

SECTION 13-H BODY SHELL

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13-21 GENERAL BODY CONSTRUCTION

The over-all rigidity of the integral body construction is drawn from each of the individual metal components which, when welded together, comprise the body shell assembly. The floor pans and rail assemblies forming the underbody area incorporate attachment provisions for the power train and the suspension systems. The underbody, therefore, contributes the greatest amount of strength to the body assembly. This type of integral construction eliminates the conventional independent chassis frame and has become known as the "unitized" type of body construction. The general body shell construction is illustrated in Figures 13-97, 13-98, 13-99, 13-101 and 13-102.

Figure 13-103 illustrates the major assemblies, sub-assemblies and various individual components that make up the underbody and shroud assembly. This illustration primarily shows construction detail of the parts and is intended as a guide to parts nomenclature. It does not necessarily reflect a breakdown of available service replacement parts.

UNDERBODY AND SHROUD ASSEMBLY

- | | |
|---|--|
| <ol style="list-style-type: none"> 1. Panel Assembly - Front Wheelhouse Upper and Lower 2. Panel Assembly - Shroud Top Vent Duct Center and Sides 3. Brace - Dash to Motor Rail 4. Panel Assembly - Shroud Upper 5. Grille - Shroud Top Vent 6. Extension - Dash to Motor Mount Upper Brace 7. Filler - Dash to Shroud Side Upper Corner 8. Panel - Shroud Lower with Sealing Strip 9. Reinforcements - Compartment Pan at Gas Tank 10. Rail - Motor Compartment Side Upper Front | <ol style="list-style-type: none"> 11. Rail - Motor Compartment Side Upper Rear 12. Rail - Motor Compartment Side Lower 13. Rail - Floor Pan Side 14. Rail Assembly - Motor Compartment Side 15. Rail - Front End Cross 16. Spacer - Motor Mount Bolt 17. Reinforcements - Front End Cross Rail - Outer 18. Reinforcement - Front End Cross Rail - Center 19. Nut - Motor Mount Bolt 20. Rail Assembly - Motor Compartment Side and Front 21. Support - Transmission Mounting Bolts 22. Bar #1 - Floor Pan 23. Pan - Toe 24. Pan - Floor 25. Bar and Support Assembly - Rear Seat Pan Cross 26. Pan - Rear Seat 27. Bar - Compartment Pan Cross (at Kick-up) with Reinforcements 28. Reinforcement - Rear Shock Absorber Support 29. Pan - Compartment 30. Rail - Rear End Cross 31. Panel - Rear End Lower 32. Support - Radiator Mounting 33. Spacers - Front Bumper Bolts 34. Reinforcement - Front Suspension Spacer 35. Reinforcement - Front Suspension Support 36. Spacer - Front Suspension 37. Support - Front Suspension 38. Extension - Dash to Motor Rail 39. Support - Front Stabilizer 40. Support - Parking Brake Cable - Front 41. Support - Parking Brake Cable Lever 42. Retainer - Parking Brake Cable Lever 43. Panel - Rocker Inner Front 44. Panel - Rocker Inner Rear 45. Filler - Rocker Panel - Rear 46. Filler - Rocker Panel Outer Front Extension 47. Extension - Rocker Panel Outer Front 48. Panel - Rocker Outer 49. Reinforcement - Front Body Hinge Pillar to Rocker |
|---|--|

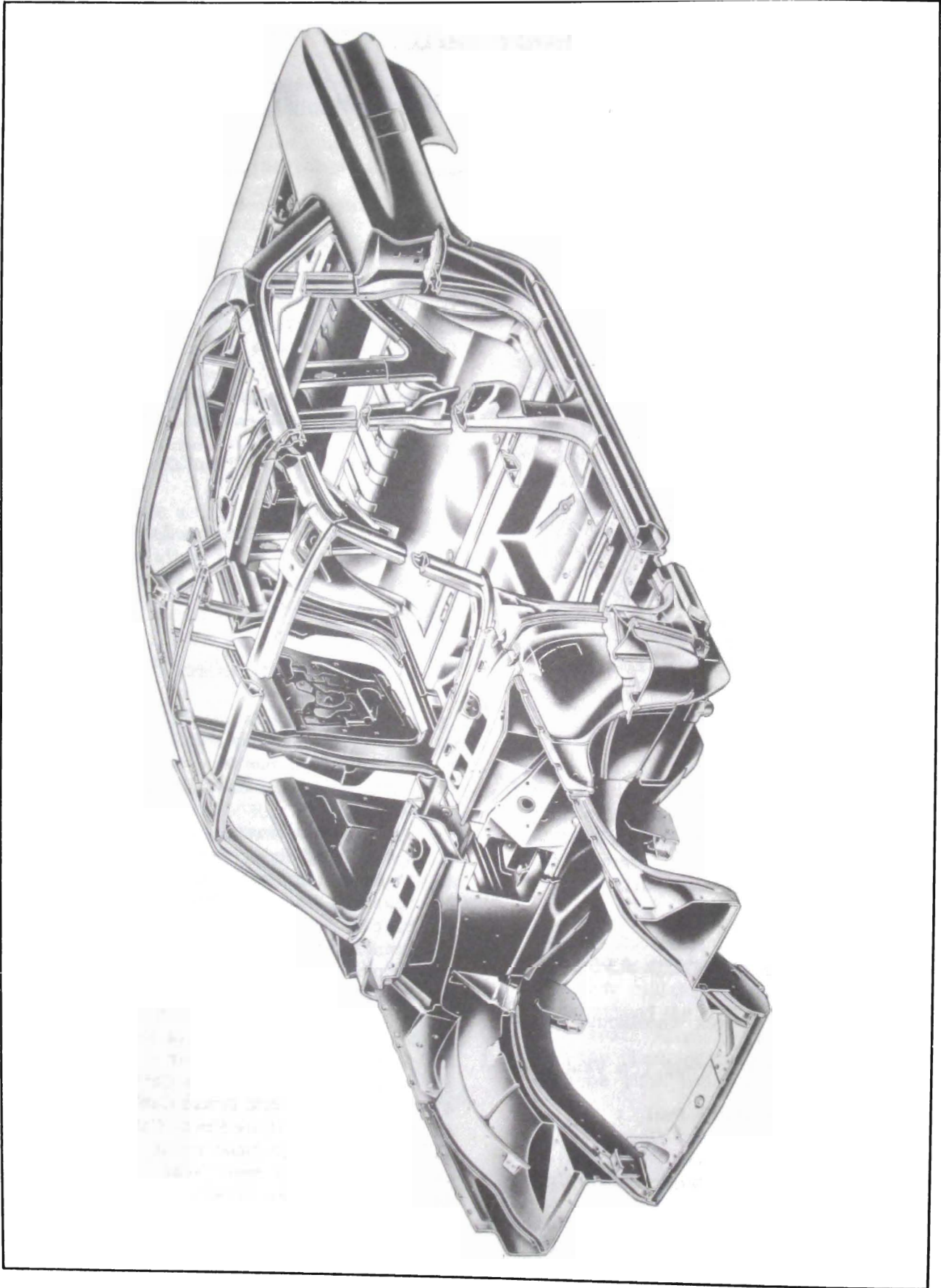


Figure 13-97—Body Shell - Front Quarter View (4119)



Figure 13-98—Body Shell - Rear Quarter View (4119)

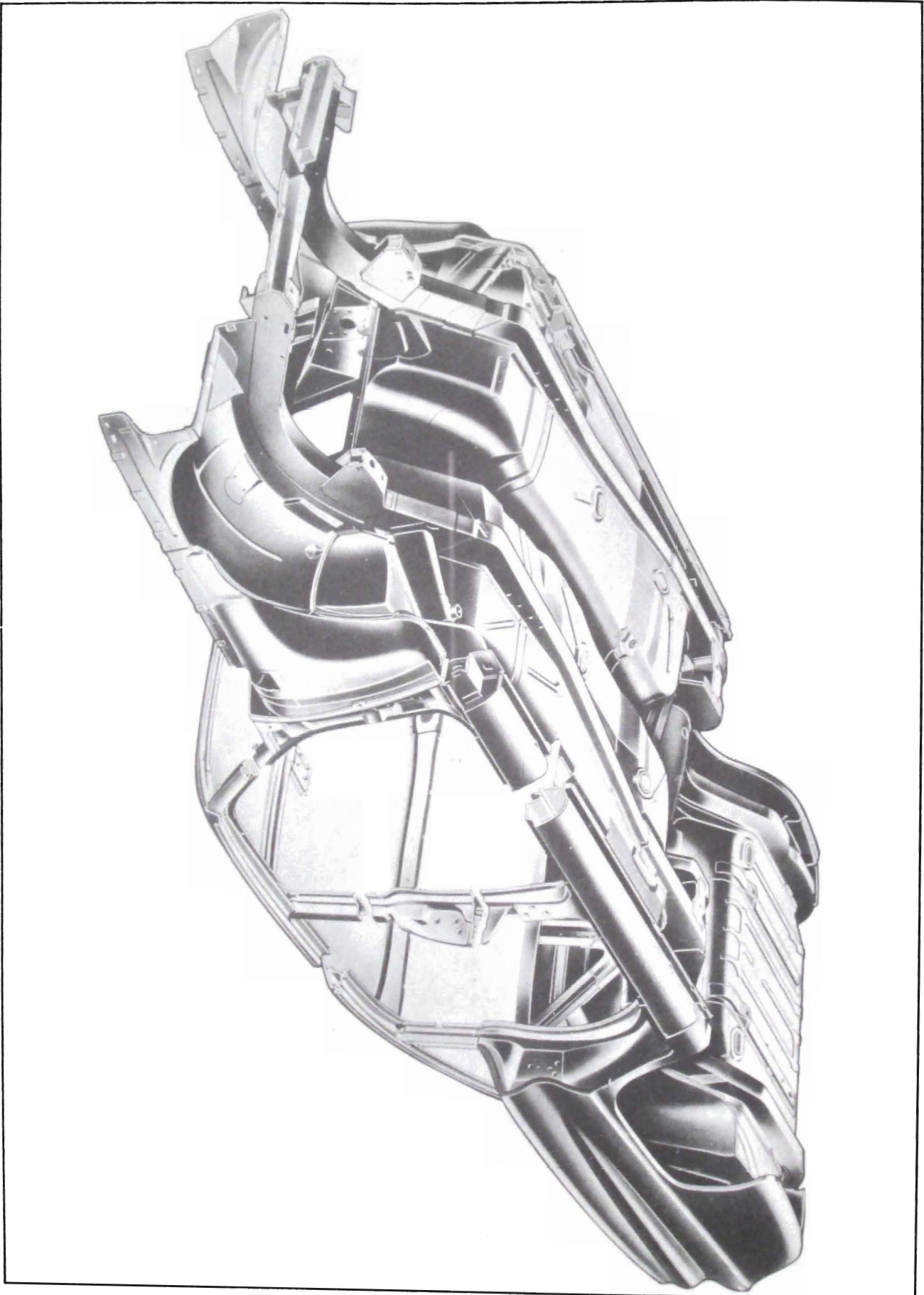


Figure 13-99—Body Shell - Lower Front Quarter View (4119)

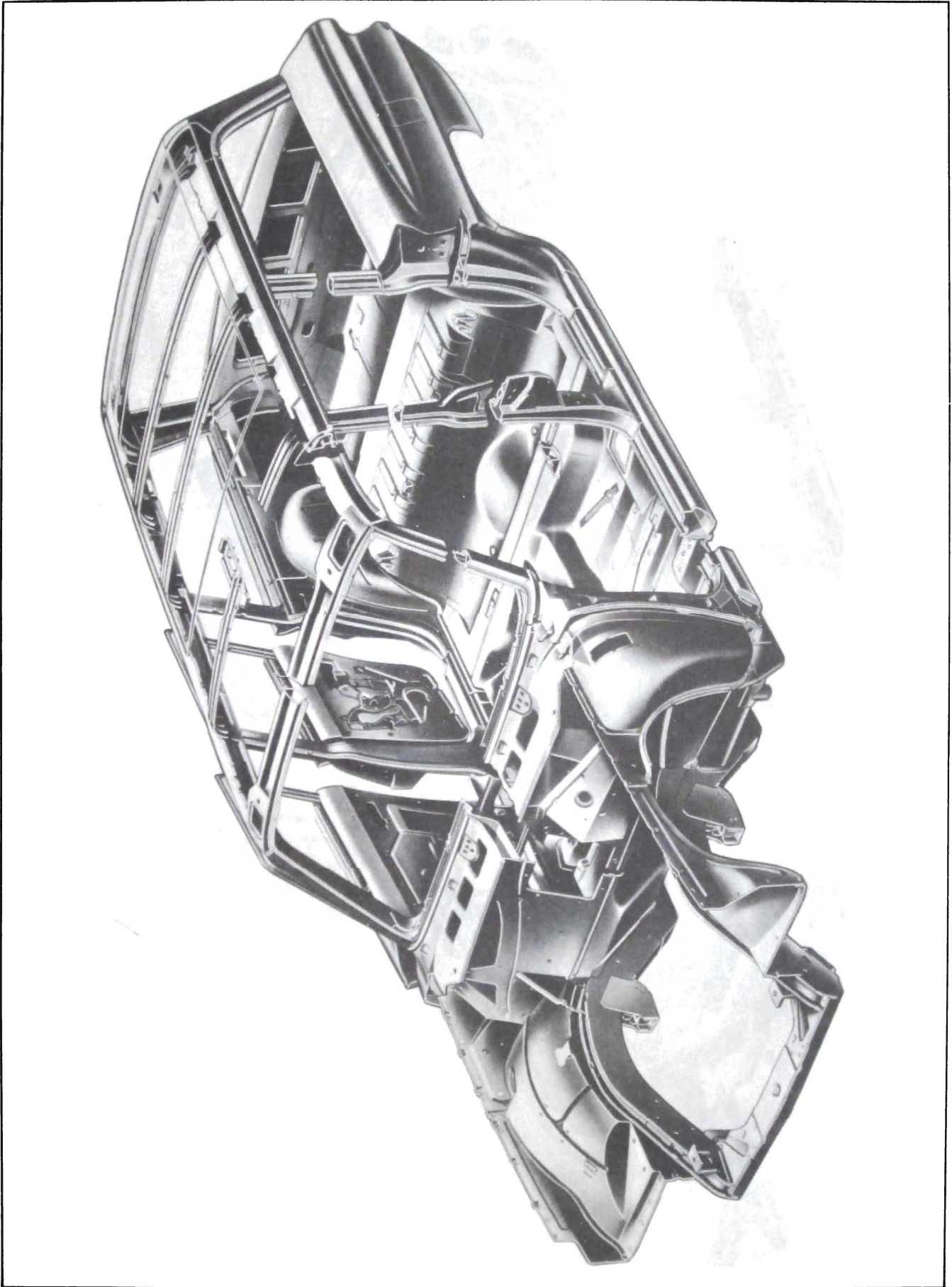


Figure 13-101—Body Shell - Front Quarter View (4135)

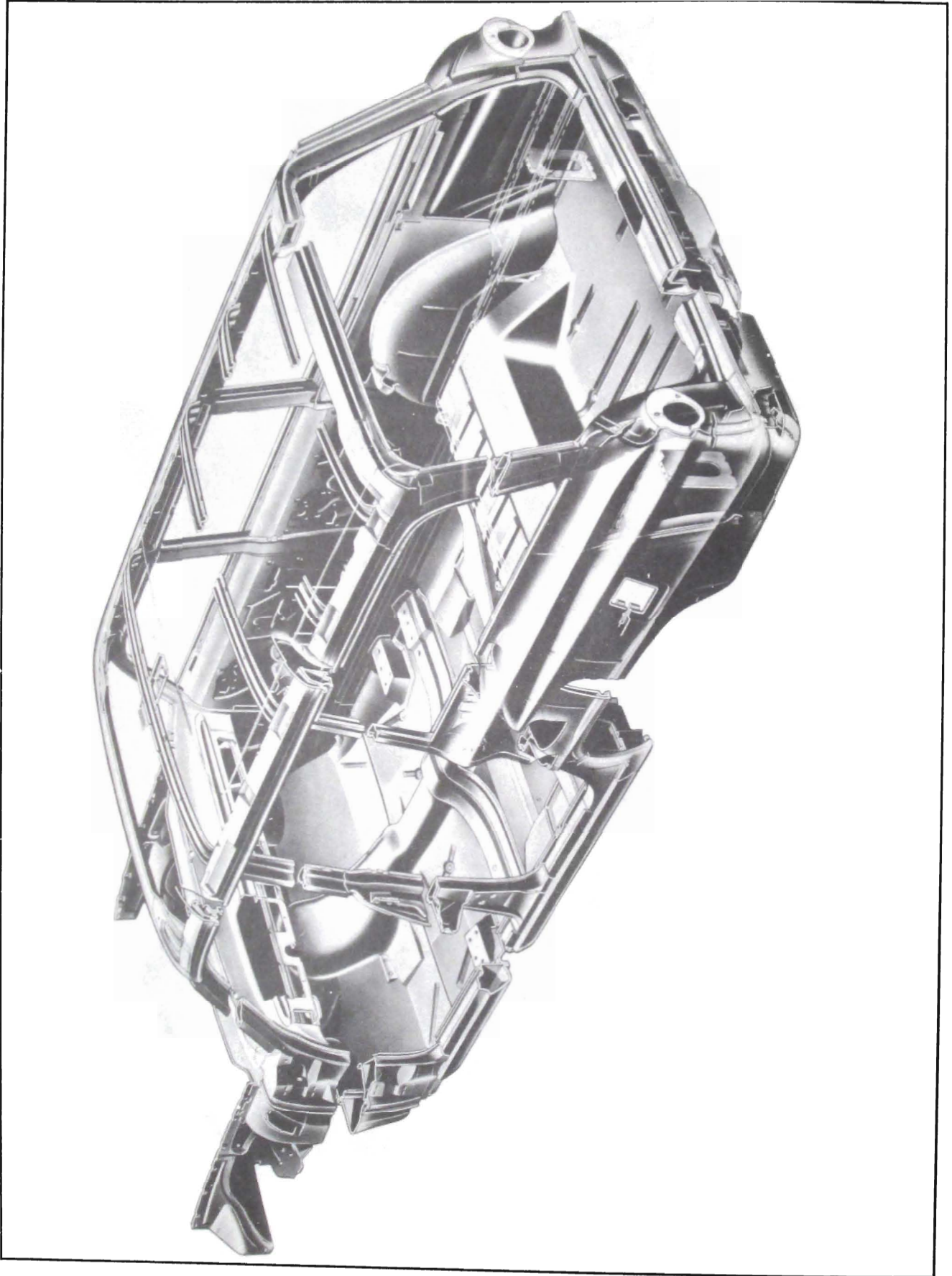


Figure 13-102—Body Shell - Rear Quarter View (4135)

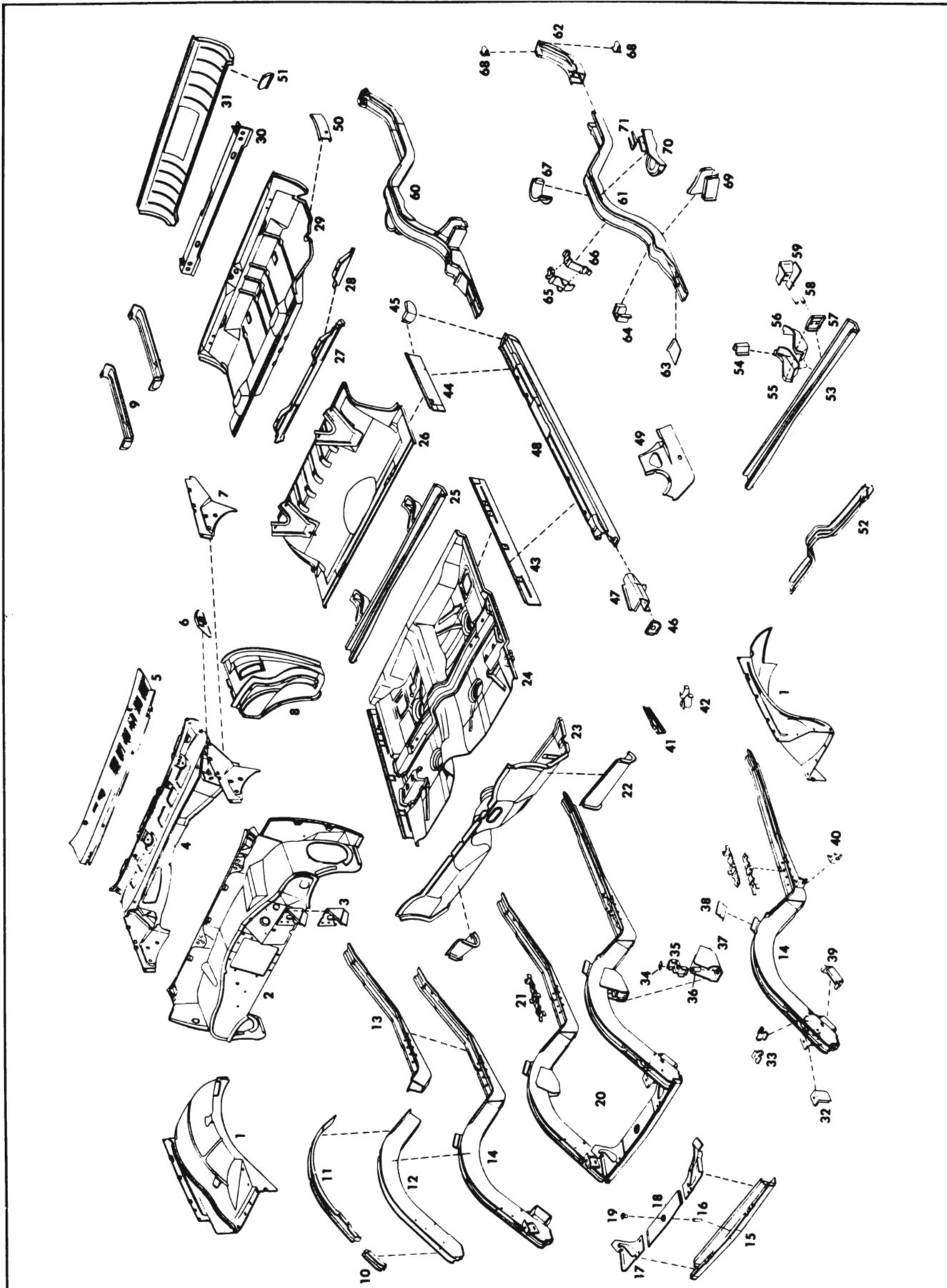


Figure 13-103—Under Body and Shroud Assembly

13-74 GENERAL CONSTRUCTION

50. Filler - Compartment Pan to Quarter Outer Panel - Front
51. Filler - Compartment Pan to Quarter Outer Panel - Rear
52. Bar #2 - Floor Pan
53. Bar - Rear Seat Pan Cross
54. Stiffener - Rear Seat Pan Reinforcement at Suspension
55. Reinforcement - Rear Seat Pan at Suspension - Inner
56. Reinforcement - Rear Seat Pan at Suspension - Outer
57. Reinforcement - Rear Suspension Mounting Support
58. Spacers - Rear Suspension Mounting Support
59. Support - Rear Suspension Mounting
60. Rail Assembly - Compartment Pan Side
61. Rail - Compartment Pan Side Front
62. Rail - Compartment Pan Side Rear
63. Cover - Compartment Pan Front Side Rail Protector
64. Spacer - Rear Suspension
65. Spacer - Compartment Pan Side Rail - Upper - at Rear Stabilizer
66. Spacer - Compartment Pan Side Rail - Lower - at Rear Stabilizer
67. Reinforcement - Compartment Pan Side Rail at Suspension
68. Spacers - Rear Bumper
69. Brace - Compartment Side Rail to Rocker Inner
70. Support - Rear Suspension
71. Support - Rear Axle Bumper

13-22 ALIGNMENT CHECKING PROCEDURE**a. Description**

The underbody assembly is comprised of side rails, cross rails, floor pan cross bars, inner and outer rocker panels and other floor panel components. The underbody is of all-welded construction. Misalignment in the underbody can affect fit of doors and rear compartment lid. Most important, however, underbody misalignment can influence the suspension system, thereby causing many of the problems that arise from a suspension misalignment. Underbody misalignment in the area of the drive shaft center support bearing may also adversely affect drive shaft alignment. Underbody alignment, therefore, should be exact to within plus or minus 1/16" of the specified dimensions.

In the event of extensive collision damage, major underbody repairs may be required to

re-establish proper alignment. Extensive collision damage may include twist, side-sway, complicated sags or a combination of these conditions in the underbody area. In some cases, it may be determined that the most practical method of repairing the damage is to employ a frame straightening machine and a qualified operator. A frame machine offers a variety of controlled pushing and pulling operations as well as accurate frame centering and leveling gauges which are especially helpful in checking the conditions described above.

To assist in checking alignment of the underbody components, repairing minor underbody damage or locating replacement parts, the following underbody dimension and alignment checking information is presented.

b. Body Tram Gauge

An accurate method of determining the alignment of the underbody utilizes a measuring tram gauge. The tram gauge required to perform all recommended measuring checks properly must be capable of extending from a length of approximately twelve inches to a length of ninety inches.

Dimensions shown in the upper portion of Figure 13-104 are calculated on a horizontal plane parallel to the plane of the underbody. Precision measurements can be made only if the tram gauge is also always parallel to the plane of the underbody. This can be controlled by setting the vertical pointers on the tram gauge according to the dimensions shown in the lower portion of Figure 13-104.

At least one of the vertical pointers on the tram gauge must have a minimum reach of seventeen inches.

A proper tramming tool is essential for analyzing and determining the extent of collision misalignment present in underbody construction.

c. Underbody Alignment Reference Points

Figure 13-105 shows the specific reference points used in making underbody measurements. Dimensions to gauge holes and other unthreaded holes are measured to dead center of the holes and flush to the adjacent surface metal.

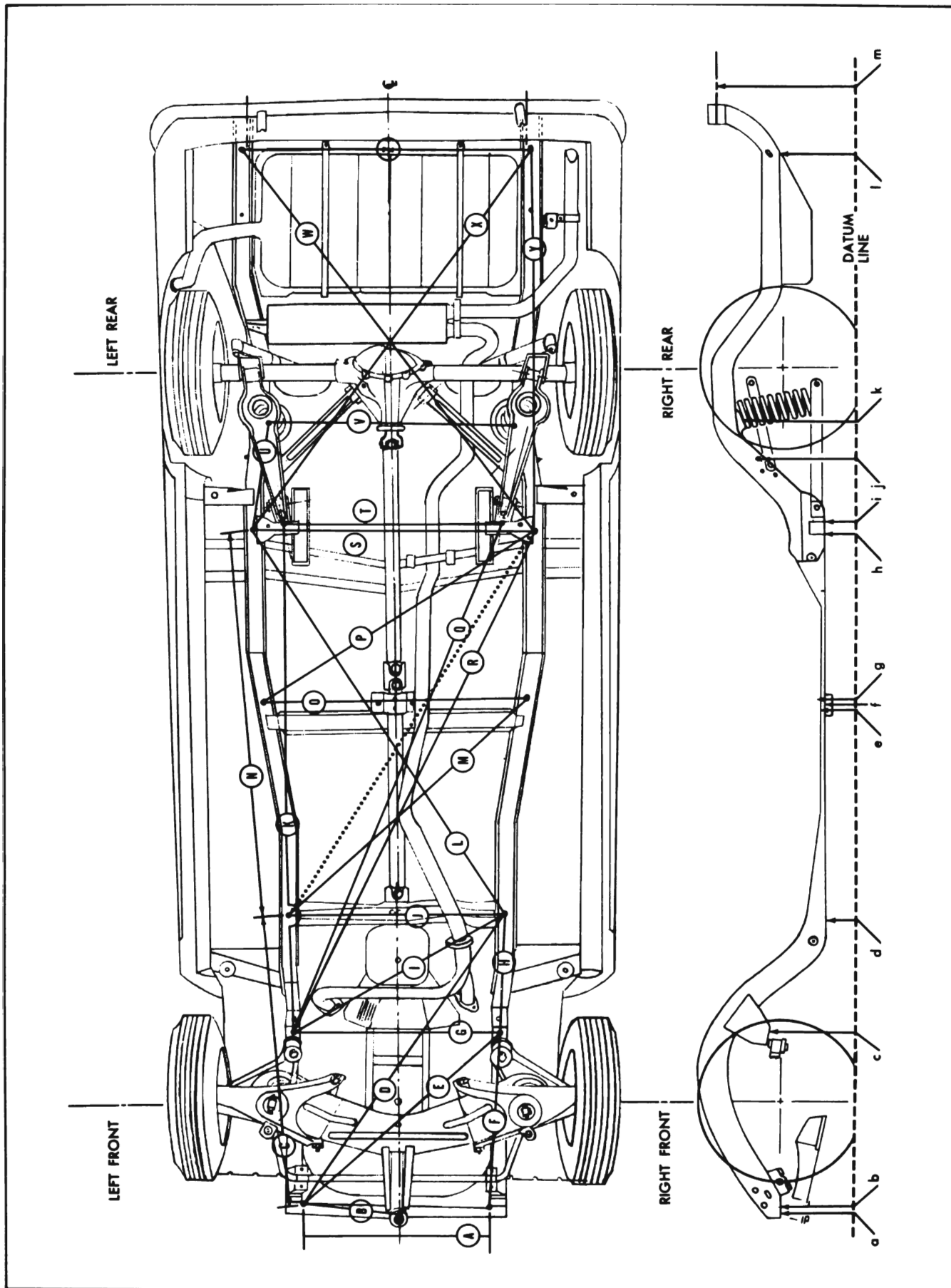


Figure 13-104—Underbody Alignment Reference Dimensions

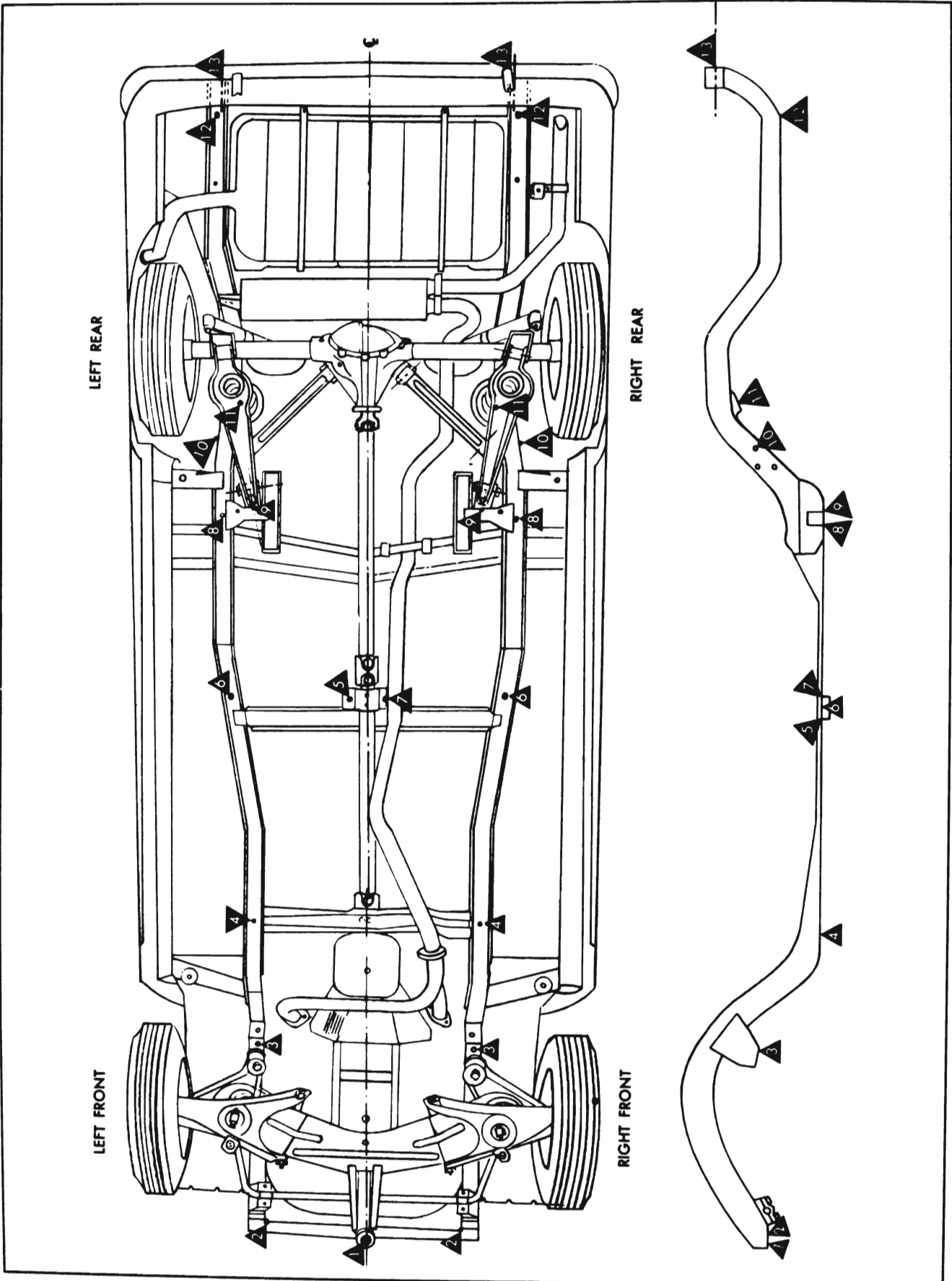


Figure 13-105—Underbody Alignment Reference Points

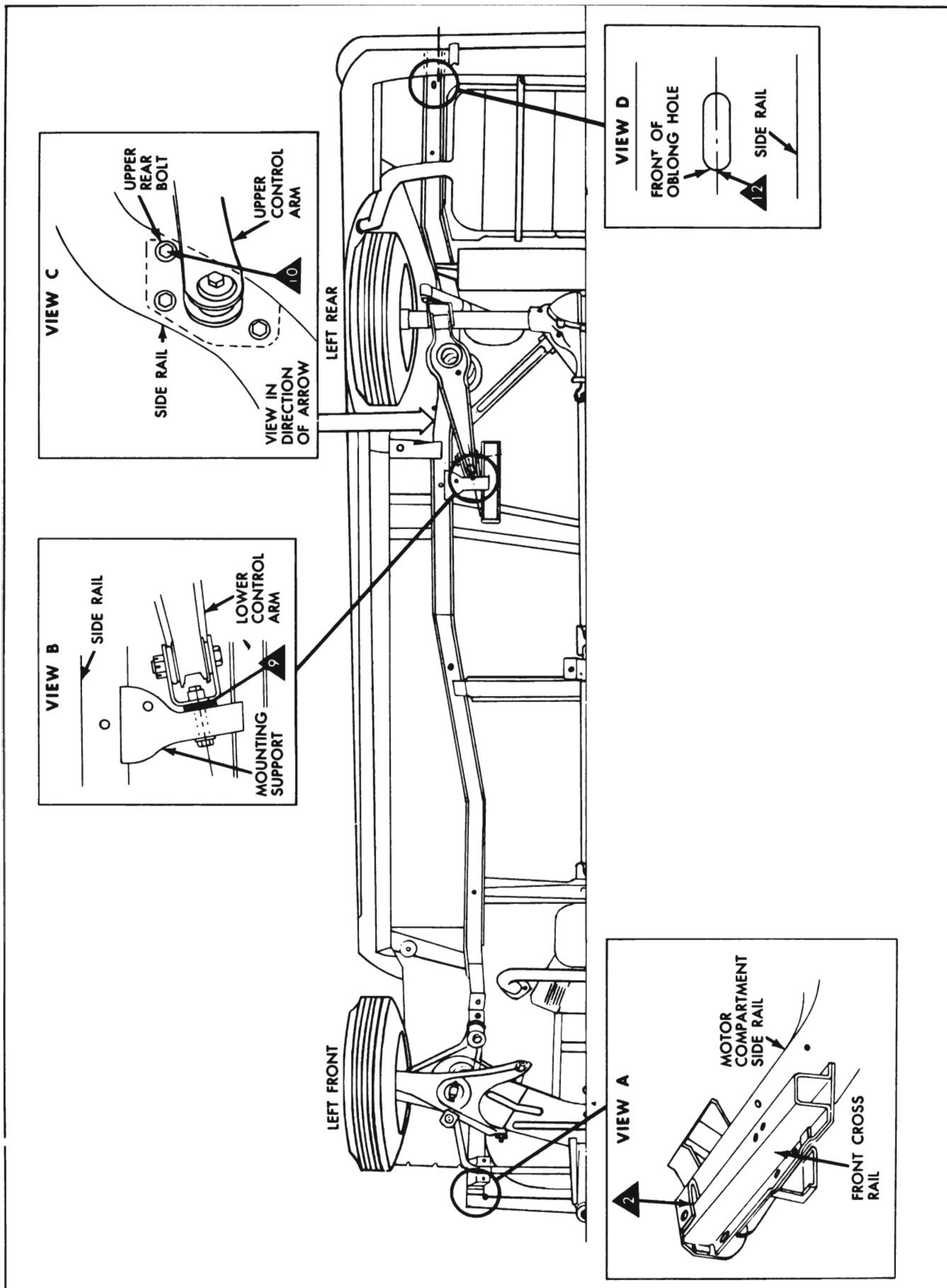


Figure 13-106—Alignment Reference Points 2, 9, 10 and 12

Following is a description of the specific body reference points for the horizontal and vertical dimensions:

1. Center of hole in front cross rail for front crossmember front center attaching bolt (front suspension removed).

2. Rear edge of front cross rail at point of contact with inboard facing of motor compartment side rail. See View "A" in Figure 13-106.

3. Center of 3/4" diameter gauge hole in lower horizontal surface of front suspension rear support bracket (just rearward of front crossmember rear attaching point on each side of car).

4. Center of 5/16" diameter gauge hole in bottom surface of each motor compartment side rail (located in area of transmission rear crossmember attaching bolt holes).

5. Center of left attaching bolt hole for drive shaft center bearing support (drive shaft, bearing and support removed).

6. Center of 5/16" diameter gauge hole in bottom surface of side rail (located directly opposite the center of the drive shaft center bearing support).

7. Center of right attaching bolt hole for drive shaft center bearing support (drive shaft, bearing and support removed).

8. Center of 5/16" diameter gauge hole in bottom surface of rear compartment side rail (located outboard of the forward attaching area of the rear axle lower control arm).

9. Lower rear edge of rear suspension mounting support, directly below center of rear axle lower control arm front support bracket attaching bolt hole. See View "B" in Figure 13-106.

10. Center of rear axle upper control arm upper rear attaching bolt hole on outboard side of rear compartment side rail. See View "C" in Figure 13-106.

11. Center of hole in rear spring upper mounting plate (on rear compartment side rail).

12. Center front edge of oblong hole in bottom surface of rear compartment side rail (located slightly forward of rear end lower panel). See View "D" in Figure 13-106.

NOTE: Reference point "12" in left side rail (gas tank filler neck side) is 1-5/16 inches further from body centerline than reference point "12" in right side rail (tail pipe side).

13. Center of inboard attaching bolt hole for rear bumper support.

UNDERBODY DIMENSION CHART (Refer to Fig. 13-104)

HORIZONTAL:			Ref.	Ref.	
Fig.	Ref.	Dimension	Point	to	Point
A		28-29/32	2	2	
B		14-15/32	1	2	(either side)
C		48	2	4	(same side)
D		56-5/8	2	4	(opp. side)
E		40-5/8	2	3	(opp. side)
F		27-23/32	2	3	(same side)
G		31-5/32	3	3	
H		20-9/32	3	4	(same side)
I		37-3/16	3	4	(opp. side)
J		31-5/32	4	4	
K		81-29/32	3	9	(same side)
L		69-1/2	4	8	(opp. side)
M		47-15/16	4	6	(opp. side)
N		59-7/8	4	8	(same side)
O		37-27/32	6	6	
P		47-3/32	6	8	(opp. side)
Q		87-23/32	3	9	(opp. side)
R		88-19/32	3	8	(opp. side)
S		40-1/8	8	8	
T		31-21/32	9	9	
U		17-23/32	8	11	(same side)
V		37-1/32	11	11	
W		68-15/16	8	12	(left side)
X		69-23/32	8	12	(right side)
Y		55-7/8	8	12	(same side)
Z		42	12	12	

NOTE: Horizontal dimensions to reference points "5" and "7" will be covered independently in drive shaft alignment section.

VERTICAL:			Datum Line
Fig.	Ref.	Dimension	to Ref. Point
a		7-1/2	1
b		7-7/16	2
c		9-3/8	3
d		6-1/16	4
e		7-3/32	5
f		6-1/16	6
g		9-9/16	7
h		6	8
i		6-1/32	9
j		14-11/16	10
k		16-13/32	11
l		10	12
m		18-21/32	13

d. Principles of Tramming

As indicated in the underbody dimension chart, all diagonal dimensions (except "W" and "X") are of equal distance to the same

matching reference points on the opposite side of the body. These are commonly referred to as crosscheck dimensions.

EXAMPLE: Dimension "L" is 69-1/2 inches measuring from reference point "4" on right side to reference point "8" on left side; the crosscheck dimension between reference point "4" on left side to reference point "8" on right side (indicated by dotted line in Figure 13-104) is also 69-1/2 inches.

To measure the distance accurately between any two reference points on the underbody, two specifications are required:

1. The horizontal dimension between the two reference points to be trammed.
2. The vertical dimension from the datum line to the reference points to be trammed. As an example, diagonal measurement "R" (calculated on a horizontal plane) between reference point "3" and reference point "8" is 88-19/32 inches.

The specifications from the datum line to the reference points indicate a vertical height difference of 3-3/8 inches between forward reference point "3" and rearward reference point "8". The front vertical pointer used at reference point "3" should be adjusted so as to extend 3-3/8 inches further from the tram bar than the rear pointer used at reference point "8".

With the proper settings the tram bar will be on a plane parallel to that of the body plane. The exception to this would be when one of the reference points is included in the misaligned area; then, the parallel plane between the body and the tram bar may not prevail. After completion of the repairs, the tram gauge should be set at the specified dimensions to check the accuracy of the repair operation.

e. Car Preparation

Preparing the car for the underbody alignment check involves the following:

1. Place the car on level surface.
2. The weight of the car should be supported at the wheel locations.
3. A visual damage inspection should be made to eliminate needless measuring. Obviously damaged or misaligned areas can often be located by sight.

f. Trimming Sequence

The trimming sequence will vary depending upon the nature and location of the misaligned area. Basically there are eleven key reference points that should be utilized when making underbody alignment checks. These reference points are: (See Figures 13-104, 13-105 and 13-106).

- 1 - Center of front crossmember front attaching bolt hole.
- 3 - Center of gauge holes in front crossmember rear attaching bolt support brackets.
- 4 - Center of gauge holes in motor compartment side rail at transmission.
- 6 - Center of gauge holes in side rails at drive shaft center bearing support.
- 8 - Center of gauge holes in rear compartment side rail at lower control arm.
- 9 - Below center of lower control arm front support bracket attaching holes.

Prior to performance of any trimming operation, the accuracy of reference points to be used must be determined. A measurement that originates from a reference point which is included in a damaged area will produce untrue results and confuse the evaluation of the underbody condition.

Unlike the conventional type of frame design, the unitized type of body construction seldom develops the two conditions of "twist" and "diamond" in the floor pan area as a result of front or rear end collisions. Therefore, underbody alignment checking can usually originate from the 5/16" diameter gauge holes in the side rails (reference points "4", "6" and "8").

If inspection indicates that these locations have been disturbed and are not suitable for measuring, one of the undamaged suspension locations should be used as a beginning reference point. If a rare situation should exist where all of the key locations are not suitable as reference points, repair operations should begin with the body floor pan area. All other underbody components should be aligned progressively from this area.

NOTE: If preliminary tram checks (covering horizontal dimension "O" and vertical dimensions "e", "f" and "g") reveal any alignment discrepancy, consult drive shaft alignment section before attempting repairs.

g. Body Centering Gauges

Another tool that is extremely useful in repairing underbody collision damage is a body

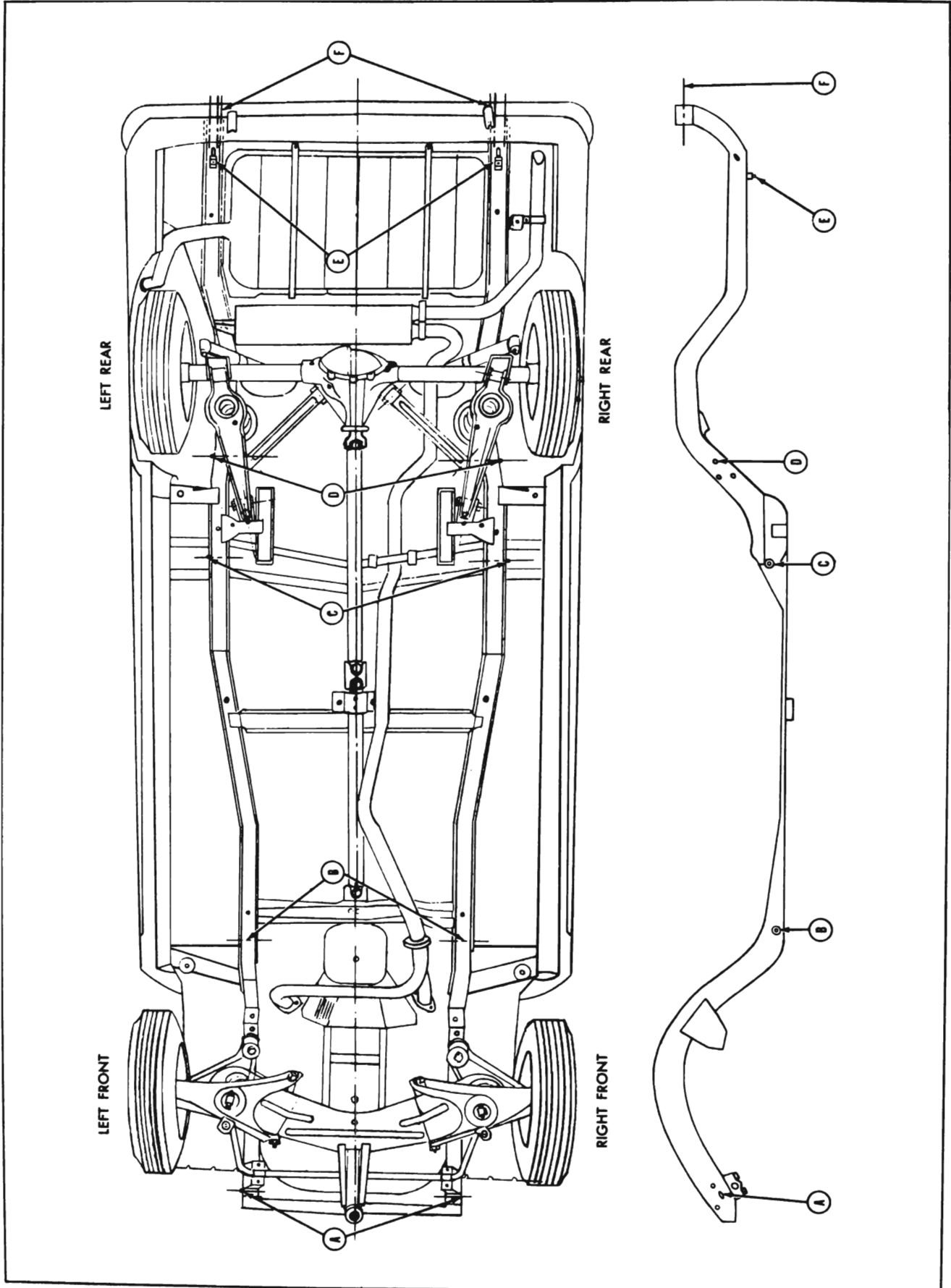


Figure 13-107—Centering Gauge Attaching Points

centering gauge set. The centering gauges automatically indicate the body centerline and the body level. Collision damage may result in twist, side-sway or sags to the underbody which may not be readily apparent to the naked eye. Sighting along the center vertical pointers and along the horizontal bars of the centering gauges will make these conditions very apparent and will help to isolate the particular areas which are affected. A minimum of three centering gauges must be used simultaneously. Figure 13-107 shows five pair of attaching points (A, B, C, D and F) which are located symmetrically on both sides of the body and are considered suitable for mounting most types of hang-on centering gauges.

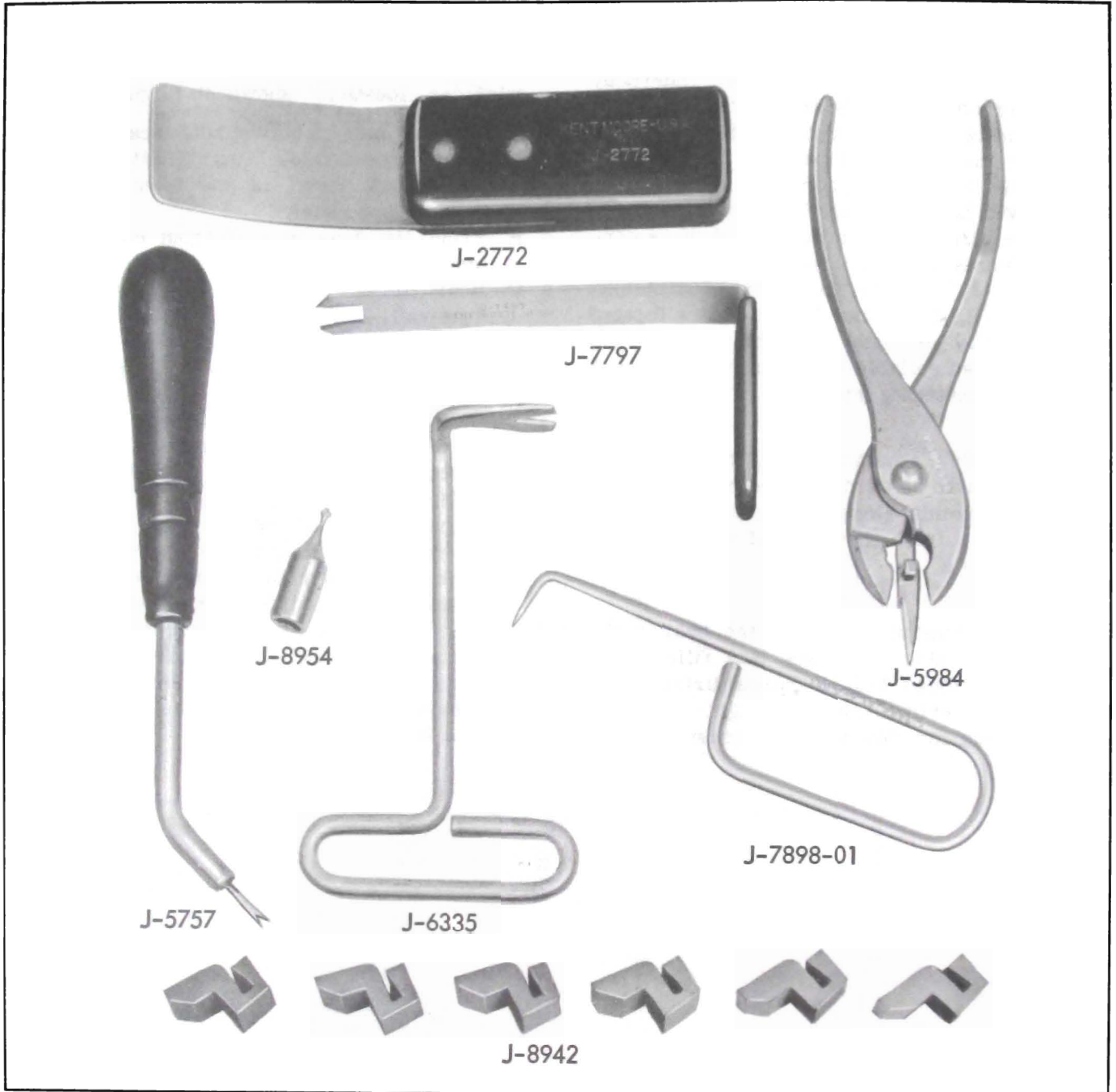
Magnetically attached type of centering gauges may also be used at these points as well as at other points along the bottom surface of the side rails from the front of the car to the rear axle area.

From the rear axle area to the rear of the car, the left side rail (gas tank filler neck side) is positioned 1-5/16 inches further from the body centerline than the right side rail. Compensation for this variance must be made

when using any type of centering gauge in this area.

Following is a description of the specific attaching locations shown in Figure 13-107.

- A. Lowest point of oblong hole located in front compartment side rail (located slightly above and ahead of the front stabilizer support brackets).
- B. Front tie down hole in front compartment side rail.
- C. Rear tie down hole in rear compartment side rail.
- D. Upper rear attaching hole for rear axle upper control arm forward support (bolt removed).
- E. Optional: If magnets are used, they should be attached to lower surface of rear compartment side rail. Rear edge of both magnets should be at front edge of oblong hole in each side rail (just forward of rear end lower panel). Left magnet (gas tank filler neck side) and right magnet (tail pipe side) should be positioned to compensate for variance between centers of side rails and body centerline (1-5/16 inches differential).
- F. Rear bumper inboard attaching bolt holes. Bumper assembly must be removed for this hook-up.



SPECIAL BODY TOOLS

- | | |
|-----------|---|
| J-2772 | Headlining Inserting Tool |
| J-5757 | Mechanical Weatherstrip Clip Inserting Tool |
| J-5984 | Mechanical Weatherstrip Clip Reforming Tool |
| J-6335 | Door Trim Panel Remover |
| J-7797 | Door Inside Handle Clip Removing Tool |
| J-7898-01 | Window Reveal Molding Removing Tool |
| J-8942 | Windshield Checking Blocks |
| J-8954 | Molding Clip Installing Tool |

Figure 13-108—Special Body Tools