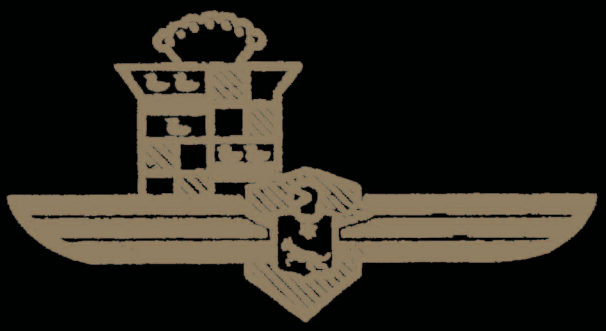
CADILLAC
LA SALLE



SHOP MANUAL

for 1939

CADILLAC-LASALLE

SHOP MANUAL

for 1939

covering

CADILLAC 39-61, 60S, 75, 90

LASALLE 39-50

Service Department
CADILLAC MOTOR CAR DIVISION
GENERAL MOTORS SALES CORPORATION
DETROIT, MICHIGAN

Litho. in U. S. A.
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Introduction

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

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

MODELS INCLUDED

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

Series	No. of Cylinders	Bore and Stroke	Wheel-base	Displacement	Engine Number
39-50 LaSalle	V-8	3-3/8" x 4-1/2"	120"	322 cu. in.	2290001 and up
39-61 Cadillac	V-8	3-1/2" x 4-1/2"	126"	346 cu. in.	8290001 and up
39-60S Cadillac	V-8	3-1/2" x 4-1/2"	127"	346 cu. in.	6290001 and up
39-75 Cadillac	V-8	3-1/2" x 4-1/2"	141"	346 cu. in.	3290001 and up
39-90 Cadillac	V-16	3-1/4" x 3-1/4"	141"	431 cu. in.	5290001 and up

In presenting information within the various groups, the LaSalle construction is covered first, then the 39-61 Cadillac and, finally, the larger Cadillac cars. This order has been followed because it gives first the information on the larger volume cars.

IDENTIFICATION

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

Series 39-50, 61, 60S, and 75 — On the crankcase just behind the left cylinder block, parallel to the dash, and on the left frame side bar opposite the steering gear.

Series 39-90 — On the left rear corner on the flat top of the crankcase, parallel to the dash, and on the left frame side bar opposite the steering gear.

The body style number, job number, andpaint and trim numbers are stamped on a plate attached to the front of the dash under the hood on the left side on all models. The body style numbers are listed on page 18.

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

QUICK REFERENCE INDEX. To use, move either the hand or selection tool directly over the section you desire to reference. Simply click once with the mouse button and the manual will automatically jump to that section.

Contents

BODY

General Description

Fisher bodies are used on 39-50 LaSalle and on 39-61 and 60 Special Cadillac cars, and Fleetwood bodies on 39-75 and 90 cars. These bodies are all constructed of steel. Steel Turret Tops are used on all closed body styles except the Fleetwood Formal Sedans and Town Cars, which have steel tops covered with leather.

DOORS AND WINDOWS

The front doors on all body styles are hinged at the windshield pillar. The rear doors are hinged at the rear on all body styles except Convertible sedans and the 39-60S sedan.

Concealed door hinges are used on 39-50 and 61 closed bodies at all points except the lower front door hinge. Conventional type hinges are used at this point and at all points on the other body styles. Door hinge adjustment is discussed in Note 18.

The doors of the 39-60S sedan are of unique construction, with only a light chromium frame around the window glass. This construction is similar to that used on Convertible body styles, so much so that the service operations listed for 39-60S doors apply almost unchanged to Convertible cars of other series.

All body styles have no-draft ventilation, with pivoting glass panels in the front doors, and in the rear doors of the 60S sedan and Fleetwood sedans with blind quarters; and sliding glass panels in the rear quarter windows of coupes and sedans on all other models. The pivoting ventilators on most body styles are fitted with small locking bolts to prevent their being forced open.

One-piece steel garnish mouldings and finish panels are used on 39-50 and 61. Steel mouldings without finish panels are used on 39-60S. All wood garnish mouldings and finish panels are used on the Fleetwood bodies (39-75 and 90), except at the windshield and center division.

LOCKS AND KEYS

The door lock cylinders are mounted below the handles on 39-50, 61 and 60S, but are integral with the handles on Fleetwood bodies. Both front doors are fitted with locks on all 39-series cars. The right hand rear doors on some Fleetwood Sedans are also fitted with locks.

The two-key locking system is used on all series. The front door locks are operated by the octagonal-handled ignition key (leaf shaped handle on 39-60S cars), as are the locks for fenderwell spare tires or separate tire compartments. The glove compartment and the trunk or deck lid lock are operated by the round-handled key. Key numbers are stamped, not on the keys, but on small metal slugs fastened in the keys, which should be knocked out and destroyed after a record of the numbers has been made.

SUNSHINE TURRET TOP

The Sunshine Turret Top is optional at extra cost on the 39-50 five-passenger two-door sedan and 39-50, 61 and 60S five passenger sedans. It consists of a movable panel or lid that extends from just behind the windshield to a point beyond the front seat back, nearly the full width of the roof. When closed, the panel is locked in its forward position. It is released by turning a locking handle, after which it may be moved to the rear any amount up to the fully open position.

Gutters, drains and sponge rubber seals around the roof opening prevent air or water leaks when the roof is closed.

BODY STYLES

Five different chassis models with 42 body styles, as listed on page 18, comprise the 1939 line. This listing gives in detail the arrangement of seats and windows, and locations of spare tires and luggage space. Chassis for commercial bodies are also available in the 39-50, 61, and 75 series.

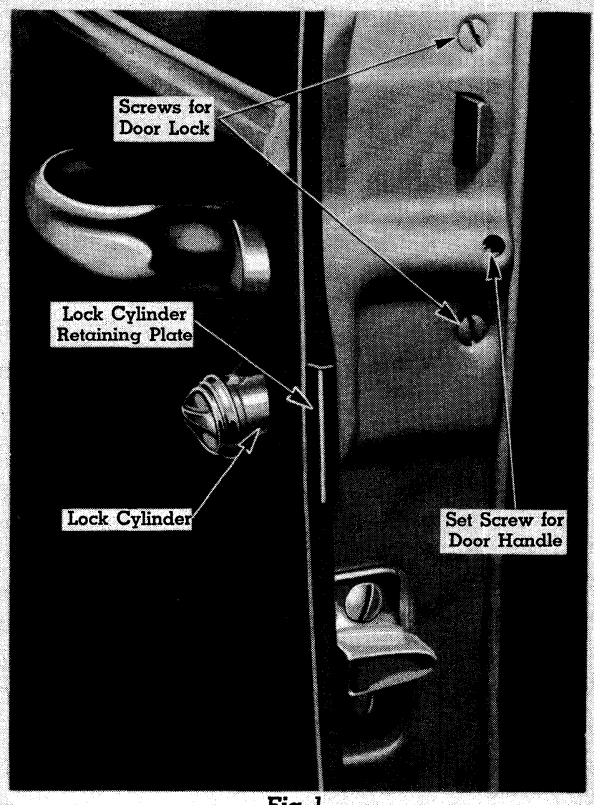


Fig. 1.
Removing Door Lock Cylinder
Series 39-50 and 61

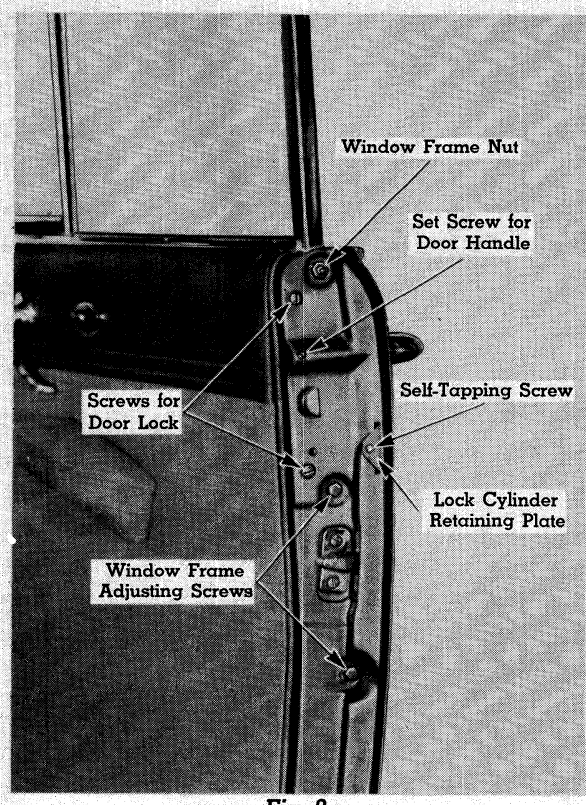


Fig. 2.
Removing Door Lock Cylinder
Series 39-60S

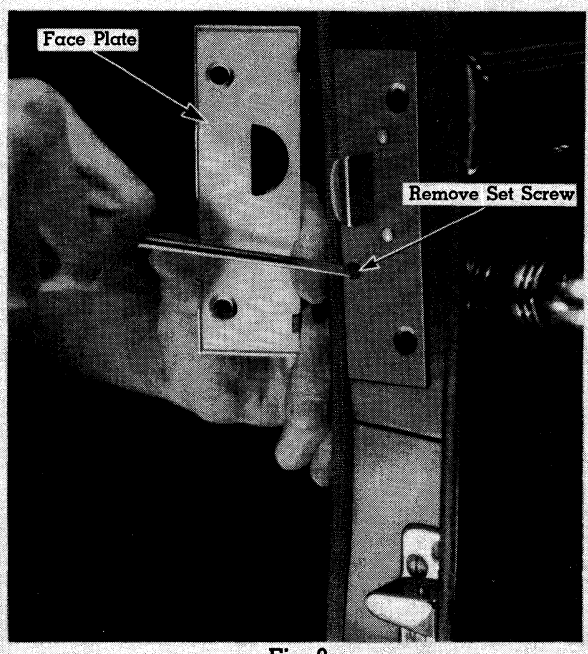


Fig. 3.
Removing Outside Door Handle
Series 39-75 and 90

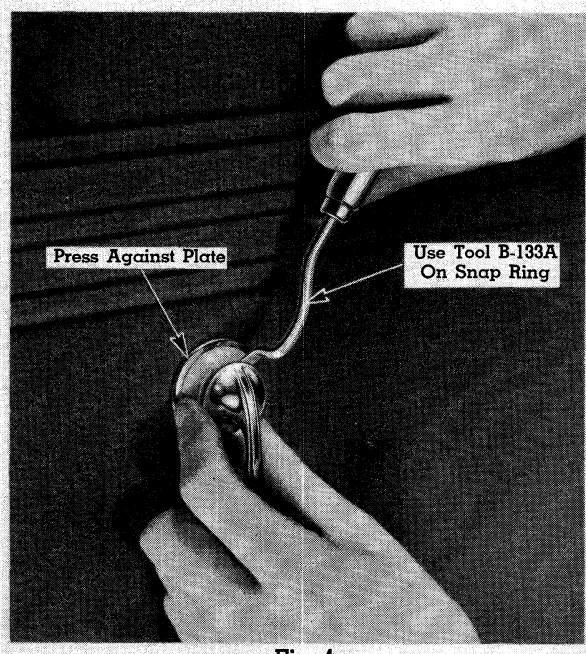


Fig. 4.
Removing Inside Door Handle
Typical of All 39-Series

Plate 1. Door Locks and Handles

Service Information

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

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

1. CLEANING CHROME-PLATED PARTS

Chrome-plated parts will retain their brightness much longer and keep new in appearance indefinitely if protected from corrosion caused by rust-forming chemicals and kindred causes.

The greatest danger to chrome-plated parts comes from salt and calcium chloride which are used to clean streets of snow and ice in the winter, and are also applied to dirt and gravel roads to lay dust in the summer. These compounds are splashed or thrown on plated parts and, if allowed to remain for any length of time, are destructive to the finish, as they cause a chemical reaction which eats through the surface and opens it to rust.

Corrosive atmospheres also exist in some localities, particularly along the sea-coast where the air is salt-laden, and these too have a harmful effect on chrome-plate.

Much of the destructive force of these elements can be eliminated if the plated parts are washed frequently and then treated with wax or sealer, such as is used with lacquer polish. After washing the plated parts and drying with a chamois, apply the wax or sealer with a clean soft cloth and then polish with another clean cloth. This treatment should be applied each time the car is washed.

If this operation has been neglected and rust spots do appear on chrome-plated parts, wash these spots vigorously with a scouring powder suitable for porcelain, then rinse and dry them and apply a sealer compound.

2. DOOR HANDLE REMOVAL AND INSTALLATION

Outside door handles on all 39-series cars are removed by unscrewing the set screw in the inside end of the door handle. The lock finishing plate must be removed on Fleetwood cars to reach the set screw. See Plate 1, Figure 3.

Replacement door handles do not have the hole drilled in the attaching end. When installing a new handle, drill a 3/16 inch hole in the end, locating it so as to provide only enough clearance at the surface of the door to permit easy operation.

Inside door handles, including remote control handles, ventilator handles and window regulator handles, are removed by pressing back the finishing plate against the trim to permit release of the handle locking device. This device is simply a horseshoe-shaped spring wire, which can be snapped out with a narrow screwdriver or with Tool No. B-133A. (See Plate 1, Figure 4).

To reinstall a handle, first put the finishing plate on the shaft, next install the locking spring in the handle, and then tap the handle in place, using a rubber mallet or a block of wood covered with felt or leather.

3. SERVICING LOCK CYLINDERS

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

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

Key-cutting equipment for medium and large size service stations can be purchased from Briggs and Stratton Corporation, Milwaukee, Wisconsin. The necessary equipment includes a key decoder, key cutting machine, and lock checking and staking tool. Complete instructions for servicing keys are supplied with this equipment.

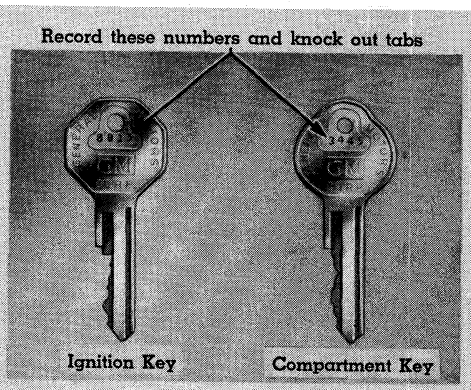


Fig. 5. Keys—One Set

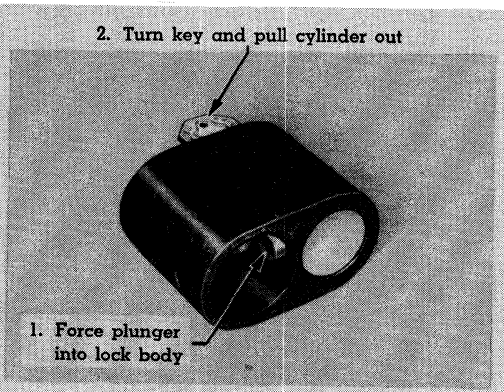


Fig. 6. Removing Lock Cylinder
(Exposed Spare Tire)

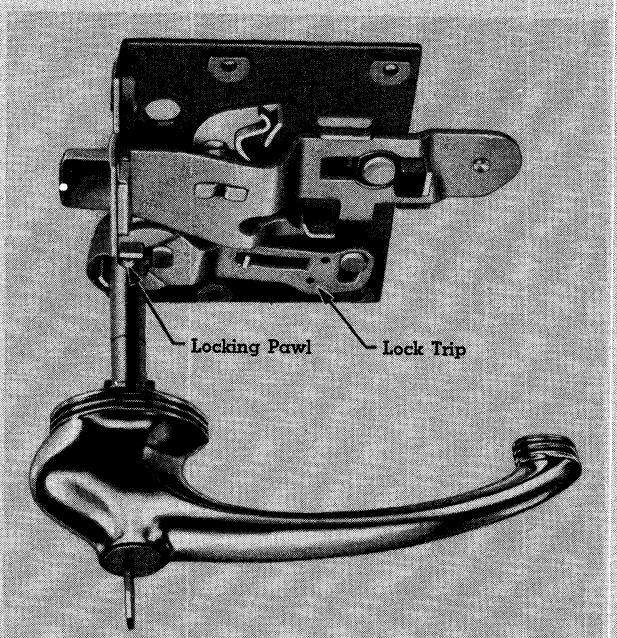


Fig. 7. Door Handle and Lock Mechanism
Series 39-75 and 90

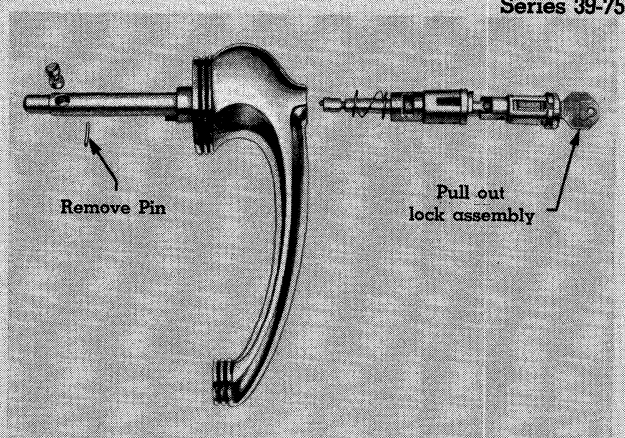


Fig. 8. Locking Handle Disassembled
Series 39-75 and 90

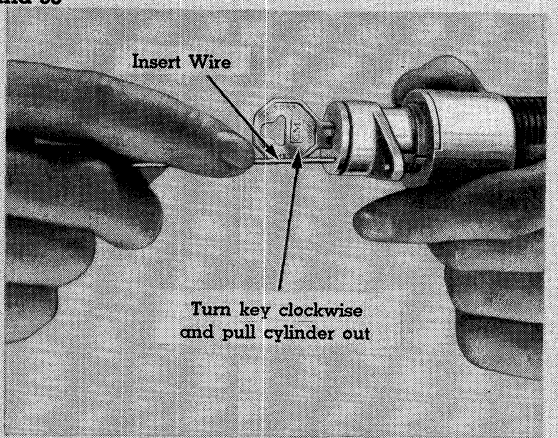


Fig. 9. Removing Ignition Lock Cylinder

Plate 2. Locks and Keys

4. DOOR LOCK CYLINDER REMOVAL AND INSTALLATION

Series 39-50 and 61 — Pull locking plate in door edge out about an inch and a half. The plate, which is concealed by the rubber weatherstrip opposite the door handle (See Plate 1, Figure 1), can be forced out by prying on outer edge of the flange with a screwdriver. When fully released, lock cylinder can be pulled out with the fingers.

When reinstalling lock cylinder, it should first be pushed into position in door panel and lock tested to see that it is in operating position before reinserting locking plate. Pushing down door lock button on inside of door before inserting lock will assist the installation.

Series 39-60S — 1. Remove self-tapping screw in locking plate at edge of door. (See Plate 1, Figure 2).

2. Pull locking plate out as far as it will come.

3. Insert key in lock cylinder and turn to locked position.

4. Using key as a handle, pull lock cylinder out and remove locking plate from edge of door.

Installation — 1. Place inside locking device in forward or locked position.

2. Slide locking plate in from edge of door, inserting it just far enough to permit installation of lock cylinder.

3. Attach a small piece of friction tape to lock rod and end of lock cylinder, with which to hold lock rod up while threading into door opening.

4. Using key as handle, insert lock rod and cylinder as far as possible in door opening without forcing.

5. Manipulate key between locked and unlocked positions until offset in lock rod slips into place and lock cylinder can be forced all the way in.

6. Slide the locking plate all the way in and reinstall the self-tapping screw. Locking plate must be in contact with door facing.

Series 39-75 and 90 — Remove the door handle from the door by unscrewing the set screw at the inner end of the handle. Then remove the retaining pin in the handle shank and draw the cylinder out with the key inserted. (See Plate 2, Figure 8).

5. REMOVAL OF OTHER LOCK CYLINDERS

Trunk Handle Lock Cylinder — This is removed in the same manner as the 39-75 locking handle, after the handle has been removed from the trunk lid.

Removing Ignition Lock Cylinder — Insert the key in the lock and turn in clockwise direction until it stops, then insert a pointed stiff wire (a bent paper clip will do) in the hole provided in the cylinder to depress the plunger. Continue to turn the key in a clockwise direction and then pull cylinder out. (See Plate 2, Figure 9).

Removing Glove Compartment Lock Cylinder — Unlock compartment door, remove set screw in back of lock cylinder bracket and, with cylinder in unlocked position and latch pushed down, pull assembly out from front. The cylinder can be removed from its housing by depressing the first tumbler and then inserting the key to pull out the cylinder.

Fenderwell Tire Lock Cylinder — Unlock and unfasten tire cover clamp. Press in on lock plunger (See Plate 2, Figure 6), forcing it further into lock body, until lock cylinder can be pulled out with key.

6. GARNISH MOULDING REMOVAL

Series 39-50 and 61 — The door garnish mouldings on these cars are held in place by self-tapping screws along top and side edges of door. Remove these screws, unscrew inside door locking knob and take out the moulding.

The garnish mouldings around the windshield, back window, and rear quarter windows are held in place with Phillip's head screws, and can be taken out after removing these screws.

Series 39-60S, 75 and 90 — All of the garnish mouldings on these series cars are held in place by Phillip's head screws.

7. DOOR TRIM PAD REMOVAL AND INSTALLATION

Series 39-50, 61, 75 and 90

Removal — 1. Remove door window garnish moulding.

2. Remove regulator and remote control handles.

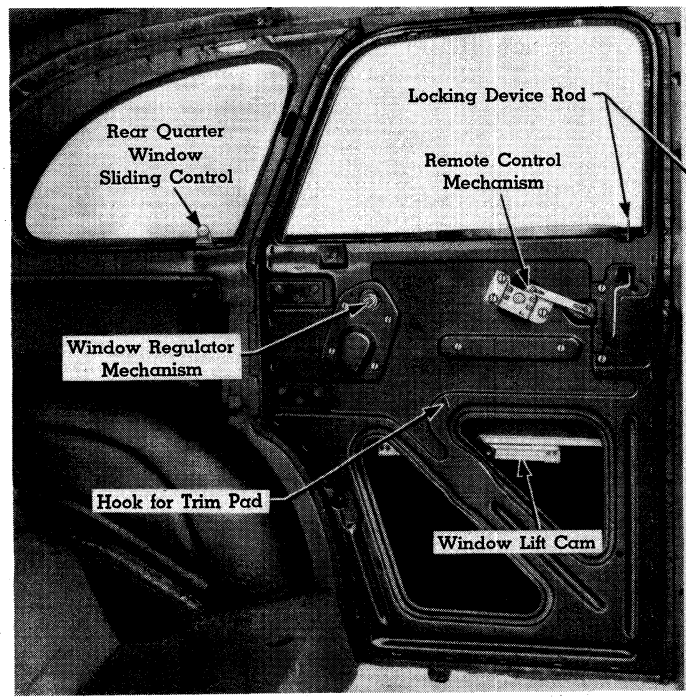


Fig. 10.
Rear Door and Rear Quarter Series 39-50 and 61
Typical of Series 39-75 and 90

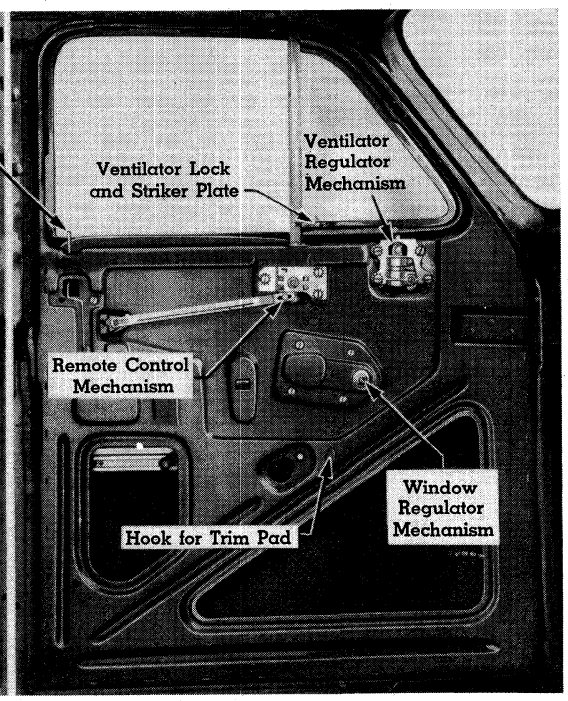


Fig. 11.
Front Door Series 39-50 and 61
Typical of Series 39-75 and 90

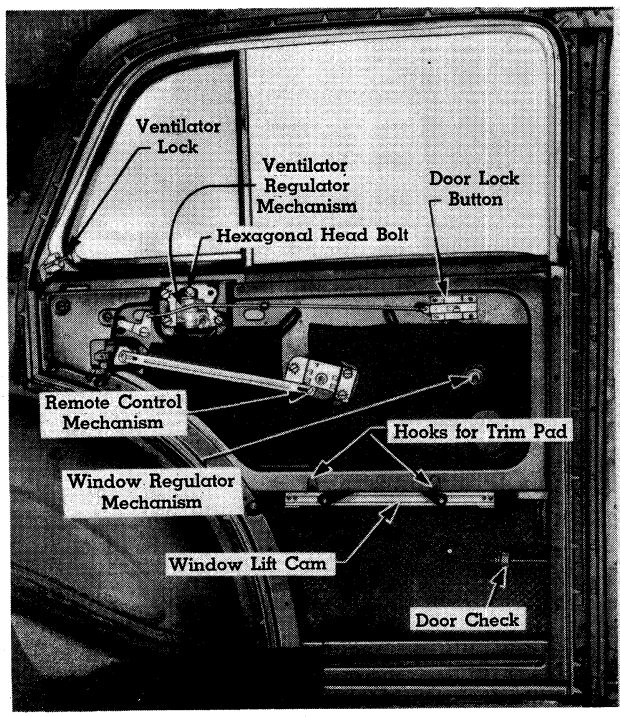


Fig. 12.
Rear Door Series 39-60S

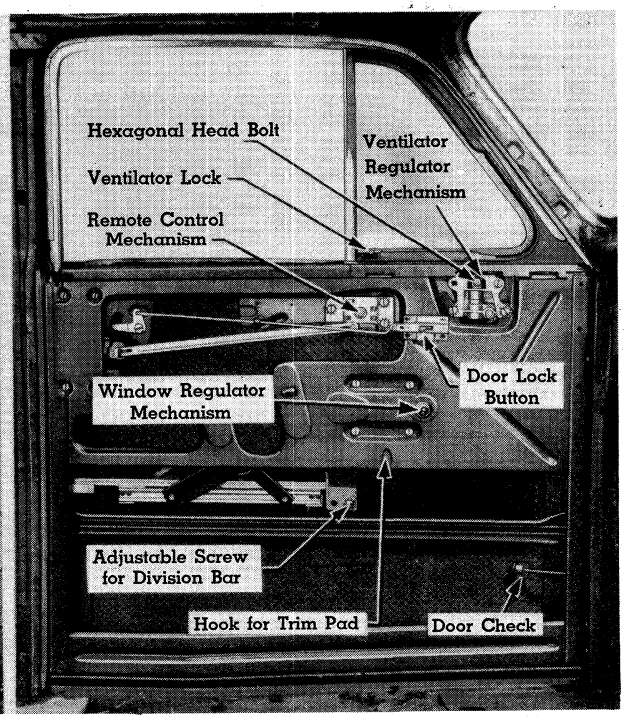


Fig. 13.
Front Door Series 39-60S

Plate 3. Under-Trim Construction

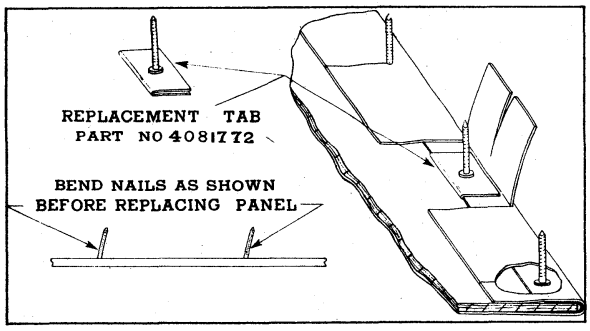


Fig. 14 Door Trim Pad Nails

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

4. Remove two Phillip's head screws located at bottom corners of trim pad.

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

6. Lift trim pad up to disengage it from hook on door inner panel and remove. (See Plate 3, Figures 10 and 11).

Installation — 1. Straighten corrugated nails so they will engage slots in door inner panel. (See Figure 14).

2. Engage slot in foundation of door trim pad over hook on door inner panel.

3. Align door trim pad with door and drive the corrugated nails into the slots in the door inner panel, using a rubber or smooth wooden mallet.

NOTE: Nails should be driven in a little at a time in order to get an even installation.

4. Install Phillip's head screws at lower corners of trim pad assembly.

5. Install garnish moulding, regulator and remote control handles and inside locking knob.

6. Replace arm rest assembly.

Series 39-60S

Removal — 1. Remove garnish moulding at lower edge of door glass by taking out the Phillip's head screws.

2. Remove plate for inside door locking device.

3. On front doors, remove door arm rest.

4. Remove all inside door handles.

5. Remove screws at lower corners of trim pad. (2 on front door trim; 3 on rear).

6. Remove tacks along upper edge of trim pad.

7. Loosen trim at top and take out self-tapping brads at upper part of trim pad.

8. Starting at top, pry both thicknesses of trim away from door far enough to release the spring clips around the edges.

9. Lift trim pad carefully off of door, lifting high enough to unhook clip at center of pad (2 clips used on rear door).

Installation — is the reverse of the above operations, with emphasis on the following precautions:

1. Be sure trim pad is fastened to hook (or hooks) in center of door panel.

2. If any of the trim pad-to-door spring clips are broken or missing, install new clips.

8. WINDSHIELD GLASS REPLACEMENT

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

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

1. Remove windshield wiper arm and blade. Loosen screws in wiper housing cap.

2. Remove rear view mirror.

3. Tape the instrument panel full length of garnish moulding.

4. Remove garnish moulding and center division by taking out Phillip's head screws along face.

5. Remove glass and channel together from the inside, taking care not to kink or damage chromium bead.

6. Check windshield opening frame with template and .010 inch feeler gauge until template is level all the way around

the opening and does not rock or tilt. Any high spots or low spots should be leveled with a hammer and a block of wood.

7. Remove channel from old glass for installation on the new.

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

8. Apply sealing compound FS-621 to windshield flange and install rubber channel and windshield glass.

9. Seal center division channels and gaskets by setting the four screws that hold the outer and inner channels against the gaskets.

10. Seal windshield rubber channel outer lip, by applying FS-621 sealing compound with Sealing Gun No. B-182. Nozzle of gun should be inserted well beneath rubber lip to perform this operation properly.

11. Reinstall garnish mouldings, rear view mirror, and windshield wiper parts.

9. BACK WINDOW GLASS REPLACEMENT

The back window glass and channel of all 39-series cars is retained in place by the garnish moulding, installed under pressure. The procedure for removal is as follows:

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

2. Take out all Phillip's head screws along face of moulding and division bar and remove moulding.

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

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

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

Installation -- 1. Install channel assembly on glass.

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

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

4. Seal glass and channel assembly in place with FS-621 cement.

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

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

10. WINDSHIELD AND BACK WINDOW LEAKS

Series 39-60S

The construction of the windshield and back window seal on 39-60S bodies differs from that of other bodies, so that different procedures are necessary for correction of leaks. There are three ways in which water can leak around the windshield and back window, as follow:

1. Between body and window reveal.
2. Between window reveal and rubber channel.
3. Between rubber channel and glass.

Leakage between glass and channel or between channel and reveal can usually be corrected by applying compound FS-621, with Sealing Gun No. B-182. In case of leakage between body and reveal, the following procedure will be necessary:

1. Remove garnish moulding.
2. Remove glass and rubber channel.
3. Remove screws holding reveal to body.
4. Using a wooden block and mallet, carefully drive reveal out of body opening.
5. Remove rubber gasket.
6. Carefully clean all of the old sealer off reveal. Also clean body opening and edges of the glass.
7. Use compound FS-621 to cement a new rubber gasket on the window reveal.
8. After this compound has dried thoroughly, apply a 1/4-inch bead of FS-621 on flange of reveal and on body opening.
9. Install reveal carefully in body opening and clamp it in place with 6 or 8 "C" clamps mounted on protective wooden blocks, in order to compress the sealer and the rubber gasket.
10. Install screws that hold reveal in place and remove the "C" clamps.
11. Install glass in rubber channel and seal glass to channel with FS-621 compound.

12. Coat inner flange of reveal with FS-621 and install glass and channel in position.

13. Before these compounds have had a chance to set, reinstall garnish mouldings. Turn moulding screws up snugly but not too tight, taking care to tighten them evenly in order to avoid uneven strains that might cause the glass to crack.

11. DOOR WINDOW GLASS REPLACEMENT

Removal — Series 39-50, 61, 75 and 90.

1. Remove door window garnish moulding.
2. Remove upper glass run channel.
3. Remove center division channel by taking out two screws at both top and bottom of channel. (Front doors only).
4. Raise glass and remove four small screws and washers from regulator cam.
5. Lower glass slightly, tip inward at top to clear door.
6. Turn regulator handle, raising window as far as possible so that cam may be seen in window opening.
7. Unhook glass lower sash channel from regulator cam and remove glass.

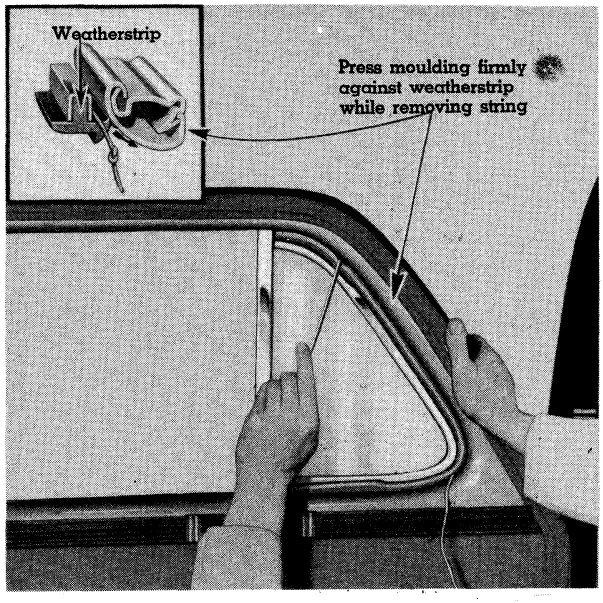


Fig. 15. Installing Ventilator Weatherstrip

Installation — Series 39-50, 61, 75 and 90 — To reinstall a door glass, reverse the above operations.

When installing garnish moulding on front doors, it is necessary to work the lip or flange of the ventilator weatherstrip out over the garnish moulding. In order to do this without damaging weatherstrip or moulding, a heavy string or cord should be used as shown in Figure 15.

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

Removal — Series 39-60S — 1. Remove door trim pad. (See Note 7).
2. Remove screw at top of center division bar, and screw at division bar and lower edge of window opening.
3. Disassemble screw at lower end of division bar. On front doors, this is an adjustable screw (See Plate 3, Figure 13).
4. Remove center division bar through inner side of window opening at the top.
5. Remove the four retaining screws from lift cam.
6. Disengage glass from cam and lift it out through window opening.
7. Remove metal channel from old glass for installation on new glass if glass is to be replaced.

Installation — Series 39-60S — The installation procedure is, in general, the reverse of the above operations.

12. REAR QUARTER GLASS REPLACEMENT

Removal — Series 39-50 and 61

1. Remove garnish moulding.
2. Remove the screws holding the ventilator frame and garnish moulding support clip.
3. Remove glass complete with channel and ventilator regulator assembly.
4. Disassemble glass from channel and regulator mechanism.

Installation — is made by reversing the above operations. Make sure that the regulator is in the extreme forward or closed position when assembling frame attaching screws.

Series 39-75 and 90 — Rear quarter windows in which either sliding ventilators or stationary windows are used can be removed and installed in the following manner:

1. Remove garnish moulding by taking out Phillip's head screws along face of moulding.
2. Loosen trim around window.
3. Remove retaining screws in glass channel.
4. Loosen outside lip of rubber channel and remove glass and channel toward inside.
5. Remove channel from old glass for installation on new, if glass is to be replaced.

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

The glass is installed in reverse order of its removal, except that glass channel must be sealed in place with FS-621 cement.

13. VENTILATOR GLASS REPLACEMENT

Replacement of pivoting ventilator glass is the same on all bodies. It is unnecessary to remove ventilator assembly, garnish moulding, or control handles.

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

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

Installation of a ventilator glass requires pushing tool, Tool No. B-175. Glass filler — a special tape available from the factory Parts Department — must be used to wrap the edges before installation. Three thicknesses of this filler are available, 1/32", 3/64" and 1/16".

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

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

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

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

If a ventilator weatherstrip loosens from the retainer, it should be recemented in place with FS-621 cement and allowed to dry for at least an hour under pressure.

14. VENTILATOR ASSEMBLY REPLACEMENT

Series 39-50, 61, 75, and 90 — 1. Remove garnish moulding.
2. Remove ventilator control handle and door remote control handle.
3. Loosen door trim down about five inches.
4. Remove two screws holding top of ventilator assembly to door.
5. Remove screw holding bottom of ventilator assembly to door.
6. Remove four screws holding ventilator regulator to door inner panel.
7. Open ventilator slightly and pry top of assembly in.
8. Close ventilator and remove from door.

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

Series 39-60S — 1. Remove ventilator glass.
2. Remove garnish moulding and lower corner of trim by ventilator regulator.
3. Take out hexagonal-head bolt from lower ventilator shaft. (See Figure 13).

4. Spring ends of ventilator frame together until upper pivot shaft is clear of door and remove frame.

15. REMOVAL OF DOOR WINDOW FRAME AND VENTILATOR REGULATOR

Series 39-60S only

1. Remove door window glass.
2. Remove door lock (See Note 16).
3. Remove wooden strips along lower edge of window opening.
4. Remove screws attaching ventilator moulding, and ventilator regulator to door.
5. Remove adjusting screws and nut and lift frame out of door.
6. To disassemble ventilator regulator, cut rivets that hold it to the frame.

Installation — is, in general, the reverse of disassembly, except that regulator must be bolted to window frame.

16. DOOR LOCK REPLACEMENT

Series 39-50, 61, 75 and 90 — 1. Remove garnish moulding and door trim pad.
2. Remove door outside handle, and lock cylinder on 39-50 and 61 front doors.
3. Remove screws holding door lock assembly to door inner panel. Two of these screws are in the edge of the door. (See Plate 1, Figures 1 and 3).
4. Remove interior door lock rod.
5. Remove remote control mechanism.
6. Disconnect remote control connecting link from lock.
7. Remove glass run lower channel.
8. Remove lock from lower part of door.

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

Series 39-60S — 1. Remove outside door handle.
2. Remove door trim pad.
3. Close door window glass.
4. On front doors, remove door lock cylinder (See Note 4).
5. Remove door locking device, link and lever.
6. Remove remote control mechanism, and disassemble remote control link.
7. Take out screws that hold lock to inner door panel. There are four screws and star washers on the inner panel and two screws in the edge of the door. (See Plate 1, Figure 2 and Plate 3, Figures 12 and 13).
8. The rear door lock can be taken out at this point, but window frame may require manipulation in order to remove front door lock, as follows:
9. Remove the two lower adjusting screws (Plate 1, Figure 2) for the door window frame and loosen the nut at the top. Then move lower end of frame back and forth until lock can be pulled out from below.

Installation — is performed by reversing the above operations.

NOTE: The adjustable screws for the lower end of the window frame are of different lengths. Install the longest one in the lower hole.

17. BODY BOLT ADJUSTMENT

Closed Bodies -- The two front body bolts, one on each side, are fitted with hard fabric shims, and should be turned down tightly.

The remaining body bolts are fitted with softer cushions. These cushions are of rubber composition on 39-50 and 61, and on these series, the body bolts should be turned down one full turn after the lock washers have been flattened.

The cushions on 39-60S, 75 and 90 cars are of pure rubber, and on these series the body bolts should be turned down 1-1/2 turns after the lock washers have been flattened.

Convertible Bodies — The body bolts on convertible body styles are all fitted with hard fabric shims, and should be turned down tightly.

18. DOOR ALIGNMENT

In checking the fit of doors, the wedge plate and dovetail bumper should be removed so that the door will act freely on its hinges. Three points should be checked to assure proper door fit. These are:

1. Vertical alignment spacing at hinge side of door.

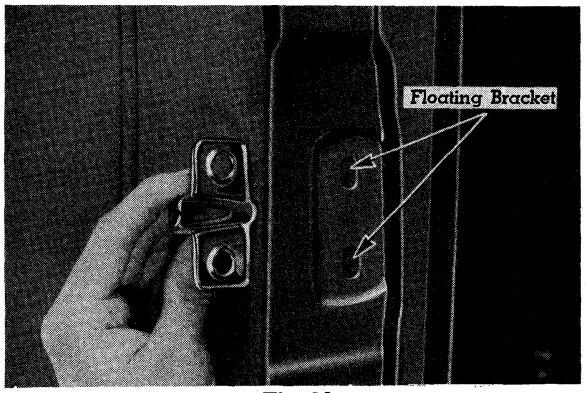


Fig. 16.
Door Wedge Plate
Typical of All 39-Series

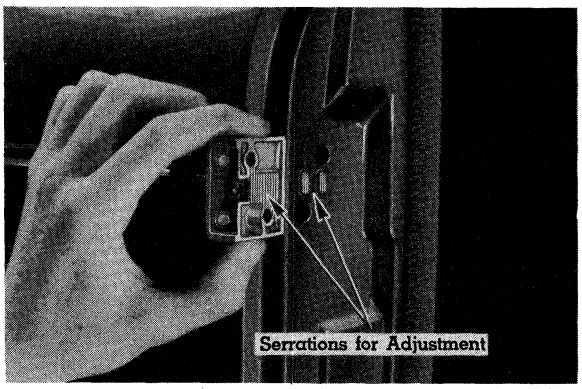


Fig. 17.
Door Lock Striker Plate
Typical of All 39-Series

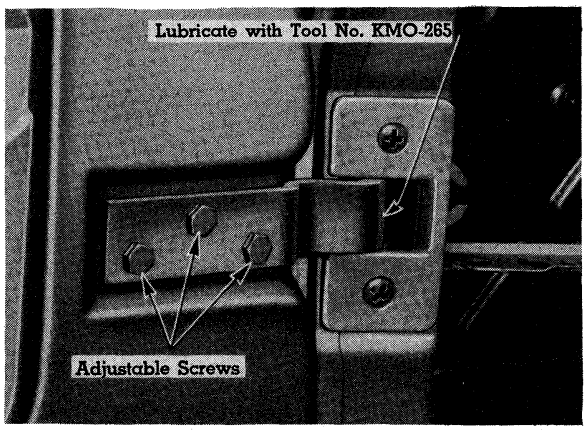


Fig. 18.
Concealed Type Door Hinge
Series 39-50 and 61

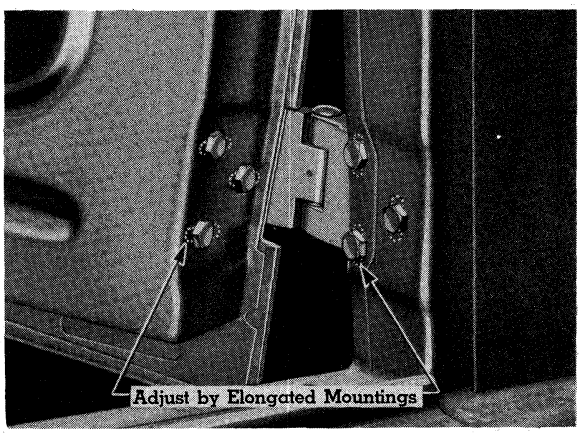


Fig. 19.
Visible Type Door Hinge
Series 39-60S-75 and 90

Plate 4. Door Alignment Adjustments

2. Horizontal alignment on lock side of door at belt moulding.

3. Alignment of door flanges with body panels at all door edges.

Unequal vertical alignment usually indicates loose hinge bolts or screws or a bent hinge. Loose hinges should be tightened securely. Bent hinges should be straightened or replaced.

Incorrect horizontal door alignment indicates that the door is swinging too high or too low. This condition can be corrected by shimming the body at the low points, using one or more fabric shims as required and installing them on the body bolts, between body and frame.

Unequal alignment of door flanges and body panels can be corrected by hinge adjustment, as all door hinges are adjustable both up and down and in and out in the body opening.

The concealed type hinges* used on 39-50 and 61 closed cars are attached to the body hinge pillars with two Phillip's head screws and to the door hinge pillars with three 3/8-inch cap screws threaded into a floating tapped block inside of the door. The holes in the door pillars are oversize and round to permit the two-way adjustment. (See Plate 4, Figure 18).

The visible type hinges used at the lower front on 39-50 and 61 and at all points on 39-60S, 75 and 90 are adjustable

*Lubrication of these hinges is explained in Note 15 of the Lubrication Section.

by means of holes in the body pillar which are elongated vertically and holes in the door pillar which are elongated horizontally. (See Plate 4, Figure 19).

The door striker plate on each door opening is adjustable in or out to bring the door closer or farther away from the body. The wedge plate is adjustable by means of a serrated base and elongated holes (See Plate 4, Figure 16) which permit moving it up or down to centralize it with the dovetail assembly.

Series 39-60S only -- The lower panels of the front and rear doors on 39-60S cars and on all series convertible cars can be realigned by adjusting or bending hinges or adjusting door striker plates in the same manner as for the other series. In addition, the window frames can be moved inward or outward to conform to the body contours and provide a snug fit against the weatherstrip, in the following manner:

1. Loosen the nut and the two adjusting screws on the door facing. (See Plate 1, Figure 2)

NOTE: These screws are located on the rear facing of the front door, and on the front or hinge pillar facing of the rear door.

2. Move the top of the door frame inward or outward as required, and retighten screws securely.

19. SEAT CUSHION REMOVAL

The front seat cushions and seat backs on 39-50, 61 and 60S body styles are made up in a single assembly, and must be removed from the car as a unit.

To perform this operation, unhook the return springs and take out the bolts at the front seat adjustment support at each side. Then slide the entire seat forward and remove.

Separate seat cushions and seat backs of conventional design are used on all 39-75 and 39-90 cars.

20. SUNSHINE ROOF REMOVAL AND INSTALLATION

Removal -- 1. Slide lid back to wide open position.

2. Remove hold down bracket at each front corner of lid by sliding bracket out from between trim and lid. Screw heads are exposed through trim.

3. Pull lid forward, gradually raising forward edge, until lid is pulled completely out of opening in top.

Installation -- Reverse the above operations, starting by locating hold down brackets at rear corners of lid in their respective spring-loaded cams in the metal tracks.

21. SUNSHINE ROOF SERVICING

If a Sunshine Roof is opened and closed a great deal, the felt bushings on the four guides will eventually wear and must be replaced, or noisy operation and water leaks will develop.

This operation is performed most quickly by replacing the four guide and bushing assemblies. In order to permit prompt replacement, a set of these assemblies should be made up by cementing felt bushings to a set of guides with FS-629 compound and binding them in place until the cement is thoroughly dried. Used guides can be used, provided that they are cleaned thoroughly of old cement, so that the new cement can provide a proper bond.

One or more spacers are used when installing each guide assembly, the number depending entirely on the height the lid must be raised for a tight fit to the weatherstrip. Each of the four guides should be spaced according to its own individual requirements. If too many spacers are used, the lid will work stiff and probably not close. If too few are used, the lid will close more easily, but will not be water-tight.

The valance at the rear and sides of the roof lid was made of upholstery material on the first bodies, and of rubber on later bodies. The rubber valance is 1/4 inch wider than the first type.

If the valance is to be replaced for any reason, the rubber valance should always be installed. The valance is attached to the lid trim pad. A study of the method of removal will indicate the correct installation procedure, with the following precautions:

Start the center of the rubber valance at the center of the trim pad, and work outward to the ends. The metal clips used to fasten the valance at the rear corners cannot be applied by hand. It is necessary to whip-stitch the valance to the trim pad at these places.

BODY

Body Styles

Series 39-50 (120" Wheelbase)—Fisher Bodies

2 Coupe	39-5027	Quarter windows, 2 opera seats, luggage and spare tire under deck
2 Convertible Coupe	39-5067	Fabric top, blind quarter, 2 opera seats, spare tire under deck
5 Touring Sedan, 2-Door	39-5011	Built-in trunk, spare tire in trunk, divided front seat, wide rear windows
5 Touring Sedan, 2-Door	39-5011A	Same as 39-5011, but with Sunshine Turret Top
5 Convertible Sedan	39-5029	Built-in trunk, spare tire in trunk, fabric top, blind quarter.
5 Touring Sedan, 4-Door	39-5019	Built-in trunk, spare tire in trunk
5 Touring Sedan, 4-Door	39-5019A	Same as 39-5019, but with Sunshine Turret Top

Series 39-61 (126" Wheelbase)—Fisher Bodies

2 Coupe	39-6127	Quarter windows, 2 opera seats, luggage and spare tire under deck
2 Convertible Coupe	39-6167	Fabric top, blind quarter, 2 opera seats, luggage and spare tire under deck
5 Convertible Sedan	39-6129	Built-in trunk, spare tire in trunk, fabric top, blind quarter
5 Touring Sedan, 4-Door	39-6119	Built-in trunk, spare tire in trunk
5 Touring Sedan, 4-Door	39-6119A	Same as 39-6119, but with Sunshine Turret Top
5 Touring Sedan, 4-Door	39-6119F	Same as 39-6119, but with Imperial division

Series 39-60S (127" Wheelbase)—Fisher Bodies

5 Special Sedan, 4-Door	39-6019S	Built-in trunk, spare tire in trunk, blind quarter, chrome window frames
5 Special Sedan, 4-Door	39-6019S-A	Same as 39-6019S, but with Sunshine Turret Top
5 Special Sedan, 4-Door	39-6019S-F	Same as 39-6019S, but with Imperial division

Series 39-75 (141" Wheelbase)—Business Cars

8 Business Touring Sedan	7523-L	Built-in trunk, spare tire in trunk, livery trim, 2 auxiliary seats
8 Business Touring Imperial Sedan	7533-L	Built-in trunk, spare tire in trunk, livery trim, Imperial division, 2 auxiliary seats

Series 39-75 and Series 39-90 (141" Wheelbase)—Fleetwood Bodies

	V-8 Style Numbers	V-16 Style Numbers	
2 Coupe	39-7557	39-9057	2 Opera seats, spare tire under deck, quarter windows, deck lid
5 Coupe	39-7557B	39-9057B	Full width rear seat, quarter window, spare tire under deck, deck lid
2 Convertible Coupe	39-7567	39-9067	Fabric top, 2 opera seats, spare tire under deck, blind quarter, deck lid
5 Sedan, 4-Door	39-7519	39-9019	Built-in trunk, spare tire in trunk
5 Sedan, Division	39-7519F	39-9019F	Built-in trunk, spare tire in trunk, glass division
5 Formal Sedan	39-7559	39-9059	Built-in trunk, spare tire in trunk, glass division, blind quarter, leather roof, 2 opera seats
5 Town Sedan	39-7539	39-9039	Built-in trunk, spare tire in trunk, close coupled, blind quarter, metal roof
5 Convertible Sedan	39-7529	39-9029	Built-in trunk, spare tire in trunk, division, optional opera seats, fabric top, blind quarter
7 Sedan	39-7523	39-9023	Built-in trunk, spare tire in trunk, 2 auxiliary seats
7 Imperial Sedan	39-7533	39-9033	Built-in trunk, spare tire in trunk, Imperial division, 2 auxiliary seats
7 Formal Sedan	39-7533F	39-9033F	Built-in trunk, spare tire in trunk, Imperial division, blind quarter, leather roof, 2 auxiliary seats
7 Town Car	39-7553	39-9053	Built-in trunk, spare tire in trunk, blind quarter, leather roof, removable canopy over chauffeur's seat, 2 auxiliary seats

FRAME

General Description

The frames used on the 39-50, 61 and 60S Cadillac and LaSalle cars are of the familiar X-type construction with side bars curved at the front to partially enclose the helical front springs. The frames of these cars are similar in design, although there are differences in dimensions, bracket locations and other constructional details, due to varying wheelbases and other body requirements.

The number of body bolt brackets on 39-50 and 61 frames has been decreased to four, there being two on each side. Although the body is secured to the frame at seven points on each side, the bolts pass directly through the frame side bars at all points except the two mentioned. Frames on 39-50 convertible models have extra heavy X-members to increase rigidity, while those on 39-61 convertibles also have additional reinforcements.

The frames used in 39-75 and 90 cars are likewise similar to each other in design, differing mainly in dimensions. These frames have straight sidebars with the front spring pads formed by an extension of the front cross member. Reinforcements extend both forward and back from the heavy channel-section X-member, forming box section sidebars in these areas.

The design of commerical car frames of all series are much the same as their corresponding series passenger car frames, but with differences in length and heavier construction features.

Chassis Model Designation

Series	Wheelbase	Overall* Length	Tread	
			Front	Rear
39-50	120-1/4"	202-5/8"	58"	59"
39-61	126"	207-1/4"	58"	59"
39-60S	127-1/4"	214-3/4"	58"	61"
39-75	141-1/4"	225-3/8"	60-3/8"	62-1/2"
39-90	141-1/4"	222"	60-3/8"	62-1/2"
39-50 Comm'l	156-1/2"	238-7/8"	58"	61"
39-61 Comm'l	162-1/4"	243-1/2"	58"	61"
39-75 Comm'l	161-3/8"	245-3/8"	60-3/8"	62-1/2"

* with bumpers

Other Frame References

Other Body References

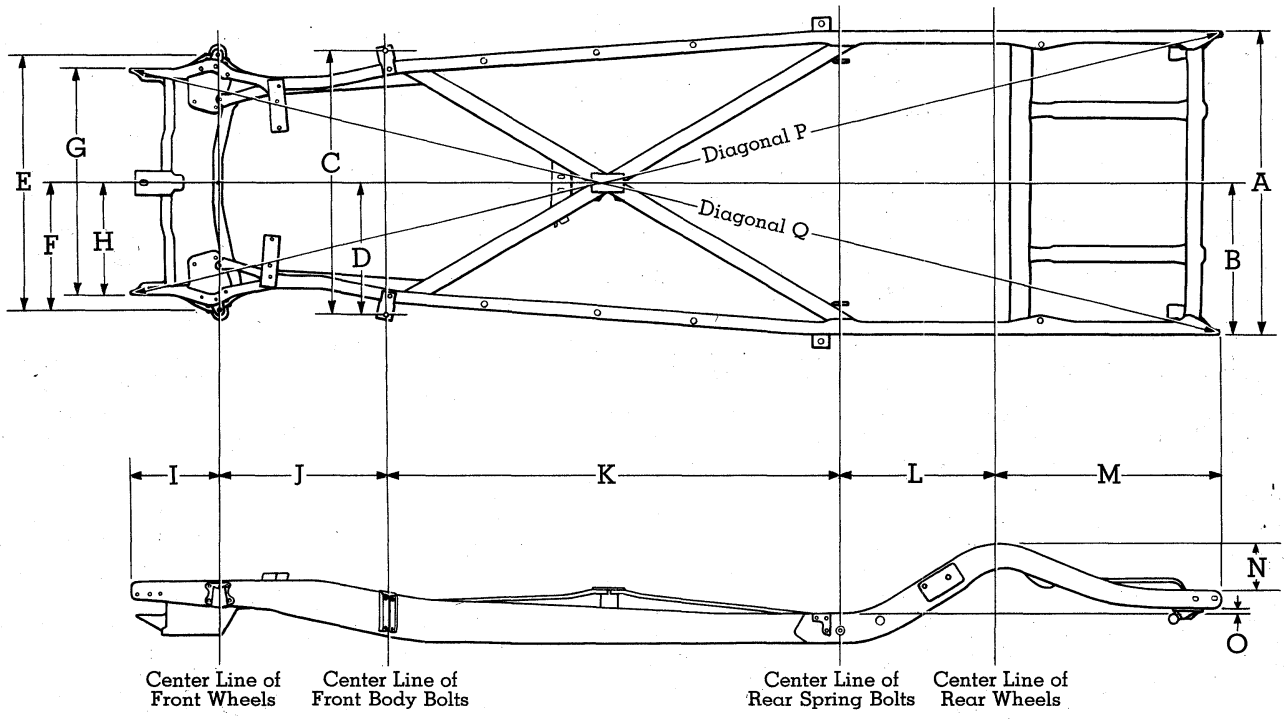


Fig. 1 Frame, Series 39-50, 61

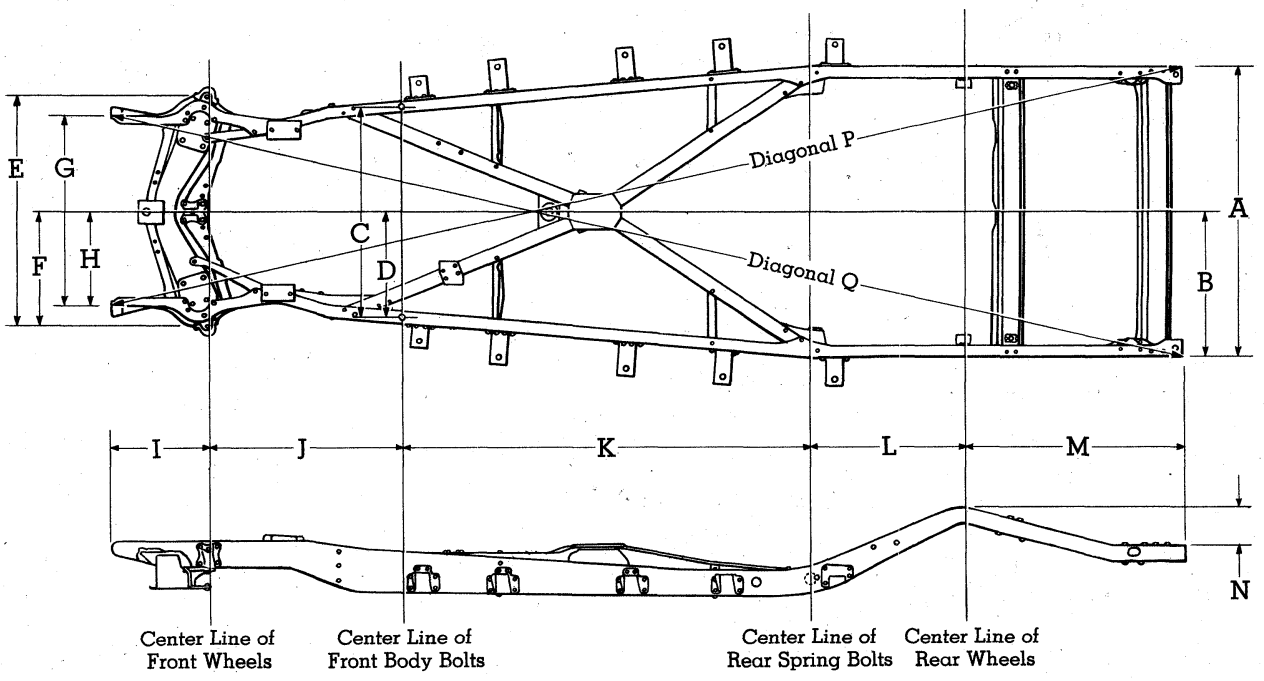


Fig. 2 Frame, Series 39-60 S

Frame Specifications

Dimensions	39-50	39-61	39-60S	39-75 39-90	39-50 Comm'l	39-61 Comm'l	39-75 Comm'l
A (*B)	48"	48"	49-1/2"	49-1/4"	48"	48"	49-1/4"
+ C (*D)	41-1/2"	41-5/8"	35-5/8"	28-5/8"	41-1/2"	41-5/8"	37"
E (*F)	40"	40"	39-1/2"	43-1/8"	40"	40"	43-1/8"
G (*H)	35-1/2"	35-1/2"	39"	26-1/4"	35-1/2"	35-1/2"	26-1/4"
I	14-3/4"	14-3/4"	15-7/8"	15"	14-3/4"	14-3/4"	15"
J	25"	30-7/8"	31-3/4"	33"	25"	30-7/8"	35-7/8"
K	71"	70-7/8"	70"	79-1/4"	107-1/4"	107-1/8"	96-1/2"
L	24-1/4"	24-1/4"	25-1/2"	29"	24-1/4"	24-1/4"	29"
M	36"	36"	36-7/8"	38-1/4"	36"	36"	38-1/4"
N	7-1/4"	7-1/4"	6-1/4"	7-1/4"	7-1/4"	7-1/4"	7-1/4"
O	5/8"	5/8"	1-1/8"	2-1/2"	5/8"	5/8"	2-1/2"
** P & Q	176"	181-5/8"	184"	198-1/8"	211-3/8"	217"	218"

* (B = 1/2 A) (D = 1/2 C) (F = 1/2 E) (H = 1/2 G)
\+ Measurement taken from centerline of first body mounting bolts.
** Diagonals P & Q should be equal within 3/16 inch.

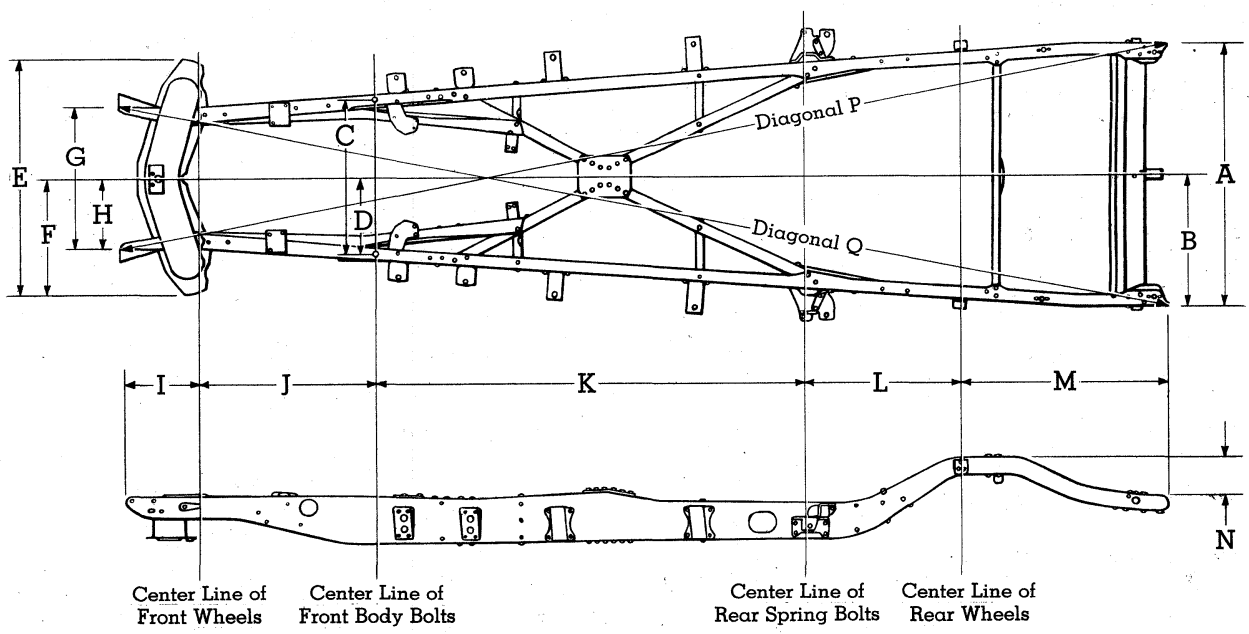


Fig. 3 Frame, Series 39-75, 90

FRONT WHEEL SUSPENSION

General Description

Independent front wheel suspension is used on all 39-series Cadillac and LaSalle cars. This type of suspension, with its coil springs, pivoted suspension arms, and integral shock absorbers, provides minimum road shock, maximum front end stability and accurate control of all geometric relations.

One system is used on series 39-50 and 61 cars (See Figure 1), a similar system is used on 39-60S, and a third on series 39-75 and 90 (See Figure 2). These systems are all the same in principle, but they differ in construction details.

One difference is in the use of rubber bushings at the inner ends of the lower suspension arms on series 39-50 and 61, in contrast with the use of threaded bushings with rubber dust seals on 39-60S, 75 and 90. This makes a difference in the number of front suspension lubricating points on the various series.

The design of the lower suspension arms themselves is different. These arms are steel pressings on 39-50 and 61 cars, whereas they are forgings on 39-60S, 75 and 90 cars. This difference changes somewhat the disassembly procedure.

An eccentric threaded upper bushing, which controls both caster and camber adjustments, is used on series 39-50, 61 and 60S. On series 39-75 and 90, the eccentric feature is not employed, and camber adjustment is made with shims.

The steering knuckle pins operate in plain bushings, top and bottom, on series 39-50, 61 and 60S, whereas needle bearings are used at these points on the heavier series 39-75 and 90 cars.

*

Service Information

Front wheel alignment is the mechanics of keeping all the interrelated factors affecting the running and steering of the front wheels in proper adjustment. Correct alignment is necessary to keep the front wheels in their true running position and is essential for easy and efficient steering, as well as the prevention of abnormal tire wear.

1. CORRECTION OF WHEEL MISALIGNMENT

The following factors should be checked and put in proper setting, exactly in the order given, when testing the wheel alignment of any car.

Tire Pressure—Checking and inflating the tires to the proper pressure is the very first operation of any wheel alignment job. It is essential to good steering, good riding, and maximum tire life. Underinflation alone results in actual misalignment, with consequent hard steering and excessive tire friction, which causes rapid and uneven tire wear.

The correct tire pressures for the 39-series cars are:

39-50, 61	24 lbs.	front and rear
39-60S	28 lbs.	front and rear
39-75, 90	32 lbs.	front and rear
39-75 *Business cars	32 lbs.	front
	38 lbs.	rear

Trueness, Balance, and Tracking of both front and rear wheels. (See page 101.

Adjustment of Front Wheel Bearings. (See page 102).

Condition of Shock Absorbers. (See page 33).

Adjustment of Steering Gear and All Steering Connections. (See page 95).

Caster Angle of Steering Knuckle Support. (See following notes).

Camber Angle and Knuckle Pin Inclination.

Toe-in of Front Wheels in Straight Ahead Position.

Toe-out of Front Wheels on Turns.

Condition of All Bushings and Bearings.

* This refers only to styles 7523-L and 7533-L. The tire pressures of cars with commercial bodies depend upon the total weight of the car. Follow tire manufacturers' recommendations.

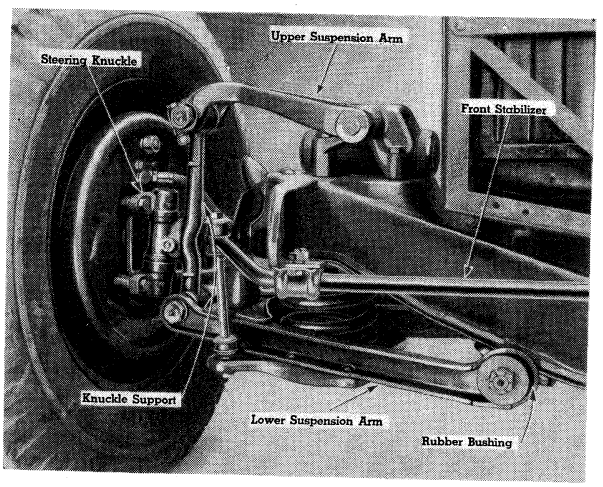


Fig. 1 Steering Knuckle and Support (Series 39-50 & 61, Typical of 39-60 S)

2. CASTER ANGLE

(Before checking the front wheel alignment factors--caster, camber, toe-in and toe-out, be sure to "normalize" the front springs by working the bumper up and down. This is necessary because the height of the springs affects the wheel alignment. If for any reason a person should get into the car while it is on the alignment machine, the normalizing procedure must be repeated.)

Caster is the fore and aft angle of inclination between the steering knuckle pin and vertical. See Plate 5, Figure 3. When the top of the knuckle pin is inclined toward the rear, positive caster results. Positive caster imparts a trailing action to the front wheels. When the knuckle pin is inclined toward the front, negative or reverse caster results. This gives the front wheels a leading action.

Excessive forward caster causes hard steering due, among other factors, to the increasing tendency of the front wheels to toe-in. Excessive reverse caster will cause erratic steering with a tendency to turn one way or the other, instead of traveling in a straight course, and the steering wheel will not return to the straight ahead position after making a turn.

3. CASTER ADJUSTMENT

On 39-50 and 61 cars, there should be from 1-1/4° to 2-1/4° reverse caster. On 39-60S cars, the setting should be between positive 1/4° and negative, or reverse 1-1/4°. On 39-75 and 90 cars, the limits are from 1/4° positive to 1/4° negative caster.

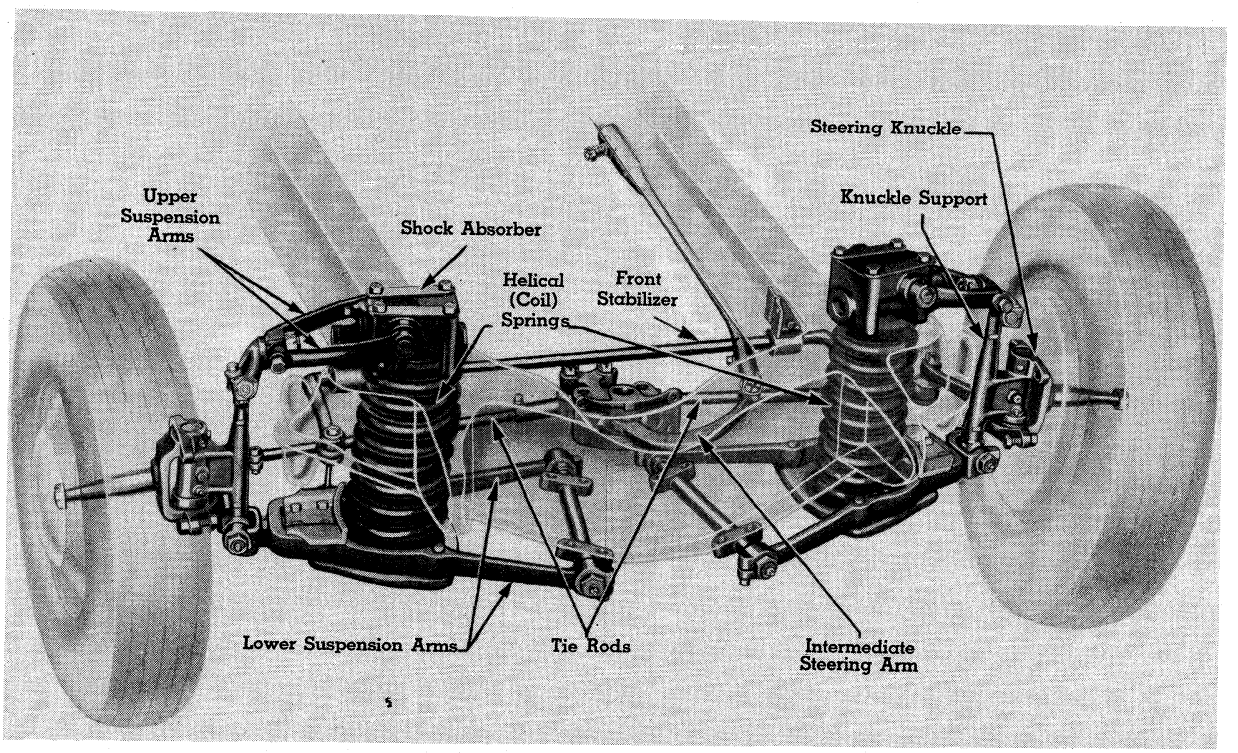


Fig. 2 Complete Front Suspension Assembly - Series 39-75 & 90

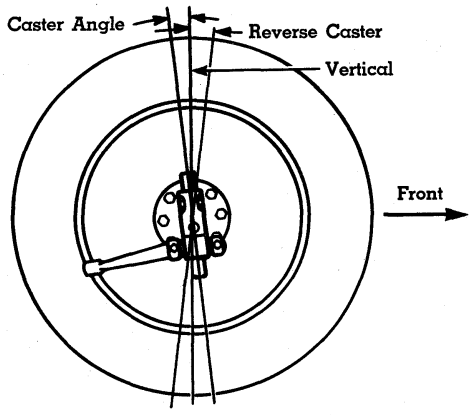


Fig. 3. Front Wheel Caster

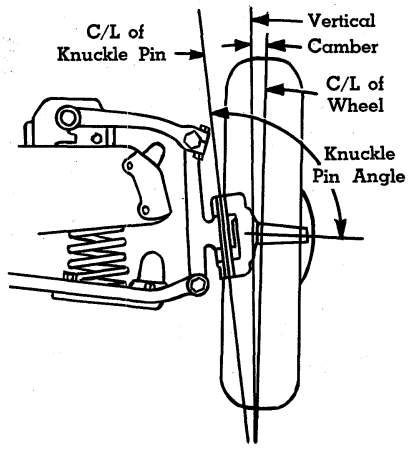


Fig. 4. Elements of Front Wheel Camber

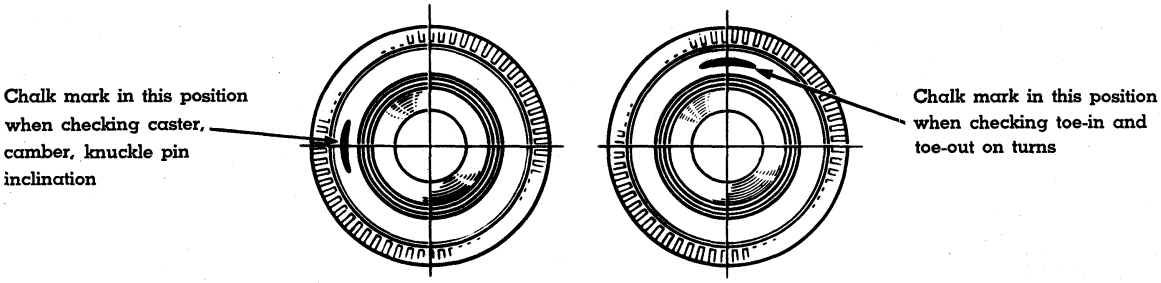
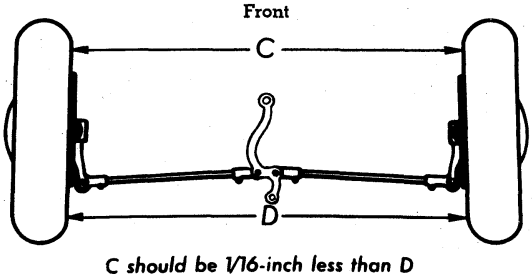


Fig. 5. Location of point of greatest run-out on front wheels when checking alignment factors.



C should be 1/16-inch less than D

Fig. 6. Front Wheel Toe-In

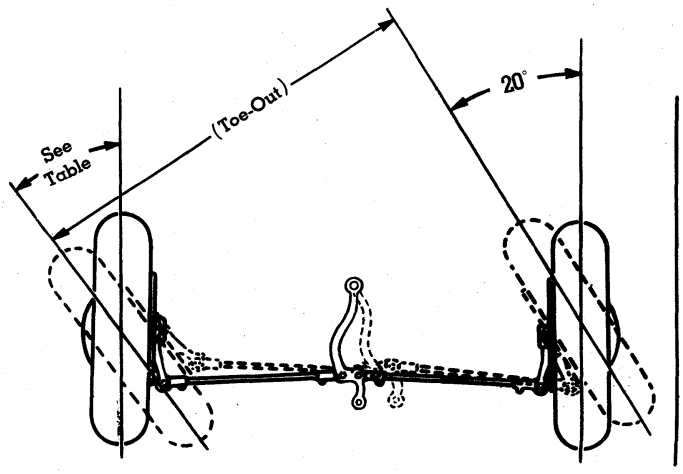


Fig. 7. Toe-Out on Turns

Plate 5. Front Wheel Alignment Factors

When checking the caster angle, it is important to take the reading with the weight of the car on the front wheels, and to position the wheels as shown in Plate 5, Figure 5. The caster angle should come within the limits given above and be equal within 1/2° on both sides of the car.

The procedures for setting the caster angle on 39-series cars are as follow:

Series 39-50, 61 and 60S -- 1. Loosen clamp screw at upper end of steering knuckle support.

2. Remove lubrication fitting from front bushing for threaded pin at upper suspension arm.

3. Insert wrench, Tool J-720, through hole from which lubrication fitting was taken and adjust caster by turning threaded pin until desired caster setting is secured, as shown in Plate 6, Figure 8.

Turning threaded pins in a clockwise direction increases caster and vice versa. It is important to turn the pin in complete turns only so as not to change the camber setting.

4. After completing the adjustment to recommended specifications, tighten clamp screws and reinstall lubrication fittings.

Series 39-75 and 90 -- 1. Loosen retaining nuts fastening steering knuckle support yokes to upper and lower suspension arms.

2. Loosen clamp screw at upper end of steering knuckle support.

3. Remove lubrication fitting from front bushing of upper support yoke.

4. Insert wrench, Tool J-720, through the hole from which the lubrication fitting was taken and adjust caster by turning the threaded pin until the desired caster setting is secured. Turning threaded pin in a clockwise direction increases the caster and vice versa.

5. After completing adjustment to recommended specifications, tighten yoke retaining nuts and support clamp screws, and reinstall lubrication fittings.

NOTE: The above procedures can be used only to change the caster angle two or three degrees. If caster is out more than this, check front suspension parts for misalignment and make correction by replacing bent or misaligned parts rather than by attempting excessive adjustment.

4. CAMBER

Camber is the outward tilt of the front wheels at the top. See Plate 5, Figure 4.

Too much camber is undesirable because of the effect it has on tire contact with the road. Uneven camber causes wander, or a tendency to pull to one side. In order to secure the effect of camber required for easy steering and minimum wear of parts, the steering knuckle pins are inclined inward at the top to reduce the amount of camber which would otherwise be necessary. It is obvious, therefore, that the angle of inclination of the steering knuckle pins is closely associated with the wheel camber in its effect on steering.

5. CAMBER ADJUSTMENT

The proper camber setting for series 39-50 and 61 cars is negative 1/4° to positive 3/4°; for 39-60S cars is negative 1/4° to positive 1/2°; and for 39-75 and 90 cars is 0° to positive 1/2°.

When checking the camber, the front wheels should be turned so that the high spot on the tires is in a horizontal plane, as shown in Figure 5. The camber angle should be within the limits given above and equal within 1/2° on both sides of the car.

Knuckle Pin Angle -- If camber is incorrect the inclination of the steering knuckle pin (Figure 4) should be checked according to the specifications on page 35. An incorrect angle indicates bent suspension arms or steering knuckle supports, which, of course, have a direct effect on camber. Bent parts should be replaced and, since the installation of new parts may affect the turning angle of the wheels, the toe-out of the wheels on turns should be checked after such replacements.

It is also advisable after making a camber correction to change the tires, putting the front ones on opposite rear wheels and the rear ones on opposite front wheels to provide a normal tire contact.

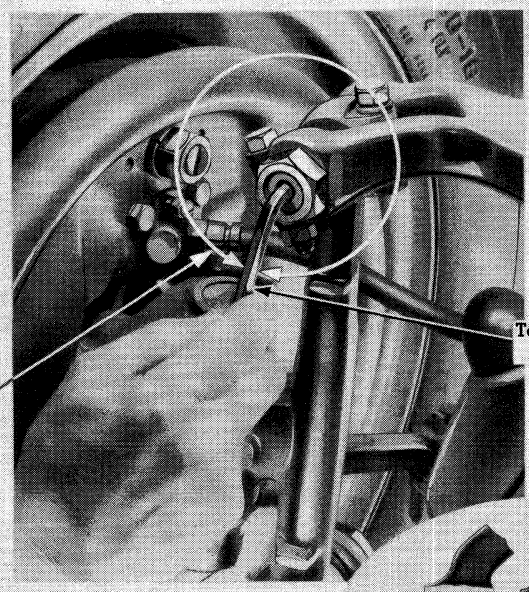


Fig. 8. Caster Adjustment
Series 39-50, 61 and 60S

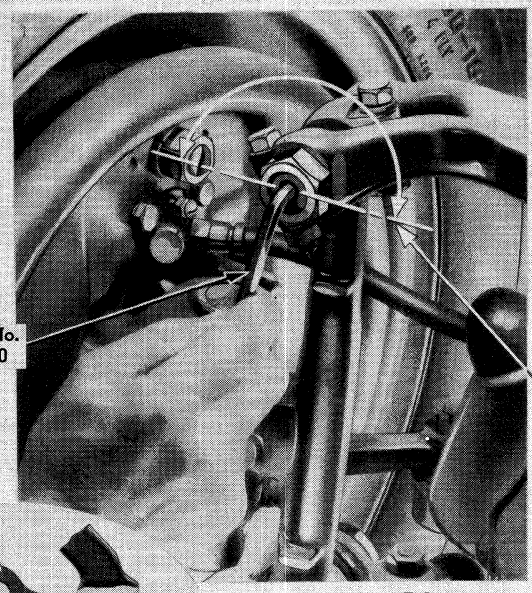
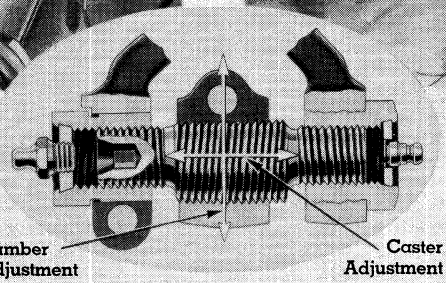


Fig. 9. Camber Adjustment
Series 39-50, 61 and 60S

Caster adjustment should be made in complete turns only. Turning threaded pin clockwise increases the caster. Turning it counter-clockwise decreases the caster.



Camber adjustment is made in ½ turns only: Position of eccentric portion of threaded pin controls the camber from zero to maximum in 180° turn

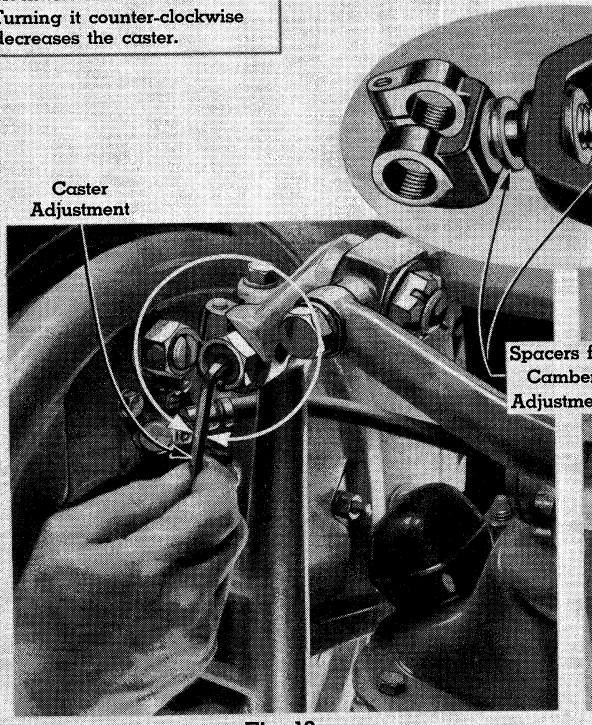


Fig. 10.
Caster Adjustment Series 39-75 and 90

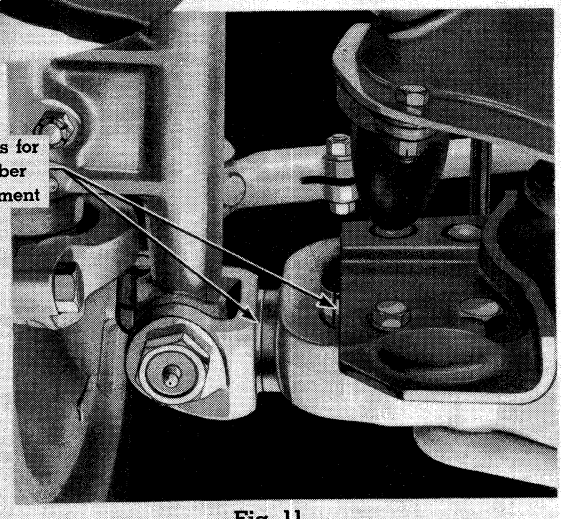


Fig. 11.
Camber Adjustment Series 39-75 and 90

Plate 6. Caster and Camber Adjustment

Camber Correction — The procedure for setting the camber angle is as follows:

Series 39-50, 61 and 60S — 1. Loosen clamp screw at upper end of steering knuckle support.

2. Remove lubrication fitting from front bushing of upper support yoke.

3. Insert wrench, Tool J-720, through hole from which lubrication fitting was removed, and adjust camber by turning threaded pin until desired adjustment is secured. Make adjustments on each side as nearly equal as possible.

NOTE: Since the camber adjustment is controlled by the eccentric action of the threaded pin, 1/2 turn gives the maximum adjustment, and is all that should be required. (See Plate 6, Figure 9).

4. After completing adjustment to the recommended specifications, tighten the knuckle support clamp screws and install the lubrication fittings.

Series 39-75 and 90 — 1. Remove retaining nut and spacers from the steering knuckle support yoke at the lower suspension arm.

2. Remove steering knuckle support yoke and reinstall with spacers rearranged so as to secure the correct camber.

Normally, there is one spacer between the yoke and the suspension arm and one between the suspension arm and the retaining nut, as shown in Plate 6, Figure 11. To decrease camber, place both spacers between the yoke and the suspension arm; to increase camber, place them both between the suspension arm and the retaining nut.

3. After completing the adjustment according to specifications and as nearly equal on each side as possible, reinstall the steering knuckle support yoke retaining nut, tighten securely and lock in position.

6. TOE-IN

The setting or adjustment of the front wheels so that the distance between them is less at the front than at the rear is called "toe-in." See Plate 5, Figure 6. The purpose of toe-in is to make the wheels roll straight ahead and compensate for the tendency of cambered wheels to roll outward. Toe-in is also necessary to prevent abnormal tire wear.

7. ADJUSTMENT OF TOE-IN

The proper toe-in setting depends upon the type of equipment used for checking. When measuring toe-in with equipment that is used while the car is at rest, the toe-in should be from 1/32 to 3/32-inch. When testing with "scuff board" equipment that takes the measurement while the car is in motion, the limits should be from 0 to 1/16-inch. When using the type that reads in feet per mile, the limits should be 0 to 12 feet per mile.

When checking toe-in, the wheels and tires should be made to run as nearly true as possible and the readings should be taken only when the front wheels are in a straight ahead position and with the steering gear on its high point. The high spot on the side of the tires should be in a vertical plane, as shown in Figure 5, when testing on stationary equipment.

Toe-in readjustment is made on series 39-50 and 61 cars by turning the tie rod adjusters at the outer ends of each tie rod after loosening the clamping screws.

On Series 39-60S, 75 and 90 cars, the tie rods themselves are turned to make the adjustment.

Be sure to turn both rods or both adjusters an equal amount until the proper toe-in setting has been obtained.

NOTE: On Series 39-50 and 61 cars, the tie rods or adjusters should be turned in the direction of forward wheel rotation to increase toe-in.

On Series 39-60S, 75 and 90 cars, the tie rods should be turned in the direction of rearward wheel rotation to increase toe-in.

When adjustment has been completed according to the recommended specifications, tighten all clamp screws.

FRONT WHEEL SUSPENSION

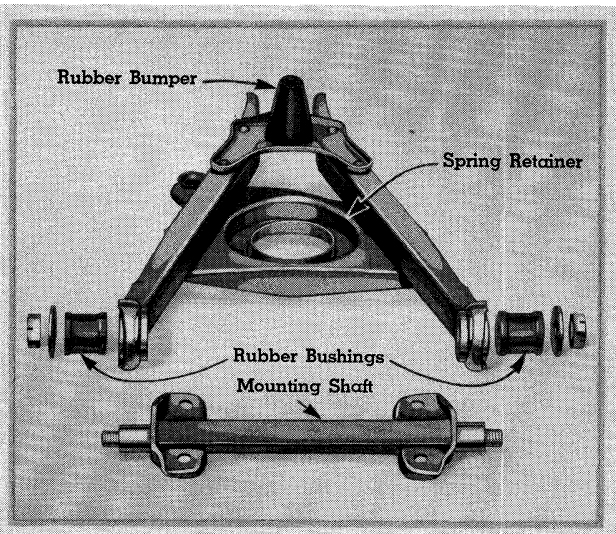


Fig. 12. Lower Suspension Arm
Series 39-50 and 61

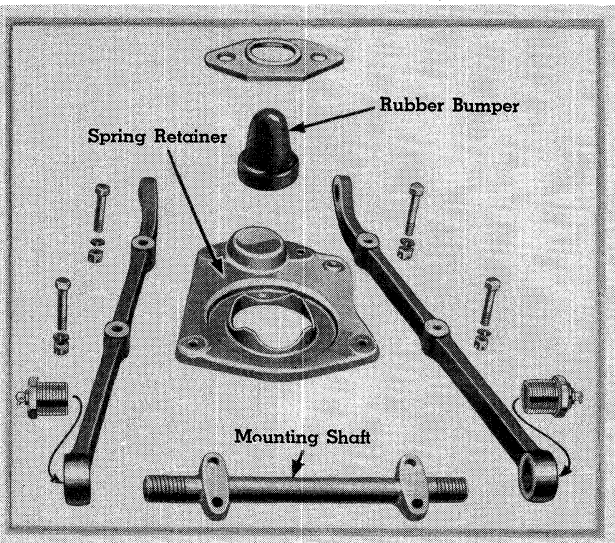


Fig. 13. Lower Suspension Arm
Series 39-60S

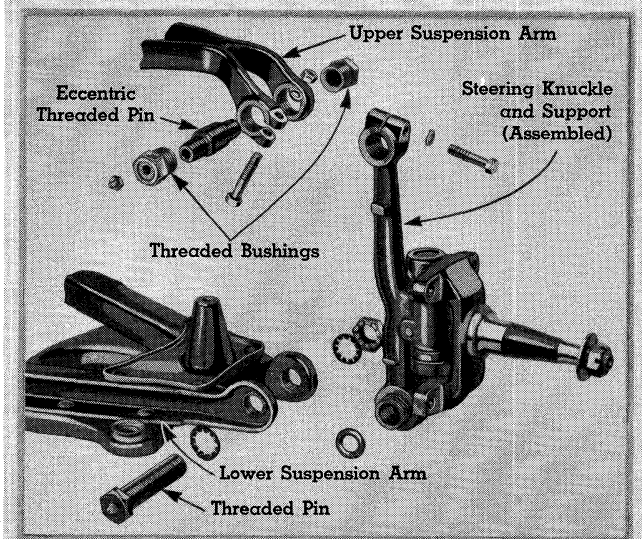


Fig. 15. Steering Knuckle
Assembly
Series 39-50 and 61
Typical of 39-60S

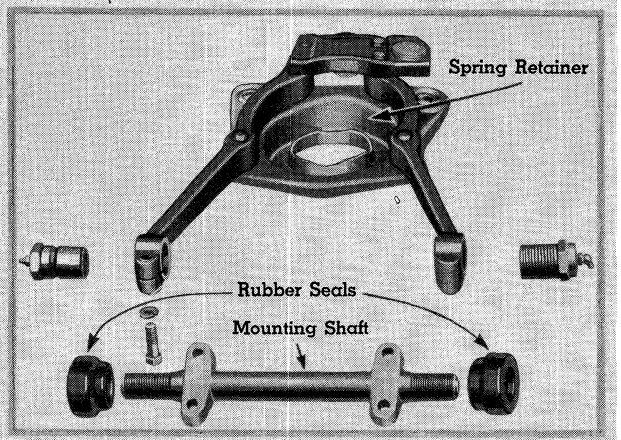


Fig. 14. Lower Suspension Arm
Series 39-75 and 90

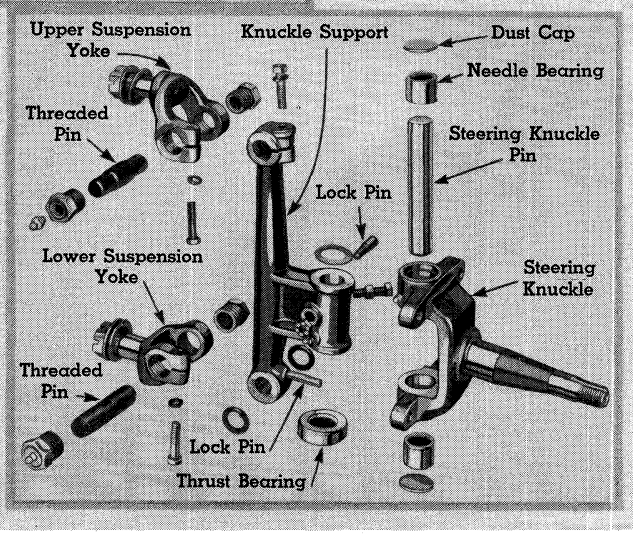


Fig. 16. Steering Knuckle
Assembly
Series 39-75 and 90

Plate 7. Front Suspension Parts, Disassembled

8. TOE-OUT ON TURNS

The toe-out of the front wheels on turns is an important factor of front wheel alignment. (See Plate 5, Figure 7).

Toe-out develops when the front wheels are turned to the right or left, depending on the amount of deflection from the straight ahead course, because of the difference in the arc made by the inside wheel as compared with that of the outside wheel.

Toe-out on turns is essential for easy steering and maximum tire life. It is provided for by the design of the steering knuckle arms, whose geometry bears a definite relationship to the steering radius, the wheelbase of the car, and the distance between the steering knuckle pins.

Toe-out is checked by turning the wheels to the right or left, locating the outside wheel in a definite position, and determining the setting of the inside wheel. See specifications, page 35.

Errors in the setting of the inside wheel are usually due to accidental bending of steering knuckle arms, which should be corrected by replacement. When replacements of this kind are made, it is important to check the steering knuckles and lower suspension arms to make sure that they have not been damaged and to see that the camber and caster are correct and equal on both sides; and that the toe-in is correct.

9. ADJUSTMENT OF STEERING STOP SCREWS

Whenever a complete check of front wheel alignment is made on 39-75 and 90 cars, it is well to check the adjustment of the steering stop screws to prevent any possibility of chassis interference with the wheels on turns or of the steering gear roller bottoming in the housing. No stop screw adjustment is required on the other 39-series cars.

The procedure for setting the stop screws is as follows:

1. Turn the front wheels to the exact straight ahead position and mark the steering wheel with a piece of tape at the high point.

2. Turn the steering wheel two complete revolutions to the right and adjust the right hand stop screw until it rests against the stop.

3. Again set the wheels in a straight ahead position and turn the steering wheel two complete turns to the left and adjust the left hand stop screw.

10. REMOVAL AND INSTALLATION OF STEERING KNUCKLE AND KNUCKLE PIN (ALL SERIES)

1. Lift front end of car from floor with jack or hoist.

2. Remove car wheel, wheel hub and brake drum assembly, and wheel bearings.

3. Disconnect tie rod at steering knuckle arm pivot ball joint.

4. Remove brake dust shield.

5. Remove locking pin from steering knuckle support.

NOTE: On Series 39-50, 61 and 60S cars, locking pin is a tight press fit and should be driven out from end with flat surface on side. On Series 39-75 and 90, locking pin is a threaded bolt.

6. Remove dust caps at upper and lower knuckle pin holes, tap out steering knuckle pin, and disassemble steering knuckle support from steering knuckle, taking care not to damage thrust bearings. (See Plate 7).

On series 39-75 and 90 cars, the needle bearings at top and bottom of steering knuckle pin should be removed from steering knuckle to complete the disassembly.

Installation should be made in the reverse order of operations. Proper lubrication of parts when assembling is most important.

11. REMOVAL AND INSTALLATION OF STEERING KNUCKLE SUPPORT AND YOKE ASSEMBLY

Removal from series 39-50, 61 and 60S cars:

1. Remove steering knuckle as previously explained.

2. Place jack under lower suspension arm to support coil spring while disconnecting upper end of steering knuckle support.

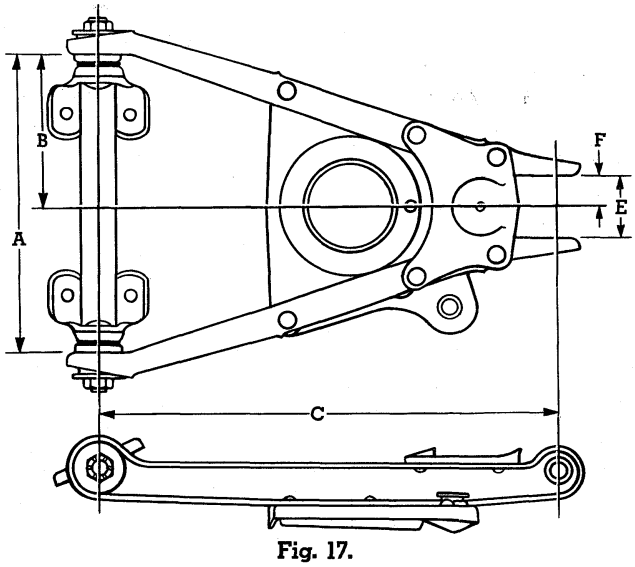


Fig. 17.
Lower Suspension Arm Series 39-50 and 61

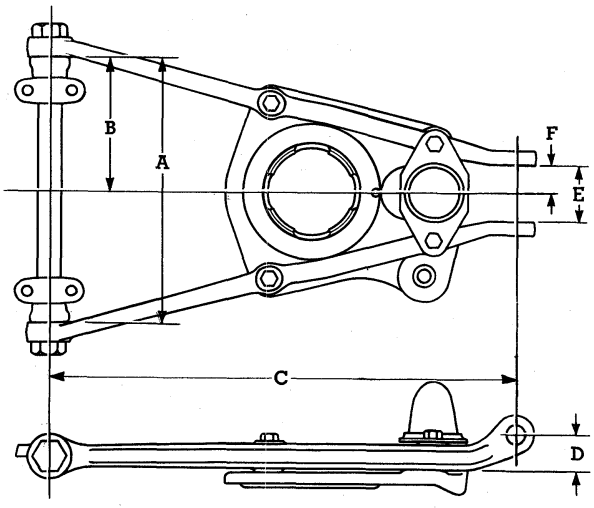


Fig. 18.
Lower Suspension Arm Series 39-60S

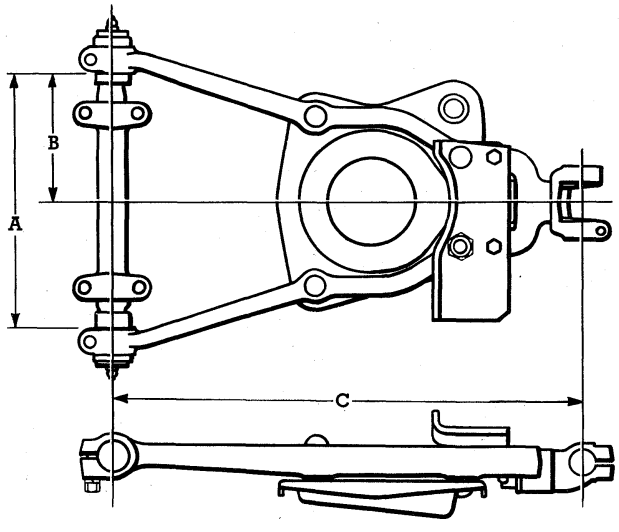


Fig. 19.
Lower Suspension Arm Series 39-75 and 90

Plate 8. Alignment of Lower Suspension Arms

DIMENSIONS

Dimensions	39–50 39–61	39–60S	39–75 39–90
A	11–1/4"	11–1/4"	11–1/4"
B	5–5/8"	5–5/8"	5–5/8"
C	18–1/16"	19–1/2"	18–23/32"
D	.....	1–5/8"	.....
E	2–3/8"	2–3/8"	.....
F	1–3/16"	1–3/16"	.....

3. Disconnect front stabilizer.
4. Loosen clamp screw at upper end of steering knuckle support.
5. Loosen clamp screw in upper suspension arm at threaded pin.
6. Mark the position of the threaded pin so that the correct caster and camber position can be maintained when reassembling.
7. Remove threaded bushing at rear end of threaded pin.
8. Remove lubrication fitting at front end of threaded pin, insert wrench, Tool No. J-720, and remove threaded pin from steering knuckle support and upper suspension arm.
9. Swing the steering knuckle support outward at top to free from car.

NOTE: Helical car spring can be removed at this point, if desired, by lowering jack under lower suspension arm.

10. Remove threaded pin from lower suspension arm, which will release steering knuckle support as final operation.

Installation — The reverse order of operations will serve as a guide for reassembly.

When assembling the threaded pins at the upper and lower ends of the steering knuckle support, it is important to install the pins as nearly as possible in their original position because the eccentric pin at the top controls the caster and camber adjustment, as illustrated in Plate 6. The caster and camber should be checked when the installation is completed.

Removal — from series 39-75 and 90 cars:

1. Remove steering knuckle, as previously explained.
2. Place jack under lower suspension arm to support coil spring while disconnecting upper end of steering knuckle support.
3. Disconnect stabilizer link.
4. Remove retaining nut which holds steering knuckle support yoke to upper suspension arm.
5. Swing steering knuckle support outward at top to free from upper suspension arm.

NOTE: Helical car spring can be removed at this point, if desired, by lowering jack under lower suspension arm.

6. Remove retaining nut that fastens steering knuckle support yoke to lower suspension arm.
7. Remove steering knuckle support yoke assembly.
8. Loosen clamp screws at upper and lower steering knuckle support yokes and upper end of steering knuckle support.
9. Mark the position of the threaded pin so that it will be possible to reassemble the unit in its original position to maintain proper steering alignment.
10. Remove threaded bushing and pin assembly at ends of steering knuckle support.

Installation — The reverse order of operations will serve as a guide for reassembly.

When assembling the threaded pins at the upper and lower ends of the steering knuckle support yokes, it is very important to assemble them in their original position so that the correct wheel alignment relationship will be maintained.

The final step is to check the elements of front wheel alignment to make sure that all adjustments are correct.

12. REPLACING LOWER SUSPENSION ARMS AND FRONT COIL SPRINGS (ALL SERIES)

1. Remove front wheel, hub, bearings, and steering knuckle support, as previously explained.
2. Remove coil spring by lowering jack and dropping outer end of lower suspension arm to the floor.
3. Remove suspension arm by removing mounting shaft support bolts at frame cross member.
4. Place suspension arm and mounting shaft assembly on bench and disassemble mounting shaft from arm. (See Plate 7).

Installation — The reverse order of operations will serve as a guide for installation.

When installing the lower suspension arms, see that the coil springs have insulators at each end and are properly seated

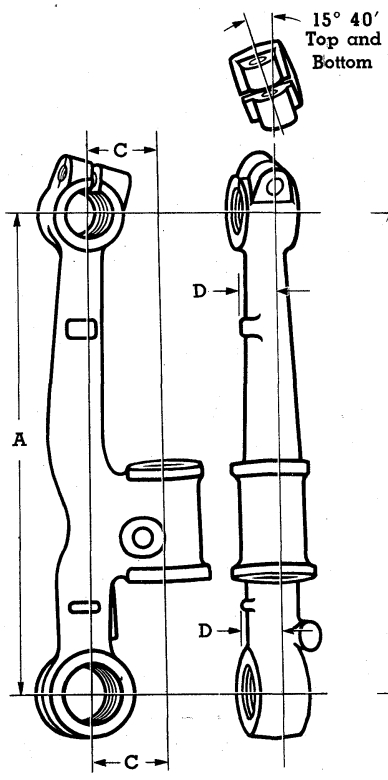


Fig. 20.
Steering Knuckle Support
Series 39-50 and 61

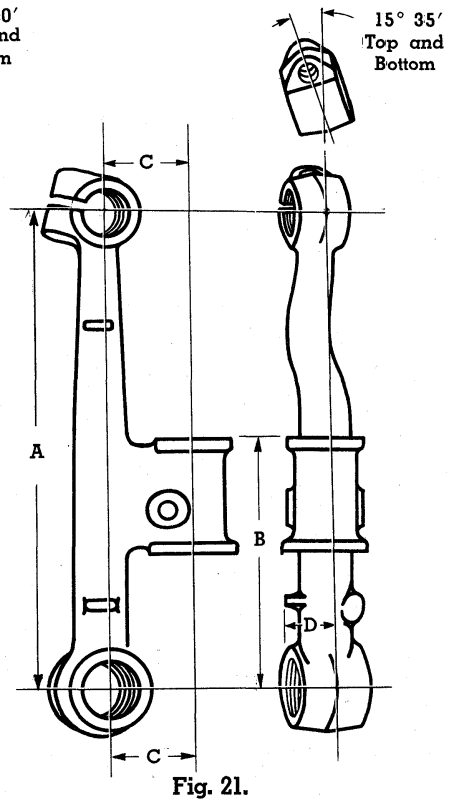


Fig. 21.
Steering Knuckle Support
Series 39-60S

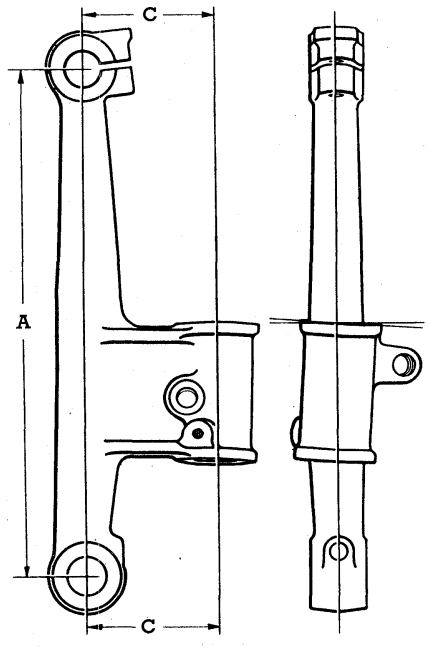


Fig. 22.
Steering Knuckle Support
Series 39-75 and 90

Plate 9. Alignment of Steering Knuckle Supports

DIMENSIONS

Dimensions	39-50 39-61	39-60S	39-75 39-90
A	10-7/32"	10-7/32"	10-29/32"
B	.....	5-21/64"	.....
C	1-27/32"	1-31/32"	2-13/16"
D	5/8"	7/8"	.....

in their retainers when lifting the suspension arm with the jack for assembly of the steering knuckle support.

Lubricate all parts thoroughly after installation.

13. REPLACING RUBBER BUSHINGS

Replacement of the rubber bushings at the inner ends of the lower suspension arms on 39-50 and 61 cars is performed as follows:

1. Remove the lower suspension arms from the car (Note 12).

2. Remove the two rivets which hold the spring seat to one of the lower suspension arms, and also remove one of the rivets that holds the bumper plate to this arm--the one nearest the mounting shaft.

3. Drill out the two mounting holes for the spring seat to 7/16" diameter, and the mounting hole for the bumper plate to 3/8" diameter.

4. Remove the two self-locking nuts from the ends of the suspension arm shaft.

5. Spread the suspension arms apart and remove the shaft and rubber bushings. (The arms will pivot on the one rivet that was not removed.)

Installation --

1. Assemble the shaft and bushings into the suspension arms and install the self locking nuts loosely on the ends of the shaft.

2. Install the threaded pin that carries the steering knuckle support in the outer ends of the suspension arms. This will hold the arms in correct alignment while the nuts and bolts for the spring seat and bumper plate are being installed.

3. When the suspension arm assembly is being installed on the car, loosen the self-locking nuts if necessary to secure proper positioning of the mounting shaft. Tighten these nuts thoroughly after the lower suspension arms have been installed.

NOTE: These bushings are not adjustable. The self-locking nuts that hold the bushing retainers must always be well tightened. Furthermore, the bushings must not be lubricated at any time with any type of lubricant.

14. CHECKING BENT PARTS

Whenever it is necessary to check the alignment of parts which have been bent or damaged by accident or other cause, the figures shown in Plates 8, 9 and 10 should be used to determine the extent that the parts are out of alignment.

15. STRAIGHTENING BENT PARTS

The straightening of bent parts in the front wheel suspension system should be attempted only within the following limits:

Parts should not be straightened if they are sprung out of alignment more than 5°. To straighten parts while cold is likely to result in stresses and sometimes in cracks invisible to the naked eye, which will render the part unsafe for use. Straightening with heat will destroy the effect of previous heat treatment, leaving the steel either soft and weak or brittle and easily broken.

Welding of parts subjected to severe strain should never be permitted because the welding process will change the structure of the metal around the weld, rendering it unsafe for further use.

16. CARE OF SHOCK ABSORBERS

Aside from periodic checking of the liquid level, the shock absorbers require attention only in cases of noisy operation or unsatisfactory riding. Correction of either of these conditions is explained in Note 6, page 41 for both the front and rear shock absorbers.

Shock absorber valve data are given in the specification table and the installation of valves is evident from the sectional views in Plate 13, page 40.

DIMENSIONS OF STEERING ARMS (See Next Page)

Dimensions	39-50 39-61	39-60S	39-75 39-90
A	4-15/16"	5"	6-5/8"
B	19/32"	1"	1-5/8"
C	2-25/64"	3"	.....
D	.....	10-7/8"	7-5/8"
E	.....	8-1/4"	8-1/2"
F	.....	1-1/16"	.....
G	.....	1-3/8"	1-39/64"
H	.....	59/64"	1-1/32"
I	.....	.....	1-3/4"

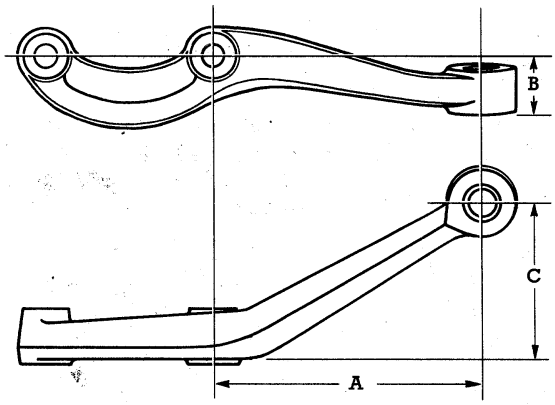


Fig. 23.
Steering Knuckle Arm
Series 39-50, 61 and 60S

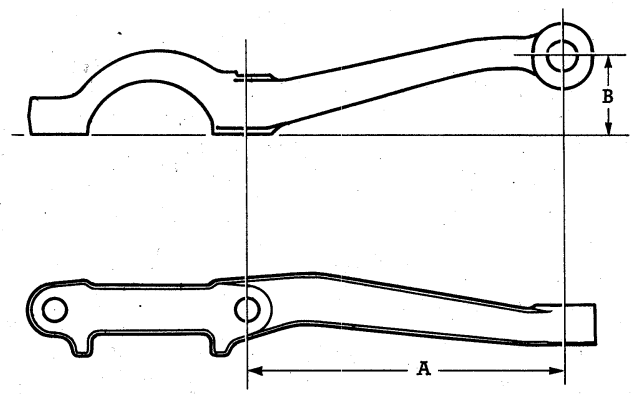


Fig. 24.
Steering Knuckle Arm
Series 39-75 and 90

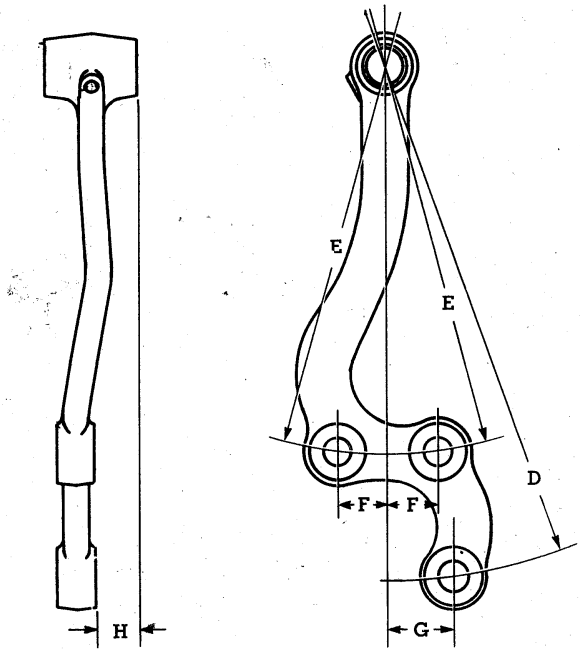


Fig. 25.
Intermediate Steering Arm
Series 39-60S

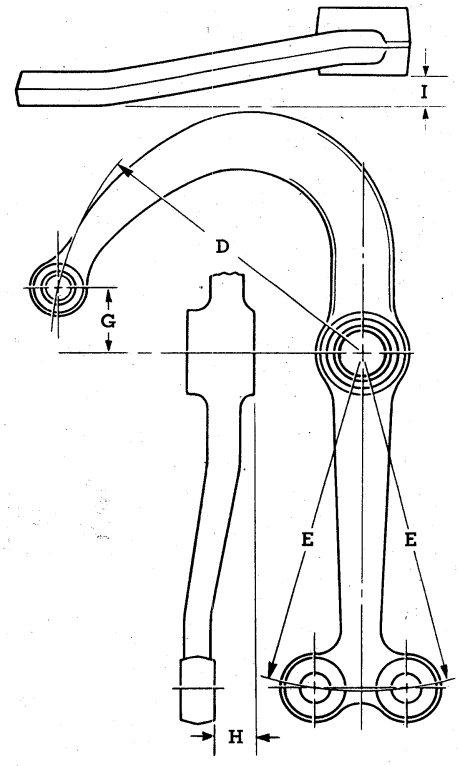


Fig. 26.
Intermediate Steering Arm
Series 39-75 and 90

Plate 10. Alignment of Steering Knuckle Arms and Intermediate Steering Arms

FRONT WHEEL SUSPENSION

Front Wheel Suspension Specifications

Subject and Remarks	39-50	39-61	39-60S	39-75	39-90
Camber of front wheels ..	-1/4 to 3/4°	-1/4 to 3/4°	-1/4 to 1/2°	0 to 1/2°	0 to 1/2°
Angle between steering knuckle pin and wheel spindle	95° 51'	95° 51'	95° 51'	95° 16'	95° 16'
Caster angle	-1/4 to -2-1/4°	-1/4 to -2-1/4°	-1/4 to -1-1/4°	0 to ± 1/4°	0 to ± 1/4°
Shock absorbers --					
Rebound valve	1-EX	1-EX	1-EX	1.25BX	1.25BX
Compression valve	ODX	ODX	ODX	OBX	OBX
NOTE: Valve markings are stamped on outside cap.					
Fluid	Delco	Delco	Delco	Delco	Delco
Type No.	1946-GH	1946-GH	1946-EF	1951-DC	1951-DC
Springs, car --					
Diameter (inside)	3-11/16"	3-11/16"	4-1/8"	4-1/8"	4-1/8"
Free length (approximate) --					
Five wheel	15-7/8"	15-7/8"	15"	14-7/8"	14-7/8"
Six wheel	15-7/8"	15-7/8"	15"	14-7/8"	15"
NOTE: If spring has sagged more than 1/4 inch, it should be replaced. Identification: Spring No. is stamped on flat surface of end coil. See Front Spring Data Chart.					
Steering gear and connections. See "Steering Gear" section, page 95.					
Toe-in (in motion)	0 to 1/16"	0 to 1/16"	0 to 1/16"	0 to 1/16"	0 to 1/16"
Toe-in (at rest)	1/32 to 3/32"	1/32 to 3/32"	1/32 to 3/32"	1/32 to 3/32"	1/32 to 3/32"
Toe-out on turns -- With outside wheel set at 20° inside wheel angle should be	22-1/4 to 23-3/4°	22-1/4 to 23-3/4°	22-3/4 to 24-1/4°	22-3/4 to 24-1/4°	22-3/4 to 24-1/4°
Tread--Front	58"	58"	58"	60-1/2"	60-1/2"
Tread--Rear	59"	59"	61"	62-1/2"	62-1/2"
Turning Radius--Right ...	20.5 ft.	21.3 ft.	22.5 ft.	23.4 ft.	23.4 ft.
Turning Radius--Left	20.5 ft.	21.3 ft.	22.4 ft.	22 ft.	22 ft.

Front Spring Data Chart

Series	Body Model	Wheel Equipt.	Part No.	Free Length	Color Marking	Remarks
39-50 & 61	All passenger cars	5 wheel	1428427	15-7/8"	Green	.....
		6 wheel	1428428	15-7/8"	White	.....
	Commercial chassis		1428429	14-5/8"	Yellow	.....
39-60S	All passenger cars	5 wheel	1428426	15"	Red	.....
		6 wheel	1427280	15"	Orange	.....
39-75	All passenger cars	5 wheel	1413789	14-7/8"	White	2 Daubs center coils
		6 wheel	1413790	14-7/8"	Red	2 Daubs center coils
	Commercial chassis		1413791	15"	Yellow	2 Daubs center coils
	Special Bus Job		1420237	15"	None	.....
39-90	All passenger cars	5 wheel	1413790	14-7/8"	Red	2 Daubs center coils
		6 wheel	1413791	15"	Yellow	2 Daubs center coils

FRONT WHEEL SUSPENSION

Other Front Wheel Suspension References

Other Rear Wheel Suspension References

Other Brake References

REAR WHEEL SUSPENSION

General Description

The rear axles used on all 39-series Cadillac and LaSalle cars are of the same design, although they differ in axle ratios and in size, the 39-75 and 90 axle being larger and heavier than the 39-50, 61, and 60S axle. The construction features are apparent from Plate 11. Hypoid gears with a 50° spiral angle are used for the final drive. Tapered roller bearings support the differential case, and two tapered roller bearings are used on the pinion shaft.

Wheel and axle shaft mountings are of semi-floating design. Axle shaft oil seals are located at the outer ends of the axle tubes. Permanently lubricated and sealed ball bearings are used at the rear wheels. Two permanently lubricated needle bearing universal joints are used in conjunction with a tubular propeller shaft on all 39-series cars. Lubrication of the slip joint splines is provided for by a fitting at the splines.

The rear springs on 39-50 and 61 cars are mounted inside the frame sidebar, attached to a spring bolt at the front, and having tension type parallel link shackles at the rear, as shown in Figure 3. The shackles have rubber bushings top and bottom, and rubber is also used at the spring bolt.

The conventional type of spring suspension is used on the larger series. The spring bolt on 39-60S, 75 and 90 cars is mounted in rubber bushings. Threaded U-type shackles are used at the rear on 39-60S. The shackles on 39-75 and 90 rear springs

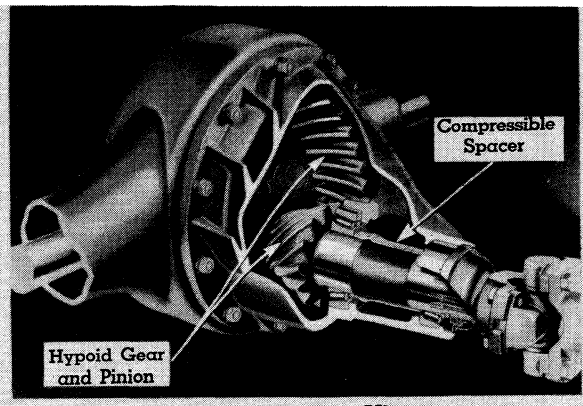


Fig. 1. Cut-Away View

Fig. 2. Cross Sectional View

Plate 11. Rear Axle

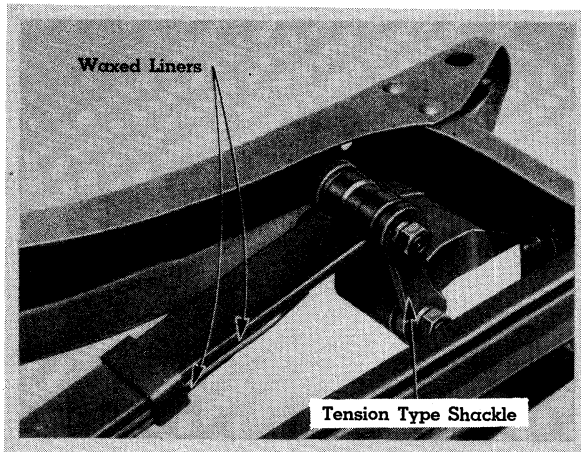


Fig. 3. Rear Spring Connection to Shackle Series 39-50 and 61

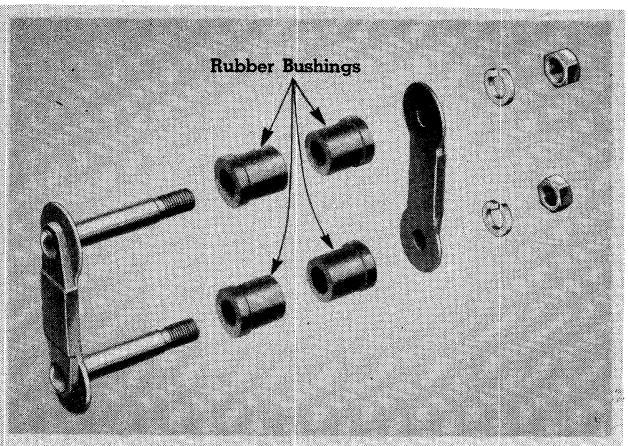


Fig. 4. Rear Spring Shackle Series 39-50 and 61

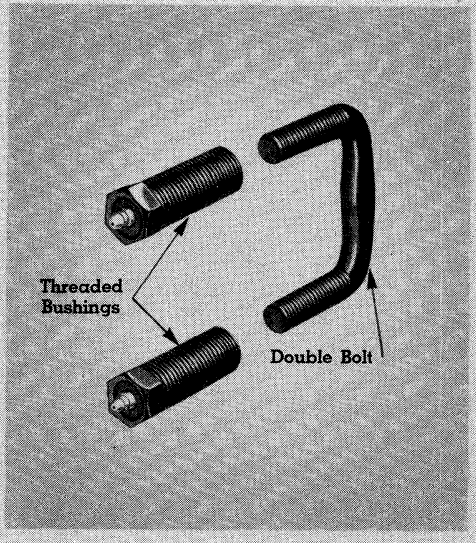


Fig. 5. Rear Spring Shackle Series 39-60S

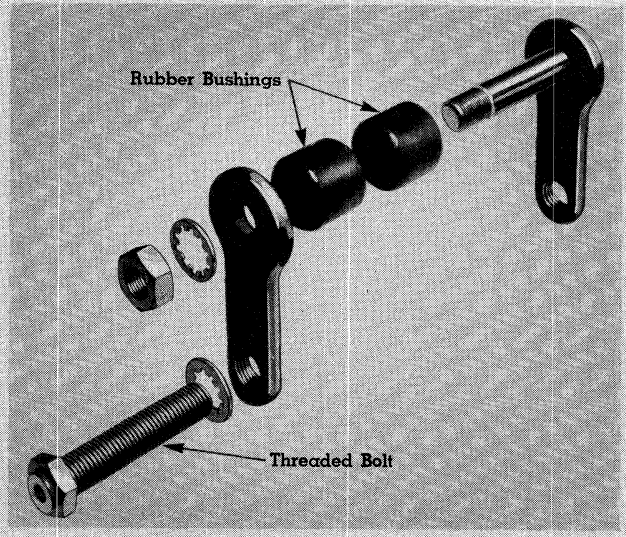


Fig. 6. Rear Spring Shackle Series 39-75 and 90

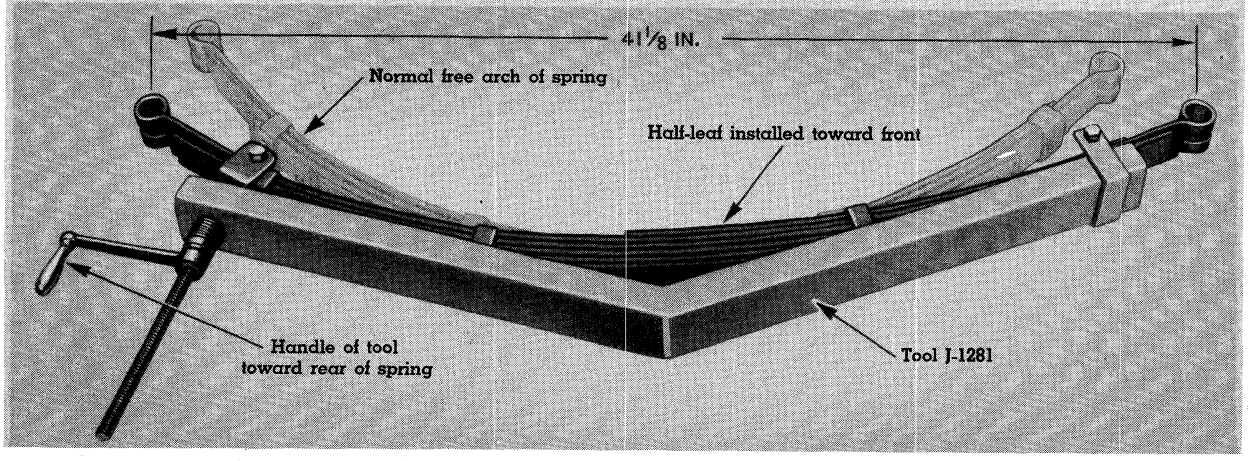


Fig. 7.
Rear Spring Removal and Installation Tool

Plate 12. Rear Springs

are of the parallel link type with a threaded lower shackle bearing and a rubber mounted upper bearing.

Double-acting hydraulic shock absorbers are used both front and rear on all 39-series cars. The 39-75 and 90 rear shock absorbers have a three-position adjustment, illustrated in Figure 12, to provide variable action according to the owner's desire. A cross-link type rear stabilizer is used on these series.

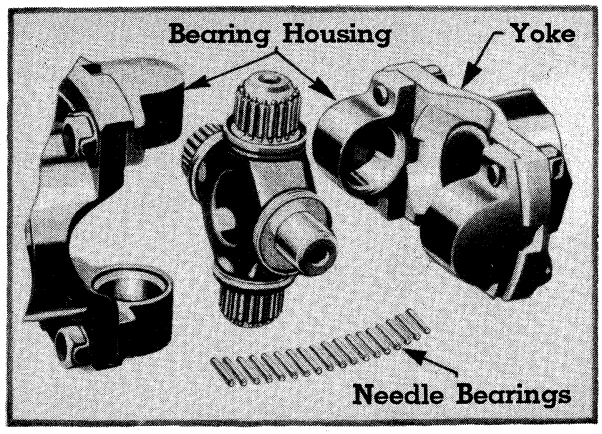


Fig. 8 Universal Joint, Exploded View

Service Information

1. REMOVAL AND INSTALLATION OF AXLE SHAFTS

1. Dismount the road wheel.
2. Remove the retaining nut from the end of the axle shaft.
3. Pull the wheel hub and brake drum assembly off the shaft.
4. Remove the brake dust shield.

NOTE: The axle shaft is held in the housing by the dust shield which, when bolted in place, bears against the outer race of the wheel bearing.

5. Pull the shaft and bearing assembly out of the housing, using Tool No. J-838.

Installation -- The axle shaft is installed in the reverse order of its removal. It will be necessary to bleed the brake line, which was disconnected to remove the dust shield.

2. REMOVAL AND INSTALLATION OF DIFFERENTIAL CARRIER

Any service on the differential carrier assembly should be handled by replacement of the complete assembly. No disassembly or adjustment of this unit should be attempted in the service station. To replace the assembly:

1. Disconnect rear universal joint.
2. Remove axle shafts.
3. Remove cap screws holding carrier to axle housing and take out entire assembly.

To Reinstall — reverse the above procedure.

3. REMOVAL AND INSTALLATION OF UNIVERSAL JOINT

To remove the universal joint on all series cars, it is necessary only to remove the cap screws that hold the journal caps to the yokes. If a joint is removed and is not to be disassembled, the opposite bearing retainers should be wired together to keep them in place on the journals of the cross.

Disassembly of the joint after removal from the yokes is accomplished by pulling the retainers off the cross journals and taking out the needle bearings.

Before reassembling a joint, wash all parts thoroughly in gasoline or kerosene and blow them out with air to remove all traces of dirt and grit. Repack the bearings with wheel bearing grease when assembling.

The cap screws used for the universal joints are made of special material and heat treated. When reinstalling a joint, therefore, use either the original cap screws or new screws for this purpose secured from the factory Parts Department. Ordinary cap screws must not be used. New locking plates should also be used when the retaining screws are reinstalled.

Care must be exercised to assemble the universal joint spline connection and the propeller shaft in the correct position. The arrow on the universal joint should always be in line with the arrow on the propeller shaft.

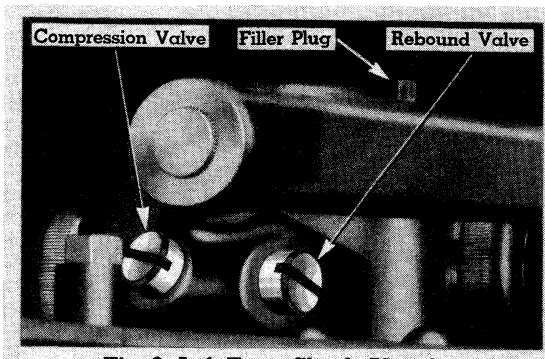


Fig. 9. Left Front Shock Absorber
Series 39-50, 61 and 60S

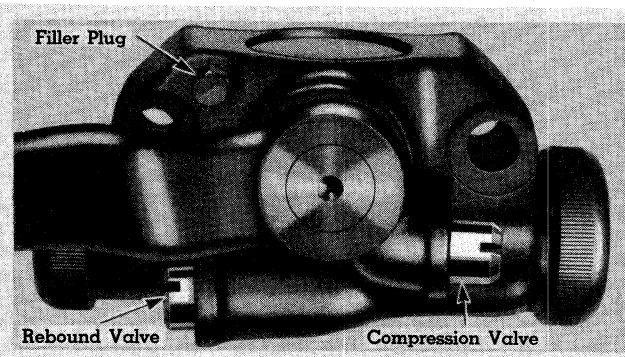
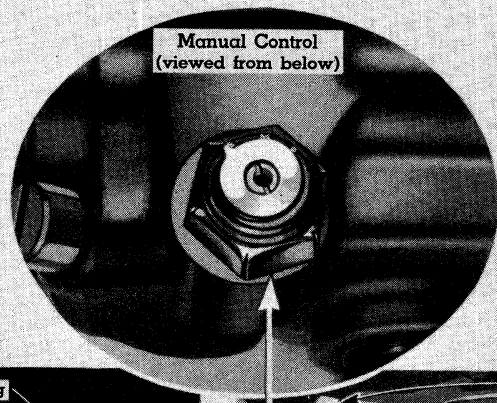


Fig. 10. Left Rear Shock Absorber
Series 39-50, 61 and 60S



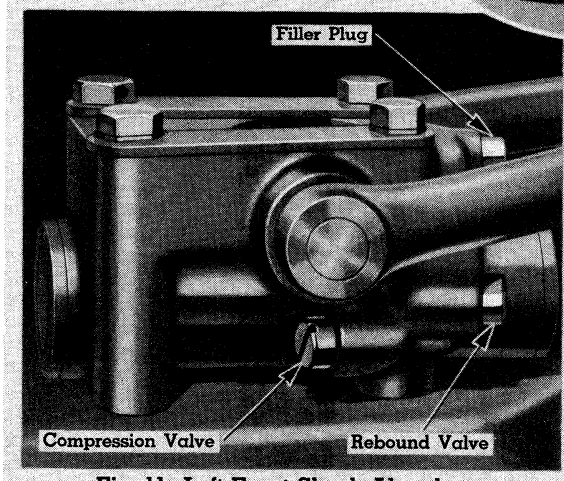


Fig. 11. Left Front Shock Absorber
Series 39-75 and 90

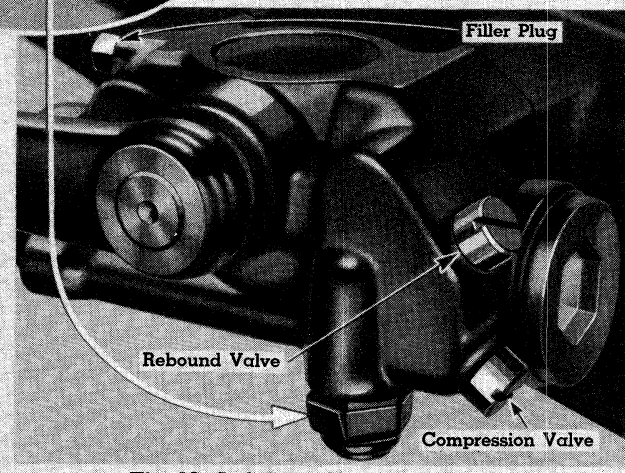


Fig. 12. Left Rear Shock Absorber
Series 39-75 Typical of 39-90

Plate 13. Shock Absorbers

4. REPLACEMENT OF OIL SEALS

Whenever the pinion bearing oil seal on a 39-series car is replaced, the oil seal retainer should also be replaced. A used retainer should never be reinstalled because of the possibility of leaks between the retainer and the housing or the oil seal.

The oil seal and the retainer must first be assembled together and then installed in the housing as a unit. An arbor press should be used to assemble the seal and the retainer.

5. REMOVAL AND INSTALLATION OF SPRING SHACKLES

The spring bolts at the front end of the rear springs on all 39-series cars are easily removed or installed without interference from any sheet metal parts.

Removal of these bolts is simply a matter of removing the retaining nut and pulling the bolt out of its rubber bushings.

To reinstall, reverse the above procedure.

Disassembly and assembly procedure for 39-series rear spring shackles is apparent from Plate 12.

Removal of a rear spring requires removal of the front bolt, the U-bolts that clamp the spring to the rear axle, the spring shackle bushing on series 39-60S, and the complete disassembly of the spring shackles on series 39-50, 61, 75 and 90.

In removing a rear spring from 39-50 or 61 cars, the spring must first be straightened to its operating position. Tool No. J-1281 must be used for this operation (See Figure 7). Clamp the tool on the spring with the screw handle toward the rear of the car. Install the front clamp bolt of the tool just in back of the foremost spring alignment clamp.

This tool must also be used when reinstalling a rear spring. The tool must be applied and the spring straightened until the spring eye centers are approximately 41-1/8 inches apart.

6. ADJUSTMENT OF REAR SHOCK ABSORBERS

The adjustment of the rear shock absorbers on series 39-75 and 90 cars is made by pushing up on the locking cap and turning the adjustment operating shaft with a screw driver until the desired "ride" position is secured. See Plate 13, Figure 12. The shaft has three positions soft (S), medium (M) and firm (F). The firm position is with the operating shaft turned in a clockwise direction to the (F) position, etc.

Any complaints of bottoming at high speeds or under severe conditions can be corrected by setting the shaft in the (F) position. It is important that both rear shock absorbers be adjusted to the same position of control.

7. SHOCK ABSORBER SERVICE

The only service ordinarily required by the shock absorbers, aside from periodic checking of the liquid level, is the correction of either noisy operation or unsatisfactory riding qualities.

Noisy operation of shock absorbers is usually due to looseness in the shock absorbers or linkage. In case of such trouble check and tighten the entire shock absorber mechanism. In making this check-up, it is not enough simply to make a visual inspection and decide that the connections look sufficiently tight; a wrench must be used at every point and everything well-tightened.

It is also important to make certain that all four shock absorbers are filled with shock absorber fluid and that there is no air in the cylinders or passages. In case of complaint, it may be necessary to bleed all four shock absorbers to get all of the air out of the cylinders and passages.

To do this properly, make sure that the shock absorber is correctly mounted and thoroughly tightened to the car frame, then remove the filler plug and fill with shock absorber fluid. Reinstall the plug securely and, with the link disconnected, move the shock absorber arm up and down several times the full length of its travel.

This operation of adding fluid, reinstalling the plug and working the arm should be repeated until all of the air is worked out of the shock absorber. This may take three or four operations. The shock absorber is satisfactorily bled when no more fluid can be added after working the arm in the manner just described.

Only after it is known that all shock absorbers contain the proper amount of fluid should any other tests be made to determine the cause of unsatisfactory riding qualities.

Dirt in the shock absorber fluid may cause unsatisfactory operation by causing the valves to stick. In such cases the difficulty can usually be recognized by moving the shock absorber arm up and down. The presence of dirt on the valves will be indicated by the lack of resistance in one or both directions.

In case dirt is present, the shock absorber should be removed, disassembled and thoroughly washed with kerosene and blown out with air, and refilled with clean shock absorber fluid.

REAR WHEEL SUSPENSION

8. ADJUSTMENT OF REAR STABILIZER

The cross link rear stabilizer used on 39-60S, 75 and 90 cars does not require readjustment from the original factory setting. Whenever the stabilizer has been removed during service operations on the rear axle or springs, however, it is important to reinstall the stabilizer bar with the correct adjustment.

This is accomplished merely by having the car loaded only to normal curb weight (no passengers) and then installing the stabilizer, attaching it first to the axle and then to the bracket on the frame. After the bar has been attached to the frame, the adjusting nuts should be drawn up securely without disturbing the position of the rod.

Rear Wheel Suspension Specifications

Subject and Remarks	39-50 & 61	39-60S	39-75	39-90
Axle housing out of true not over	1/16"	1/16"	1/16"	1/16"
Axle Shaft--				
Length	30-7/16"	31-7/16"	32-7/32 to 32-11/32"	32-7/32 to 32-11/32"
Out of true (at ground surface near splines) not over	.006"	.006"	.006"	.006"
Color at threaded end	.....	Green	Red	Red
Gear Ratio	3.92 - 1	3.92 - 1	4.58 - 1	4.31 - 1
Shock Absorbers --				
Rebound Valve	ILX	I-L	.25-5X	0-5X
Compression Valve	IAI	OCX	1-5X	2-5X
Control Valve			CX	AV
NOTE: Valve markings are stamped on rear cap				
Shock Absorber Fluid	Delco	Delco	Delco	Delco
Tread (Rear)	59"	61"	62-1/2"	62-1/2"

Rear Spring Data Chart

Series	Body Model	Part Number	No. of Leaves	
39-50	Two Passenger Cars	1428635	9	Orange Daub
	Five Passenger Cars	1428637	9	White Daub
	Commercial Chassis	1428640	13	Aluminum Daub
39-61	Two Passenger Cars	1428636	9	Green Daub
	Five Passenger Cars	1428638	9	Yellow Daub
	Commercial Chassis	1428640	13	Aluminum Daub
39-60S	Five Passenger Cars	1424330	9	.....
39-75	Two Passenger Cars	1425655	9	Red Daub
	Five and Seven Passenger Cars	1425656	10	Yellow Daub
	Five and Seven Passenger Export and Livery Cars	1425659	11	Green Daub
	Commercial Chassis	1425657	12	Aluminum Daub
	Special Bus	1426764	13	.....
39-90	Two Passenger Cars	1425655	9	Red Daub
	Five and Seven Passenger Cars	1425656	10	Yellow Daub
	Five and Seven Passenger Export and Livery Cars	1425659	11	Green Daub

BRAKES

General Description

The braking system used on 39-series Cadillac and LaSalle cars comprises service brakes of the hydraulic type combined with a hand lever that operates the rear brake shoes through a mechanical linkage.

The service brake system consists of a combined fluid supply tank and master cylinder, in which the hydraulic pressure is originated; four wheel cylinders in which the pressure is applied to operate the brake shoes against the wheel drums; and the tubing and flexible hoses connecting the master cylinder to the wheel cylinders.

The combined supply tank and master cylinder is mounted ahead of the pedal on 39-50 and 61 cars, and is accessible from under the hood. On 39-60S, 75 and 90 cars, it is mounted on the frame beneath the left front floorboards. The main function of this unit is to maintain a constant volume of fluid in the system at all times, regardless of expansion or contraction due to temperature changes. It also serves as a pump when bleeding the brake lines.

The front wheel cylinders have a larger diameter than the rear cylinders; consequently, the front and rear cylinders are not interchangeable on the same car series. This arrangement of the wheel cylinders give a higher braking ratio on the front wheels than on the rear. (See specifications.)

The hand brake lever is mounted under the instrument panel at the extreme left. It is connected by a steel cable to a lever mounted on the frame X-member. From this lever cables extend to each rear brake, where they actuate the brake shoes by means of a curved lever and strut rod.

The brake drums are of composite construction, being made of a steel backing plate with a wear resisting iron ring cast in the inner part of the drum flange to provide the best possible braking surface. Moulded brake lining is used on both primary and secondary brake shoes of all 39-series cars.

*

Service Information

1. BRAKE ADJUSTMENT (SERVICE BRAKES)

Series 39-50, 61 and 60S

1. Jack up car, dismount all four wheels, and remove adjusting hole covers from brake dust shields.
2. Disconnect cables to rear brakes at equalizer in frame X-member.
3. Adjust pedal operating rod.

On 39-50 and 61 cars, this is done by loosening lock nut and turning connecting link in or out until grommet under floorboards is compressed to 3/4-inch when operating rod is against stop in master cylinder. (See Plate 14, Figure 1).

On 39-60S cars, this is done by adjusting link until brake pedal has from 1/4- to 3/8-inch free movement before it starts piston on its pressure stroke.

NOTE: This adjustment is important! Piston primary cup must clear by-pass (Plate 14, Figure 1) when brake pedal is disengaged, otherwise brakes will drag.

4. Insert a .015-inch feeler through inspection slot in drum while slot is opposite adjusting (lower) end of secondary shoe and, by moving feeler up along secondary shoe, pry entire shoe assembly forward, as far as possible.
5. Expand shoes by means of notched adjusting screw (sometimes called a "star wheel") until primary shoe contacts drum securely and secondary shoe is snug against feeler.
6. Then back off adjusting screw just enough to establish a clearance of .015-inch, one and one half inches from each end of secondary shoe. This will provide correct operating clearances for both primary and secondary shoes.
7. If .015-inch clearance cannot be secured at each end of secondary screw, loosen anchor pin lock nut and turn eccentric anchor pin in direction required to equalize clearances. Retighten lock nut and recheck clearances.

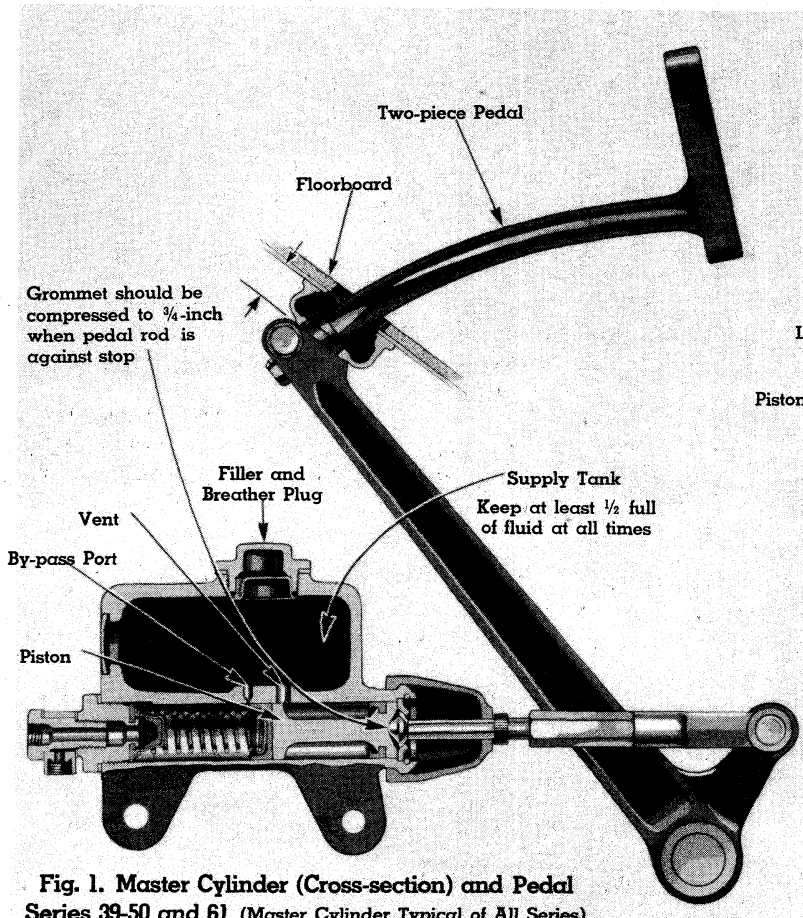


Fig. 1. Master Cylinder (Cross-section) and Pedal Series 39-50 and 61 (Master Cylinder Typical of All Series)

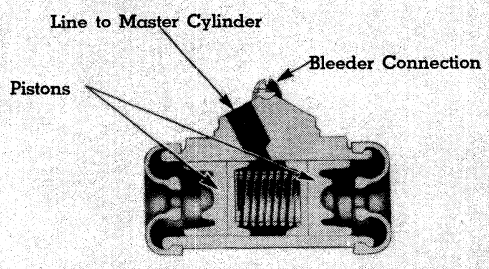


Fig. 2. Wheel Cylinder Cross Section Typical of All 39-Series

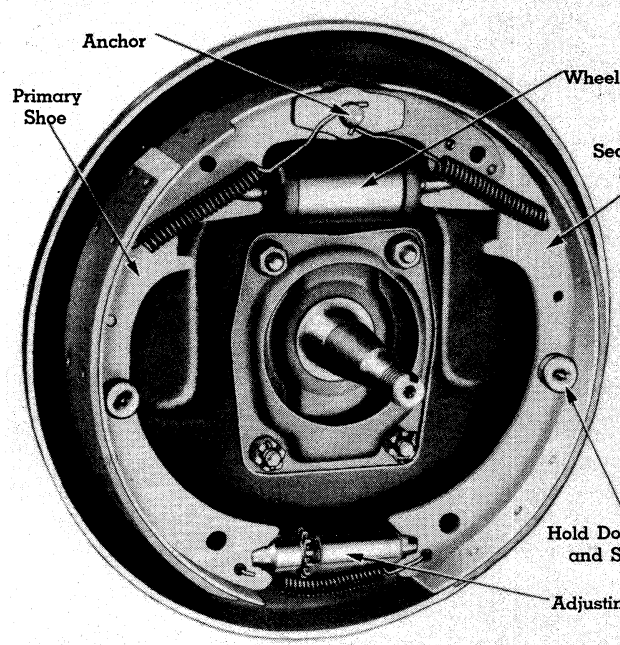


Fig. 3. Left Front Brake Mechanism Series 39-50, 61 and 60S

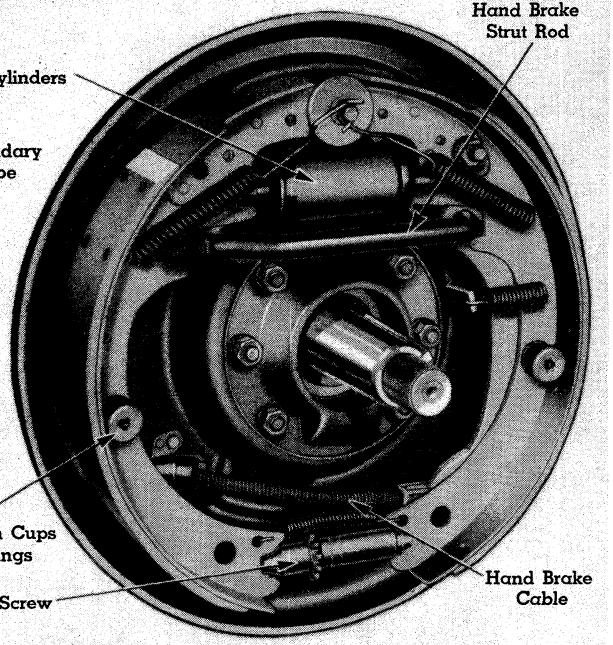


Fig. 4. Left Rear Brake Mechanism Series 39-75 and 90

Plate 14. Brake Details

8. Reinstall adjusting hole cover.
9. Repeat operations 4 through 8 uniformly at each of the four wheels.
10. Reconnect and adjust hand brake cables.

Series 39-75 and 90

1. Jack up car, dismount all four wheels, and remove adjusting hole covers from dust shields.
2. Disconnect cables to rear brakes at equalizer in frame X-member.
3. Adjust pedal operating rod to allow 1/4-to 3/8-inch free movement of brake pedal before it starts piston on pressure stroke.

NOTE: This adjustment is important and must not be neglected.

4. Loosen lock nut at eccentric adjustment. Insert a .010-inch feeler between lining on secondary shoe and drum.
5. Clearance between lining and drum can be taken up to the required .010-inch by turning eccentric in direction of forward wheel rotation.
6. If .010-inch clearance cannot be secured at both ends of secondary shoe, readjust anchor pin by loosening lock nut and turning eccentric anchor pin in direction required to equalize the clearances. Retighten lock nut, and recheck clearance at both ends of shoe.
7. Clearance between primary brake shoe and drum is secured by turning notched adjusting screw. Expand shoes until brake drags. Then turn back until brake drum is free of drag.
8. Reinstall adjusting hole cover.
9. Repeat steps 4 through 8 uniformly for each of the four wheels.
10. Reconnect and adjust hand brake cables.

2. HAND BRAKE ADJUSTMENT

1. Make sure foot brakes are fully released.
2. Disconnect hand brake cables at equalizer.
3. Tighten adjustment at both rear wheels until drums can just be turned by hand.
4. With hand brake lever in fully released position, pull cables taut and adjust clevises so that clevis pins can just be inserted.
5. Back off adjustment of shoes at both rear brakes until wheels are free (15 to 20 notches).

3. BLEEDING THE BRAKING SYSTEM

The braking system requires bleeding, either entirely or in part, whenever any pipe lines are disconnected or whenever air gets into any of the lines. If the pipe line is disconnected from the master cylinder, the system must be bled at all four wheels. If a pipe is disconnected from an individual wheel cylinder, only that one wheel requires bleeding.

1. First of all, fill supply tank with Delco Super No. 9 Brake Fluid. Keep tank at least one-half full of fluid all during bleeding operation. Tool No. J-713 is a special supply reservoir for automatically maintaining the correct level.
2. Remove cap screw from end of bleeder connection at wheel cylinder and attach bleeder drain tube, Tool No. J-628, allowing it to hang in a clean container such as a pint fruit jar.
3. Unscrew bleeder connection three-quarters of a turn.
4. Depress brake pedal by hand, allowing pedal to return slowly to released position.

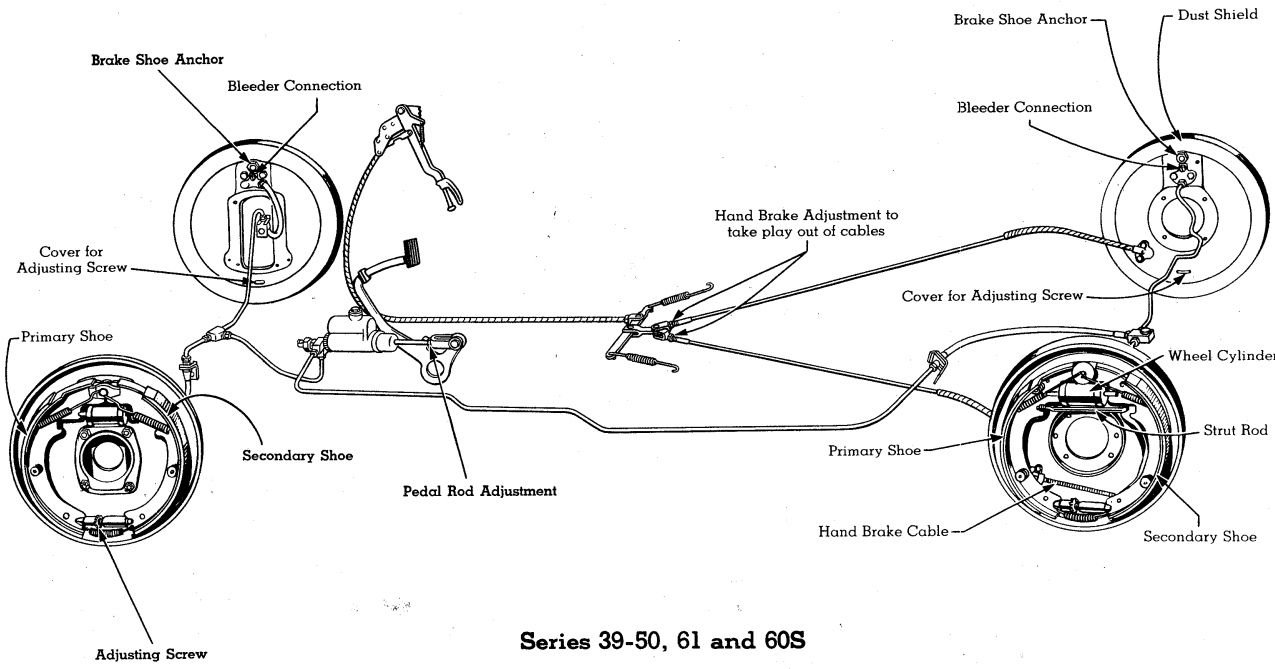
This provides a pumping action which forces fluid through the tubing and out at wheel cylinder, carrying with it any air that may be present.

5. Watch flow of fluid from hose, preferably by keeping end of hose below surface of fluid, and when air bubbles cease to appear, or when stream flow is uninterrupted, close bleeder connection.

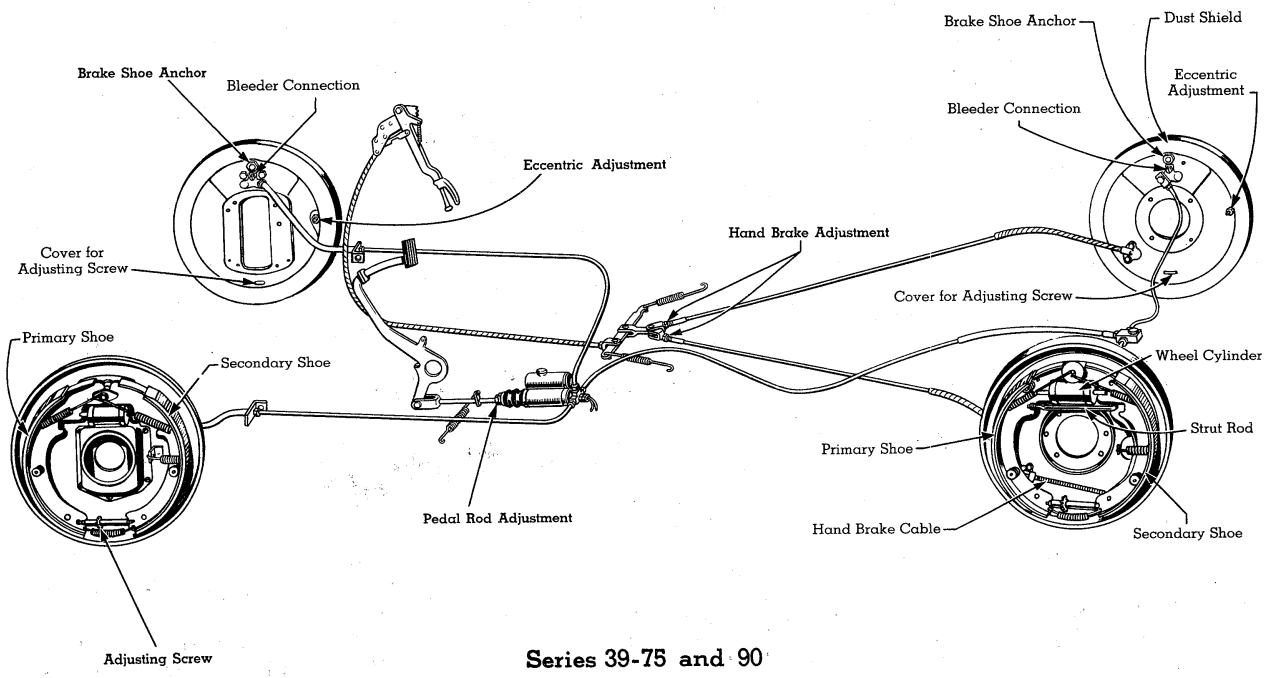
Depressing pedal 5 to 7 times is usually sufficient to bleed a line.

6. If the entire system is to be bled, repeat the foregoing operation at each of the four wheels.
7. Replenish fluid in supply tank after each cylinder is bled. Should supply tank be drained during bleeding operation, air will enter the lines and necessitate rebleeding of entire system after tank has been refilled.

NOTE: The fluid withdrawn in bleeding operation should not be used again. Refill



Series 39-50, 61 and 60S



Series 39-75 and 90

Plate 15. Brake Adjustment References

supply tank with fresh fluid only. Use Delco Super No. 9 Brake Fluid.

8. Before reinstalling filler plug at conclusion of bleeding operation, make certain that supply tank is more than half full of fluid.

4. RELINING BRAKES

1. Jack up car.
2. Remove all four wheels.
3. Remove wheel hub and brake drum assemblies.

NOTE: Do not depress brake pedal when one or more brake drums are removed.

4. Disconnect hand brake cables at equalizer.
5. Remove brake shoe hold-down cups and springs.
6. Disconnect brake shoe return springs and shoe connecting springs.
7. Attach piston clamp, Tool No. J-718, to wheel cylinder and remove brake shoes.
8. Disconnect hand brake cables from hand brake operating levers at rear brakes.
9. Check lining wear. If linings are worn nearly flush with rivets, install new linings.
10. If it is necessary to true brake drums, do not grind out more than .030 inch over original limit of inside diameter. (See specifications).
11. Check steering knuckle pin bushings for looseness.
12. Tighten bolts that hold dust shields to rear axle and front wheel spindles.
13. Install brake shoes, brake shoe hold-down cups and springs, and return springs and connecting springs. The piston clamp can then be removed.

NOTE: Brake shoes must be installed with primary shoe at front and secondary shoe at rear.

14. Install wheel hub and drum assemblies, and wheels.

NOTE: Readjustment of notched adjusting screw and centralization of shoes at eccentric adjustment (on 39-75 and 90) may be necessary to permit assembly of hubs and drums.

15. Adjust front wheel bearings.
16. Check rear spring U-bolts and rubber insulators between rear axle and springs, and adjust if necessary as follows:

Tighten U-bolts to uniform tension of from 45 to 52 foot pounds, on series 39-50, 61 and 60S cars and from 55 to 65 foot pounds on series 39-75 and 90 cars, keeping lower pads flat with bottoms of springs.

17. Adjust brakes as outlined in Note 1.

5. RELINING BRAKE SHOES

Brake lining used on 39-series cars for service requirements is already cut to size, surface ground, chamfered at the ends, drilled and counterbored for rivets, and ready for installation on shoes. Installation is merely a matter of riveting lining in place and smoothing up edges around rivet hole counterbores.

6. LUBRICATING BRAKE DUST SHIELDS

A popping noise may sometimes occur in the brakes when they are applied in forward speed after having been applied in reverse. This is generally a result of the edge of the shoe hanging slightly on the bosses of the dust shield before centralizing.

In such cases, the edges of the shoes should be smoothed up where they contact bosses and lubricated slightly.

A suitable lubricant for this purpose is furnished under specification number G-2-1/2-B (Lubriplate). Care should be taken in applying lubricant to make sure that none is permitted to get on the brake lining.

The procedure should eliminate any objectionable popping. It should be remembered, however, that the centralizing action of the brakes may result in a slight click when the brakes are applied in reverse. This noise is hardly noticeable and should cause no annoyance.

7. REMOVAL AND DISASSEMBLY OF BRAKE UNIT

1. Remove wheel and wheel hub and brake drum assembly.

2. Disconnect flexible hose or brake line assembly from wheel unit.

NOTE: It is possible to dismount dust shield for front brake without disconnecting hose, provided assembly is supported in such a manner as to avoid strain or damage to hose. The line must be disconnected for rear dust shield and in cases where front brake mechanism is to be disassembled.

3. Remove bolts holding dust shield to steering knuckle or axle, and dismount complete assembly.

NOTE: When removing rear brake from car, hand brake cables must be disconnected at lever on frame.

4. In reassembling wheel cylinders, note that fronts and rears are not interchangeable. The front cylinders may be identified by the larger bore.

5. To reinstall assemblies, reverse above operations, and bleed lines if they were disconnected.

8. REMACHINING BRAKE DRUMS

When remachining brake drums in the service station, drums must not be ground down more than .030 inch beyond original limit of inside diameter. See Specification Table for brake drum size. When brake drums are too thin, the intense heat that frequently develops will cause them to distort and warp. Drum thickness should be measured 1/2-inch from outer flange.

Replacement brake drums supplied by the Parts Department are finished at the factory before being shipped. This eliminates necessity for further finishing after installing on wheel.

Brake Specifications

Subject and Remarks	39-50 & 61	39-60S	39-75 & 90
Braking Area (foot brakes)			
Square inches	196	208	258
Drums --			
Inside diameter	11.995-12.005"	11.995-12.005"	13.995-14.005"
Out of round, not over	.007"	.007"	.007"
Clearance between brake lining and drum	.015"	.015"	.010"
Remachining (See Note 8)			
Fluid	Delco Super No. 9	Delco Super No. 9	Delco Super No. 9
Lining --			
Length--Primary	11-17/32"	11-17/32"	13-21/32"
Length--Secondary	12-31/32"	12-31/32"	15-1/32"
Width--Front brake lining	2"	2-1/4"	2-1/4"
Width--Rear brake lining	2"	2"	2-1/4"
Thickness	3/16"	3/16"	1/4"
Composition	Moulded	Moulded	Moulded

ENGINE

General Description

Three different engines are used in the 39-series Cadillac and LaSalle cars. A 322 cubic inch 90° V-8 engine is used in the series 39-50 LaSalle, a larger 346 cubic inch 90° V-8 engine in the series 39-61, 60S and 75 Cadillac cars, and a 431 cubic inch 135° V-16 engine in the series 39-90 Cadillac.

LASALLE AND CADILLAC V-8 ENGINES

The cylinder blocks and crankcase of 39-series V-8 engines are made in one casting of grey iron. The cylinder heads are also of cast iron.

The crankshaft is supported by three main bearings. The main bearing caps are cast iron, and are held in place with special cap screws and lock washers. Shell type bearings of steel-backed babbit are used. End thrust is taken by the center main bearing.

Six counterweights are used, four of them integral with the crankshaft. Number two and five counterweights are piloted by locating sleeves and held to the crankshaft by special cap screws and lock washers. Harmonic balancers and "damped bending" flywheels are used on Cadillac engines.

The "damped bending" flywheel is not a rigid casting. It consists of a cast iron rim attached to the crankshaft by a flexible steel disc flanked by damping plates. Any slight bending motions of the crankshaft are absorbed by these plates, and the flywheel rim runs at all times in a true, vibrationless plane.

The connecting rods for opposite cylinders are carried side-by-side on the same crankpin. The large end of the connecting rod is split on an angle to permit removal from the top of the cylinder block. The rods are rifle-drilled for pressure lubrication of the piston pins, and the large ends are also drilled for lubrication of the cylinder bores. The connecting rod bearings are of the steel-back babbitted type.

The pistons are of T-slot design and made of aluminum alloy which has been anodized to provide a hard aluminum oxide wearing surface. Two compression rings and two oil rings are used on the pistons. The piston pins float in the connecting rods and are retained in the pistons by snap rings. The inside bore of the piston pins in the 39-61, 60S and 75 engines is tapered, resulting in a thicker wall at the center than at the ends.

The camshaft is a solid shaft supported by three bearings and driven by a silent chain. Both the crankshaft and the camshaft sprockets are stamped with a locating mark, letter "O", for timing the camshaft when installing the chain.

Hydraulic valve lifters are used on all V-8 engines for maintaining zero clearance between valve stem and lifter, thereby assuring quiet operation and efficient valve action, besides eliminating the necessity for valve tappet adjustments.

The distributor and oil pump drive gear is integral with the camshaft. The camshaft gear meshes with an idler gear that drives a single gear on the shaft that drives both the distributor and the oil pump. The distributor rotates in a clockwise direction on all 39-series V-8 engines.

Oiling System -- The gear type oil pump is bolted to the bottom of the crankcase at the left of the rear main bearing. Oil enters the pump through a screened and floating intake as shown in Plate 16, Figure 2. This intake floats on the surface of the oil at all times and draws off only the clean surface oil. The oil pressure regulator is built into the pump body.

Oil is forced by the pump through a passageway drilled in the crankcase to the oil header, which is drilled lengthwise along the left side of the crankcase. From the oil header, other drilled passages branch through the bearing support webs to the three main and the three camshaft bearings.

Oil is carried from the rear camshaft bearing to the distributor and oil pump drive shaft and gears, and from the front bearing to the timing chain. Oil from the forward end of the header passes to the four sets of hydraulic valve lifters.

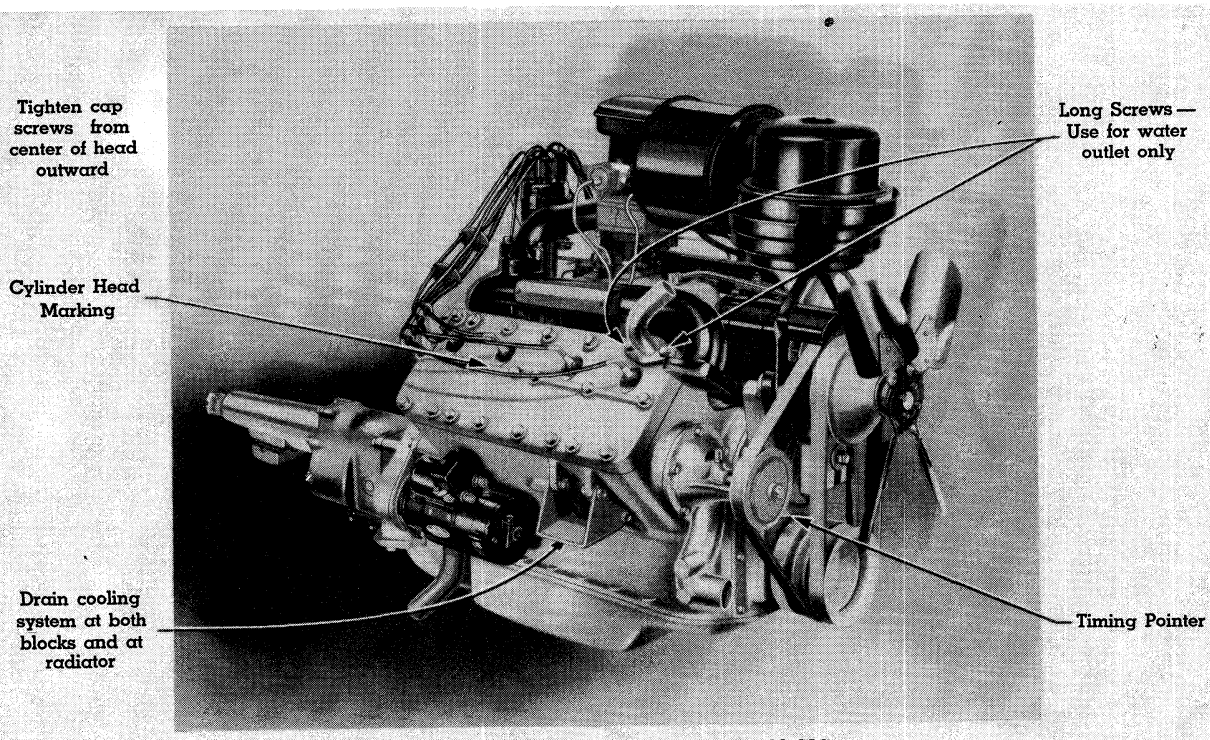


Fig. 1. Right Side View of Series 39-60S
Typical of 39-50, 61 and 75

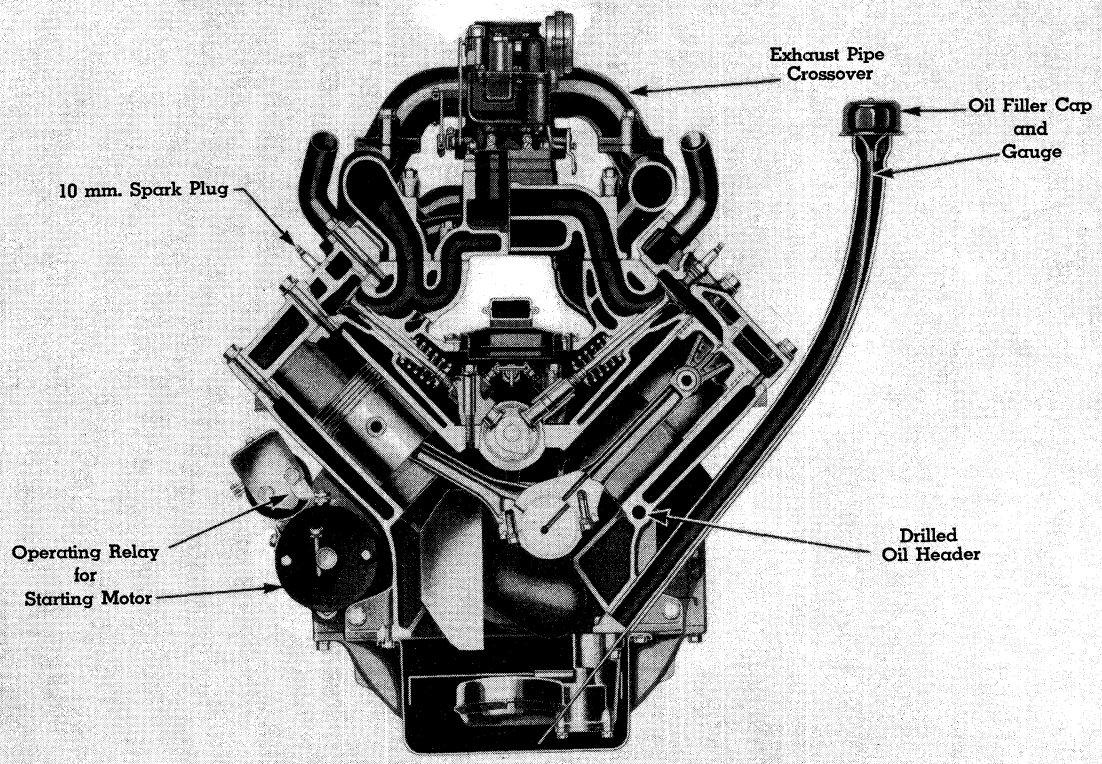


Fig. 2. Cross Sectional View of Series 39-50
Typical of All 39-Series

Plate 16. V-8 Engine

Oil from the main bearings passes through drilled passages to the crankpins, where part of the oil lubricates the connecting rod bearings, part flows up to the piston pins, and part passes through the small holes in the big end of the connecting rods to lubricate the cylinder bores.

The crankcase ventilating system provides a positive and nearly constant air circulation through the crankcase at all times. With this system, air enters the crankcase through an intake at the bottom of the oil filler neck, which is fitted with a copper mesh air filter. The air and any contaminating vapors are then drawn out through two baffled openings in the valve covers.

The vapors pass back into a cored passageway between the engine rear bulkhead and the flywheel. An outlet fitting, which is a part of the oil pan, discharges them beneath the car. This system requires no external suction pipes.

Cooling System -- The water pump, located at the front of the right hand cylinder block, is driven by a belt which also drives the generator, located in the engine vee. A permanently sealed ball bearing is used at the outer end of the water pump shaft. The center bearing, however, is lubricated through a fitting. Automatically adjusted chevron type water pump packings provide a water and air tight seal around the shaft at the impeller end.

A separate belt is used to drive the fan. It is adjusted by raising or lowering the fan bracket, which is mounted to a support on the engine front cover. The fan rotates on a permanently sealed ball bearing, and does not require lubrication in service.

The generator pulley is so designed that the contact between belt and pulley is located on the inside surface of the belt instead of along the vee-shaped sides, where it is located on the water pump and crankshaft pulleys. (See Plate 21, Figure 13). This arrangement reduces wear on the belt.

The water pump draws fluid from the bottom of the radiator and delivers it directly to the right cylinder block. The water is then by-passed at the center of the cylinder block where half of the fluid is forced through a cored passageway to the left cylinder block. After circulating through the blocks, the fluid passes out through an outlet in the top of each cylinder head leading to the upper tank of the radiator, and repeats the cycle. Full length water jackets provide an even temperature over the entire length of the cylinder walls.

A built-in pressure valve type radiator filler cap with a bayonet safety catch is used to protect the cooling system from loss of water or anti-freeze through boiling.

Ignition System -- The ignition system consists of an induction coil, mounted on the forward side of the dash; a timer which interrupts the low tension current from the battery and produces a high voltage in the secondary circuit of the coil; and a distributor to direct the high voltage current to the spark plugs.

The distributor is fully automatic in operation. It is mounted at the rear of the engine and is driven by the camshaft. A single contact arm is used with an eight lobe breaker cam which is integral with the distributor shaft. The ignition setting is indicated by a timing quadrant at the base of the distributor housing and is controlled by revolving the housing a few degrees either way from the zero mark on the scale. The automatic spark advance is controlled by centrifugal weights. Timing marks are stamped on the timing disc at the front end of the crankshaft.

Carburetion -- Carter carburetors are used on the LaSalle 39-50 engine and Stromberg carburetors on the 39-series Cadillac V-8 engines.

Although the fundamental design of these two makes of carburetors is different, their operation and performance is quite similar. Both carburetors have vented fuel nozzles which permit any gas bubbles that may form in the carburetor to escape without forcing gasoline out of the nozzle. Both makes of carburetors are provided with a drain in the float chamber cover of the carburetor.

The automatic choke used with each type of carburetor depends for its operation on heat piped into the control box from the heaters on the exhaust manifolds

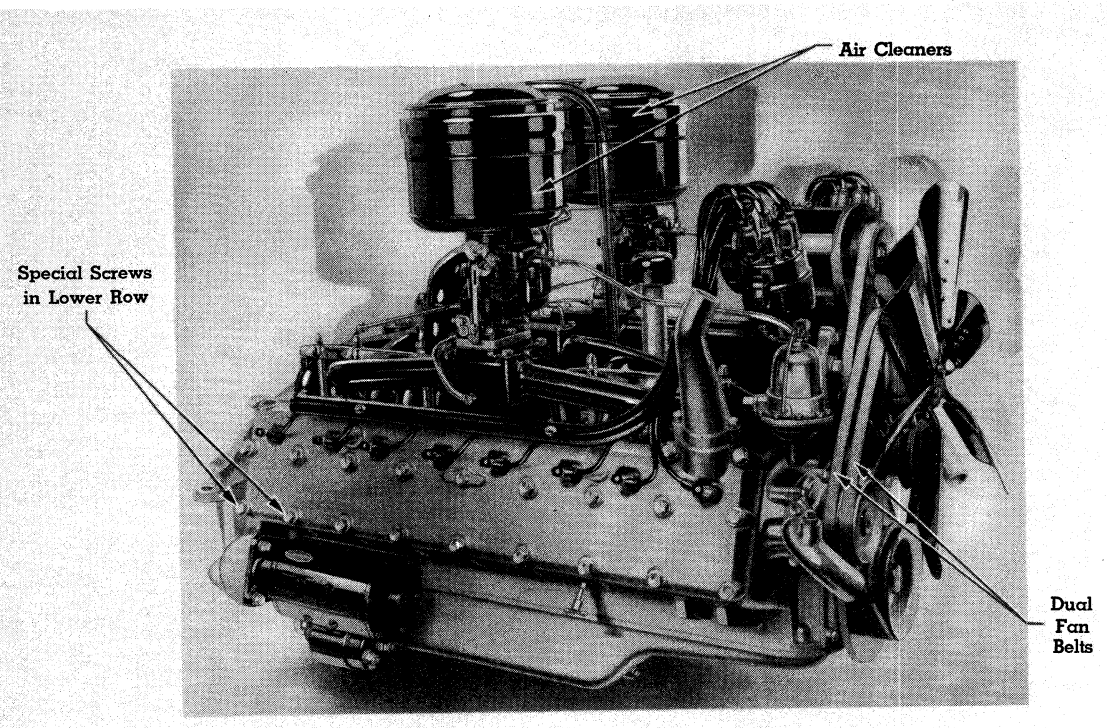


Fig. 3. Right Side View, Series 39-90

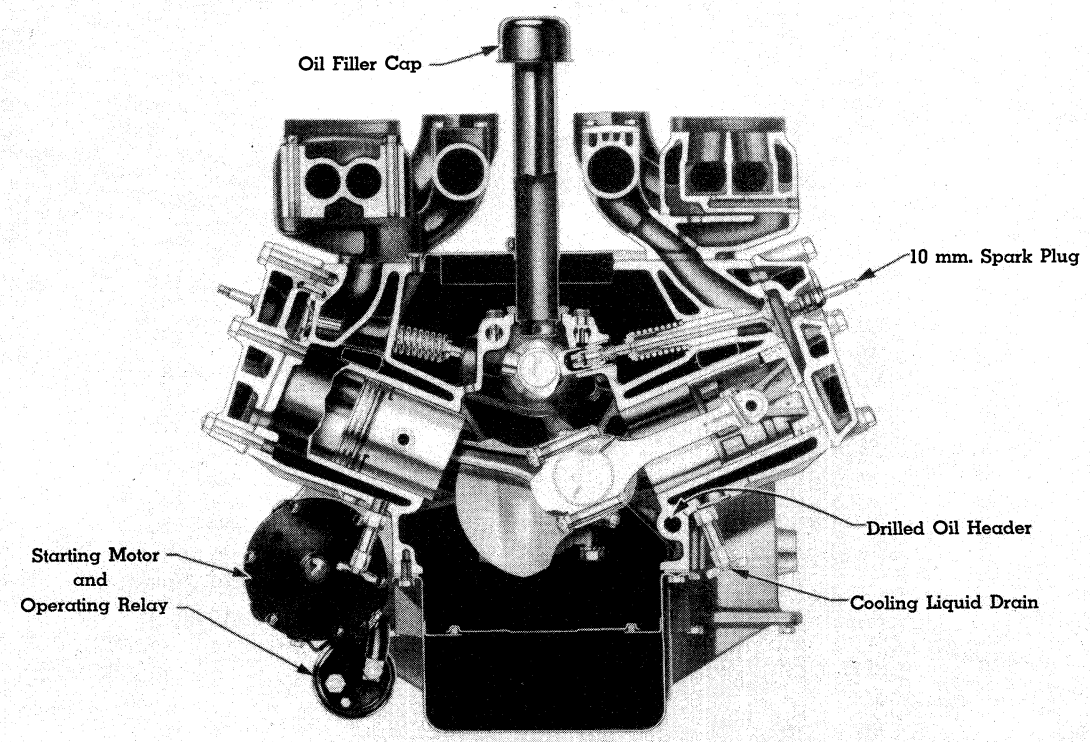


Fig. 4. Cross Sectional View, Series 39-90

Plate 17. V-16 Engine

when the engine is started. The arrangement of the piping and the design of the thermostats is, however, different on the two types of carburetors.

A combination fuel pump and vacuum pump is mounted on the front engine cover directly behind the fan. The pump is driven by a removable eccentric keyed to the front end of the camshaft.

Manifolds -- Two separate intake manifolds made up in a single casting are used on the 39-series V-8 engines. Each manifold supplies the two center cylinders on one side and the two end cylinders on the opposite side.

The exhaust manifolds, like the intake manifolds, are mounted on top of the cylinder groups. There are three exhaust ports for each cylinder block. The end cylinders have individual ports, while the center cylinders are grouped together in one port, from which a passage leads to the heated chamber of the intake manifold. A cross-over pipe just forward of the rear exhaust port connects the left hand exhaust manifold with the right hand manifold.

The exhaust pipe take-off is at the front of the right-hand cylinder block on series 39-50, 61 and 60-S engines, and at the rear of the left-hand block on series 39-75 engines.

Engine Supports -- The 39-series V-8 engines are supported by two rubber mountings at the side of the cylinder blocks toward the front of the engine, and one rubber mounting at the transmission extension in the rear. These supports do not require adjustment.

CADILLAC V-16 ENGINE

The cylinder blocks and crankcase of the 39-90, V-16 engine are made in one casting of grey iron. The cylinder heads are also of cast iron. The angle between the cylinder blocks is 135°, which permits uniformly spaced power impulses every 45°.

The crankcase casting has seven ribbed bulkheads which, with the front and rear walls, support the nine main bearings. Bearing caps are of cast iron. Removable shell type bearings of steel-backed babbit are used. End thrust is taken by the center main bearing.

The nine-bearing crankshaft has eight counterweights forged integral with the shaft. A rubber insert type of torsional vibration dampener is included in the fan pulley assembly in the front of the engine.

The connecting rods for opposite cylinders are carried side-by-side on the same crankpin. Use of 2-inch diameter crankpins permits the removal of piston and rod assemblies from above without the necessity of an angle-split rod bearing. The connecting rod bearings are made of steel-backed babbit and are of the removable shell type.

The piston pins are held in the connecting rods by locking screws, and rotate in the pistons. With this construction snap rings for the pins are not required, nor is it necessary to have a drilled oil passage in the connecting rod to lubricate the piston pin.

The pistons are of T-slot design and are made of aluminum alloy with anodized finish. Two compression rings and one oil ring are used. Two grooves are broached in the piston the full length of the piston pin bearing, to collect oil from the cylinder wall and distribute it along the pin.

The camshaft is mounted on five bearings in alternate bulkheads of the crankcase. It is located in the center of the Vee directly above the crankshaft and is driven by a non-adjustable silent chain at the front of the engine.

The cams operate valve lifters which include hydraulic valve silencers of similar design to those used in V-8 engines. Single valve springs with internal dampeners are employed. The entire mechanism is enclosed by two removable covers placed across the top of the engine Vee.

Oiling System -- The gear type oil pump is attached to the crankcase at the rear of the engine and driven by a vertical shaft which has at its upper end a gear meshing with a gear integral with the camshaft. The main oil pressure regulator is built into the pump body.

Oil is drawn from the pan through a floating intake to the gear type oil pump, and is forced by the pump to a header that runs the full length of the crankcase.

Drilled passages in the bulkheads connect the header with the main and the camshaft bearings, and drilled passages in the crankshaft carry oil to the connecting rod bearings.

The oil pump drive shaft bearing, the two distributor drive shafts, and their eccentrics for driving the two fuel pumps are lubricated directly by passages connected with the main bearing supply. The timing chain and sprocket are lubricated by oil which has passed through the front camshaft bearing.

A pipe leading from the main oil header carries oil to the two small headers along both sides of the camshaft. Oil from these headers passes to the hydraulic valve silencers, lubricating them and providing the pressure necessary for the automatic valve adjusting action. The headers are interconnected, and at the rear of the left-hand header there is a non-adjustable auxiliary relief valve.

The crankcase ventilating system is of the suction type. The filter-protected engine oil filler provides the main air inlet. A pipe for ventilating air also extends from each air cleaner, one to the front valve compartment, the other to the rear. Still another pipe extends upward from the crankcase to the line leading from the vacuum pump to the intake manifold.

At low speed or part throttle operation, air is drawn into the crankcase through the oil filler and into the valve chambers through the air cleaner pipes. Cored holes in the crankcase bulkheads and drilled holes in the valve chamber walls permit free circulation of air. After absorbing water and fuel vapor, the air is drawn up through the vacuum line and into the intake manifold.

At high speeds, the direction of air circulation is partly reversed. The manifold vacuum is decreased, but the rush of air into the carburetors draws the fumes from the crankcase and valve chambers up through the pipes that lead to the air cleaners.

Cooling System -- Two independent water circulating systems are used -- one for each bank of cylinders, although the radiator is common to both. The radiator bottom tank has two outlets, each of which is connected to one of the two centrifugal type water pumps mounted on the sides of the engine at the front.

The water pumps do not employ the usual soft packings but have a double seal which requires neither lubrication nor adjustment. A helical spring forces a stationary carbon washer against the water pump impeller hub, preventing leakage along the impeller shaft. The same spring holds a rubber seal against the carbon ring and against the outside of the housing, preventing leakage around the carbon block. The pump impellers are held on the hard steel shafts by a press fit.

From each pump, water is forced to the rear through a tube that extends the full length of the cylinder, and that sprays water around the valve chambers and at the same time assures correct distribution of fluid throughout the blocks. After circulating in the full length water jackets, the water passes upward through regulated openings into the cylinder heads and then forward to the outlets.

Two parallel vee belts driven by double pulleys on the crankshaft encircle the water pump pulleys at each side and the fan pulleys at the top of the engine.

The generator is mounted above the engine vee at the front, and is driven by a short belt from a pulley placed just behind the fan driven pulleys and rotating with them.

Ignition System -- The ignition circuit for each bank of cylinders is entirely separate. Two coils and two condensers are used and two separate distributor units direct the high tension current to the proper spark plugs.

The breaker mechanisms for both of these circuits are, however, located in the left distributor housing. The two breaker arms, although separate electrically, operate on the same eight-lobed cam. The right hand distributor unit serves only to direct the current to the spark plugs in the right hand block.

The ignition setting for the left hand block of cylinders is indicated by a timing quadrant at the base of the distributor housing. The ignition setting

for the right hand cylinder block is controlled by an adjustable mounting plate within the left hand distributor housing.

The ignition coils are mounted on a bracket attached to the radiator upper tank and are held together in a die-cast base into which the ignition lock cable passes. The two distributors are mounted at the front of the engine and are driven by a single gear on the camshaft. As viewed from above, the left hand distributor rotates clockwise and the right hand distributor counter-clockwise. The two condensers are mounted on the outside of the left hand distributor.

Carburetion--Fuel pumps of the familiar link-driven flexible diaphragm type are used. The link drives project inward and engage push rods operated by eccentrics on the distributor drive shafts. Gasoline filters are an integral part of the pumps.

A pipe leads from the right hand fuel pump to the right hand carburetor and from the left hand pump to the left hand carburetor, but these lines are inter-connected so that either pump may supply both carburetors.

Two heavy duty oil bath air cleaners of cylindrical design are each mounted directly above the corresponding carburetor. Two 1-1/8" Carter carburetors are employed. The carburetors are of the dual down-draft design with one carburetor barrel serving the four inside cylinders while the other serves the four end cylinders.

The automatic chokes are of the Carter climatic control type. The thermostats for these units are operated by heat drawn into the control box from the exhaust manifold heater by means of manifold vacuum.

All exhaust ports are single. The two center ports of each cylinder bank are connected to the heating passages from the intake manifold. The exhaust pipes discharge into a cross pipe just behind the carburetors and this pipe conducts the exhaust gases to the left side of the engine and downward to the rear.

Engine Supports -- The 39-90, V-16 engine is supported at five points in rubber mountings. There are two supports at the front corners, two intermediate supports and a rear support at the transmission extension.

*

Service Information

1. CYLINDER NUMBERING

The left front cylinder is designated as number one cylinder on all 39 series cars. The cylinder numbering is made according to arrangement, rather than firing order. The odd numbered cylinders are on the left bank and the even numbered cylinders on the right bank.

2. REPLACING MAIN BEARINGS

When main bearings are found to be worn beyond the limits specified on page 76, they should be replaced. No attempt should ever be made to shim, file or otherwise take up worn bearings.

Replacement main bearings are finished to exact size and do not require reaming or scraping. They can be installed without removing the crankshaft by observing the following procedure:

1. Remove cap from front main bearing and remove worn bearing shell from cap.

2. Rotate crankshaft in a reverse direction to turn upper shell out of crankcase.

NOTE: No special tool is provided for this operation. Instead, a cotter pin should be placed in a vice and the rounded end flattened to a T shape. Then the pin can be inserted in the oil passage hole in the journal and the projecting head will contact the bearing and force it out as the shaft is turned.

3. Place new upper bearing shell on crankshaft journal with locating lug in correct position, and rotate shaft to turn upper shell up into position.

4. Install lower bearing shell in cap and reinstall cap.

5. Repeat this procedure for each main bearing.

NOTE: New bearings will not provide satisfactory operation if the crankshaft journals are worn or scored. Worn limits for micrometer testing are given in the specification table on page 76.

Always install new cork plugs in grooves in sides of rear main bearing caps, when reinstalling caps, to prevent oil leaks around cap. These plugs should be well greased to facilitate installation in grooves.

3. REPLACING REAR MAIN BEARING OIL SEAL

All Series

Installation of a new rear main bearing oil seal in both V-8 and V-16 engines requires the use of Tool No. J-1177. After the crankshaft has been removed from the engine and the worn packing taken out, proceed as follows:

1. Remove rear main bearing shells, to avoid possible damage.
2. Install a length of new packing in groove in crankcase, inserting it behind sheet metal retainer.
3. Drive packing up into place, using Tool No. J-1177, and pounding with a hammer on handle of tool.
4. With tool held in position, cut off each end of packing flush with bearing edge.
5. Repeat this operation in the bearing cap. An arbor press will provide the best means of forcing packing in place and holding it while cutting.

4. CLEAN OIL LINES BEFORE INSTALLING NEW BEARINGS

Before installing new main or connecting rod bearings in any engine, it is important to clean out thoroughly all of the oil passages in order to remove any foreign material that might later damage the new bearings.

The correct procedure for cleaning drilled oil passages on V-8 engines is as follows:

1. Remove oil pump.
2. Remove plug at front end of crankcase oil header. (See Plate 18, Figure 8.)
3. Apply compressed air and intermittent shots of kerosene from an oil can at the header opening.

On V-16 engines, the auxiliary relief valve for the silencer mechanism, located at the rear of the left drilled passage, can be removed for cleaning and to permit blowing out this passage. No attempt should be made to readjust it. When reinstalling, be sure to have the relief hole pointing so the oil will flow against the camshaft and not on the oil pump gears.

The plugs that are inserted in the crankcase casting above the valve silencer oil passages require no attention and should not be disturbed.

A more thorough cleaning of the oil lines can be secured when the radiator is off the car and the crankshaft and camshaft out, by removing the plug for the header and the plugs for the lines to the bearings and cleaning the lines with a stiff wire brush.

Whenever the oil lines are cleaned, the small oil hole in the lower end of each connecting rod should be inspected and cleaned out, if necessary, to assure adequate cylinder wall lubrication. The oil pump float screen and regulator valve should also be cleaned at this time.

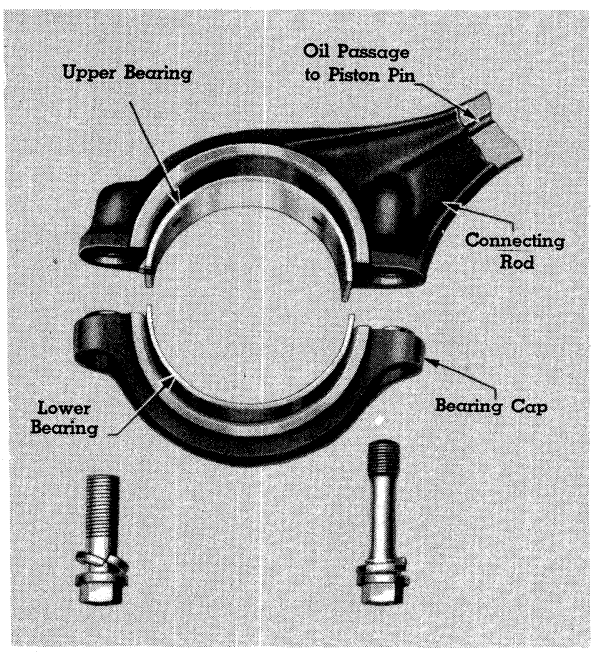


Fig. 5. Connecting Rod and Bearing Assembly Series 39-50, 61, 60S and 75

5. REPLACING FLYWHEEL RING GEAR

It is not necessary, when a flywheel ring gear is damaged, to replace the entire flywheel. The old ring gear can be driven off the flywheel, and a new one heated and installed.

The ring gear can be heated either on a hot plate or in an oven. A suitable oven can be made by cutting an oil drum 5 or 6 inches from the bottom and making a cover to fit.

The gear should be heated to from 350 to 400° F., but no hotter. The temperature can be checked with an ordinary oven thermometer. If a hot plate is used, two 1/8-inch pieces of solder can be placed on opposite edges of the gear. When the solder starts to melt, the gear is hot enough.

CAUTION: Do not heat the gear with a welding torch or over a direct flame. Uncontrolled heat will destroy the temper of the gear.

6. REMOVAL AND INSTALLATION OF CONNECTING RODS AND PISTONS

The connecting rod and piston assemblies are removed from the top of the cylinder blocks on all 39-series engines. Because of the compact design of the V-8 crankcase, the big ends of the V-8 connecting rods are split at an angle to make removal through the bores as easy as possible.

The rod bearing caps are attached to the rods with special type cap screws. When installing connecting rod or main bearing caps of this type, use a wrench with a T-handle no more than 12 inches across.

Always inspect the crankshaft journals carefully whenever connecting rods are removed. A rough or scored crankpin will result in further failure if it is not corrected before the engine is reassembled.

The pistons should be assembled to the rods on all 39-series engines so that the T-slot in the skirt will be on the left side of the engine. (See Note 7 on V-8 bearing halves).

The lock washers used under the V-8 connecting rod screws are of special design and material. New lock washers, Part No. 1419129 must always be used. They are available only from the factory Parts Department.

When assembling the connecting rods to the crankshaft on all 39 series cars, make sure that the numbers on the rods are toward the bottom of the engine and that they correspond with, and are on the same side as, the numbers on the caps.

7. CONNECTING ROD BEARINGS

If connecting rod bearing clearance exceeds the limits given on page 76, the bearings should be replaced. No attempt should be made to shim, file, or adjust worn bearings. The bearings can be removed or installed without removing the piston and connecting rod assembly from the engine. It is necessary only to remove the connecting rod bearing caps and replace the upper and lower bearing halves.

The upper and lower halves of the connecting rod bearings used in the V-8 engines are not interchangeable because of the holes in the upper bearing for the oil passages in the connecting rod. When installing these bearings, make sure that the upper half is installed correctly in the top of the rod, or no oil will reach the piston pins and cylinder walls.

8. CONNECTING ROD ALIGNMENT

When straightening connecting rods, the rod is more liable to hold its shape if it is bent a little further than necessary and then bent back until it is straight. Otherwise, it may return to its former shape, due to the toughness of the steel used in its construction.

When checking the alignment of the connecting rod assembly, both sides of the piston should be tested by reversing it on the alignment fixture. Both sides of the piston should rotate parallel with the face of the fixture. Tool No. J-874CL is available for making these tests.

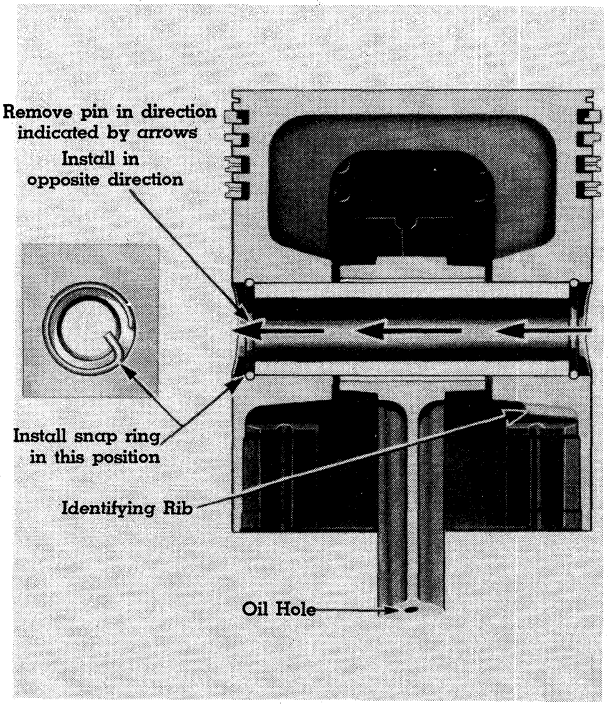


Fig. 6. Cross Section of Piston Series 39-50, 61, 60S and 75

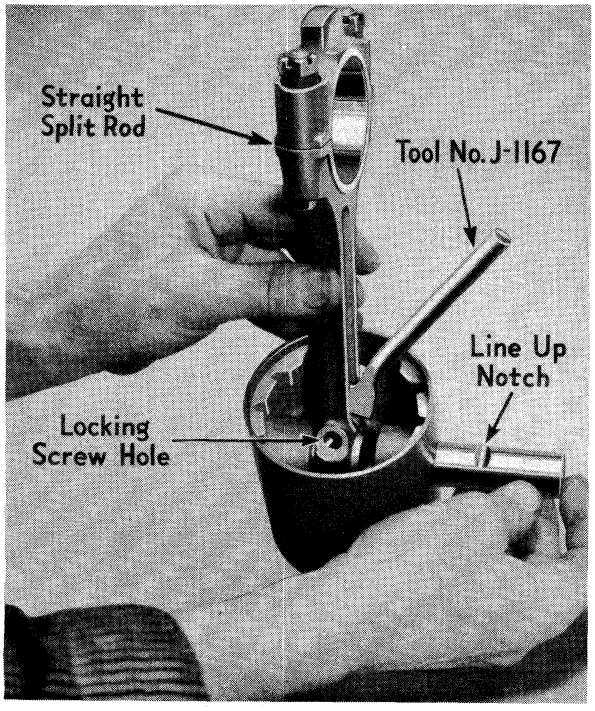


Fig. 7. Installation of Piston Pin, Series 39-90

9. REMOVING AND INSTALLING PISTON PINS

Removal -- Series 39-50, 61, 60S and 75.

1. Remove snap rings that hold piston pin in place in piston.
2. Place piston in boiling water to expand piston pin hole.
3. Push piston pin out of piston by hand from raised rib side of piston hole boss as shown in Figure 6.

NOTE: Never use an arbor press to remove piston pins because pressure may distort or crack piston.

Installation -- 1. Lubricate piston pin with engine oil.
2. Heat piston in boiling water.
3. Push pin into piston by hand from side opposite boss with raised rib. (See Figure 6).

Removal -- Series 39-90 1. Remove locking screw from upper end of connecting rod.
2. Spread split end of rod by installing Tool No. J-1167, tapping it gently in place.
3. Drive piston pin out of piston and rod, using a brass drift.

Installation -- 1. Spread split end of rod with Tool J-1167.
2. Assemble pin in piston and rod in correct position, lining up notch in pin with locking screw hole in rod, as shown in Figure 7.
3. Tap pin into place and turn locking screw part way in before removing spreading tool.
4. Tighten locking screw assembly.

10. MEASURING PISTON CLEARANCE

When fitting anodized aluminum pistions, two feeler gauge ribbons of different thickness should be used. These ribbons should be from 3/8 to 1/2 inch wide and, for convenience, from 7 to 10 inches long. The following thicknesses are required:

Thin Gauge	Thick Gauge
.002"	.0025"

The ribbon should be placed at the high spot of the piston next to the "T" slot. With the feeler gauge in position in the cylinder, and the piston in its running position, the piston should drop of its own weight with the thin feeler and hold tightly in place with the thick feeler.

For convenience, the fit trials may be made with the upper end of the piston just sufficiently above the top of the cylinder to hold it with the fingers. The feeler ribbon, the piston, and the cylinder wall should be clean, and the ribbon must be free from kinks and wrinkles when fitting pistons.

Replacement pistons are furnished by the factory Parts Department in the following oversizes:

All V-8's	V-16's
Standard	Standard
.003 oversize	.....
.005 oversize	.005 oversize
.010 oversize	.010 oversize
.015 oversize	.015 oversize
.030 oversize	.030 oversize

Piston diameters, as given in the specification table, can be measured with a large micrometer. The measurements must be taken on the large diameter, which is 90° from the piston pin hole. Measure at two points; just above the lower edge and just below the lower ring groove.

Before ordering pistons for replacement, it is extremely important to determine the size of the cylinder bores by actual measurement. This is essential because the cylinder bore may have been enlarged by refinishing without being marked "oversize." Actual measurement at the time of replacement is the only certain way of avoiding errors in ordering. Cylinder bore diameters must be measured accurately with an inside micrometer or dial indicator.

11. INSTALLATION OF CYLINDER HEADS (V-8 ENGINES)

Only two different cylinder heads are required for all 39 series V-8 engines. One head is used for the 39-61 and 60S Cadillac engines, which have a 3-1/2-inch bore and a 6.25 to 1 compression ratio; the other head is used on the 39-50 LaSalle engine, which has a 3-3/8-inch bore and a 6.25 to 1 compression ratio, and also on the 39-75 Cadillac engine, which has a 3-1/2-inch bore and a 6.70 to 1 compression ratio.

The markings on the cylinder heads used in production differ from those supplied for service. The right-hand cylinder heads used in production on both 39-50 and 39-75 engines are marked 322-625 and 346-670*, whereas the left-hand heads on 39-50 are marked 322-625 and those on 39-75 are marked 346-670*. Cylinder heads supplied by the Parts Department are marked with both numbers regardless of whether they are right-hand or left-hand heads.

The two cap screws used at the water outlet connection on each cylinder head have oversize heads and are 1/2 inch longer than the remaining cylinder head cap screws. Use these screws only at the water outlet connection. (See Plate 16, Figure 1). If these screws are installed at any other point on the cylinder head and an attempt is made to draw them up, they may break through the water jacket and irreparably damage the entire engine block.

12. INSTALLATION OF CYLINDER HEAD GASKETS (V-8 ENGINES)

Cylinder head gaskets on 39-50 engines are similar to those on series 39-61, 60S and 75 engines, except for the bore, which is sufficiently different to prevent their use interchangeably. Use of the wrong gasket in either case may result in a sluggish engine, due to an enlarged combustion chamber or to a hot spot caused by burning away of the gasket.

Identification of the two gaskets is easily made by the part number stamped on one surface between the two inside cylinder bore holes. The 39-50 part number is 1419114; the 39-61, 60S and 75 part number 1419759. The gaskets are interchangeable between the right and left cylinder blocks of their respective engines.

Perfect Seal Gasket Paste is recommended for use when installing cylinder head gaskets. This paste remains in a semi-fluid state which assures a good seal and permits easy disassembly at any time.

The paste is available from the Parts Department either in a kit containing an eight ounce tube of paste and a special roller for applying it, or in a carton of 12 eight ounce tubes.

*Indicate piston displacement and compression ratio.

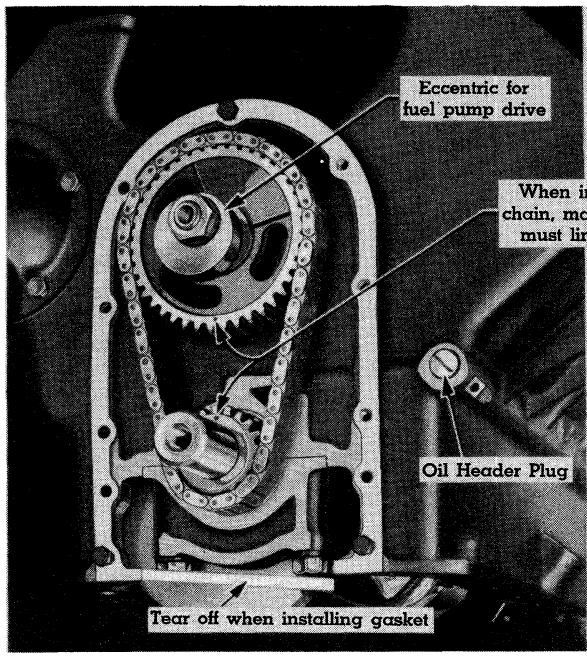


Fig. 8. Timing Chain Series 39-50, 61, 60S and 75

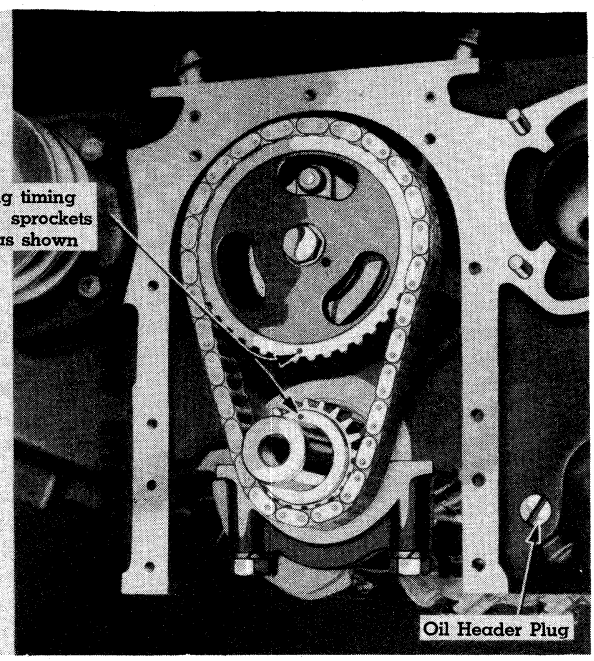


Fig. 9. Timing Chain Series 39-90

Plate 18. Crankcase and Timing Chain

Cylinder head gaskets for series 39-90 engines are interchangeable between right and left cylinder blocks.

13. TIGHTENING CYLINDER HEADS (V-16 ENGINES)

Thorough tightening of the cylinder head cap screws is necessary to insure a leak-proof connection. Tighten the screws from the center of the head outward. First tighten all the screws while the engine is cold, then run the engine until it is thoroughly warmed up and retighten.

It is recommended that the cylinder head cap screws be tightened in this manner just before the car is delivered to the purchaser, and that the tightness be rechecked again at the 1,000 mile inspection.

When reinstalling cap screws make sure that the short screws are installed along the lower edge of the head. Inasmuch as copper-faced cylinder head gaskets are used, the gaskets are not coated with gasket paste in production. If gasket paste is used in service, spread it on very thinly, and make sure that none of it gets into the valves or other parts of the engine.

14. CHANGING COMPRESSION RATIOS (V-8 ENGINES)

All 39 series engines are equipped with high compression cylinder heads. In the event that a lower compression ratio is required to meet certain operating conditions, this can readily be secured on V-8 engines by installing special shims (2 on each side) between the cylinder heads and blocks.

15. REPLACING CAMSHAFT BEARINGS (V-8 ENGINES)

Removal -- 1. Dismantle engine by removing such parts as generator, carburetor, manifolds, distributor drive mechanism, hydraulic valve lifter assemblies, etc., so that camshaft can be removed.

2. Remove radiator grille, radiator, and engine front cover.

3. Remove transmission and flywheel housing.

4. Remove camshaft.

5. Remove camshaft bearings by pushing them out of engine bearing supports, in which they are a press fit.

NOTE: Special Tool No. J-829 is recommended for this operation.

Installation -- 1. Check new camshaft bearings carefully for trueness, out-of-roundness, finish, etc.

2. Paint outside surface of new bearings with white lead so they will slip readily into place.

NOTE: Be sure to line up oil holes in bearings properly with passageways when installing bearings.

3. Install front camshaft bearing, piloting installation Tool, No. J-829, at rear and center bearing locations.

4. Install rear camshaft bearing, piloting installation tool at front.

5. Install center camshaft bearing, piloting installation tool at front and rear bearings.

6. Reinstall camshaft, front engine cover, transmission and clutch housing.

NOTE: Exercise great care not to scrape or damage camshaft bearings in any way when installing camshaft as sharp edges of cam lobes may easily ruin bearing.

7. Reassemble engine complete in reverse order of disassembly.

16. CAMSHAFT REMOVAL AND INSTALLATION, 39-90

Due to the design of the crankcase, the V-16 camshaft must be removed from the engine for any service, even visual inspection and, in order to remove it, special Tool J-1210 is practically indispensable.

This operation requires removal of the radiator and fender assembly as a unit, the crankshaft balancer and pulley, the front cover, timing chain and camshaft sprocket, and the valves and valve lifters. Before jacking up the front of the engine to remove the crankshaft balancer and pulley, be sure to disconnect the flexible pipes from the gasoline lines to the fuel pumps.

The camshaft removing tool is then attached to the front of the camshaft by turning it into the tapped hole for the sprocket screw. When so attached, the tool permits easy removal and reinstallation of the shaft.

After reinserting the camshaft, make certain that the front camshaft bearing is properly installed. Due to the offset of the holes, there is only one correct way to reinstall the bearing. Do not attempt to force it in an incorrect position.

17. REPLACING TIMING CHAIN AND SPROCKETS

Engine timing chains and sprockets should be installed as a unit. Care should be exercised to see that the timing marks are properly lined up as shown in Plate 18.

Pilot, Tool No. J-836, should be used on the end of the camshaft when installing the chain and sprockets on V-8 engines. Do not attempt to force the camshaft sprocket on the shaft, as this might damage the distributor and oil pump drive gear or the rear camshaft bearing.

The front cover plate gasket of all engines is an open end gasket, but for easier handling is supplied with a closed end. When installing this gasket, therefore, tear off the lower portion as shown in Plate 18.

18. REMOVING AND INSTALLING VALVES

Series 39-50, 61, 60S and 75 -- To remove the valves from V-8 engines, it is necessary first to remove the valve lifter assemblies. The valve spring keepers can

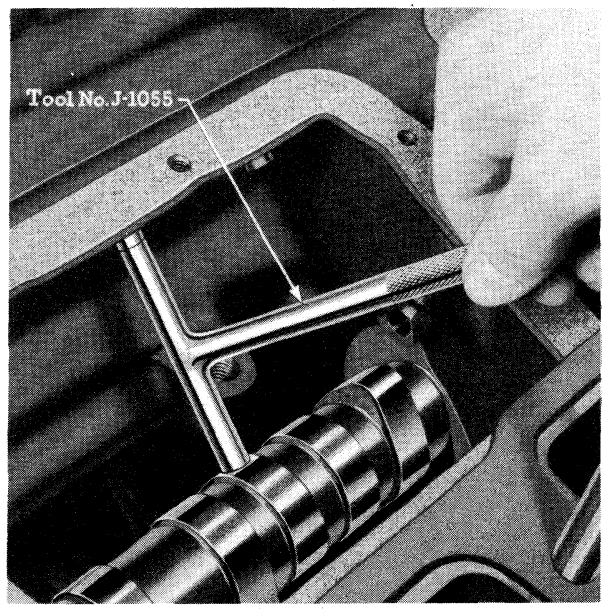


Fig. 10. Checking Valve Stem Length Series 39-50, 61, 60S and 75

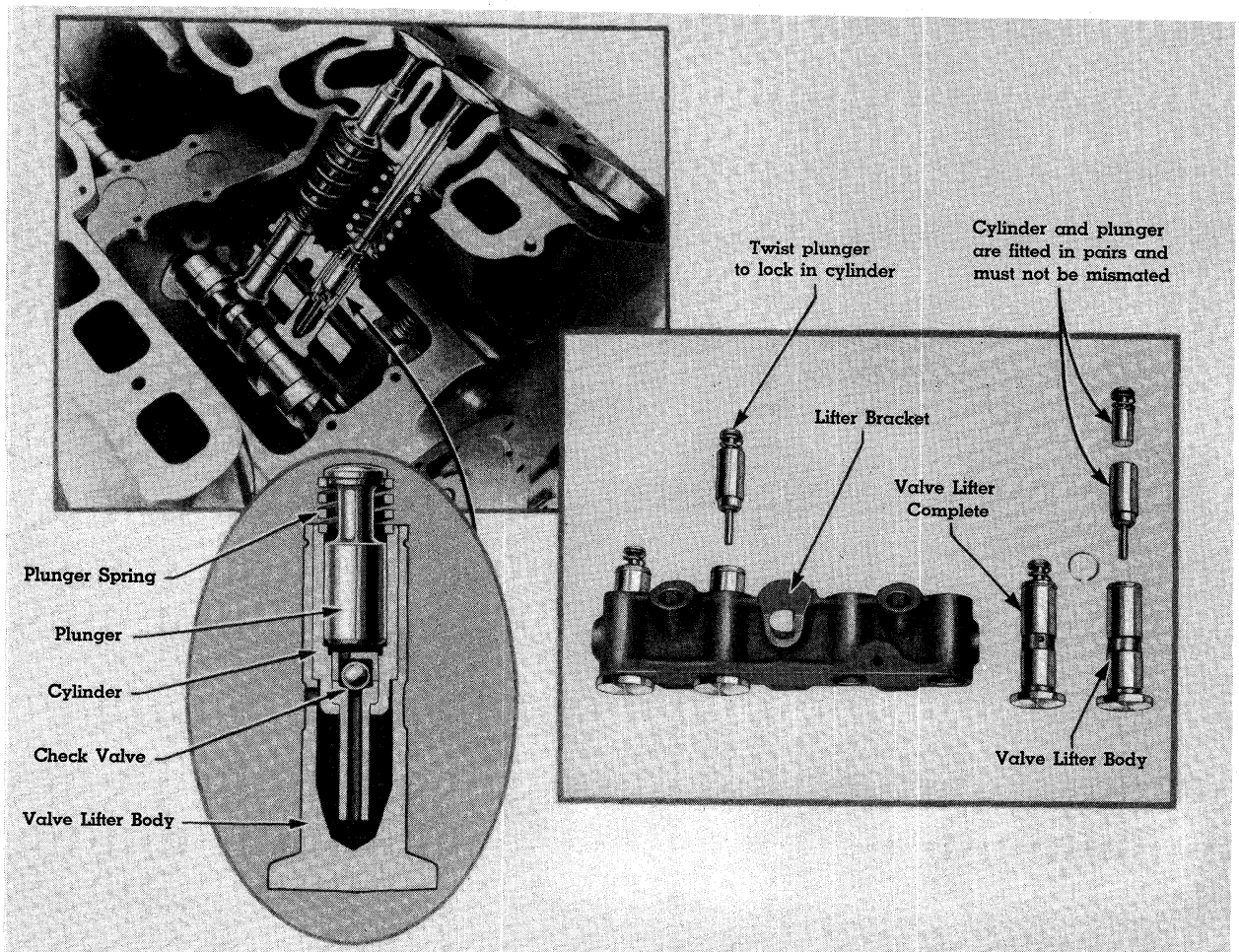


Fig. 11. Arrangement of Valves, Valve Lifters, and Silencer Parts

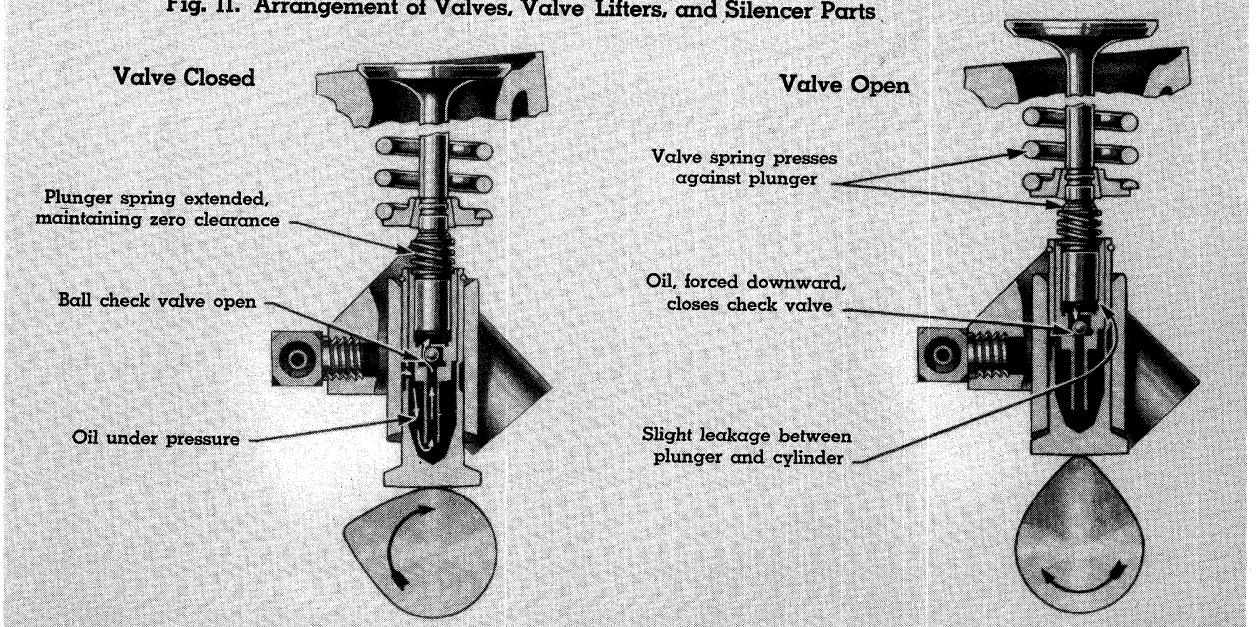


Fig. 12. Operation of Valve Silencer Mechanism

Plate 19. Valve Mechanism, Series 39-50, 61, 60S and 75

then be removed by compressing the springs with valve lifter J-257-X. This valve lifter is also used for installing the keepers when reinstalling the valves.

Before reinstalling the valve lifter assemblies, the valve stems should be checked for proper length, using the valve stem length gauge J-1055. If the valve stems are found to be too long when checked in the closed position, they should be ground off until the tool will slide into place. The valve lifters should be disassembled and cleaned before being reinstalled.

Installation of the lifter assemblies is greatly facilitated by the use of Tool J-827, which holds the tappet plungers down.

Series 39-90 -- The procedure for removing the valves from V-16 engines differs in two ways from the V-8 procedure. First, the valves must be removed before the individual valve silencer assemblies can be removed. Second, a different valve lifter, Tool No. J-1211, should be used.

Although this valve lifter permits removal of individual valves without taking off the fenders, it is recommended that the front fender and radiator assembly be first removed whenever valves are to be ground or all the valves removed. The fenders, radiator casing and core can be removed as a single assembly -- it is not necessary to remove the hood.

When removing the valve lifter and silencer assemblies, it is important to keep them in order and reinstall them in the same guide hole from which they were removed. Two sizes of lifters are used, the larger size must be installed in the large holes and the smaller size in the small holes.

The large size lifters can be identified by a letter "B" stamped in the oil groove. The large guide holes are also identified by a "B" stamped beside the hole. Both sizes of lifters are stocked by the Parts Department. When ordering valve lifters be sure to specify which size is needed.

19. VALVE SILENCER OPERATION

Series 39-50, 61, 60S and 75 -- The design and construction of the hydraulic valve lifter mechanism used on all 39-series V-8 engines is shown in Plate 19.

The manner in which these valve lifters operate is as follows: Oil is forced under pressure directly to each tappet body through the longitudinal passageway drilled in the valve lifter bracket. From this passageway, oil enters the chamber inside of the valve lifter body through a small hole leading into the plunger cylinder. The oil pressure opens the ball check valve (Figure 12), in the inner cylinder, permitting oil to pass into the space in the cylinder below the plunger.

When the cam brings the valve lifter up against the resistance of the valve spring, the oil in the inner cylinder is trapped by the ball check valve. This prevents the plunger from sliding down into the cylinder, and with the valve lifter spring keeping the plunger in contact with the valve stem at all times, zero clearance is maintained between the stem and lifter, providing silent valve operation.

Series 39-90 -- The hydraulic valve lifters on the V-16 engine operate in exactly the same manner as the V-8 lifters, and they are of the same construction except that they are installed individually in the crankcase casting and are supplied with oil through holes drilled in the casting.

20. NOISY OPERATION OF VALVE SILENCERS

Noisy operation of the hydraulic valve mechanism may be due to:

1. Incorrect oil level (too high or too low).
2. Improper oil pressure.
3. Weak valve lifter plunger springs.
4. Dirty, scored or worn valve lifter parts.

Incorrect Oil Level -- The level of the oil in the engine is an important factor relating to quiet valve operation. The oil level should never be above nor more than one quart below the "Full" mark on the oil level indicator. (7 quart mark on V-8 engines). If the oil level is too high, foaming may result; if the level is too low, air may enter the pump inlet. In either case, noisy valve action will result.

Improper Oil Pressure -- Correct oil pressure is also an important factor to be checked in case of noisy valve operation.

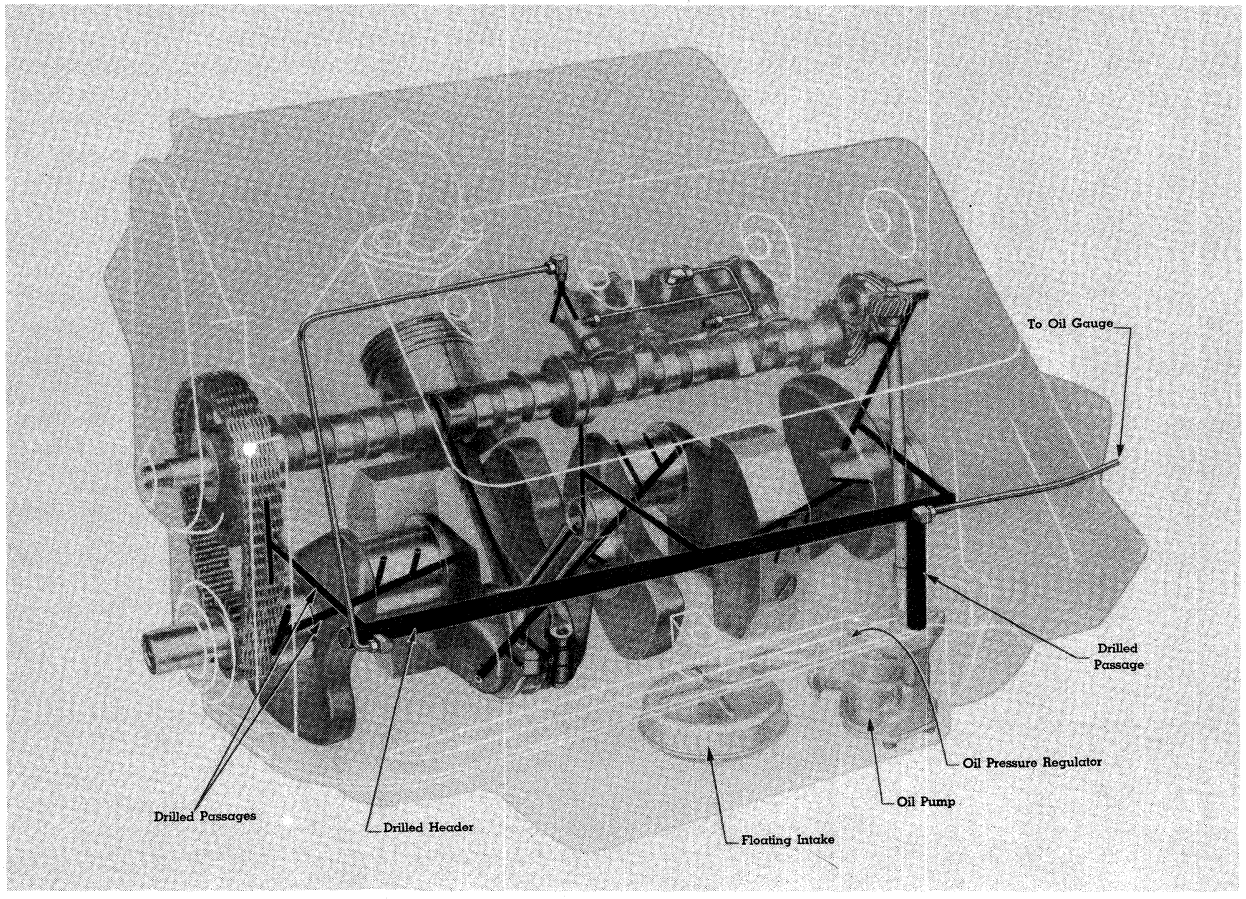


Plate 20. Engine Oiling System, Series 39-50, 61,60S and 75

Extremely high pressure may lift the entire hydraulic unit against the plunger spring, permitting excessive plunger movement and wear. Low pressure permits oil relief leakage between the plunger and cylinder to exceed the oil feed through the ball check valve.

If the valve action is noisy after the oil is hot, determine the oil pressure at the silencer pipe. Pressure here should be 3 to 5 pounds when gauge on dash reads 12 to 15 pounds.

Trouble with the oil pressure usually results from a leak somewhere in the oiling system, a stuck or improperly operating oil pressure relief valve, scored parts, or faulty operation of the oil pump. Correction should be made by eliminating any leaks in the oiling system, and replacement of any defective parts as the case may require.

Weak Valve Lifter Plunger Springs -- In some cases, noisy valve operation may result from weak valve lifter plunger springs which permit excessive plunger movement and wear. If such a condition is thought to be the cause of the difficulty, each valve silencer unit should be checked as follows:

1. Remove each unit from valve lifter assemblies or crankcase.
2. Disassemble unit and thoroughly clean so that each plunger and cylinder is entirely free from oil.
3. Carefully dry each part and reassemble unit.
4. Check the pressure required to compress each plunger spring, dry.

If the strength of these springs is such that less than 6 or 7 pounds is required to compress them, the hydraulic unit should be replaced. The valve cylinder and plunger are mated and should be replaced as a unit.

Dirty, Scored or Worn Valve Lifter Parts -- A recurring tap or click synchronized with the valve action indicates

trouble in single silencer units, which should be disassembled and inspected for:

1. Sticking mechanism.
2. Dirt, pitting or incorrect clearance between plunger and cylinder.
3. Operating clearance between plunger and valve stem.

Sticking -- resulting from dirt or foreign particles is the most likely cause. It can be corrected by thorough cleaning of individual parts after disassembly by wiping with a soft cloth and washing in gasoline.

A stuck ball check valve may be unseated with a small blunt tool, after which the cylinder should be washed thoroughly in gasoline.

Air pressure may be used to dry parts but the nozzle should be held at least two inches away.

The engine oil pan should always be removed and cleaned, and the engine flushed when dirt has been responsible for sticking, otherwise the condition may recur almost immediately. The oil passages in the valve lifter brackets should also be thoroughly cleaned.

Pitting and Scoring -- of the surfaces may cause sticking. This may result from gritty particles, excessive wear or damage during installation. This condition requires replacement of the hydraulic unit (cylinder and plunger). It is not necessary to replace the valve lifter body.

NOTE: Slight scratches on the valve lifter body have no effect on the operation of the engine or the valve silencers.

Incorrect Clearance — between the cylinder and the plunger is usually caused by mismating of parts. The parts of the hydraulic unit -- cylinder and plunger -- are carefully fitted in manufacture and are not interchangeable.

Reassembly -- When reassembling the silencer parts, note the following:

1. Ball check should rattle when cylinder unit is shaken.
2. Plunger should bounce back when pressed quickly into cylinder and released.
3. Plunger spring should be locked into cylinder body with a twist of plunger.
4. Cylinder should slide smoothly into tappet body when free of oil.

Valve Clearance Check -- There must always be .030 - .070 inch clearance between the valve stem and the top of the plunger measured with no oil in the hydraulic unit and with the plunger and plunger spring fully depressed.

Measure this clearance with a feeler gauge --

1. When new silencer parts are installed.
2. If locations of parts are changed.
3. When valves are reseated.

If the clearance is less than .030 inch, grind a few thousandths off the end of the valve stem. On V-8 engines check with Tool J-1055 when installing valves as explained in Note 18.

Installation -- After the installation has been completed, the hydraulic units should be filled with oil by running the engine until the valve action becomes quiet.

21. FAN AND GENERATOR BELT ADJUSTMENT

The fan belt on V-8 engines is adjusted by raising or lowering the fan bracket. The water pump and generator belt on these engines is adjusted by changing the position of the generator. The dual belts that drive the fan and water pumps on the V-16 engine are adjusted at the fan bracket, and the V-16 generator belt at the generator.

All of these belts are adjusted by tightening the respective brackets until there is no free movement or looseness in the belts, yet without straining the belts. This adjustment applies to all 39 series belts, and is the same for both new and used belts.

If it is necessary to replace one of the dual belts on V-16 engines, both belts must be replaced, and the new belts that are installed must be a matched pair secured from the factory Parts Department.

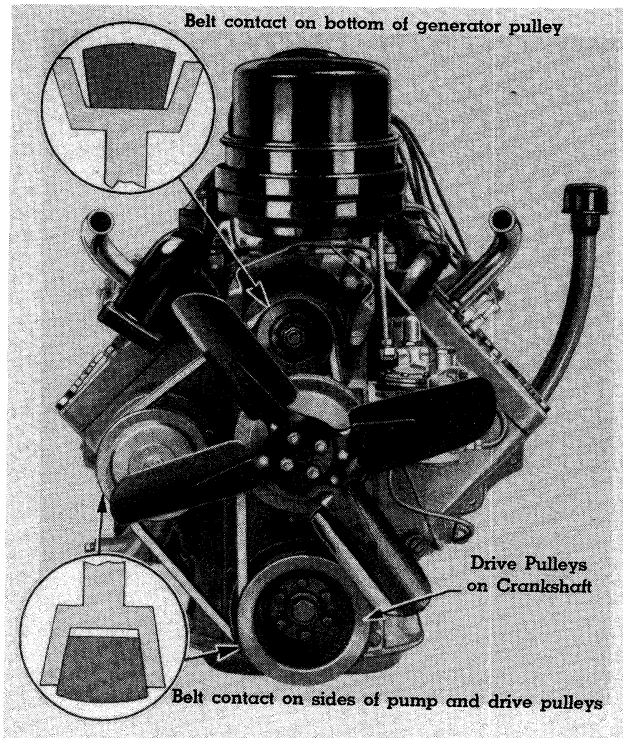


Fig. 13. Belt Arrangement
Series 39-50 (Typical of 39-61, 60S and 75)

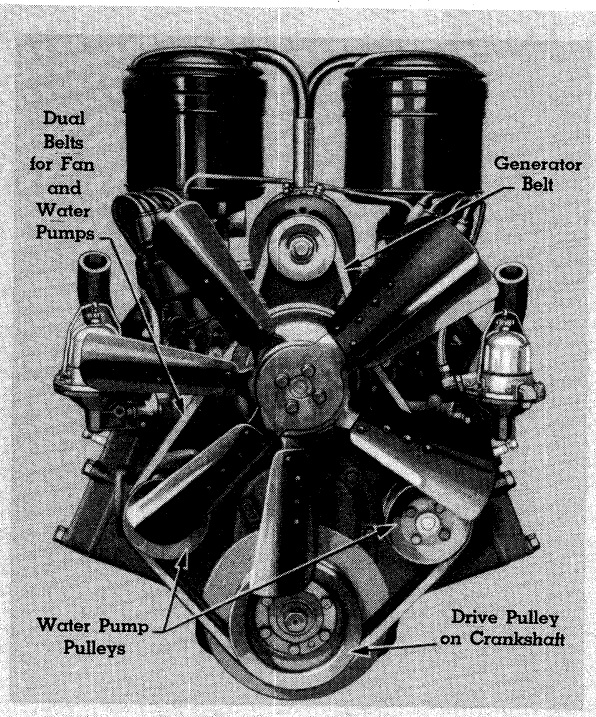


Fig. 14. Belt Arrangement
Series 39-90

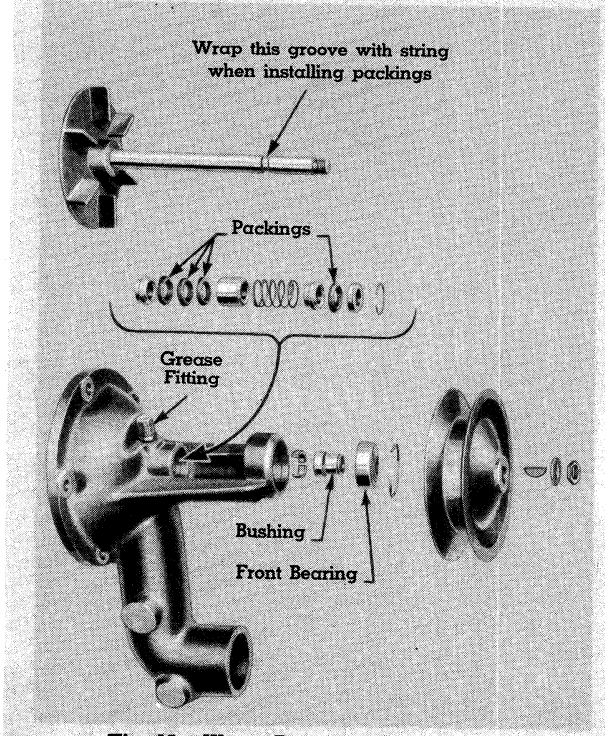


Fig. 15. Water Pump — Disassembled
Series 39-50, 61, 60S and 75

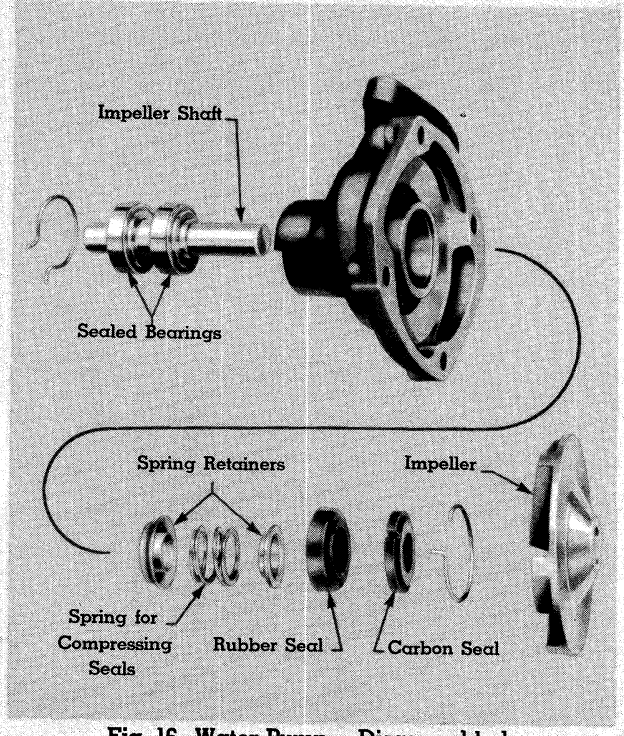


Fig. 16. Water Pump — Disassembled
Series 39-90

Plate 21. Cooling System Details

Only belts properly matched for length at the factory will operate satisfactorily in the V-16 engine.

22. REPLACING FAN PULLEY

Series 39-50, 61, 60S and 75 -- Two types of fan pulleys were used in production. The second type pulley, which is supplied for service, differs from the first type in having a metal reinforcement cup 5/64 inch thick on the inner side of the hub.

When installing the second type pulley on 39-50 engines originally fitted with the first type, the driving hub must be forced back on the shaft 5/64 inch to compensate for the reinforcement and maintain belt alignment. When pressing the hub back, be sure to support directly on the shaft end and not on the bearing.

When installing a new pulley on 39-61, 60S and 75 engines, the original hub must also be replaced, because it cannot be installed a second time with the proper press fit on the shaft. The pulley is attached to the rear face of the new hub before it is installed. No change in location is involved on these series, because the position of the pulley reinforcement does not affect the belt alignment.

23. REPLACING FAN SHAFT

Whenever the fan shaft and bearing is replaced on a 39-series engine, the fan hub must also be replaced because, once pressed off the shaft, it cannot be reinstalled with the proper fit.

On this account the fan shaft and hub are listed as an assembly by the factory Parts Department, although they are not supplied already assembled. The fan pulley must be mounted on the hub before the hub is assembled to the shaft.

The fan shaft and fan hub are listed separately for the 39-90, but it is important on these engines also to replace the fan hub whenever the fan shaft is replaced.

24. WATER PUMP SERVICE

Disassembly of the V-8 water pump for replacement of parts is performed in the following manner: (Water pump off car).

1. Remove belt pulley.
2. Remove snap ring.
3. Push impeller rearwards and remove split washer in back of front bearing.
4. Remove lock ring at front end of rear bushing.
5. Remove impeller and shaft.
6. Remove rear bushing assembly toward front, being careful not to lose any parts.
7. Remove front bearing by forcing it out toward the front.
8. Remove bushing from front bearing.

Reassembly, in general, is the reverse of the disassembly operations. To assemble the pump packings on the shaft, install pilot, Tool No. J-831, on the end of the shaft and insert in the pump body. Also wind string around the recess near the end of the shaft to present a smooth surface on which to slide the packings.

Then install the bushings and packings on the shaft and slide them into position in the pump housing. Coat the chevron packings with water pump grease (G-13) before installing. Install center bushing with grooved side toward the rear packing.

Disassembly Series 39-90 -- 1. Remove pump from engine and remove belt pulleys by taking out four pulley cap screws.

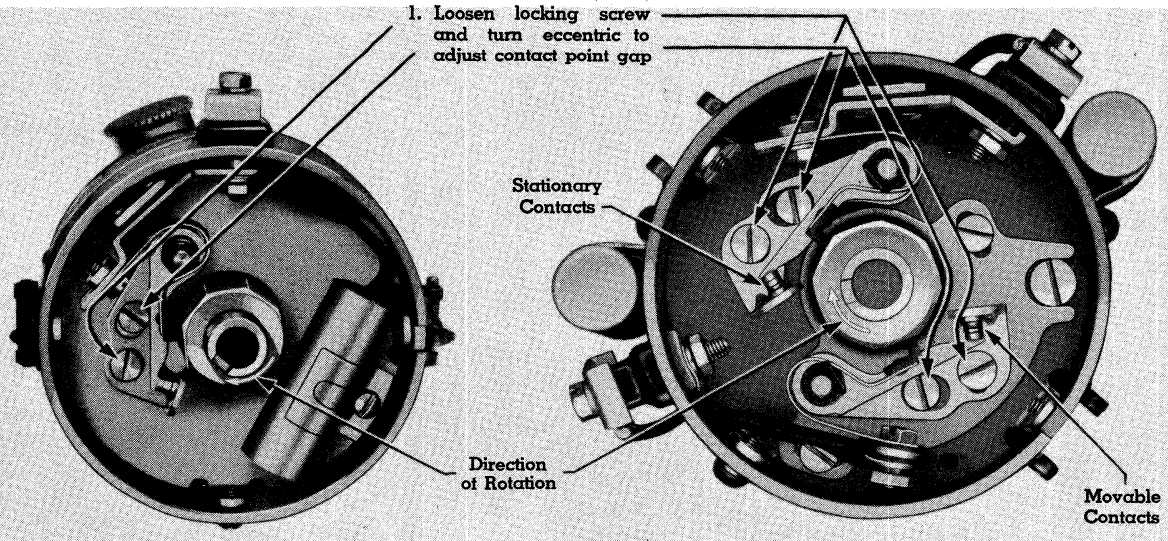
2. Press pulley drive flange off of impeller shaft, supporting flange in an arbor press and pressing out shaft.

3. Remove lock ring for bearings at front of shaft, and while supporting front end of pump housing casting, press pump shaft out of impeller.

4. Remove lock ring at rear, and take out carbon ring, rubber seal, spring and retainers. Note carefully order in which these pump parts are disassembled so that reassembly may be performed correctly (See Figure 16).

Reassembly -- is the reverse of the above procedure, but with special emphasis on the following points:

1. Spread a light coating of water pump grease on contact surfaces of rubber seal and on carbon ring that rides on impeller. These surfaces must be lubricated when assembled so as to be water tight.



2. Rotate distributor housing until contacts just separate when IG/A timing mark is opposite pointer, and rotor lines up with No. 1 insert in distributor cap. Hold cam against direction of rotation.

Fig. 17. Timing Mechanism Series 39-50, 61, 60S and 75

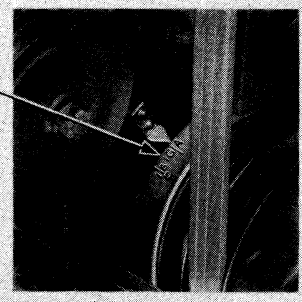


Fig. 19. Timing Marks

3. Adjust stationary contacts as in Note 2, with the L. H. distributor rotor pointing to No. 1 insert. Adjust movable contacts to IG/A mark for No. 4 cylinder when R. H. rotor points to No. 4 insert. Adjust by means of eccentric screw.

Fig. 18. Timing Mechanism Series 39-90

Spark Plug Gap	
Series 39-50, 61, 60S and 75	.025 — .030 inch
Series 39-90	.030 — .035 inch

Contact Point Gap	
All Series	.0125 — .0175 inch

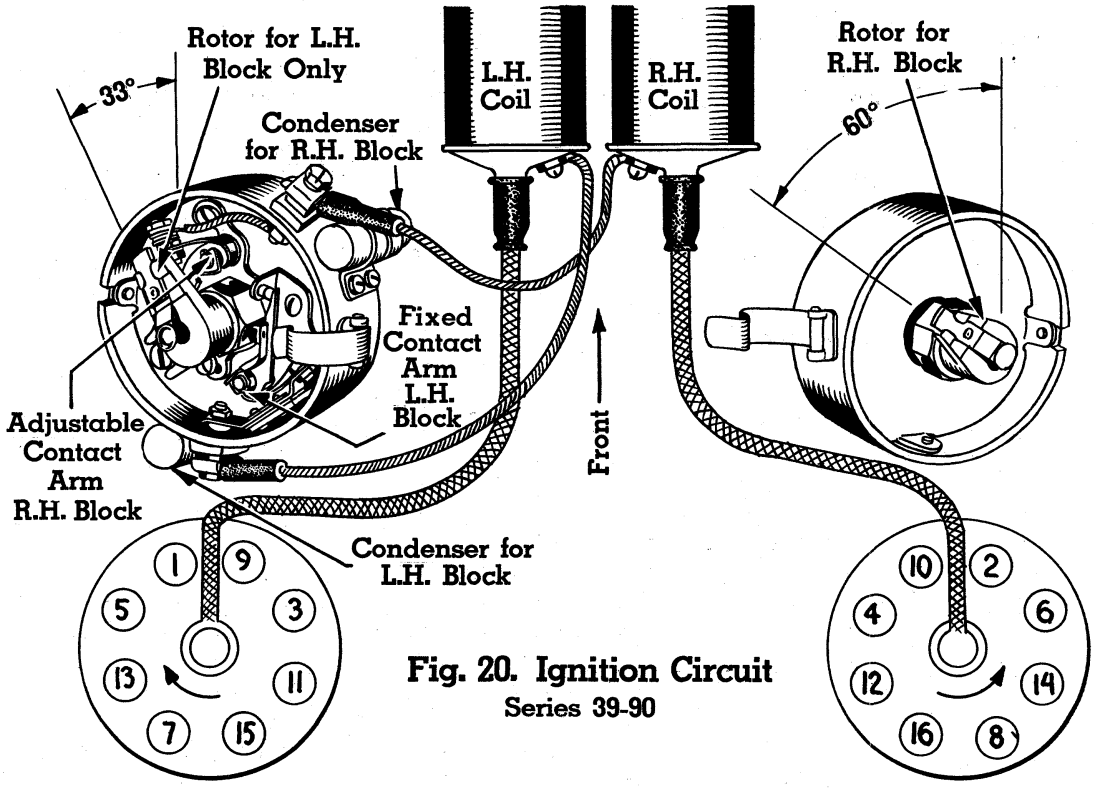


Fig. 20. Ignition Circuit Series 39-90

Plate 22. Ignition Adjustments

2. After assembly, check clearance between forward face of impeller and pump housing. This should be not less than .015 inch nor more than .025 inch.

New Pumps — Occasionally, a new pump or a newly rebuilt pump will be found to leak slightly, indicating that the carbon seal has not seated properly on the face of the impeller. Normally this condition will correct itself in a very few miles.

25. IGNITION ADJUSTMENTS

Detailed instructions on spark plugs, contact points and ignition timing are given in Plate 22.

The V-16 ignition circuit, which is described on page 54, is illustrated in Figure 20.

All of the timing adjustments for the V-16 system are made in the left hand timer distributor unit. The only attention required by the right hand distributor is correct installation, as explained in Note 26, and lubrication.

26. REMOVAL AND INSTALLATION OF DISTRIBUTOR AND DISTRIBUTOR DRIVE SHAFT

When the distributor drive shaft and gear on V-8 engines is removed or installed, particular care must be exercised to get the driven gear meshed with the camshaft gear in the proper position, otherwise it will be impossible to time the engine correctly.

To install a distributor drive shaft on 39-series V-8 cars, first turn crankshaft to firing center for No. 1 cylinder. Then mesh distributor driven gear with driving gear on camshaft so that slot in upper end of drive shaft coupling is offset toward left hand or rear side of the engine. In other words, narrow part of coupling at slot should be to the left or rear.

NOTE: Care should be exercised when making this installation to make sure that the drive shaft extending down to the oil pump is properly lined up. Otherwise, damage might result from pushing pump shaft through pump cover.

The slots in the driving rods for the V-16 distributors are not offset, and it is therefore possible to install these distributors 180° out of time. In order to insure correct installation, turn the crankshaft to firing center for No. 1 cylinder and install the distributors with the rotors pointing forward and to the left. In the correct positions, the L.H. rotor points 33° to the left of the forward position, and the R.H. rotor points 60° to the left, as shown in Figure 20.

27. REPLACING V-8 DISTRIBUTOR DRIVE IDLER GEAR SUPPORT

The idler gear that drives the distributor and oil pump drive shaft on series 39-50, 61, 60S and 75 engines is carried on a support fastened to the rear end of the crankcase.

To remove the support:

1. Remove flywheel housing, left rear valve tappet assembly and idler gear.
2. Remove oil sealing screw and retaining screw from top of housing.
3. Push support out toward rear of car.

Reverse above procedure for installation, exercising care to force locking screw down tight while tapping pilot lightly with a hammer.

28. REMOVING IGNITION COIL

The ignition coil on all 39-series V-8 cars is located on the engine side of the dash. On V-16 cars the ignition coils are mounted in a carrier bracket at the back of the upper radiator tank.

The construction of the coil itself is the same on all series. In every case the ignition coil cover must be removed and the ignition cable wire disconnected at the coil before the ignition coil itself can be removed. The general procedure is as follows:

1. Disconnect high tension wire at coil.
2. Disconnect primary wire at coil.
3. Loosen clamp bolts holding coil to dash or mounting bracket.
4. Insert Tool J-726 between coil body and cover. Revolve coil clockwise and cover counter-clockwise to remove cover.

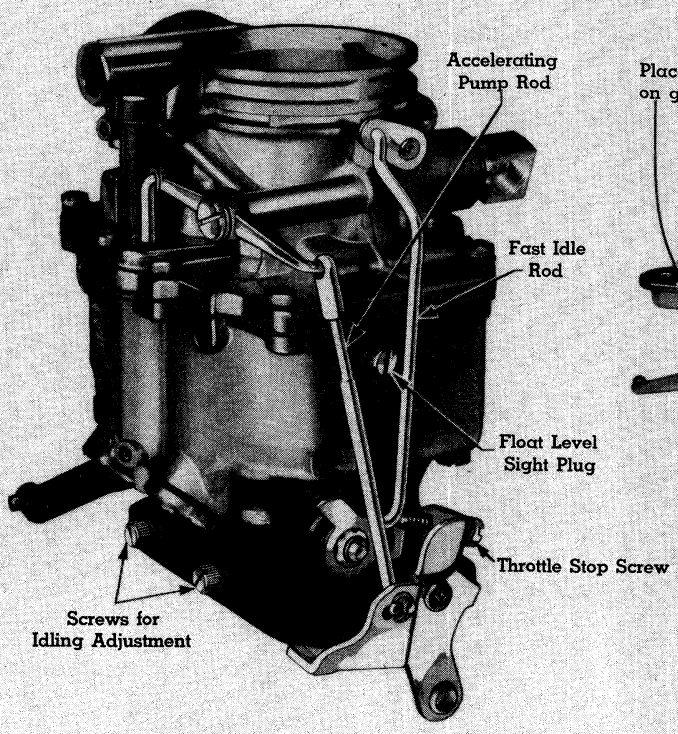


Fig. 21. Idling Adjustments

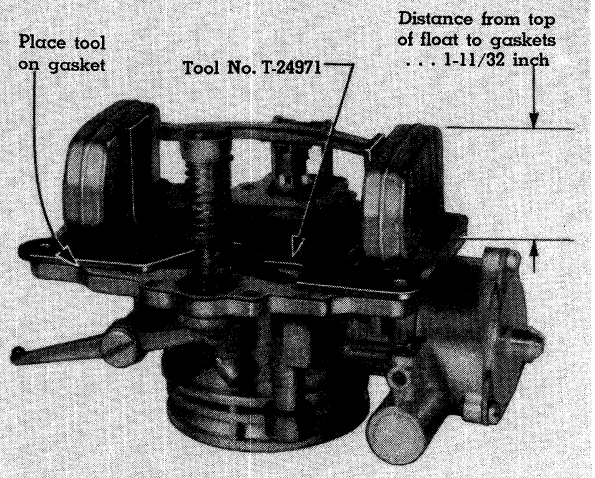


Fig. 22.
Float Level Adjustment

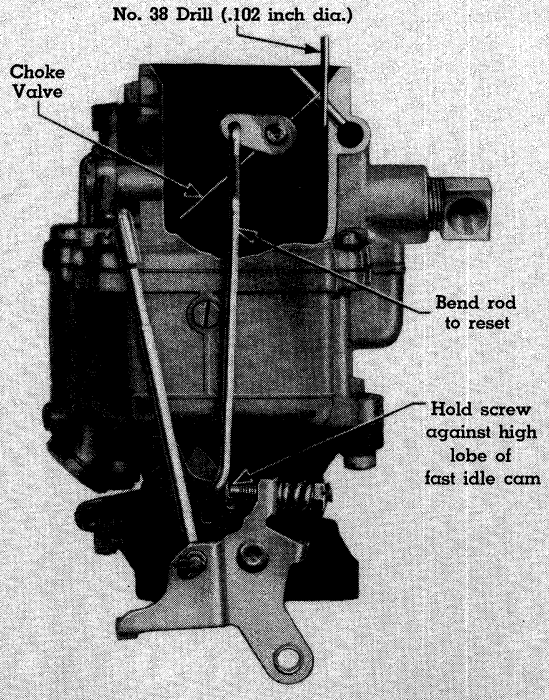


Fig. 23. Fast Idle Adjustment

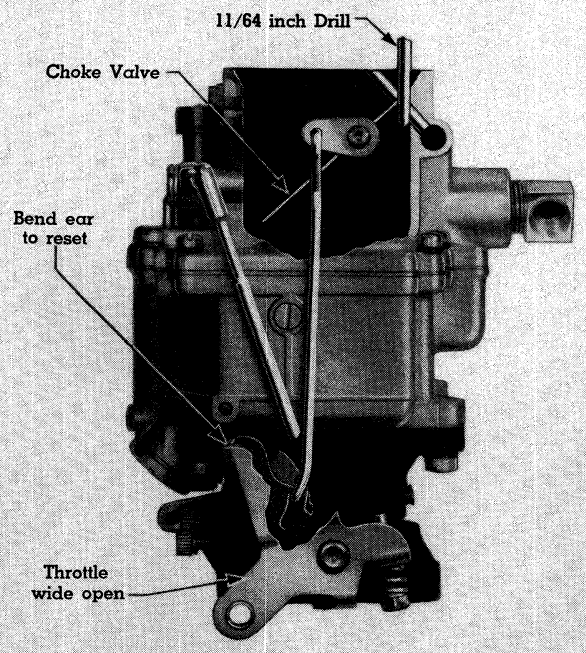


Fig. 24. Choke Release Adjustment

Plate 23. Stromberg Carburetor

5. Disconnect ignition switch wire at coil.

Installation is the reverse of removal, except that no special tools are required.

29. CARBURETOR ADJUSTMENT

Two different makes of carburetors are used on the 39-series engines. Stromberg carburetors are used on all Cadillac V-8 engines and Carter carburetors are used on LaSalle V-8 engines and Cadillac V-16 engines.

While the two makes of carburetors are very similar in operation and performance, their fundamental design is different. The following procedures are given to guide you in servicing either make of carburetor.

STROMBERG CARBURETOR - Series 39-61, 60S and 75

Idling Adjustment

1. Run engine until it is thoroughly warm so that choke valve is wide open and throttle stop screw is on slow idle.
2. Set throttle stop screw so that engine speed approximates 7 to 8 m.p.h. in high gear on level road.
3. Adjust two idle adjustment screws so that engine runs smoothly without loping or stalling at this speed. (See Plate 23, Figure 21).

NOTE: Turn screws clockwise to lean the mixture and counter-clockwise to enrich the mixture. If a good idle is not obtained, remove the idle adjusting screws and check to make sure that no dirt has accumulated around the adjusting screw seats.

Float Level Adjustment

The float level should be set to 5/8 inch below the top surface of the float chamber.

The level corresponds to the lower level of the sight plug when the engine is idling, and may be checked without disassembling the carburetor.

IMPORTANT: The float level can be checked only while the engine is running. Do not, however, start the engine while the carburetor cover is removed because a backfire might cause a serious fire or injury.

If the float level requires resetting, bend the float lever arm at the point adjacent to the fulcrum pin. Tool No. T-24971 should be used to re-check the position of the floats when the carburetor is disassembled. When the floats are properly set, the tops will be flush with the tops of the vertical guides of the tool, as shown in Figure 22.

If the special tool is not available, the float location can be checked by measuring from the top of the float to the gasket. This distance should be 1-11/32 inch.

Accelerating Pump Adjustment

Two holes are provided in the throttle lever for the accelerating pump rod. This rod should normally be placed in the inner hole, which provides the shorter stroke. In cases where a richer charge is required during acceleration, the rod can be placed in the outer hole.

Fast Idle Adjustment

To check the fast setting of the carburetor:

1. Hold throttle stop screw against high lobe of fast idle cam.
2. Move choke valve as far as possible to closed position.
3. Insert a No. 38 drill (.102"-dia.) in the opening. (See Figure 23).
4. If this amount of opening is not obtained, bend fast idle rod lightly at point just below choke shaft.

Choke Release Adjustment

To correct a flooded condition, the choke valve can be partially opened by depressing the accelerator pedal all the way. This action can be checked as follows:

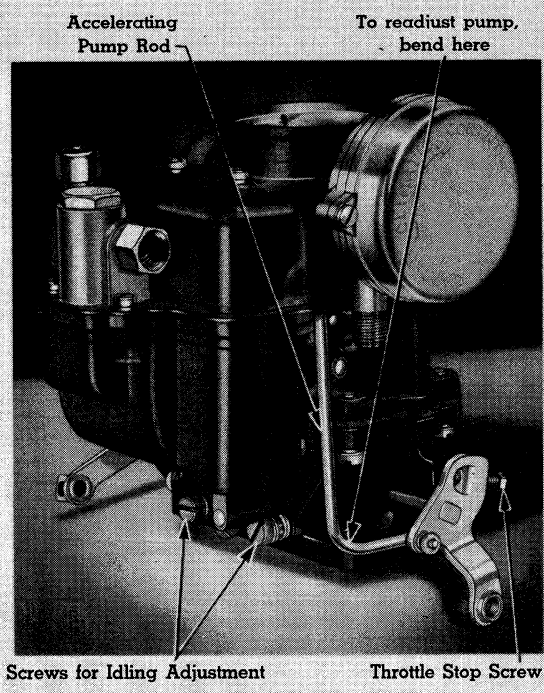


Fig. 25. Idling Adjustments

Fig. 26. Fast Idle Adjustment

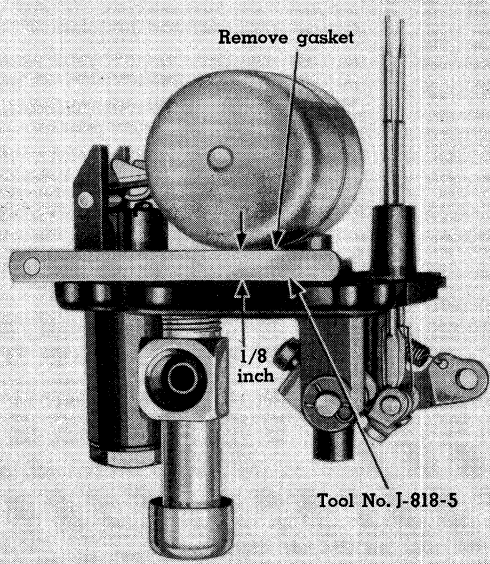


Fig. 27. Float Level Adjustment

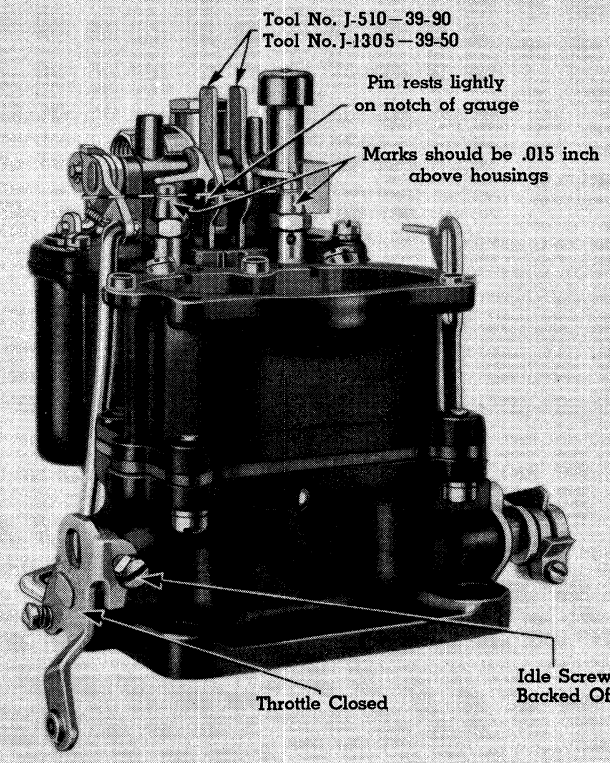


Fig. 28. Metering Rod Adjustment

Plate 24. Carter Carburetor

1. Hold throttle in fully open position.

2. Measure space between top of choke valve and side of carburetor air horn. (See Figure 24). This should be between .156 and .187 inch. It can be measured best by inserting a drill of 11/64" diameter in opening.

3. If readjustment is required, bend ear on throttle lever to correct position.

Choke Control Disassembly

1. Disconnect heat tube from thermostat housing.

2. Remove carburetor from manifold.

3. Remove thermostat cover screws and lug washers, and take cover off of housing.

4. Remove locknut, lockwasher, and serrated washer, and take vacuum piston out of housing.

5. Clean piston and cylinder walls with a clean rag saturated with acetone or alcohol. Blow out all channels with compressed air. Clean screen on inside of cover by blowing air into heat tube connection, being careful not to distort screen.

Reassembly -- 1. Place vacuum piston in cylinder with slot on piston assembled down. Assemble lever on choke stem.

NOTE: Do not use any type of lubricant on piston or in cylinder.

2. Place vacuum piston gauge T-25046 on choke housing with small hole fitted over pin of choke lever and indicator mark lined up with projection on housing.

3. Place a No. 70 drill (.028 inch) between choke valve and air horn.

4. Assemble serrated washer, lockwasher and locknut, tightening merely by hand. Check choke valve opening.

5. Remove drill and tighten lock nut with wrench T-25047.

NOTE: Do not attempt to change position of serrated washer or piston lever without loosening lock nut.

6. Reassemble cover, as explained in following note, and reconnect heat tube.

Thermostat Setting

The thermostat is calibrated to give satisfactory performance with the blends of gasoline ordinarily used. When installing thermostat cover see that edge of screen is not crimped or creased, as this would cause leakage.

Locate thermostat hook at bottom of housing and then rotate cover in "RICH" direction until mark "O" coincides with projection on housing. Place lugs in position and fasten cover screws securely.

NOTE: When assembling heat tube connection nut onto thermostat cover, do not use excessive pressure to avoid changing position of cover.

CARTER CARBURETOR - Series 39-50 and 90

Idling Adjustment

The procedure given for making the idling adjustment on the Stromberg carburetor will also apply to the Carter carburetor. (See Plate 24, Figure 25).

Float Level Adjustment

1. Remove air horn assembly and float bowl cover and disengage metering rods by removing metering rod arm pin.

2. Invert float bowl cover, holding needle seat away and float in horizontal position.

3. Measure distance between metal rim for cover gasket and nearest point of float. Be sure gasket is removed.

4. Bend lip of float lever if measurement shows improper setting. The correct float level setting is 1/8-inch for 39-50 engines and 13/64-inch for 39-90 engines.

NOTE: Tool J-818-5 (39-50), and Tool J-818-4 (39-90) are convenient for measuring this distance.

Automatic Choke Adjustment

Except for a check of the moving parts to see that they operate freely and an occasional cleaning of the hot air line and screen, no adjustment of the automatic choke control unit should be necessary. If the initial and part throttle running

mixture is too lean or too rich, revolve the thermostat housing as indicated on the housing face.

Accelerating Pump Adjustment

With pump connecting link in place and throttle stop screw backed out, pump plunger should travel 13/32 inch from closed to wide open position. Readjustment can be made by bending throttle connector rod at a lower angle.

Metering Rod Adjustment

This adjustment should be made when reassembling a carburetor. Proceed as follows:

1. Insert two metering rod gauges, Tool No. J-1305 on the 39-50 or Tool No. J-510 on the 39-90, in place of metering rods. Be sure gauges seat in metering rod jets.
2. Install metering rod pin and pin spring in metering rod arm.
3. Rest a screwdriver lightly on metering rod arm until pin rests on shoulders of notches in both gauges. A slight bend in metering rod arm may be necessary to equalize setting of two pins.
4. With throttle valves seated and metering rod pin resting lightly on notches in both gauges and throttle fully closed, tighten anti-percolator arm screw.
5. Remove gauges and metering rod pin and install metering rods, discs, metering rod spring, pin, and pin spring. Hook spring onto metering rods.

Anti-Percolator Adjustment

Before reassembling the carburetor after making the metering rod adjustment, check the anti-percolator jet adjustment. These jets are in correct adjustment when the scored marks on the jets are .015 inch above the tops of the jet housings with the throttle fully closed as shown in Figure 28.

If the adjustment is incorrect, it can be reset readily by bending the metering rod arms with Tool No. J-787.

NOTE: The easiest way to check this adjustment is to insert a .015 inch feeler between the jets and the metering rod arms and then to set the arms so that the scored marks line up with the tops of the housings.

Slow and Fast Idle Adjustment

1. Make sure that correct slow idle adjustment (7 to 8 m.p.h.) has been made.
2. With fast idle screw resting against high lobe of fast idle cam, check clearance between throttle lever adjusting screw and carburetor casting stop, as shown in illustration. (See Plate 24, Figure 26).
3. Adjust clearance to final setting of .030 inch for correct operation. Tool No. J-668 provides an accurate means of measuring.

Dechoking Adjustment

1. Check distance between upper edge of choke valve and wall of the carburetor air horn when the throttle is fully open.
2. Measure opening, which should be approximately 1/8 inch, and bend lip on fast idle connector rod that contacts choke trip lever, if it is necessary to change position of valve.

With throttle wide open, push choke valve open. Choke should lock in wide open position. Closing the throttle will release choke valve. If it does not lock, recheck dechoking adjustment.

30. EQUALIZING V-16 CARBURETOR ADJUSTMENT

The adjustments of the two carburetors on the series 39-90 engines should be equalized to secure smooth running of the engine. The best method to follow is to use an equalizing gauge. The gauge is connected to the intake manifolds after the vacuum lines are disconnected.

Make sure that the gauge hangs straight and check the level of the mercury in the tube. When the idling screws and throttle stop screws are properly adjusted, both columns of mercury should be at the same height and the engine should run smoothly at 300 R.P.M.

If the columns of mercury are not at the same level and the engine speed is too fast, reduce the speed by backing off the throttle stop screw on the side on which the mercury column is the lower.

If the speed is too slow, turn the throttle stop screw in a little on the side on which the mercury column is higher.

Adjust the right-hand throttle control rod to exactly the right length so that the clevis pin can be slipped into place without changing the engine speed.

A further check should be made on the throttle adjustment by running the engine at approximately 1000 R.P.M. and noting the mercury level in the gauge. If the columns are not practically level, a slight readjustment of the right-hand throttle control rod will be necessary. Finally, run the engine again at idling speed and check the mercury columns again. A very slight readjustment of the throttle control rods may be necessary to bring them to the proper level again.

If an equalizing gauge is not available, the following method may be used to equalize the carburetor adjustment:

Disconnect the coil primary wire for the right-hand cylinder block. Adjust the left-hand carburetor in the same manner as when using mercury tube and set the throttle stop screw so the engine will just turn over without stalling.

Then disconnect the coil primary wire for the left-hand cylinder block and adjust the right-hand carburetor in a similar manner. With the metering pins and throttle stop screws on both carburetors properly adjusted, the engine should idle at about 300 R.P.M.

The foregoing adjustment may be slightly rich when all cylinders are operating. To correct this, it may be necessary to screw up slightly each idling adjustment. While testing the car on the road, the above adjustments should be rechecked to be sure they are satisfactory.

31. CLEANING CARBURETOR AIR CLEANER

The filtering unit of the carburetor air cleaner on all 39-series cars should be serviced every 2,000 miles or oftener if extreme dust conditions are encountered. The correct procedure for servicing the cleaners is as follows:

1. Remove cleaner from car.
2. Loosen cap screw at top of cleaner and remove cover.
3. Remove wire mesh unit and metal screen from reservoir.
4. Pour oil out of reservoir and remove all sludge or dirt deposits from screen and reservoir.
5. Clean all parts thoroughly with gasoline, taking particular care to wash all accumulated dirt and dust out of wire mesh.
6. Dry all units thoroughly with air and install reservoir and metal screen.
7. Pour one pint of S.A.E. 50 engine oil (S.A.E. 40 for winter temperatures) in the reservoir.
8. Reassemble cleaner and install on car.

NOTE: No oil should be poured on wire mesh of this type cleaner.

32. SERVICING FUEL AND VACUUM PUMPS

The service operations that can be performed on the fuel and vacuum pumps without special tools are the cleaning of the filter and replacement of the filter parts, the vapor dome, and the inlet and outlet valves. Under no circumstances should either of the pump housings be disassembled unless the necessary special tools for reassembly are available.

Service on the fuel pumps or vacuum pumps, whether of a combination unit or separate type, can be obtained from A.C. or United Motors Service stations, where special tools and repair parts are available. Distributors who wish to make repairs in their own stations can purchase the necessary tools at an A.C. service station. Others may keep a spare pump of each type in stock for exchange to assure prompt service.

33. ENGINE SUPPORT ADJUSTMENT

All of the engine supports on V-8 engines, and the front and intermediate supports on V-16 engines require no adjustment, but should be installed with the attaching parts tightened securely. The rear support for V-16 cars should be adjusted by turning down the nut, finger tight and then turning an additional half turn with a wrench.

ENGINE

Engine Specifications

SUBJECT AND REMARKS	39-50	39-61	39-60S	39-75	39-90
Bore	3-3/8"	3-1/2"	3-1/2"	3-1/2"	3-1/4"
Stroke	4-1/2"	4-1/2"	4-1/2"	4-1/2"	3-1/4"
Compression ratios -					
Standard	6.25-1	6.25-1	6.25-1	6.70-1	6.75-1
Optional	5.75-1	6.70-1	6.70-1	6.25-1	6.08-1
Optional	.....	5.75-1	5.75-1	5.75-1	.....
Compression pressures (lb. per sq. in.)					
At 1000 R.P.M.	155	155	155	170	180
Horsepower -					
Rated (taxable)	36.45	39.20	39.20	39.20	67.60
Developed at 3400 R.P.M.	125	135	135	140	.....
Developed at 3600 R.P.M.	.....	.....	.....	.....	185
Piston displacement in cu. in.	322	346	346	346	431
Points of suspension, number	3	3	3	3	5
CAMSHAFT					
Bearing clearance -					
New limits	.0015-.0033"	.0015-.0033"	.0015-.0033"	.0015-.0033"	.0013-.0025"
Worn limits, not over	.0045"	.0045"	.0045"	.0045"	.004"
Bearing out of round, not over	.002"	.002"	.002"	.002"	.002"
Number of bearings	3	3	3	3	5
CHAINS					
Camshaft chain -					
Adjustment	None	None	None	None	None
Number of links	62	62	62	62	62
Morse Type No.	C-3682-R	C-3682-R	C-3682-R	C-3682-R	C-3682-R
Width	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-1/4"
CONNECTING RODS					
Clearance between bearing and shaft -					
New limits	.0015-.0025"	.0015-.0025"	.0015-.0025"	.0015-.0025"	.0015-.0025"
Worn limits, not over	.0045"	.0045"	.0045"	.0045"	.0045"
End play on lower bearings	.008-.014"	.008-.014"	.008-.014"	.008-.014"	.008-.014"
CRANKSHAFT & MAIN BEARINGS					
Crankpin diameter	2.4590-2.4595"	2.4590-2.4595"	2.4590-2.4595"	2.4590-2.4595"	1.9988-1.9993"
Crankpin out of round, not over	.00025"	.00025"	.00025"	.00025"	.00025"
Clearance, main bearings-					
New limits	.0015-.0025"	.0015-.0025"	.0015-.0025"	.0015-.0025"	.0015-.0025"
Worn limits, not over	.005"	.005"	.005"	.005"	.005"
Main bearing journals, out of round, not over.	.00025"	.00025"	.00025"	.00025"	.00025"
End play in crankshaft -					
New limits	.001-.005"	.001-.005"	.001-.005"	.001-.005"	.001-.005"
Worn limits	.010"	.010"	.010"	.010"	.010"

Engine Specifications (Cont'd)

SUBJECT AND REMARKS	39-50	39-61	39-60S	39-75	39-90
OIL PUMP					
Backlash between drive gears, not over	.008-.012"	.008-.012"	.008-.012"	.008-.012"	.008-.012"
Clearance between pump body and drive shaft -					
New limits	.0010-.0025"	.0010-.0025"	.0010-.0025"	.0010-.0025"	.0010-.0025"
Worn limits, not over .	.005"	.005"	.005"	.005"	.005"
Clearance between pump body and gears -					
New limits	.002-.004"	.002-.004"	.002-.004"	.002-.004"	.002-.004"
Worn limits, not over..	.006"	.006"	.006"	.006"	.006"
End play in pump gears -					
New limits	.001-.004"	.001-.004"	.001-.004"	.001-.004"	.001-.004"
Worn limits, not over .	.006"	.006"	.006"	.006"	.006"
OIL PRESSURE REGULATOR					
Clearance between valve plunger and housing -					
New limits	.0020-.0035"	.0020-.0035"	.0020-.0035"	.0020-.0035"	.0020-.0035"
Worn limits, not over .	.005"	.005"	.005"	.005"	.005"
Normal pressure at 30					
M.P.H. (min.)	25 lbs.	25 lbs.	25 lbs.	25 lbs.	25 lbs.
Idle	15 lbs.	15 lbs.	15 lbs.	15 lbs.	15 lbs.
Spring					
Free length (approx.) .	2-25/64"	2-25/64"	2-25/64"	2-25/64"	2-19/32"
Pressure at 1-13/32" ..	5-3/4-6-1/4 lbs.	5-3/4-6-1/4 lbs.	5-3/4-6-1/4 lbs.	5-3/4-6-1/4 lbs.	.....
Pressure at 1-15/32" ..	.....	.....	.....	.....	7-1/4-7-3/4 lbs.
Valve opens at	30 lbs.	30 lbs.	30 lbs.	30 lbs.	30 lbs.
PISTONS AND CYLINDERS					
Cylinder bore out of round, not over	.0005"	.0005"	.0005"	.0005"	.0005"
Taper, not over	.0003"	.0003"	.0003"	.0003"	.0003"
Piston Clearance (see note)					
Bottom of skirt	.0020-.0025"	.0020-.0025"	.0020-.0025"	.0020-.0025"	.0020-.0025"
Cylinder bore, standard .	3.3745-3.3765"	3.5000-3.5020"	3.5000-3.5020"	3.5000-3.5020"	3.2500-3.2520"
Piston skirt diameter-- standard	3.3726-3.3746"	3.4979-3.4999"	3.4979-3.4999"	3.4979-3.4999"	3.2483-3.2503"
Piston skirt diameter-- oversize					
.003" oversize	3.3761-3.3776"	3.5014-3.5029"	3.5014-3.5029"	3.5014-3.5029"	.....
.005" oversize	3.3781-3.3796"	3.5034-3.5049"	3.5034-3.5049"	3.5034-3.5049"	3.2538-3.2553"
.010" oversize	3.3831-3.3846"	3.5084-3.5099"	3.5084-3.5099"	3.5084-3.5099"	3.2588-3.2603"
.015" oversize	3.3881-3.3896"	3.5135-3.5149"	3.5135-3.5149"	3.5135-3.5149"	3.2638-3.2653"
.030" oversize	3.4031-3.4046"	3.5284-3.5299"	3.5284-3.5299"	3.5284-3.5299"	3.2788-3.2803"
PISTON PINS					
Clearance between pin and bushing -					
New limits	.0002-.0008"	.0002-.0008"	.0002-.0008"	.0002-.0008"	.....
Worn limits, not over .	.0018"	.0018"	.0018"	.0018"	.....
Clearance between pin and piston -					
New limits	.....	.....	.....	.....	.0001-.0006"
Worn limits, not over .	.....	.....	.....	.....	.0018"

Engine Specifications (Cont'd)

SUBJECT AND REMARKS	39-50	39-61	39-60S	39-75	39-90
PISTON RINGS					
Clearance between rings and sides of grooves in piston -					
Top compression ring ..	.0023-.0041"	.0023-.0041"	.0023-.0041"	.0023-.0041"	.0030-.0043"
Bottom compression ring	.0013-.0026"	.0013-.0026"	.0013-.0026"	.0013-.0026"	.0013-.0026"
Oil rings	.0013-.0026"	.0013-.0026"	.0013-.0026"	.0013-.0026"	.0013-.0026"
Gap between ends -					
Compression rings	.007-.012"	.007-.012"	.007-.012"	.007-.012"	.007-.015"
Oil rings	.007-.015"	.007-.015"	.007-.015"	.007-.015"	.007-.015"
Number of compression rings	2	2	2	2	2
Number of oil rings	2	2	2	2	1
Width of compression rings					
Top ring	3/32"	3/32"	3/32"	3/32"	3/32"
Bottom ring	1/8"	1/8"	1/8"	1/8"	1/8"
Width of oil rings	5/32"	5/32"	5/32"	5/32"	3/16"
VALVES, EXHAUST					
Clearance between stem and guide -					
New limits	.0022-.0042"	.0022-.0042"	.0022-.0042"	.0022-.0042"	.0020-.0040"
Worn limits, not over .	.005"	.005"	.005"	.005"	.005"
Clearance between stem and camslide ..... (With hydraulic unit compressed)	.030-.070"	.030-.070"	.030-.070"	.030-.070"	.030-.070"
Clearance between lifter bracket and camslide -					
New limits	.0010-.0024"	.0010-.0024"	.0010-.0024"	.0010-.0024"	.....
Worn limits, not over .	.0035"	.0035"	.0035"	.0035"	.....
Clearance between crankcase and camslide -					
New limits	.....	.....	.....	.....	.0015-.0025"
Worn limits, not over .	.....	.....	.....	.....	.0035"
Distance between valve stem and heel of camshaft	3.000"	3.000"	3.000"	3.000"	.....
Head diameter, overall ..	1.626-1.636"	1.626-1.636"	1.626-1.636"	1.626-1.636"	1.370-1.380"
Stem, length overall	5-33/64"	5-33/64"	5-33/64"	5-33/64"	5-39/64"
Stem, diameter	.3405-.3415"	.3405-.3415"	.3405-.3415"	.3405-.3415"	.3405-.3415"
Lift	.345"	.345"	.345"	.345"	.302"
Seat angle	45°	45°	45°	45°	45°
Seat width (minimum)	.075"	.075"	.075"	.075"	.075"
Seat eccentricity, not over ..... (total indicator reading)	.0015"	.0015"	.0015"	.0015"	.0015"
VALVES, INLET					
Clearance between stem and guide -					
New limits	.0012-.0032"	.0012-.0032"	.0012-.0032"	.0012-.0032"	.0010-.0030"
Worn limits, not over .	.005"	.005"	.005"	.005"	.005"

Engine Specifications (Cont'd)

SUBJECT AND REMARKS	39-50	39-61	39-60S	39-75	39-90
VALVES, INLET (CONT'D.)					
Clearance between stem and camslide ..... (with hydraulic unit compressed)	.030-.070"	.030-.070"	.030-.070"	.030-.070"	.030-.070"
Clearance between lifter bracket and camslide -					
New limits	.0010-.0024"	.0010-.0024"	.0010-.0024"	.0010-.0024"	.....
Worn limits, not over .	.0035"	.0035"	.0035"	.0035"	.....
Clearance between crankcase and camslide -					
New limits	.....	.....	.....	.....	.0015-.0025"
Worn limits, not over .	.....	.....	.....	.....	.0035"
Distance between valve stem and heel of camshaft	3.000"	3.000"	3.000"	3.000"	.....
Head diameter, overall ..	1.876-1.886"	1.876-1.886"	1.876-1.886"	1.876-1.886"	1.495-1.505"
Stem, length overall	5-33/64"	5-33/64"	5-33/64"	5-33/64"	5-19/32"
Stem, diameter	.3415-.3425"	.3415-.3425"	.3415-.3425"	.3415-.3425"	.3415-.2425"
Lift	.335"	.335"	.335"	.335"	.290"
Seat angle	45°	45°	45°	45°	45°
Seat width (minimum)	.075"	.075"	.075"	.075"	.075"
Seat eccentricity not over (total indicator reading)	.0015"	.0015"	.0015"	.0015"	.0015"
VALVE SPRINGS					
Free length	2.210"	2.210"	2.210"	2.210"	2.074"
Pressure in pounds -					
Compressed to 1-59/64" (valve closed)	66	66	66	66	.....
Compressed to 1-37/64" (valve open)	145	145	145	145	.....
Compressed to 1-25/32" (valve closed)	.....	.....	.....	.....	50
Compressed to 1-15/32" (valve open)	.....	.....	.....	.....	100
VALVE TIMING					
Intake opens	T.D.C.	T.D.C.	T.D.C.	T.D.C.	6°B.T.C.
Intake closes	42°A.B.C.	42°A.B.C.	42°A.B.C.	42°A.B.C.	28°A.B.C.
Exhaust opens	52°B.B.C.	52°B.B.C.	52°B.B.C.	52°B.B.C.	14°B.B.C.
Exhaust closes	10°A.T.C.	10°A.T.C.	10°A.T.C.	10°A.T.C.	12°A.T.C.
FAN					
Belt -					
Length--center to center	7-11/16-7-13/16"	10-13/32-10-19/32"	10-13/32-10-19/32"	10-13/32-10-19/32"	11-3/4-11-7/8"
Width	1-1/64"	1-1/64"	1-1/64"	1-1/64"	5/8"
Type	34° Vee	34° Vee	34° Vee	34° Vee	38° Vee

ENGINE

Engine Specifications (Cont'd)

SUBJECT AND REMARKS	39-50	39-61	39-60S	39-75	39-90
RADIATOR					
Hoses—cylinder block to radiator (top)					
Diameter, inside	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-1/2"
Length	10-1/8"	11-1/4"	11-1/4"	11-1/4"	10-1/4"
Hose--radiator to water pump					
Diameter, inside	2"	2"	2"	2"	1-3/4"
Length	Moulded	Moulded	6-3/4"	6-3/4"	Moulded
WATER PUMP					
Clearance between impeller and pump body ..	.050-.092"	.050-.092"	.050-.092"	.050-.092"	.015-.025"
Clearance between pump shaft and bushings -					
New limits	.0010-.0025"	.0010-.0025"	.0010-.0025"	.0010-.0025"	.....
Worn limits, not over .	.0035"	.0035"	.0035"	.0035"	.....
Packing spring -					
Free length	1-1/4"	1-1/4"	1-1/4"	1-1/4"	.....
Pressure in pounds compressed to 1/2"	2-1/2-3	2-1/2-3	2-1/2-3	2-1/2-3	.....
Springs must show no set when compressed with coils touching.					
IGNITION					
Coil, Delco-Remy type number	1115128	1115128	1115128	1115128	553-E
Distributor -					
Delco-Remy type number.	1110604	1110604	1110604	1110604	1110601-L.H. 1110602-R.H
Angle between contact arms	.....	.....	.....	.....	22-1/2°
Contact point gap	.0125-.0175"	.0125-.0175"	.0125-.0175"	.0125-.0175"	.0125-.0175"
Tension of contact arm spring in ounces	19-23	19-23	19-23	19-23	19-23
Timing mark (IGA) ahead of center	5°	5°	5°	5°	6°
Spark plugs					
AC type number	104	104	104	104	104
Gap	.025-.030"	.025-.030"	.025-.030"	.025-.030"	.030-.035"
Thread	10 mm.	10 mm.	10 mm.	10 mm.	10 mm.
Ignition switch					
Delco-Remy type number.	1865711	1865711	1116255	1116255	1116256
Firing order	1,8,7,3,6,5,4,2	1,8,7,3,6,5,4,2	1,8,7,3,6,5,4,2	1,8,7,3,6,5,4,2	1,4,9,12,3,16,11,8 15,14,7,6,13,2,5,10
CARBURETION					
Make	Carter	Stromberg	Stromberg	Stromberg	Carter
Model	WDO-423-S	AAV-26	AAV-26	AAV-26	407-S (L.H.) 408-S (R.H.)
Size	1-1/8"	1-1/4"	1-1/4"	1-1/4"	1-1/8"
Float level setting ..... (Fuel level below top surface of bowl).	1/8"	5/8"	5/8"	5/8"	13/64"

Other Engine References

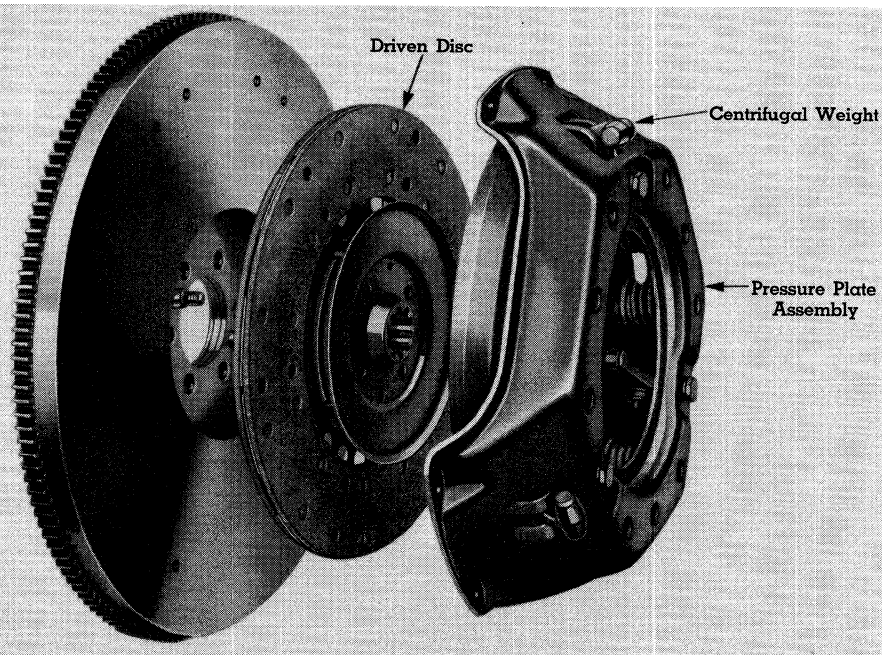


Fig. 1. Exploded View of Clutch Series 39-50, 61, 60S and 75

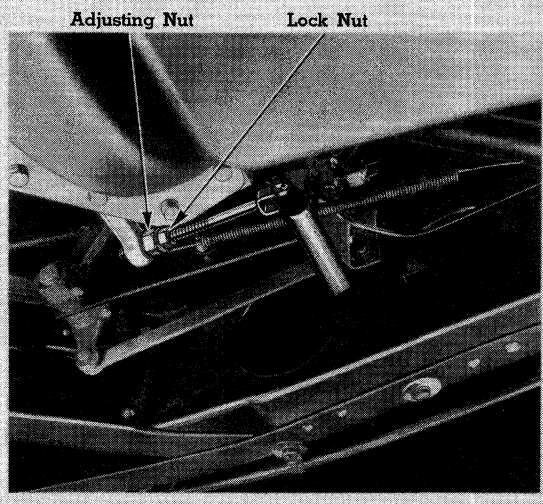


Fig. 2. Clutch Pedal Adjustment
Series 39-50 and 61

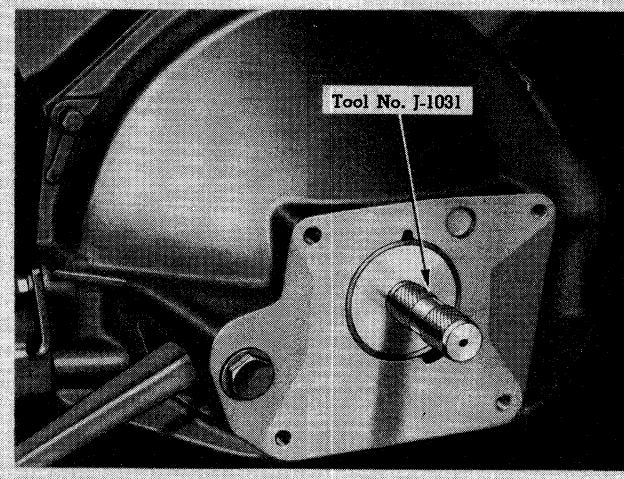


Fig. 3. Aligning Clutch Driven Disc
Typical of All 39-Series

Plate 25. Clutch Details

CLUTCH

General Description

The clutches used on series 39-50, 61, 60S and 75 cars are similar in design to each other, the main point of difference being in the size of the driven disc, and clutch cover, as given in the specification table on page 85. Note that two different sizes of clutches are used on 39-50 cars.

The clutches on V-8 cars have 9 pressure springs and 3 release levers. Small centrifugal weights are forged integral with the release levers. Eight coil spring vibration dampeners are used on the driven discs.

The clutch for the 39-90 V-16 cars is of somewhat different design. It has 12 pressure springs and 6 release levers. Centrifugal weights and driven disc dampening springs are not used with this design.

The clutches on all series V-8 cars are mounted on the flywheel by means of piloting screws which have close fitting shoulders that extend into counterbores in the flywheel. The V-16 clutch cover plate assembly is piloted in the flywheel.

*

Service Information

1. REMOVAL OF CLUTCH FROM CAR

1. Remove transmission, after disconnecting front universal joint and placing a jack under engine oil pan, as explained in Note 9, Page 90.
2. Remove clutch housing pan.
3. Mark flywheel and clutch pressure plate assembly so that they can be reassembled in same position, and thus retain proper balance.
4. Loosen retaining screws that hold clutch on flywheel, a turn or two at a time. Six screws are used on 39-50, 61, 60S and 75; twelve are used on 39-90. This loosening is continued carefully until spring pressure is fully released.
5. Remove retaining screws and take clutch assembly and driven disc from flywheel.

2. INSTALLATION OF CLUTCH IN CAR

1. If either a new clutch disc or a new transmission is to be installed, check fit of splines on clutch disc hub and clutch connection shaft. A free fit is necessary to prevent clutch drag. Lubriplate or graphite grease applied to splines will aid in proper assembly.
2. Install driven disc and pressure plate assembly loosely on flywheel, making certain first, that driven disc is installed with oil guard toward rear, and second, that balance marks on flywheel and pressure plate are in line.
3. Center hub of driven disc, using aligning arbor, Tool No. J-1031, and tighten retaining screws securely.
4. Reinstall clutch housing pan and transmission.
5. Finally, check clutch pedal free play, and adjust to within 7/8 - 1-1/8 inches.

3. DISASSEMBLY OF PRESSURE PLATE ASSEMBLY

1. Place pressure plate assembly in arbor press with a block under spring pressure plate, so arranged that cover is left free to move down.
2. Place a block or bar across top of cover, resting it on spring bosses, and place assembly under compression.
3. Remove retaining screws which hold clutch release lever clevises in place.
4. Slowly release the pressure from press and remove spring cover.
5. Remove springs and clutch release levers by removing clutch release lever pivot pins and disassembling yokes and rollers.

4. REASSEMBLY OF PRESSURE PLATE ASSEMBLY

1. Inspect springs carefully and replace them in complete sets if they show signs of having been overheated. If springs have been overheated, they will show a pronounced blue color, indicating the temper has been drawn, or else paint will be burned off. If heating has continued long enough, the springs will have a dark gray color, indicating that the temper has been entirely removed from them. The free height of the springs should be checked against the specifications, Page 85.

2. Place pressure plate in arbor press and set clutch springs on it in a vertical position, seating them on the insulators resting on the small bosses.

3. Reinstall clutch release levers.

4. Lay cover on top of assembled parts, taking care that clutch levers are in position and that tops of pressure plate springs are properly seated under seats in cover.

5. Lay a bar across cover and slowly compress assembly, making sure that pressure plate lugs are guided through the proper holes in cover.

6. Insert screws holding lever pivot clevis to cover plate, holding clevis square while tightening screw.

7. Release and apply pressure on assembly several times so that all moving parts will settle into their working position.

8. Remove pressure plate assembly from press and adjust clutch release levers.

5. ADJUSTMENT OF CLUTCH RELEASE LEVERS

Before adjustment is attempted levers must be worked several times to center the bearings. The only accurate method of adjusting clutch release levers is by use of clutch lever adjusting gauge, Tool No. J-285-C as follows:

1. Place gauge in flywheel in position normally occupied by driven disc.

2. Mount pressure plate assembly on flywheel, turning holding screws a turn or two at a time so as not to spring cover.

3. Use Tool No. J-1031 to center gauge plate properly.

4. Lay a short straight edge across center boss of gauge, as a guide for positioning clutch levers.

5. Tap cover plate at lever clevis screws while firmly holding inner end of lever down.

6. Remove gauge and reinstall clutch with driven disc.

6. SQUEAKS IN CLUTCH MECHANISM

The cause of clutch squeaks is most likely to be contact between the driving lugs and the clutch pressure plate assembly where the lugs project through the lower plate.

Squeaks at this point can best be eliminated by placing a thin coating of water pump grease on a feeler gauge and then passing the gauge between the points of contact.

Another method of greasing is to disengage the clutch fully and rub the grease on the exposed part of the bearing surface. Engaging and disengaging the clutch a number of times will then allow the grease to work down through the pressure plate holes.

A second source of clutch squeaks is at the clutch pedal adjusting nut. This squeak is best cured by backing the ball nut off its seat and applying a thin coating of grease on the bearing surface.

7. LUBRICATION OF PILOT BEARING

Whenever the transmission or clutch is removed for any reason, the clutch connection pilot bearing should be inspected to make sure that it is in good condition and adequately lubricated.

This bearing should always be lubricated lightly with wheel bearing grease, if removed from the car at any time, but too much lubricant should not be used because of the possibility of grease reaching the clutch plates.

Insufficient lubricant may result in seizing and turning in the race, resulting in whip which would cause rapid wear on the shaft and on the gear teeth.

8. REMOVAL OF LOCKING PINS

Clutches as furnished by the Parts Department are provided with three locking pins or blocks, one at each clutch release lever.

When the clutch is installed and the cover plate tightened in position, these pins or blocks are released. It is extremely important that these pins be removed; otherwise, they will drop into the clutch housing and may cause considerable damage when the car is put into operation.

9. BALANCING CLUTCH

Balance is a vital factor in the clutch. To secure proper balance, it is necessary, first of all, to reassemble the clutch

according to the balance marks on the rotating parts. After the clutch has been reinstalled, jack up the rear wheels and run the engine from 24 to 30 m.p.h. (speedometer reading) for the 39-50, 61, 60S and 75 cars and from 32 to 38 m.p.h. for the 39-90 cars, and note whether there is excessive vibration. If there is, the clutch must be rebalanced in the following manner:

Install one or two 1/8" thick washers with a 5/16" diameter hole on one of the clutch pressure plate assembly cap screws, starting at the point where the clutch has been drilled for balancing. This will make the condition either much better or much worse. Then on repeated trials, add or take away one or two washers at each screw until a satisfactory balance is achieved.

Clutch Specifications

SUBJECT AND REMARKS	39-50	39-61	39-60S	39-75	39-90
Clearance between hub and splines on clutch connection shaft --					
New limits	.0013-.0035"	.0013-.0035"	.0013-.0035"	.0013-.0035"	.0013-.0035"
Worn limits	.0045"	.0045"	.0045"	.0045"	.0045"
Disc facings --					
Diameter inside	.....	6-1/2"	6-1/2"	6-1/2"	7"
Before engine unit 2-D-701	6-1/2"	.....	.....	.....	.....
After engine unit 2-D-700.	6"	.....	.....	.....	.....
Diameter outside	.....	11"	11"	11"	11-1/2"
Before engine unit 2-D-701	10-1/2"	.....	.....	.....	.....
After engine unit 2-D-700.	10"	.....	.....	.....	.....
Thickness	.123-.127"	.123-.127"	.123-.127"	.123-.127"	.123-.127"
Number used	2	2	2	2	2
Material	Woven	Woven	Woven	Woven	Woven
Driven disc with facings --					
Number used	1	1	1	1	1
Number dampener springs used	8	8	8	8	None
Thickness (overall compressed)	.340-.360"	.350-.370"	.350-370"	.350-.370"	.345-.365"
Runout, not over	.025"	.025"	.025"	.025"	.025"
Pedal (clutch) free play	7/8 to 1-1/8"	7/8 to 1-1/8"	7/8 to 1-1/8"	7/8 to 1-1/8"	7/8 to 1-1/8"
Pressure springs --					
Number used	9	9	9	9	12
Color	Yellow	Yellow	Yellow	Yellow	Red
Free length	2-5/16"	2-5/16"	2-5/16"	2-5/16"	2-11/32"
Pressure in pounds compressed to 1-9/16"	145-150	145-150	145-150	145-150	120-130
Spring, retracting clutch pedal-pedal --					
Free length, inside loops	10-1/2"	10-1/2"	8-5/16"	8-9/16"	8-9/16"

Other Clutch References

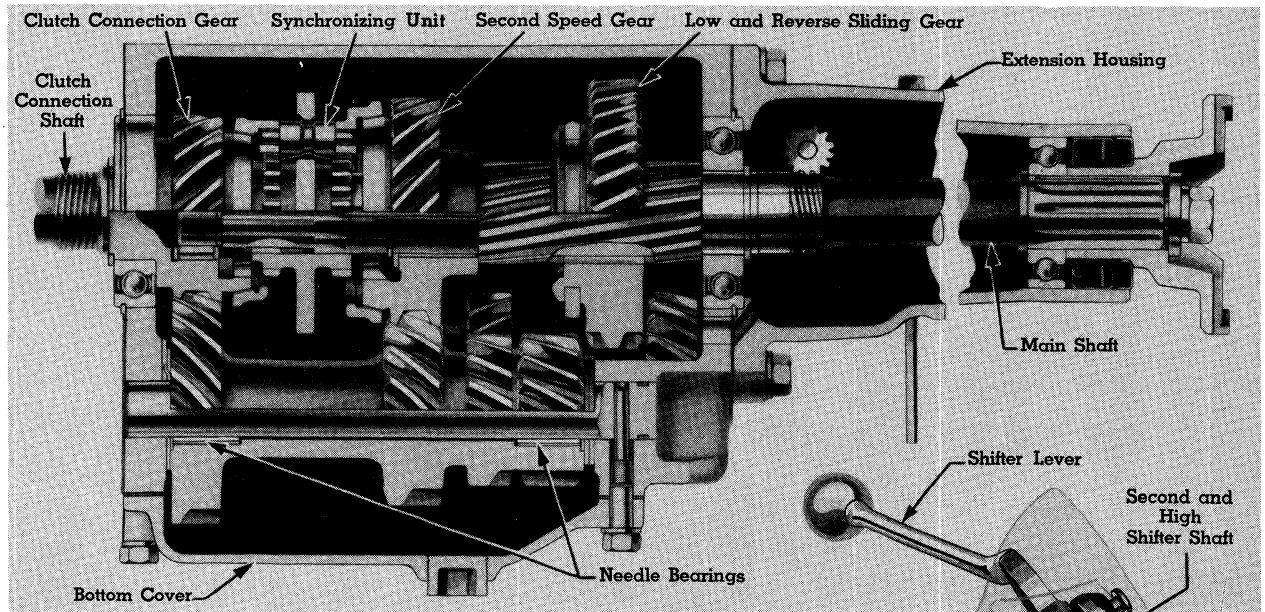


Fig. 1. Transmission Cross Section

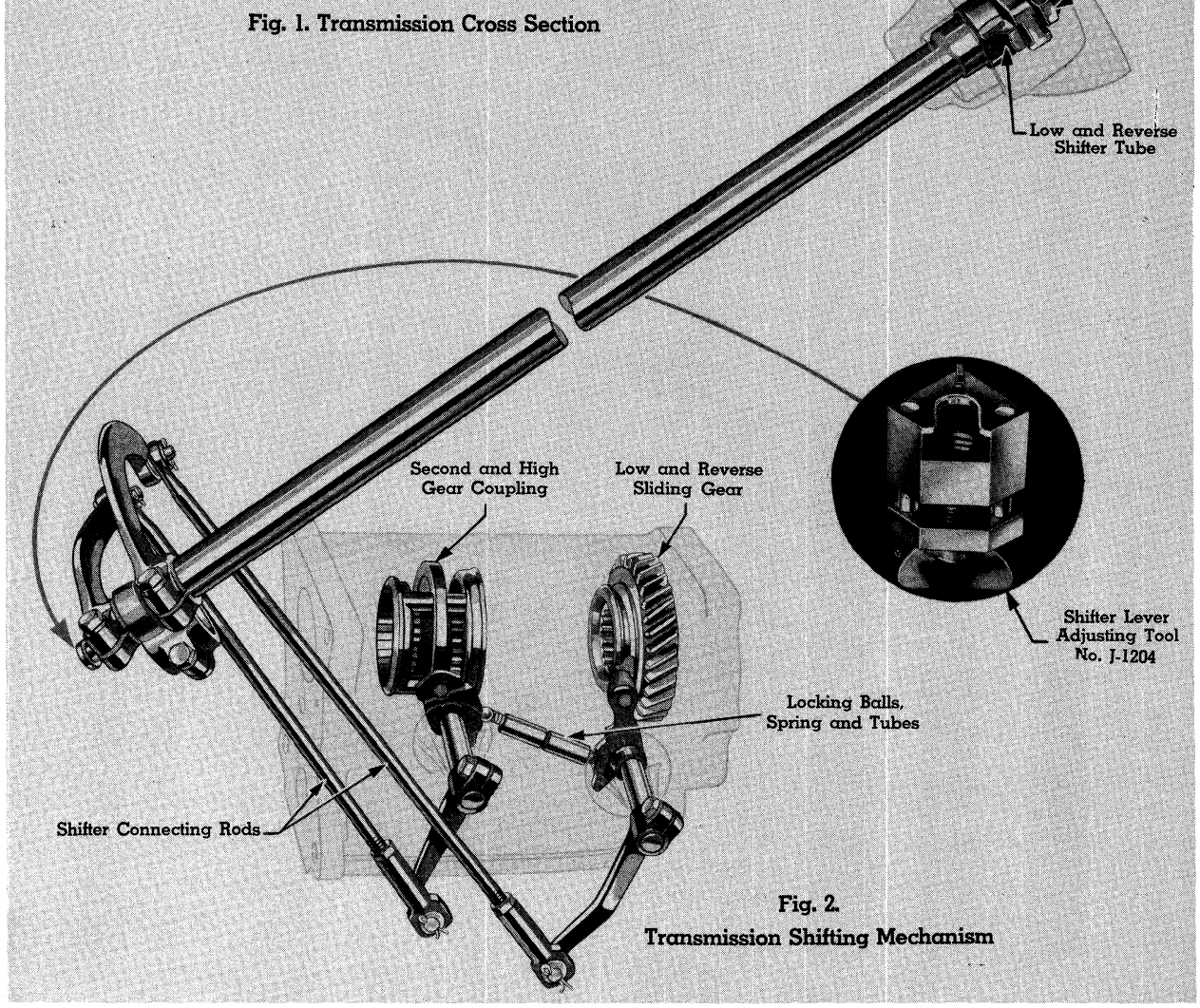


Fig. 2. Transmission Shifting Mechanism

Plate 26. Transmission and Controls, All Series

TRANSMISSION

General Description

The familiar inertia type syncro-mesh transmission is used on all 39-series Cadillac-LaSalle cars. All transmissions have the same synchronizing mechanism, gear train and gear case, but they differ in the length of the transmission mainshaft and extension housing. One length is used on the 39-50, 60S and 61 cars, and a different length on the 39-75 and 90 cars.

The synchronizing mechanism consists primarily of two cone-type friction clutches, one for second gear and one for high gear, which are controlled by flat springs mounted in slots in the sliding gear coupling.

The transmission control lever is mounted as shown in Figure 2. Two concentric torsion shafts extend from the control lever pivot down the left side of the steering column. Below the floorboards, each of the two shafts carries a lever from which a rod extends to another lever fastened to a short shaft in the transmission case.

Levers are mounted on the inner ends of these shafts, one of which carries a shoe that contacts the high and intermediate shifter disc, while the other carries a shoe that shifts the low and reverse sliding gear.

*

Service Information

1. CORRECTION OF GEAR CLASH

Gear clash when shifting into low is usually due to incomplete clutch disengagement or to the driver's failure to wait long enough for the gears to stop spinning. This is not a transmission fault and can be corrected only by proper driving instruction.

Gear clash when shifting into second or high may be due to incomplete clutch disengagement, or to shifting from one gear to another without allowing sufficient time for the synchronizing mechanism to operate.

2. TRANSMISSION SLIPPING OUT OF GEAR

Cases of 39 series transmissions slipping out of high gear may be due to a slight variation in the crankcase bell housing. This may be corrected by removing the clutch housing and indicating the bell housing for low spots. In the event of severe low spots, the bell housing should be refaced.

Slipping out of any gear may be due to incorrectly adjusted shifter connecting rods, which can be corrected as explained in Note 3. This may also be due to a loose rear motor support, or improper length of the control rods or even a bending in the rubber bushings of the control rods.

3. ADJUSTMENT OF SHIFTER CONNECTING RODS

The shifter connecting rods between the transmission and the lower end of the shifting tubes may be adjusted in the following manner:

1. Place shifter control lever in neutral, between second and high gear.
2. Lengthen or shorten adjustable end of low and reverse shifter connecting rod until control lever may be lifted into low or reverse gear without interference.

This adjustment must be accurately made, otherwise it will be impossible to cross over from high and second to low and reverse.

4. SHIFTING MECHANISM RATTLES

Rattles in the shifting mechanism are usually due to a looseness between shifting levers and the bracket holding them to bottom of steering column. These rattles may be eliminated by correct adjustment for clearance, or by the installation of spring washers between the levers and the bracket.

Two spring washers should be used between the low and reverse shifter tube and bracket. Three more washers should be used between second and high shifter shaft and

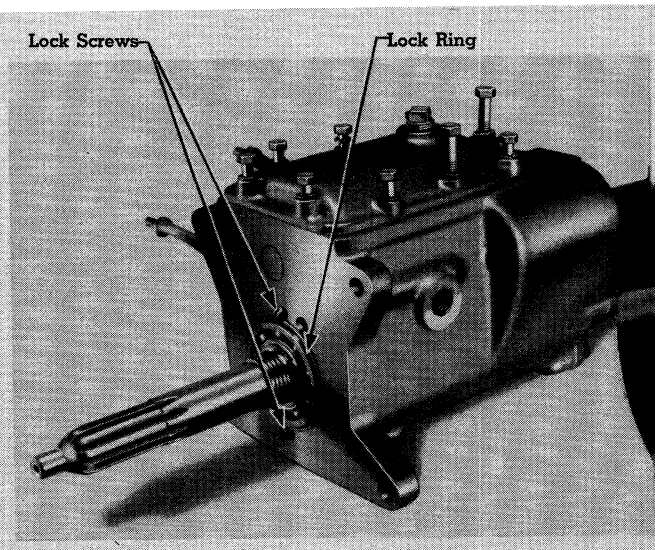


Fig. 3. Clutch Connection Locking Mechanism

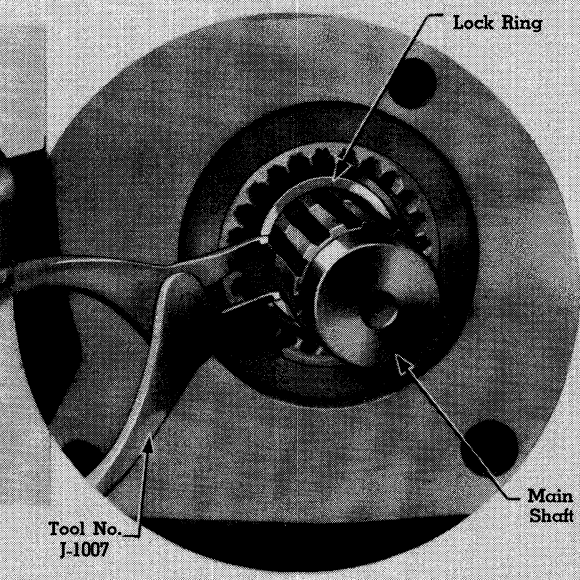


Fig. 4. Removing Lock Ring for Second Speed Gear

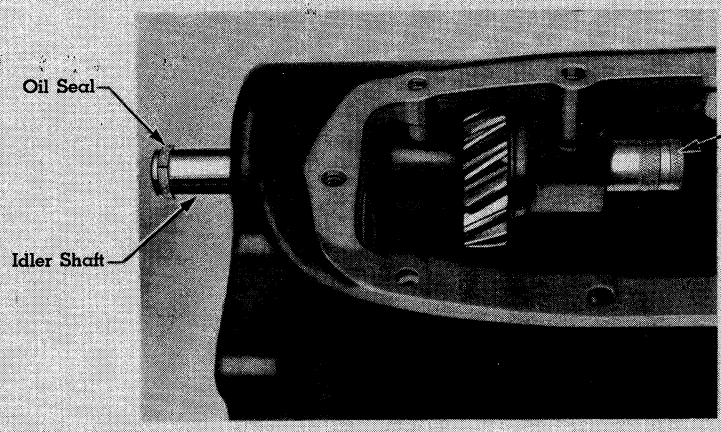


Fig. 5. Installing Reverse Idler Gear

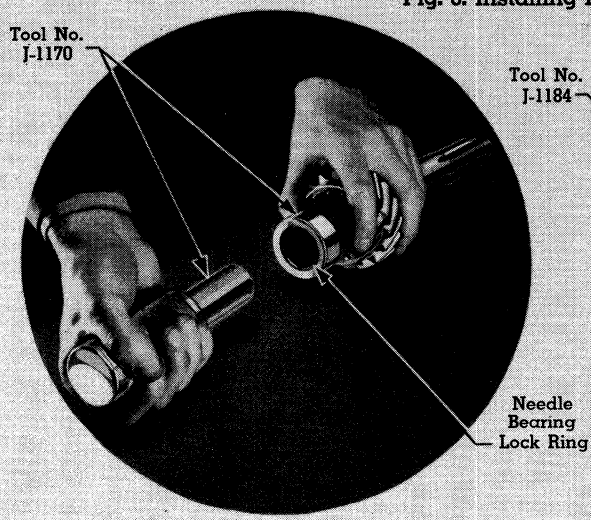


Fig. 6. Installing Needle Bearings

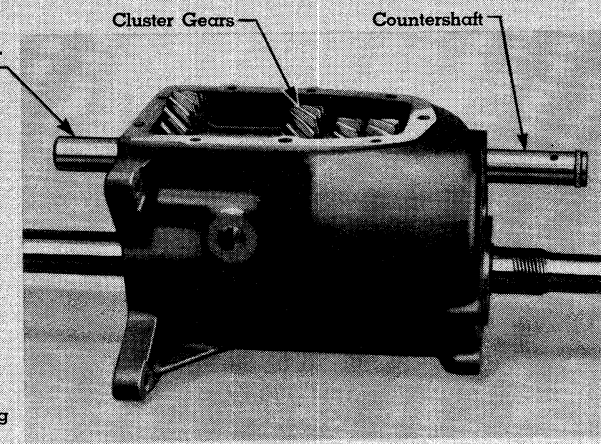


Fig. 7. Assembly of Countershaft

Plate 27. Transmission Assembly, All Series

bracket. After the springs are installed, the levers should be readjusted as explained in Note 6.

Some cars were equipped with only one anti-rattle spring washer, located between the second and high shifter shaft and the bracket. Rattles on these cars can be eliminated by installing four more spring washers at the points named.

5. HARD SHIFTING

Hard shifting may be due to:

1. Driver may not lift shifter lever high enough when shifting into low and reverse.
2. Front seat adjustment may be incorrect. Attempting to shift while sitting back in seat with right arm in a straightened position is much harder than when sitting forward and shifting with arm bent at right angles.
3. Insufficient clearance between levers at bottom of shifting tube. The remedy for this condition is readjustment of levers as mentioned in Note 6.
4. Inner end of shifter control lever may be chipped or otherwise damaged where it contacts shifting lugs. This condition should be corrected by replacing shifter control lever.
5. Shifting lugs on shifter shaft assembly may be chipped or marked where they contact shifter control lever. Shafts with damaged lugs should be replaced.
6. The thickness of the detent springs affects ease of shifting. First 39 series cars were equipped with springs .022" thick. These were later changed to .018" thick springs, except on series 39-90 cars. Second type springs should be installed when transmission is disassembled for any reason.
7. Incorrectly adjusted shifter connecting rods.
8. Dragging or spinning clutch.
9. Improper lubricant in transmission.
10. Tight fit between low and reverse sliding gear and mainshaft.

6. ADJUSTMENT OF SHIFTER LEVERS

1. Apply Tool No. J-1204 to lower end of high and second shifting shaft, and tighten screw slightly. (Figure 2).
2. Loosen clamping screws on both levers.
3. Turn screw on tool until second and high gear shift - as tested at gear shift lever - feels smooth and not too tight. Clamping screw may remain loose while the trials are being made.
4. When proper feel is obtained for second and high gear shift, tighten clamping screw.

CAUTION: The clamping screw must not be tightened too much, as this may close bushing that supports shaft at lower end of tube and make it impossible to obtain proper shift in either lever.

5. As a final step, adjust the low and reverse lever by pushing it down until there is no more than .005 inch clearance between the lever and the bracket, as measured with a feeler gauge.

7. DISASSEMBLY OF SHIFTING MECHANISM

1. Remove steering wheel as explained in steering section, page 99.
2. Remove high and second lever at lower end of shifting column.
3. Loosen clamp screw holding low and reverse lever in place.
4. Remove cross-over spring at upper end of shifting column.
5. Loosen clamp screw holding upper shifter housing to steering column.
6. Lift upper housing with shifter tube and shaft attached from steering column.
7. Pull second and high shifting shaft out of shifting tube.
8. Remove gear shift lever.
9. Pull low and reverse shifting tube out of housing.

8. ASSEMBLY OF SHIFTING MECHANISM

1. Install low and reverse shifting tube in housing with lug pointing away from center of housing.
2. Hold gear shift lever in place and install second and high shifting shaft inside shifting tube.
3. If bracket holding lower end of shifting tube to steering column on 39-50 and 61 cars has been removed, it should be reinstalled with clamping bolt washer in slot in steering column.
4. Push housing with shifting shaft and shifting tube down next to steering

column until lower end of the torsion shaft is an inch or two away from lower bracket.

5. Holding low and reverse shifter lever in place above bracket, pull torsion shaft through end of the lever.

6. Install two anti-rattle spring washers between lever and bracket.

7. Pull shifting shaft through bracket, meanwhile sliding low and reverse lever into place on shifting tube.

8. Install second and high lever on end of shifting shaft, using three anti-rattle spring washers, between lever and bracket.

9. Lower or raise shifter housing below steering wheel so that shifter control lever does not strike housing at any point, and tighten clamp screw.

10. Install cross-over spring.

11. Install steering wheel.

12. Adjust and tighten shifter levers as explained in Note 6.

13. If shifter connecting rods were removed, they should be installed and adjusted as explained in Note 3.

9. REMOVAL OF TRANSMISSION FROM CAR

1. Place jack under engine at back end of oil pan, using a wooden block to prevent damage to oil pan.

NOTE: This precaution need not be observed on 39-90 cars, because this model has five engine supports.

2. Disconnect front and rear universal joints, and remove propeller shaft.

3. Disconnect transmission extension at engine rear support.

4. Remove crossmember that carries engine rear support.

5. Disconnect speedometer cable.

6. Remove shifter connecting rods at levers on transmission.

7. Loosen transmission cap screws and, while supporting transmission at rear end so that clutch connection shaft can be kept in line with clutch hub, slide transmission back.

8. Plug drain hole for clutch connection shaft bearing to prevent loss of lubricant.

9. Remove transmission from car, lowering front end first.

CAUTION: Do not allow transmission to hang on clutch connection or carry transmission by clutch connection as this will spring clutch disc or injure the front mainshaft bearing.

10. INSTALLATION OF TRANSMISSION

This procedure is the reverse of that given for removal with the following precaution:

Connect shifter connecting rods to control levers last, after transmission is in place. Adjust shifter connecting rods as explained in Note 3.

11. DISASSEMBLY OF TRANSMISSION

1. Remove speedometer driven gear adapter housing and speedometer driven gear.

2. Remove universal joint flange from rear end of mainshaft.

3. Remove cap screws holding extension housing to case and remove housing. Bearing and oil seal can be removed by tapping them off with a soft hammer.

4. Remove transmission cover.

5. Remove countershaft through rear end of case, and remove countershaft cluster gears, washers, spacers and needle bearings, taking care not to lose any of the needle bearings.

CAUTION: Handle gears and bearings with care to avoid nicks, and protect them against dirt and grit.

6. Remove lock screws holding clutch connection shaft and bearing in place.

7. Pry clutch connection shaft and bearing out of the front end of the transmission case, taking care not to lose any of the needle bearings in shaft.

8. Remove sliding coupling and synchronizer off front end of main shaft.

9. Remove lock ring holding second speed gear in place, using Tool No. J-1007.

10. Tap main shaft and bearing out of rear end of case, and remove gears from shaft.

11. Tap reverse idler gear shaft out of back end of case, and remove reverse idler gear and thrust bearings.

12. Loosen clamping screws for shifting levers, and remove levers.

13. Remove shifting lever shafts through inside of case, taking care not to lose interlock spring, balls or tubes.

12. ASSEMBLY OF TRANSMISSION

1. Install high and second speed lever and shaft in neutral position, making sure that the shoe is properly in place.

2. Install ball, tube and spring interlock assembly inside of case.

3. Compress spring and locking balls.

4. While spring is compressed, install low and reverse shifter shaft with sector in neutral position, making sure shoe is in place.

5. Install new cork seals, at outer end of shift shafts, using Tool J-1169.

6. Tap shifter levers into place on their respective shafts by bracing inner end of sector with a hammer, and tighten clamping screws.

7. Tap reverse idler gear shaft partly into place and install steel-backed babbit thrust washer at rear, making sure that clip in washer fits in slot in case.

NOTE: If the gear, bushings or washers show evidence of excessive wear, the entire assembly should be replaced.

8. Put a new cork seal on outer end of shaft.

9. Place reverse idler gear on shaft. Install idler gear replacer pilot, Tool J-1010, at front and extend through boss sufficiently to hold front thrust washer in position. Tap shaft into position, making sure that hole for locking screw on inner end of shaft lines up properly with hole in bottom of case.

10. Hold low speed shifter gear in contact with shifter shoe and insert main shaft through end of case and low speed shifter gear.

11. Install second speed gear on forward end of main shaft.

12. Install thrust washer and lock second speed gear in place with new lock ring, using special tool J-1007.

13. Slip sliding coupling and synchronizer on front end of shaft.

14. Install needle bearings in clutch connection mainshaft pilot, using Tool No. J-1170, and lock them in place with a new lock ring.

15. Tap clutch connection shaft and bearing into place and install outer lock ring.

16. Install lock screws in clutch connection outer lock ring.

17. Tap rear main shaft bearing into place using a pipe with an inside diameter of 1-1/2".

18. Start counter shaft through back end of transmission.

Install needle bearings in counter shaft cluster gear, using Tool No. J-1184.

19. Install bronze thrust washers in place, at front and rear ends, and start counter shaft gear assembly on counter shaft.

20. After placing new cork seal on outer end of shaft, tap it into place and align lock hole at rear end of shaft with hole in case.

21. Install gasket and cover, making sure that the two long locking screws that hold the reverse idler gear shaft and counter shaft in place are installed correctly.

22. Install extension housing gasket and slip extension housing on over back end of mainshaft.

23. Tap extension rear bearing in place, using a pipe with an inside diameter of 1-1/4".

24. Install cap screws holding extension to transmission case and tighten securely.

25. Tap rear oil seal into place over end of shaft.

26. Drive front universal joint flange onto end of main shaft with lead hammer and install cap screw holding it in place, tightening it securely.

27. Slip speedometer driven gear in place, revolving it slightly to make sure it meshes properly with gear on rear main shaft.

28. Install speedometer driven gear adapter housing and tighten it to transmission case.

Other Transmission References

Transmission Specifications

SUBJECT AND REMARKS	39-50	39-61	39-60S	39-75	39-90
MAINSHAFT ASSEMBLY					
Backlash between splines on mainshaft and splineways on sliding gear coupling --					
New limits	.0005-.001"	.0005-.001"	.0005-.001"	.0005-.001"	.0005-.001"
Worn limits, not over .	.003"	.003"	.003"	.003"	.003"
Backlash between splines on mainshaft and splineways in low and reverse gear --					
New limits	.004-.007"	.004-.007"	.004-.007"	.004-.007"	.004-.007"
Worn limits	.010"	.010"	.010"	.010"	.010"
Clutch connection shaft out of true, not over .	.0015"	.0015"	.0015"	.0015"	.0015"
Mainshaft out of true, not over	.0015"	.0015"	.0015"	.0015"	.0015"
Clutch connection shaft pilot bearings --					
Diameter of needle bearings	.2180-.2182"	.2180-.2182"	.2180-.2182"	.2180-.2182"	.2180-.2182"
Number of needle bearings used	14	14	14	14	14
Diameter of mainshaft pilot	.7631-.7636"	.7631-.7636"	.7631-.7636"	.7631-.7636"	.7631-.7636"
Diameter of clutch connection shaft counterbore	1.2002-1.2010"	1.2002-1.2010"	1.2002-1.2010"	1.2002-1.2010"	1.2002-1.2010"
Mainshaft yoke out of round, not over	.002"	.002"	.002"	.002"	.002"
REVERSE IDLER GEAR ASSEMBLY					
Clearance between bushing and shaft --					
New limits	.0020-.0035"	.0020-.0035"	.0020-.0035"	.0020-.0035"	.0020-.0035"
Worn limits	.005"	.005"	.005"	.005"	.005"
End play in gear, not over	.006-.018"	.006-.018"	.006-.018"	.006-.018"	.006-.018"
COUNTERSHAFT ASSEMBLY					
Countershaft needle bearings --					
Diameter of needle bearings	.1248-.1250"	.1248-.1250"	.1248-.1250"	.1248-.1250"	.1248-.1250"
Diameter of countershaft	.9993-.9998"	.9993-.9998"	.9993-.9998"	.9993-.9998"	.9993-.9998"
Diameter of countershaft gear cluster, counterbore	1.2498-1.2506"	1.2498-1.2506"	1.2498-1.2506"	1.2498-1.2506"	1.2498-1.2506"
SHIFTING MECHANISM					
Clearance between shifter shafts and transmission case --					
New limits	.0020-.0035"	.0020-.0035"	.0020-.0035"	.0020-.0035"	.0020-.0035"
Worn limits	.005"	.005"	.005"	.005"	.005"
Interlock spring --					
Free length	2-23/32"	2-23/32"	2-23/32"	2-23/32"	2-23/32"
Pressure in pounds compressed to 1-31/32" ...	10-13	10-13	10-13	10-13	10-13

FUEL TANK AND EXHAUST

General Description

The gasoline tank on all 39 series cars is mounted crosswise in the frame with two metal straps, and can be removed from below without disturbing any of the sheet metal parts. The gasoline line to the engine is carried in brackets attached to the left frame side member on the 39-50, 61 and 60S series and on the right frame side member on the 39-75 and 90 series. The gearless type gasoline gauge operates electrically. Details of its operation and servicing are given in the Electrical Section.

The exhaust pipes on all series are covered with a heavy asbestos insulation at the front to prevent excessive heat under the hood or in the body, and to muffle exhaust noises. Rubber and fabric cushions are used between the muffler supports and the frame on all models to prevent exhaust vibrations from being transmitted to the body. The tail pipe end on all series cars is porcelain enameled to prevent rust.

The mufflers used on all 39-series cars are a "three-pass" type as shown in Figure 1. They are constructed of heavy gauge corrosion resisting terne-plate. The shells have a double thickness of this metal, secured to the headers with spun-over lock seams. Resonaters of the same materials as the mufflers are used on 39-60S, 75 and 90 cars.

The mufflers on 39-50 and 61 cars are located parallel to the frame side members on the right side of the car. The resonators on the series 39-75 and 90 cars are located parallel to the frame side members along the left side, (the series 39-60S is on the right hand side) while the mufflers on these cars are mounted crosswise on the frame just in back of the gasoline tank.

*

Service Information

1. REMOVAL AND INSTALLATION OF GASOLINE TANK

The following procedure should be followed when removing the gasoline tank:

1. Raise rear end of car from floor with chain fall.
2. Drain tank.
3. Disconnect filler tube hose at lower clamp on series 39-50, 61, 75 and 90 cars.

NOTE: Remove short filler neck extending through the fender, and its rubber grommet from series 39-60S cars.

4. Move tail pipe to right of car, away from tank, on series 39-50 and 61 cars.

NOTE: This is not necessary on 39-60S, 75 and 90 cars. However the filler neck clamp at the frame should be removed on 39-50, 61, and 60S cars.

5. Disconnect gasoline line.
6. Remove tank support straps.
7. Lower tank to disconnect gauge wire on float unit.
8. Remove tank from car.

2. INSTALLING MANIFOLD GASKETS

Exhaust manifolds are subject to such extreme variations in temperature that the metal expands and contracts to a considerable degree. For this reason, care should be exercised not to draw the manifold bolts up too tight. The manifold bolts should be tightened while the engine is running and should be drawn up just enough to stop all exhaust leaks.

3. REMOVAL AND INSTALLATION OF MUFFLERS

Removal and installation of mufflers and exhaust pipes will be self-evident from the diagrams in Plate 28. One precaution is necessary when installing 39-50 and 61 mufflers - be sure the end on which the word "inlet" is stamped, is installed toward the front.

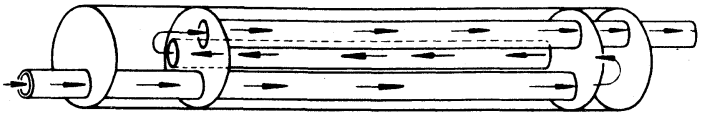


Fig 1. Cross Section of "Three Pass" Muffler
Typical of All 39-Series

Fig. 2. Exhaust System
Series 39-50 and 61

Fig. 3. Exhaust System Typical of Series 39-60S 75 and 90

Plate 28. Exhaust System Details

STEERING GEAR

General Description

Steering gears of the worm and double roller type are used on all 39-series cars, but two rather distinct designs are required because of differences in mounting and in steering connections.

The steering gear used on 39-50, 61 and 60S cars is mounted inside the frame sidebar. The roller shaft in this gear extends from the bottom of the housing, and the pitman arm operates a cross mounted connecting rod.

On 39-50 and 61 cars, this rod is connected to the steering arms by two short tie rods, and to the right frame sidebar by an idler lever. (Plate 30, Figure 4). On 39-60S cars, the connecting rod actuates an intermediate steering arm to which the tie rods are connected.

The 39-75 and 90 steering gear is mounted on the frame sidebar with the roller shaft extending inward, and the pitman arm operates a longitudinal drag link. Two universal joints are used to connect the steering shaft and the worm shaft of the steering gear on these models.

*

Service Information

1. STEERING GEAR ADJUSTMENTS

The steering gear adjustments for all series cars are given in Plate 29 on Page 96.

2. REMOVAL OF INTERMEDIATE STEERING ARM

Removal -- 39-60S -- 1. Remove plug from right hand end of steering connecting rod.

2. Disconnect steering connecting rod from pivot ball at intermediate steering arm.

3. Disconnect tie rods at intermediate steering arm.

4. Remove fulcrum bolt from intermediate steering arm bracket assembly on rear of front frame cross member.

5. Remove intermediate steering arm.

Installation -- The reverse order of operations will serve as a guide for installation. In tightening the nut on the fulcrum bolt, care should be exercised not to draw it too tight. Moderate tightening is all that is necessary. See Note 7.

Removal -- Series 39-75 and 90 -- 1. Disconnect steering connecting rod from steering gear arm.

2. Loosen clamp screw on steering connecting rod at intermediate steering arm ball joint assembly.

3. Remove steering connecting rod by unscrewing rod from steering arm ball joint assembly.

4. Disconnect tie rods at other end of intermediate steering arm by removing nuts holding pivot ball assemblies to arm.

NOTE: It is necessary to use Special Tool No. J-624-A to remove tapered shank of the pivot ball from the steering arm when performing this operation.

5. Remove intermediate steering arm bracket assembly by removing the four bolts holding it to frame cross member.

6. Place assembly on bench and remove retaining nut from fulcrum bolt.

7. Remove bolt, intermediate steering arm, and bearings to complete disassembly.

NOTE: Use a press to remove bolt, if necessary.

Installation --

The reverse order of operations may be used as a guide for installation of this unit.

When installing the intermediate steering arm, it is important to make sure that the ball bearings are properly lubricated with (G-12) wheel bearing grease before installation. Also, when tightening the nut on the fulcrum bolt, care should be exercised to draw the nut up just enough to remove all perceptible play in the bearings without causing them to bind.

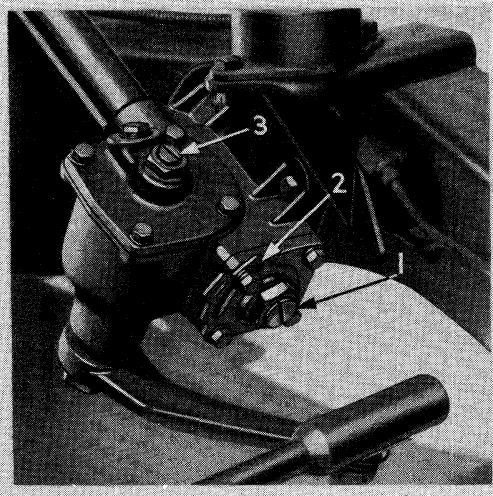
3. REMOVAL OF STEERING UNIVERSAL JOINTS

Series 39-75 and 90

1. Loosen clamps at upper universal joint, lower joint and steering worm shaft.

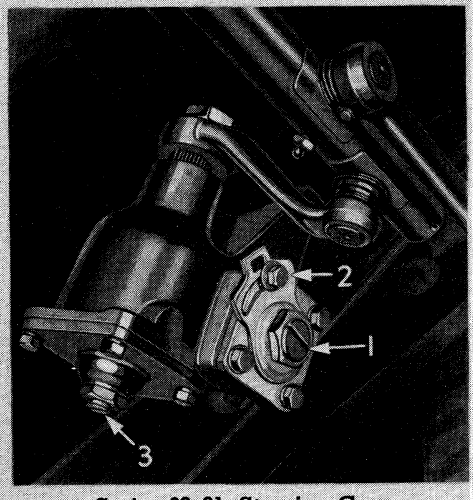
STEERING GEAR

1. Back off adjusting screw (or nut) slightly after loosening lock nut. Turn steering wheel 1½ turns to right or left so roller turns free in worm, and tighten adjusting screw (or nut) until a pull of 1 to 1½ lbs. at rim of steering wheel is necessary to move wheel over high spot of worm. Check pull after tightening lock nut. With new gears used less than 1,000 miles, a pull of 1¼ to 1¾ lbs. should be necessary.

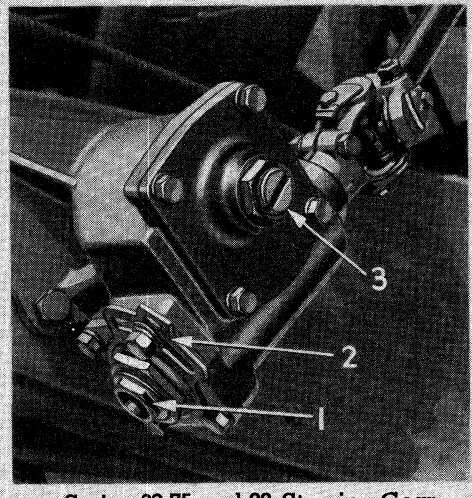


2. Turn eccentric to adjust backlash between worm and roller. Pull on steering wheel should be 2 to 2½ lbs. with roller on high point of worm. With new gears used less than 1,000 miles, a pull of 2½ to 3 lbs. should be necessary. Backlash between worm and roller should be approximately the same with the steering wheel turned one revolution from either extreme position.

Series 39-50 and 60S Steering Gear



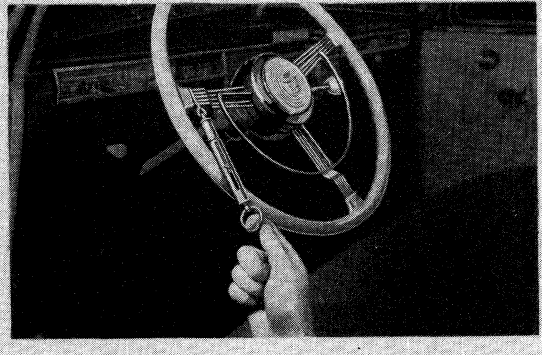
3. Turn adjusting screw in against roller until all play is taken up, and slight binding felt when turning steering wheel with roller off high spot; then back off just enough to free adjustment.



Series 39-61 Steering Gear

Series 39-75 and 90 Steering Gear

If front wheels do not point straight ahead when roller is on high point of worm, adjust the steering connecting rod end, or the tie rods until straight ahead position is obtained.



Tire Inflation Pressure
(Front and Rear)

39-50 LaSalle	24 lbs.
39-61 Cadillac	24 lbs.
39-60S Cadillac	28 lbs.
39-75 Cadillac	32 lbs.
39-90 Cadillac	32 lbs.

(Minimum—Cold)

Plate 29. Steering Gear Adjustments

2. Slide shaft as far as possible up into upper universal joint.
3. Remove shaft and lower universal joint from steering worm shaft.
4. Pull shaft off upper universal joint.
5. Remove upper universal joint.

Installation --

1. Install upper universal joint on steering shaft.
2. Insert intermediate shaft in upper universal joint as far as possible.
3. Install lower universal joint on steering worm shaft and insert intermediate shaft.
4. Tighten clamp holding lower joint to steering worm shaft.
5. Tighten clamp holding upper universal joint to steering column shaft.
6. Tighten clamp holding upper universal joint to intermediate shaft. This clamp fits into a notch at upper end of shaft.
7. Tighten clamp holding lower universal joint to intermediate shaft. This clamp tightens into a groove at lower end of the shaft.

4. CORRECTION OF STEERING UNIVERSAL JOINT CHUCKLE

Series 39-75 and 90

1. Loosen clamp screw holding lower universal joint to steering worm shaft.
2. Insert pinch bar or heavy screwdriver between bottom of lower yoke and top of steering gear base, and force yoke upward approximately 1/32 of an inch.

NOTE: If it is impossible to force this yoke upward, loosen clamp screw holding the upper universal joint upper yoke to steering column shaft. Force assembly downward and then tighten clamp screw. After this is done, it will be found that lower yoke may be easily raised.

3. Holding lower yoke up with bar, tighten clamp screw securely.

5. REMOVAL OF TIE RODS

Series 39-50 and 61

1. Remove pivot nuts holding tie rods to steering arms.
2. Disconnect tie rods from steering arms.
3. Unscrew plug and remove ball seat holding idler lever to right end of steering connecting rod.
4. Disconnect idler lever from steering connecting rod.
5. Lower right end of connecting rod, allowing spring, spacer assembly and ball seat to slide out end of rod. Take care not to lose any parts.
6. Disconnect right tie rod from steering connecting rod.
7. Unscrew end plug and remove spring ball seat and safety plug from left end of steering connecting rod.
8. Disconnect pitman arm from steering connecting rod.
9. Lower left end of steering connecting rod, allowing spring, spacer assembly and ball seat to slide out end of rod.
10. Disconnect left tie rod.

Installation --

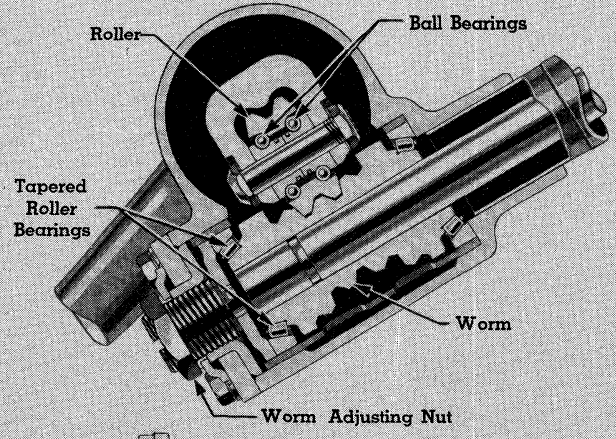
The tie rods and parts should be assembled in the reverse order of disassembly with the following exceptions.

1. Lubricate pitman arm, idler arm and tie rod balls with chassis lubricant when assembling.
2. Adjust right, or idler lever end, of steering connecting rod by screwing end plug up tight and backing it off 1/4 to 1/2 turn.
3. Adjust left, or pitman arm end, of steering connecting rod by screwing end plug up tight and backing it off 3/4 of a turn.

6. REMOVAL AND DISASSEMBLY OF IDLER LEVER

Series 39-50 and 61

1. Disconnect idler lever from steering connecting rod as explained in Note 5.
2. Remove two bolts holding idler lever to frame side member.
3. Turn frame end of lever out of threaded bushing at lever joint.
4. Remove lock ring in threaded bushing.



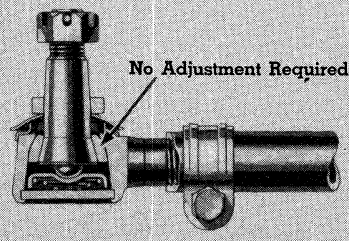


Fig. 2. Steering Tie Rod End
Series 39-50, 61 and 60S

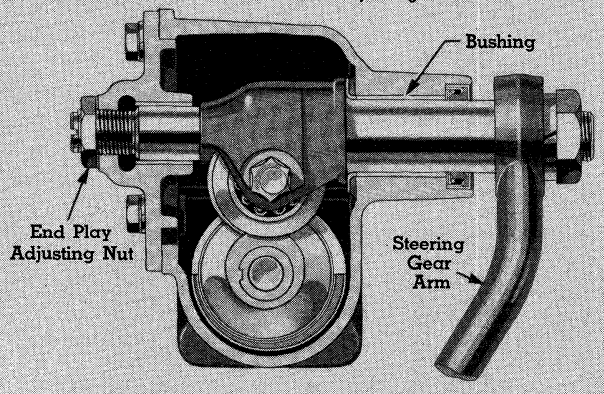


Fig. 1. Steering Gear Sectional Views
Series 39-50, 61 and 60S

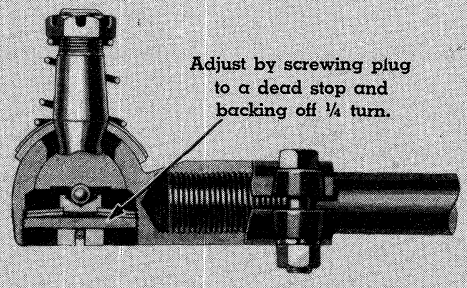


Fig. 3. Steering Tie Rod End
Series 39-75 and 90

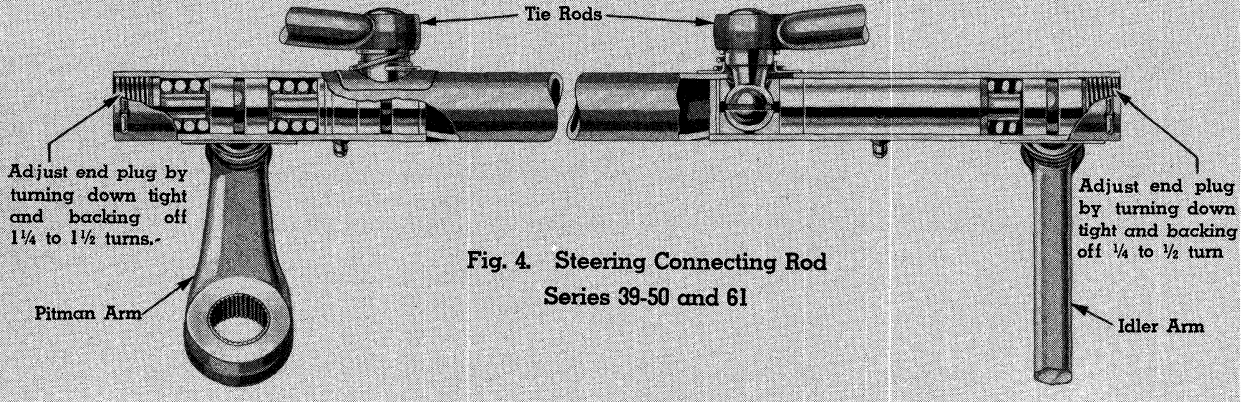


Fig. 4. Steering Connecting Rod
Series 39-50 and 61

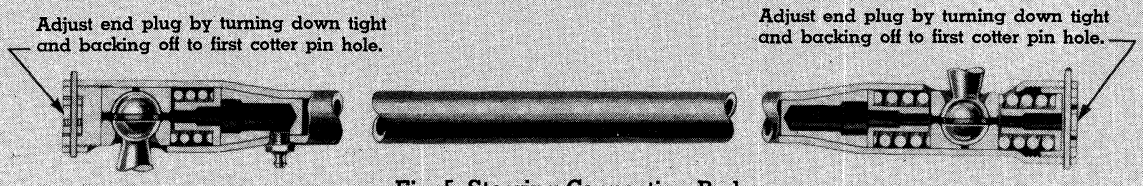


Fig. 5. Steering Connecting Rod
Series 39-75 and 90

Plate 30. Steering Gear Connections

5. Remove threaded bushing from lever joint.

Assembly and Installation --

Assemble and install the idler lever in the reverse order. Tighten the idler arm support 1/4 to 1-1/4 turns after it seats firmly against the rubber bushing.

7. CORRECTION OF INTERMEDIATE STEERING ARM RATTLE

In the event of a slight rattle occurring in the steering system on series 39-60S, the intermediate steering arm should be checked for looseness.

Looseness at this point is generally caused by the pivot pin being loose and moving up and down on the steering arm bolt. In most cases, merely tightening the bolt at the bottom of the front cross member will eliminate the rattle.

The bolt must not be drawn up too tight, however, as there is danger of stripping. Where moderate tightening of the bolt does not eliminate the rattle, it will be necessary to install an additional shim at the bottom of the steering arm pivot pin before tightening the bolt.

8. REMOVAL OF STEERING WHEEL - ALL SERIES

1. Press horn cap down and turn left or right until catch is released, and remove cap.
2. Remove sponge rubber ring.
3. Remove contact assembly.
4. Remove horn button spring.
5. Remove steering wheel hub nut.

NOTE: Use a deep socket wrench or an end wrench, taking care not to injure horn wire terminal.

6. Remove steering wheel. (Horn ring comes off with flexible wheel).

9. ASSEMBLY OF STEERING WHEEL - ALL SERIES

1. Slip steering wheel over end of steering column shaft so that middle spoke is vertical and directly opposite notch in end of steering column shaft.

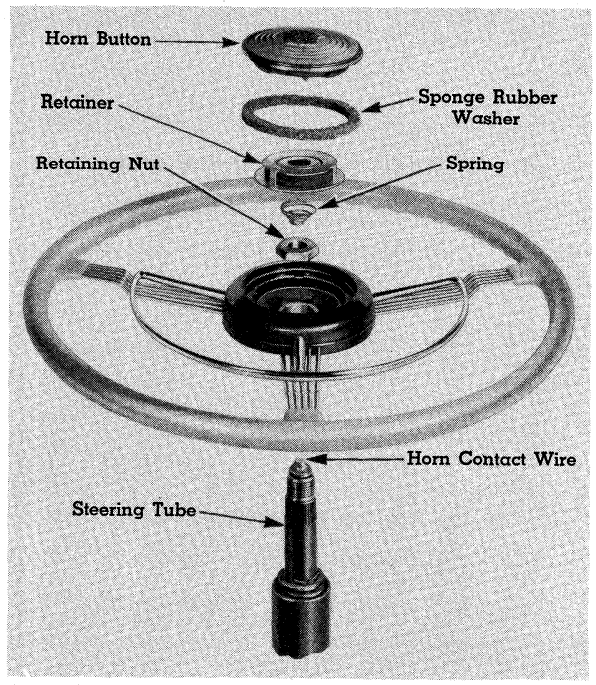


Fig. 6 Steering Wheel Disassembled Typical of All Series

NOTE: On 39-75 and 90 series cars the middle spoke on the steering wheel should be vertical when the clamping bolt holding the lower steering universal joint to the worm shaft is horizontal.

2. Tighten steering wheel hub nut down thoroughly, using a wrench with an 18 inch handle.
3. Place small end of horn button spring over horn terminal.
4. Install contact assembly, small end up.
5. Install sponge rubber ring around edges of wheel hub.
6. Press horn cap down in place and turn left or right until lugs slip under hub clips.

NOTE: Emblem should be horizontal when middle spoke is vertical.

STEERING GEAR

Steering Gear Specifications

SUBJECT AND REMARKS	39-50 & 61	39-60S	39-75 & 90
STEERING CONNECTIONS			
Spring at steering gear pitman arm ball joint of steering connecting link--			
Free length	15/16"	15/16"	1-19/64"
Pressure in pounds, compressed to 7/8"	420-500	420-500	.....
Pressure in pounds, compressed to 1-5/32"	.....	.....	450-550
Spring at left tie rod ball joint of steering connecting link			
Free length	15/16"	.....	.....
Pressure in pounds, compressed to 7/8"	420-500	.....	.....
Spring at ball joint at idler arm end of steering connecting link			
Free length	3/4"	.....	.....
Pressure in pounds, compressed to 37/64".	250-300	.....	.....
Spring at forward end of steering connecting link--			
Free length	.....	3/4"	1-1/16"
Pressure in pounds, compressed to 37/64".	.....	250-300	.....
Pressure in pounds, compressed to 7/8"	.....	.....	250-350

Other Steering Gear References

Other Wheels and Tires References

WHEELS AND TIRES

General Description

Disc wheels are used on all 39-series cars. Slots just inside the rims of 39-50, 61 and 60S cars provide for brake drum cooling and permit the use of emergency chains. The tire sizes, plies and inflation pressures are given in the specification table.

Drop-center rims are used on all series. Large size, snap-on type hub caps are used on all series. Wheel disc covers or rings are available as an accessory on all series cars, except the V-16, upon which the wheel discs are standard equipment. When wheel discs are used, no hub cap is required because the hub cap is integral with the disc.

The spare wheel and tire are carried in the bottom of the trunk on all sedan bodies, excepting fenderwell jobs. The spare tire and wheel are carried under the rear deck on coupe models.

In order to simplify jacking up the car, jack pads are provided on the rear springs and at the lower front suspension arms of 39-75 and 90 series cars. The jacks on Series 39-50, 61 and 60S cars lift the cars by the front or rear bumper supports.

*

Service Information

1. LOCATION OF BUMPER-TYPE JACK

The bumper-type jack used on series 39-50, 61 and 60S cars should be inserted under the double bumper supporting bars, close to the rubber grommet on the body as shown in Figure 1. In this position it will not slip on the bumper and the bumper will be subjected to much less strain.

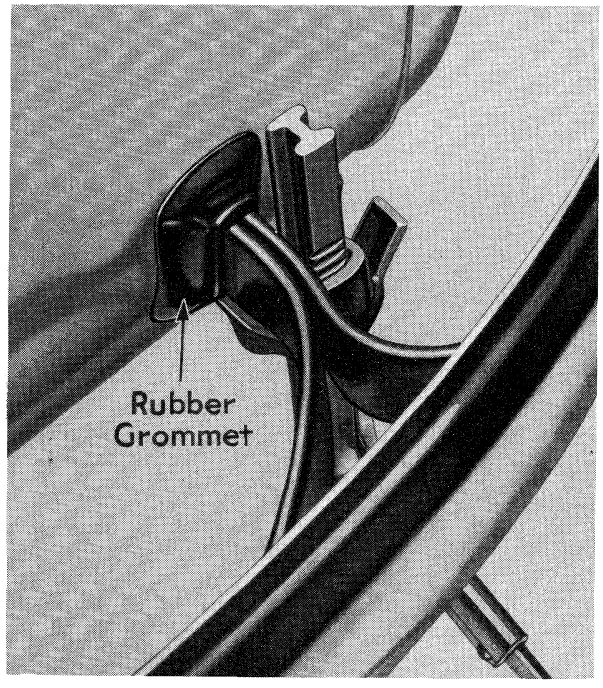


Fig. 1 Use of Bumper-Type Jack
Series 39-50, 61 and 60S

2. INTERCHANGING TIRES

Normal tire wear is uneven between the front and rear wheels because of the difference in the functions of the front and rear tires. Tire wear can be reduced to a minimum by changing the type of use and the direction of rotation at regular intervals.

It is advisable, therefore, to interchange the tires as rights and lefts and between front and rear; that is, the right front tire should be interchanged with the left rear and the left front with the right rear. This change should be made every 4000 miles.

This interchange has the advantage of reversing the direction in which the tire turns at the same time that its position on the car is changed, and equalizes the wear by subjecting all tires to equal amounts of all types of wear.

3. WHEEL RUN-OUT AND ECCENTRICITY

The wheels or tires should not run-out (wobble) more than 3/64 inch as measured on the side of the rim at the base of the tire when it is properly inflated. Run-out is the result of a bent wheel, an improperly mounted wheel, worn knuckle bearings or steering connections. These parts should be checked for correct adjustment, proper alignment, and wear whenever excessive run-out is encountered.

The wheels and tires should also run concentric with the steering knuckle spindle within 3/64 inch measured on the upper flange of the rim with the tire removed.

Wheel run-out, eccentricity, and balance are closely associated with steering complaints and with front wheel alignment. Further information on these conditions will be found under "Front Wheel Suspension."

4. BALANCING TIRES AND WHEELS

Tires are balanced to offset the weight of the valve stem and, if removed, the tube should be reinstalled in its original position with the valve stem in line with the balancing mark on the outside of the casing, otherwise the tire and wheel will be unbalanced.

The wheel itself should be in proper balance. An out-of-balance wheel can be corrected by the use of detachable balancing weights, supplied by the factory Parts Department. The weights are placed on the light side of the wheel and as nearly under the center of the tire as possible.

To balance a wheel, first remove it from the axle and clean out the grease from the bearings. Mount it upright on a suitable stand (a wheel spindle clamped in a vise will do) and test by rotating it slowly, allowing it to stop itself. When the wheel stops, the heavier point will be at the bottom. Mark this point and also the uppermost point; then turn the wheel until these points are in a horizontal position. Install balancing weights on the light side until the wheel balances in the horizontal position.

This operation should be performed with the tire on the rim. If the tire was off, it will have to be installed as recommended above, and the balance rechecked. The wheel bearings should then be repacked with wheel bearing grease and the wheel reinstalled.

5. WHEEL BEARING ADJUSTMENT

In adjusting the front wheel bearings, first make sure that the wheel is all the way on the spindle. Then tighten the adjusting nut securely, using a wrench with a handle 8 or 9 inches long, at the same time rotating the wheel to seat all parts. After a thorough tightening, back off the nut 1/12 turn (1/2 flat). If the cotter key cannot be installed in this position, loosen the adjusting nut until it can be installed.

CAUTION: When adjusting the front wheel bearings, care should be taken not to mistake play in the knuckle bolt for play in the wheel bearings.

The rear wheel bearings on all series cars are of the self-lubricating type and require no adjustment.

Wheels and Tires Specifications

SUBJECT AND REMARKS	39-50 & 61	39-60S	39-75 & 90
RIMS			
Type	Drop Center	Drop Center	Drop Center
Diameter at base of tire	15-15/16"	15-15/16"	15-15/16"
Width at base of tire	4-1/2"	4-1/2"	5"
TIRES			
Inflation pressure in pounds	24	28	32
Size	7.00 x 16	7.00 x 16	7.50 x 16
Number of plies	4	4	6

CHASSIS SHEET METAL

General Description

This section covers such sheet metal parts as the hood, radiator shell and grilles, fenders, running boards, and splash pans. These parts are so constructed that they can either be serviced individually, or they can be handled as complete units.

The 39-50 and 61 series cars may or may not be equipped with running boards, depending on the owner's preference. Cars that do not have running boards are fitted with main side sill cover panel extensions and rubber stone guards on the rear fenders.

*

Service Information

1. OPENING THE HOOD

To raise the hood top panel on V-8 cars, tilt the radiator ornament back. This will release both the manual catch and the automatic safety catch. Compensating springs help to raise the panel and hold it in position.

The hood top panel on V-16 cars has two manual catches. Tilting the radiator ornament back releases the first catch, after which the panel can be raised far enough to reach in and release the safety catch.

The hood side panels can be removed easily to provide better access to the engine. Each panel is held in place by two screws at the upper corners and by clips (thumb screws on 75 and 90 cars) along the lower edge. To remove a panel it is necessary only to loosen these screws a few turns and lift the panel out from the clips.

2. REMOVAL AND INSTALLATION OF HOOD

1. Raise hood top panel, remove side panels, and lower top panel.

2. Remove pivot bolt from center counter balancing spring on 39-50 and 61 cars.

3. Remove capscrews holding each hood hinge to cowl.

4. Lift off hood top panel.

The installation of the hood top panel is performed approximately in the reverse of the procedure for removal.

3. ALIGNMENT OF HOOD, RADIATOR AND FRONT FENDERS

The radiator, radiator grilles and front fenders are constructed so that they may be removed or installed as a unit. Inasmuch as the alignment of these parts also affects that of the hood top panel and hood side panels, the alignment of all these sheet metal parts should be made together.

When reinstalling the radiator, grilles, and front fenders, they should be assembled as a unit, installed, and only loosely bolted in position until the proper alignment with the hood top panel and cowl is obtained. The hood top panel should be kept in the lowered position while checking alignment.

Elongated bolt holes at the rear of the fenders permit easy horizontal and vertical alignment of this part of the assembly. The forward and back position of the radiator casing may be adjusted by loosening or tightening the radiator tie rods. The up and down adjustment of the radiator casing can be made by placing shims under the radiator mounting bolt.

The hood hinge holes are elongated to permit sidewise adjustment of the hood top panel. Alignment is secured by tightening the front attaching screws and prying the panel into the proper position, using a large screw driver in the oblong hole.

The hood side panels are held in place by two screws at the top which slip over "U" shaped clips on the panel. Loosening the bolts and screws allows the panel to be tapped into the correct position. Both the hood top panel and the radiator-fender assembly should be properly aligned before alignment of the side panels is attempted.

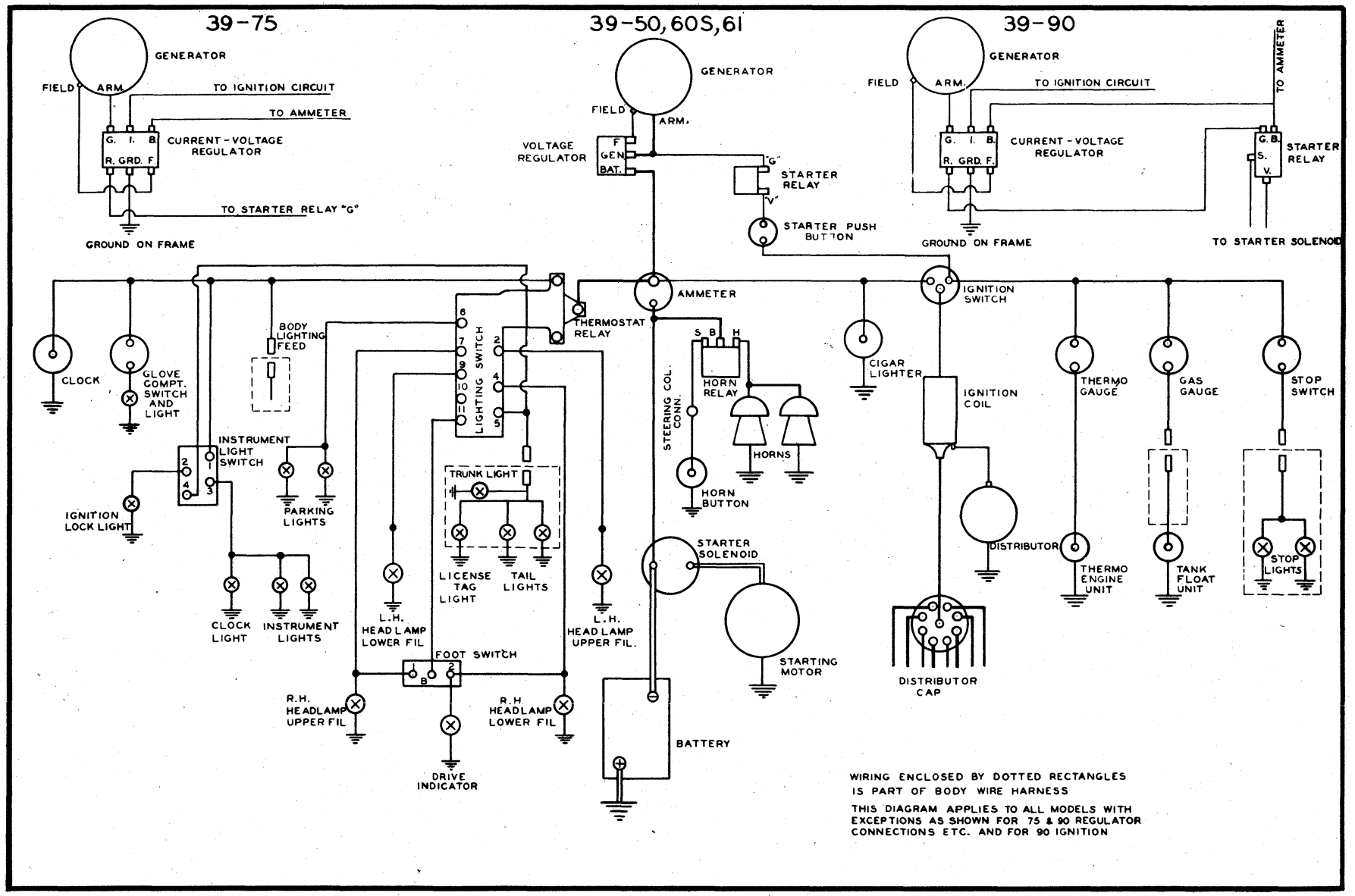


Plate 31. Circuit Diagram, All Series

ELECTRICAL

General Description

The electrical systems of all 39-series cars are of the same general arrangement and design, differing only in the size and characteristics of some of the major units as outlined below.

Battery—The batteries are the same except for location and for differences in size and capacity, as given in the Specification Tables.

The 39-50 LaSalle battery is located under the left front floorboards. The 39-61, 60S and 75 batteries are mounted under the hood on the right hand side ahead of the dash. The battery on the 39-90, V-16 is located under the right front seat.

Generator—The generators on all 39-series cars are located in the engine vee, behind the fan for best cooling, and are belt driven.

Two distinct types of generator circuits are employed. The type used on series 39-50, 61 and 60S cars has the charging rate controlled by a voltage regulator. The type used on series 39-75 and 90 has both a voltage and a current regulator to provide the most accurate charging rate control.

The generator charging circuits for all series are given in the Circuit Diagram, Plate 31. The regulator mountings and connections are shown in Plate 32. The generator charging rate curves are shown in Figure 1.

Starting Motor—The starting motor is mounted just in front of the flywheel housing at the right side of the engine. It is operated by a push button on the dash, by means of a solenoid, relay and switch mounted together on the starter housing. The solenoid engages the starter pinion with the flywheel gear before the cranking current is turned on.

The starter is connected back to the generator in such a way that when the generator is charging, a reverse current flows through the cut-out relay, breaks the circuit, and prevents starter engagement. The ignition switch is connected in series with the relay so the ignition must be turned on before the starter can be operated.

The solenoid serves two purposes. It operates both the starter gear shifting mechanism and the starting current switch. When sufficient current is passed through the windings, the plunger is moved first to engage the starter pinion with the flywheel ring gear and then to close the switch contacts.

Lighting System—The headlamps provide three beams—an upper or country driving beam, a lower or city driving beam, and a passing beam, in which the beam from the right lamp only is lowered—in addition to the parking lights. The headlamps are controlled by a hand switch on the instrument panel and a foot-operated selector switch. Operation of the switches is diagramed in Figure 17.

Two combination rear and stop lamps, and a license plate lamp that is part of the trunk lid handle, complete the driving lights. The instrument lamps may be operated with, or independent of, the driving lights. In addition to the customary lights in the body of the car, there are two self-operating lights, as follow:

The glove compartment has a small light which turns on when the door is opened. The switch is located at the upper left corner of the door opening. The trunk also has a floodlight, which is

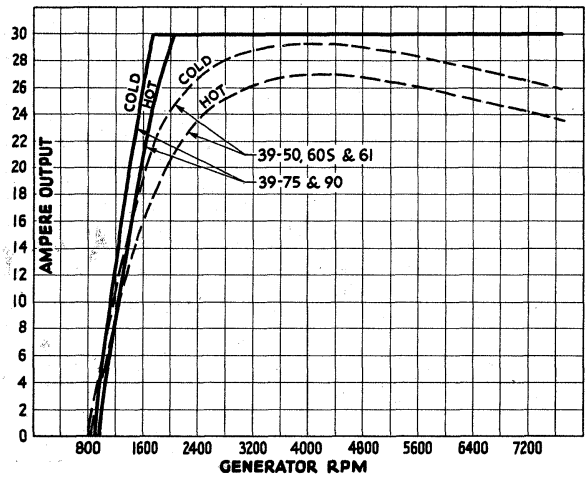


Fig. 1 Generator Charging Rates

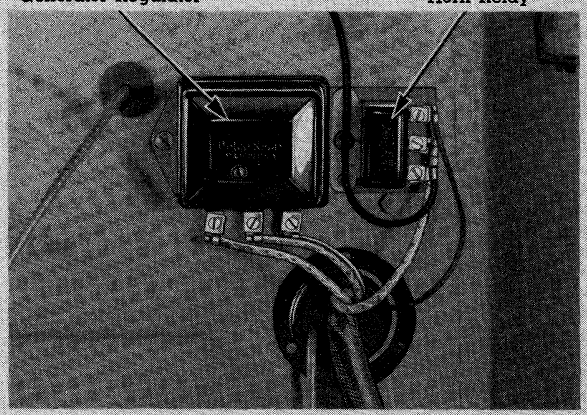


Fig. 2. Regulator Mounting
Series 39-50 and 61 (Typical of 39-60S)

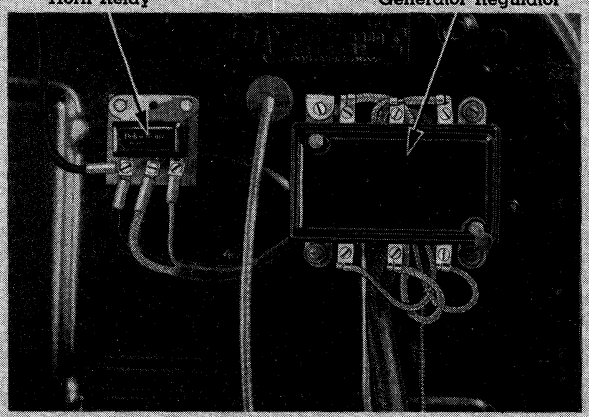


Fig. 3. Regulator Mounting
Series 39-75 and 90

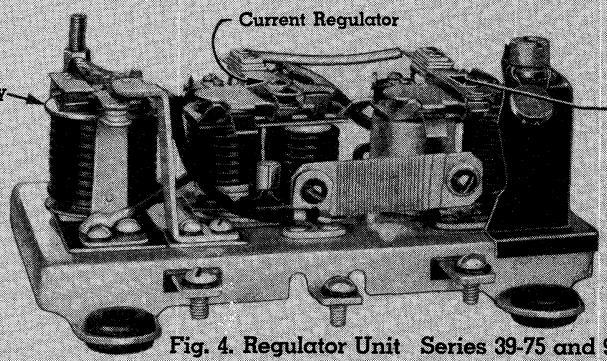


Fig. 4. Regulator Unit Series 39-75 and 90

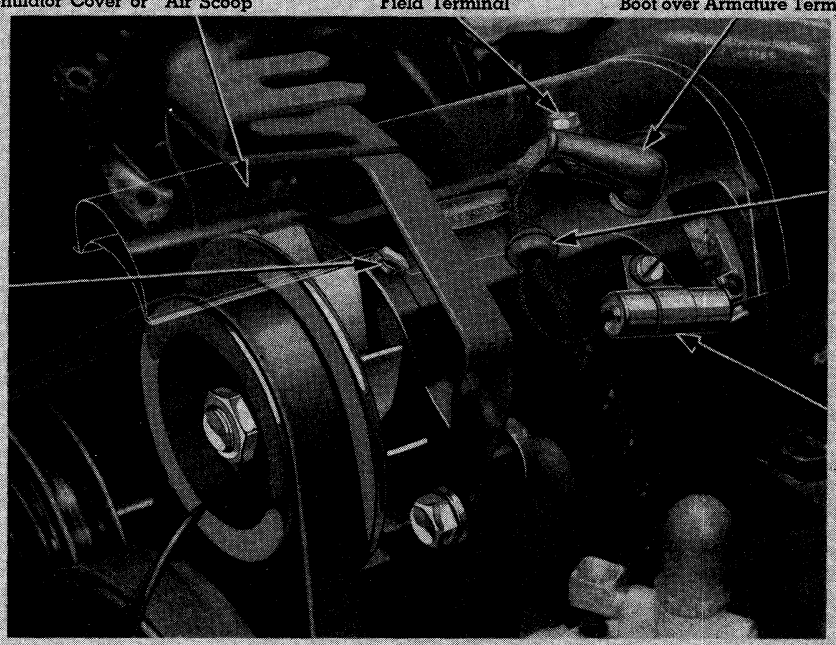


Fig. 5. Generator and Connections
Series 39-50, 61, 60S and 75

Plate 32. Generator and Regulator Mountings

connected in the lighting circuit so that it operates only when the rear lamps are turned on. A gravity switch, which is part of the lamp mounting, turns the light on and off as the trunk lid is raised or lowered.

A thermostat relay, mounted on the lighting switch, is placed in the lighting circuits to guard against damage due to electrical shorts. When a short occurs, the relay will vibrate and cause the lights to flicker until the short is corrected.

Horns--The horns on all V-8 cars have short die cast bells. They are mounted accessibly under the hood on the hood cross brace. The horn relay is mounted on the front of the dash, next to the generator regulator. Horn relay connections are shown in Figures 6 and 7.

The 39-90, V-16 car uses long trumpet type horns mounted behind the radiator grille. These horns are adjusted while on the car by reaching through hand holes in the radiator shroud when the hood is open.

Instrument Panel--The same design of instrument panel is used on all 39-series cars. The structural portion is integral with the body and the visible portion is assembled to it. The removal of individual instruments is covered in Note 9.

Both the gasoline gauge and the engine temperature indicator operate electrically and function only when the ignition is turned on. The gasoline gauge tank unit is essentially a rheostat, actuated by the movement of the float in the tank. Changes in fuel level change the resistance in this circuit, which in turn is indicated on the dial.

The thermostatic unit in the cylinder head is affected by temperature changes so that it likewise changes the resistance in its circuit, which is indicated on the temperature indicator dial and calibrated in degrees Fahrenheit.

The battery indicator is not an ammeter; it indicates merely whether the battery is being charged or discharged. When the current is to be measured, a precision ammeter and voltmeter must be used, and attached to the proper terminals at the regulator box.

The clock is electrically operated. It is started automatically when the hands are reset. The clock reset and regulating knobs can be reached from inside the glove compartment. When resetting the clock, be careful not to disturb the regulator pointer.

The instrument panel lights are controlled by a three position switch. At the left, it lights the instrument lamps provided the headlamps are also lit. At the right, it lights both the instrument lamps and the lock lamp, regardless of the headlamps. Center position is off.

*

Service Information

1. DISCONNECTING WIRES IN GENERATOR CIRCUIT

Whenever disconnecting any wires in the generator circuit, the starter circuit, or any wires in the harness opening at the regulator box, the battery must be disconnected first of all.

This precaution is necessary to prevent any possibility of the loose connections being grounded in a way that will reverse the generator polarity--a condition which may cause serious damage to the charging circuit.

Never run or test the generator on open circuit. If it should ever be necessary to operate the engine without the battery connected, the generator must be grounded or both generator and regulator will be damaged.

2. INSTALLING GENERATOR COVER

Two precautions must be observed when reinstalling the ventilator cover or "air scoop" on 39-series generators. The first is to make certain that the raised area in the cover is directly over the armature terminal, to provide maximum clearance for the wiring, and the second is to make sure that the cover does not conceal the front generator oil cup.

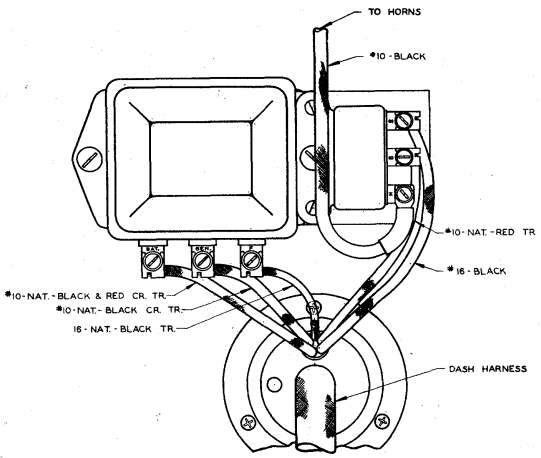


Fig. 6 Regulator Connections
Series 39-50, 61 and 60S

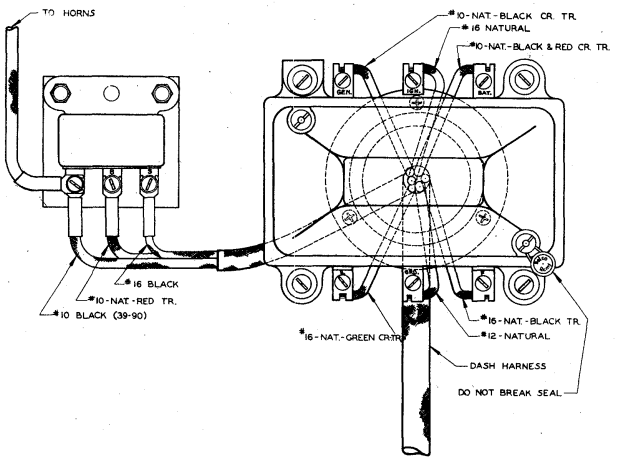


Fig. 7 Regulator Connections
Series 39-75 & 90

The location of the raised area is particularly important on cars equipped with radio, as the radio condenser lead is connected at this point, and it must be installed correctly if adequate clearance is to be maintained.

To connect this condenser lead wire, slip it first through the rubber grommet that protects the wiring harness from the edge of the ventilator cover. Then place it parallel to the wiring harness and under the protective rubber boot that insulates the terminal and wires from the cover. (See Plate 32, Figure 5).

3. STARTER SOLENOID SERVICE

The solenoid starter circuit is so designed that after the generator is charging, there is no possibility of the starter engaging while the engine is running, even if the starter button is accidentally depressed. There are two conditions, however, that may cause accidental starter engagement.

1. The idling speed may be so low that the generator is not charging. In order to assure against starter difficulties, the idling speed should always be set high enough to keep the ammeter indicating on the "charge" side.
2. There may be a short in the wire from the starter relay to the generator regulator. This short may occur at the relay cover or anywhere in the wiring harness, and must be located with a test light. In case of a "floating ground" it may be necessary to move the wiring harness at various points to produce the ground.

In case the starter engages as soon as the ignition is turned on, either the starter switch button is sticking or there is a short in this circuit.

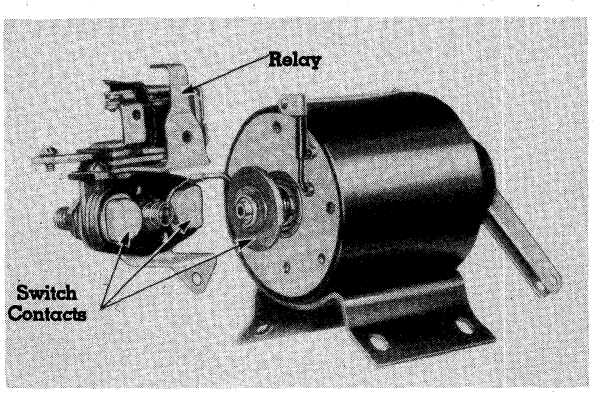


Fig. 8 Starter Solonoid and Switch

4. SOLENOID PLUNGER ADJUSTMENT

The only adjustment on the starting motor assembly is that of the solenoid plunger to secure the proper mesh of the starting pinion with the flywheel ring gear. To make this adjustment:

1. Remove starter from engine.
2. Remove pin in upper end of shifting yoke.
3. Push solenoid plunger all the way in the solenoid and move pinion all the

MODEL	DIM. A	DIM. B
39-50	25 1/2	36 11/32
39-60 S	27 1/2	35 19/32
39-61	26 3/8	36 29/32
39-75	26 1/4	38 9/16
39-90	32 9/16	34

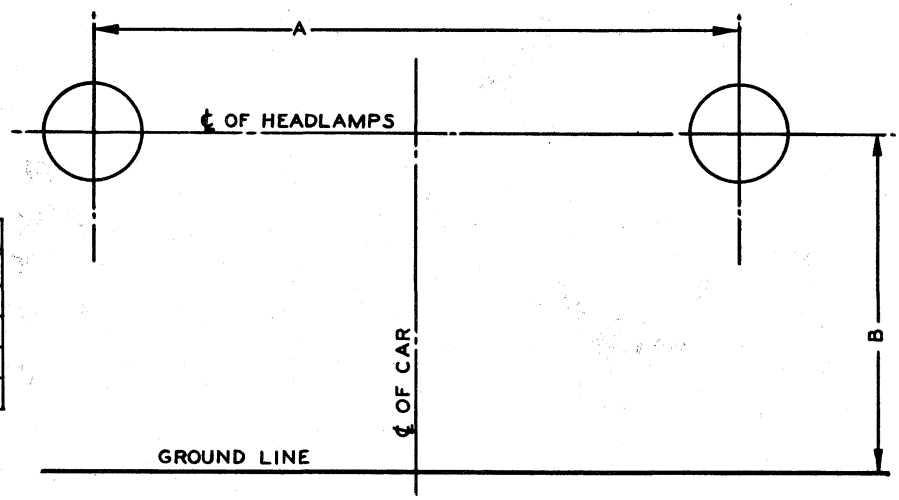


Fig. 9 Headlamp Aiming Diagram

way out to what would be cranking position if starter were mounted, taking out all backlash in shifting mechanism.

4. Move pinion 1/8 inch back toward disengaged position and adjust stud in solenoid plunger until pin may just be inserted at forward end of slot.

5. CLEANING HEADLAMPS

The headlamps require periodic cleaning and occasional readjustment. To clean the headlamps, remove both headlamp lens and clean them with alcohol inside and out. Wipe all dust from the reflectors and, if necessary, polish them with a soft rag dipped in a mixture of lampblack and alcohol.

In polishing reflectors, always rub from the center outward in straight lines. Do not polish reflectors with a circular motion, because the fine circular lines break up the light rays and reduce the illumination.

Replace any gaskets that are damaged or do not fit properly. Replace any bulbs that are burned out or show signs of blackening. Try the lighting switches in all positions and see that all bulbs burn properly.

In replacing bulbs it is important to use bulbs furnished by the factory Parts Department or manufactured by approved bulb suppliers. Only prefocused headlamp bulbs with Mazda trademark should be used.

6. HEADLAMP ADJUSTMENT

Two adjusting screws on each headlamp provide for accurate aiming of the headlamp beam. The adjusting screw for up-and-down aiming is in a hole at the bottom of each lamp; the screw for sideways aiming is at the inner edge of the lamp between the lamp door and the radiator casing, and is accessible after removing the chromium plated spring-retained plug.

The headlamp beams are to be aimed with the lens and door in place in order to avoid the possibility of adjustment being changed when the door is reinstalled. Most accurate aiming can be secured with headlamp testing equipment.

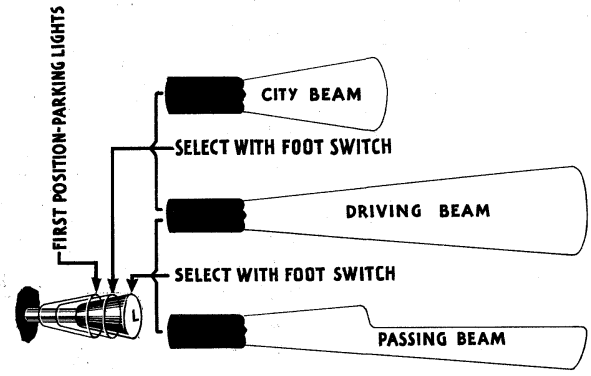


Fig. 10. Headlamp Switch

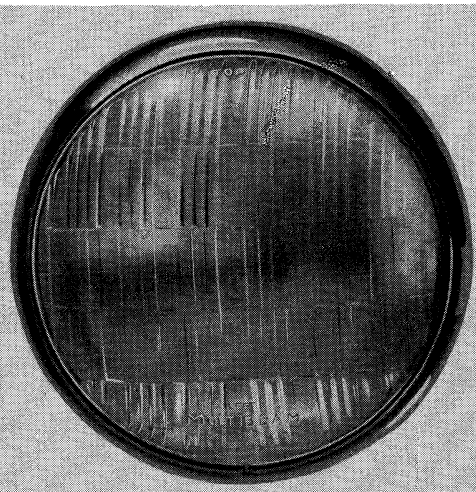


Fig. 11. Headlamp Lens

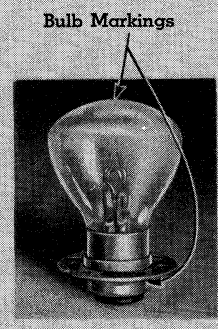


Fig. 12. Prefocused Bulb

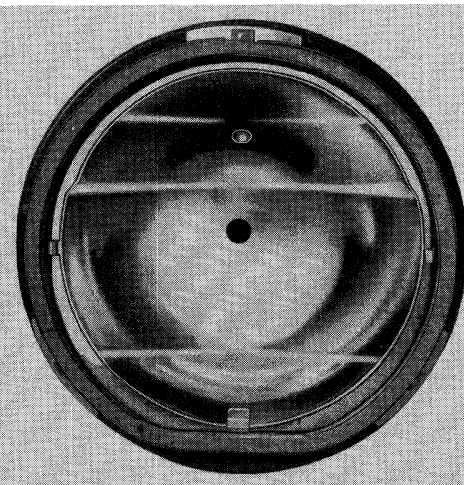


Fig. 13. Headlamp Reflector

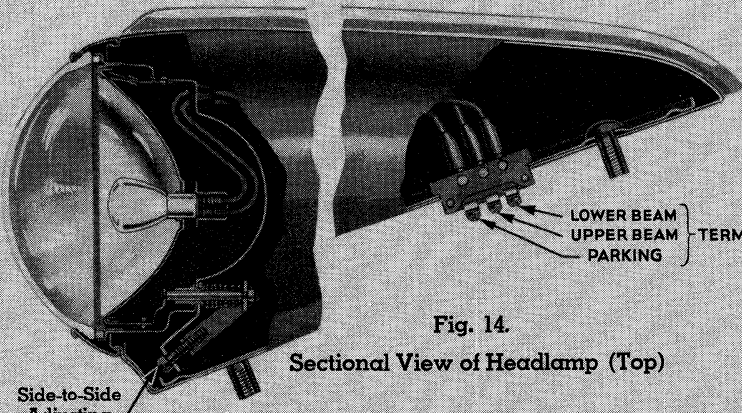


Fig. 14. Sectional View of Headlamp (Top)

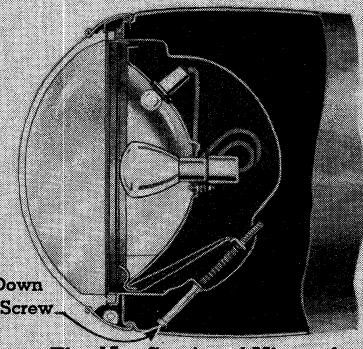


Fig. 15. Sectional View of Headlamp (Side)

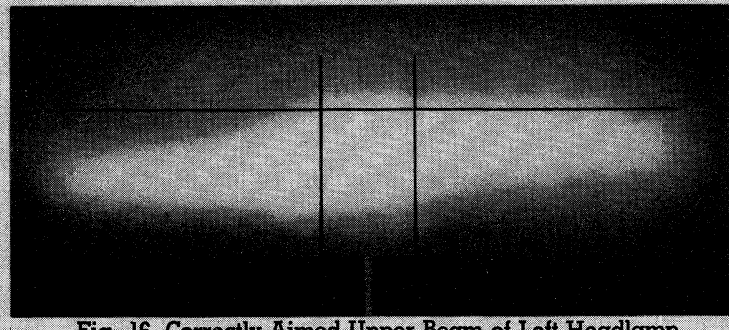


Fig. 16. Correctly Aimed Upper Beam of Left Headlamp

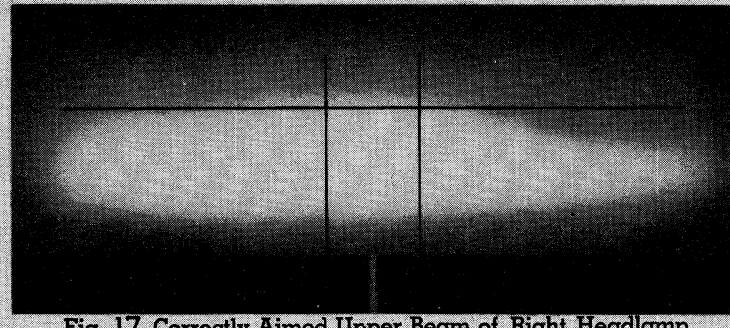


Fig. 17. Correctly Aimed Upper Beam of Right Headlamp

Plate 33. Headlamp Adjustment, All Series

If testing equipment is not available the lights can be aimed using a screen drawn up according to the dimensions given in the illustration in Figure 9. The procedure when using the screen is as follows:

1. Place the car on a level floor 25 feet from the screen.
2. With the lens and doors in place, switch the headlamps to the "driving" position and cover one lamp.
3. Tighten or loosen the adjusting screws to give the correct beam pattern as shown in Figures 16 and 17.
4. Repeat the procedure on the other headlamp, meanwhile covering the one already adjusted.

When replacing the headlamp bulbs there is a possibility that the adjustment may be changed. Therefore, when a new bulb is installed, the headlamp adjustment should be checked after the door has been reinstalled.

7. HORN BUTTON ALIGNMENT, 39-50

Sticking horn buttons on 39-50 cars with standard steering wheels are usually due to misalignment of the horn button retainer. The retainer has three ears which hold the button in place. These ears project upward and inward from the base of the retainer. The vertical section must be at right angles with the base of the retainer.

If these ears do not have the correct angle, they must be bent back to it, otherwise, they will throw the button to one side, making it stick down when depressed.

8. HORN ADJUSTMENT

In cases of poor horn tone, the difficulty will ordinarily be found to result from one of the following causes:

Low Battery—Make sure that the battery is in good condition and fully charged, also that the battery connections are clean and tight.

Poor Electrical Contacts—Check the contacts to make sure they are not burned or dirty.

Faulty Horn Relay—Make sure the relay is operating properly. In most cases, a defect in the tone can be corrected by checking the above points. If not, the air gap between the armature and the field should be checked as a last resort. This gap requires extremely accurate setting and should not be touched until all other possibilities have been exhausted.

If the air gap is out of adjustment, it should be set parallel within .003 inch and to the following limits:

* Low note .... .042 to .046 inch
High note ... .032 to .036 inch

9. REMOVAL OF INSTRUMENTS

The individual instruments can be disassembled from the instrument panel, first in pairs, and then singly. In removing or installing instruments, care must be exercised not to bend the pointers or to otherwise damage the delicate working parts.

To assure against damage to the pointers, which are mounted in front of the dials, stops are located on the back of the panel. When an instrument cluster is to be removed, the screws must be taken out and the cluster moved down until the stops are cleared, then the cluster can be lifted out without damage to the pointers.

The glass over the group of instruments can be replaced, but it is necessary first to remove the entire panel of instruments, after which the Phillip's screws holding the moulding can be taken out and the glass replaced. The glass over the center and right hand panels must be replaced with the channels. These parts can be removed individually after loosening the screws at the back of the panel.

10. GASOLINE GAUGE SERVICE

If the gasoline gauge does not register when ignition switch is turned on,

1. This may be caused by a break in the line between the dash unit and the ignition switch.

If the gauge shows Full under all conditions,

* These figures for V-8 only. See specifications for V-16.

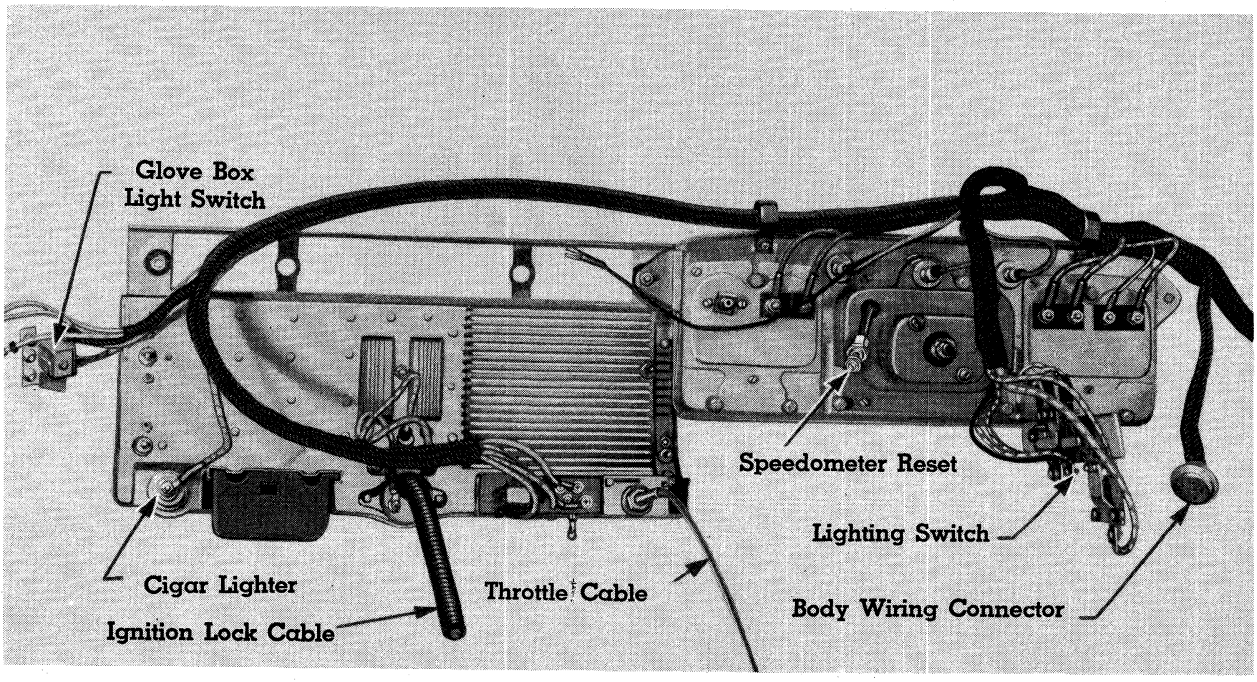


Fig. 18 Instrument Panel, Rear View

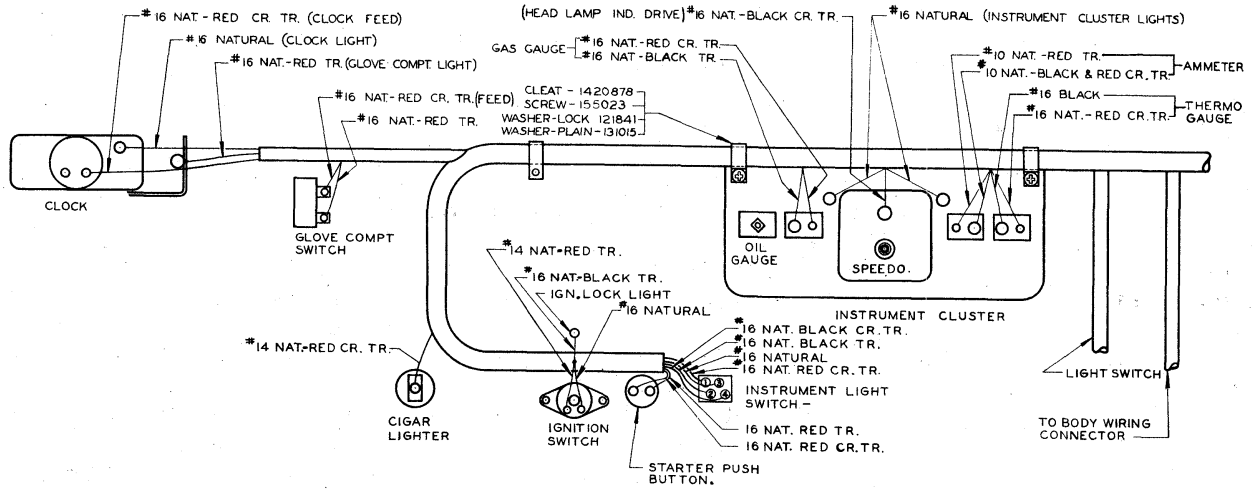


Fig. 19 Instrument Panel Connections

1. This may be caused by a break in line between dash unit and tank unit. To remedy this, check line and all connections.

2. Tank unit burned out. Replace tank unit.

3. Tank unit improperly "grounded" due to loose mounting screws or paint under the screw heads.

Tighten screws holding the tank unit. "Ground" the tank to the chassis and test.

If the gauge shows Empty under all conditions,

1. This may be caused by wires being reversed on dash unit. To correct this trouble, reattach wires to proper terminal.

2. Dash unit not "grounded." Ground or replace dash unit.

3. Lead to tank unit grounded or tank unit rheostat continually grounded.

If gauge is inaccurate throughout entire range:

This condition may indicate the need for readjustment of the lock screw for the

magnetic coils operating the needle. The lock screw is on the bottom of the dash unit on the left hand side. To readjust, loosen the screw and re-set to the correct readings. It is, of course, necessary to have a float unit in the circuit and to recheck the readings by filling the tank.

In some instances, incorrect readings are due to a bent float arm. The remedy in this case is bending the arm back to its normal position.

The work in locating the trouble will be considerably simplified if an extra tank unit is available, as this can be connected up temporarily with the gauge by a short piece of wire, and grounding the tank unit to the chassis. The float can then be moved to the "Full" and "Empty" positions. If the dash unit indicates the corresponding positions, the trouble is confined to the tank unit and wiring.

11. TEMPERATURE GAUGE SERVICE

If the temperature indicator shows "hot" at all times, or is otherwise inoperative, the fault is usually in the cylinder head unit, which should be replaced. In rare cases, there may be failure of the dash unit, which can be corrected only by replacement.

12. CLOCK RESETTING AND REGULATING

The resetting knob for the clocks used on 39-series cars is located close to the regulator lever; a fact which sometimes results in accidental changing of the regulator when the clock is reset.

The resetting knob on the clock has a wide top that is slightly concave. The correct method to be used when resetting the clock is to place the end of the index finger on the top of the knob, push in and turn either direction as required. The knob should not be twisted between the thumb and forefinger as this might move the regulator lever.

All clocks have a pencil mark opposite regulator pointer to indicate the setting determined by the manufacturer, thus permitting easy readjustment if the lever is accidentally bumped. The regulator may be seen by placing a mirror on a slant in the glove compartment opening and directing a light upon it.

In some instances, the mark may not be exactly correct for operating conditions. However, the regulator may be easily readjusted as required.

13. INOPERATIVE CLOCKS

Should an instance occur where a clock on a 39-series car is found to be inoperative, the ground connection should be inspected. The two ears which support the clock also serve as a ground connection.

The parts of the panel upon which the two ears rest should be thoroughly cleaned and scraped free of any foreign matter. The screws holding the clock to the panel also must be tightened securely.

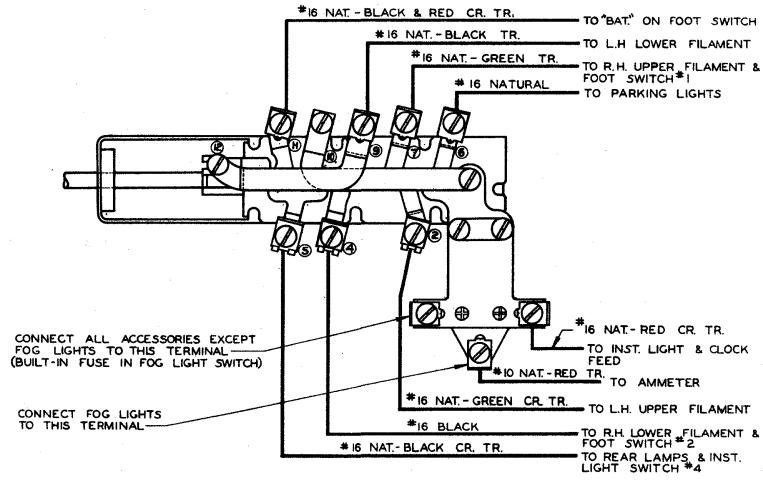


Fig. 20 Headlamp Switch Connections

If a clock should still prove to be inoperative after the ground connections have been checked, it should be removed from the car and tested on a separate battery.

14. INSTALLING ELECTRICAL ACCESSORIES

When installing additional electrical equipment, such as heaters or spot lights, they should ordinarily be connected to the thermostat relay (the "fuse" of the lighting system) as shown in Figure 20, so that the new circuit will also be protected by the relay.

Cadillac radios or fog lights should, however, be connected to the feed terminal on the relay or to the discharge side of the ammeter, as these accessory circuits have their own fuse protection.

If the owner installs so much electrical equipment that the total normal load causes the relay to vibrate, it will be necessary to connect some of the equipment direct to the discharge side of the ammeter. Equipment so connected will not have circuit breaker protection.

Bulb Data Chart

LOCATION	VOLTAGE	CANDLE POWER	CONTACT	MAZDA NO.
Headlights				
Right ..... } 39-50, 61, 60S & 75	6-8	32-21	Double	2320-L
Left ..... }	6-8	32-21	Double	2320-L
Right ..... } 39-90	6-8	32-32	Double	2330-L
Left ..... }	6-8	32-32	Double	2330-L
Rear Light (signal & drive)	6-8	21-3	Double	1154-L
Dome light	6-8	15	Single	87
Quarter light	6-8	15	Single	87
License illuminating bulb	6-8	3	Single	63
Fender light	6-8	3	Single	63
Parking light in headlight	6-8	1.5	Single	55
Instrument lights	6-8	1.5	Single	55
Clock light	6-8	1.5	Single	55
Glove compartment light	6-8	1.5	Single	55
Trunk light	6-8	1.5	Single	55
Beam indicator bulb	6-8	1	Single	51
Radio light	6-8	1	Single	51
Ignition lock light	6-8	1	Single	51

Other Electrical References

Electrical Specifications

SUBJECT AND REMARKS	39-50, 61 & 60S	39-75	39-90
BATTERY			
Delco type number	17 K.T.W.	17 K.I.W.	21 D.W.
Capacity ampere hours —			
20 hour rate	115	115	175
Charging rate on bench —			
Start in amperes	10	10	10
Finish in amperes	8	8	8
Terminal grounded	Positive	Positive	Positive
Plates, number of	17	17	21
GENERATOR			
Delco type number	1101056	1102654	1102655
Armature —			
Commutator out of round, not over	.002"	.002"	.002"
Charging rate maximum in amperes (See Figure 1)	29	30	30
Voltage regulator —			
Voltage setting			
Closed circuit in volts at 70° F	7.5-7.9	7.5-7.9	7.5-7.9
Closed circuit in volts at 150° F	7.4-7.6	7.4-7.6	7.4-7.6
Do not set voltage on open circuit. Generator output should be 8-10 amperes.			
Delco type number for complete regulator units	5860	5867	5867
HORN			
Delco type number	K-33-H	K-33-H	K-33-D
Air gap between armature and field core —			
Low rate	.042-.046"	.042-.046"	.045-.050"
High rate	.032-.036"	.032-.036"	.036-.040"
Current consumption in amperes at 6 volts	10-12	10-12	12-14
STARTING MOTOR			
Delco type number	1107912	1107912	000714
Armature			
Clearance between shaft and bearings, not over	.010"	.010"	.010"
Commutator out of round, not over	.002"	.002"	.002"
End play, not over	.030"	.030"	.030"
Relay —			
Air gap between armature and core	.010-.014"	.010-.014"	.010-.020"
Hold contacts together lightly while measuring air gap			
Contact gap (point opening)	.030-.045"	.030-.045"	.015-.030"

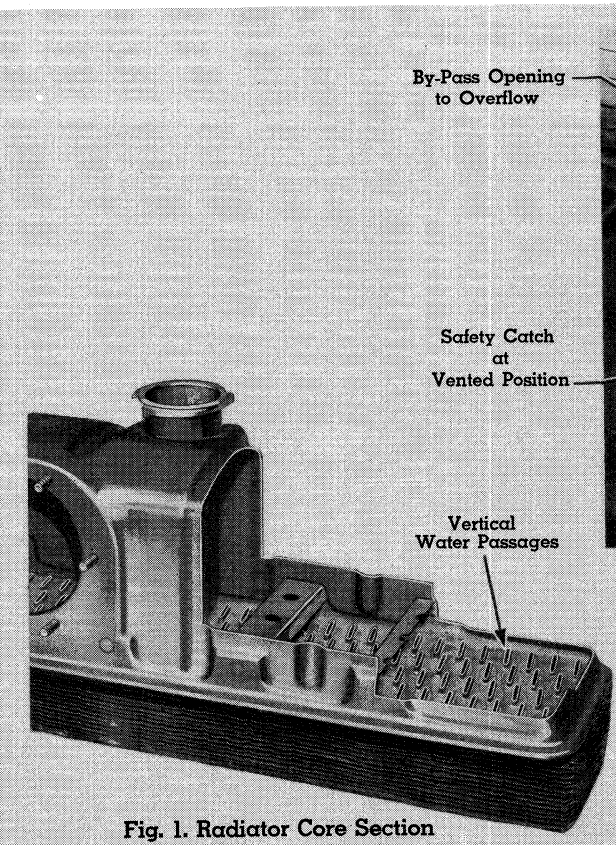


Fig. 1. Radiator Core Section
Typical of All V-8 Series

Fig. 2. Radiator Filler Cap
Typical of All Series

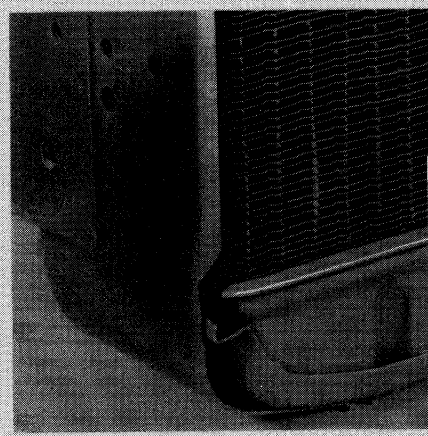


Fig. 3. Radiator Core to Lower
Tank Header Joint

Typical of All V-8 Series

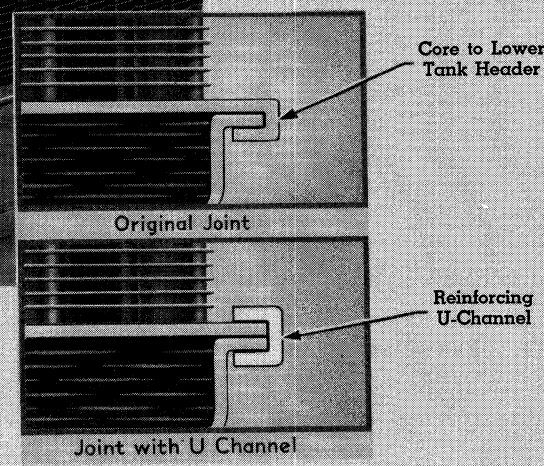


Plate 34. Radiator Details

RADIATOR

General Description

The radiators on all 39-series cars are of an all-copper tube and fin construction, except on 39-90, which has a cellular core. The water passages are wide and straight with smooth interiors, permitting free cooling liquid flow and efficient cleaning of the radiator.

All radiators have thermostatically controlled shutters installed just ahead of the radiator core.

A pressure-operated vent valve is contained in the radiator filler cap on all series cars. Fluid must pass through this valve in order to reach the overflow pipe. As a pressure of about 7 lbs. is required to open this valve, the boiling point of the solution is raised and there is less likelihood of loss of cooling solution, particularly volatile anti-freezes.

*

Service Information

1. REMOVING RADIATOR FILLER CAP

The radiator cap used on all 39-series cars is of the bayonet type with a safety catch.

To remove the cap, it is first rotated toward the left until the stop is reached. In this position the cooling system becomes vented to the atmosphere as shown in Plate 34, Figure 2. The cap should be left in this safety position until all pressure or steam has been relieved. The cap is then removed by further rotation to the left. When reinstalling cap, be sure to turn all the way to the right.

2. COOLING LIQUID LEVEL

The cooling system should be filled to a level approximately one inch below the bottom of the filler neck. This means that solution will be visable just above the baffles in the radiator tank. In order to avoid excessive expansion losses, it should not be filled higher than this level.

3. RADIATOR RUST PREVENTIVE

To safeguard the cooling system against excessive formation of rust and scale, with the resultant radiator plugging and large solution losses, some form of rust preventive should be used the year around.

Cadillac Cooling System Inhibitor is recommended for this purpose. C-60 Soluble oil may also be used as a rust preventive. One quarter of a pint of C-60 oil is all that should be applied to the cooling system at one time.

It is important not to use too much inhibitor and not to use two different types at the same time. Many anti-freeze solutions, particularly the non-volatile types, contain a rust inhibitor. When these anti-freezes are used, no other inhibitor should be added.

4. DRAINING THE COOLING SYSTEM

There are three drain cocks in the cooling systems of all 39-series cars. One is located at the side of each cylinder block and one located on the radiator outlet casting at the bottom of the radiator.

In order to assure a complete drainage of the cooling system, be sure to open all three drain cocks and to have the engine hot when draining.

5. ANTI-FREEZE RECOMMENDATIONS

Denatured alcohol, methanol, distilled glycerine, and ethylene glycol are the most commonly used anti-freeze solutions.

Certain precautions are always necessary when using anti-freeze solutions. Alcohol and methanol solutions must be watched closely to guard against loss by evaporation and against damage to the car finish by solutions or vapors. Glycerine and ethylene glycol solutions have a tendency to loosen rust and scale and to leak out of partially tightened connections, and on this account, necessitate thorough cooling system conditioning before they are installed.

Alcohol and methanol solutions have, for all practical purposes, the same specific gravity and they may be tested

with the same hydrometer and may be mixed in the same solution. In making these tests, both the temperature and the specific gravity must be taken into consideration.

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

Whenever anti-freeze is to be installed, inspect the entire cooling system carefully. All hose connections and gaskets should be tight and in good condition. Deteriorated hoses or broken gaskets should be replaced. A careful inspection of the water pump, radiator and fan belt is also important. The cooling system thermostat and shutter mechanism should always be tested for proper operation.

6. HIGH READING THERMOSTAT

In areas where extreme cold weather is encountered, it may be necessary to install a special high reading thermostat in order to secure satisfactory results from a hot water heater, if one is used in the car. The operating temperatures for both standard and high reading thermostats are shown in the table.

Thermostat Operating Table
All 39-Series

Standard Thermostat

Starts to Open ..... 148-153° F.
Fully Open by ..... 170° F.

High Reading Thermostat

Starts to Open ..... 163-168° F.
Fully Open by ..... 185° F.

NOTE: It is not advisable to use volatile anti-freezes with high reading thermostats because of the possibility of solution loss due to the high temperatures.

7. REMOVING RADIATOR THERMOSTAT

The radiator thermostat may be replaced and the shutters adjusted on the series 39-61, 60S and 75 cars, without removing any parts, through the large hand hole in the top of the radiator shroud. On series 39-50 cars, the dummy shroud at the top of the grille must first be removed, after which the thermostat is readily accessible. The thermostat in series 39-90 cars is located on the engine side of the radiator and of course no parts need to be removed to replace it.

8. VACUUM TESTS FOR RADIATOR CLOGGING

1. Remove radiator filler cap.
2. Attach vacuum gauge or a mercury manometer to water pump drain fitting as shown in Plate 35.

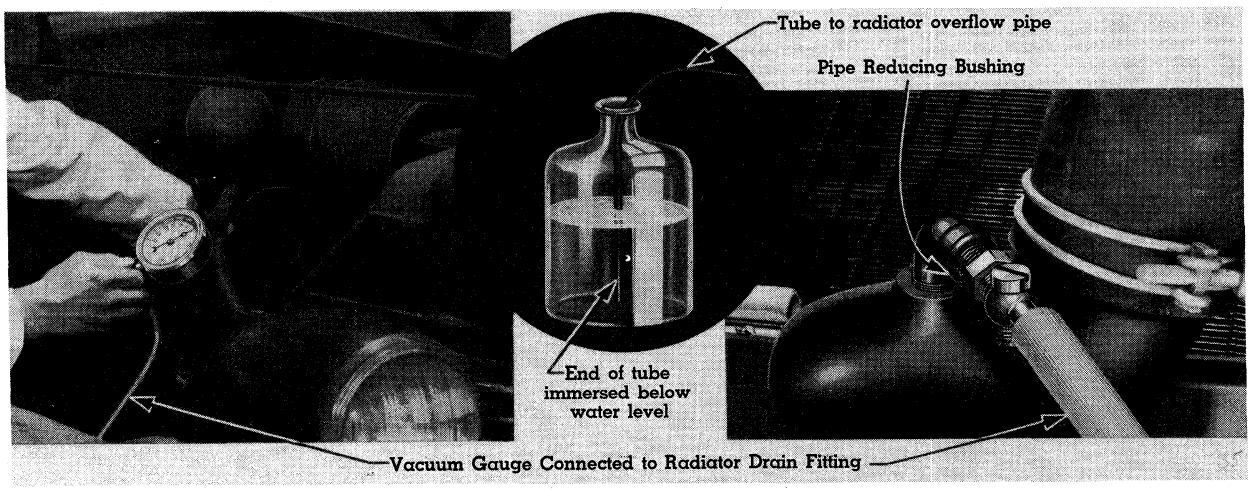


Plate 35. Radiator Tests

NOTE: It is necessary to install either a 37-series fitting with a 1/4 to 1/8-inch pipe reducing bushing or a plain tube fitting to avoid air leakage at this point.

If the liquid is not hot, the drain fitting may be changed without draining and with very little loss.

3. Jack up car and run engine until solution has been warmed to between 160 and 180°, as indicated by a thermometer inserted in the radiator filler neck.

4. Accelerate engine to a speed of 60 m.p.h., and take reading on vacuum gauge or mercury manometer. If vacuum exceeds 5 inches of mercury this is evidence of at least partial radiator clogging or restriction. Be sure that radiator cap is off while making this test.

NOTE: In rare cases of severe overheating at high mileages, the vacuum reading may be low even though the radiator is clogged, because the water pump impeller is badly corroded and eaten away. In such cases, the pump impeller must be replaced.

As an alternative method, a radiator flow rate test, may also be used to determine the extent of radiator clogging. Since equipment used for this purpose varies, however, test specifications for universal use cannot be supplied.

9. AIR AND WATER LEAKAGE TESTS

The following test procedure will show the presence of air leakage at cylinder head gaskets and at the water pump:

1. Fill cooling system completely. Do not leave any air or expansion space as in normal filling.

2. Install a radiator cap, without a pressure valve or a cap in which pressure valve has been drilled.

3. Secure a glass jar of from one-half to one gallon capacity and fill it half full of water. Secure also a length of 3/8-inch rubber tubing, attaching one end to radiator overflow pipe and submerging other end in water in jar as shown in Plate 35.

4. Jack up car and run engine with transmission in high gear. Evidence of leakage from water pump or cylinder head gaskets will be a bubbling of air through rubber hose into jar.

Bad cylinder head gasket leakage will cause bubbling under almost any running condition, although the best test is to run the engine at speeds not over 10 m.p.h. but operating under full load or wide open throttle, a condition secured by momentarily applying the brakes.

Water pump leakage is most evident at higher speeds (around 60 m.p.h.) and with little or no load. If leakage occurs under this running condition, but not at low speed full throttle, the water pump is definitely the cause.

10. AIR AND WATER LEAKAGE CORRECTION

Cylinder head gasket leakage can be corrected by installing new gaskets and insuring leak-proofing by applying Perfect Seal Gasket Paste, available from factory Parts Department, before installation.

Water pump leakage in an otherwise normal cooling system can usually be remedied by replacing worn pump parts, such as packing glands or shafts. A water pump in good condition will, however, leak air at high speeds if the radiator is so badly clogged that there is a high restriction at the pump inlet.

11. PREVENTIVE RADIATOR CLEANING (Recommended on cars driven less than 12,000 miles)

1. Drain solution from cooling system by opening all drain fittings.

2. Refill system with fresh water and add one package of Cadillac Cooling System Cleaner.

3. Run engine at medium speed for one hour at a temperature as hot as possible without boiling.

4. Drain system by opening all drain fittings.

5. Flush entire system thoroughly to remove all of cleaner. Use water only for this operation and do not reverse flush.

6. Check radiator for leaks.

7. Check radiator air passages for plugging with bugs, leaves, etc.

8. Check shutter thermostat to see that it opens and closes shutters.

9. Check condition and tension of fan and water pump belts.

10. Check condition of hoses and tighten clamps.

11. Tighten all cylinder head bolts.

12. Refill cooling system. In summer, use water and one bottle of Cadillac Cooling System Inhibitor. In winter also, use inhibitor unless anti-freeze contains an inhibitor.

12. CORRECTIVE RADIATOR CLEANING

The cleaning procedure for use on very dirty, clogged or over-heating cooling systems is as follows:

1. Drain solution from cooling system by opening all drain fittings.

2. Refill system with fresh water and add two packages of Cadillac Cooling System Cleaner.

3. Run engine at medium speed at a temperature as high as possible without boiling for two to three hours, depending on condition of system.

4. Tighten cylinder heads while engine is hot.

5. Drain system by opening all drain fittings.

6. Disconnect radiator-to-water pump hose at radiator, and cylinder head-to-radiator hoses at cylinder heads.

7. Reverse flush each side of engine block only, using water and compressed air.

8. Replace water pump hose and reverse flush entire system, including radiator, with water only. In doing this, connect flushing gun to one cylinder head outlet and block off opposite outlet with a clamp or plug in hose.

NOTE: On V-16 cars, the water pumps should be removed before beginning flushing to avoid damaging carbon seals. The water distributing tube in each cylinder block should also be pulled out two or three inches to facilitate thorough cleaning.

9. Check radiator for leaks. This may be done best by fitting radiator with a standard 3-1/2 to 4 pound pressure cap and warming up solution.

NOTE: The 4 pound pressure cap is either a 37-series LaSalle cap without a vent hole or a 38-series LaSalle cap without either a vent hole or a green marking in the center.

10. Check radiator air passages, shutter operation, fan belt, hoses, and cylinder head bolts.

11. Refill cooling system, and add one bottle of Cadillac Cooling System Inhibitor, except where an anti-freeze containing an inhibitor is used.

13. SPECIAL RADIATOR CLEANING

1. If a very hard scale deposit is present, it may be necessary to circulate cleaner for a longer period of time.

2. For extremely greasy systems, regular procedure may be modified by --

(a) Adding two to three quarts of kerosene after one package of cleaner has been dissolved in radiator solution. Circulate for one hour.

(b) Draining and flushing out first cleaner solution and adding a second package of cleaner. Circulate for one hour or more.

3. In systems having a very large quantity of sludge deposit, it is sometimes difficult either to dissolve all the material with the cleaner or to remove it all by ordinary reverse flushing. A satisfactory procedure for these conditions is a supplementary prodding and flushing through the first and second bolt holes at the bottom row at each end of the cylinder heads and the center row bolts on each end of the heads.

A piece of tubing (5/16" outside diameter by approximately 12" long) connected to a good water or water and air supply and flushed through each of these bolt holes while reverse flush water is circulating through engine will give good results.

14. DISASSEMBLY OF RADIATOR CORE ASSEMBLY

Due to the construction of the radiator core assembly, the top tank should never be removed for service purposes and then reinstalled. It can however be removed and installed on a new radiator core because of the way in which new cores are supplied by the factory.

When it is necessary to disassemble the core, the bottom tank should be removed as follows:

1. Remove anchorage and outlet casting.
2. Melt solder on header-to-tank clinch joint.
3. Pry open and break off the clinch joints with any flat, narrow tool on the engine side of the tank and straight part of ends only.
4. Slide tank out toward the rear without changing the clinch joints on the front side.

15. ASSEMBLY OF RADIATOR CORE

In order to install the bottom tank to the core in as strong a manner as possible, a "U" channel should be constructed to slip over the header-to-tank clinch joint as shown in Plate 34, Figure 3. It may be made from a piece of ordinary .025 to .035 inch sheet brass, 3/8 inch wide by 25 inches long.

The brass should be bent over a piece of flat stock to make a "U" channel approximately .100 inch inside the "U" with 1/8 inch legs, or it may be constructed by bending at only one leg, soldered in place on the joint at that leg and then clinched or bent over the ends of the joint to form the other leg. Small Vee-shaped scallops should be cut in the legs of the channel a short distance in from each end to facilitate bending around the corners of the tank.

Radiator Specifications

SUBJECT AND REMARKS	39-50	39-60S	39-61 & 75	39-90
Area of radiator core in square inches	400	381	400	506
Capacity of cooling system in quarts	25	24-1/2	24-1/2	30
Water temperature control	thermostat & shutters	thermostat & shutters	thermostat & shutters	thermostat & shutters

Other Radiator References

LUBRICATION

	Lubrication Number											
	1	2	3	4	5	6	7	8	9	10	11	12
Every 1000 miles												
Oil starter and generator oil cups (none on V-16)	●	●	●	●	●	●	●	●	●	●	●	●
Oil hand brake connections	●	●	●	●	●	●	●	●	●	●	●	●
Oil clutch release mechanism	●	●	●	●	●	●	●	●	●	●	●	●
Oil distributor cam wick (2 on V-16)	●	●	●	●	●	●	●	●	●	●	●	●
Lubricate distributor grease cup (2 on V-16)	●	●	●	●	●	●	●	●	●	●	●	●
Lubricate water pump (except V-16)	●	●	●	●	●	●	●	●	●	●	●	●
Lubricate chassis connections	●	●	●	●	●	●	●	●	●	●	●	●
Lubricate body hardware	●	●	●	●	●	●	●	●	●	●	●	●
Add water to battery	●	●	●	●	●	●	●	●	●	●	●	●
Add liquid to radiator	●	●	●	●	●	●	●	●	●	●	●	●
Check tire inflation	●	●	●	●	●	●	●	●	●	●	●	●
Inspect steering gear lubricant level	●	●	●	●	●	●	●	●	●	●	●	●
Inspect transmission lubricant level	●	●	●	●	●	*	●	●	●	●	●	*
Inspect rear axle lubricant level	●	●	●	●	●	*	●	●	●	●	●	*
Every 2000 miles												
Drain and replace engine oil		●		●		●		●		●		●
Clean filter in crankcase ventilating breather		●		●		●		●		●		●
Clean carburetor air cleaner		●		●		●		●		●		●
Every 6000 miles												
* Drain, flush and refill transmission						●						●
* Drain, flush and refill rear axle						●						●
Replace oil filter cartridge (V-16 only						●						●
Every 12000 miles												
Clean, repack and adjust front wheel bearings												●

Plate 36. Lubrication Schedule

LUBRICATION

Service Information

1. ENGINE OIL RECOMMENDATIONS

During cold weather an oil should be used that will permit easy starting at the lowest atmospheric temperature that is likely to be encountered.

When the engine crankcase is being refilled, the engine oil should be selected, not on the basis of the atmospheric temperature existing at the time of the change, but on the anticipated minimum temperature for the entire period during which the oil is to be used. Unless the selection is made on this basis, difficulty in starting will be experienced at each sudden drop in temperature.

The viscosity grades of engine oil for use at the various cold weather temperatures are as follows:

If you anticipate that the minimum atmospheric temperature will be:

	Use the grade indicated:
Not lower than 32° F. above zero	20-W or SAE-20
As low as 10° F. above zero	20-W
As low as 10° F. below zero	10-W
Below 10° F. below zero .	10-W plus 10% kerosene

Note: 10-W oil plus 10% kerosene is recommended only for those territories where temperature falls below 10° F. below zero for long periods.

During summer weather, use of 20-W or SAE-20 engine oil will permit better all-around performance of the engine than will the heavy body oils. SAE-30 oil may be used if it is expected that the average prevailing daylight temperature will be 90° F. or above, or if the car is regularly driven at high speeds.

2. CHANGING ENGINE OIL

Under normal driving conditions, draining the crankcase and replacing with fresh oil every 2000 miles is recommended.

Under adverse driving conditions, it may become necessary to drain the crankcase oil more frequently. These conditions would include:

1. Driving through dust storms or on extremely dusty roads may contaminate the engine oil in spite of the engine air cleaners.
2. During extremely cold weather, frequent starts, low operating speeds, and short runs may contaminate the oil with water condensation inside the crankcase.

Drain the crankcase only after the engine has been heated to normal operating temperature. The benefit of draining is, to a large extent, lost if crankcase is drained when engine is cold, as some suspended foreign matter will cling to the sides of the oil pan and will not drain out readily with slower moving cold oil.

Whenever the crankcase oil is changed, the copper gauze in the crankcase ventilating breather cap should be cleaned in gasoline and dipped in engine oil. The carburetor air cleaner should also be cleaned and reoiled. (See Note 29, Engine Section).

3. ENGINE ACCESSORIES

Engine accessories which require periodic lubrication include, on V-8 engines, the generator, starting motor, water pump, distributor, and carburetor air cleaner. Of these items, only the distributors and the air cleaners require attention on V-16 engines. The V-16 engine does, however, have an external oil filter of the cartridge type. The filter cartridge should be changed every 6,000 miles.

4. CLEANING ENGINE OIL PAN AND SCREEN

Cleaning of the engine oil pan and intake float screen is recommended on all series engines at 12,000 mile intervals.

All of the engine oil passes through the oil pan and screen before reaching the oil pump. Foreign matter that may be in the oil is both screened out and permitted to settle out at this point so that the oil reaching the pump is free from abrasive particles.

As these particles accumulate, the screen may become partly clogged, restricting the flow of oil through the oiling system. This material, being grit or metal particles, is highly abrasive and capable of causing excessive wear in the engine unless removed.

It is a good plan, when the oil pan is down for periodic cleaning, to inspect the connecting rod and crankshaft bearings.

5. REAR AXLE LUBRICATION

The use of the proper kind and amount of lubricant in the rear axles of 39 series cars is an important consideration with which every Service man should be familiar. ONLY HYPOID DIFFERENTIAL LUBRICANT should be used.

Note: SAE-90 grade lubricant should be used all season, except in localities where winter temperatures are consistently below zero. At such times SAE-80 may be used.

The lubricant level should be inspected and fresh lubricant added, if necessary every 1,000 miles. The lubricant should be drained, the differential thoroughly flushed, and refilled with fresh hypoid lubricant every 6,000 miles.

6. TRANSMISSION LUBRICANT

The recommended lubricant for year-around use in all 39 series Cadillac and LaSalle transmissions is SAE-90 gear lubricant or SAE-90 EP lubricant. The SAE-90 Hypoid Lubricant recommended for the rear axle is also satisfactory for use in the transmission.

The transmission lubricant level must be inspected every 1,000 miles and lubricant added as needed. The transmission must be drained, flushed and refilled with fresh lubricant every 6,000 miles.

7. WATER PUMP LUBRICATION

The water pump on all 39 series V-8 cars is equipped with one covered lubrication fitting at the water pump packing side of the impeller housing. The cover should be removed and water pump grease (G-13) applied every 1,000 miles on all series. The water pumps on the 39-90, V-16 cars have sealed bearings and do not require lubrication. The waterpump should not be lubricated with the engine running.

8. DISTRIBUTOR LUBRICATION

A grease cup is provided for lubricating the distributor drive shaft bearing on all 39 series engines every 1,000 miles. The distributor advance mechanism also requires attention at the same intervals.

A felt wick located in the center of the timer cam provides a means of lubrication for this mechanism. The wick is accessible upon removal of the distributor rotor, and engine oil should be applied every 1,000 miles.

The application of a slight amount of petrolatum to the timer cam every 1,000 miles is also beneficial.

9. STEERING GEAR LUBRICATION

Special steering gear lubricant, meeting the S-200 specifications, is required for use in the steering gears of all 39 series cars. The lubricant level should be inspected every 1,000 miles and additional lubricant added to bring the level to the filler plug opening. As this lubricant is suitable for all season use, there is no necessity for draining and replacing except in the event of steering gear disassembly.

10. "GREASE GUN" CONNECTIONS AND LUBRICATION

Lubrication fittings for use of a grease gun are used wherever practical on the engine and chassis of all 39 series cars. All of the points on the car that are provided with grease gun connections should be lubricated every 1,000 miles.

The location of these points may be found by inspection or by looking at a Cadillac-LaSalle Lubrication Chart. These Charts are placed inside the back cover of the Owner's Manuals. They include such points as the following: knuckle pins, suspension arm connections, steering connections, propeller shaft spline joint, etc.

11. "OIL CAN" LUBRICATION

There are a number of points on the engine and chassis which, although not provided with a lubrication fitting, will operate more freely if given regular oiling.

Most important of these points are the hand brake cables, levers and brackets, clutch release connections, and hood hinges. Engine oil should be applied to these points with an oil can every 1,000 miles to assure free operation.

The throttle and choke connections on the dash and the engine, including the relay shafts for these connections on the series 39-90 should also be lubricated with a few drops of engine oil every 1,000 miles.

12. WHEEL BEARING LUBRICATION

The front wheel bearings on all series cars require repacking with wheel bearing grease and readjustment every 12,000 miles. In lubricating these bearings, always use grease meeting the G-12 specifications. The adjustment of the front wheel bearings is discussed in the section on Wheels and Tires, Page 102.

The rear wheel bearings on all series cars are of the self-lubricating type and require no adjustment. These bearings are packed with lubricant and permanently sealed at assembly.

13. LUBRICATING FRONT SUSPENSION SYSTEM

The threaded pins and bushings of the front wheel suspension system require thorough lubrication every 1,000 miles. It is important that the weight of the car be off the bearings, to assure lubrication at the contacting surfaces.

When lubricating these parts, therefore, the front end of the car must be lifted with a jack placed under the center of the front cross member so that the car is supported at the frame, and the front suspension system entirely relieved of weight.

The rubber bushings used in the ends of the cross shaft on series 39-50 and 61 cars should not be lubricated under any condition.

14. REAR SPRING LUBRICATION

The rear springs of all 39 series cars have waxed liners between each spring leaf. These springs require no lubrication in service. Do not attempt to lubricate them. The rubber bushings used in the rear spring shackles of series 39-50 and 61 cars should not be lubricated.

15. BODY HARDWARE

Lubrication of the body hardware is an important part of each 1,000 mile lubrication operation. The following items should be performed.

1. Lubricate the hinge pins on visible type hinges sparingly with stainless oil.
2. Apply a small amount of petrolatum to the door lock bolts and striker plates.

The lubrication of concealed door hinges on 39-50 and 61 series cars requires the use of a special grease gun, Tool No. KMO-265 with which chassis lubricant is used.

16. APPROVED LUBRICANTS

Nine different types of lubricants (not including engine oil) are required for satisfactory lubrication of 39-series Cadillac-LaSalle cars.

Specification No.	Lubricant
A-9-HL	Rear Axle Lubricant
A-90-EP	Transmission Lubricant
S-200	Steering Gear Lubricant
G-2-1/2-B	Brake Plate Grease (Lubriplate)
G-11	Chassis Lubricant
G-12	Wheel Bearing Grease
G-13	Water Pump Grease
C-60	Soluble Oil for Cooling System
G-19	Petroleum for Distributor and Battery Terminals

Lubricant Capacities

SUBJECT AND REMARKS	39-50	39-61	39-60S	39-75	39-90
Crankcase (quarts)	7	7	7	7	11
Transmission (pints) ...	2-1/2	2-1/2	2-1/2	2-1/2	2-1/2
Rear Axle (pints)	5	5	5	6-1/2	6-1/2
Steering Gear (pints) ..	3/4	3/4	3/4	1/2	1/2

Special Tools

Available through the Hinckley-Myers Company, Jackson, Mich.

Tool No.	Description	Series
BODY		
B-133-A	Door Handle Lock Ring Remover	A11
B-175	Ventilator Glass Installer	A11
B-176	Ventilator Glass Puller	A11
B-177	Garnish Moulding Installer	A11
B-182	Sealing Compound Gun	A11
B-206-B	Phillips Head Screwdriver (1" Shank)	A11
B-208-A	Phillips Head Screwdriver (Heavy Duty)	A11
KMO-265	Concealed Hinge Lubricator	39-50&61
FRONT SUSPENSION		
J-602	Control Arm Yoke Nut Wrench	39-75&90
J-720	Caster Angle Adjuster	A11
REAR SUSPENSION		
J-766	Shock Absorber End Cap Wrench	39-50,61&60S
J-838	Rear Axle Shaft and Bearing Puller	A11
J-1281	Rear Spring Replacing Tool	39-50&61
J-1284	Rear Wheel Puller	39-50,61&60S
BRAKES		
HM-13985	Brake Adjusting Tool	A11
HM-20001	Brake Feeler Gauge	A11
J-627	Hydraulic Brake Bleeder Wrench	A11
J-628	Hydraulic Brake Drain Assembly	A11
J-713	Brake Master Cylinder Refiller	A11
J-718	Brake Cylinder Clamps (4)	A11
J-760-A	Brake Cylinder Clamps (4)	A11
J-854	Brake Anchor Pin Nut Wrench	A11
ENGINE		
HM-937	Piston Inserter Set	A11
HM-109626	Carburetor Equalizing Gauge	39-90
J-257-X	Valve Lifter Remover and Replacer	39-50,61,60S&75
J-505-CL	Carter Carburetor Kit	39-50&90
J-507	Plunger Assembly Sleeve	39-50&90
J-508	Jet Extractor	39-50&90
J-511	Carburetor Anti-Percolator Nut Wrench	39-50&90
J-510	Pair Metering Rod Gauges	39-90
J-668	Throttle Opening Gauge	39-50&90
J-787	Metering Rod Bending Tool	39-50&90
J-816-1	3/16" Jet Wrench	39-50&90
J-816-2	1/4" Jet Wrench	39-50&90
J-816-4	7/16" Jet Wrench	39-50&90
J-816-5	Jet Wrench Handle	39-50&90
J-816-6	11/32" Jet Wrench	39-50&90
J-818-4	13/64" Float Level Gauge	39-90
J-818-5	1/8" Float Level Gauge	39-50
J-1136	Carburetor Throttle Gauge	39-50&90
J-1306	Ball Retaining Ring Tool	39-50&90
J-1305	Metering Rod Gauges	39-50
J-730	Valve Lock Inserter	39-90
J-822	Crankshaft Dowel Remover	A11
J-826	Valve Stem Guide Replacer	39-50,61,60S&75
J-827	Valve Lifter Bracket Installer	39-50,61,60S&75
J-829	Camshaft Bearing Remover, Replacer and Aligner	39-50,61,60S&75
J-831	Pilot Thimble - Water Pump Impeller Shaft Assembly	39-50,61,60S&75
J-834	Rear Main Bearing Cap Puller	39-50,61,60S&75

Tool No.	Description	Series
ENGINE Cont'd.		
J-836	Camshaft Sprocket Installing Pilot	39-50,61,60S&75
J-874-CL	Connecting Rod & Piston Alignment Fixtures	A11
J-874-X	Connecting Rod Alignment Fixture	A11
J-1038	Valve Guide Remover & Installer	39-90
J-1055	Valve Stem Length Gauge	39-50,61,60S&75
J-1167	Wrist Pin Remover and Installer	39-90
J-1177	Rear Main Bearing Oil Seal Compressor	A11
J-1210	Camshaft Puller	39-90
J-1211	Valve Spring Compressor	39-90
J-1212	Distributor Drive Shaft Aligning Gauge	39-90
J-1275	Spark Plug Wrench	A11
J-1136	Spark Plug Gauge	A11
KMO-223	Valve Lapping Suction Cup	A11
KMO-242	Connecting Rod Socket	A11
KMO-248	Water Pump Lubricator	A11
*SER-360	Stromberg Carburetor Kit.	39-61,60S&75
* T-19099	Main Jet Plug Screwdriver	39-61,60S&75
* T-23844	Metering Jet Socket Wrench	39-61,60S&75
* T-24733	Power Piston and Float Bender Tool	39-61,60S&75
* T-24924	Metering Jet Socket Wrench	39-61,60S&75
* T-24947	Main Discharge Jet Remover	39-61,60S&75
* T-24968	Grip Handle	39-61,60S&75
* T-24970	By-pass Jet and Check Valve Tester	39-61,60S&75
* T-24971	Float Gauge	39-61,60S&75
* T-25046	Choke Gauge	39-61,60S&75
* T-25047	Choke Stem Nut Socket Wrench	39-61,60S&75
* T-25056	Choke Valve Stop Gauge	39-61,60S&75
CLUTCH		
J-285-C	Clutch Finger Equalizing Gauge	A11
J-288	Straight Edge - For Setting Clutch Fingers.	A11
J-688-C	Clutch Drive Plate Indicating Fixture Complete	A11
J-688-5	Arbor for J-688-C Fixture	A11
J-1031	Clutch Aligning Arbor	A11
K-361-R	Clutch Pilot Bearing Puller	A11
KMO-249	Clutch Relay Shaft Lubricator	39-60S
TRANSMISSION		
J-1007	Snap Ring Removing and Replacing Pliers	A11
J-1010	Idler Gear Replacer Pilot	A11
J-1169	Transmission Shifter Shaft Oil Seal Inserter	A11
J-1170	Clutch Connection Shaft Needle Bearing Lock Ring Replacer	A11
J-1184	Transmission Needle Bearing Loader	A11
J-1204	Transmission Lower Shifter Lever Adjuster	A11
STEERING		
J-624-A	Intermediate Steering Arm Screw Press	39-75&90
J-1032	Steering Up and Down Lock Nut Wrench	39-60,61,60S&75
MISCELLANEOUS		
J-1264	Torque Wrench	A11
J-1272	Vacuum Aerial End Mill	A11

* Available through Bendix Products Division, South Bend, Indiana

Torque Tightness Specifications

Location	Size	Ft. Lbs. Torque Min.	Ft. Lbs. Torque Max.
FRONT SUSPENSION			
Shock absorber bolts - All Series	1/2-20	100	115
Shock absorber connecting links - All Series	1/2-20	40	48
Suspension arms to frame - Series 39-50, 61, 60S	7/16-20	60	70
Series 39-75, 90	1/2-20	85	100
Knuckle to brake backing plate and steering arm			
Series 39-50, 61, 60S	7/16-20	60	70
Series 39-75, 90	1/2-20	90	100
Front stabilizer to frame - All Series	7/16-20	50	60
REAR SUSPENSION			
Differential carrier to axle housing - All Series	3/8-24	30	35
Brake backing plate to axle housing			
Series 39-50, 61, 60S	3/8-24	35	40
Series 39-75, 90	7/16-20	50	55
Rear shock absorber to frame - All Series	9/16-18 or 5/8-18	120	140
Shock absorber connecting links - All Series	1/2-20	40	48
Front of rear spring - Series 39-50, 61	Special	65	75
Series 39-60S, 75, 90	Special	90	110
Rear spring bushing and hanger bushing - All Series	Special	65	75
Rear stabilizer			
Series 39-60S, 75, 90 (Toggle adj. type)			
Frame end	9/16-18	120	130
Lower end bolts	1/2-20	80	90
Axle end	9/16-18	120	130
Universal joint screws - All Series	5/16-24	15	20
ENGINE			
Wrist pin clamp screw - Series 39-90	5/16-24	20	25
Intake & exhaust manifold - All Series	3/8-24	25	30
Connecting rod bolts - All Series	Special	55	60
Cylinder head bolts - All Series	7/16-14	70	75
Flywheel to crankshaft - All Series	7/16-20	65	70
Main bearing caps to crankcase - Series 39-90	1/2-13	100	110
Main bearing caps to crankcase - Series 39-50, 61, 60S, 75	9/16-12	130	140
Spark plugs - All Series	Spec. 10 m.m.	35	40
Fan support to bracket - All Series	5/8-11	85	95
FUEL TANK & EXHAUST			
Gas tank brackets and strap to frame			
Series 39-50, 61, 60S	5/16-24	10	15
Gas tank brackets and strap to frame			
Series 39-75, 90	3/8-24	20	30
Gas tank strap draw bolts - Series 39-60S	3/8-24	2	3
Gas line fittings - All Series	.....	10	15
Support brackets, exhaust pipe to frame -			
All Series	5/16-24	10	15
Rubber mountings for muffler - tighten the 5/16-24 and 1/4-20 nuts just enough to flatten lockwashers - All Series			
Exhaust system "U" bolts - All Series	1/4-20	7	8
Self tapping screws for muffler supports, mud pan, and gas line - All Series	.....	10	15
STEERING			
Intermediate steering arm -			
Series 39-60S - Pivot Bolt	1/2-20	90	100
Series 39-75, 90 - Bracket Bolt	3/8-24	20	25
Tie rods			
Series 39-50, 61, 60S - Pivot to steering arms	1/2-20	50	60
Series 39-50, 61, 60S - Clamp bolt on tubes	.....	8	10
Series 39-50, 61 - Idler lever-threaded bushing	.....	60	70
Series 39-75, 90 - Pivot to steering arms	5/8-18	75	90
Series 39-75, 90 - Clamp bolts in ends	3/8-16	10	12
Steering gear to frame			
Series 39-50, 61, 60S	7/16-14	40	45
Series 39-75, 90	1/2-13	70	75
MISCELLANEOUS			
Wheel mounting nuts - All Series (Taper seat nut)	1/2-20	110	120
Bumper to brackets - All Series	1/2-13 or 1/2-20	80	90
Bumper brackets to frame - All Series	1/2-13 or 5/8-18	80	90

Litho. in U. S. A.