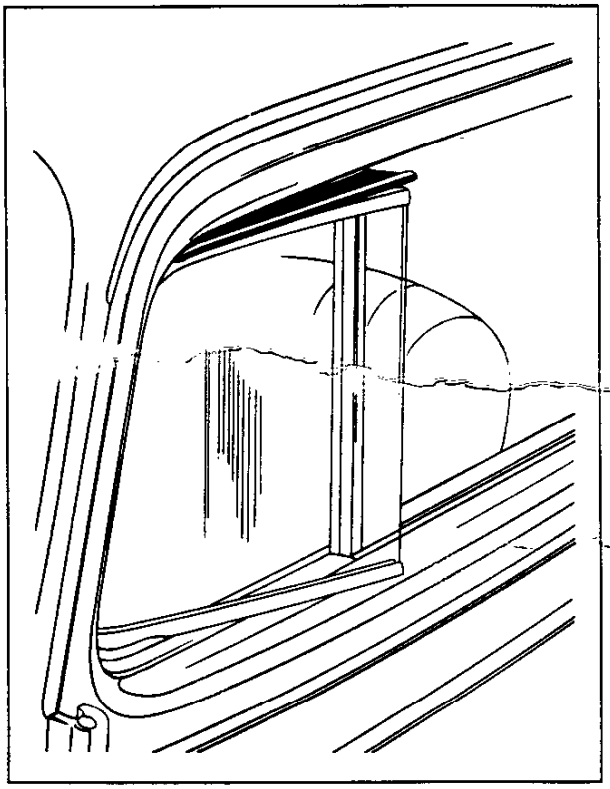
The 1934 line of Master passenger model types includes the Sedan, Coach, Town Sedan, two-passenger Coupe, Sport Coupe (with rumble seat), Cabriolet and Sport Roadster. All of the bodies are approximately 3-3/4 inches longer, with the cowl lengthened 1-3/4 inches and 2 inches added to the width of the closed body front doors. On the interior of the closed bodies, the increased overall length is divided to provide 1-1/4 inches more leg room in the front seat and 2-1/2 inches more leg room in the rear seat.

The same smart beaver tail design and flowing stream lines, which characterized the 1933 closed bodies, are continued in the 1934 line with modifications. The front header panel, just above the windshield, is smoother and more rounded. This is accomplished by the omission of one of the moulding lines at this point.

The windshield on all closed bodies is sealed more effectively against leakage of rain at the lower edge. The rubber insulation is made in a single piece with the glass seated deeper in it. The rubber is moulded with the outer sealing lip turned inward so as to insure sufficient pressure between it and the windshield glass to make a tight joint. The outside decorative moulding is moulded into the rubber. With this new arrangement, the joint area is increased and all outer surfaces drain away from the glass, eliminating any pockets or gutters which might cause leaks.

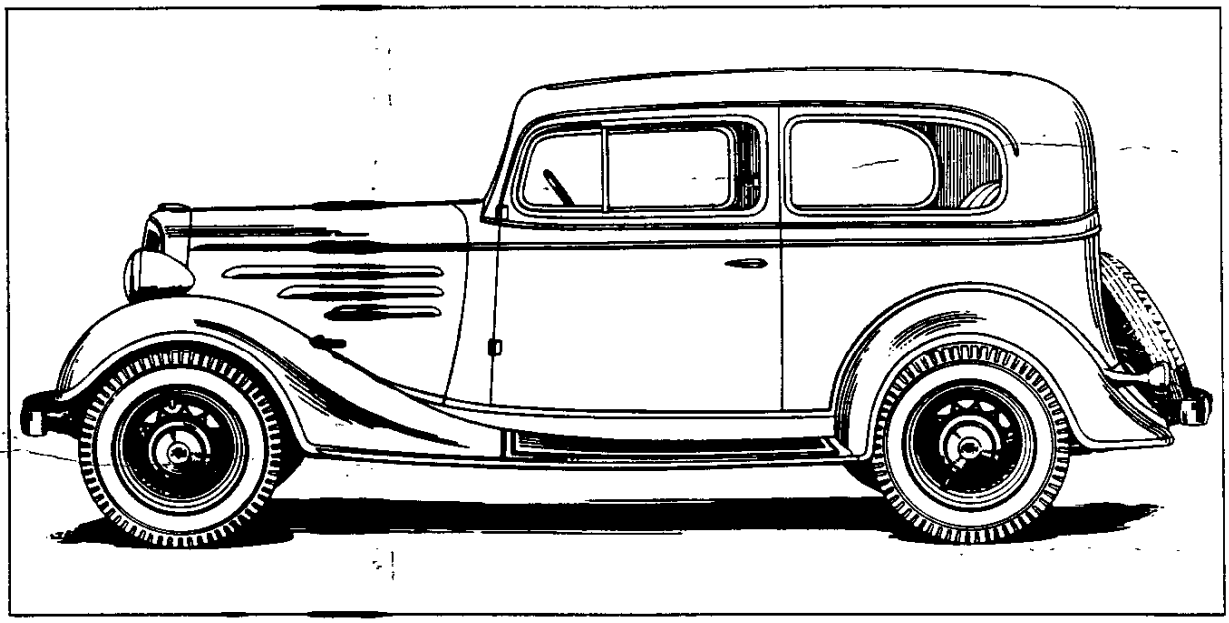
The cowl ventilator is located closer to the windshield, with its screened opening facing toward the rear. It is controlled by a lever with a neat die cast knob located farther toward the left where it is more easily accessible to the driver. The air, which enters thru the rust-proofed screen at high speed, is divided by a central deflector which diverts the air toward the sides, insuring better ventilation, because of more uniform distribution of the air.





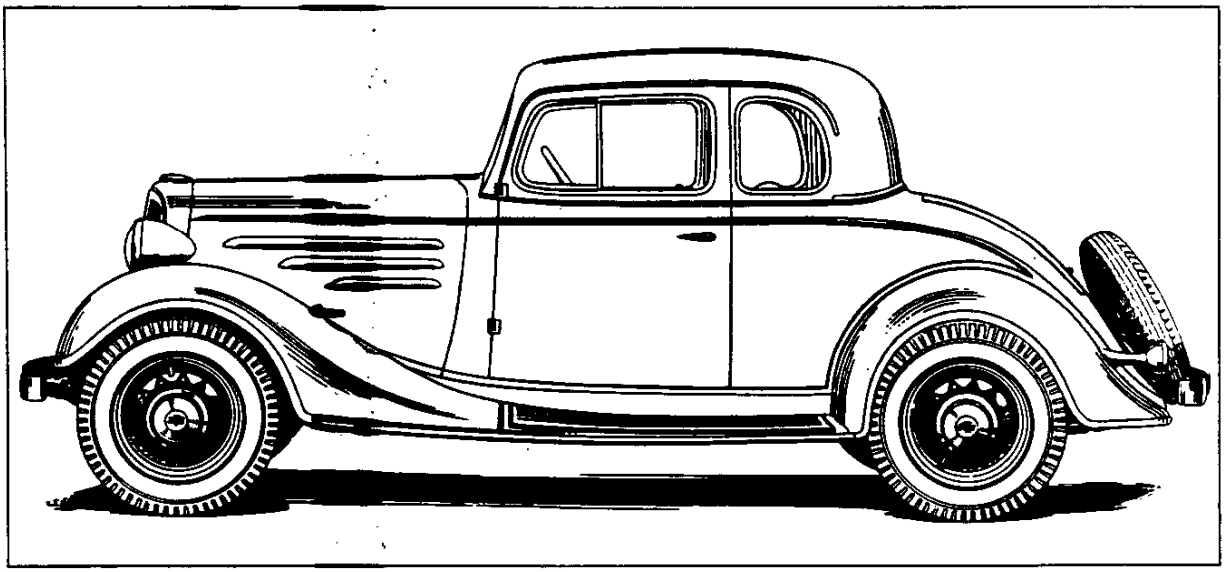
The No-Draft Ventilators in the front windows of the Sedan and the four-window coupe are wider, balancing the increased width of the front doors and providing more controllable ventilation. All No-Draft Ventilators close against a stationary, chrome-plated pillar at the edge of the main window glass. They are operated by attractive crank handles thru a low ratio regulator gear which insures quick operation. Deflectors are added over each of the front door ventilators to exclude rain when the ventilator is open and to prevent down draft. They extend outward from the doors just above the edge of the ventilators and have a rolled gutter at their outer edges to catch rain and to insure stiffness. They are finished in body color.

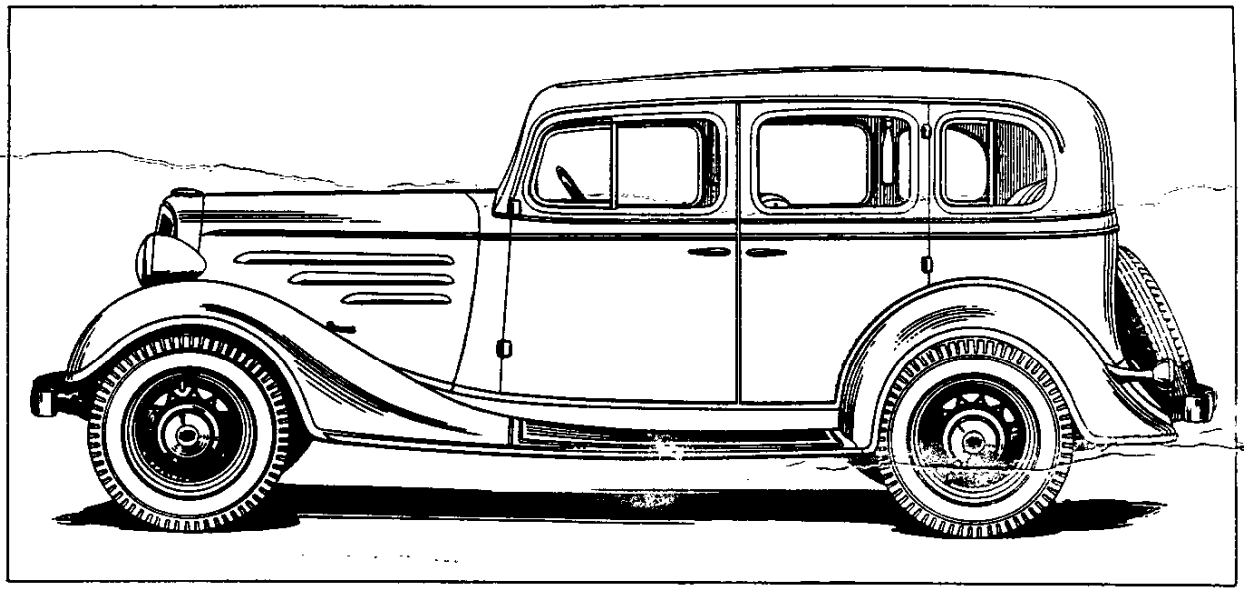
The doors in all closed bodies include several



features which prevent rattles. The dovetails are redesigned to eliminate sticking and to prevent movement of the door when closed. They retain the ejector principle in which the wedge is forced out by squeezing. The rubber member is much stiffer and incorporates coil springs, preventing door movement at the latch.

The striker plates are made of steel instead of die castings and have square faces which present more contact area, reducing unit pressure and holding lubrication longer. The lock bolts are of half-round section, centrally seated in half-round seats. Spring tension in the lock mechanism keeps the bolts in their seats, preventing side movement and the clicking noise which results from it. In all front doors, a diagonal brace is added from the center of the hinge side to the lower corner of the lock side to prevent sagging and vertical movement of the doors. A screw adjustment, which is accessible from below when the doors are open, permits the application of tension on the added brace to

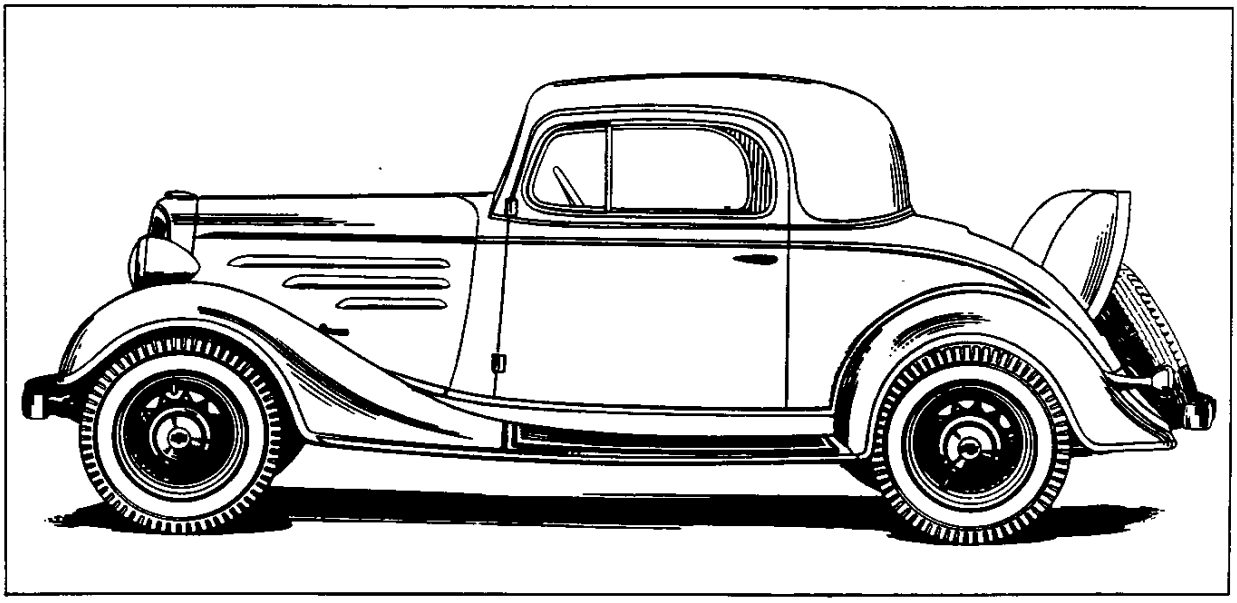


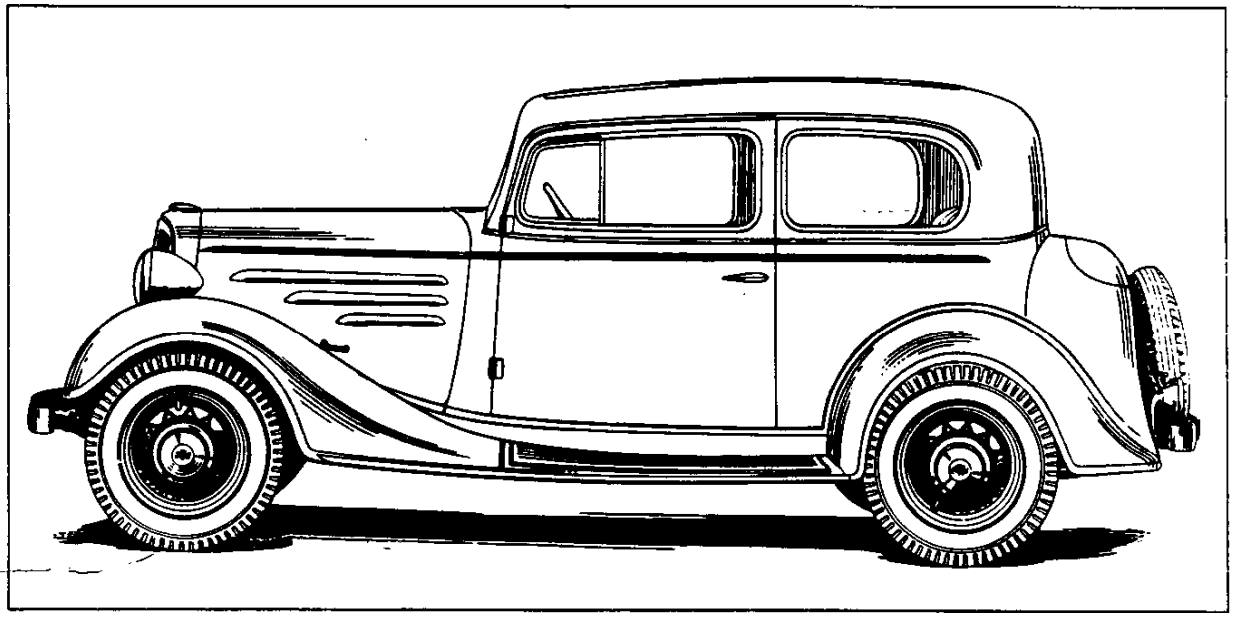


compensate for warpage and misalignment. The exposed portion of the door hinges is shorter, carrying the load of the doors closer to their points of support on the pillars, insuring more rigid mounting and presenting a neater appearance.

The outside door handles are neat, slender and streamlined. Their length insures a good grip and their slenderness improves the appearance and harmonizes with the flowing external lines of the car.

The lock mechanism, built into the right hand front door handle, is improved in design, incorporating features which have never before been available in automotive locks. Locks, at best, can only deter and delay the thief from entry. They cannot absolutely insure the exclusion of unauthorized persons, because they are usually limited to a size which precludes the incorporation of sufficient material to prevent destruction. In the 1934 door locks, many features have been added to prevent the average thief from defeating the lock within a length of time



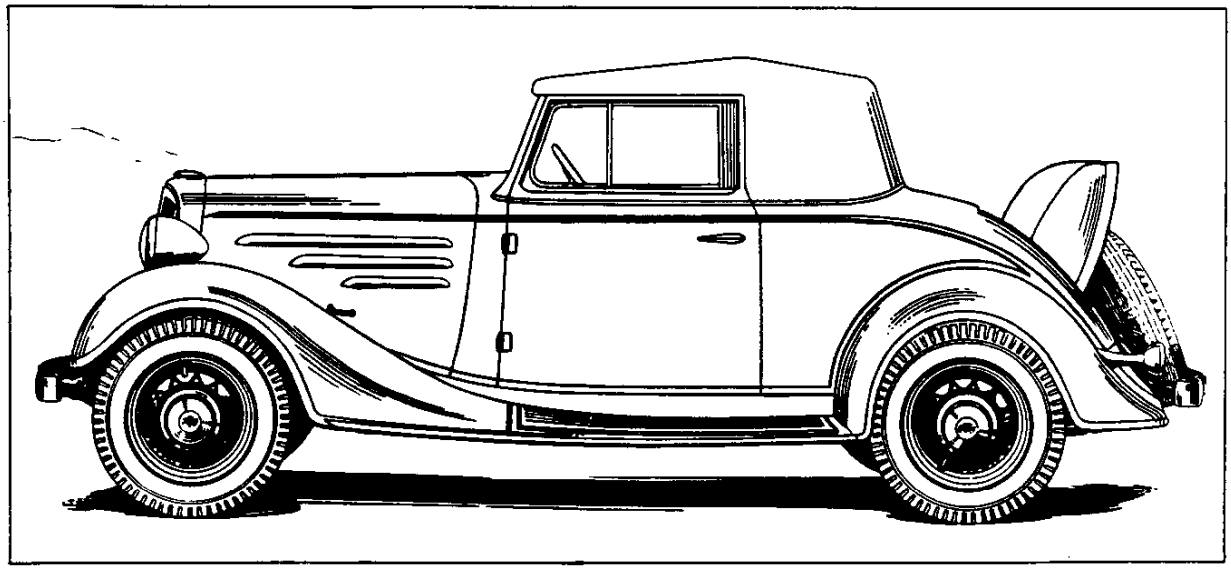


which the experience of the insurance underwriters indicates to be reasonable.

The keys bear no number for the enlightenment of the thief. However, provision is made to permit the owner to have full knowledge of his key numbers. When the car is purchased, each key is furnished with an integral tab upon which the key number is marked. A record of this number is made by the owner, after which the tab is broken from the key and destroyed.

Instead of the usual 200 different keys for all cars, 1000 key changes are provided with the new locks. This results in a reduction in a thief's chances of finding the proper key by the "cut and try" method to only 20 percent of his former chances.

Experience has already shown that this cumbersome method would undoubtedly require more time than a thief can safely afford to spend on any one "job". Another feature is the matching of keys to fit both the door lock and the ignition lock. To further prevent "forcing" the lock, the handles



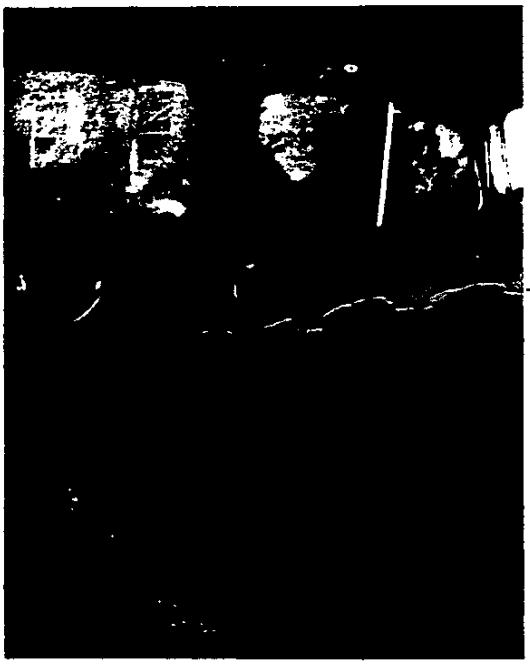
containing key locks are free turning when looked. They are arranged to return to their horizontal position automatically, as heretofore. When the key is turned in the lock and removed, a slide snaps in place over the key opening. This slide protects the lock from dust.

The interior remote door lock control handles are relocated to set in an upright position. The window and ventilator cranks have large bakelite knobs finished to simulate walnut wood. They are located to permit comfortable operation and to avoid interference with the driver's knees.

The left front doors of all closed bodies have an arm rest built in. The rest is very softly cushioned to provide a comfortable support for the driver's left forearm, relieving fatigue on long drives.

The instrument and control carriers, with the storage compartment already described, set in the body instrument panel, which is finished in body color and has a walnut finished panel extending along the instrument panel header. The new instrument arrangement, in combination with the other features of the driving compartment, contribute to the comfort of the driver and present a neater, more distinctive appearance.

All window mouldings in the closed bodies have walnut finish and the redesigned interior equipment consists of the same articles used in the 1933 bodies. The ash receivers at the top of the rear seat in the Sedan and at each side of the rear seat in the Coach and Town Sedan are located in more convenient positions and are built into the trim of the body to present a much neater appearance. The foot rest in the Sedan is reversed to fold toward the rear. This prevents the rest from folding up when foot pressure is applied. The dome light in the Sedan, Coach and Town Sedan is located farther forward to provide better illumination in the front compartment. The front seat adjustment latch in all bodies is located at the left, where it is much more accessible and permits operation by the driver without causing him to assume an uncomfortable position. In the Sport and Coupe and the Cabriolet bodies, the seat guides are of spring steel, which exerts pressure to prevent the front seat from rattling when occupied only by the driver. The right hand bucket seat in the Coach and Town Sedan is also more rigidly mounted for the same purpose.



The seat and back cushion construction in all closed bodies is improved to insure greater comfort. In the seat cushions, those coil springs on which the load is supported are laced at the top with piano wire to provide a strong network which prevents any individual spring from pushing up thru the padding. The front row of coil springs in the seat cushion is clipped together as before. The front seat cushions are mounted on wood frames. In the seat back cushions the three upper rows of coil springs are held together by burlap strips which act as snubbers, deadening the noise of spring movement. A higher grade padding is used in the cushions to insure longer life. The seat and back trim is pleated, as before, with narrower seams.

The framework in all closed bodies is improved by many minor features, all of which combine to increase the strength of the body structure and prevent rattles and squeaks. The braces from the cowl rail to the pillars are strengthened by the addition of a web in the corners. The attachment of the roof structure at the front end is strengthened by the use of more bolts.

The rear end structure is given additional vertical support, as well as greater cross rigidity, by the addition of two steel braces which extend diagonally from the rear sills up to the rear belt.

The attachment of the body panels to the framing is improved by the use of bolts instead of nails to fasten the roof panels around the inner edges of the crown rails. More bolts are used to hold the wheelhouse panels more securely to the body sills. The rear end of the body is more rigidly attached to the chassis, due to the reinforcing effect of the rear sill corner brackets and the increased number of bolts used to attach these brackets to the sills.

The interior body trimming is of the same general type used in the 1933 bodies. The head lining, however, is attached to the roof slats by a new method of "listing". In the new 1934 closed bodies, the head lining is supported by spring wires curved to the contour of the roof and corners. This presents a neater, smoother appearance and lowers the trim beading to the lower edge of the roof rails.

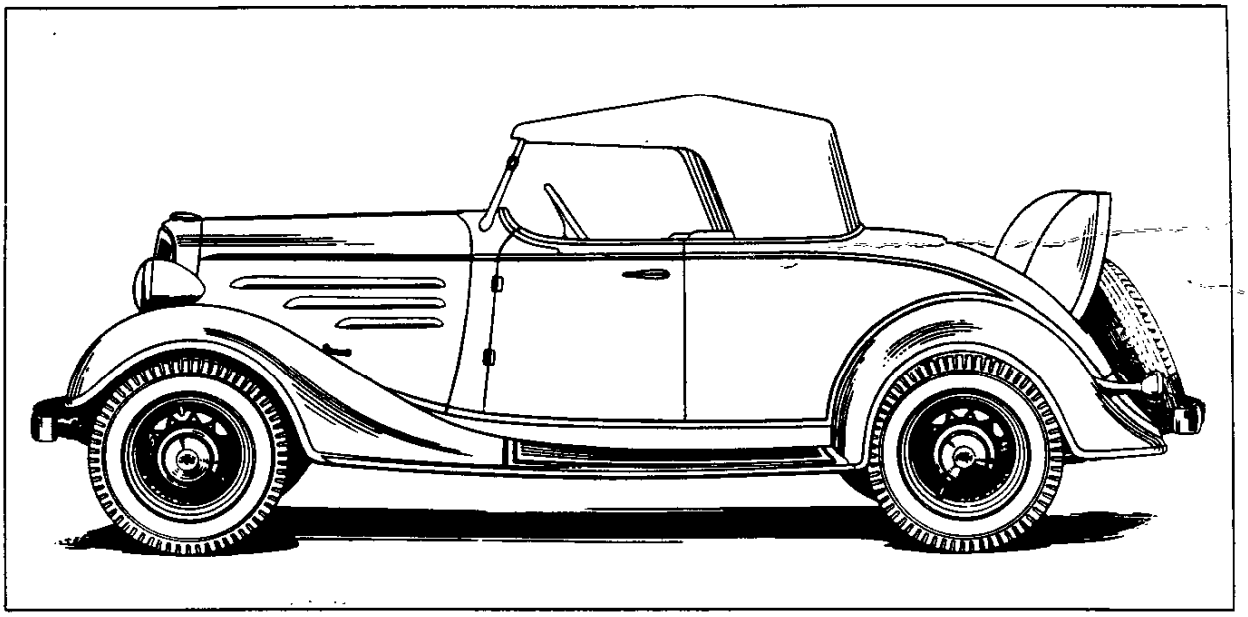
The insulation and sealing of all closed bodies against heat, cold, noise, fumes and weather is more complete and thorough than ever before. The front floor is imbedded in felt at all support points, providing complete sealing and preventing squeaks. Insulation completely seals all floor openings and all openings for wiring are also positively sealed. Wherever steel plates are used to cover openings, an insulating lining is applied to all exposed surfaces of the plate to insulate against heat and noise. At the pedals and steering column, insulation is provided by a heavy seal of high grade felt installed under compression. Sponge rubber seals are also installed under compression at the gear shift and hand brake lever openings to insulate against noise, heat and road splash. The dash is more effectively insulated against the entrance of heat and noise by the addition of a celotex lining between the dash and the regular dash mat. At the rear of the body, the floor and seat pans are more securely attached by the use of more screws, bolts and nails, sealing the body more effectively against the entrance of air and fumes. The floor mat jute lining is sprayed with a latex coating to resist moisture and to resist shedding of the jute fibers.

The floor mat is entirely new in design and very easy to clean. Its surface is ribbed fore and aft on the toe boards and crosswise on the floor. This permits brushing dirt in a natural direction without interference of the ribs.

In the Coach and Town Sedan, a tool compartment for small tools is located under the right front seat, while the larger tools are carried in a compartment back of the rear seat. Both these compartments are lined with jute to prevent the tools from rattling against the steel panels. In all other body models, the tools are carried in the full width compartment under the front seat.

SPORT ROADSTER

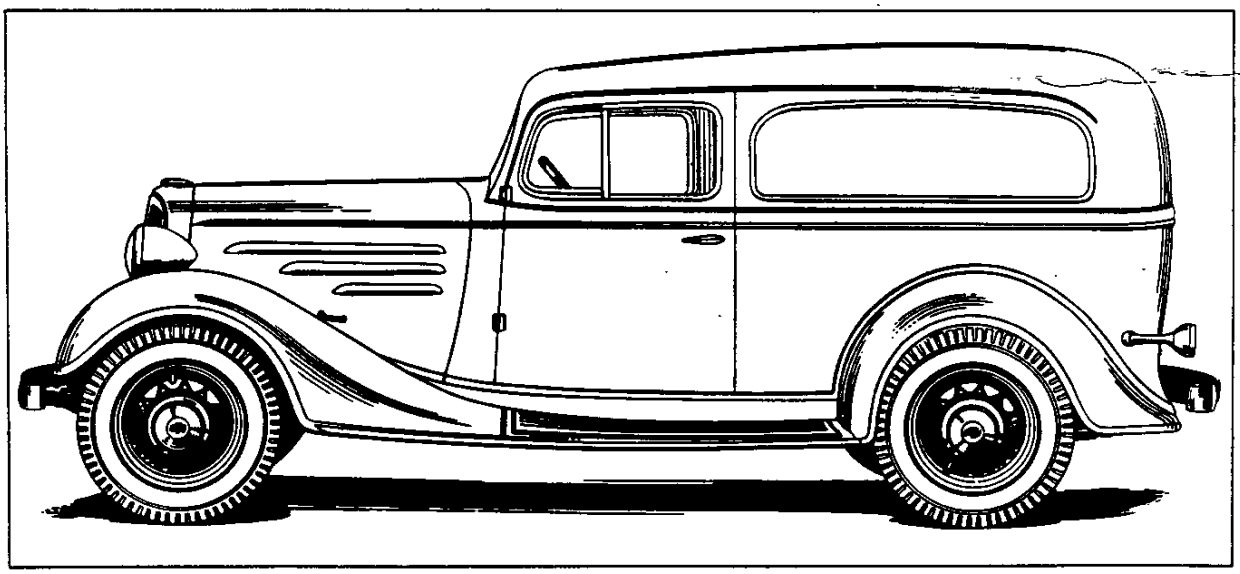
The Sport Roadster, which is now the only strictly open body, retains all of its individuality as a roadster, but also includes many of the closed body features. The body is 3-3/4 inches longer, providing more leg room in the rumble seat and a wider compartment back of the front seat for the top to fold into. The top is longer and much better



looking. The windshield is approximately 2 inches wider. This increase in length and width adds greatly to the appearance of this model. The cushions are softer and much more comfortable. The insulation at the floor is the same as that of the closed bodies, as is the instrument, control and storage compartment arrangement.

SEDAN DELIVERY

Contrary to past practice, the Sedan Delivery is built on the passenger car chassis. It includes all of the chassis features of the passenger line and the body is identical with the Sedan forward of the load carrying platform, except for the seats which are the 1934 Coach bucket seats with imitation leather upholstery. The leg room is 3-3/4 inches greater than in the 1933 model. The rear end of the Sedan Delivery body has a pleasing beaver tail shape similar to the Half Ton Truck panel body. The body side panels are stamped in one piece with the mouldings integral. The



side advertising panels are longer and symmetrical at the front and rear, presenting a more attractive appearance. The side doors are 3-1/2 inches wider at the center and 4-3/4 inches wider at the bottom. The side moulding treatment is similar to that of the Sedan. The loading space is longer, wider and slightly lower. As special equipment, which may be installed in the factory at additional cost, the advertising panels may be replaced by glass with a regulator arrangement. This is an advantage for some business purposes and also permits the use of the loading space for carrying passengers.

COMPARATIVE SPECIFICATIONS

	1933	1934
CLOSED BODIES		
Cowl ventilator length at front	8-11/16	8-13/32
Cowl ventilator length at rear	9-1/16	9-1/2
Cowl ventilator width	5-3/32	4-3/4
Cowl ventilator opening direction	Front	Rear
Front door width (Sedan)	31	33
Front door width (Coach - Town Sedan)	38-3/8	40-19/64
Front door width (Coupe)	31	33
N.D.Ventilator width (Sedan and Coupes)	10-3/8	12
SPORT ROADSTER		
Top length	46-5/8	50-3/8
Windshield width	42-9/16	43-3/4
SEDAN DELIVERY		
Platform length	57-1/2	60
Load space width at belt	51	52
Load space height at center bow	44-1/2	42-1/2

SPECIAL EQUIPMENT

For the motorist who wishes equipment in addition to that furnished with the car as standard, a complete line of accessories is provided. Each accessory is designed to fit and to cooperate with the car as it is built in production and each includes the same high grade materials and workmanship found in all Chevrolet products. The following list includes all available Chevrolet accessories, and the detail descriptions following the list cover only those accessories which are new or different from the 1933 product:-

Onyx gearshift lever knob.
Drum type metal tire cover.
Ring type metal tire cover.
Ornamental radiator filler cap.
Radiator filler cap lock.
Front bumper.
Rear bumper.
Bumper guard.
Rear view mirror with clock.
Rear view mirror with electric clock.
Battery charger.
Gasoline tank locking cap.
Wheel moulding.
Locking hub cap.
Spot lamp.
License plate frame.
Cigarette lighter.
Ash receiver.
Sun visor glare shield.
Deluxe luggage carrier and rack.
Extension luggage carrier and rack.
Luggage rack.
Sun shade- right hand.
Six tube, double unit radio.
Five tube, single unit radio.
Hot water heater.
Hot water super-heater.

DRUM TYPE METAL TIRE COVER

This beautiful pressed steel cover entirely hides the spare wheel and tire. It is made of two stampings, the inner one extending from the center of the tire tread over the inner side, while the outer one extends to the center of the wheel. The hub cap assembles

outside of the cover to present a neat, finished appearance and to assist in holding the cover in place. The joint between the two halves of the cover is hidden by a wide stainless steel moulding. Another decorative stainless steel moulding on the outer cover member breaks up the large circular surface, and further improves the appearance. The two halves of the cover are securely held together by spring clips.

ONYX GEARSHIFT LEVER KNOB

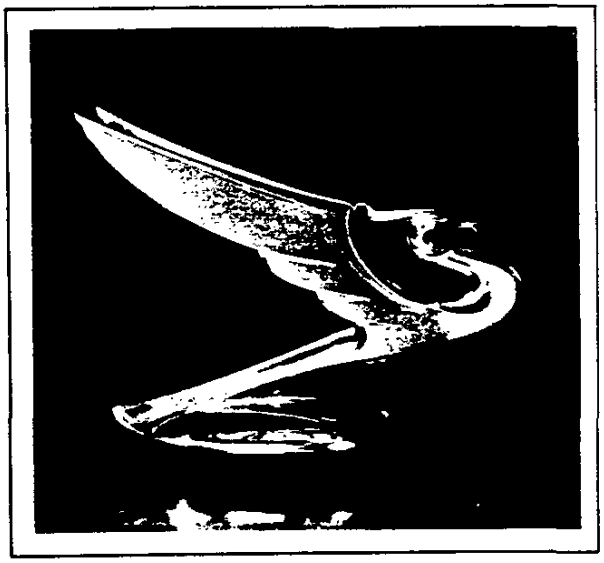
This attractive knob is made of a moulded composition finished to simulate onyx. It has a soft rubber core to provide a resilient mounting.

RING TYPE METAL TIRE COVER

A ring type tire cover is also supplied. It is similar to the drum type cover in design, except that it extends only over the tire, leaving the hub and spokes of the wheel visible.

ORNAMENTAL RADIATOR FILLER CAP

For the motorist who wishes to add more distinctive appearance to his car, an ornamental radiator filler cap is provided. This



cap is very modern in appearance and is designed to harmonize with the flowing lines of the car.

BUMPERS

Front and rear bumpers are supplied as special equipment. They are designed to harmonize with the other appearance features of the car. The rear bumper is the same as in 1933. The front bumper is redesigned with two back bars which provides greater flexibility at the center and increases the rigidity at the ends.

BUMPER GUARDS

Sturdy, chrome plated guards are available for use on both front and rear bumpers. They bolt to the impact bars of the bumpers in a vertical position, increasing the range of protection.

REAR VIEW MIRROR WITH CLOCK

Two rear view mirrors with built-in clocks are available. The pull winding type runs for 30 hours without rewinding. It has white hands and numerals on a black dial, which is located at the right of the mirror. The mirror with the electric clock is much more decorative with a gilded finish around its edges and chrome finished hands and numerals. It is equipped with the necessary length of wire to connect it to the electrical system.

BATTERY CHARGER

For the convenience of the motorist who has many electrical accessories on his car to overload his standard electrical system, a battery charger is available. It consists of a separate charging unit connected to a socket on the instrument panel with provision for plugging into a lighting socket.

HOT WATER HEATERS

A choice of two different hot water heaters is provided for Chevrolet car owners. These heaters are very efficient in operation. One is of the outdraft type, designed for ordinary winter driving. The other is a superheater which provides a maximum of comfort at extremely low temperatures. Each is equipped with a two speed motor and adjustable deflectors.

A high temperature thermostat and all necessary

attaching parts are also furnished with each unit.

A permanent type of anti-freeze is necessary with the super-heater, while that of the out-draft type is adaptable for use with any anti-freeze solution.

GASOLINE TANK LOCKING CAP

To afford protection against theft of fuel from the gasoline tank, a locking cap is available. This sturdy cast cap has a lock unit built into it and two keys are supplied. The cap is finished in bright chrome plate.

WHEEL MOULDING

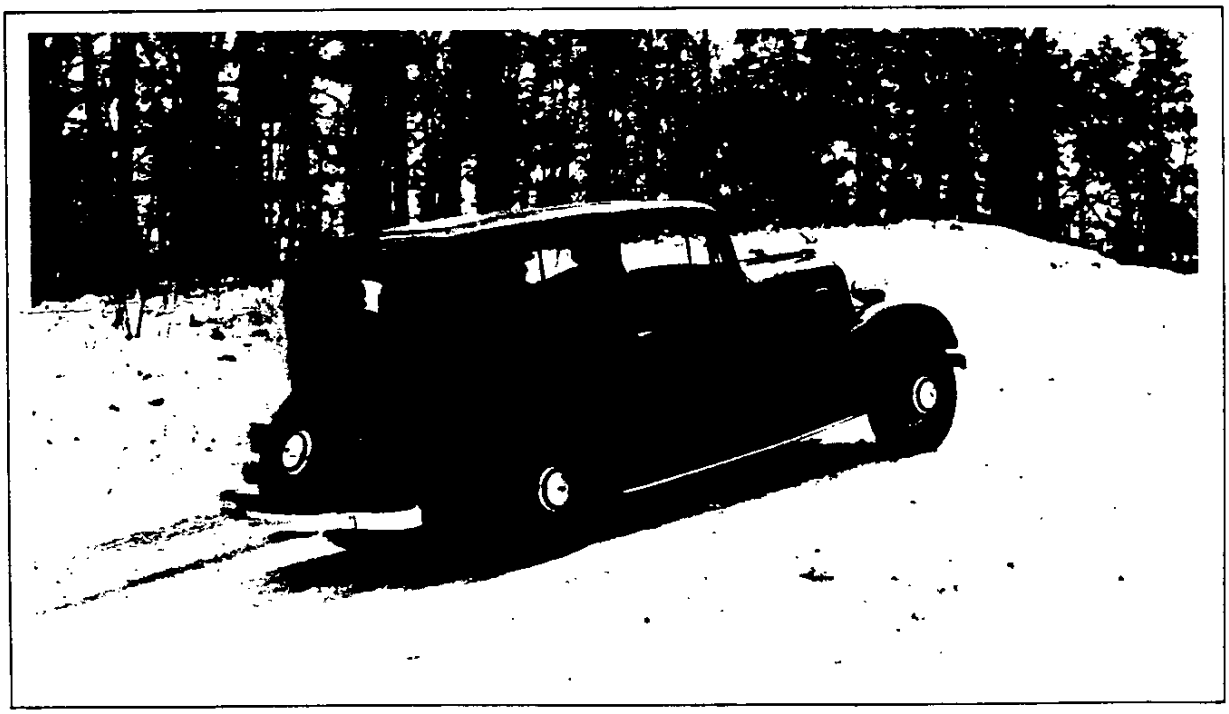
A special wheel moulding, in bright chrome finish, is supplied to add a further note of distinction to the beautiful wire wheels. This moulding is in the form of a ring which attaches to the wheel rim by means of serrations and spring pressure.

LOCKING HUB CAP

Special hub caps which may be securely locked in place are supplied at the assembly plants at additional cost for the spare wheels. They are beautifully finished in chrome plate and equipped with balanced internal locking mechanism.

CIGARETTE LIGHTER

The cigarette lighter is designed to mount in the center of the control panel, replacing the central moulding. The metal parts are beautifully finished in bright chrome plate and the lighter knob is finished to simulate onyx.



STANDARD
1934
ENGINEERING
FEATURES

CHEVROLET

NEW FEATURES IN THE 1934 STANDARD MODELS

FRAME

1. Increased tread at front.
2. Wider frame.
3. Increased front bumper mounting spread.
4. Wider side rail flanges.
5. Sub-frames added.
6. Improved battery hanger.

EXHAUST SYSTEM

7. Heavier, smaller diameter exhaust pipe.
8. Improved exhaust pipe packing.
9. Improved muffler mounting.

SPRINGS

10. Parallel front springs.
11. Wider spring center distance.
12. Heavier front springs.

FRONT AXLE

13. Longer and heavier I beam.
14. Improved load distribution.
15. Heavier spring seat pads.
16. Wider lower I beam flange.

REAR AXLE

17. Improved load distribution.
18. Heavier gauge axle housing.
19. Larger diameter pinion shaft.
20. Roller bearing at rear of pinion shaft.
21. Improved rear bearing retainer.

BRAKES

22. Double-articulated brakes – front and rear.
23. Longer, lower brake shoes.
24. Increased lining area.
25. Cable operated rear brakes.
26. Simplified brake linkage.
27. Hand brake lever mounted on frame.

ENGINE

28. Smoother and quieter operation.
29. Improved cold operation at low speeds.
30. Increased compression ratio.
31. Water control nozzles.
32. Thicker cylinder head gasket.
33. Larger diameter camshaft.
34. Improved cam contour.
35. Increased exhaust valve lash.
36. Tappet springs added.
37. Improved push rod seats.
38. Thicker wall rocker arm bushings.
39. Wider valve seats.
40. Normalized exhaust valves.
41. Lighter valve spring pressure.
42. Stronger valve stem key.
43. Heat-treated valve spring cap.
44. Cylinder bores micromatically honed.
45. Narrower compression rings.
46. Improved piston relief contour.
47. Tempered piston pins.
48. Improved by-pass oil screen.
49. Ribbed timing gear cover flange.
50. Push rod cover insulated by rubber grommets.
51. Rocker cover insulated by rubber grommets.
52. Improved fuel distribution in inlet manifold.
53. Insulator added between carburetor and manifold.
54. Thermostatic heat control with counterbalance weight.
55. More durable manifold gaskets.
56. Improved carburetion.
57. More compact fuel pump.
58. Provision for improved timing adjustment.
59. Cushion balanced engine mountings.

CLUTCH

60. Improved braided-moulded facings.
61. Lighter spring pressure.
62. Stronger pressure levers.
63. More durable pressure lever plates.

TRANSMISSION

64. Lower end of gearshift lever hardened.
65. Rubber gearshift knob.

STEERING GEAR

66. Larger steering wheel.
67. Stronger pitman arm.

CONTROLS

68. Clutch and brake pedals mounted on frame.
69. Longer pedal bushings.
70. Clutch operated thru idler linkage.
71. Increased hand brake lever spring tension.
72. Independent hand throttle control.

WHEELS AND TIRES.

73. Improved tire valve dust caps.

SHEET METAL

74. Improved frontal appearance.
75. Increased radiator slope and sharper "V" angle.
76. Emblem mounted lower on front of radiator grille.
77. Radiator splash guard integral with fenders.
78. Front fenders extend farther over tires.
79. Sharper corners on fender skirts.
80. Shallow hood ledge "valley".
81. Longer hood with improved appearance.
82. Streamlined horizontal hood louvres.
83. Improved stabilized fender and radiator mounting.
84. Longer running board mats.

ELECTRICAL AND INSTRUMENTS

85. Improved, beaded instrument panel.
86. Improved ignition switch and lock.
87. Improved horn button.

CLOSED BODIES

88. Increased width.
89. More foot room in front seat.
90. More leak-proof windshield closure.
91. Cowl ventilator opens toward rear and deflects air to sides.
92. Deflectors added above N.D. ventilators.
93. Improved door dovetails.
94. Steel striker plates with more contact area.
95. Half-round, spring-seated lock bolts.
96. Adjustable brace added in doors.
97. More rigid door hinges.
98. Neater, streamlined outer door handles.
99. Improved door lock.
100. Stronger body structure.
101. Neater head lining attachment.
102. Improved floor mat.

OPEN BODIES

103. Sport Roadster and Phaeton added.
104. Wide top.
105. Rubber mounted rear window.
106. Ribbed toe board mat.

DETAILS OF THE 1934 FEATURES

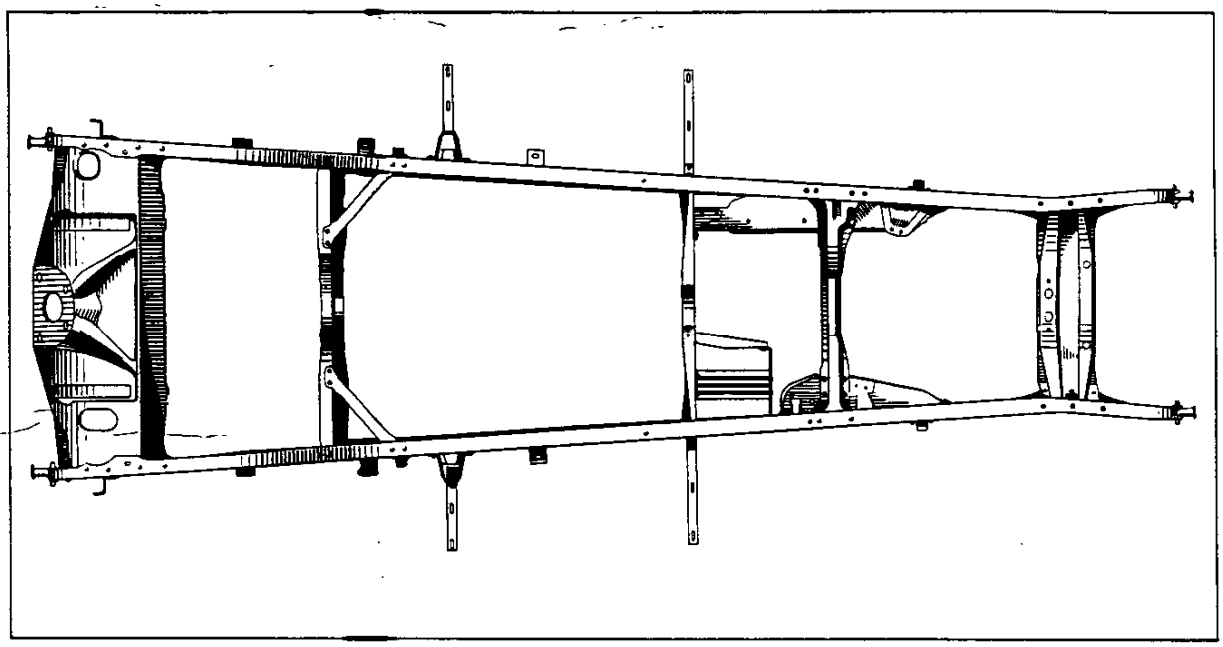
FRAME

The tread of the front wheels of the 1934 Standard models is increased to 56 inches, the same as that of the rear wheels. The frame is much like that of the 1933 Master in design, with sub-frame members for the engine mounting. The frame is wider thruout its length, tapering uniformly from the front axle to the rear end, and spreading out at the front end to wider centers for spring eye and bumper mountings. This provides for the positioning of the front springs, parallel to the centerline of the chassis, without sacrificing rigidity at the front end of the frame.

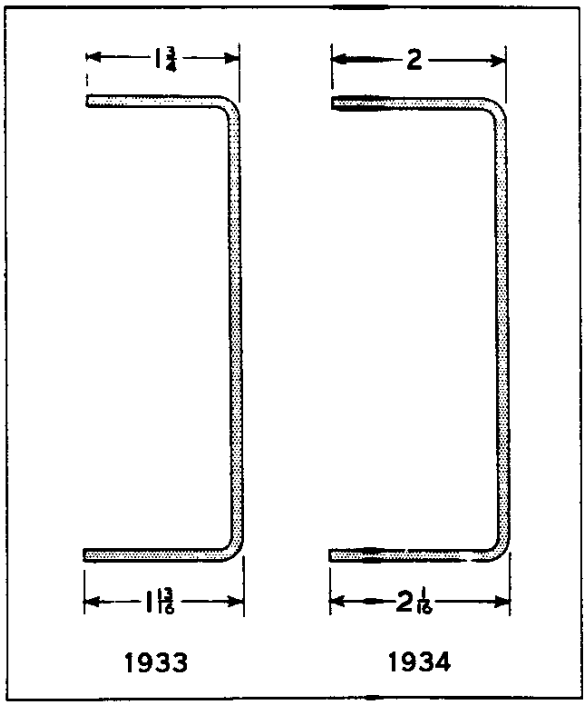
The side rails retain their former depth and thickness, but both the upper and lower flanges are increased in width 1/4 inch. The increased width of the frame and the increase in spring center distance combine to relieve the side rails of considerable stress because of the reduced leverage at which "bump" loads are applied.

The front cross member, in general design, is unchanged. The flanged, double channel section is retained, only the length being increased to provide for the increased width across the front end.

In the vicinity of the dash, strong sub-frame members, similar in design to those on the 1933 Master models, are added. On the right hand side, the sub-frame takes the form of a large gusset extending to the front and rear of the supporting cross member for an overall distance of 22-3/4 inches. This sub-frame is approximately 6-1/4 inches wide at its point of



attachment to the cross member. It is deeply ribbed and has strong vertical flanges extending along its inner and outer edges. A flat depression provides for the attachment of the engine mounting. This sub-frame member is made extremely strong and rigid by ribs pressed into its surface at strategic points. Attachment to the side rails is effected by seven rivets in the lower flange, while four rivets attach the member to the supporting cross member. The general design of the left hand sub-frame is similar to that of the right hand member, but it is much longer. It extends rearward to the transmission support member and has an overall length of approximately 33 inches. It has an upturned ear which is attached to the side rail web by two rivets to provide additional support at the point of engine support. Six other rivets attach this sturdy sub-frame member to the side rail lower flange and four additional rivets secure it to the flanges of the engine support cross member. At the rear end, the sub-frame blends into a channel section with the flanges turned inward for attachment to the transmission support cross member, which it braces, preventing excessive deflection of this cross member and the brake cross shaft mounted on it. An angle bracket riveted to the webs of the sub-frame member and the cross member reinforces this connection. The sub-frame support cross member is designed to cooperate with the sub-frame structure. It attaches to the upper flanges of the side rails, tying them securely together. It also attaches to both sub-frame members, insuring frame rigidity at the front body mounting bolts and engine mounting points. The front step hangers are more securely attached to the frame. Their inner



point of support is farther in from the side rail and brace providing a longer supporting length. The battery hanger is improved to provide a more rigid support and greater protection for the battery. At the front end a wide steel support replaces the two narrow strips which were formerly used. At the inner side a strong, double-flanged bracket extends forward from the transmission support cross member, forming a rigid support for the battery hanger bracket. This support and the corrugated guard protect the battery case from damage by flying stones.

The other frame cross members and brackets remain practically the same in design as heretofore, except as their proportions are affected by the increased frame width, the wider tread and the new spring position.

COMPARATIVE SPECIFICATIONS

	1933	1934
Frame width at front axle	26-1/2	27-3/4
Frame width at rear axle	40-1/8	41-3/8
Frame width at front end	24-9/16	29-13/16
Frame width at rear end	43-5/16	44-9/16
Side rail upper flange width	1-3/4	2
Side rail lower flange width	1-13/16	2-1/16
Right hand sub-frame thickness	None	7/64
Left hand sub-frame thickness	None	1/8

EXHAUST SYSTEM

The mounting of the exhaust system on all Standard models is revised to cooperate with the new sub-frame structure and the more flexible engine mountings. The muffler is of the same baffle type, as before. However, the attachment of the inner tube to the rear baffle is more secure to prevent looseness and rattles, due to expansion and contraction. The muffler is supported at the rear by a clamp bracket mounted on the third cross member.

It is insulated from the frame by rubber. A separate ring type clamp secures the tail pipe to the muffler.

The exhaust pipe is more rigid because of its heavier guage and smaller diameter. The packing at the exhaust manifold outlet is composed of four layers of asbestos composition similar to that used in the cylinder head gaskets. These are clipped together to form a thick packing ring which insures a leak-proof, durable seal.

COMPARATIVE SPECIFICATIONS

	1933	1934
Muffler bolt nut lock	None	French type
Exhaust pipe outside diameter	2-1/16	2
Exhaust pipe gauge	.0375	.0625
Exhaust pipe packing	3 layers composition	4 layers composition

SPRINGS

Both the front and rear springs on the Standard models set parallel with the centerline of the chassis and the centers are spread farther apart at both ends. The front spring centers were increased from 22-7/8 at the front end and 26-7/8 at the rear end to 28-1/8 at both ends. This imposes the load on the axles closer to their bearings, insuring greater strength and stability. The front springs are heavier and have seven leaves. The increase in front spring centers also reduces the offset in the front shock absorber arms. The rear spring center distance is increased from 41-7/8 to 43-1/8.

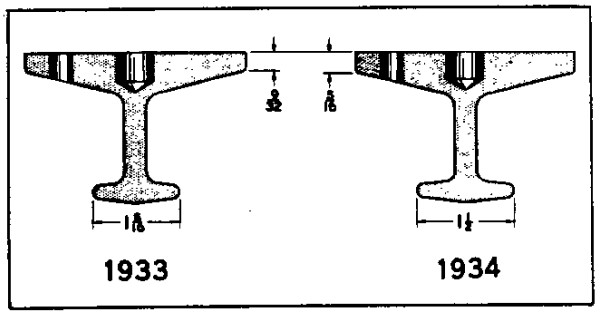
COMPARATIVE SPECIFICATIONS

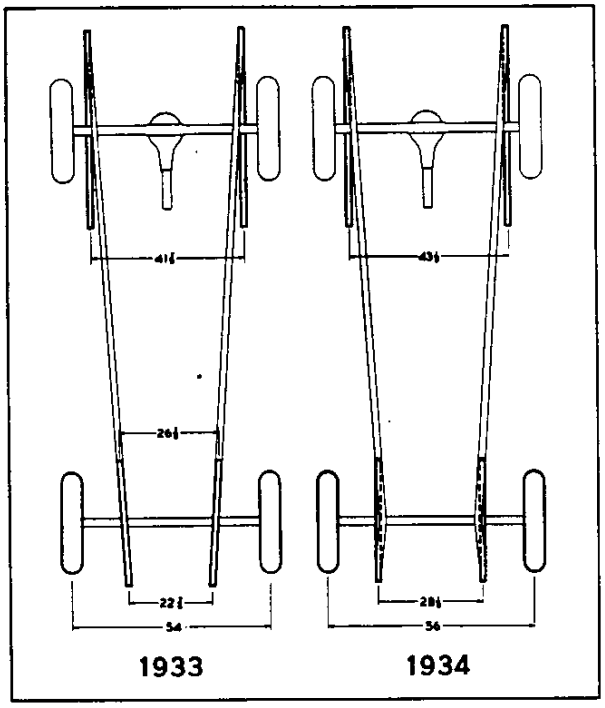
	1933	1934
Front spring center distance at front	22-7/8	28-1/8
Front spring center distance at rear	26-7/8	28-1/8

	1933	1934
Rear spring center distance	41-7/8	43-1/8
Number of leaves in each front spring	6	7
Front spring rated load	470# - 530#	550# - 610#

FRONT AXLE

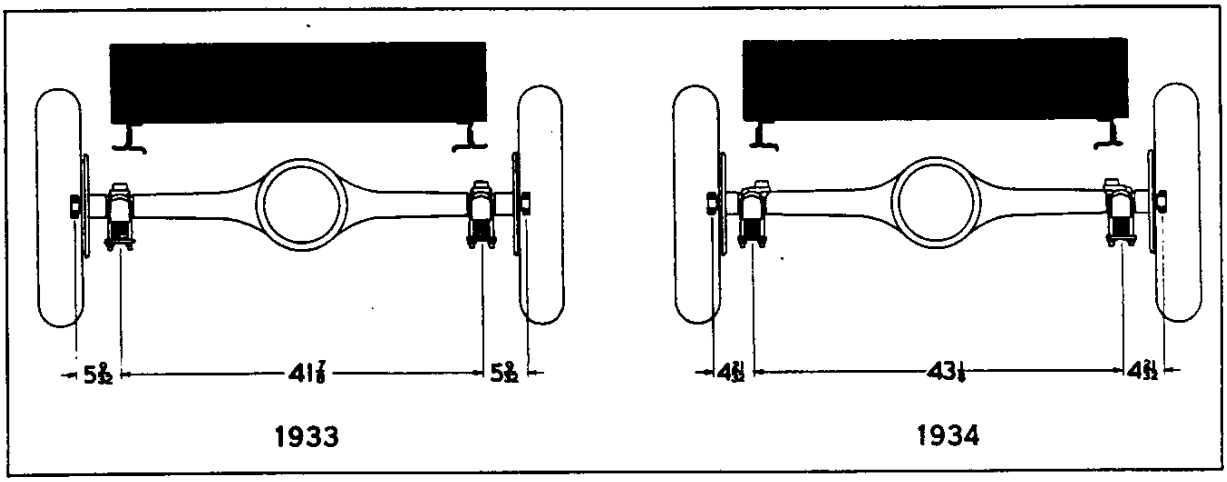
The front axle in the 1934 Standard models provides for the increase in the tread of the front wheels to 56 inches, the same as that of the rear wheels. This increases the stability of the car and improves its riding qualities. The front axle I beam is redesigned to provide for the increased front tread and the wider front spring centers. This redistribution of the load increases the strength of the I beam by reducing the bending stress. The spring pads on the I beam are thicker and the lower flange is wider, which further increases the strength at the points of maximum loading. The steering arms are forged from better alloy steel to increase their strength and rigidity.





COMPARATIVE SPECIFICATIONS

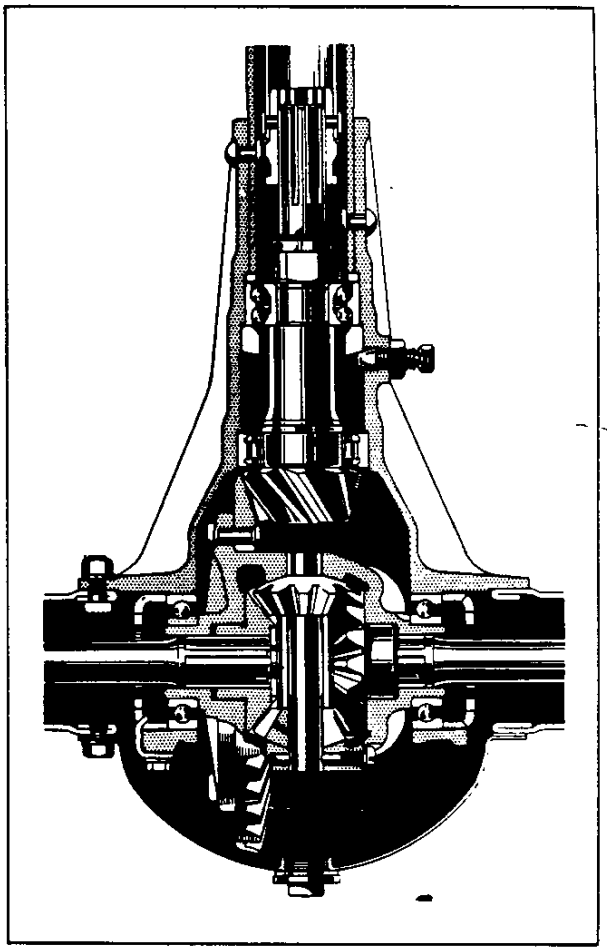
	1933	1934
Front wheel tread	54	56
Distance between spring seats	24-11/16	28-1/8
Spring seat thickness	9/32	5/16
Width of I beam flange at spring pads	1-5/16	1-1/2



REAR AXLE

The rear axle housing is made from heavier gauge metal to increase its strength and rigidity. The spring seats are spread further apart, imposing the load closer to the wheel and its bearing and thus reducing the bending stresses in the housing.

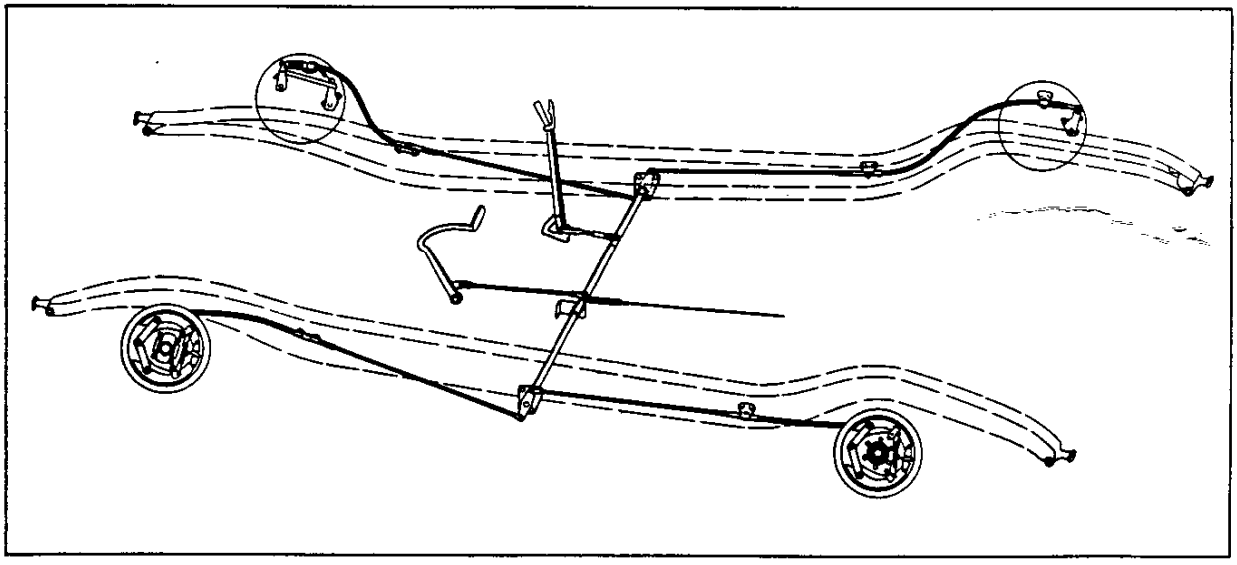
The rear end of the drive pinion is supported by a high grade roller bearing. The pinion shaft is larger in diameter and serves as the inner race for the rollers. The roller unit is restrained from moving endwise by a snap ring which seats in a groove in the pinion shaft. The pinion is made from a higher grade alloy steel which increases its strength and toughness. The front bearing lock sleeve is stronger and heavier.



BRAKES

The Standard brakes incorporate many of the Master brake design features, including double-articulated shoes, increased lower shoe length, and cable control front and rear. The ten inch diameter and 1-1/2 inch lining width are retained, but the longer lower shoes provide much better support and increase the lining area to 121-3/16 square inches. With the adoption of the cable control at the rear brakes, the length of the cam shafts is reduced and the inboard bracket on the axle housing eliminated.

The cross shaft is mounted on three bearings with the operating lever for each braking



system located between two bearings. This insures safety in case of shaft breakage. The cable control insures more uniform brake operation and eliminates the effect of axle movement on brake geometry.

The idler lever linkage on the outside of the rear brake flange plate between the cable and brake cam is retained.

The hand brake lever is mounted to the frame on the bracket extending forward from the transmission support. This eliminates movement of the lever due to engine movement.

COMPARATIVE SPECIFICATIONS

	1933	1934
Axle housing gauge	1/8	9/64
Rear pinion bearing type	Ball	Roller
Pinion shaft diameter at rear bearing	1.379	1.732
Lower brake shoe operation	Pivoted	Articulated
Lower brake lining length	5-5/32	10-3/32
Link thickness	1/8	5/32
Brake lining type	Semi-moulded, flat	Semi-moulded, curved
Total brake lining area	91-1/2 sq.in.	121-3/16 sq.in.
Number of brake cross shafts	2	1
Rear brake connections	Rods	Cables

ENGINE

In the 1934 Standard engine, the 3-5/16 inch bore and 3-1/2 inch stroke are retained and the compression ratio is increased.

The low speed flexibility and cold operation are greatly improved, without sacrificing high speed performance and economy.

The valve mechanism is much quieter and more durable. It incorporates the following features which are also included in the Master engine and are described in detail in the preceding section of this book:- Larger diameter camshaft, longer exhaust cam ramp which allows a lash of .013 hot at the exhaust valves, wider valve seats, lighter valve spring pressure and the addition of tappet springs. The rocker arm bushings have thicker walls and the valve stem keys are made of tempered steel having a higher carbon content. The valve spring caps are made more durable by the addition of a heat treatment which produces a hard, wear-resisting surface and a fine-grained core structure.

Directional control of the cooling water in the cylinder head is effected by means of stamped copper nozzles similar to those used in the Master Marine head. Double orifice nozzles are located at both sides of the head, directing water toward the siamesed exhaust valves and single orifice nozzles to the single exhaust valves.

The cylinder head gasket, like that of the Master engine, is also thicker and more durable. The cylinder and crankcase provides for the new tappet spring arrangement, the new fuel pump and the cushion balanced engine mounting. The necessary pads and additional ribbing are very similar to those on the Master cylinder and case. The pistons and rings are the same as those used in the Master engine, as is the improved by-pass oil pump screen. The rocker cover and push rod cover are insulated at the studs by the same rubber grommets used on the Master engine. Among the other features of the Master engine, which are also present in the Standard engine, are:- Normalized exhaust valves, tempered piston pins, closer fit of the rocker arm adjusting screws in the push rod socket, and increased tappet angularity to insure rotation.

The carburetor and inlet manifold embody all of the design features of the Master parts, the only difference being in the size which is proportionately smaller to provide for the fuel supply of the smaller displacement engine. A composition insulator between the inlet manifold and the carburetor, as on the Master engine, prevents percolation.

The Master exhaust manifold, including the thermostatic heat control and counterbalance weight, is used on the Standard engine to replace the former exhaust manifold which provided only manual adjustment of the heat control valve for seasonal adjustment. The addition of the thermostatic control is an important factor in the improved low speed

and low temperature operation of the Standard engine.

The Standard engine has the same provision for quicker and more accurate spark timing by means of the new neon timing light as the Master engine. The cushion balanced engine mountings, which were used so successfully on the 1933 Master engine, are also used on the 1934 Standard engine. In combination with the new sub-frame structure, this mounting principle provides for movement of the engine about both the principal axis and the vertical axis, insuring greater smoothness and freedom from engine sensations.

COMPARATIVE SPECIFICATIONS

	1933	1934
Compression ratio	5.2 to 1	5.35 to 1
Cylinder head gasket thickness	.045	.052
Camshaft diameter between cams	1-1/16	1-1/8
Inlet cam base circle	1.235	1.297
Exhaust cam base circle	1.235	1.295
Cam offset from tappet	3/32	1/8
Cam width	1/2	7/16
Tappet angularity in length of case	3/64	5/32
Exhaust cam ramp	30°	40°
Inlet valve clearance (hot)	.006	.006
Exhaust valve clearance (hot)	.008	.013
Tappet spring pressure (valve open)	None	41#
Push rod diameter at lower end	13/32	15/32
Rocker arm bushing thickness	.034	.044
Valve seat width	.030-.050	.062-.093
Exhaust valve treatment	None	Normalized
Valve spring pressure (valve open)	97#	75#
Valve spring pressure (valve closed)	47#	40#
Valve spring cap treatment	None	Carburized
Compression piston ring width	5/32	1/8
Piston pin treatment	Carburized	Carburized and tempered
Oil pump screen type	Spherical without by-pass	Cylindrical with by-pass
Push rod cover insulation	None	3 rubber grommets
Rocker arm cover insulation	None	2 rubber grommets
Inlet manifold end arms	"D" section	"Vortex flow"
Inlet manifold riser	Cast iron	Insulating material
Heat valve operation	Manual at manifold	Thermostatic
Carburetor nozzle type	Plain	Shrouded
Accelerating pump check valves	Monel balls	Hex.bakelite discs
Carburetor air horn attaching screws	#10	#12
Choke valve opening at full choke	.010	.072
Strainer screen mesh	90	120
Strainer screen wire diameter	.0052	.0036
Carburetor bowl cover vent hole	.070	.194
Engine mounting	4 point "diamond"	4 point cushion balanced

CLUTCH

Several refinements are incorporated in the Standard clutch to insure smoother operation, lighter pedal pressure and increased durability. The driven disc is faced with braided-moulded facings and the operating pressure of each spring is reduced to 82-1/2 pounds. The driven plate stop pins are flat-sided to provide more surface to bear against the slot edges in the driven plate spacer, thus reducing wear.

The pressure levers are strengthened at their tip by an increase in depth. The durability of the pressure lever plates is increased by an increase in their carbon content and by the greater width at their points of contact with the levers.

COMPARATIVE SPECIFICATIONS

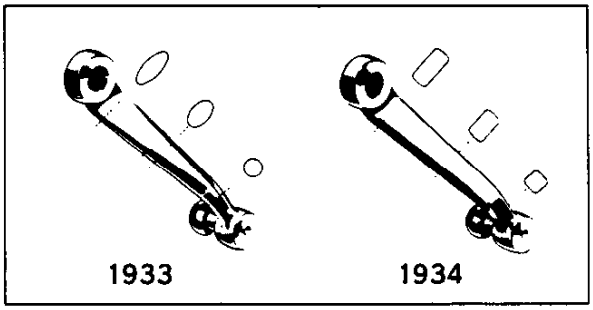
	1933	1934
Clutch facings	Moulded	Braided-moulded
Clutch spring pressure	113#	82-1/2#
Clutch disc stop pins	Round	Flattened

TRANSMISSION

The Standard transmission, which has given such satisfactory performance during the past year, is retained with the addition of some refinements. The lower end of the gear shift lever is heat treated to provide an extremely hard surface to withstand wear. The same gear shift lever knob of black hard rubber with a softer rubber core used on the Master models is also used on the Standard jobs to prevent noise being transmitted to the body.

STEERING

The steering gear is moved farther from the centerline of the chassis to agree with the increased body width. The steering wheel is one inch larger in diameter to insure easier steering control. The pitman arm sections are rectangular, with increased thickness at the large end and greater width and thickness at the small end to provide increased strength and rigidity.



COMPARATIVE SPECIFICATIONS

	1933	1934
Steering wheel diameter	16	17
Pitman arm section at upper end	1/2 x 1-1/8 elliptical	9/16 x 1-1/8 rectangular
Pitman arm section at lower end	1/2 dia.	9/16 square

CONTROLS

The clutch and brake pedals are mounted on the sub-frame, independently of the power plant, in the same manner as on the 1933 Master models. This mounting provides an adjustable stop for both pedals and insures a stable support regardless of engine movement. The pedal hubs and bushings are longer, reducing the necessary pedal offset and the tendency of the bushing to wear bell-mouthed. With the more flexible engine mountings, provision must be made to prevent engine movement from causing movement of the clutch fork. This is accomplished by the introduction of a system of idler linkage. Toward the rear of the pedals, a "U" shaped rocker lever is mounted on the sub-frame. A flat link connects one of its arms to the clutch pedal, while a second flat link connects its other arm to the clutch fork. This arrangement prevents engine movement from causing intermittent engagement of the clutch and the resulting chatter.

The same improvements in the hand brake lever, which are incorporated in the Master models, are also present in the Standard models. They insure more positive pawl engagement and prevent rattles.

The accelerator and hand throttle control are independent, as on the Master models, providing for more sensitive hand throttle adjustment, lighter accelerator spring pressure and preventing movement of the accelerator pedal when the hand throttle button is operated.

COMPARATIVE SPECIFICATIONS

	1933	1934
Location of pedal mounting	On clutch housing	On frame
Pedal hub length	1-5/16	1-7/16
Clutch pedal arm offset	2-3/8	23/32
Clutch fork actuation	Direct	Thru idler linkage
Hand brake lever spring coils	1	2
Hand brake lever latch screws	Round head	"T" head

WHEELS AND TIRES

The wheel and tire equipment on the Standard models remains unchanged. However, the new Ezemount type of tire valve dust caps supplied on the Master models are used. These improved caps insure a more secure closure and are much more convenient to use.

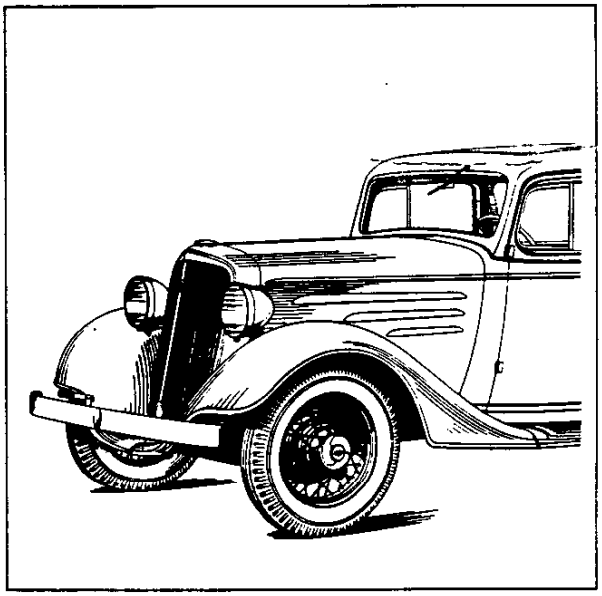
SHEET METAL

The 1934 Standard models include many of the appearance features found in the new Master models. The sheet metal parts which contribute to the outward appearance of the car are redesigned along the same smooth, sleek, flowing lines as the Master jobs.

The front fenders are much deeper, extending farther over the tires and concealing much of the chassis mechanism. The skirts are higher, forming a smaller "valley" where they join the hood. The front fenders extend to the center of the radiator, as on the Master jobs, eliminating the radiator splash guard. The edges of the fenders are strengthened by a flange turned under the beading. The fender skirts have sharper contours which make them appear to fit closer to the tires.

The radiator and hood appearance is similar to that of the Master jobs with the same treatment of radiator shell, grille and name plate. The hood is longer and has three horizontal louvres like the Master hood except for the omission of the chrome plated mouldings at the edges of the louvres. The hood catches at the center of the side panels are stronger, as on the Master jobs.

The improved stabilized fender and radiator



mounting is of the same design and incorporates the same features as the Master model. The running boards blend smoothly into the fenders. Their appearance and utility are improved by the longer rubber mat which extends farther toward the rear, covering the running boards more completely.

COMPARATIVE SPECIFICATIONS

	1933	1934
Height of front fender nose above frame	7-1/2	7-5/16
Depth of "valley" below top of fender crown	13-3/4	13-1/2
Front fender skirt corner radius	5	2-5/16
Front fender edge reinforcement	Wire	Flange
Front fender skirt brace	.063- arched	.078- straight
Running board mat length	37-5/8	43-15/16
Hood length at side hinge	35	39-1/8

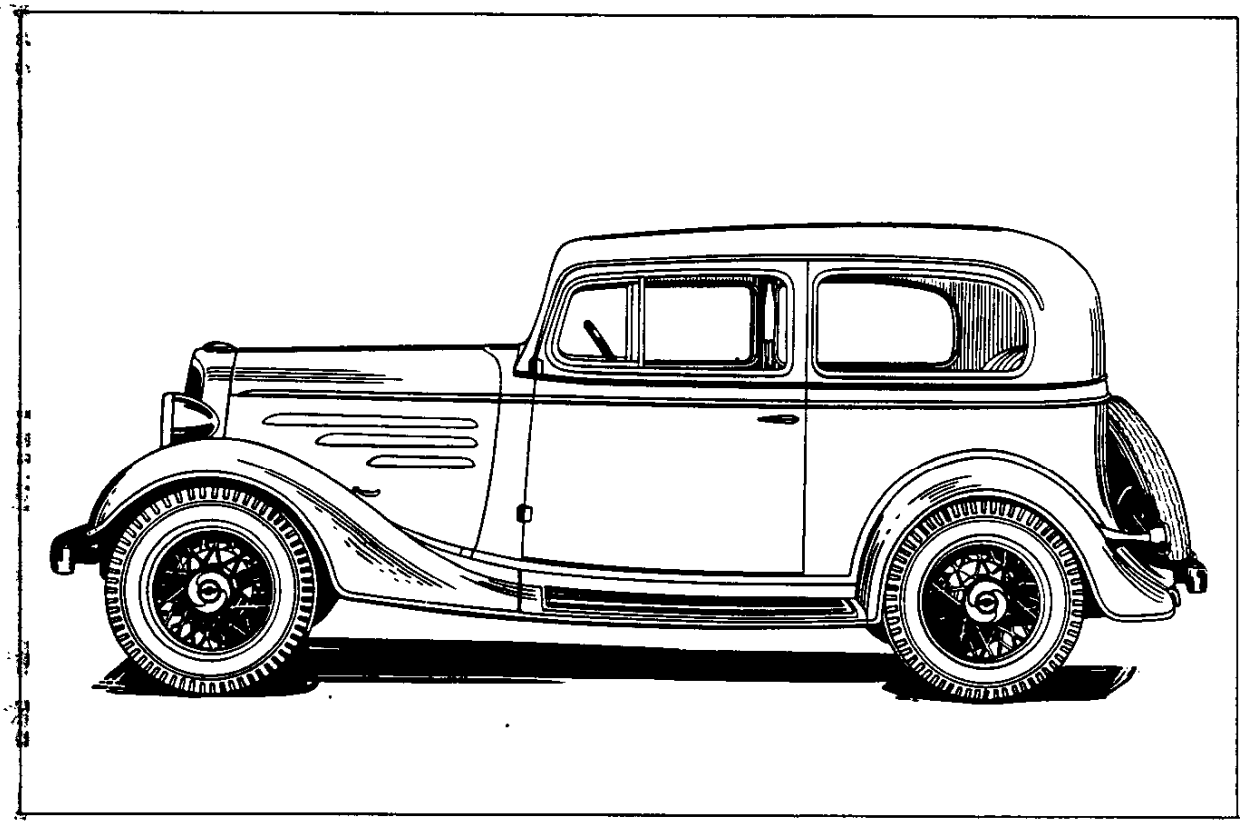
	1933	1934
Hood width across hinge line at front	19-3/8	21-7/8
Hood width across hinge line at rear	38-1/4	44-7/8
Hood catch lever thickness	1/8	5/32
Hood catch handle bearing length	5/32	9/32
Radiator slope	6°	11°
Radiator "V" angle	142°	135°
Radiator shell depth at top	6-1/2	7-1/2
Radiator shell width	19-7/8	22-7/8

ELECTRICAL EQUIPMENT AND INSTRUMENTS

The instrument panel on the 1934 Standard models presents a more pleasing appearance. The panel is wider at the center and the lower edge sweeps downward from the ends in a graceful curve. The instruments are grouped as before, but they are surrounded by an attractive embossed elliptical bead which sets the instrument group off from the rest of the panel. The space at each side of the central instrument group is depressed slightly to form attractive panels. The improved ignition lock and horn button used on the Master models are also used on the Standard jobs, providing the same features and advantages.

COMPARATIVE SPECIFICATIONS

	1933	1934
Instrument panel	Flat	Beaded and panelled
Instrument panel width at center	7	9-1/8
Ignition switch operation	Grounded	Non-grounded
Horn button diaphragm type	Deep cone	Shallow cone

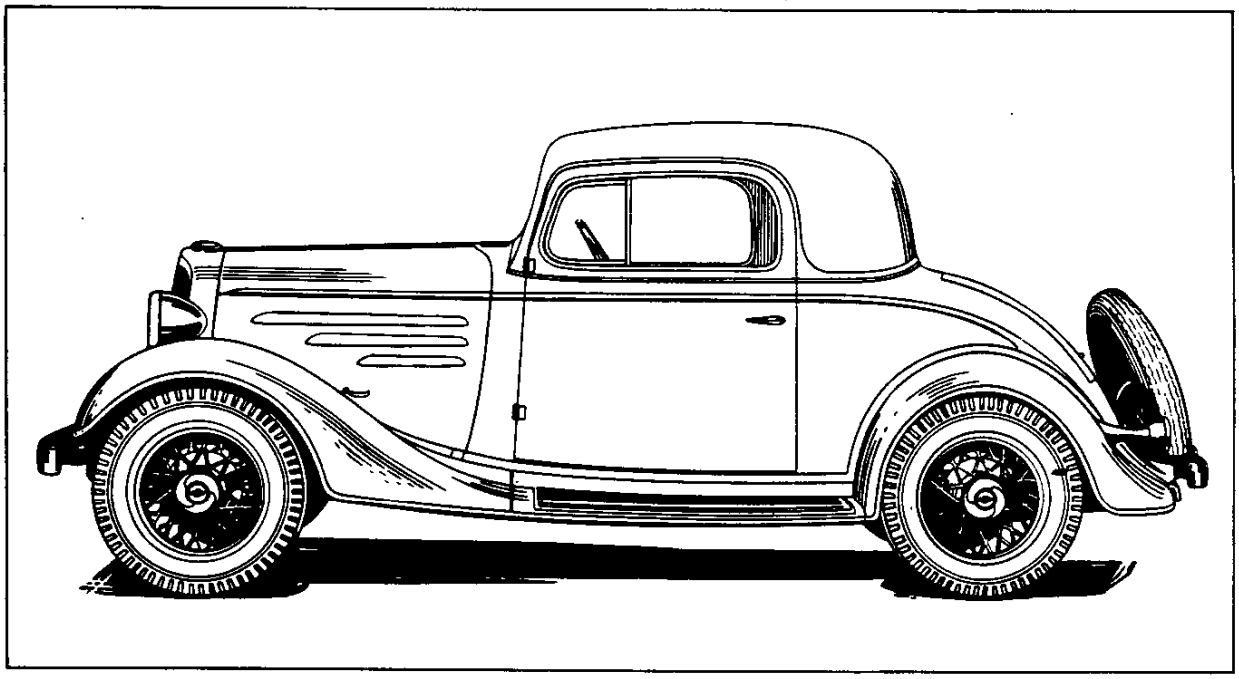


BODIES

The Standard line of bodies includes two closed models, a Coach and Coupe and two open models, a Phaeton and Sport Roadster. The entire Standard body line includes most of the appearance features found in the Master line, except for the difference in length and some of the minor appearance details.

The Standard bodies are 2 inches wider, making their width the same as that of the Master models, both inside and outside. The cowl is longer and provides 1-3/4 inches more foot room in the front seat, due to the toe boards being extended at the top.

to the domestic Standard line. These open models are attractively streamlined and have the same type beaver-tail rear end as the closed models. Both have the same wide cowl with reversed ventilator, and the same wide windshield as does the 1934 Master Sport Roadster. The safety glass windshield is set at an angle of 25 degrees to afford protection from glare. The Sport Roadster is of the same width as the corresponding Master model and has most of its appearance features. The belt moulding line on the Phaeton flows downward into the back panel, giving a very distinctive appearance. The front seat width of

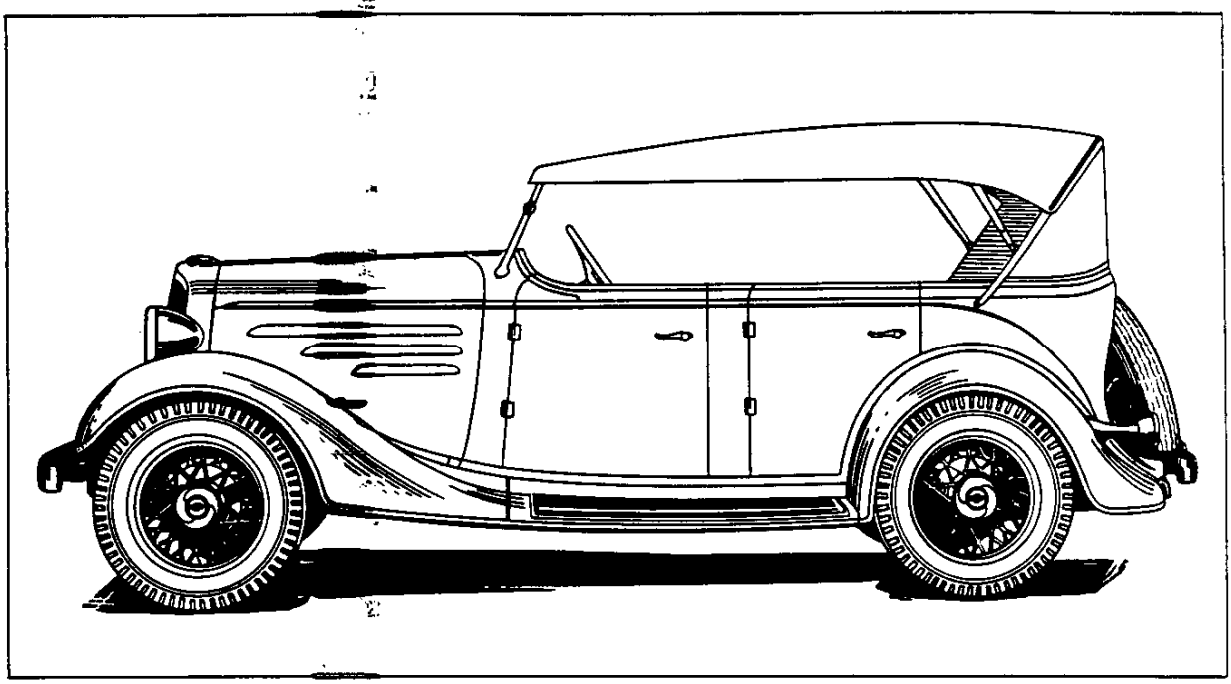


Among the features of the Standard closed body line, which are very similar to those of the Master line, are the following:- New type front header panel, improved windshield sealing, improved reversed cowl ventilator which deflects the air to the sides, shorter sturdier door hinges, improved dove tails and striker plates, diagonally braced doors, improved half-round door lock bolts, more attractive streamlined door handles and improved theft-proof lock and the body framing strengthened by the addition of bolts in the roof rail structure and new cowl braces as in the Master bodies.

The Sport Roadster and Phaeton are additions

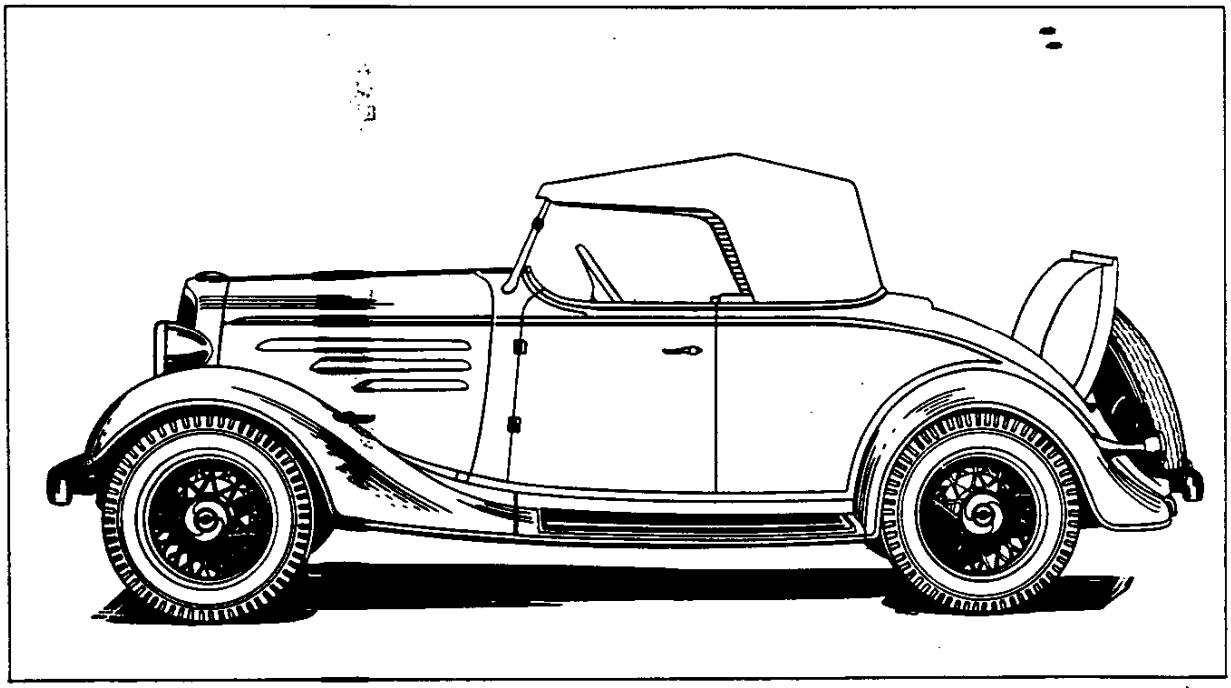
this model is greater than on the 1933 Master Phaeton, and the rear seat width is the same. The top on both open models extends well over the sides of the body, affording protection against rain and snow. The top bows are finished in their natural wood color. The rear curtain window is framed in rubber and stitched to the back curtain in a manner which prevents glass breakage and tearing of the curtain. The front side curtain windows are close to the windshield stanchions to insure maximum vision. Each curtain is held in position by two coil springs. All doors are sealed at the bottom to prevent drafts.

The seats are located so as to provide ample



leg room and a comfortable back angle. They have double-acting springs with soft tops and they are neatly trimmed in durable imitation leather. The seats are constructed so as to extend over the edges of the framing, resting on sturdy cross bars which are built into the cushion structure, eliminating the usual seat trap.

The toe and floor board mat is of the same design and material as is used in the Master models. A robe rail and foot rest are furnished in the Phaeton.



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