

GROUP 12

FRAME AND SHEET METAL

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12-1 DESCRIPTION OF FRONT END SHEET METAL

a. Front End Sheet Metal Assembly

The front end sheet metal assembly is attached to the frame and body at adjustment points. See Figure 12-1. The front of the assembly is supported by two mounts located

at the frame side rails. (See Figure 12-16 Section A-A). Shims at these locations allow up and down movement of the front of the sheet metal assembly. Fore and aft and side adjustment is allowed by oversize holes in the inner skirt assembly. (See Figure 12-5). Special washers at the upper rear locations allow adjustment of the rear assembly (See Figure 12-4). The lower rear edge of the assembly

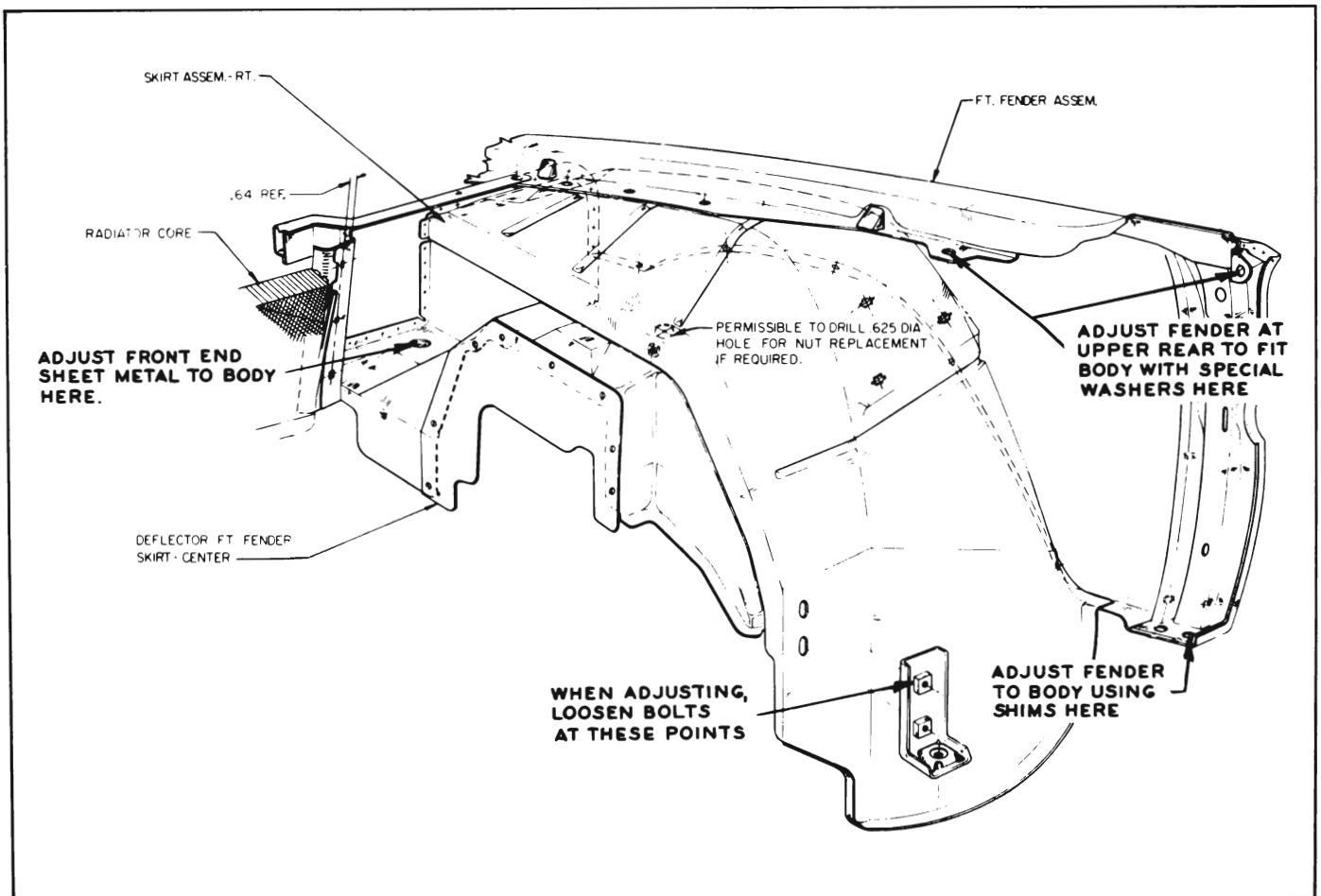


Figure 12-1—Front Fender Skirt Assembly

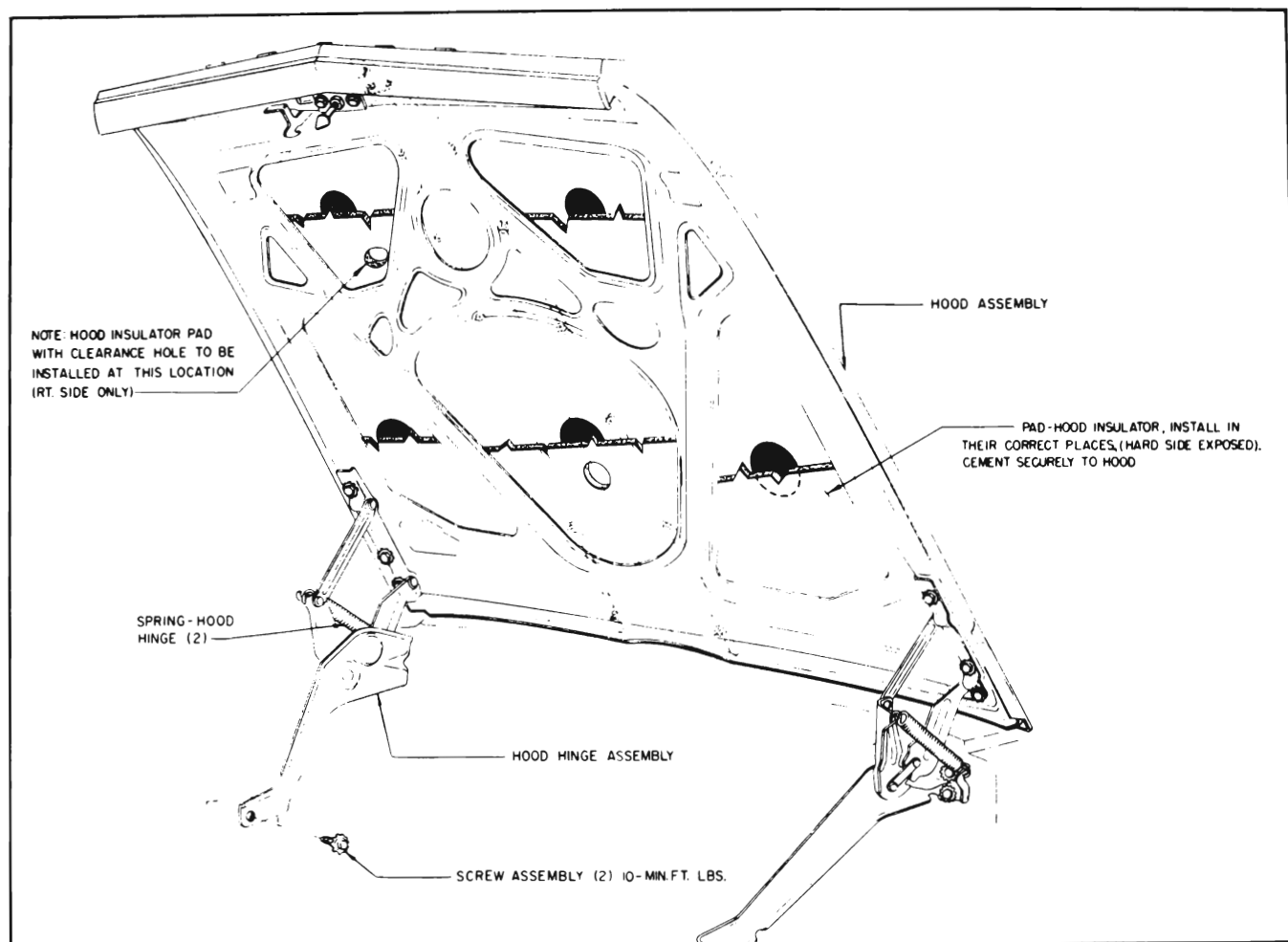


Figure 12-2—Hood & Hood Hinge Assembly

is attached to the body at the rocker panel by two bolts on each side. (See Figure 12-6). Shims are used at this location to provide up and down adjustment at the rear of the fender.

IMPORTANT: The bolts that retain the sheet metal braces must be torqued to the required torques. If these bolts are loose, the braces will not provide additional support for the sheet metal assembly.

b. Hood, Hinges and Latch Mechanism

The hood panel is of one piece construction, strengthened and held to shape reinforcement of stamped sheet metal.

The rear of the hood assembly is attached to the body cowl and fender on each side by hinge assemblies which permit the front of the hood to be raised. A heavy coil spring connected between each hinge assembly assists in raising the hood and holds it in the open position. (See Figure 12-2).

The front of the hood is held down by one dovetail bolt on hood (See Figure 12-9) which engages latch mechanism located on the upper tie bar (See Figure 12-2).

The hood is unlocked by lifting the latch handle located beneath the front center of the grille and then lifting the safety latch which is located beneath the front of the hood. (See Figure 12-9).

c. Radiator Mounting and Adjustment

The radiator is mounted in rubber, using a three-point mounting system of rubber-faced "U" shaped brackets. (See Figure 12-3).

Two of the brackets are included in the lower support bracket assembly which attaches at each end of the frame. The third is located at the top center in the guard and bracket assembly which attaches to the upper tie bar. Fore and aft adjustment is provided by slotted holes in the bracket assembly.

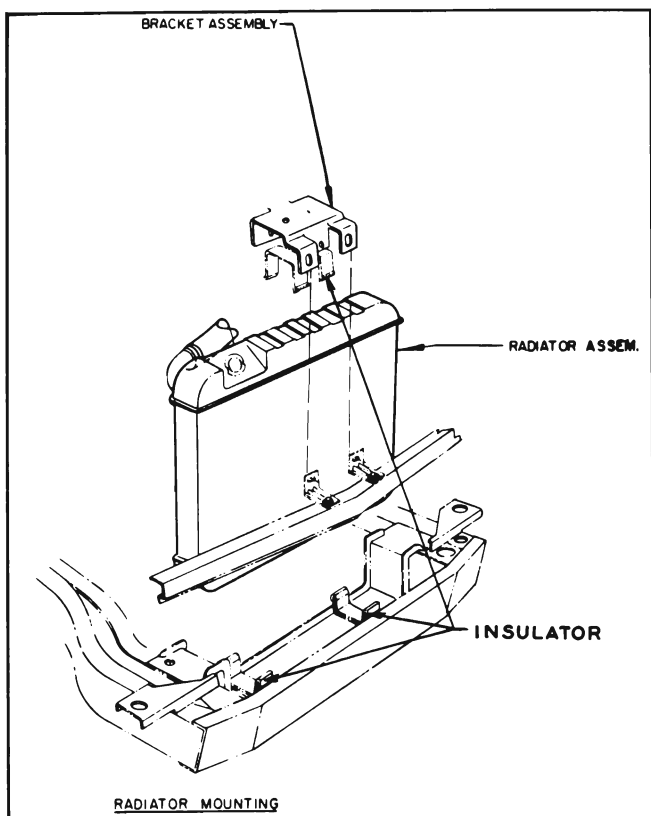


Figure 12-3—Radiator Mounting Insulator

Non air conditioning radiators are to be located $1\text{-}3/16''$ plus or $1/8''$ ahead of cooling fan and parallel within $1/8''$. Minimum fan to top tank clearance should be $3/4''$. The air conditioning radiator is to be located parallel to the fan, with the shroud parallel to the radiator core and the fan approximately one-quarter enclosed by the fan shroud.

12-2 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 form dies.

The hood and front fenders are properly aligned during the installation at the factory; however, some readjustments may be required after a car has been shipped or has been in service for sometime. This is because sheet metal parts may take a different "set" as a result of vibration and shock incident to ship-

ping 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.

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 $1/16''$ thick feeler all around the hood for clearance at the 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 can 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 rails and cowl with silicone rubber lubricant. To correct a persistent case of squeaking or grunting where hood top panel contacts ledge lacing, even when lubricated, cement a $1/16''$ 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 lacing attached to cowl ledge. The hood may be raised or lowered by adjustment at hinges (See Figure 12-9).

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 the 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 the 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.

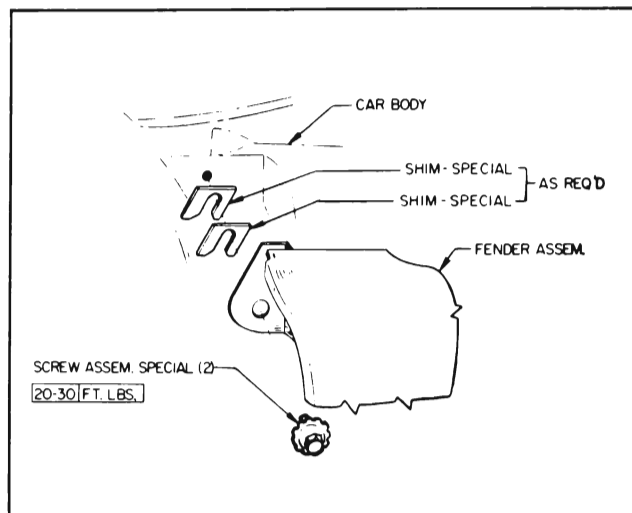


Figure 12-4—Upper Rear Fender Adjustment

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. (See Figure 12-4)

Where spacing between the rear edge of front fender and door is objectionably uneven from top to bottom, it may be necessary to adjust the shims between fender inner skirt and frame, to adjust shims between fender and rocker panel or loosen fender attaching bolts and pry between fender and rocker panel or draw fender into position and retighten bolts.

d. Hood Alignment Inspection

When the hood is closed and latched it should bear firmly against the front rubber bumpers on upper tie bar. Height of hood and width of space between hood and fenders should be reasonably even from front to rear. See Par.

12-3 (a) for hood adjustment and Par. 12-3 (a) for fender adjustment.

12-3 FENDER, BUMPER AND HOOD ADJUSTMENT

a. Front Fender

If the front end of the sheet metal assembly is too high or too low, resulting in objectionably uneven vertical spacing between the front

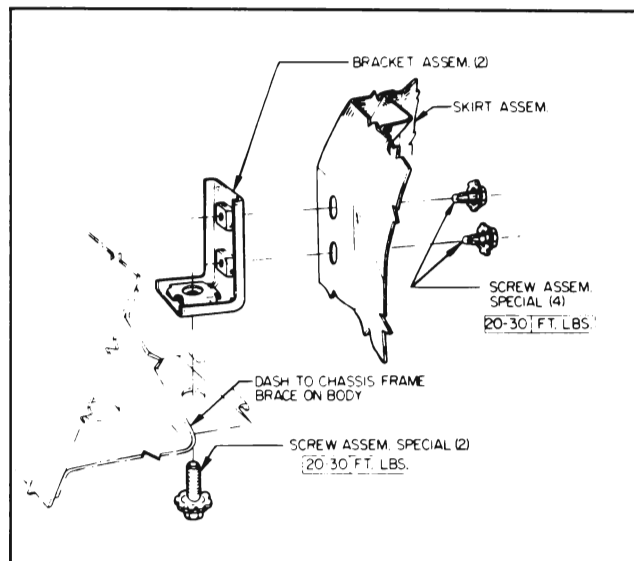


Figure 12-5—Inner Skirt to Body

fenders and doors, it will be necessary to add or remove shims at front support locations. Whenever shims are to be added or removed at the front support locations, it will be necessary to loosen the lower rear attaching bolts at the inner skirt to body. See Figure 12-5). Adjustment rear edge of the front fender is

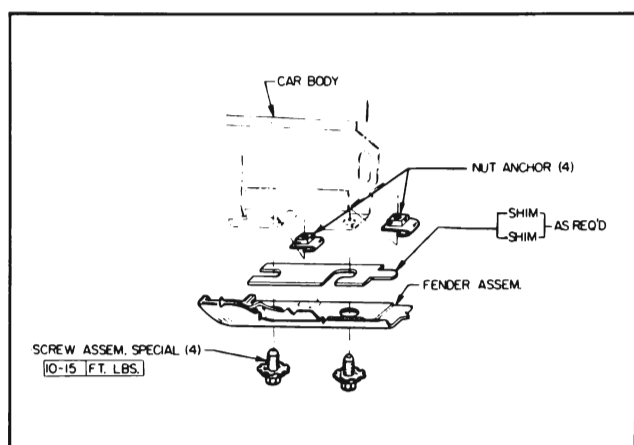


Figure 12-6—Lower Shim Location

accomplished by shimming at the two fender to body attaching points shown in Figure 12-6. The fender line should be flush with the rocker panel.

b. Bumper Adjustment

The bumper attaching bolt holes in frame cross member, back bars and bumper face plate are slotted to permit movement of the bumper and permit proper alignment with adjacent parts (See Figure 12-13.) Step assembly on rear bumper of estate Wagons should be installed per instruction in Figure 12-7.

c. Removal and Installation of Hood Hinge Springs

1. Support hood in extreme "up" position, preferably by chain fall if available.

2. To remove hood spring insert Remover and Installer J-9214 through loop in forward end of spring. Push tool toward rear of car using hinge as a pivot and carefully insert spring from notch. See Figure 12-8.

CAUTION: Care must be used when re-leasing spring.

3. Then push tool forward, causing hood spring to slid clear of hinge.

4. To replace hood spring, insert Remover and Installer J-9314 through loop in forward end of spring. Push tool upward, using hinge as a pivot, and seat spring into notch. See Figure 12-8.

c. Removal and Installation of Hood Assembly

1. Support hood in extreme "up" position.

2. Place folded rags under rear corners of hood to prevent possible damage to fenders.

3. Scribe a reference line along edge of each hinge flange so hood can be replaced in same position.

4. Remove six hood hinge to hood bolts.

5. Lift hood from car.

6. To install, reverse above procedure.

d. Hood Adjustments

1. Rear Height. Rear hood height is determined by special washers between hinge and

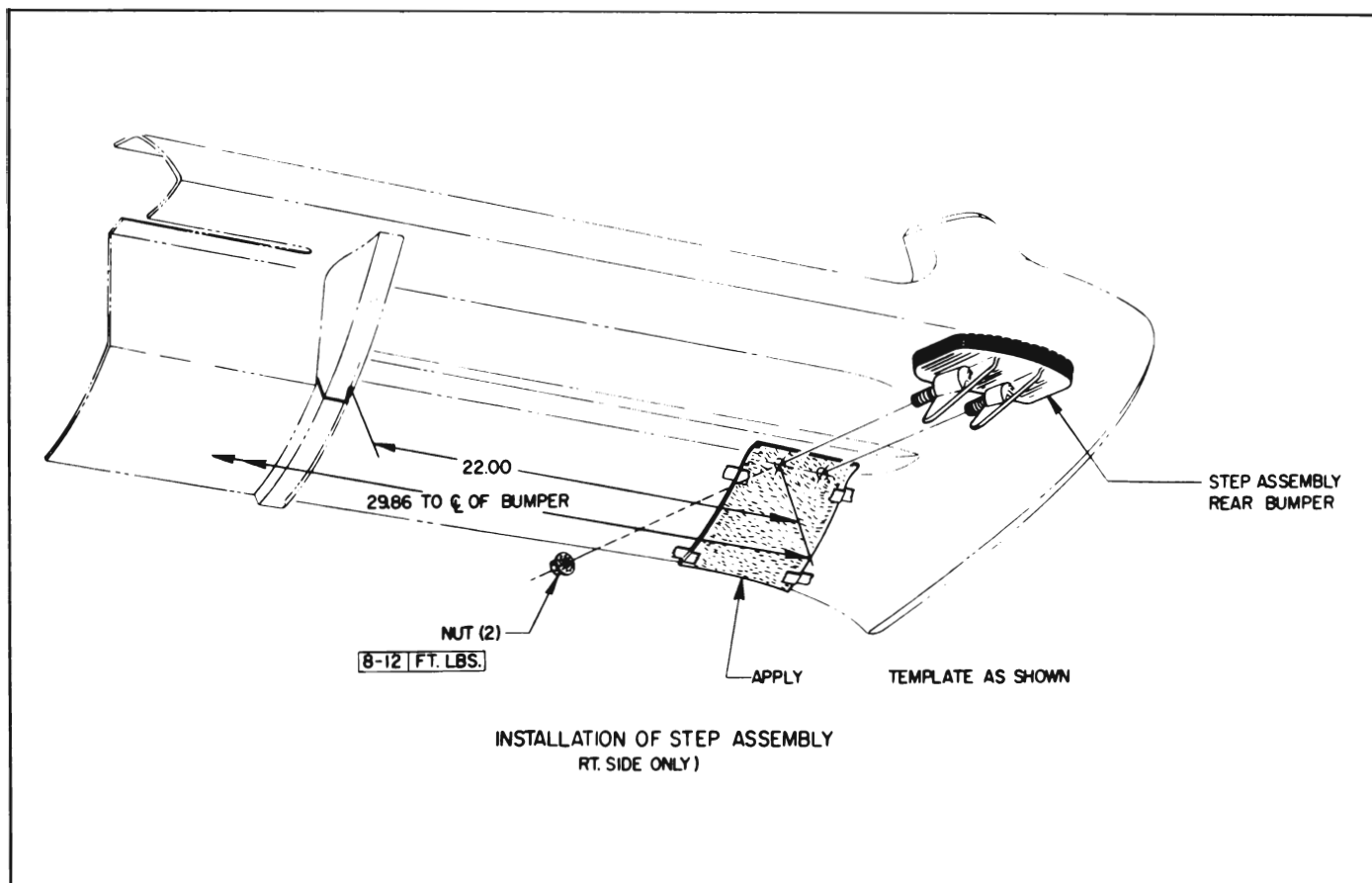


Figure 12-7—Installation of Step Assembly

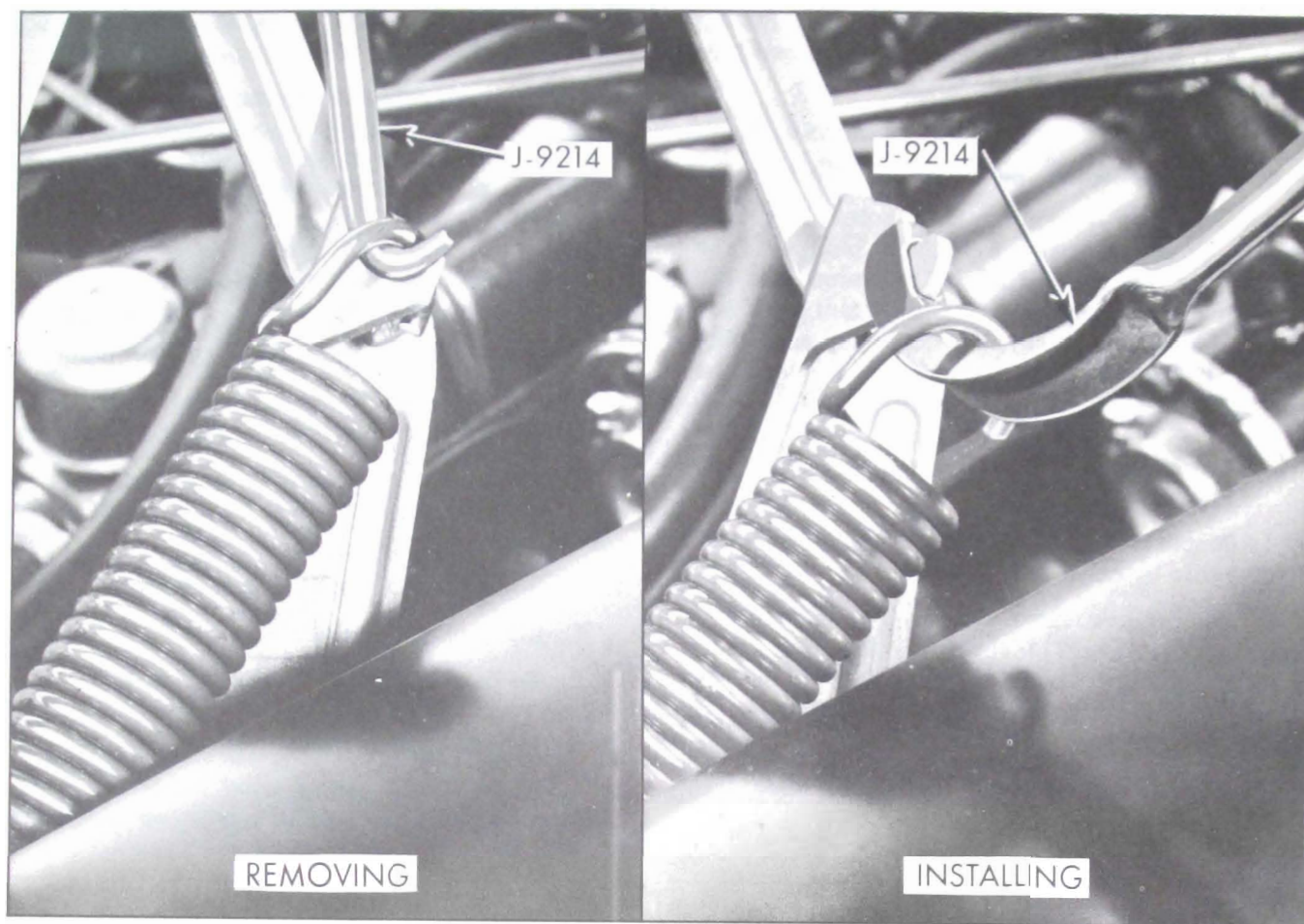


Figure 12-8—Removing and Installing Hood Hinge Spring

hood. Removing or adding washers will shift rear of hood up or down with respect to hinge. See Figure 12-9.

2. Rear Tension. Too little tension is indicated if the rear hood area flutters. To increase tension, add special washers between the hood and the hinges at the front bolts. See Figure 12-9.

Too much tension is indicated if the rear area of the hood bends as it is closed. To decrease tension, add special washers between the hood and the hinges at the rear bolts. See Figure 12-9.

3. Front Height. This is determined by two adjustable bumpers. See Figure 12-10. However, the front of the hood may not contact these bumpers unless the hood latch is correctly adjusted as described in step 4.

4. Hood Latch. Proper locking and hood guide alignment is provided by adjusting the hood upper latch assembly by means of a slotted hole. When the hood is properly spaced in the fender opening, the latch locking bolt

should be adjusted in and out by means of the screwdriver slot so that it is under considerable tension when the hood is closed and results in a slight hood pop-up when the release is operated. See Figure 12-9. After the correct setting of the latch bolt has been obtained, the jam nut should be tightened.

CAUTION: Care should be taken not to drive the latch bolt into position with a metal hammer as this will cause a burr on the latching surface of the bolt and therefore increase the opening effort after final adjustment.

To check latch alignment, raise and lower hood slowly several times. The latch bolt should enter the opening in the lower latch assembly without any side strain or other interference. If necessary, the latch bolt can be aligned by loosening the attaching bolt and tightening finger tight. Then close hood, thereby causing latch bolt to shift into alignment. Open hood and retighten latch retaining bolt being careful not to disturb the position of the latch bolt.

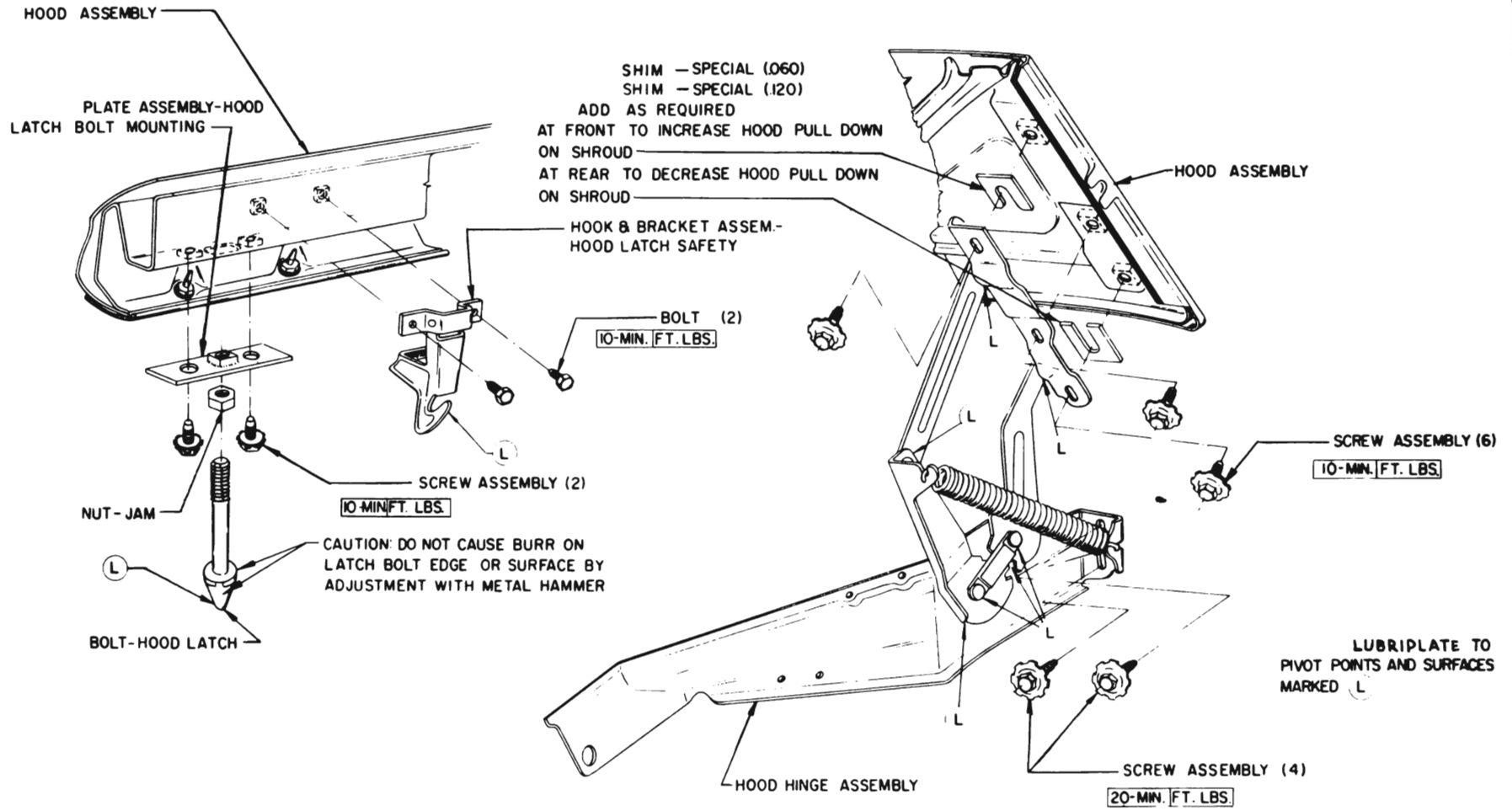


Figure 12-9—Hood and Hood Hinge Assembly

WHERE MINIMUM TORQUE ONLY IS SPECIFIED, FAILURE TORQUE IS AT LEAST 1/3 HIGHER.

5. Hood Alignment. Clearance at the rear of the closed hood should be approximately $1/8''$ to $3/16''$, and the spacing should be fairly uniform from side to side. Slotted holes in the hinge assembly will permit the hood to shift fore and aft with respect to the hinge. Side-ways the hood is self-centering in the closed position by virtue of the play in the hinge arms.

12-4 BODY MOUNTINGS

At each closed body mounting point, a rubber mount is placed between the body and the frame bracket and a rubber insulator washer is placed under the frame bracket. A plain steel washer and a tubular spacer limit compression of the rubber parts to a predetermined amount as the body bolt is tightened. See Figure 12-16. This form of mounting

eliminates metal-to-metal transmission of road and chassis noise into the body.

At some convertible body mounting points, a solid composition mount is placed between the body and the frame bracket and a plain steel washer and bolt anchors the body to the frame. See Figure 12-17.

In addition to the parts shown in Figures 12-16 and 12-17, steel shims are added as required at individual mountings to compensate for variations in body and frame in order to insure a firm mounting without distortion of body. Whenever it becomes necessary to remove body mountings, care must be taken to reinstall all of the mounting parts and steel shims in their exact original positions.

Closed bodies should not be re-shimmed to correct distortion of door openings. These

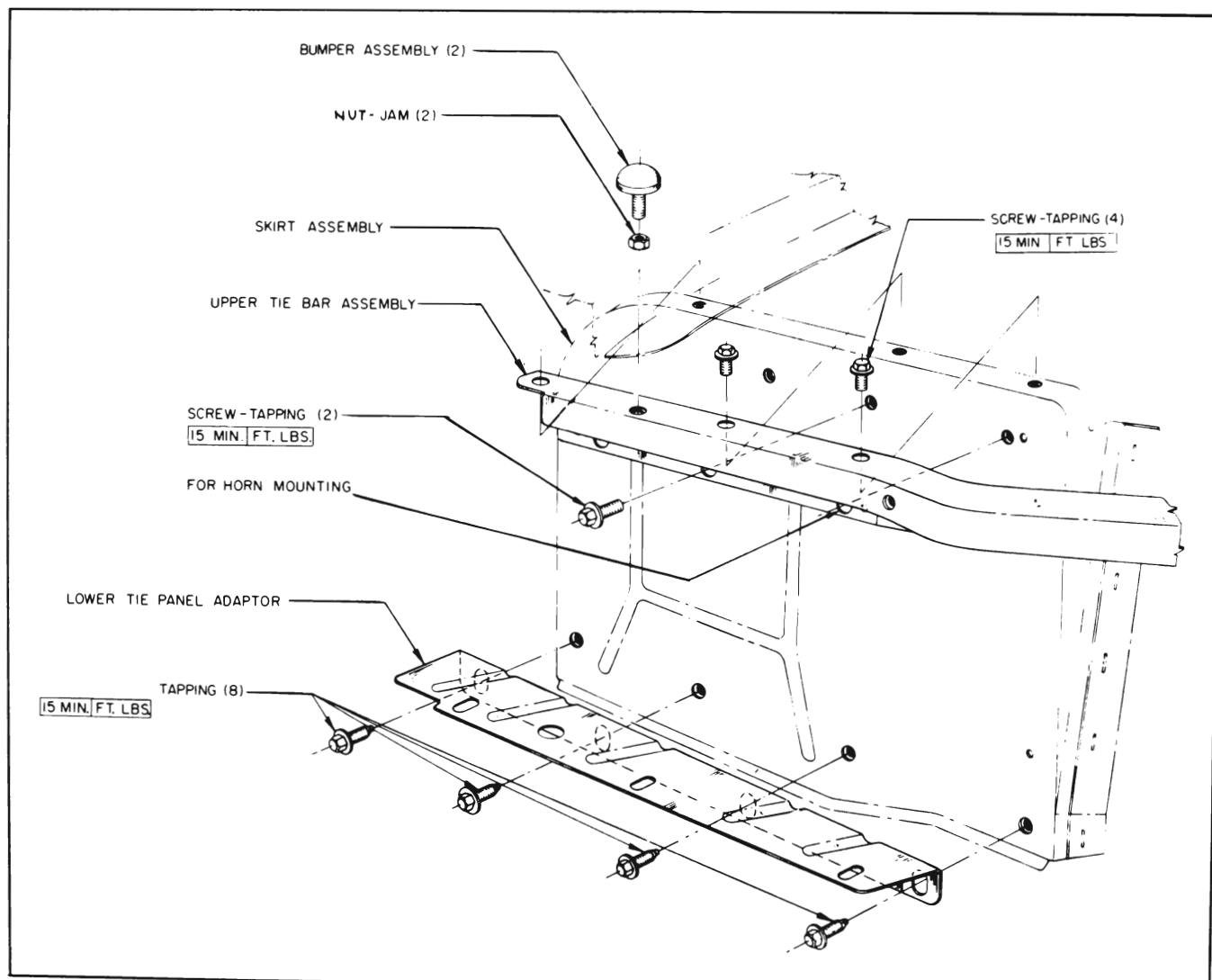


Figure 12-10—Front End Sheet Metal

openings should be shaped as required by the use of body jacks. The body should rest firmly on all mountings before bolts are tightened and steel shims should be added where body does not contact a mounting. Shims for this purpose are furnished under Group 9.023.

Convertible bodies may be re-shimmed in cases where door locks do not latch securely after door is properly adjusted in body opening. In such cases, shims placed under the ends of body will close in the body door opening sufficiently to insure proper latching of door locks.

When body bolts are tightened use a torque wrench to tighten all bolts uniformly to 30 ft. lbs. torque. The specified torque is very necessary to insure proper compression of convertible body mounting shims, and to insure tightening against the spacers in closed body mountings. Excessive tightening must be avoided as distortion of mountings will result.

12-5 DESCRIPTION OF FRAME

The frame is of the tubular center, X type construction.

The center tubular section of the frame in addition to joining the frame side rails together, encloses the center portion of the drive shaft assembly and its center bearing.

The front end sections of the frame are

deep, boxed channels which add increased resistance to impact on front end collisions. The frame side rails at the rear of the vehicle are also of a box section construction with the width and height of the box cross section smaller than that of the front end side rails.

12-6 CHECKING FRAME DIMENSIONS

The easiest and most accurate method of checking frame dimensions is by use of tram gages. When using tram gages be sure to keep cross bar level in order to insure accuracy in measurements. Frame dimension and alignment checks should be made with the tram points set at the center of each locating point.

The "plumb bob" method may be used for measuring frame dimensions if tram gages are not available. To assure any degree of accuracy when using the "plumb bob" method the vehicle should be on a level floor and the tires properly inflated. If the vehicle is on a hoist every attempt should be made to have the vehicle resting on a level plane.

To use the "plumb bob" method it is necessary to have a piece of cord attached to an ordinary surveyor's plumb bob. When measuring the distance between two points, the free end of the cord should be placed on one of the points and the plumb bob allowed to hang just above the surface of the floor. A chalk mark

FRAME ALIGNING AND REPAIR DIMENSIONS

Refer to Figure 12-18

	4700 4829	4411 4437 4439	4469 4637 4639	4435 4445	4867	4467 4667
A	71 1/2	68 3/8	68 3/8	68 3/8	71 1/2	68 3/8
B	73 3/16	70 1/2	70 1/2	70 1/2	73 3/16	70 1/2
C	95 1/4	92 1/4	92 1/4	92 1/4	95 1/4	92 1/4
D	30 1/4	30 1/4	30 1/4	23 1/2	30 1/4	30 1/4
E	32 1/16	29 1/16	29 1/16	33 7/8	32 1/16	29 1/16
F	61 1/4	61 1/4	61 1/4	53 1/2	61 1/4	61 1/4
G, G'	Diagonal distances of lines G and G' should be equal within 1/2"					
H, H'	Diagonal distances of lines H and H' should be equal within 3/8"					
I, I'	Diagonal distances of lines I and I' should be equal within 1/2"					

Dimension A - measured from the rear edge of the center hole in front end cross member to the front edge of the larger hole on bottom of drive line tunnel.

Dimension B - measured from the front edge of large hole on bottom of drive line tunnel to center of lower ball joint grease fitting.

should be made on the floor under the tip of the plumb bob. This operation should be repeated at the other necessary reference points. With these reference points located by the plumb bob marked on the floor, the distance between chalk marks may be easily measured with a tape rule.

12-7 FRAME ALIGNMENT AND DAMAGE REPAIRS

When a frame has been damaged by collision, upset, etc., the dimensions listed in Figure

12-11 and Figure 12-12 may be used to realign the frame components to factory specifications.

In the case of frame distortion or misalignment it is permissible to straighten the frame using heat. Heat can be applied without materially weakening the steel, provided the heating temperatures are kept below 1200°F. A steel temperature of 1200°F is seen as a deep cherry red when viewed in subdued daylight conditions which exist in the average repair shop. Heat in excess of 1200°F will permanently weaken the metal structure and lead to eventual frame failure in service.

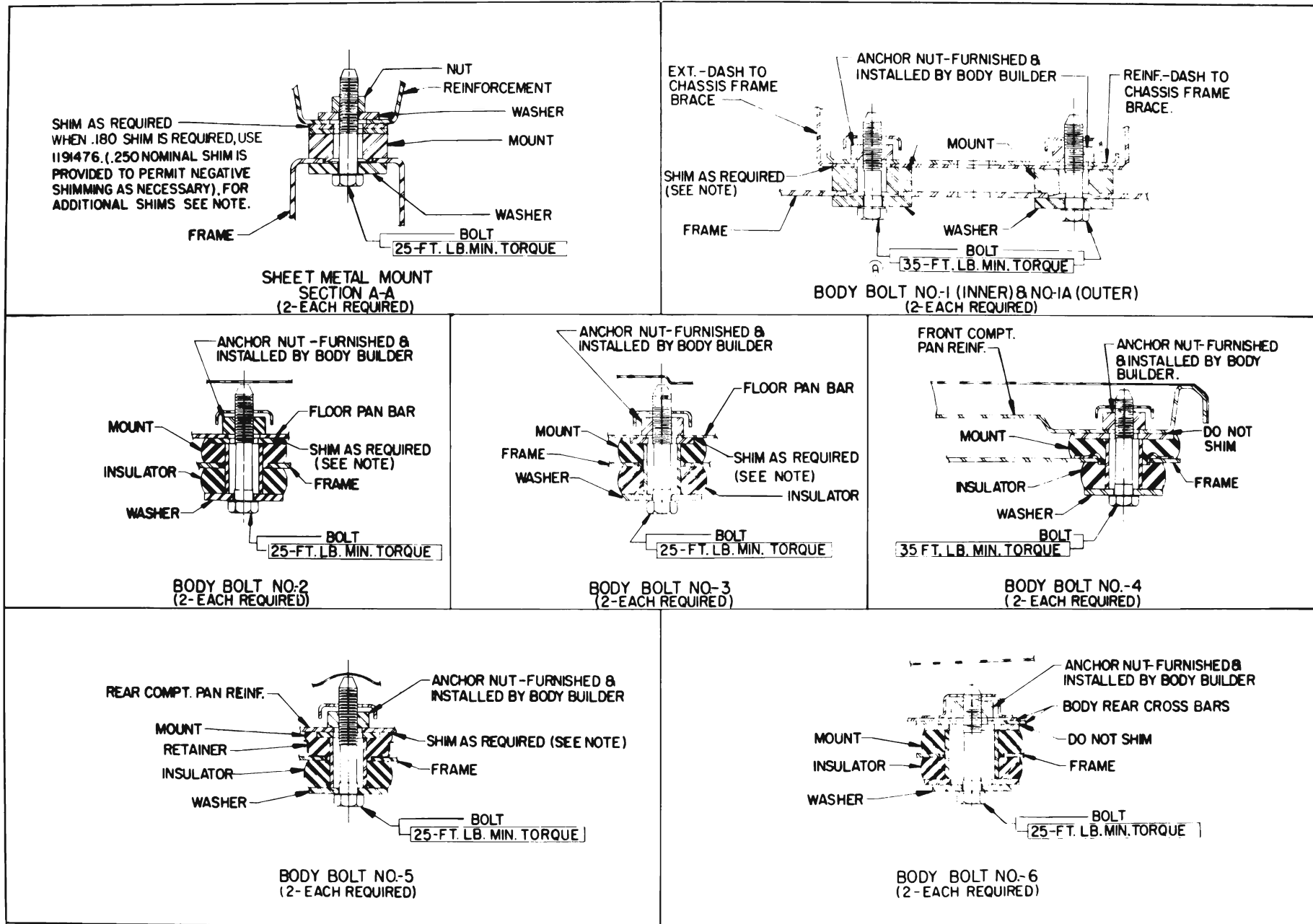


Figure 12-15—Body Mountings - Convertibles

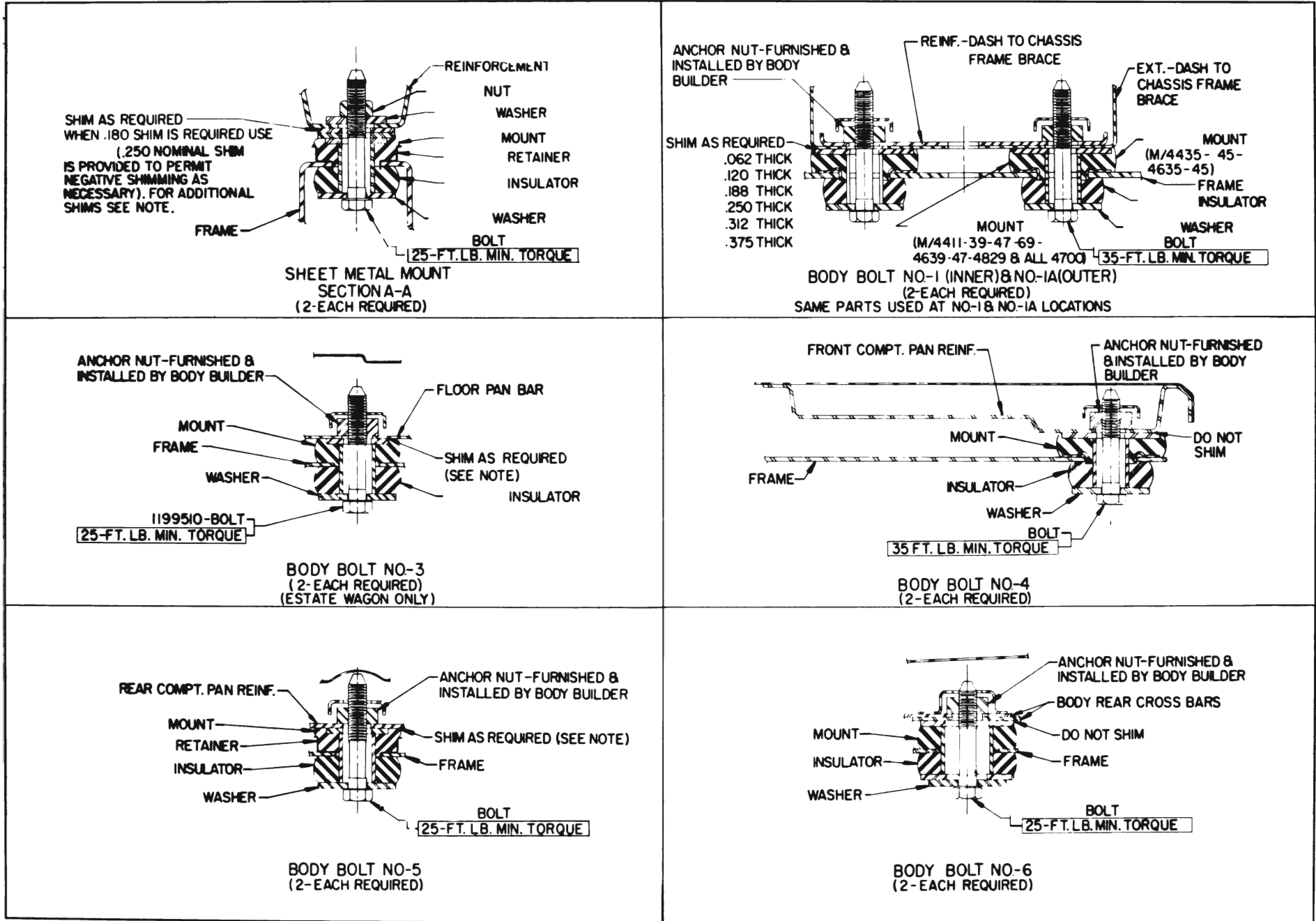


Figure 12-16—Body Mountings—Closed Bodies and Estate Wagons

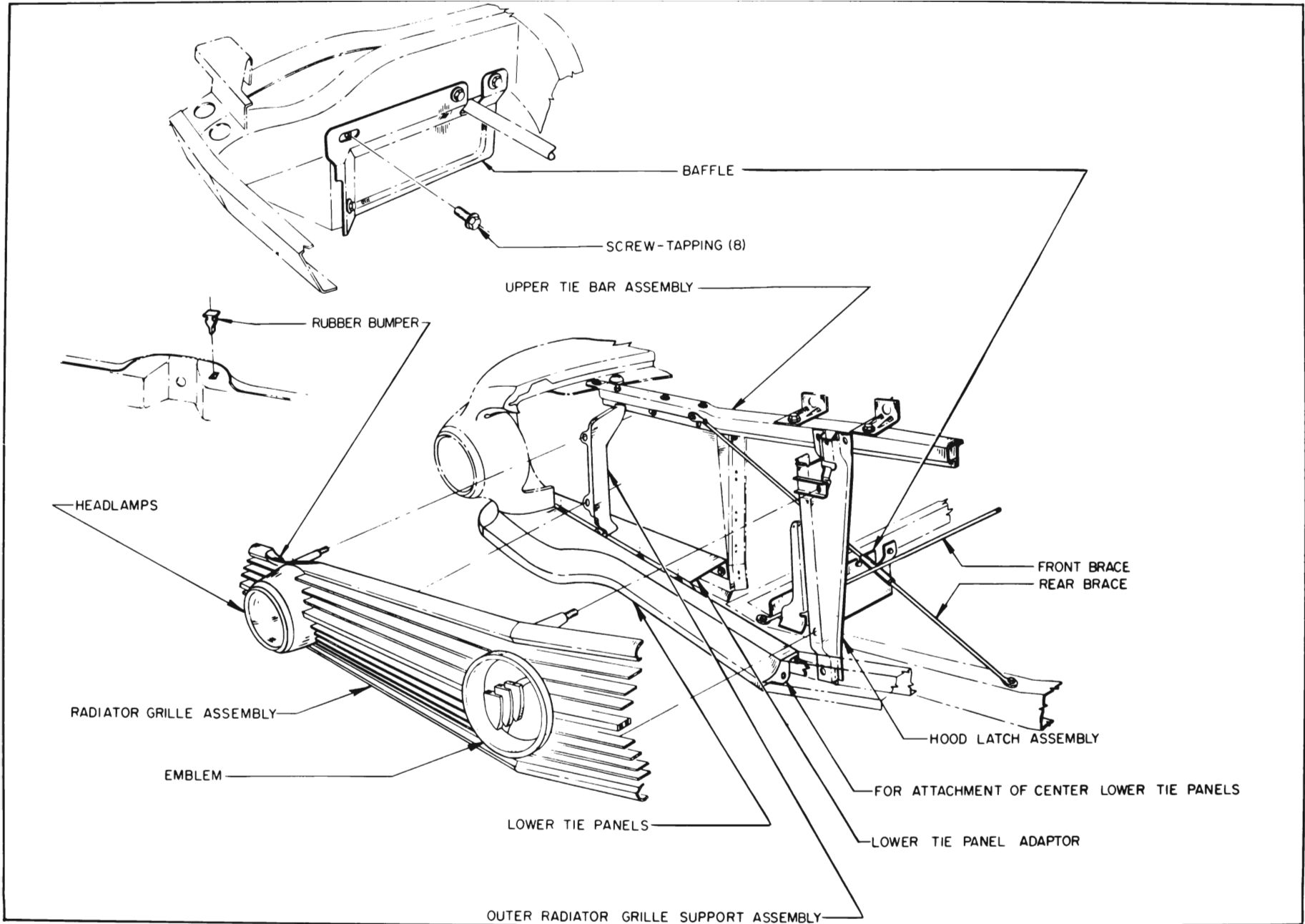


Figure 12-17—Grille and Front End Sheet Metal

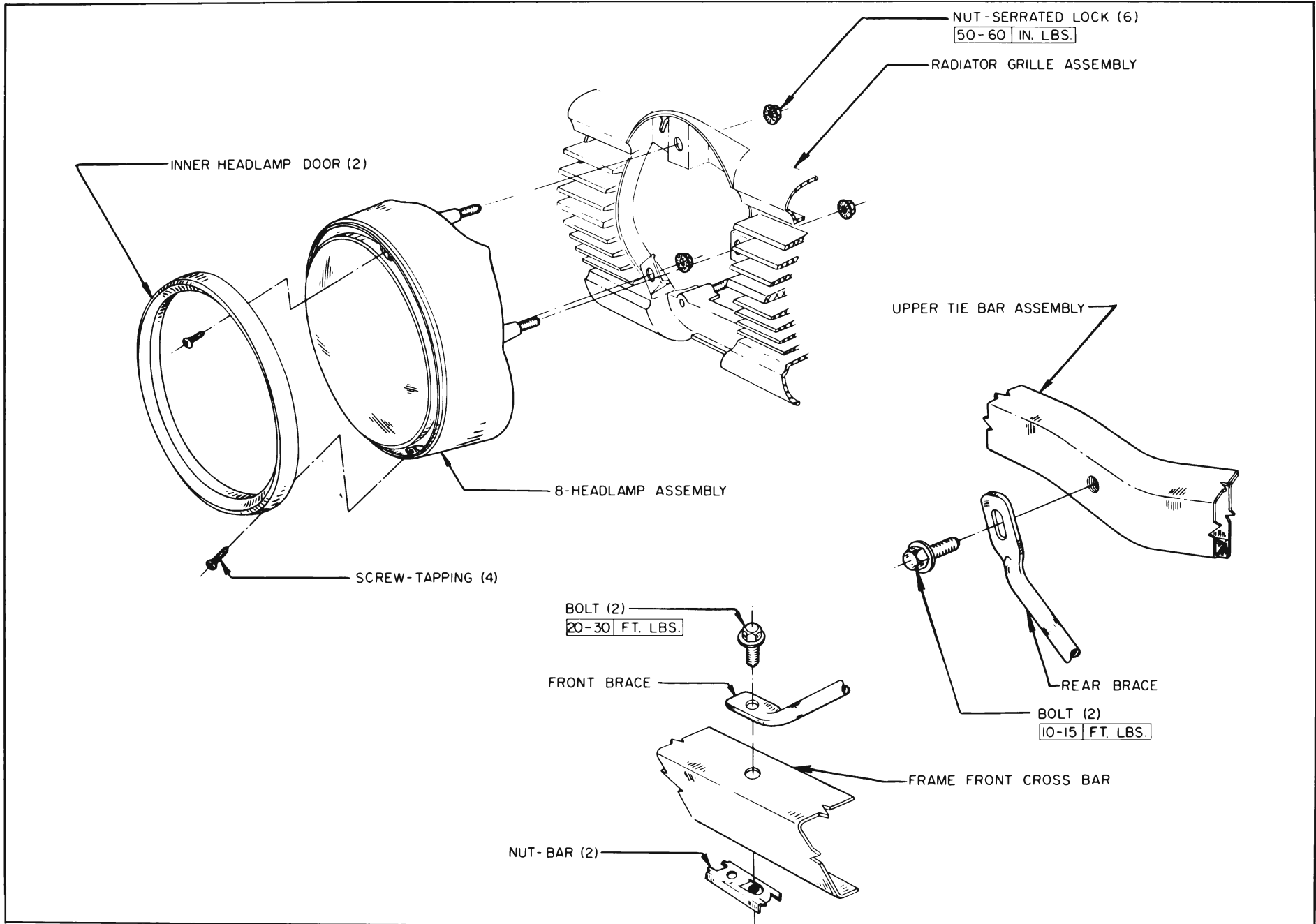


Figure 12-18—Grille and Front End Sheet Metal Illustration #2

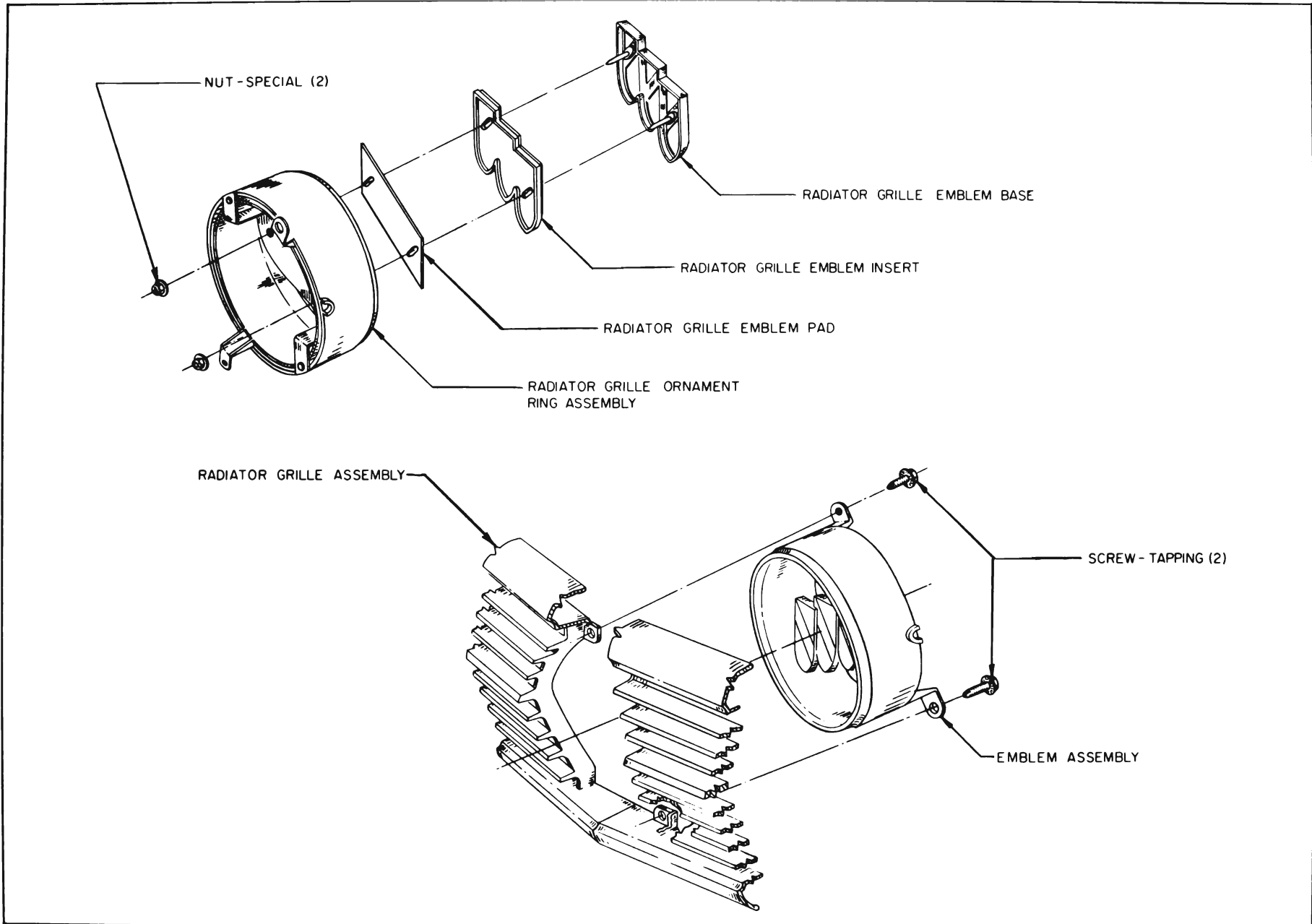


Figure 12-19—Grille and Front End Sheet Metal Illustration #3

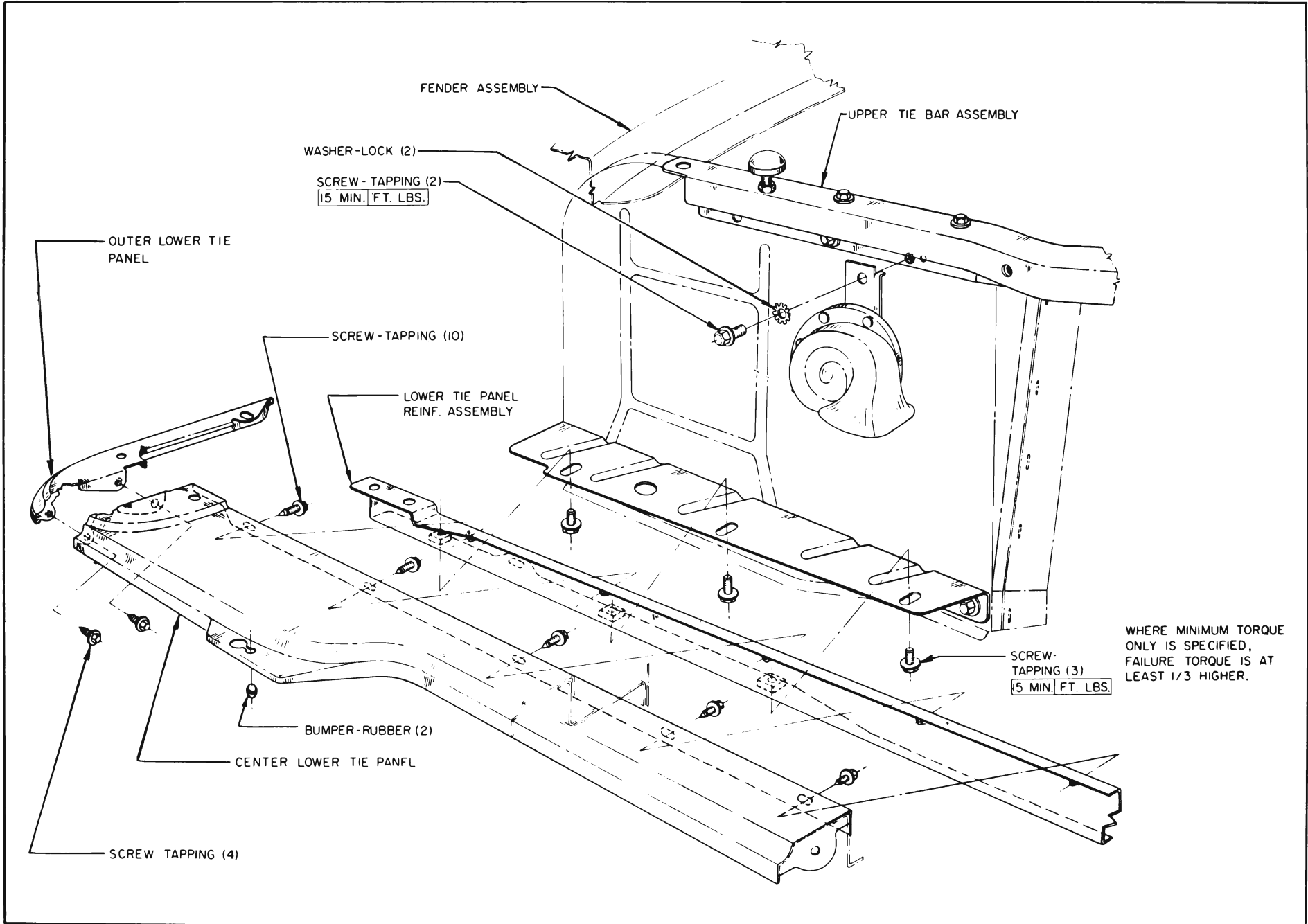


Figure 12-20—Grille and Front End Sheet Metal Illustration #4

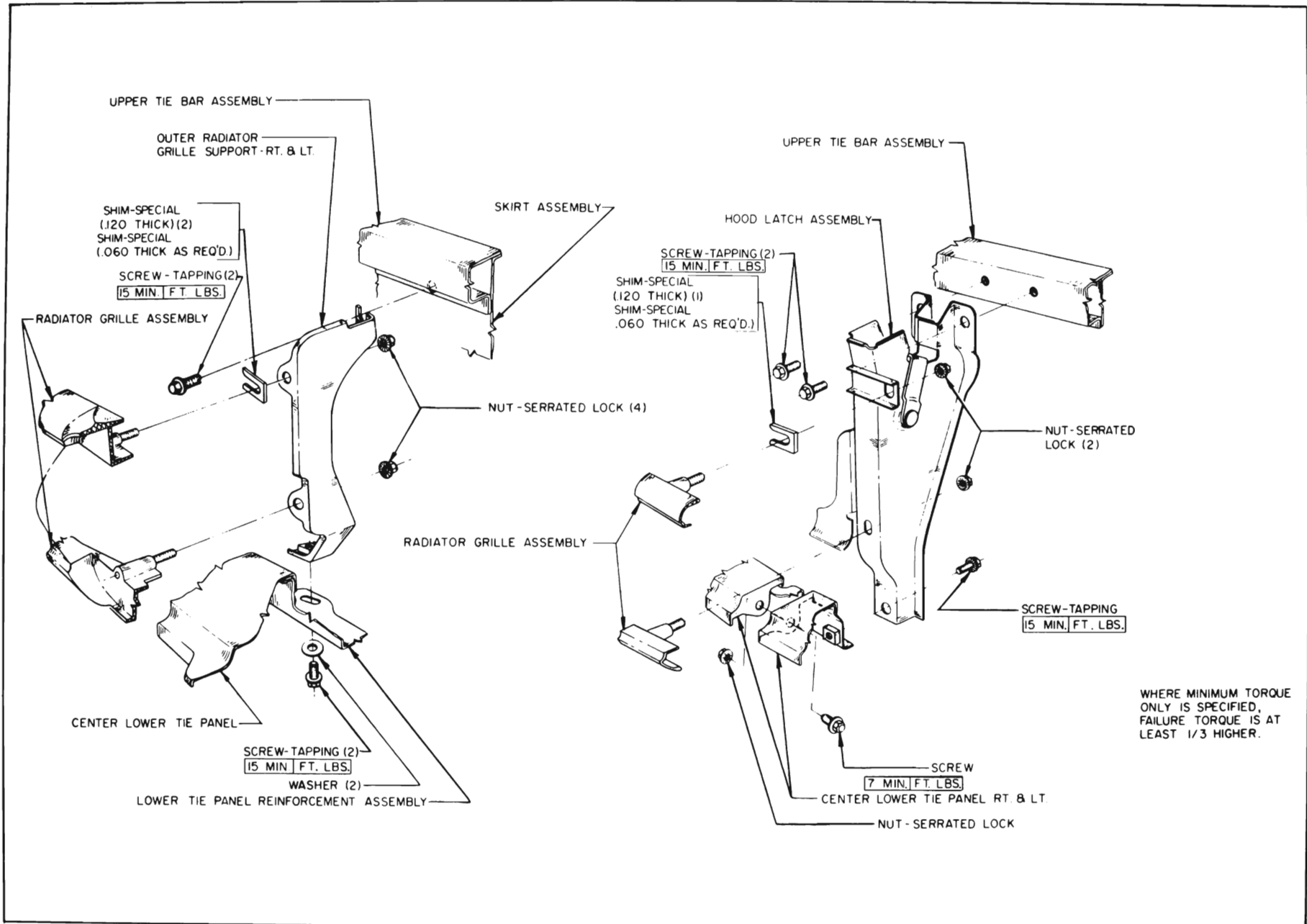


Figure 12-21—Hood Latch Assembly

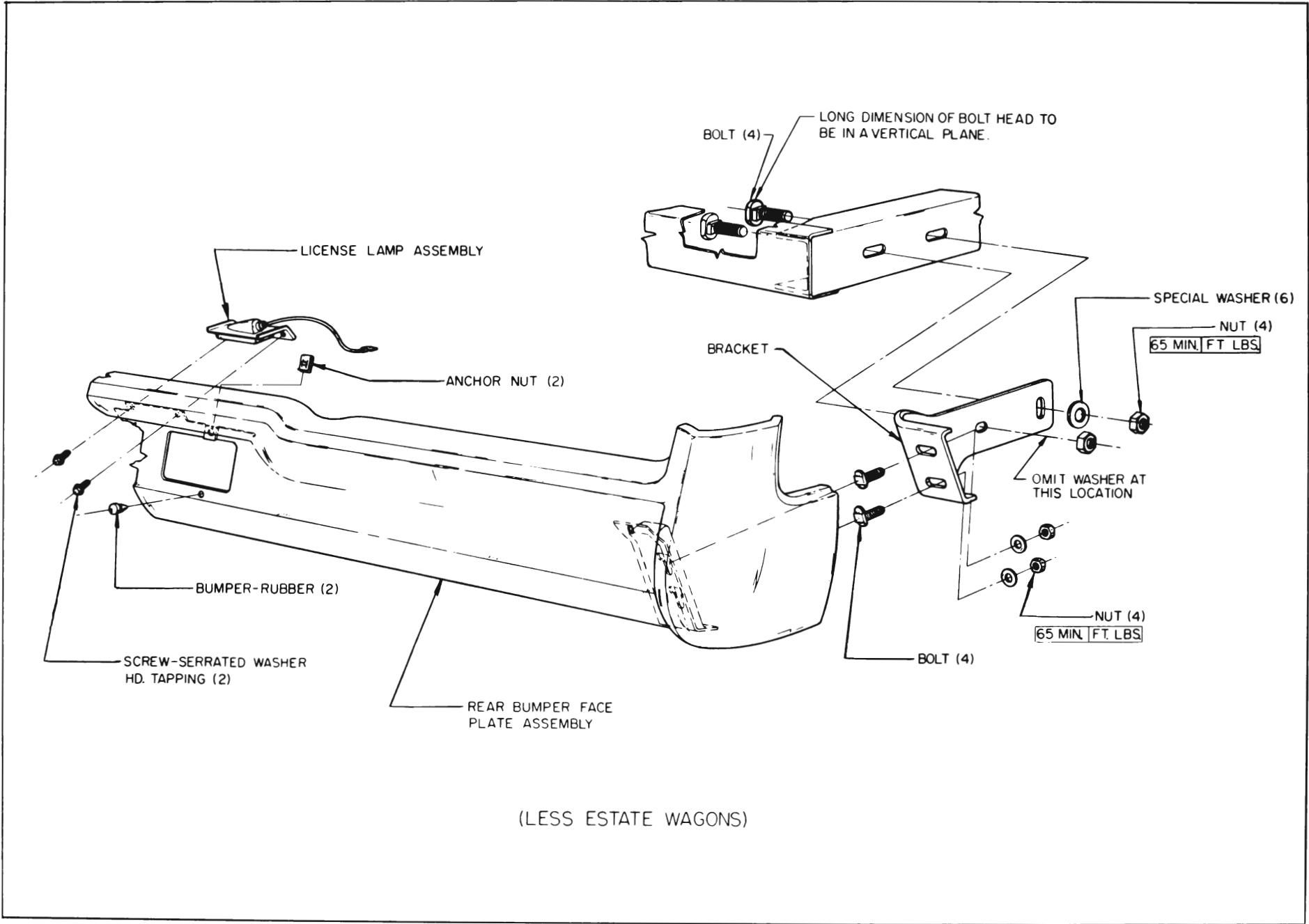


Figure 12-22—Rear Bumper Less Estate Wagons

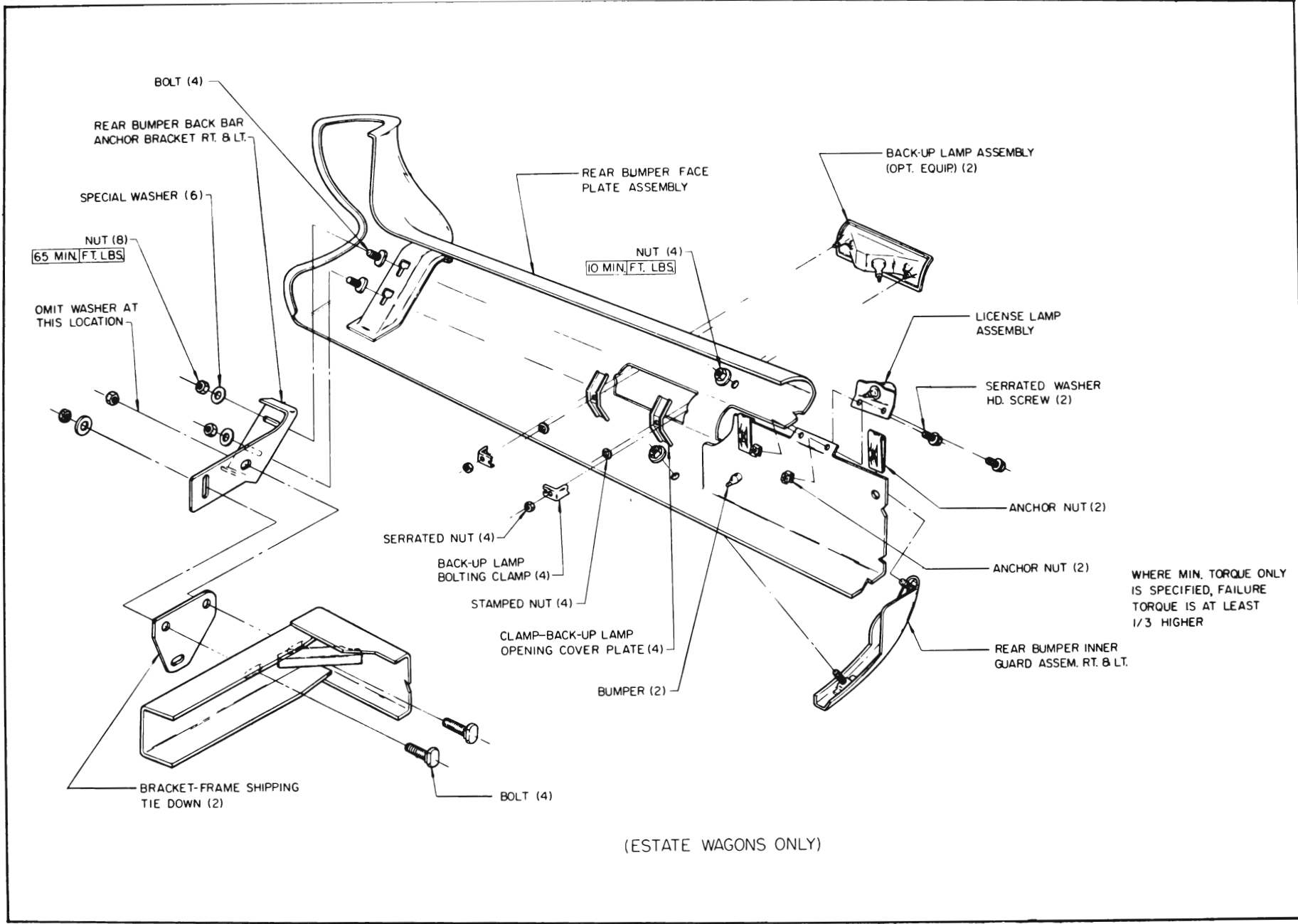


Figure 12-23—Rear Bumper Estate Wagons Only

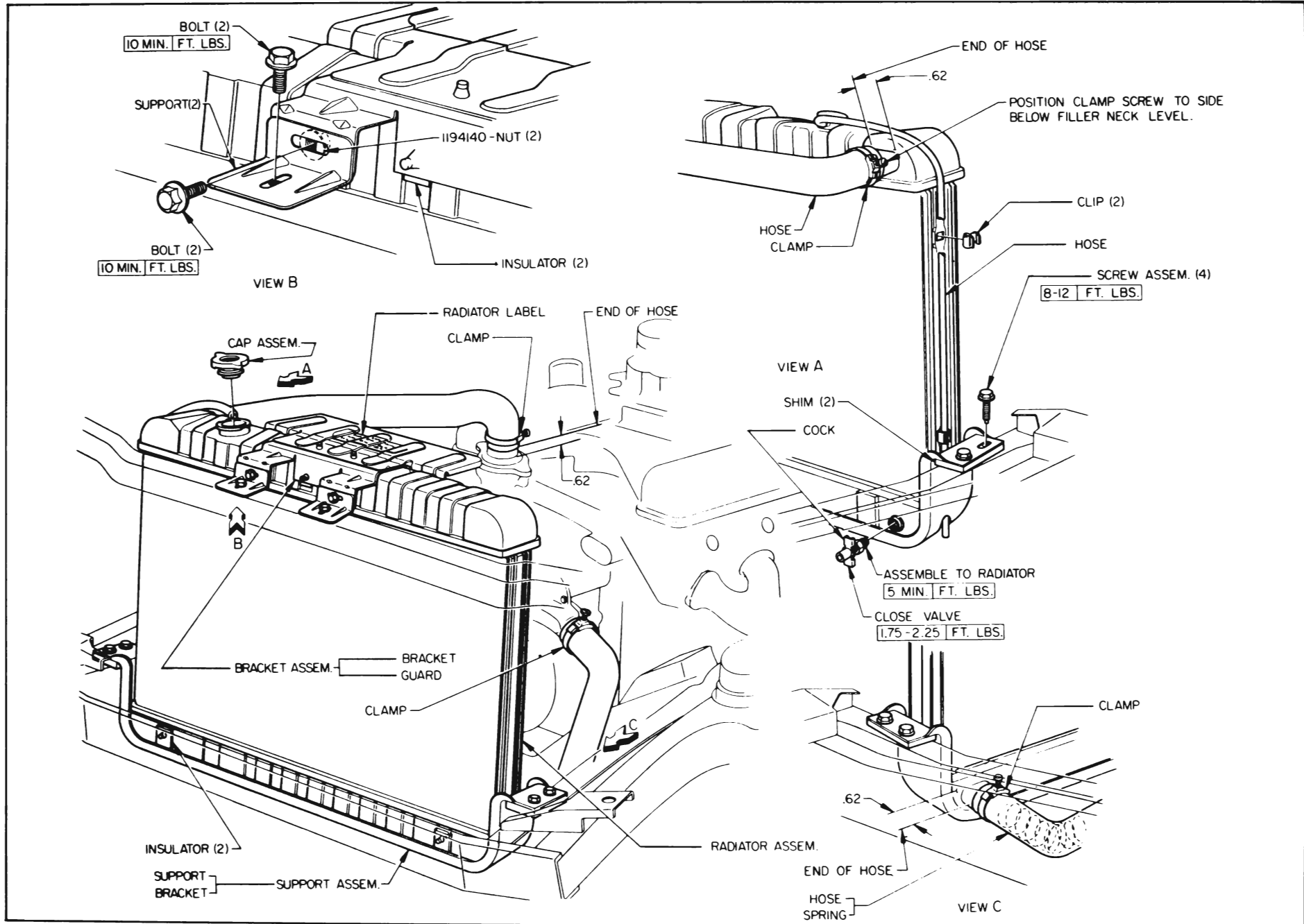


Figure 12-24—Radiator Mounting

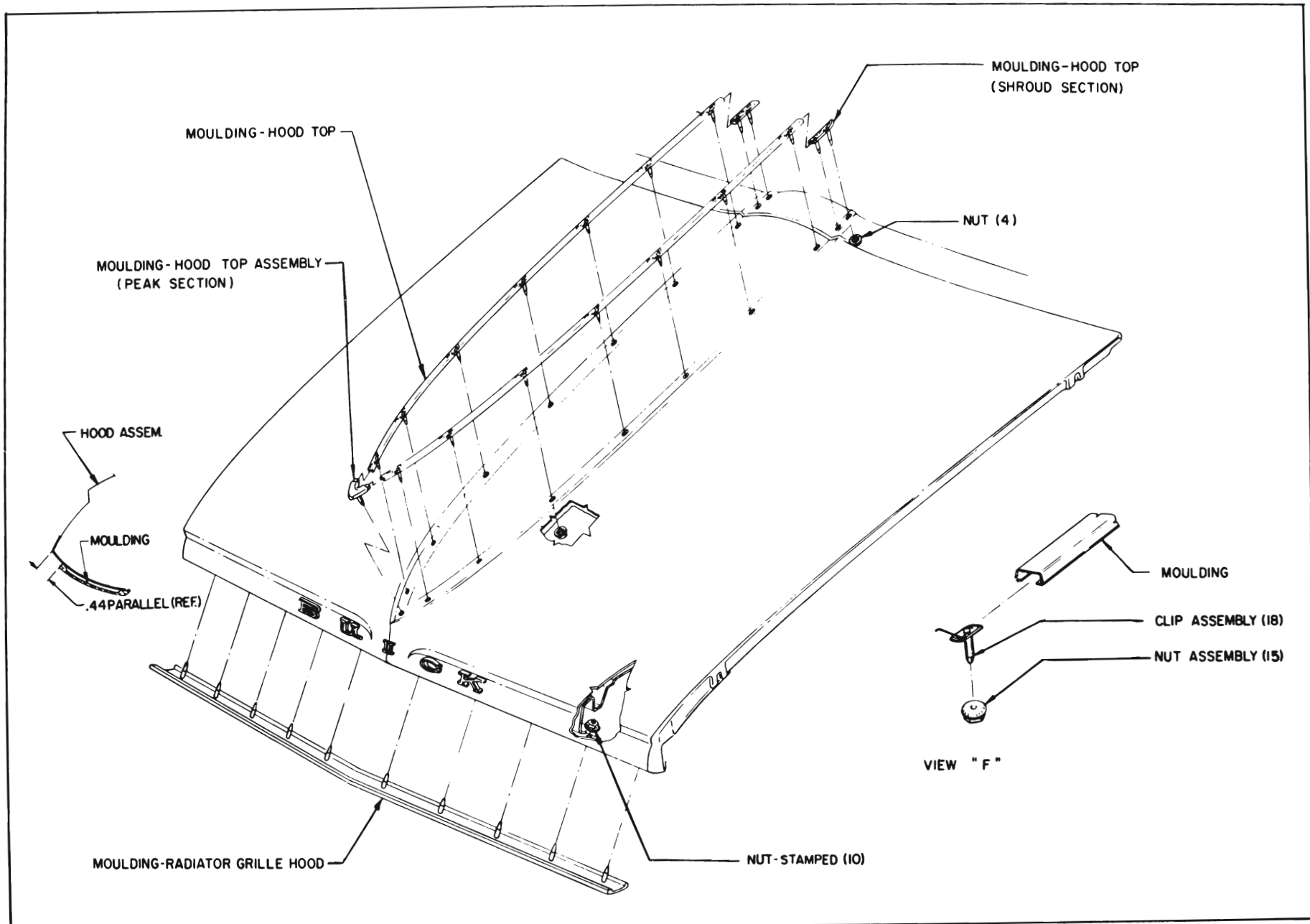


Figure 12-25—Hood Assembly

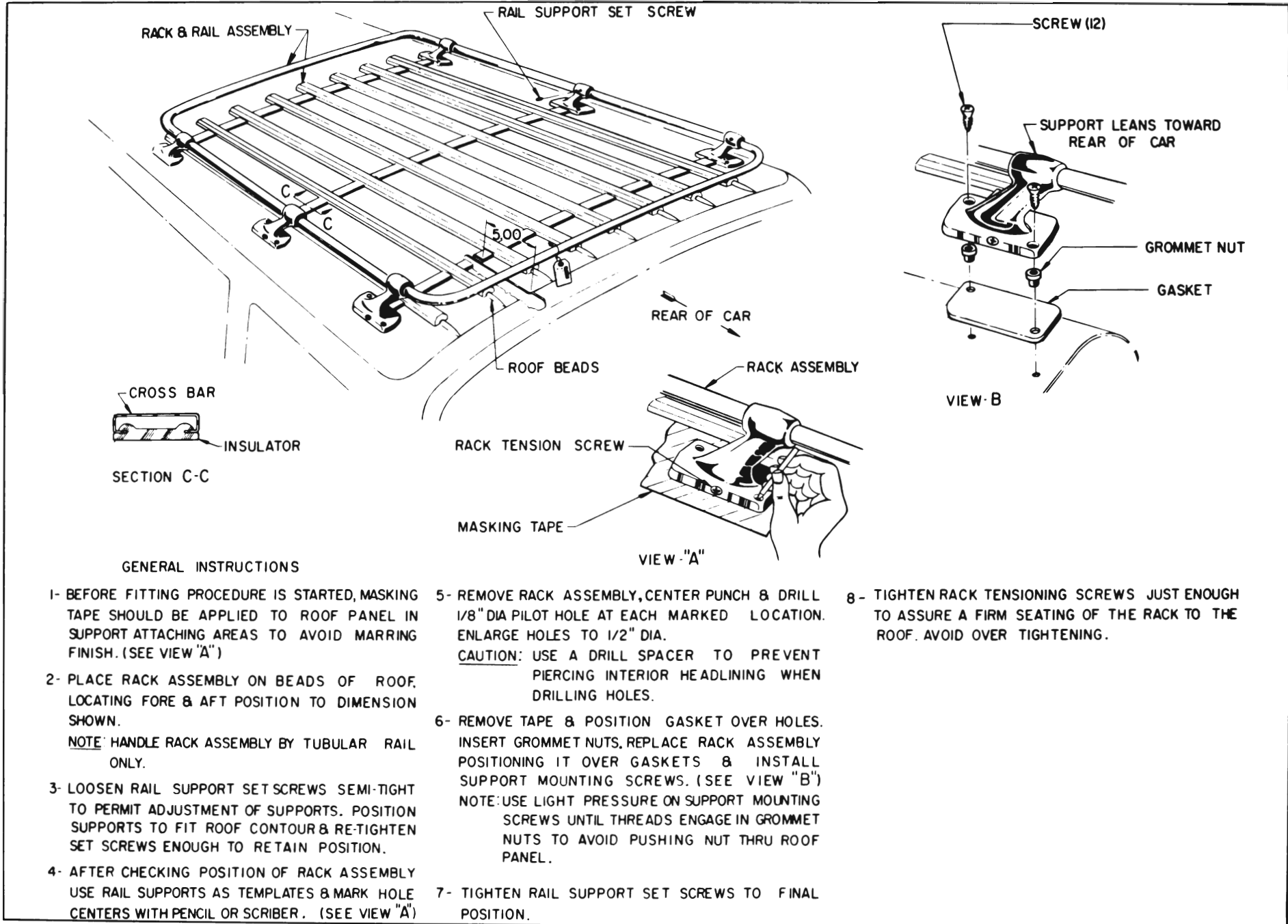


Figure 12-26—Rack and Rail Assembly