GROUP 12

FRAME AND SHEET METAL

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SERVICE BULLETIN REFERENCE

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12-1 CHECKING ALIGNMENT OF FRAME

a. Checking Alignment of Frame and Suspension Members

When a frame has been damaged by accident the following procedure may be used to check alignment of the frame, and the alignment of the chassis suspension members with the frame. This procedure should be used to check alignment after repairs to frame have been completed.

Checks are to be made with frame assembled with power plant, body, etc. and car resting on wheels. The car should be placed on a clean floor that is reasonably level. Both sides of the front ends of the frame must be the same distance from the floor; the same condition must exist at rear end of frame. Where points are to be extended to floor by use of a plumb bob, it is desirable to attach clean pieces of paper to floor with tacks or tape so that the points can be clearly marked. *Apply brakes or block wheels so that car cannot move.*

1. Using a plumb bob, extend the following points to the floor and mark where point of plum bob touches floor, as shown in figure 12-1.

A and A^1 at point of grease fitting in front ends of control arm shafts.

B and B^1 at point of grease fitting in front ends of lower pivot pins.

X at center of hole in front flange of frame front cross member, on centerline of frame.

D and D^1 at center of rear axle shafts.

E and E^1 at center of forward bolts attaching rear bumper.

F and F^1 on side rails just forward of rear axle housing, *holding plumb line flat against side rails.*

G and G^1 at each side of torque tube flange.

2. Move car out of the way. Using a chalked line, draw lines on the floor through the following points: A and A^1, B and B^1, C and C^1, D and D^1, F and F^1.

3. Divide the distance between F and F^1 and mark the center point Y on line F-F^1. Draw frame centerline through points X and Y.

4. Measure diagonal distances A to E^1. If these diagonals are not equal within $\frac{3}{16}$" the frame is bent.

5. Measure the distances J and J^1. If these are not equal within $\frac{1}{8}$" a lower control arm is bent.

6. Measure the distances K and K^1, which will be equal within $\frac{3}{16}$" if rear axle is properly aligned with frame. Points G and G^1 should be equally distant from vehicle centerline X-Y. If distances K and K^1 are not equal within $\frac{3}{16}$" and points G and G^1 are equally distant from centerline, a bent rear axle housing or torque

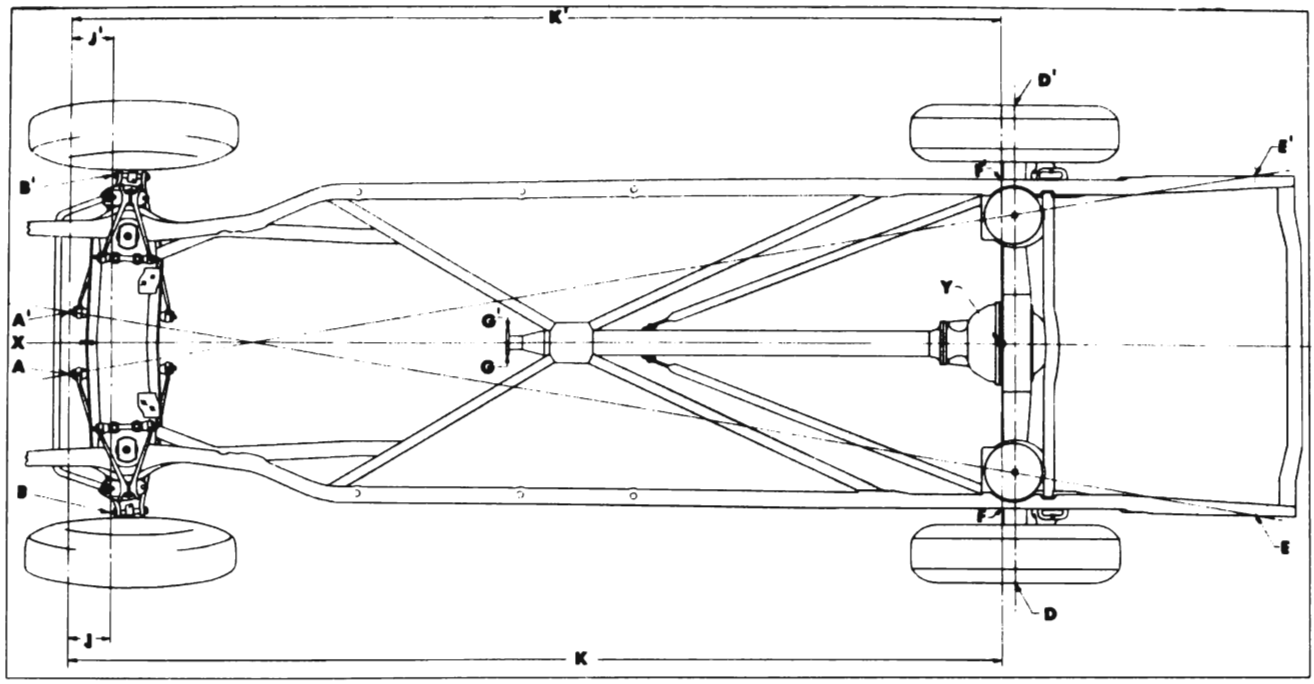


Figure 12-1—Checking Points for Frame and Suspension Alignment

tube is indicated. If points G and G¹ are not equally distant from centerline, look for misalignment of engine in the frame.

b. Checking Alignment of Frame Only

When a frame has been damaged by accident and the power plant, body, etc., are removed, the measurements shown in figure 12-2 or 12-3 may be used to check for alignment of frame members. The procedure should also be used to check alignment after repairs to frame have been completed.

The frame must be solidly supported on suitable stands so that the pilot holes in both side rails are exactly at distance indicated from a straight and level work surface. Note that alternate pilot holes of different size and location may be found.

12-2 FRAME REPAIRS

a. Straightening and Welding

In case of frame distortion resulting from an accident it is permissible to straighten or weld the frame if the distortion is not excessive.

Heat can be applied without materially weakening the steel, provided this is kept below 1200°F. This is a deep cherry red when viewed in subdued daylight, as in an average shop. Heat in excess of 1200°F. will weaken the metal structure and lead to eventual failure in service.

b. Replacement of Frame Members

If a frame front cross member is very badly distorted as a result of a front end collision, replacement is advisable because its rigid box construction makes proper straightening very difficult. Since the front suspension members are mounted on the frame front cross member, front end alignment will be affected if the cross member is not in perfect alignment.

The front end and rear cross members, rear spring support cross member, and a number of braces and brackets are available for service replacement. The old members may be removed from the frame by cutting the attaching rivets and welds, after removing other parts or assemblies to allow working space.

When installing new frame members use hot rivets since they can be properly driven with hand tools. Cold driven rivets are not recommended because they cannot be securely driven with hand riveting tools. In places where hot rivets cannot be installed it is permissible to use finished bolts snugly fitted in reamed holes. Use lockwasher with bolts and draw nuts up tight. Weld a new member to adjacent members in the same manner that the replaced member was welded.

After installation of any new frame member check the frame for proper alignment as described in paragraph 12-1. After any repairs or replacements in front end of frame be sure to check front wheel alignment (par. 7-17).

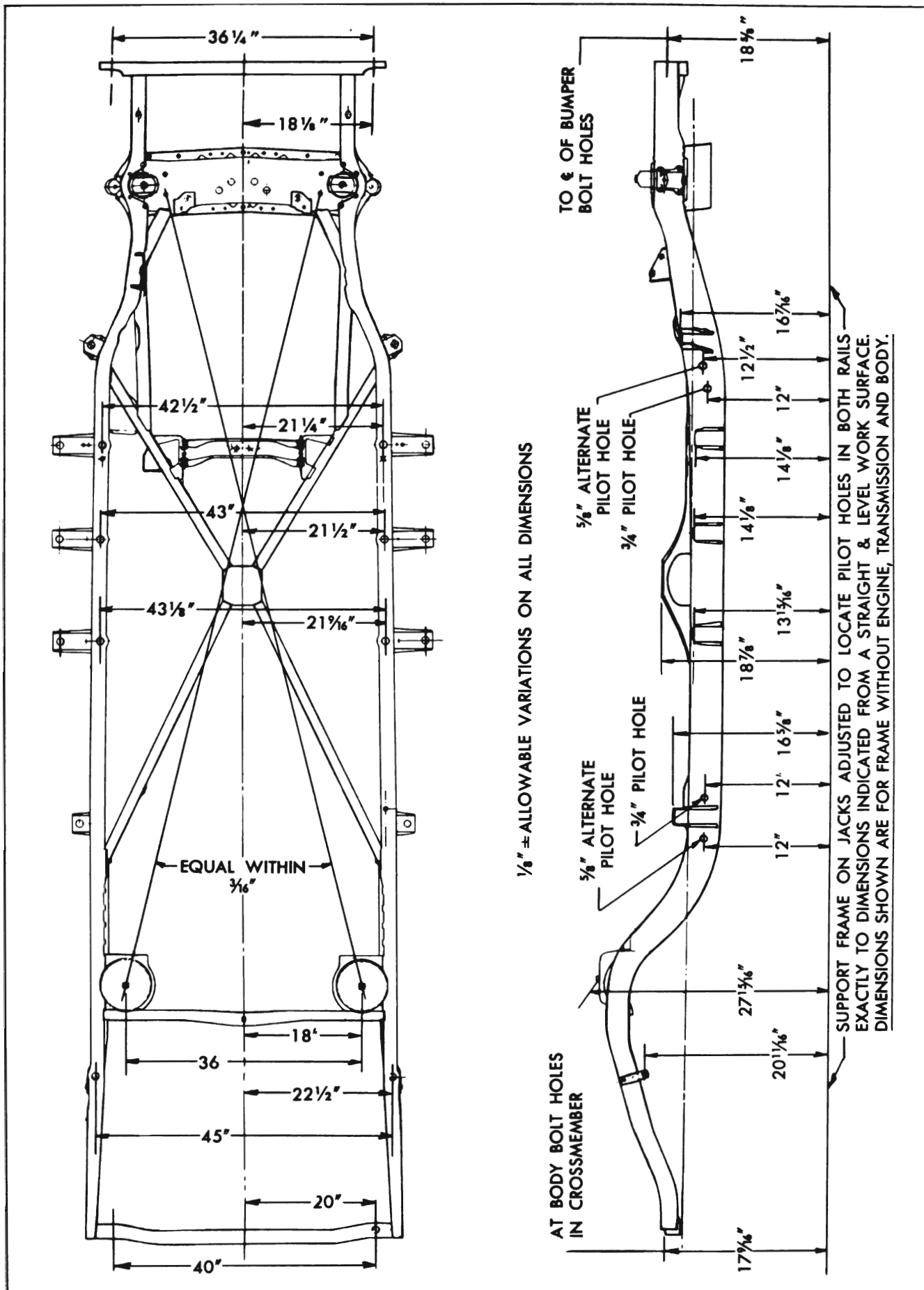


Figure 12-2—Frame Checking Dimensions—Series 40-60

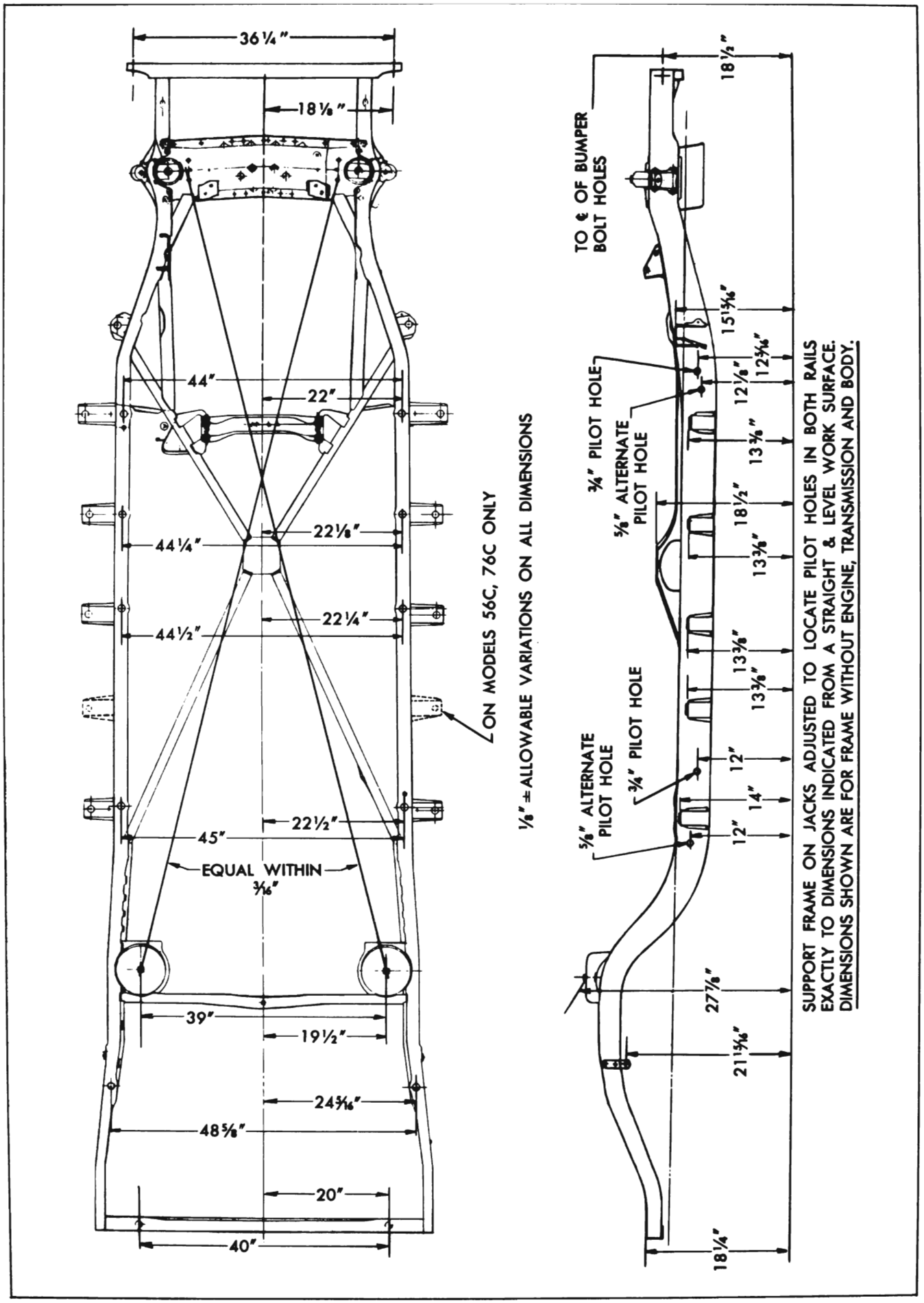


Figure 12-3—Frame Checking Dimensions—Series 50-70

12-3 DESCRIPTION OF SHEET METAL

a. Front End Sheet Metal Assembly

The front end sheet metal assembly consists of both front fenders, fender skirts and tie panel, hood latch mounting panel, radiator grille frame, radiator pan, radiator core and mounting strap, fan shroud.

All parts are joined together in an assembly that may be removed and installed as one unit, or the separate parts may be replaced without difficulty. The front end of the sheet metal assembly is supported and stabilized by attachment of the fender skirts to the frame side rails by means of bolts provided with rubber shims similar to body mountings. See figure 12-5. The rear ends of front fenders are attached directly to the body cowl.

b. Hood, Hinges, and Latch Mechanism

The hood panel is of one-piece construction which is strengthened and held to shape by front and rear transverse reinforcements of stamped sheet steel. The front end is also strengthened by a brace attached to the panel under the hood ornament to the center of the front reinforcement.

The rear end of the hood is attached to the body cowl on each side by hinge assemblies which permit the front end of hood to be raised, alligator type. A heavy coil spring connected between each hinge assembly and a bracket on the cowl assists in raising the hood, and holds it in the open position. The springs exert a downward pull when hood is in closed position.

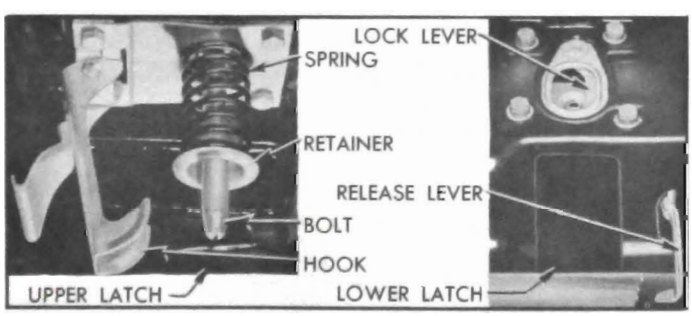


Figure 12-4—Hood Latch and Dovetail Bolt

The front end of hood is locked down by a dovetail bolt on hood which engages a lock lever in the latch mounted on a panel of the front end sheet metal assembly. Proper tension on the latching parts is maintained by a spring and retainer which surrounds the dovetail bolt (fig. 12-4). The hood is unlocked by lifting a release lever located beneath radiator grille frame. A safety hook mounted on the hood must then be pulled forward before the hood can be raised.

12-4 FENDER, BUMPER AND HOOD ALIGNMENT INSPECTION

The hood, front fenders and bumper must be aligned with each other on every car to take care of slight variations in form and dimensions of the individual parts. Sheet metal parts stamped in a given set of dies will vary somewhat in form and dimensions due to variations in the hardness of different batches of sheet metal, which cause the stampings to spring in varying amounts when released from the dies.

The hood and front fenders are properly aligned during the installation at the factory; however, some readjustment may be required after a car has been shipped or has been in service for some time. This is because sheet metal parts may take a different "set" as a result of vibration and shock incident to shipping or operation during the break-in period. In judging the need for readjustment it must be understood that exactly uniform fit and spacing cannot be obtained on all cars of a given model.

IMPORTANT: *After any work on front end sheet metal assembly which changes fender position, be sure to check aiming of headlamps as described in paragraph 10-49.*

a. Hood Noises or Panel Flutter

Squeaks or grunting noises in the hood when driving over rough roads do not necessarily indicate misalignment of hood and fenders. These noises may be caused by metal contact at some point where clearance should exist or by worn or dry hood bumpers.

If the hood squeaks, check with $\frac{1}{16}$" thick feeler all around the hood for clearance at radiator grille frame, fenders and cowl. If an edge of metal is making contact at any point where clearance should exist a bright metal spot will usually be found. Such spots may be depressed by spring hammering to provide clearance.

A grunting noise in the hood is usually caused by dry rubber bumpers or cowl ledge lacing. Lubricate all rubber bumpers on fender rails and cowl with Lubriplate (Finch Refining Co., No. 110). To correct a persistent case of squeaking or grunting where hood top panel contacts ledge lacing, even when lubricated, cement a $\frac{1}{16}$" thick strip of felt to panel where the lacing makes contact.

To prevent hood panel flutter, the rear end of hood panel must have firm contact with the rubber lacing attached to cowl ledge. The hood may be raised or lowered by adjustment at hinges. If cowl ledge lacing is loose, recement it in place and make sure that all fasteners are properly installed.

b. Preliminary Tightening

Before deciding upon any adjustment to correct hood or fender misalignment it is advisable to check tightness of all attaching screws and bolts, since a true picture of correction requirements cannot be obtained when the sheet metal is loose and free to shift.

After all parts are properly tightened inspect fender and hood alignment (subpar. *c*) and hood alignment (subpar. *d*). Make all inspections before performing any adjustments because an adjustment at one point will usually alter alignment at other points. The preliminary inspection should determine the adjustments that will produce the best overall alignment of hood and fenders at all points.

c. Fender and Hood Alignment at Front Doors

With front doors closed there should be no metal-to-metal contact between doors and rear ends of front fenders. Check for clearance at frequent points, using a strip of fibre or other soft material 1/32" thick. The spacing between rear end of front fenders and the shoulder on front edge of doors should be approximately 1/8", and fairly uniform from top to bottom.

Before making any adjustment of sheet metal to provide necessary clearance at points mentioned, first make sure that front doors are properly aligned in the body openings. If fender and door panel surfaces are not reasonably flush, correction may be made by adding or removing shims between the fender and the cowl panel.

Where spacing between end of front fender and edge of door is objectionably uneven from top to bottom it may be necessary to adjust the shims between frame rails and the sheet metal supports on front fender skirts.

d. Hood Alignment Inspection

When closed and locked, the hood should bear firmly against the rubber bumpers on lower hood latch mounting panel and the rubber lacing attached to the cowl ledge.

A clearance of approximately 1/8" should exist between each side of hood and the fender, and the spacing should be fairly uniform from front to rear. Along the sides, the hood and fender contours should be in reasonably close horizontal alignment.

A clearance of approximately 1/8" should exist between the rear edge of hood and the shoulder of cowl panel, and the spacing should be fairly uniform from side to side.

Raise and lower the front end of hood slowly several times to check for proper alignment between the dovetail bolt in hood and the latch on sheet metal panel. Dovetail bolt should enter the opening in latch without any side strain or other interference. As hood is raised and lowered, observe whether the rear edge contacts the body cowl due to improper adjustment of the hood guide bracket and roller pad.

12-5 FENDER, BUMPER AND HOOD ADJUSTMENTS AND REPLACEMENTS

a. Front Fender and Bumper Adjustment

If the front end of the sheet metal assembly is too high or too low, resulting in objectionably unequal vertical spacing between front fenders and doors, it will be necessary to change the shims located under the supports on front fender skirts. Adjustment of shims also may be required if the front end of the sheet metal assembly is tilted to right or left so that proper alignment of hood and fenders cannot be obtained by hood adjustment.

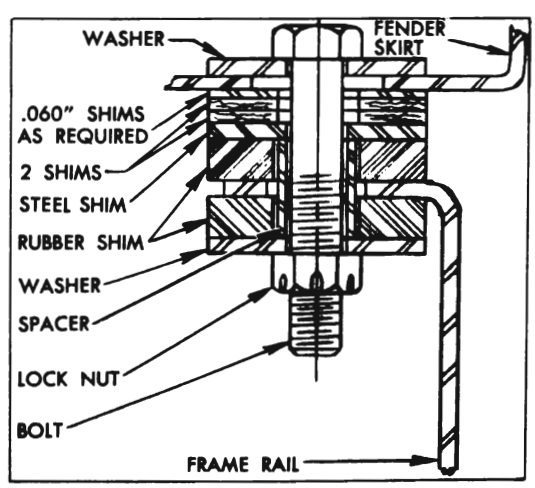


Figure 12-5—Fender Skirt Mounting Bolt and Shims

At the point where each front fender skirt support is attached to frame rail a rubber shim is placed on each side of the frame rail top flange, with a steel washer 1/8" steel shim and

tubular spacer placed to control compression of the rubber shims as the bolt is tightened. Two steelbestos shims are placed between the ⅛" steel shim and the fender skirt. When additional shimming is required one or more extra steel shims .060" thick are placed between the steelbestos shims and the fender skirt. See figure 12-5.

The front bumper attaching bolt holes in frame front cross member are slotted vertically to permit raising or lowering either end of the bumper for proper alignment with adjacent parts. Special shims are available for insertion between the bumper back bar and frame cross member to move bumper forward as may be required for proper alignment with adjacent parts.

b. Hood Adjustments

(1) *Hood Hinges.* Each hood hinge is attached to a bracket on the body cowl with three bolts and the hinge arms are attached to the hood with threaded bolts. On *Series 40-60,* the hinge bolts pass through hole in the brackets into nuts welded to the hinge plates. On *Series 50-70,* the hinge bolts pass through holes in the hinge plates into nuts welded to the brackets.

The lower bolt hole is slotted and the others are oversize to permit movement of the hinge and hood in any direction required to obtain proper alignment of hood with adjacent parts. Rotating a hinge forward will raise rear end of hood. Rotating a hinge rearward will lower rear end of hood and slightly raise the front end.

The height of front end of hood is controlled by the number of shims under the rubber bumpers mounted on the hood lower latch panel behind the radiator grille frame.

(2) *Hood Latch Dovetail Bolt.* The dovetail bolt may be turned to move up or down when the locknut on the upper end is loosened. See figure 12-4. The bolt should be adjusted so that the head engages under the lower latch lock lever without excessive vertical play when the front end of hood rests firmly on the rubber bumpers mounted on the hood lower latch panel.

(3) *Hood Lower Latch.* Slotted bolt holes in the lower latch permit sidewise movement of the latch to provide proper alignment with the dovetail bolt in hood. See figure 12-4. The latch must be set so that the dovetail bolt enters without sideward strain or other interference. The latch must not be used to force the nose of hood into alignment with fenders as difficulty in unlocking the hood may result. Proper sidewise alignment of hood should be obtained by adjustment of hood hinges.

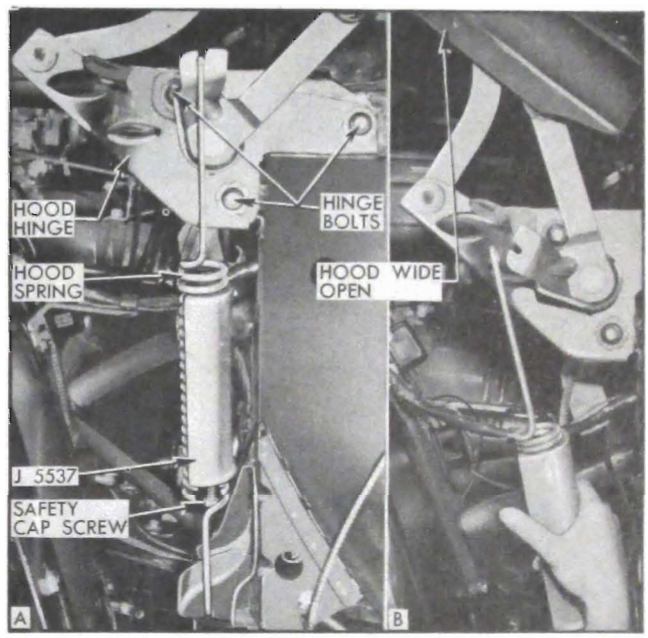


Figure 12-6—Removing Hood Hinge Spring

c. Hood Hinge Spring Removal and Installation

1. Raise hood to position where the hinge spring is fully extended.

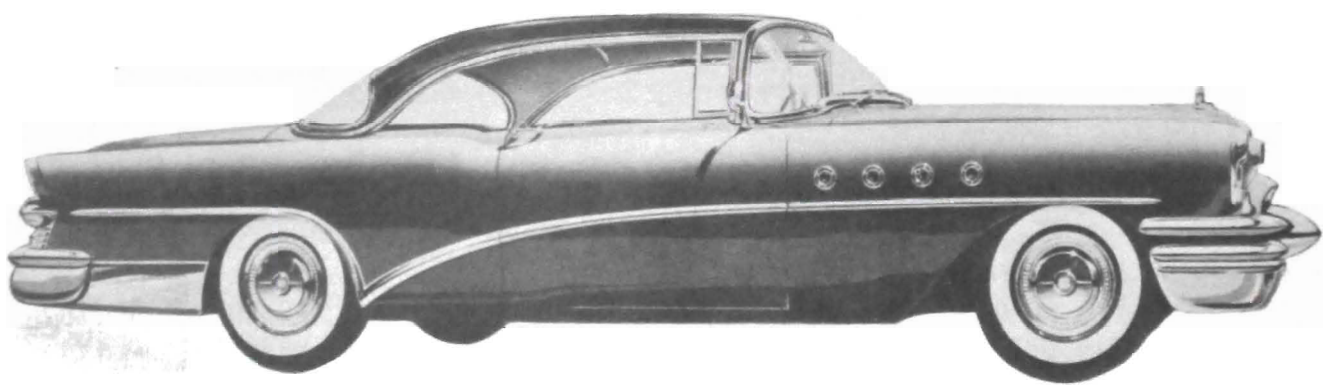
2. From underneath front fender, install Spring Remover J 5537 on spring so that the ends are fully inserted between spring coils, then install a safety cap screw in lower end of tool to avoid slippage. See figure 12-6.

3. Raise hood to wide open position and prop it securely.

4. Remove spring and tool assembly (fig. 12-6) and install a safety cap screw in upper end of tool to avoid slippage.

5. Install spring by reversing the removal procedure.

Model 76C



Model 76R