VOLKSWAGEN

BODY REPAIR INFORMATION

QUANTUM
COUPE (82-83)
SEDAN (83-85)
WAGON (82-85)

VOLKSWAGEN BODY REPAIR INFORMATION

General

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Cavity Sealing

VANAGON

Repair Procedures and Cutting Line

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QUANTUM

Repair Procedures and Cutting Lines

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This publication contains the essential body repair procedures for the VW Vanagon and Quantum models sold in the USA and Canada.

Information is grouped according to repair procedures, which are identified as to the location of that part of the vehicle (front, center, or rear).

CAUTION

It is assumed that the reader is familiar with basic automotive body repair procedures.

Special tools required in performing certain service operations are identified in this publication and recommended for use.

Use of tools or procedures other than those recommended in this repair publication may be detrimental to the vehicle's safe operation as well as the safety of the person servicing the vehicle.

Section parts listed in this publication are for reference only. Always check with your authorized dealer to verify part numbers.

Service Literature No. W42-701-005-1

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Manufactured in the United States of America

Replacement of body sectional parts and parts sections

On the basis of detailed investigations concerning damage frequency and the extent of damage to sheet metal sections, Volkswagen of America has included sectional parts in its replacement parts program and approved the use of "parts sections" in order to rationalize the repairs to these areas.

A "sectional part" is a section of a complete part (e.g. section front and rear), which is supplied direct from the Parts Department, already cut to size.

On the other hand, "parts sections" are cut from complete parts to the required size, by the bodyshop doing the repair. In individual cases it will be necessary to work exactly to the method described and illustrated in the manual.

Because the use of "sectional and/or parts sections" together with special tools and equipment influence efficiency of the operation, special note is made of the tools and equipment in the description of repair.

Basic instructions for body repairs

Cutting lines/points: The cutting lines or points illustrated in the description of the operations are based on detailed examinations carried out on accident vehicles.

In areas where cutting and subsequent joining affect the rigidity of the body and also the operational safety and serviceability of the vehicle, the cutting lines/points must be made in accordance with the instructions in this manual.

Straightening: Bodies and floor sections are produced mainly from cold formed deep drawn sheet metal. For this reason the reshaping of accident damaged areas should be carried out in the same manner.

If the extent of damage does not permit reforming, the damaged part should be cut after the adjacent surfaces have been straightened.

Note:
The removal of parts alters the weight distribution, making it necessary to secure the vehicle to a hoist, bench or suitable alternate.

Diagnosis of accident vehicles

Damage to the running gear and assembly mountings which could have very serious effects later on, is sometimes not discovered when accident vehicles are being repaired. Where the accident damage indicates possible damage to the running gear, special attention must be paid to the following components, completely independent of the axle geometry measurement which must be made in all cases:

Check to ensure that the steering gear and linkage operate correctly over the complete lock-to-lock range. Carry out a visual check for bent or cracked parts.

Check the running gear and all running gear components such as wishbones/trailing arms, suspension struts, steering knuckles, anti-roll bars, sub-frames, axle beams and mountings for bending, twisting or fractures.

Examine rims and tires for damage, run out and imbalance. Examine tires for cuts/splits etc. in treads and walls and check tire pressure.

Examine the engine/transmission/exhaust system mountings for damage.

Finally, a thorough road test will give the assurance that the vehicle is once again completely roadworthy and can be handed back to the customer without any doubt as to its mechanical state.

Similar Repair Procedures

Since the cutting and welding lines for some models are similar, we have incorporated them all in one basic procedure. The manual will only differentiate the dissimilar operation on these models. The headings at the bottom of each page will signify the applicable vehicles referred to in that specific procedure.

Preserving (Undercoating) Repaired Panels

All panels that have been repaired or replaced must have the exposed surfaces reundercoated to insure lasting durability. If access to the panels is unobtainable after welding, paint the panels where necessary and apply weld thru primer on the direct area to be welded.

Welds

No specific number of spot or plug welds will be singled out. Make note of the number when cutting out the damaged panels. All welded seams should be no more than 25mm in length.

Test Welds

Prior to and during welding procedures, test the weld(s) for quality and strength. You can best accomplish this by using scraps of similar metals, cut and clamped in a similar manner to what you are welding. Check the test sample for penetration and strength in order to make adjustments if needed.

Tool or Welding Identification

The specific tool(s) or form of welding required within a procedure will be specified following each step or illustration.
For example:

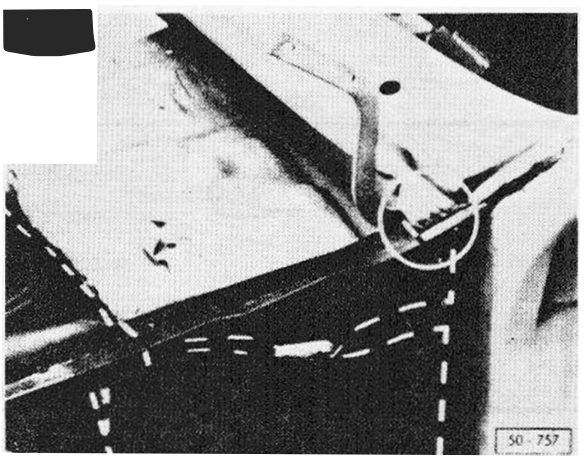


Fig. 2: Cutting out front wheelhouse

Air chisel, hammer, chisel

Safety Factors

Disconnect the negative (-) battery cable before performing any work on the vehicle.

Protect yourself by wearing goggles, earplugs, respirators, gloves, safety shoes, caps, etc. when working on a vehicle.

Safely support the vehicle before any work is done. Block the front or rear wheels if the vehicle is not lifted off of the ground.

Cap or remove the fuel tank when working on the rear section of the car.

Insure proper ventilation of your working area. Some paints and sealants can generate toxic gases when heated. Use an air chisel or saw to remove damaged panels instead of a gas torch.

Observe all local and national safety regulations when performing any work.

Cover interior with heat-resistant cover to insure safety when welding.

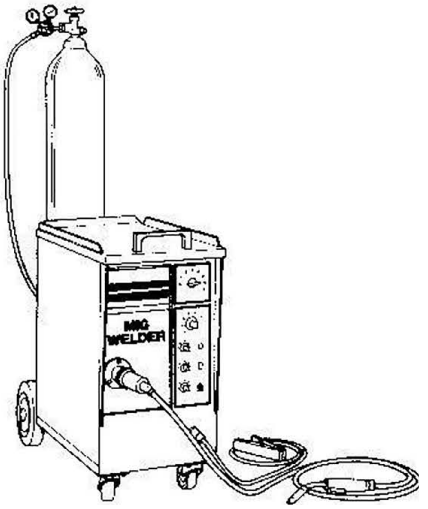
Take care when using gas or cutting torches so as not to burn body sealer or interior. Extinguish immediately if they should catch fire.

Corrosion Protection

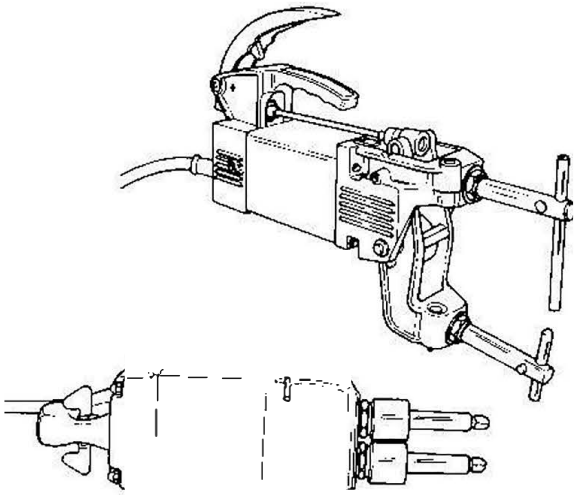
Beginning with the 1985 model year, a 3 year corrosion perforation warranty is in effect for all Volkswagen vehicles. Therefore, when repairing any Volkswagen vehicles, especially the 1985 models, it is imperative that all repaired areas have cavity preservation material properly applied to protect from corrosion.

Refer to service literature #W42-701-004-1 (Application Instructions — Cavity and Underbody Preservation) for additional information on these and all Volkswagen and Audi vehicles.

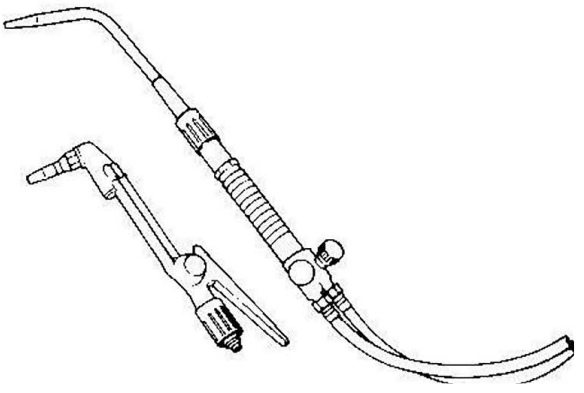
Basic Tools And Equipment



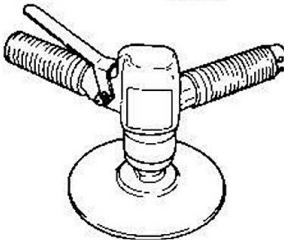
MIG Welder (Metal Inert Gas)



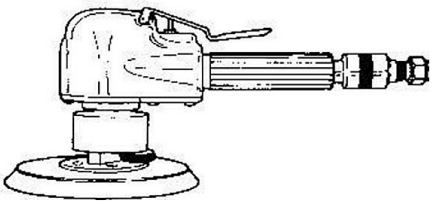
Spot Welder



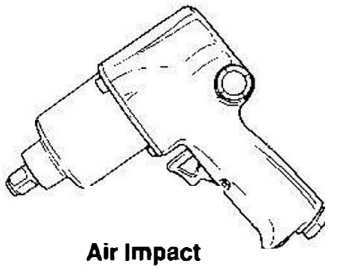
Oxy-Acetylene Torches



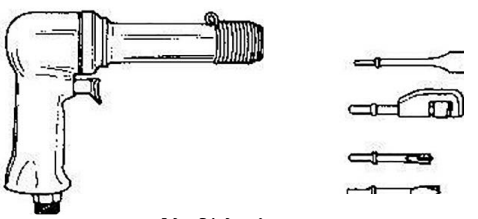
Air Grinder



Dual Action Sander

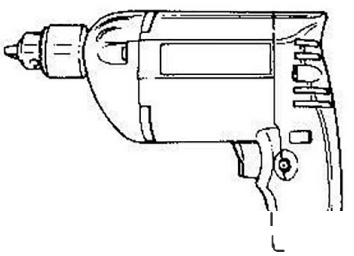


Air Impact



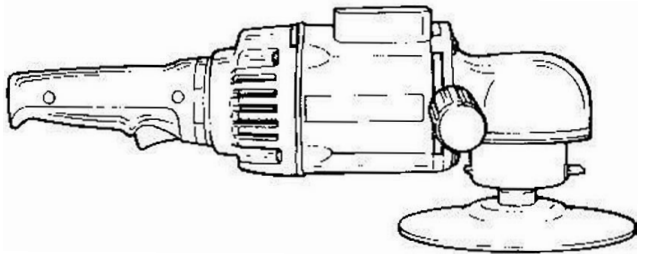
Air Chisel

Air Drill

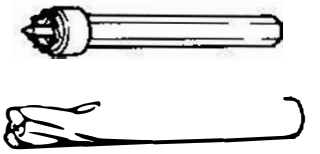


Electric Drill

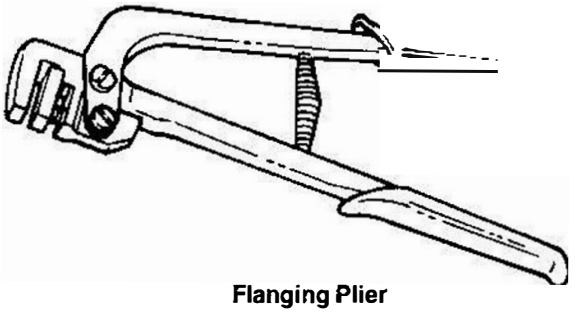
Basic Tools And Equipment



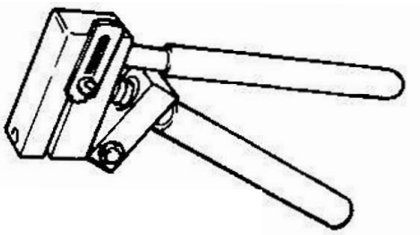
Electric Grinder



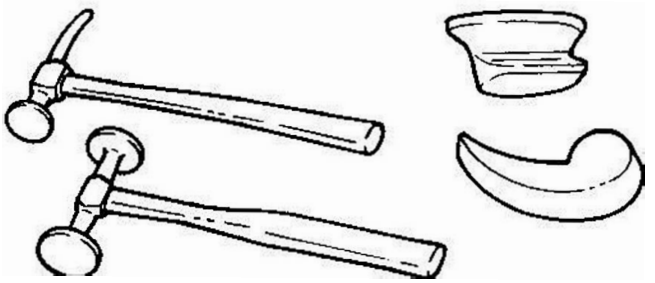
Spot Weld Cutter



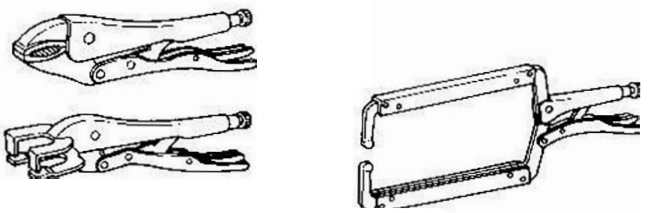
Flanging Plier



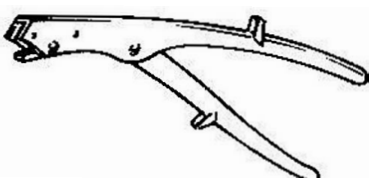
Punch Plier



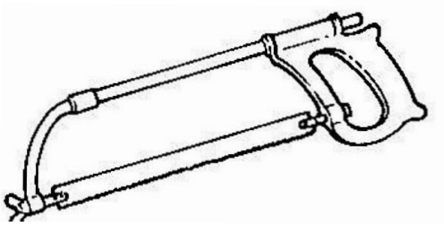
Hammer And Dollies



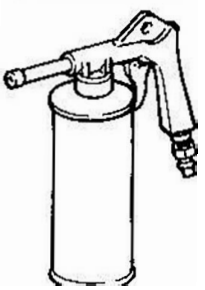
Clamps and Vise Grips



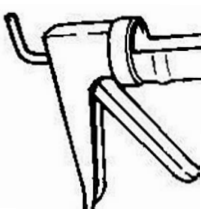
Sheet Metal Cutter



Hacksaw



Undercoating Gun



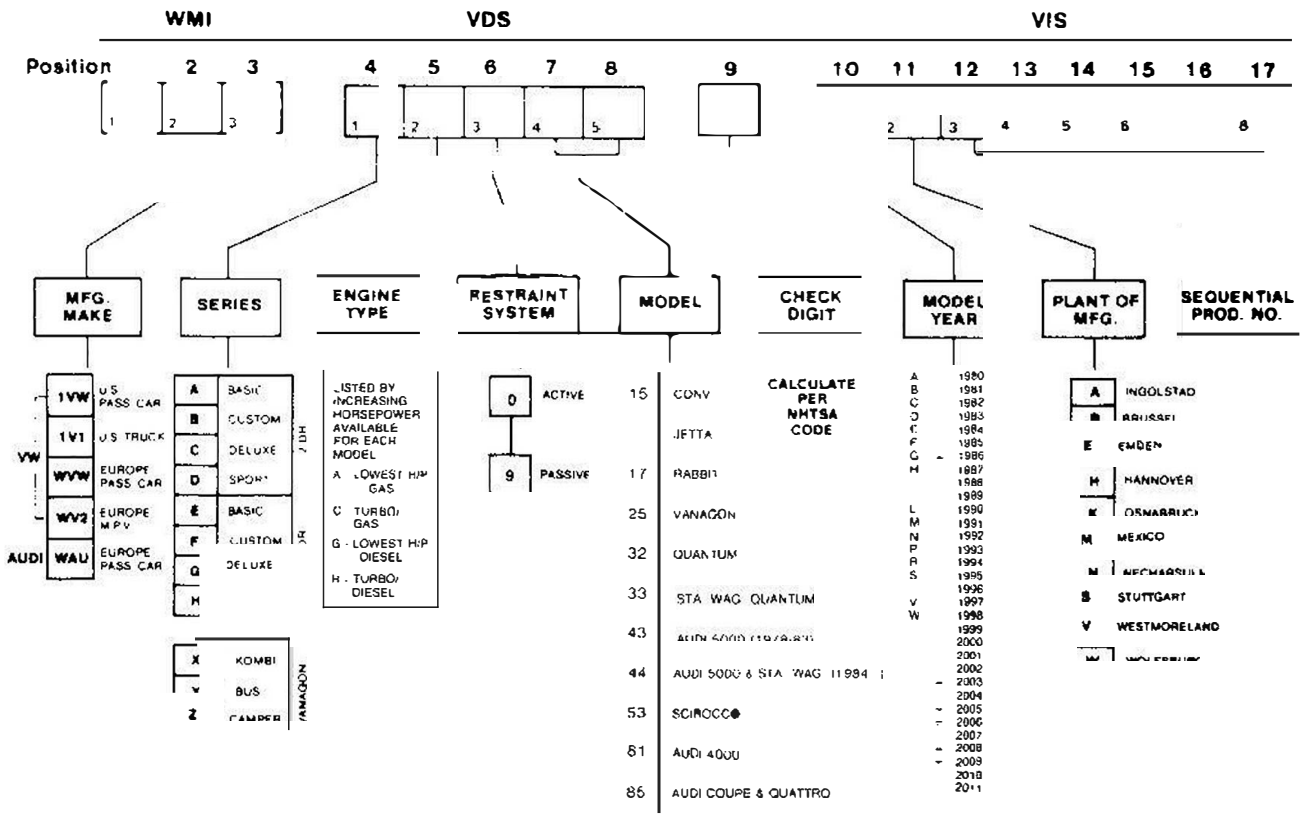
Sealing Gun

Vehicle Identification (VIN)

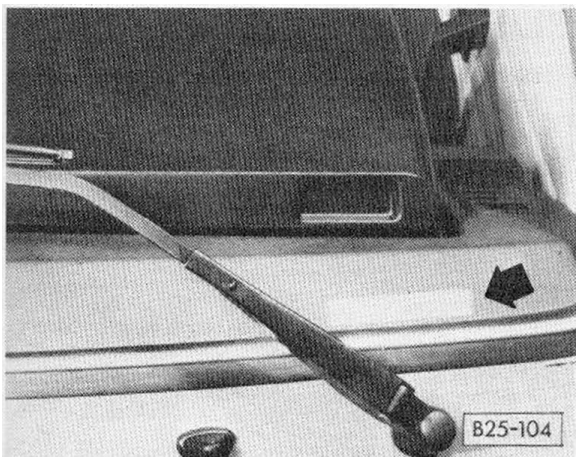
VIN Explained:

	Type/Model	Year	Serial Number
1980	25	A	5493 684
1981—			

VW/AUDI VIN BREAKDOWN

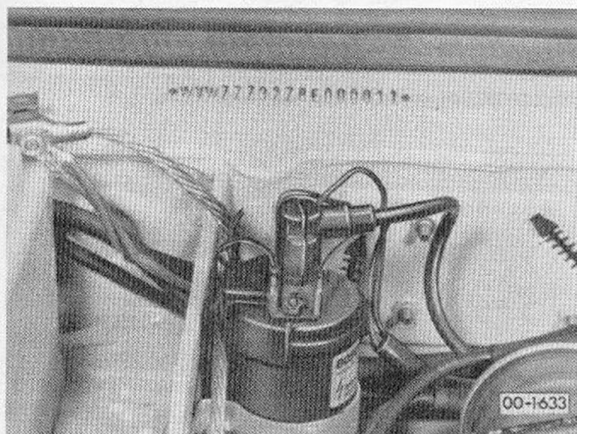


Vehicle Identification (VIN)



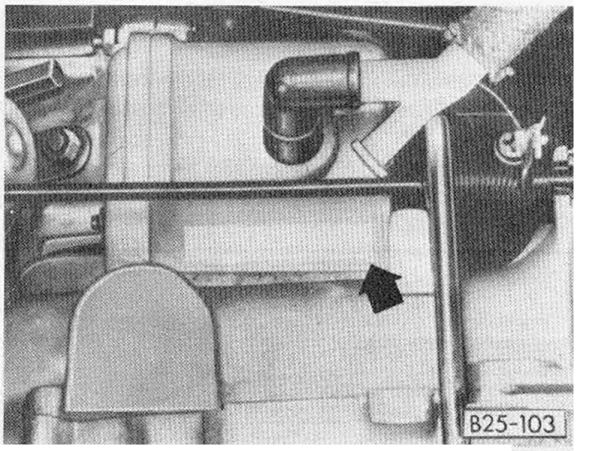
Vehicle identification number (VIN)

- on dashboard on driver's side (arrow) (Vanagon, Quantum)



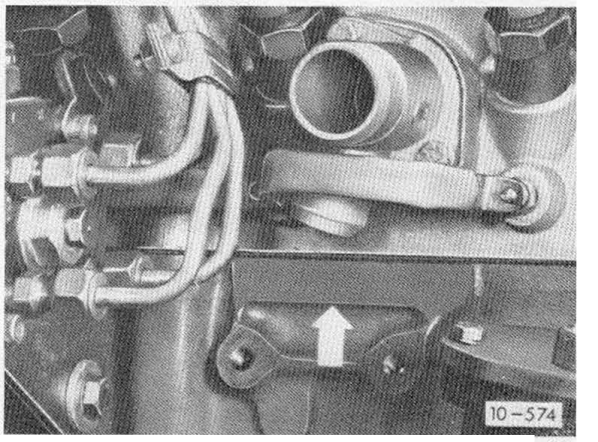
The V.I.N. No. is stamped on the upper part of the cross panel behind the engine. (Quantum)

VANAGON



Engine number(Gasoline)

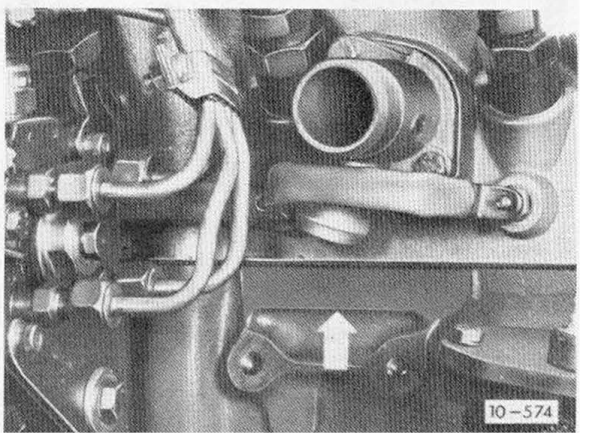
- stamped on crankcase below breather (arrow)



Engine number (Diesel)

- on engine block (arrow) between injection pump and vacuum pump

QUANTUM



The engine number is stamped on the left hand side at the rear of the cylinder block.

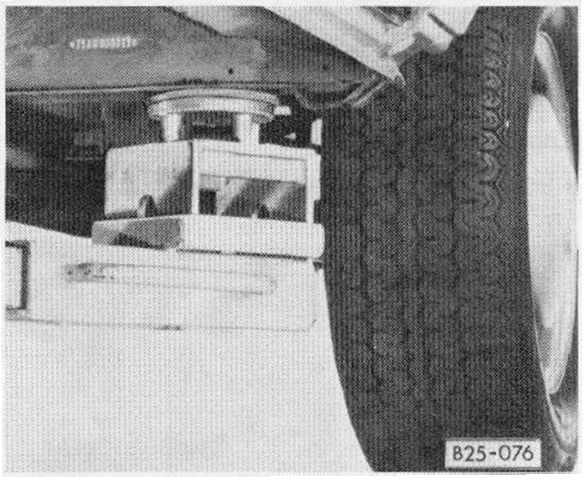
Lifting Points

Lifting vehicle with hoist/floor jack

CAUTION

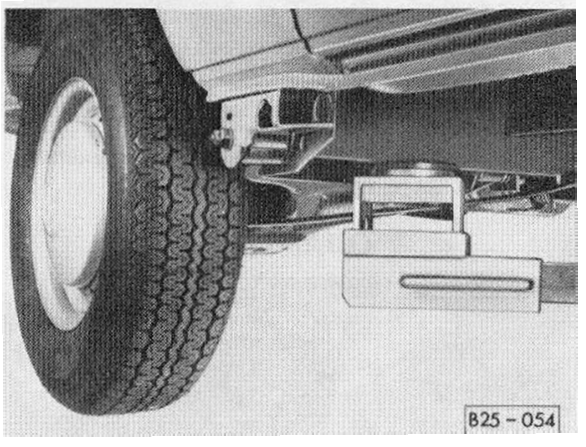
Before driving onto lift, check for clearance between lifting arms and tires to avoid cutting sidewalls.
Extend arms and check to see if arms are long enough to contact lifting points.
Lift only at points shown.

VANAGON



Front

at crossmember next to jacking port



Rear

at rear crossmember

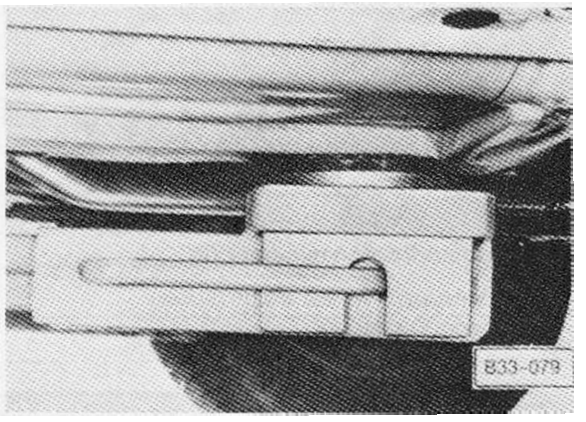
Note

When lifting vehicle with floor jack, use same lifting points as with hoist

CAUTION

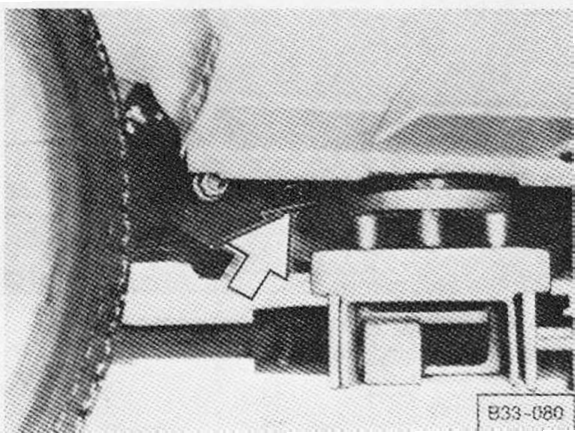
Do not lift vehicle by engine transmission or front suspension. Doing so may result in damage to components

QUANTUM



Front

at side traverse floor plan reinforcement



Rear

at welded flange of side member/floor pan

CAUTION

Do not damage parking brake cable (arrow)

Warning

When removing components such as rear axle, fuel tank, spare wheel and rear lid, place additional weight on rear end of car or anchor car to hoist to prevent tipping if center of gravity changes.

Towing

GENERAL TOWING INFORMATION

All towing procedures in this section are based on use of typical sling-type tow truck equipment. If other types or towing equipment are used, these procedures may not apply

EMERGENCY TOWING

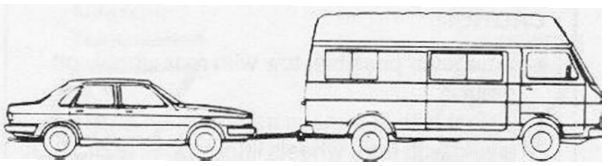
Whenever possible, tow all cars with drive wheels lifted off ground. If it is not possible to tow a vehicle with automatic transmission with drive wheels lifted off ground, observe the following.

Front wheel drive cars with automatic transmission

Dolley-tow must be used for towing front wheel drive cars lifted at rear. Car may be lifted in rear and moved to position the car for front hook up

Caution
- Never allow passengers to ride in a towed vehicle.

LONG DISTANCE TOWING



Vehicles with manual transmission

There are no restrictions on speed or distance when towing manual transmission cars behind other vehicles.

Vehicles with automatic transmission

Vehicles with automatic transmission may be towed forward (in driving direction) behind other vehicles (motor homes, etc.) at speeds up to 30 mph for a maximum of 30 miles.

CAUTION
Towing vehicle at more than 30 mph and/or for greater distance than 30 miles will damage automatic transmision for lack of lubrication.

If towing speed will be greater than 30 mph or distance greater than 30 miles, temporary modifications to vehicle are required as follows:

CAUTION
Only general work sequence is outlined. Follow complete instructions in Repair Manual

Work sequence

—remove drive shaft assemblies
—remove outer CV joints from drive shaft assemblies
—install outer CV joint in wheel bearing housing and secure hub with nut
—install outer CV joint boot
—seal boot small opening against water and dirt
—wrap drive shafts and store in vehicle

Towing

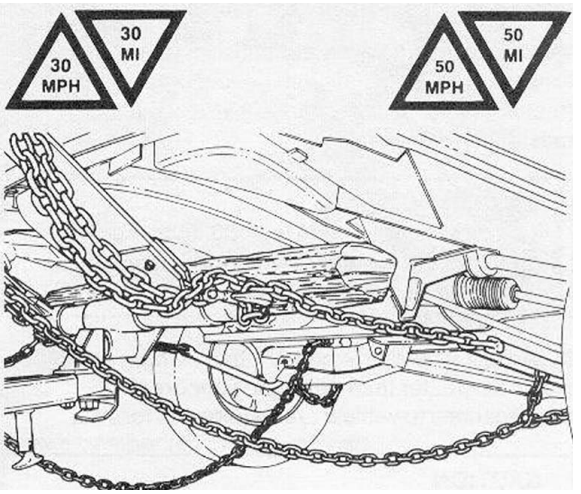
Front Towing

CAUTION

- Whenever possible, tow with rear wheels off ground
- If a car with automatic transmission must be towed with front wheels lifted because of extensive damage, dollies are required under rear wheels to avoid damage to transmission due to lack of lubrication.
- Car may be lifted in rear and moved to position for front hook-up.

Automatic Transmission

Manual Transmission



Hook-Up Procedure

—attach grab hooks under lower control arms outboard of shock absorber mounts
—place 4 x 4 under spare tire
—place tow bar under 4 x 4
—double wrap chains on tow bar
—attach safety chains to lower control arms

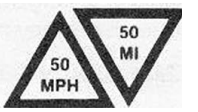
WARNING

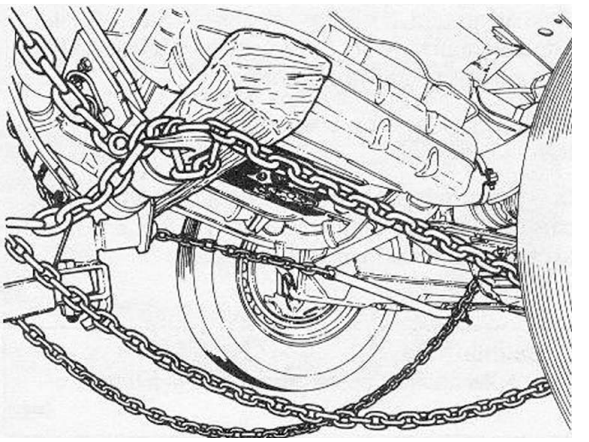
Always secure front wheels with an external wheel lock when towing with rear wheels off the ground.
Never use ignition/steering lock to secure front wheels.
Never allow passengers to ride in towed vehicle.

Rear Towing

Automatic Transmission

Manual Transmission





Hook-Up Procedure — Air Cooled Gasoline Models

—attach grab hooks to trailing arms
—place 4 x 4 under engine carrier to space tow bar away from heat exchangers
—attach safety chains to trailing arms

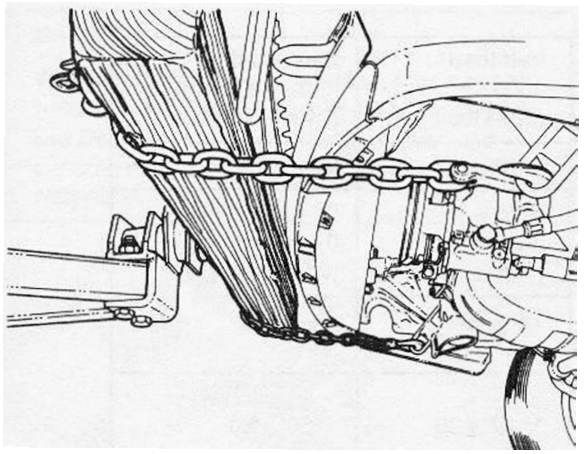
NOTE

Rear hook-up of water-cooled gasoline/diesel models is not recommended. Use flatbed slide-back tow truck for towing disabled vehicles to avoid damaging body parts.

Front Towing

CAUTION

- Whenever possible, tow with front wheels off ground
- If a car with automatic transmission must be towed with rear wheels lifted because of extensive damage, dollies are required under front wheels to avoid damage to transmission due to lack of lubrication.
- Car may be lifted in rear and moved to position for front hook-up.



Hook-Up Procedure

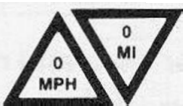
—attach grab hooks to towing eyes
—place 4 x 4 under bumper
—position towbar against front of 4 x 4
—attach safety chains of lower control arms

WARNING

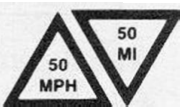
Always secure front wheels with an external lock when towing with rear wheels off the ground.
Never use ignition/steering lock to secure front wheels.
Never allow passengers to ride in towed vehicle.

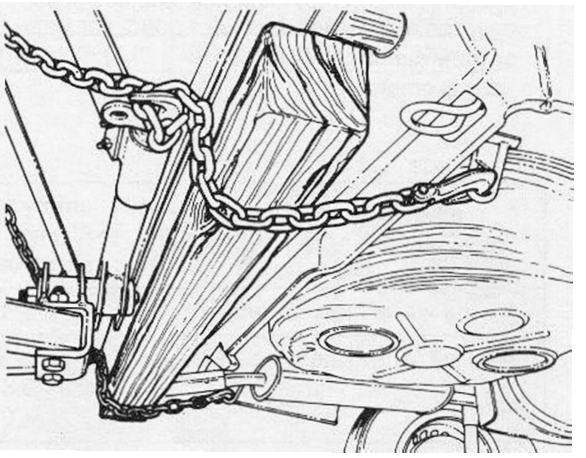
Rear Towing

Automatic Transmission



Manual Transmission





Hook-Up Procedure

—attach grab hooks to towing eyes
—place 4 x 4 under bumper
—position towbar against front of 4 x 4
—attach safety chains to lower brackets of shock absorbers

Wheel Alignment Specifications

WHEEL/TIRE SIZE AND LUG **Wheel bolt torque: 170 Nm (123 ft lb)**

25	82.83	185—14	5½J x 14	Steel	251-601-139 N-020-112-1	19mm 21mm	Lug bolt—Front only Lug nut—Rear only

Wheel alignment data for front and rear axles

When checking wheel alignment the following conditions are important

- except in emergency alignment should not be checked until vehicle has run 1,000-2,000 miles and coil springs have settled
- vehicle empty
- tire pressures correct
- test surface level and horizontal
- vehicle bounced several times
- steering gear correctly adjusted
- steering linkage free of play

Front axle

	empty 800 kg (1764 lbs.)	**half load*** 1000 kg (2204 lbs.)	**max. load*** 110—1200 kg (2425—2646 lbs.)
Toe per wheel (not pressed)	+ 10′ ± 15′	+ 10′ ± 15′	0° ± 15′
Total toe (wheels not pressed)	+ 20′ ± 30′ 2.0 ± 3.5 mm (0.08 ± 0.138 in.)	+ 20 ± 30′ 2.0 ± 3.5 mm (0.08 ± 0.138 in.)	0° ± 30′ 0 ± 3.5 mm (0.08 ± 0.138 in.)
Camber (wheels in straight-ahead position)	0 ± 30′	15′ ± 30′	0 ± 30′
Toe angle difference, at 20° lock to left and right (not adjustable)	1°10′ ± 20′	1°10′ ± 20′	1°50′ ± 20′
Caster (vehicle on level)** corresponds to camber difference of wheel on lock from 20° left and right max. permissible difference between left and right	+ 7°15′ ± 15′ 4°50′ ± 10′ 1°	6°30′ ± 15′ 4°20′ ± 10′ 1°	6° ± 15′ 4° ± 15′ 1°

Rear axle

	empty 700 kg (1543 lbs.)	**half load*** 1050 kg (2314 lbs.)	**max. load*** 1300—1400 kg (2865—3086 lbs.)
Toe per wheel Total toe (at specified camber)	0° ± 10′ 0° ± 20′	10′ ± 10′ 20′ ± 20′	10′ ± 10′ 20′ ± 20′
Camber max. permissible difference between left and right	− 50′ ± 30′ 30′	1°30′ ± 30′ 30′	2°10 ± 10′ 30′

*Measurements given for 'half load' and 'full load' apply for vehicles which cannot be measured unladen because of special equipment installed

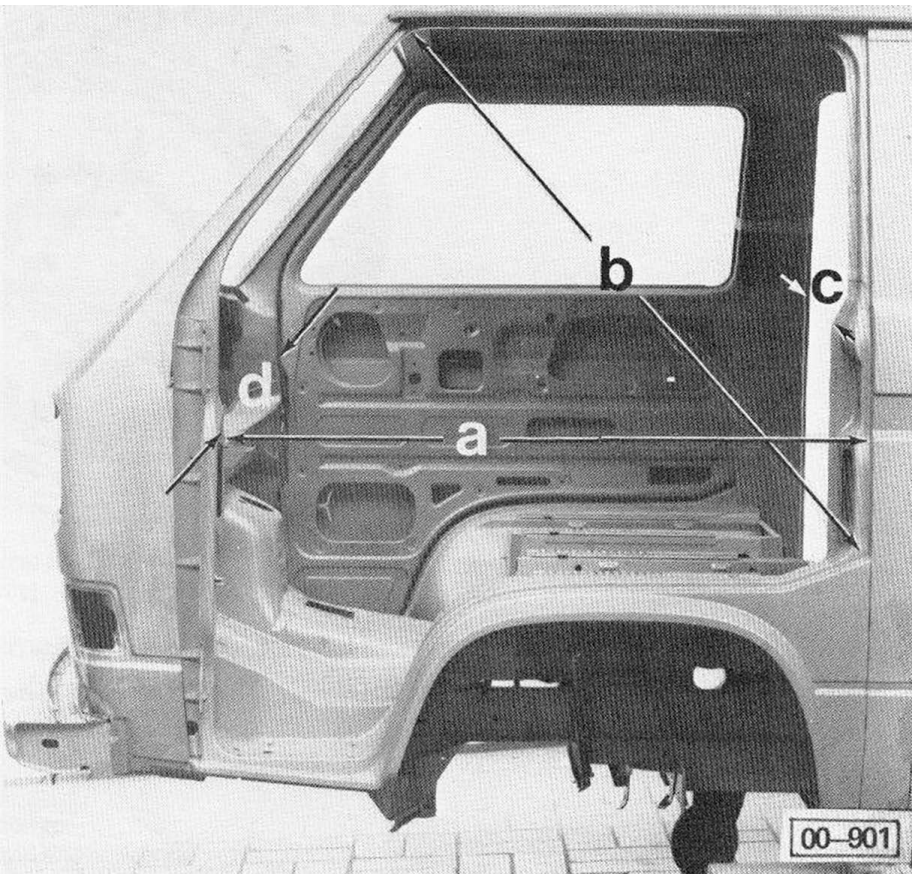
**If vehicle is inclined to front or rear, 10' must be added or subtracted for each 15' angle off level (measured in sliding door opening)

Example: Angle measured on stand :6°40'
correction angle for vehicle angle (1°to front) : 40'
actual caster angle :7°20'

Note

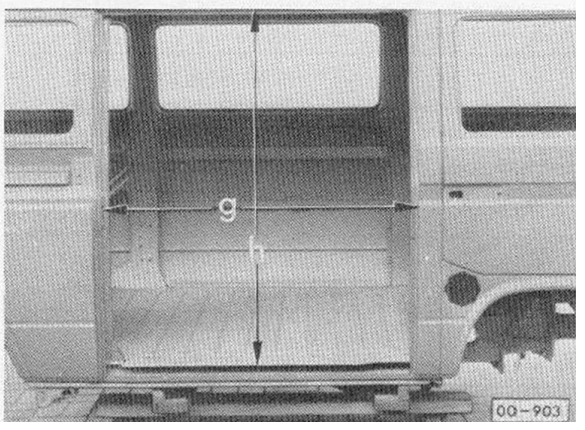
Angle of vehicle: to front — add correction figure
to rear — subtract correction figure

Dimensions

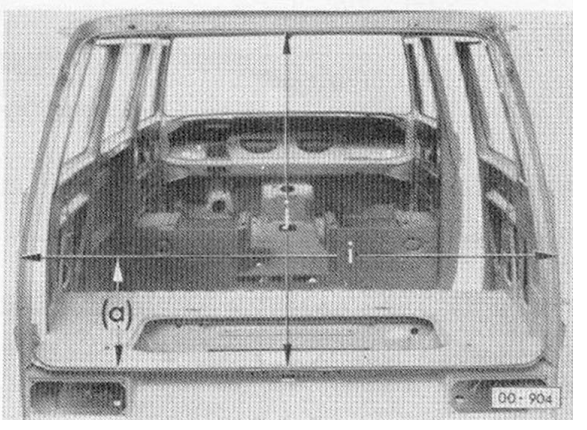


a = 1157 ± 3 mm (45 9/16 ± 1/8 in.)
b = 1270 ± 4 mm (50 ± 5/32 in.)

c = 1564 ± 1 mm (61 9/16 ± 1/32 in.)
largest distance between welded body seams
d = 1566 ± 1 mm (61 21/32 ± 1/32 in.)
distance between door contact switch holes

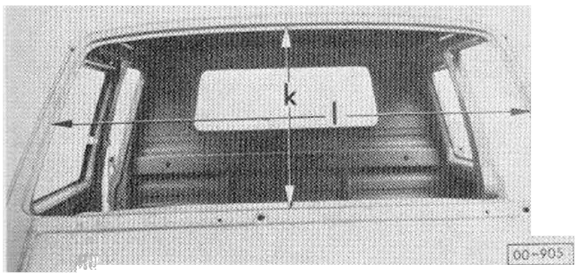


g = 1185 ± 5 mm (46 21/32 ± 3/16 in.)
h = 1348 ± 4 mm(53 1/16 ± 5/32 in.)

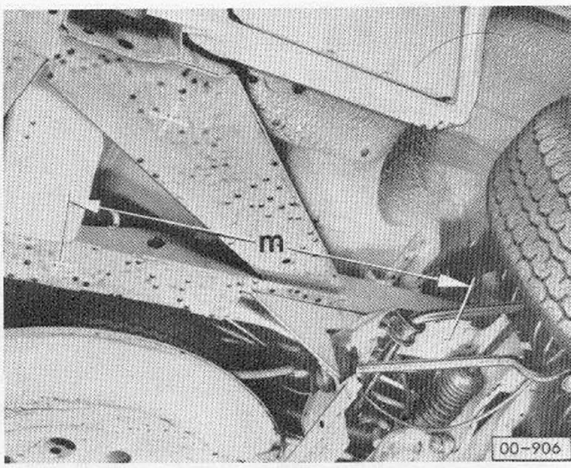


i = 1618 ± 5 mm (63 11/16 ± 3/16 in.)
j – 1050 ± 2 mm (41 11/32 ± 3/32 in.)
(a = 340 mm) (13 3/8 in.)

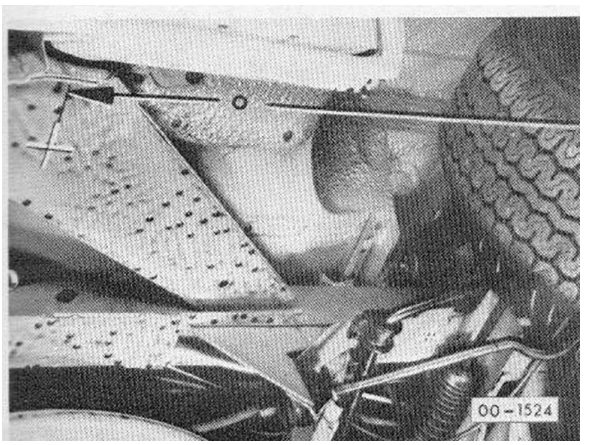
Dimensions

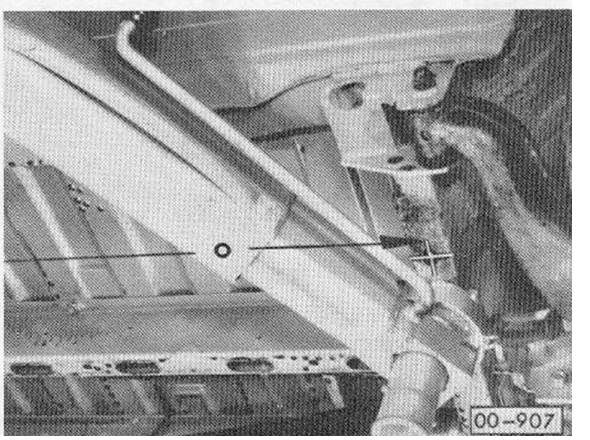


k = 723 ± 4 mm (28 15/32 ± 5/32 in.)
l = 1469 ± 5 mm (57 27/32 ± 3/16 in.)



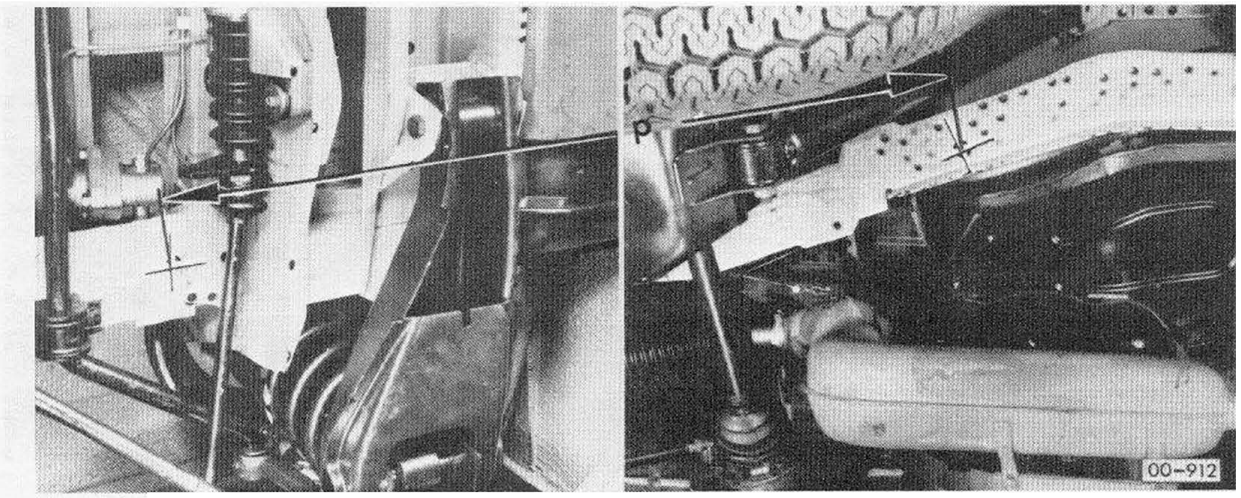
m = 698 ± 4 mm (27 15/32 + 5/32 in.)



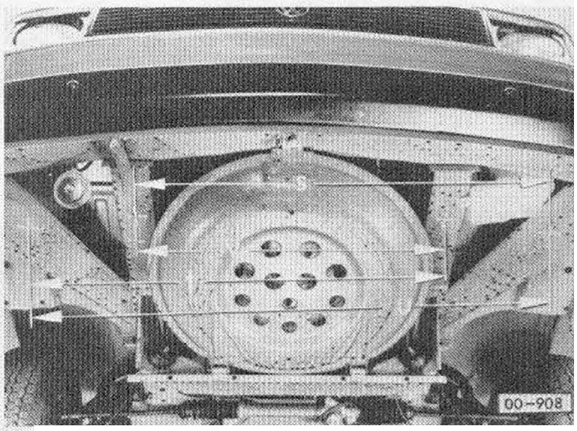


o = 2697 ± 9 mm (106 3/16 ± 11/32 in.)

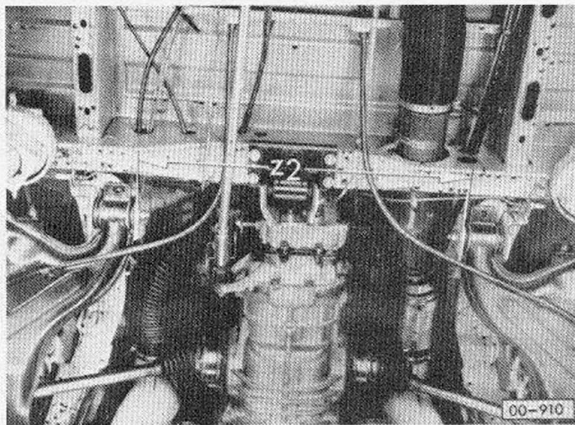
Dimensions



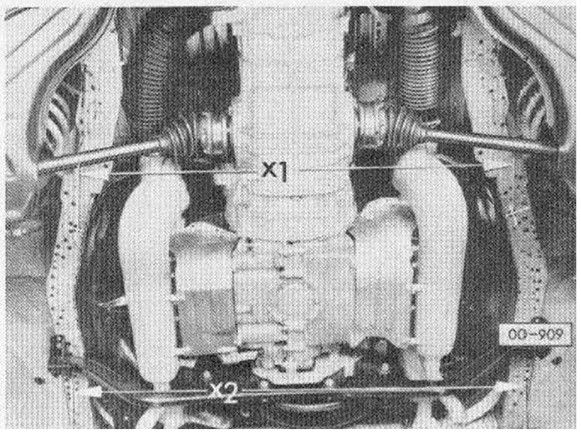
p = 2892 ± 11 mm (113 27/32 ± 7/16 in.)



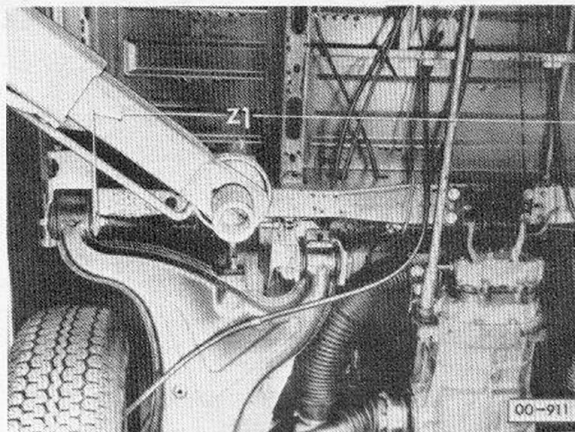
s, t 1051 ± 3 mm (41 3/8 ± 1/8 in.)
u 1326 ± 6 mm (52 7/32 ± 1/4 in.)
v 777 ± 5 mm (30 19/32 ± 3/16 in.)



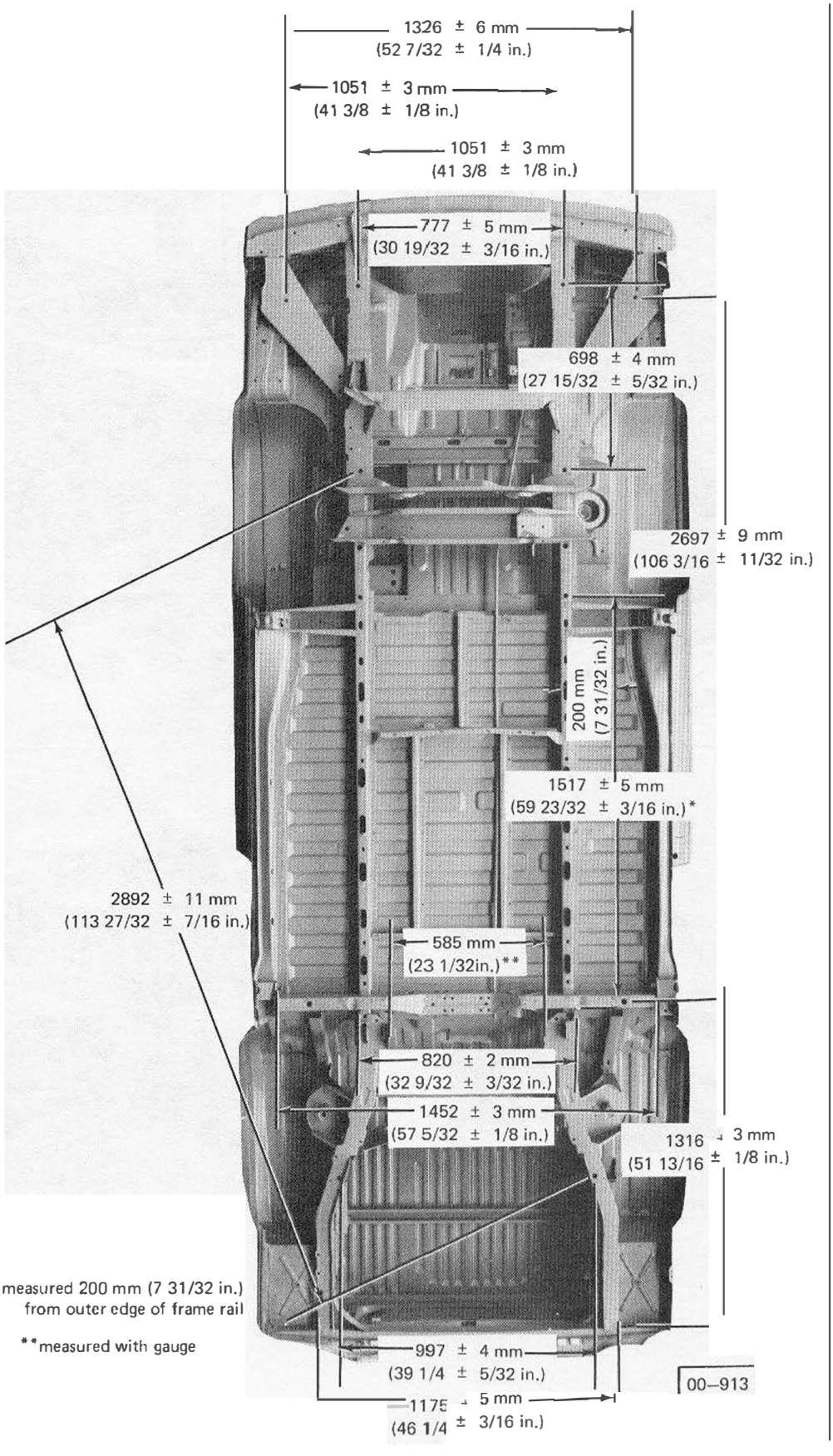
z_2 585 mm (23 1/32 in.)



x_1 997 ± 4 mm (39 1/4 ± 5/32 in.)
x_2 1175 ± 5 mm (46 1/4 ± 3/16 in.)



z_1 = 1452 ± 3 mm (57 5/32 ± 1/8 in.)

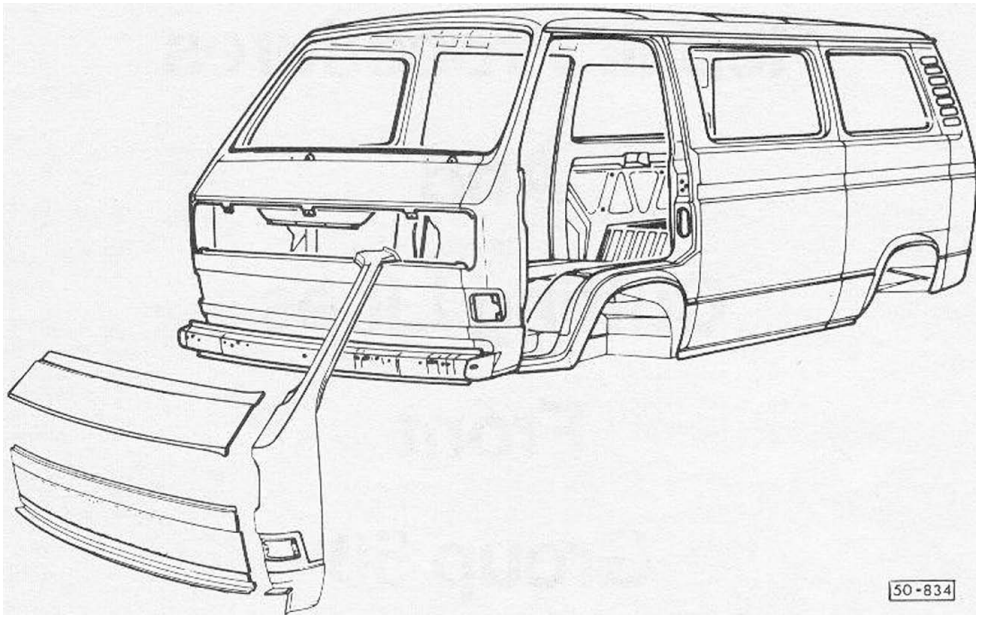


*measured 200 mm (7 31/32 in.) from outer edge of frame rail

**measured with gauge

Repair Procedures
And
Cutting Lines
Front
Group 50

50 Front Panels



Replacing front panels

Includes: corner section, upper and lower aprons

Cutting: Figs. 1-6

Preparing new parts: Figs. 7-10

Note:

Paint the insides of the front panel corner section and front aprons (upper and lower) before installation.

Aligning: Figs. 11,12

Welding: Figs. 12-14

Remove the following components to gain necessary access:

Disconnect battery

Headlight & turn signal assemblies

Front grill(s)

Front bumper (if necessary)

Front windshield (if necessary)

Front door(s) (if necessary)

Windshield wipers, washers and linkage Antenna

Corner molding (if necessary)

Electrical wiring (as necessary)

Fresh-air ducts & heater box (as necessary)

Radiator & spare wheel (if necessary)

Carpeting

50.2 Vanagon

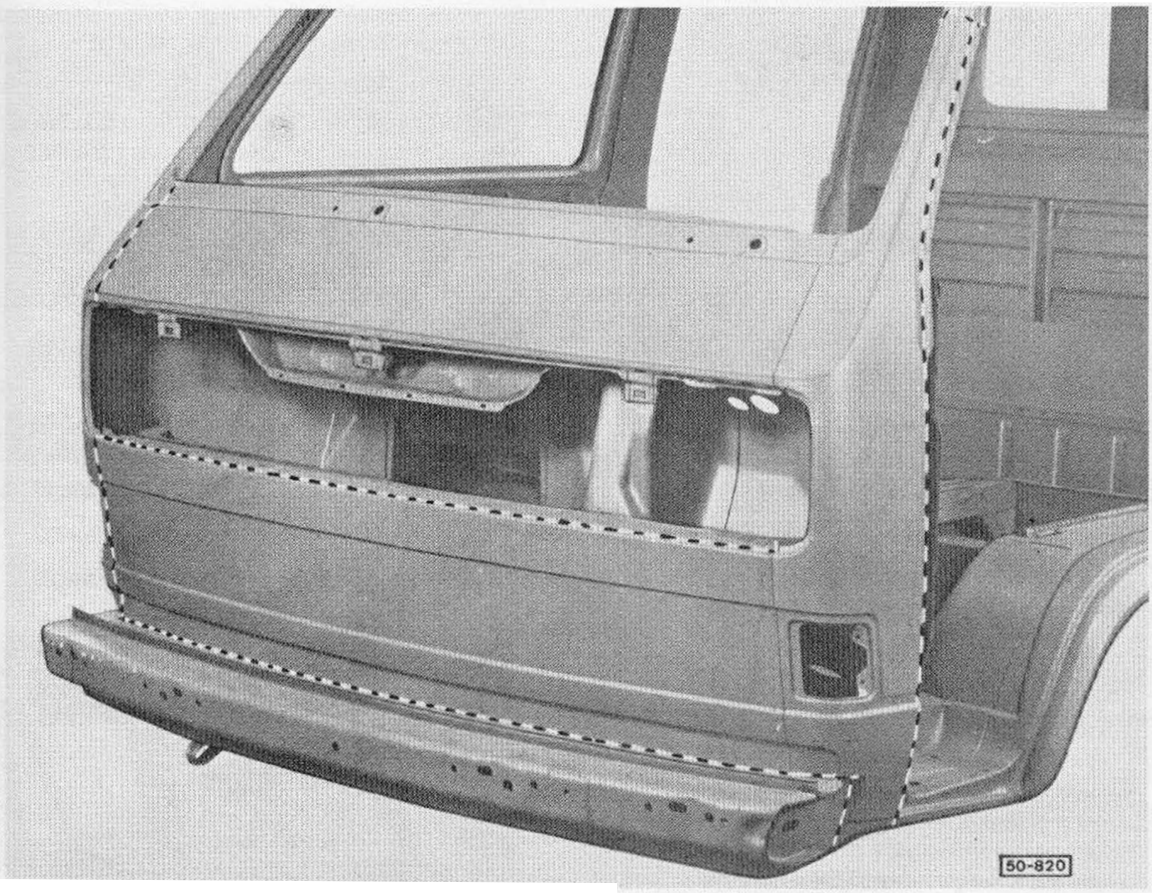


Fig. 1: Cutting out front panel corner section — part section and front aprons upper lower

Grind through the folded edge near the hinge pillar.

Air chisel, hacksaw, hammer, chisel and grinder.

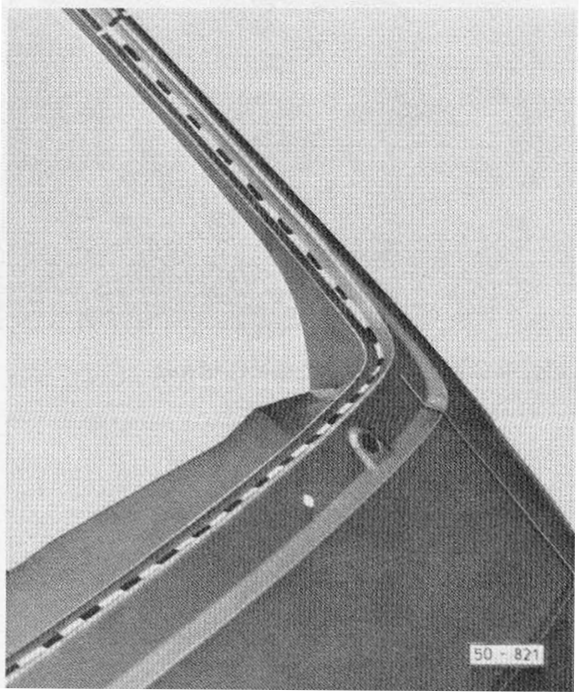


Fig. 2: Cutting out front panel corner section — part section and front apron

Air chisel, hacksaw, hammer, chisel and grinder

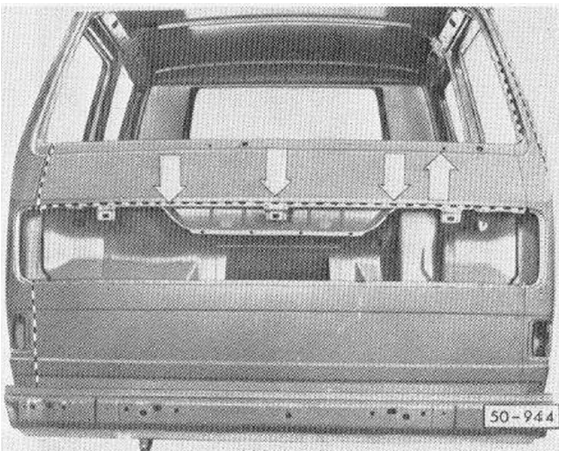


Fig. 3: Cutting out front apron, upper

Air chisel, hacksaw, hammer and chisel.

Note:

The horizontal cut should be made so that the ventilation box (arrows) and the steering column mounting bracket (arrow) are not damaged.

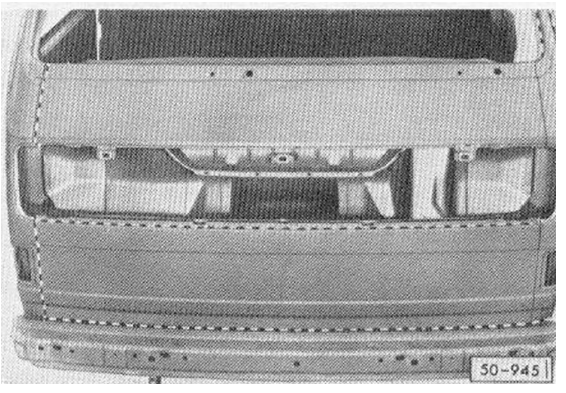


Fig. 4: Cutting out front apron, lower

Air chisel

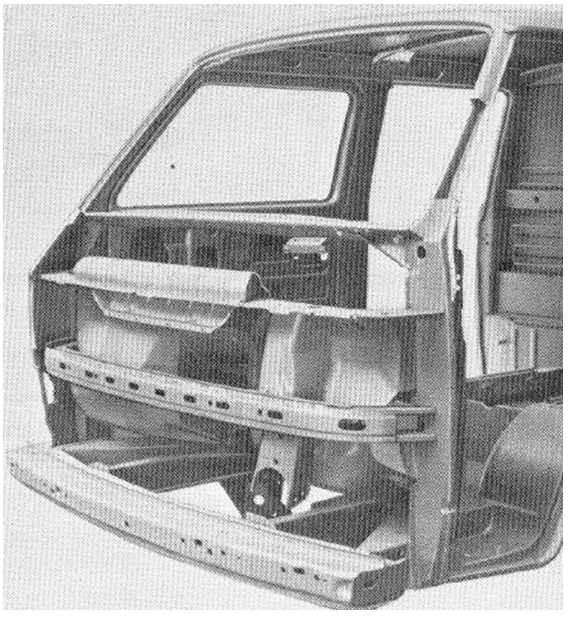


Fig. 5: Front panel corner section — part section and front aprons

Remove scrap metal remainging from parts cut out and straighten connecting surfaces.

Sander, pliers, grinder.

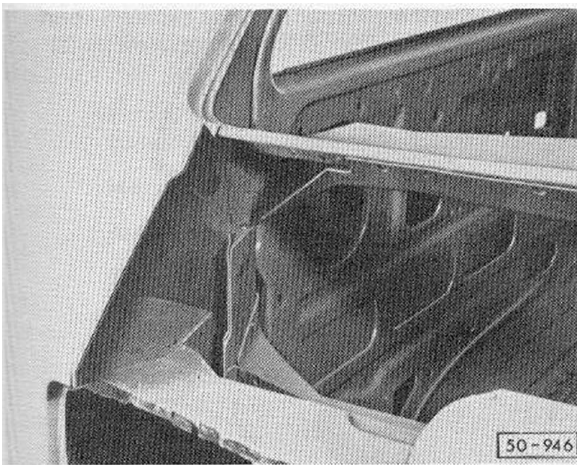


Fig. 6: Front apron (upper)

Off-set connecting area.

Off-set pliers.

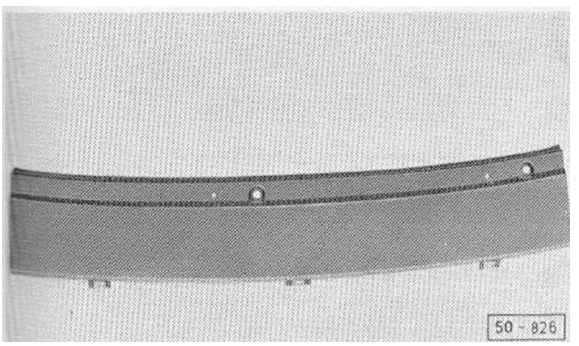


Fig. 7: Preparing new front apron (upper)

Grind connecting surfaces clean.

Sander

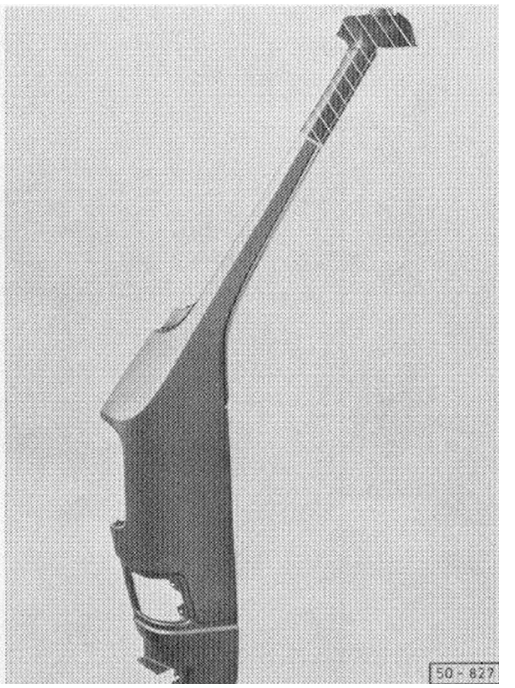


Fig. 8: Preparing front panel corner section (new part)

Transfer the cutting line onto the new part without allowing any overlapping material, and remove the surplus material (shaded areas). Grind connecting surfaces clean.

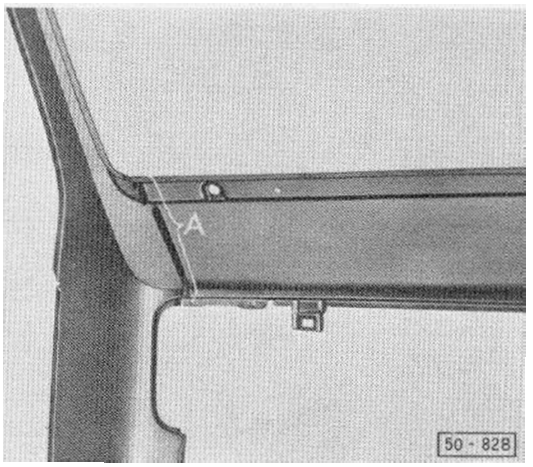


Fig. 9: Weld the front panel corner section — part section and upper front apron (new parts) before installation.

Area:A — spot weld

Fig. 10: **Preparing lower front apron (new part)**

Grind connecting areas clean.

Sander.

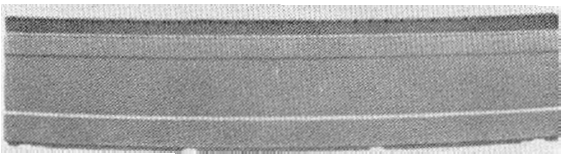


Fig. 11: **Aligning front panel corner section and front aprons**
(upper and lower)

Install door and align. Check the windshield opening dimensions -- Clamp parts tightly in position.

Note: Paint the inside of the front panel corner section — and (upper and lower) front aprons before installation. Mask off the front panel corner section at the area 'K' to avoid damaging the paint when grinding.

Coat all connecting areas, both on new part and body, which are no longer accessible after welding, with cold zinc paint. All MIG weld areas must be excluded from this operation!

Fig. 12: Align and weld the front panel corner section — part section with upper and lower front aprons.

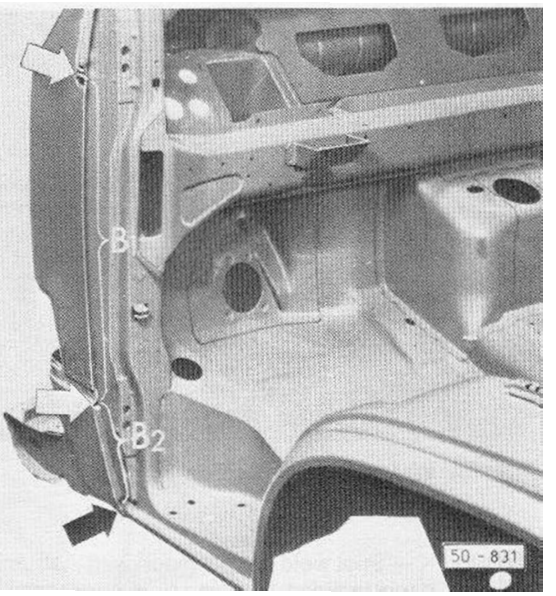
Flange B_1 and B_2 approx. 90° and weld in corner section — part section.

Hammer, flanging tool, air hammer.

Area: Arrow — MIG (staggered)

Note on areas B_1 and B_2:

After flanging, seal the area.



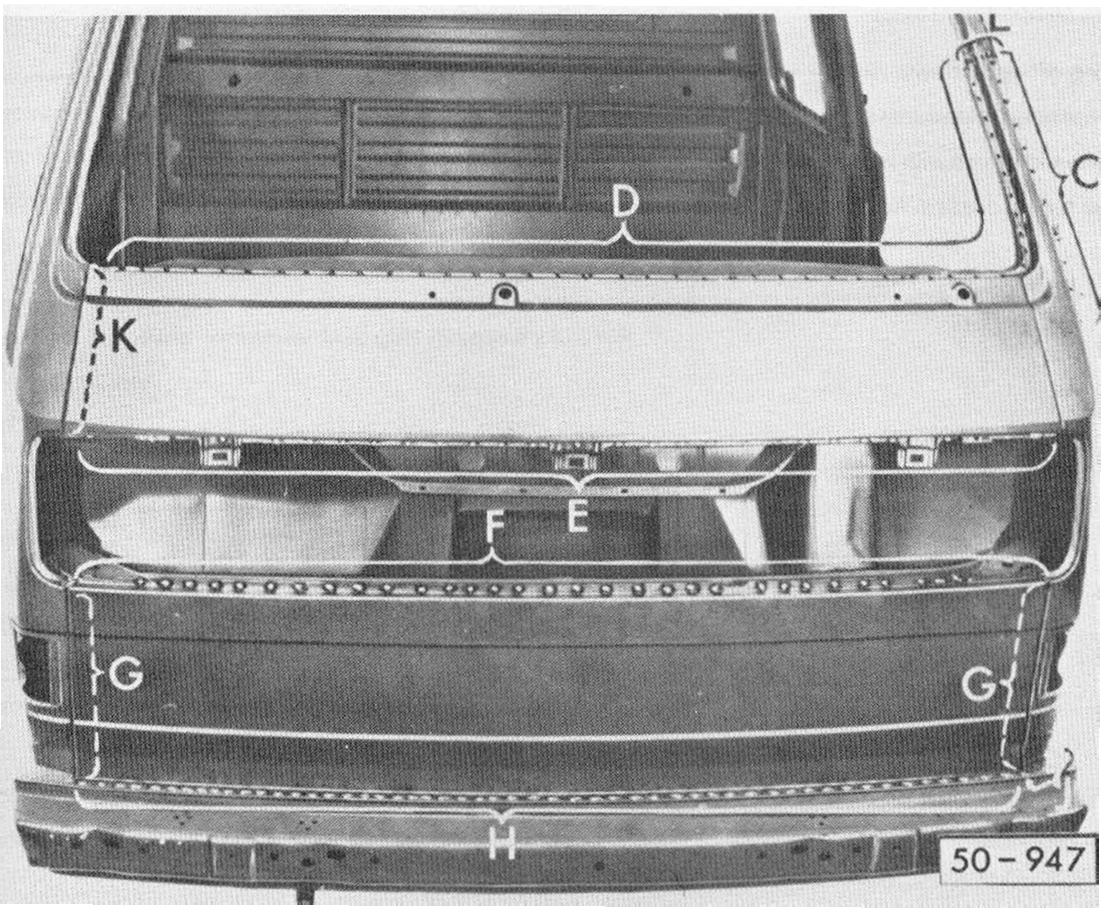


Fig. 13: Welding in front panel corner section — part section with upper and lower front apron

Areas:
- C — Spot weld
- D — Spot weld
- E — Spot weld
- F — MIG (plug) 3 plates
- G — MIG (plug)
- H — MIG (spot)
- J — MIG (spot)
- L — MIG (continuous)

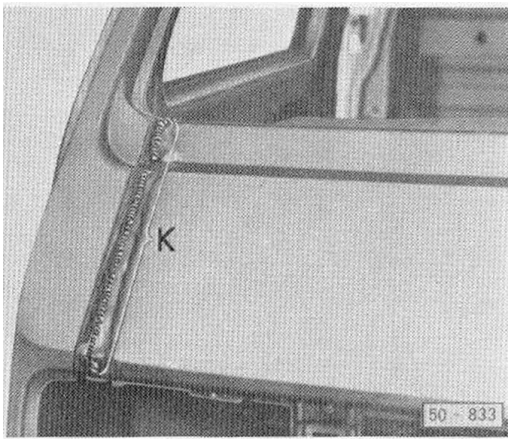


Fig. 14: Welding in front apron

Area:

K — Spot weld or MIG (spot) with instrument panel in place. (working from passenger compartment side)

Finishing-off operations:

Grind all visible weld seams smooth.

Clean all weld seams with wire brush.

Prime all repaired areas. Apply standard seals.

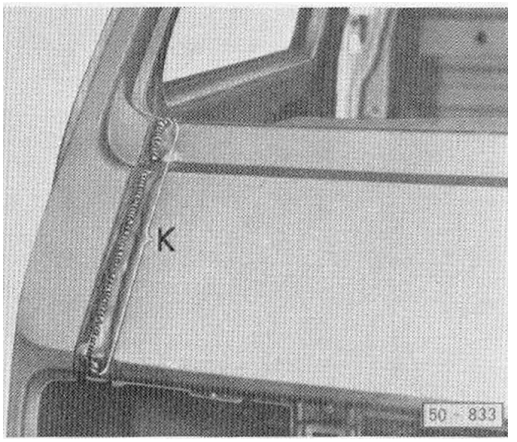


Fig. 14: Welding in front apron

Area:

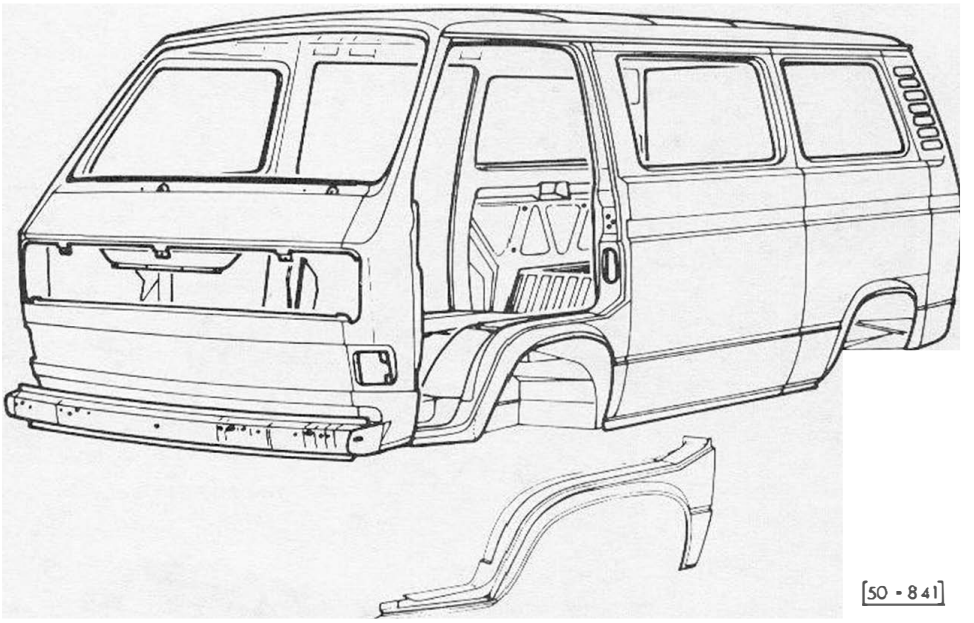
K — Spot weld or MIG (spot) with instrument panel in place. (working from passenger compartment side)

Finishing-off operations:

Grind all visible weld seams smooth.

Clean all weld seams with wire brush.

Prime all repaired areas. Apply standard seals.



Replacing front wheel arch panel

Cutting: Figs. 1-4

Preparing new parts: Fig. 5

Aligning: Fig. 6

Remove the following components to gain necessary access:

Disconnect battery

Front Door

Carpeting

CAUTION: Protect interior from welding & grinding sparks

Fuel filler neck and cap (right side)

Caution: Clean up any fuel spills to avoid a potential fire hazard

Step lining

Expansion tank

50 Front Wheel Arch Panel

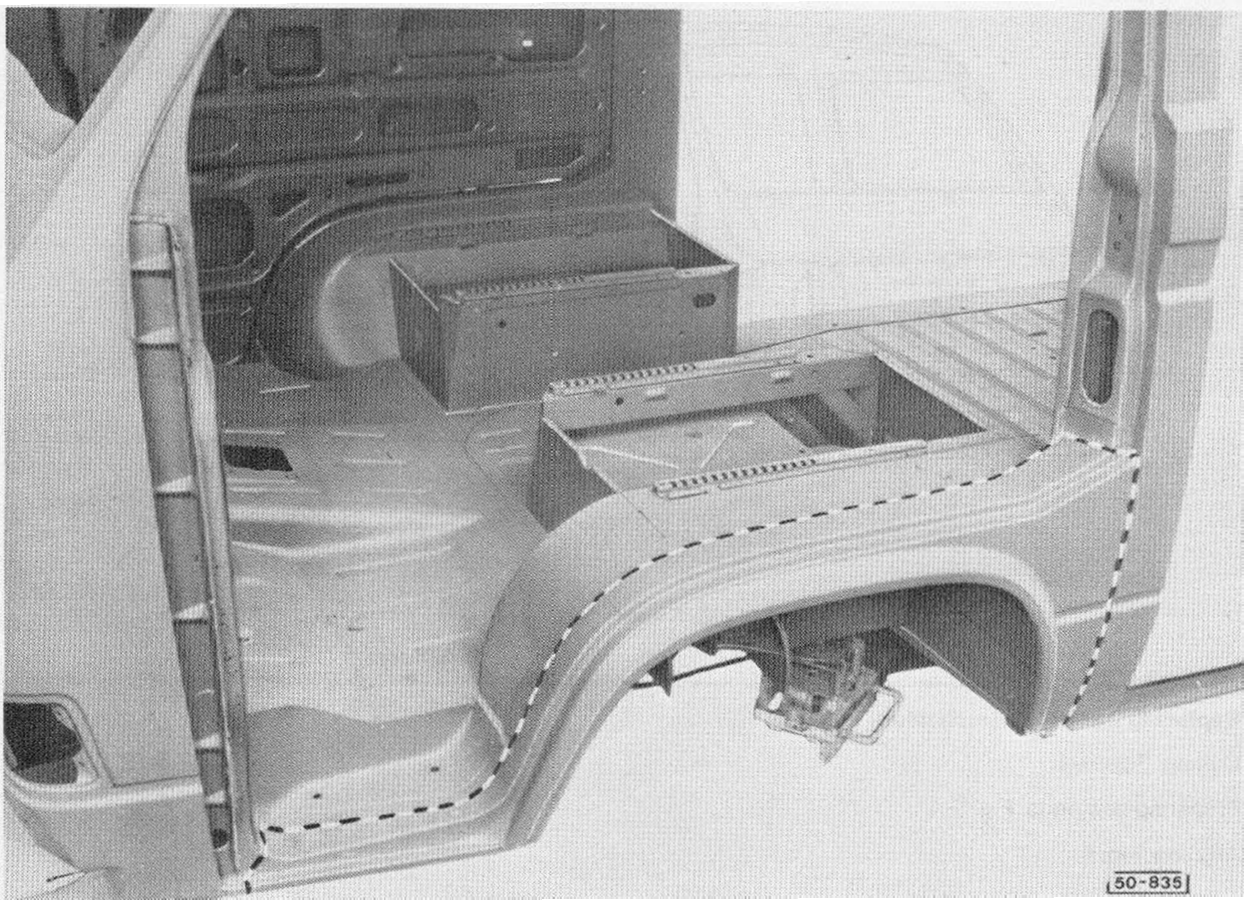


Fig. 1: Cutting out wheel arch panel

Air chisel, sander, hammer and chisel

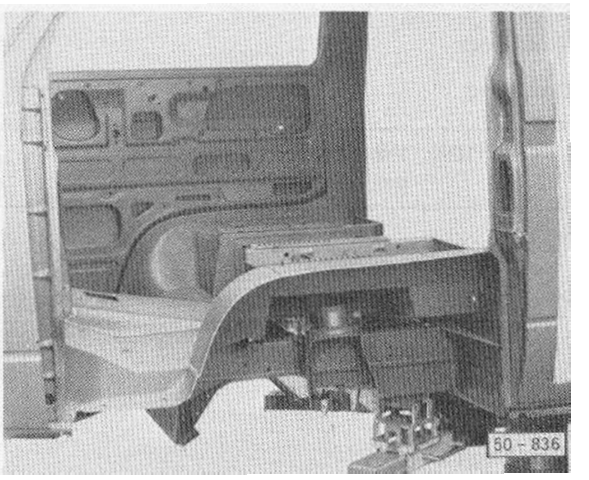


Fig. 2: Wheel arch panel

Remove scrap metal, straighten and grind connecting surfaces clean.

Sander, pliers, grinder.

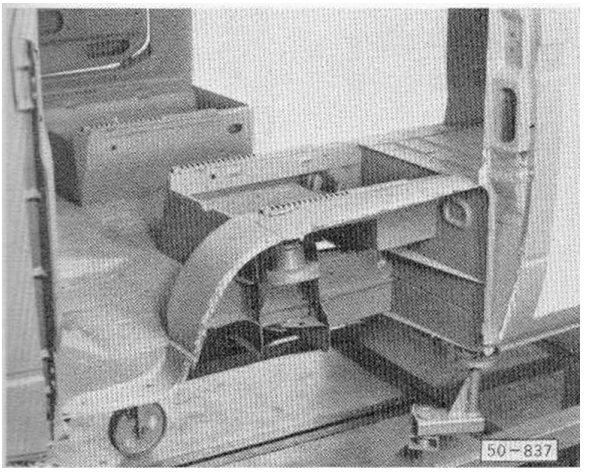


Fig. 3: Cutting out wheel arch panel

Remove scrap metal, straighten and grind connecting surfaces clean.

Sander, pliers, grinder.

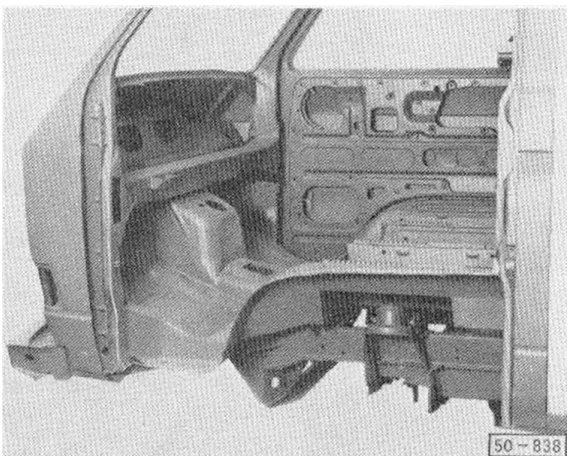


Fig. 4: Cutting out wheel arch panel

Remove scrap metal, straighten and grind connecting surfaces clean.

Sander, pliers, grinder

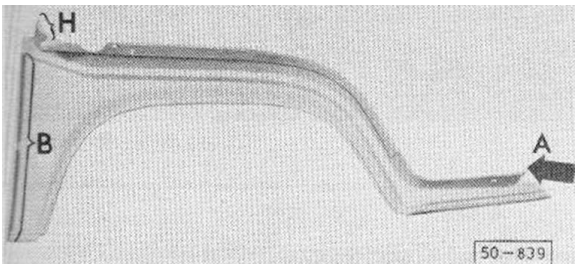


Fig. 5: Preparing wheel arch panel (new part)

Note:

The Fig. shows the left hand wheel arch panel from the inside.

Transfer the cutting line onto the new part and remove surplus material (shaded area).

To make alignment easier, knock the weld flange 'A' in the direction of the arrow.

In area 'B' make holes for MIG plug welding using a hole punch.

Distance between hole centers approx.20 mm. Grind connecting surfaces clean.

H — see Fig. 6.

50 Front Wheel Arch Panel

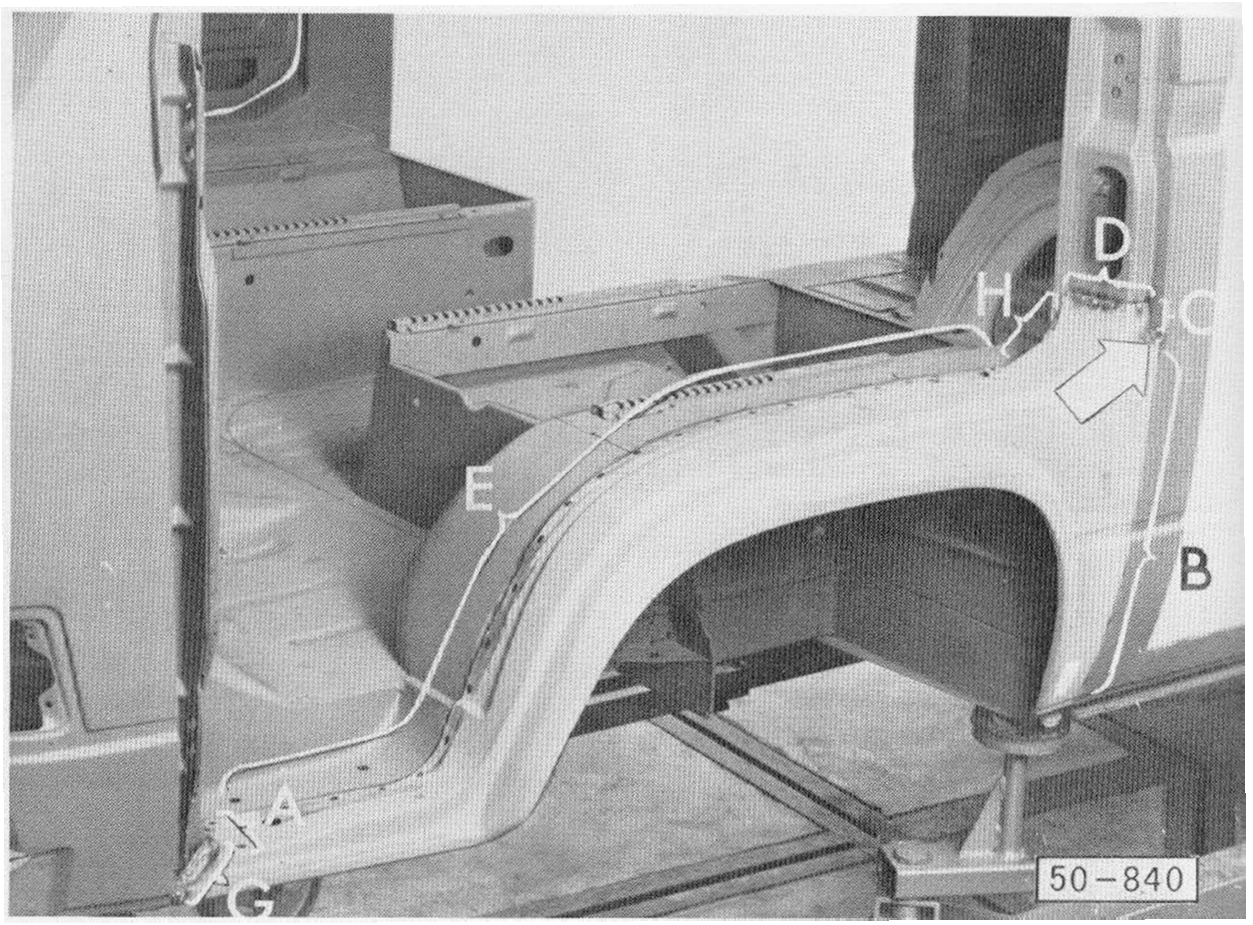


Fig. 6: Aligning and welding in wheel arch panel

Note:

Install door. Using MIG, tack weld wheel arch panel in position. Check the gap in the wheel arch panel area and if necessary, correct. Align wheel arch panel with door and if necessary correct

Areas:

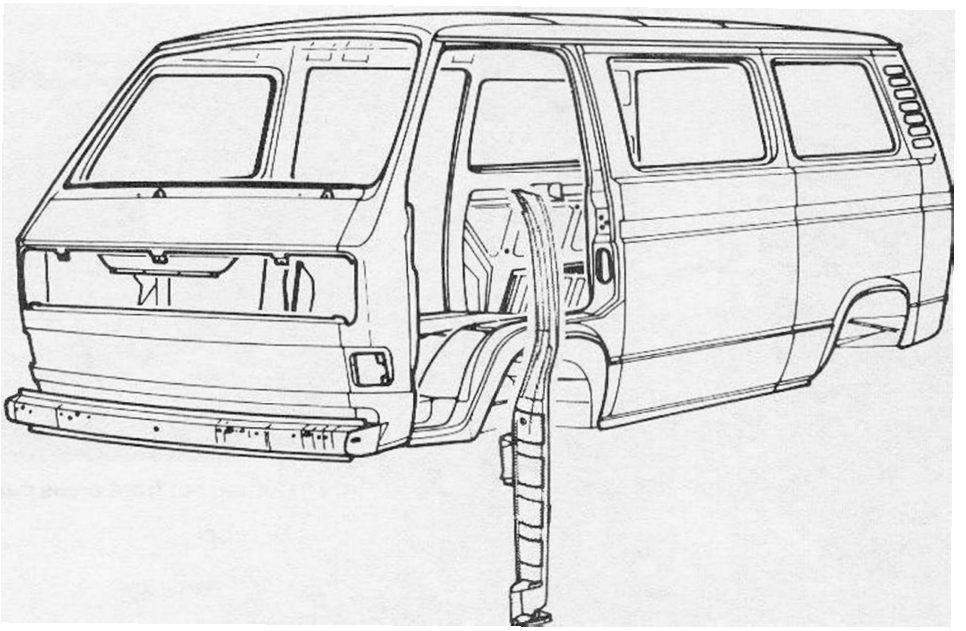
B — MIG (plug)
C — MIG (plug) — 2 holes 1.5 mm
D — MIG (plug) — 5 holes metal thickness
H — MIG (continuous) (see Fig. 5 also)
A — MIG (continuous)
G — MIG (continuous)
→ — MIG (tack)
E — Spot weld

Finishing-off operations:

Grind all visible weld seams smooth, fill with 2-component polyester material and sand down.

Clean all weld seams with wire brush.

Prime all repaired areas. Apply standard seals.



Replace Front Hinge Pillar

Cutting: Figs. 1-4

Removing Scrap Metal: Fig. 5

Preparing and Aligning New Part: Figs. 6-9

Welding: Figs 10-14

Note: Protect interior from grinding and welding sparks.

Remove The Following Components To Gain Necessary Access

Front Door

Front Windshield

Dash and Associated Components

Front and Side Carpeting

Headliner and Associated Trim (As Necessary)

Front Kick Panels

Any Necessary Electrical Wiring

Note:
Photos in this procedure are from a 1979 Type 2. They should be used as a guide. Pay careful attention to new parts configuration.

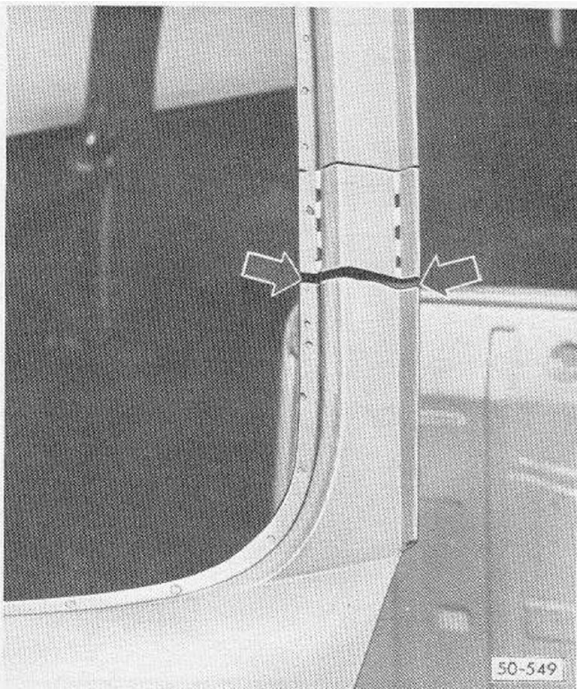


Fig 1: Cutting out front panel —

Hacksaw, cold chisel

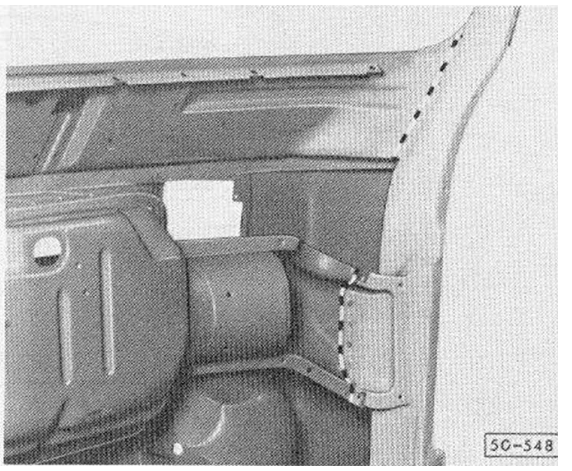


Fig. 2: Cutting out front cross panel —

Air chisel

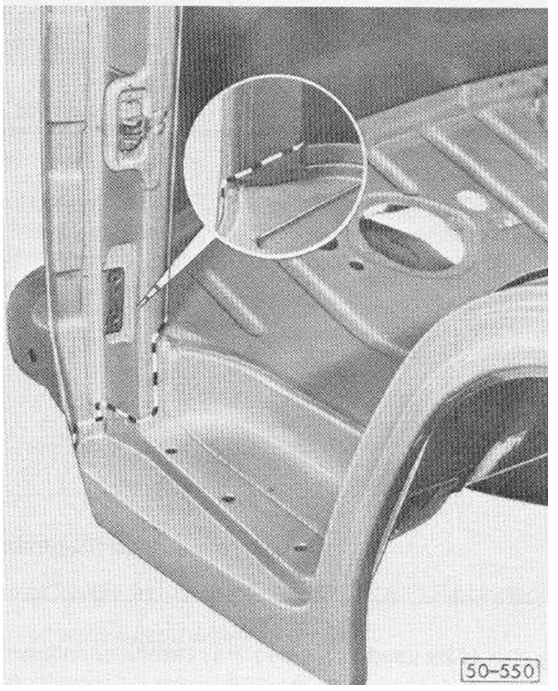


Fig. 3: Cutting out hinge pillar —

Air chisel, gas cutting torch, grinder

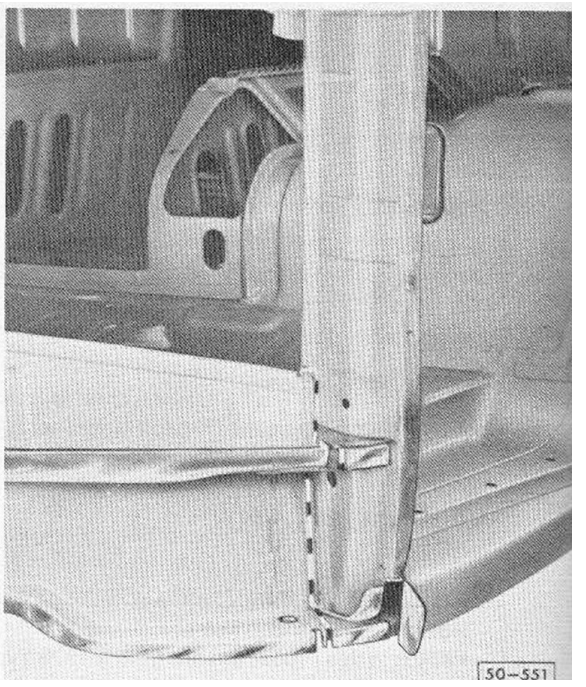


Fig. 4: Cutting out hinge pillar —

Air chisel, gas cutting torch, grinder

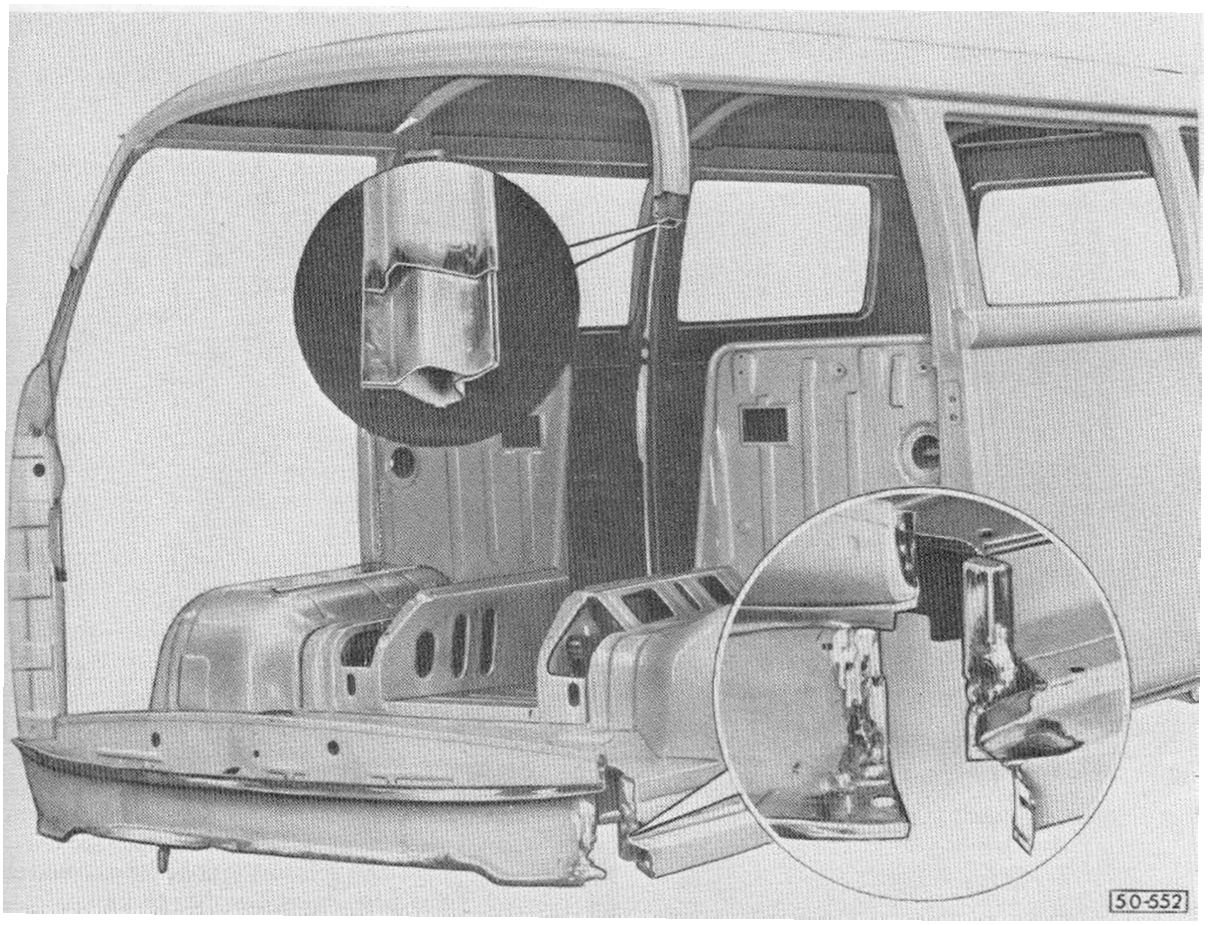


Fig. 5: Hinge pillar removed —

Remove the scrap metal remaining from parts cut out. Straighten and grind connecting surfaces clean.

Grinder, pliers, air chisel.

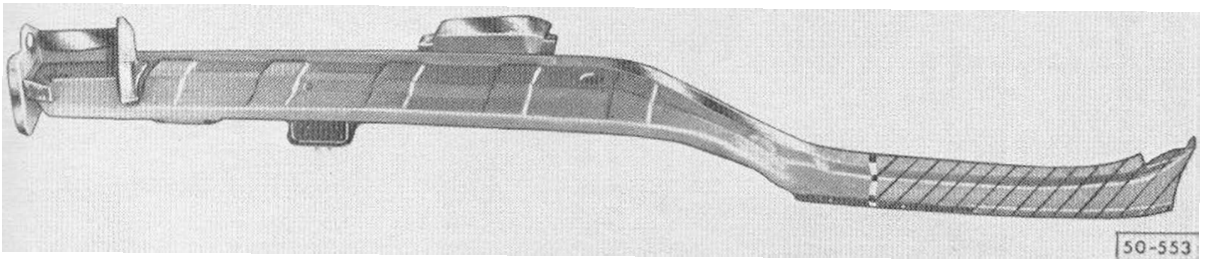


Fig. 6: Hinge pillar — new part:

Transfer cutting lines and remove surplus material — shaded area.

Hacksaw.

Connecting areas, both on new part and body, which will no longer be accessible after welding in the new part must now be coated with cold zinc paint.

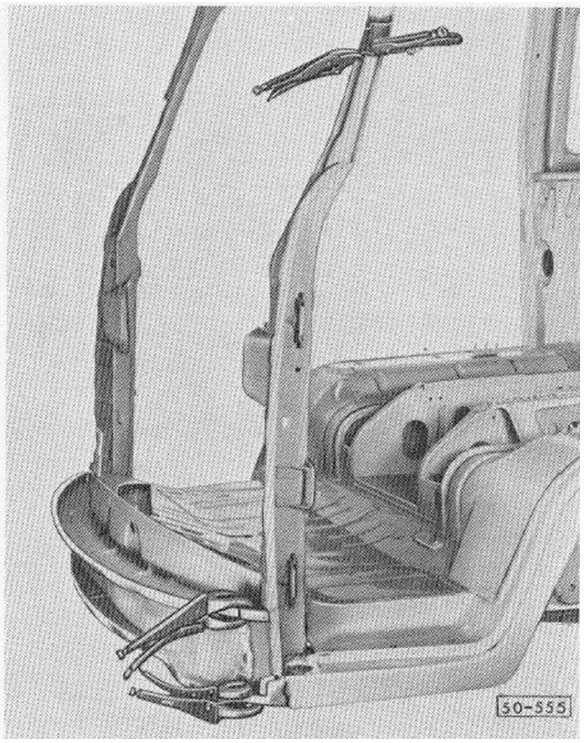


Fig. 7: Hinge pillar

Align and clamp in position.

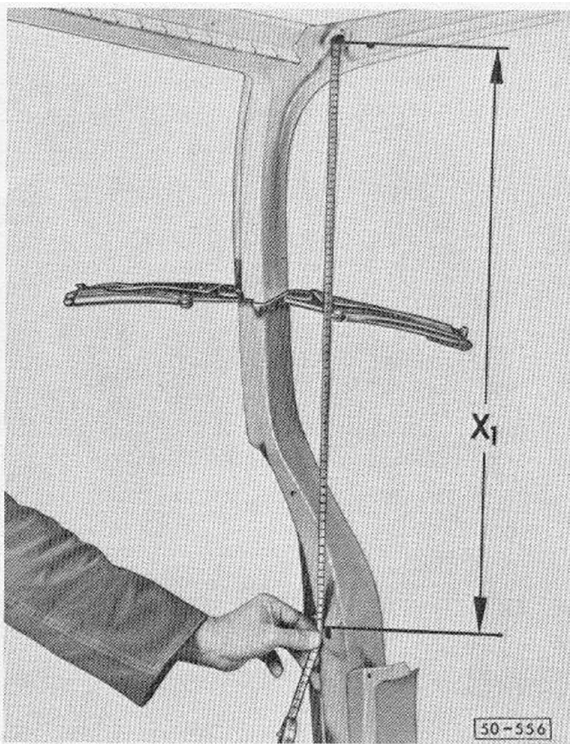


Fig. 8: Aligning hinge pillar

Measure dimension "X_1" — between sun visor mounting and door contact switch mounting hole-on the opposite side and check this measurement on the new part.

If necessary, correct the positioning of the new part.

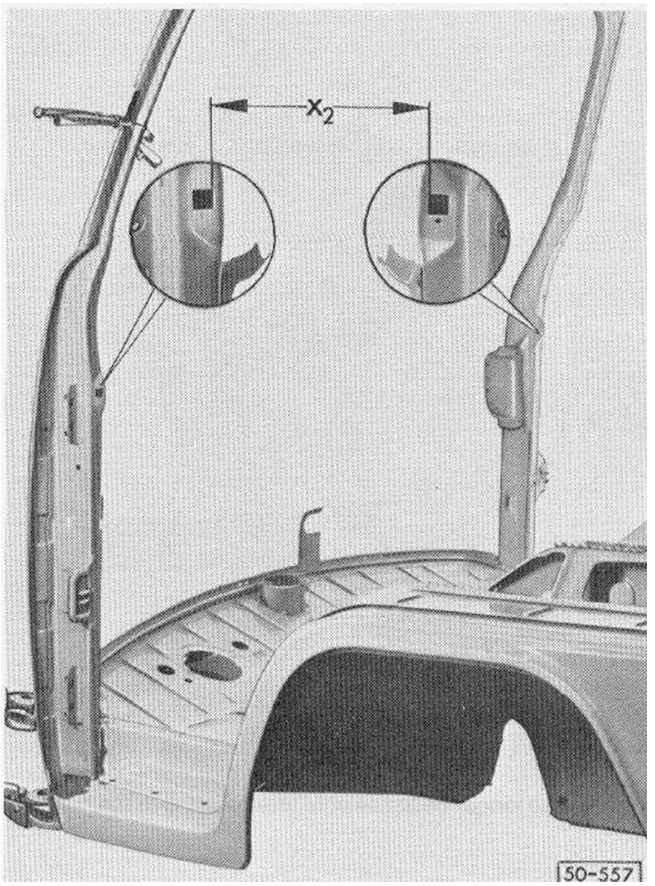


Fig. 9: Aligning hinge pillar

Measure dimension "X_2" — between the two door contact switch mounting holes —

Dimension should be 1565 mm ±3 mm

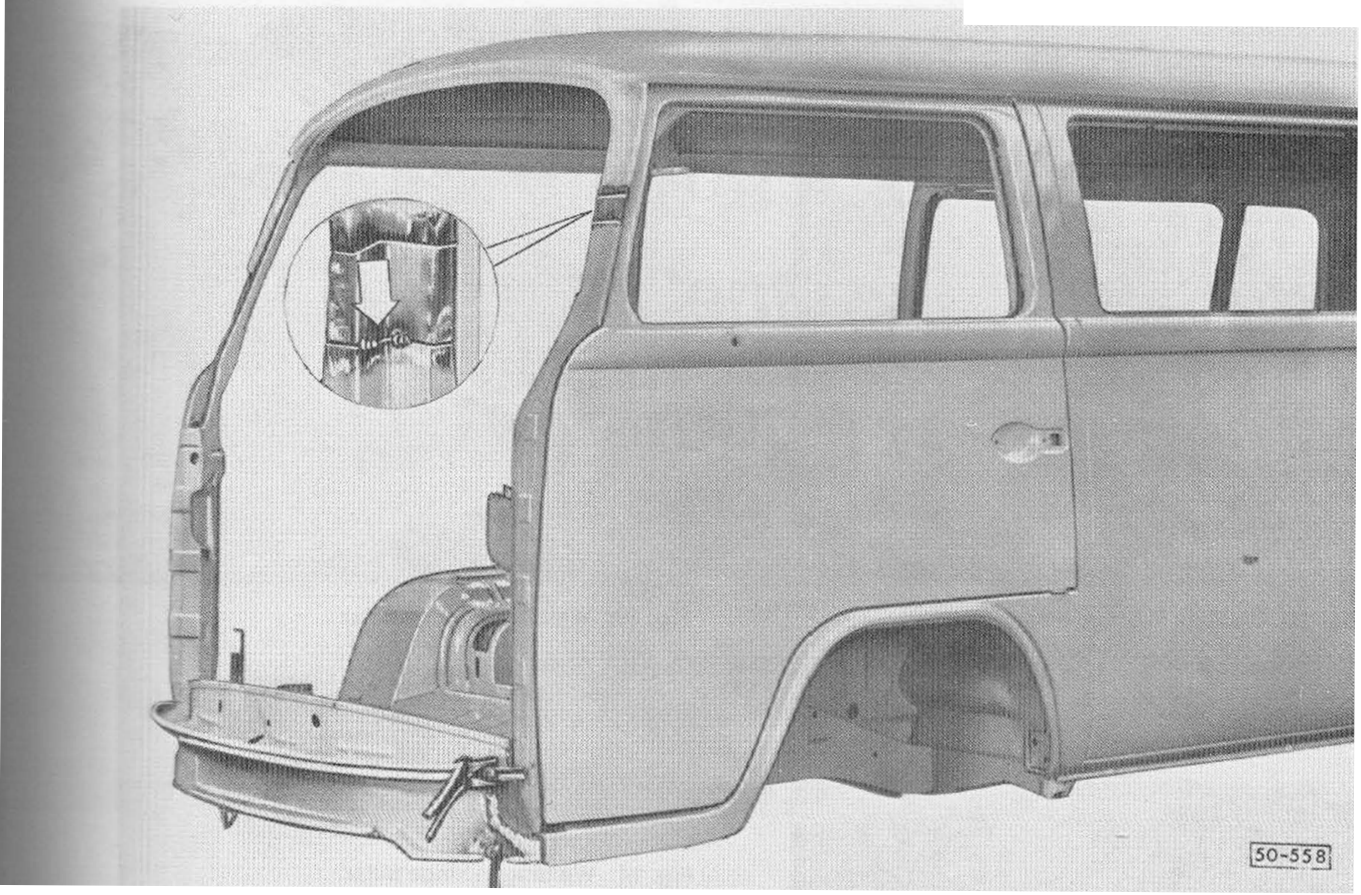


Fig. 10: Tack weld hinge pillar — install door, check the gap all round and if necessary correct the positioning of the pillar.

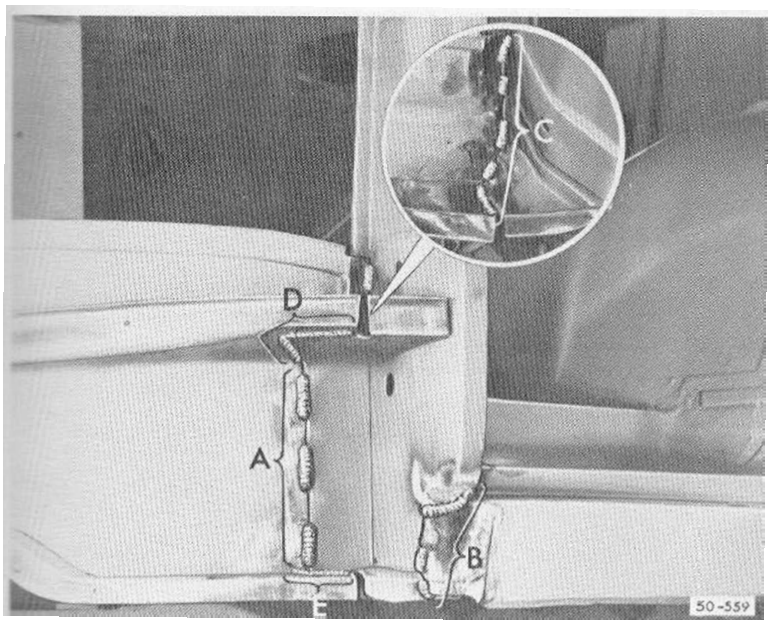


Fig. 11: Welding in hinge pillar

Areas A, B, C } MIG (Staggered)

D, E } MIG (Continuous)

50 Front Hinge Pillar

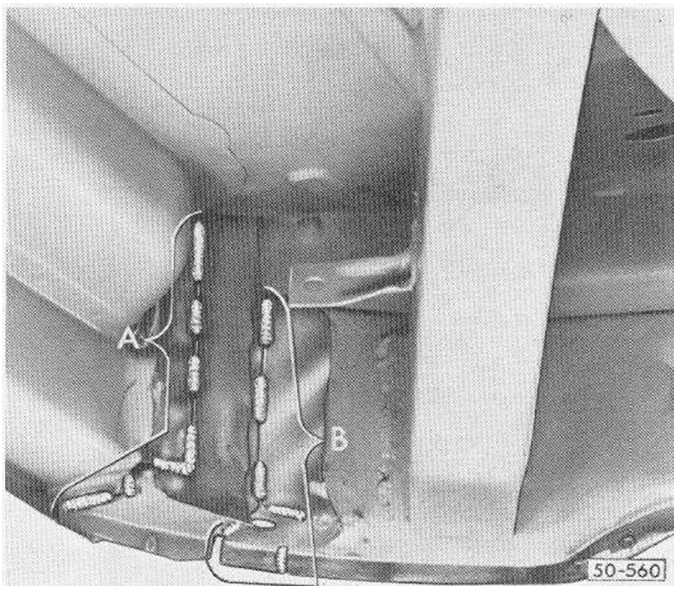


Fig. 12: Welding in hinge pillar

Areas: A, B } MIG (Staggered)

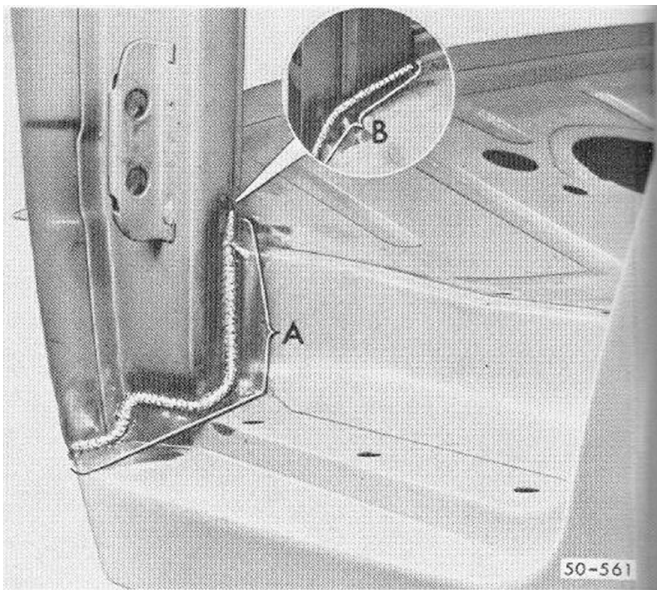


Fig. 13: Welding in hinge pillar

Areas: A, B } MIG (Continuous)

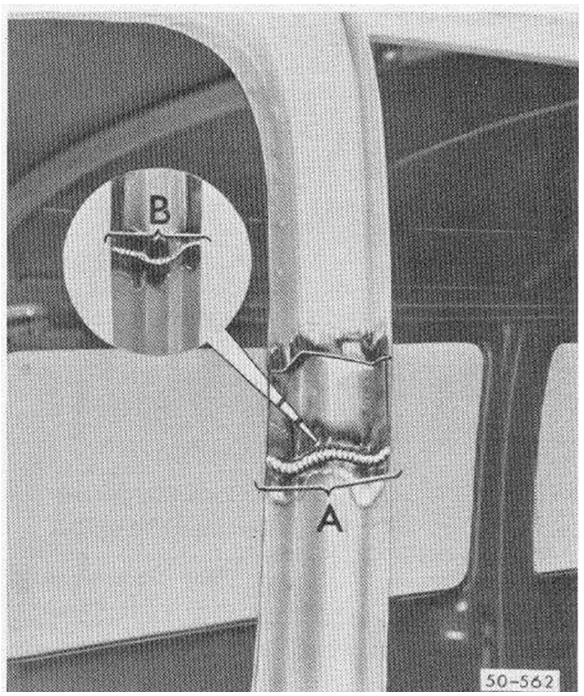


Fig. 14: Welding in hinge pillar

Areas: A, B } MIG (Continuous)

Grind connecting surfaces clean.

Clean all weld seams with wire brush.

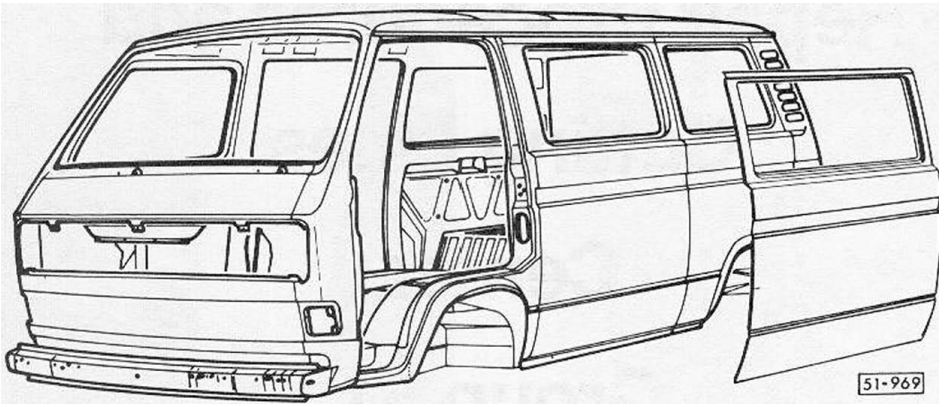
Prime and seal all repaired areas.

Carry out cavity preservation in repaired areas.

Repair Procedures and Cutting Lines Center Group 51

Repair Procedures and Cutting Lines Center Group 51

51 Front Outer Side Panel



Replacing front outer side panel

Cutting: Figs. 1,2

Preparing new parts: Fig. 3

Aligning/Welding: Fig. 4

Remove the following components to gain necessary access:

Center and rear seats

Carpeting

Trim panels

Window

Headliner trim as necessary

Camper trim (if applicable)

Caution:

Protect interior from welding or grinding sparks

51.2 Vanagon

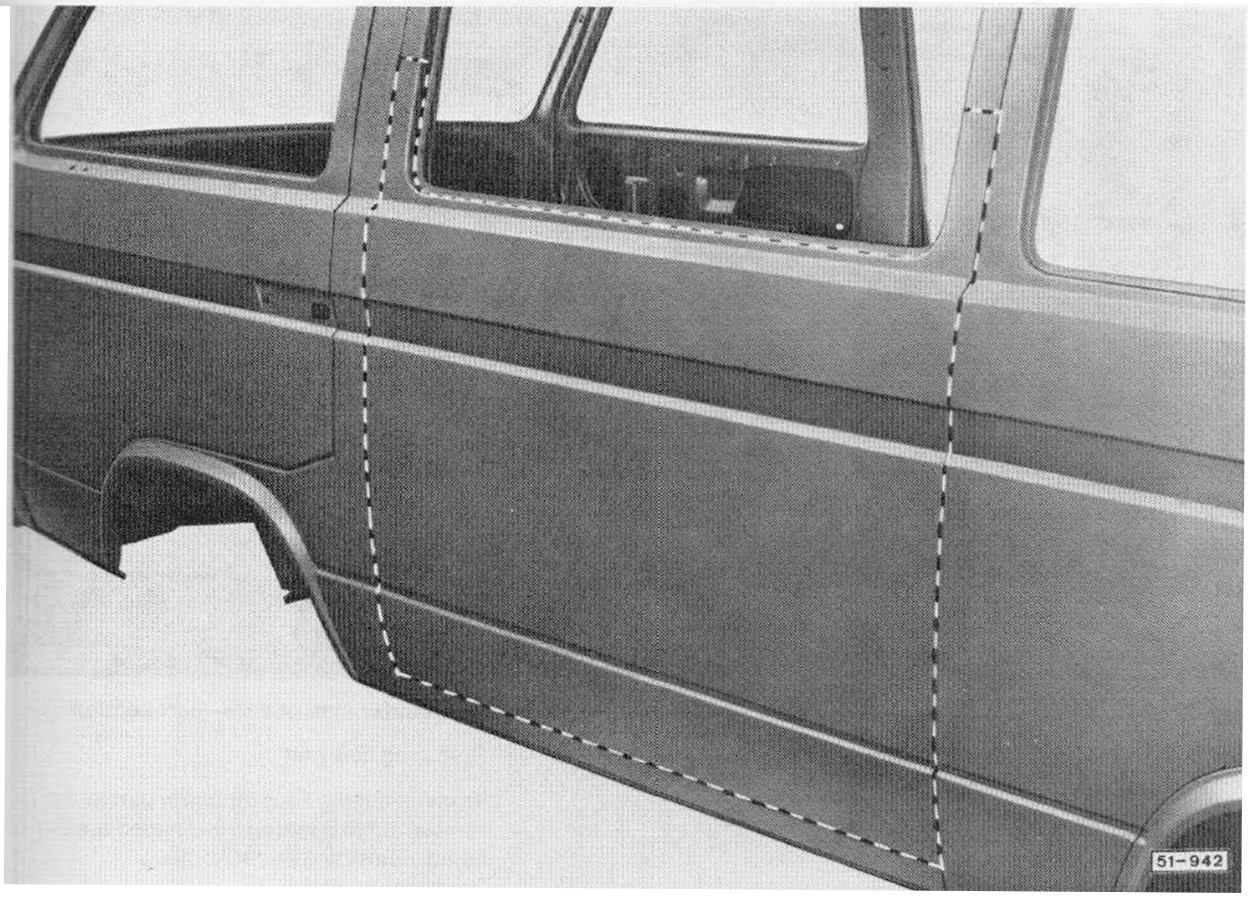


Fig. 1: Cutting out front outer side panel

Air chisel

Attention:

When making the vertical cuts, care should be taken to ensure that the pillars are not damaged.

51 Front Outer Side Panel

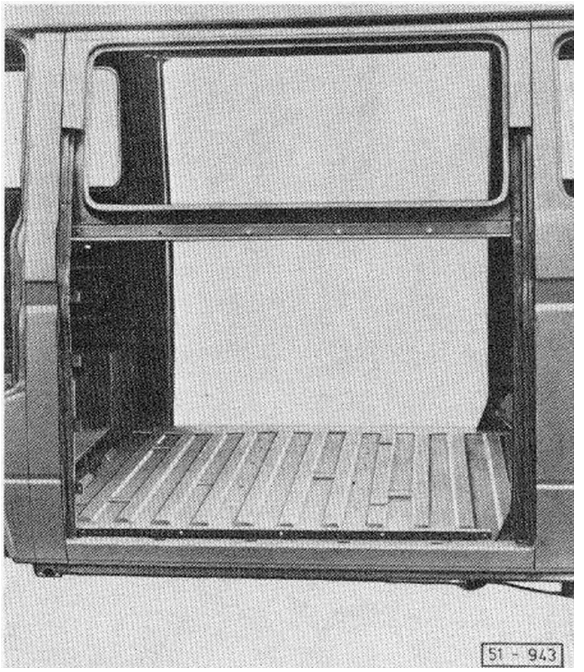


Fig. 2: Front outer side panel

Remove scrap metal, straighten and grind connecting surfaces clean.

Sander, pliers

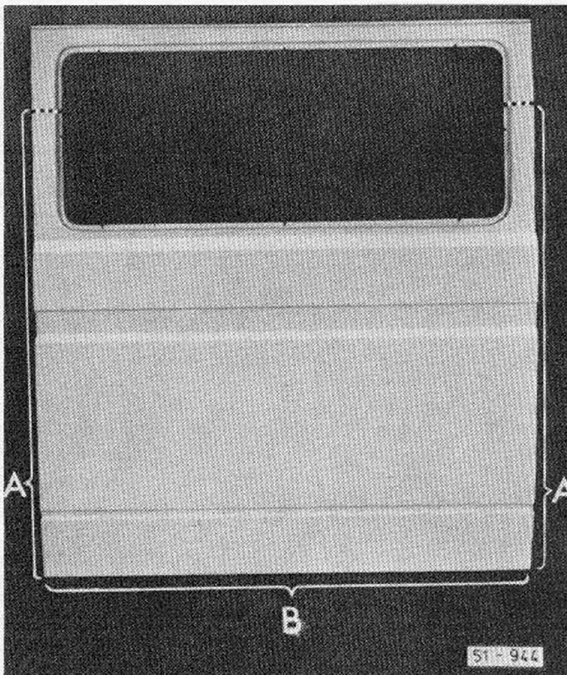


Fig. 3. Front outer side panel — part section

Preparing new part

Transfer cutting lines onto new part and remove surplus material — shaded area —. Grind connecting surfaces clean.
Hacksaw, sander

Areas:

A — Connecting areas to pillar:
Punch holes for plug welding.

B — Connecting areas to side member (luggage compartment floor):
Punch holes for plug welding.
Grind all connecting surfaces clean.

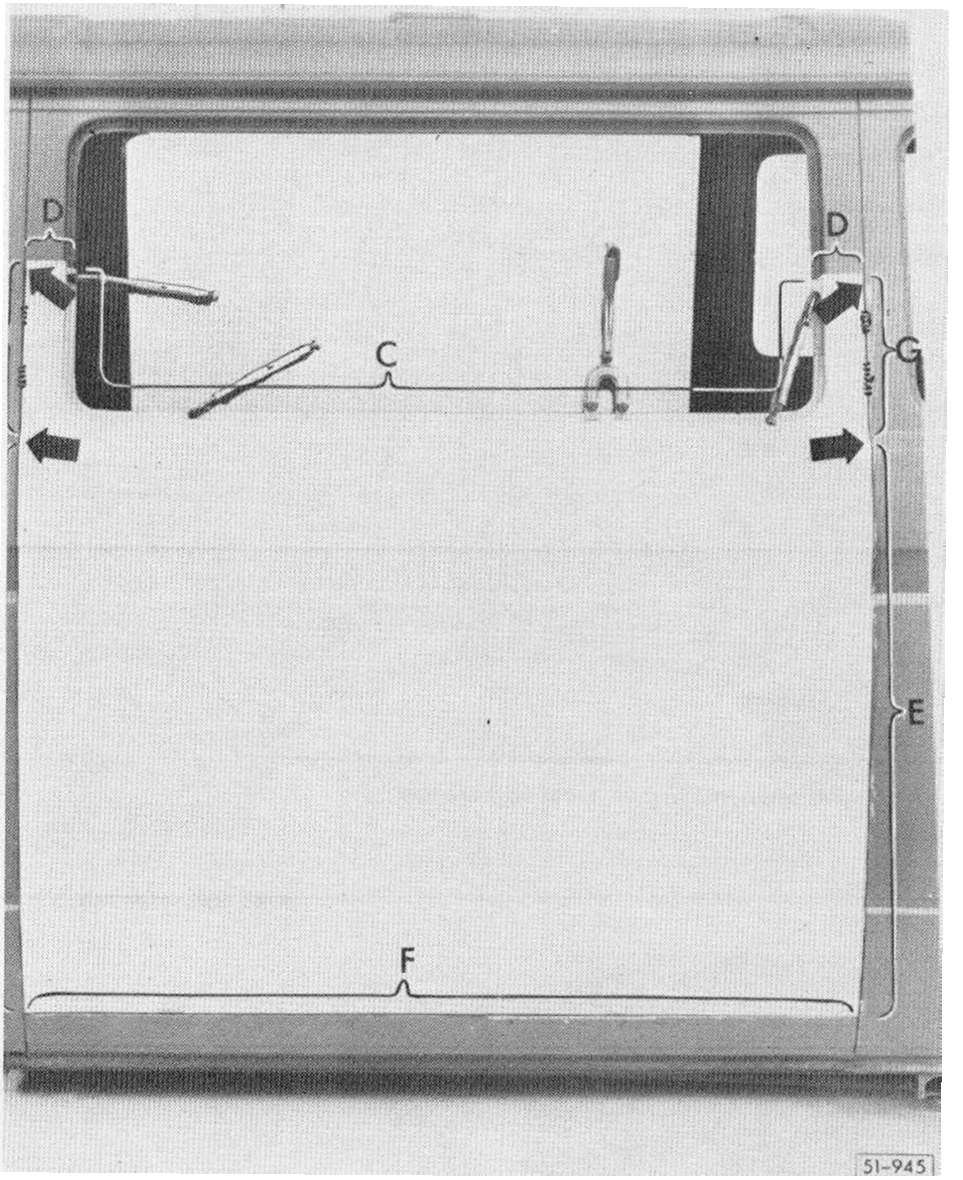


Fig. 4: Aligning and welding in front outer side panel

Areas:

C — Spot weld

D — MIG (continuous) Weld seam at intervals.
Cool adjacent areas with heat-absorbing material.

E — MIG (plug) working from inside vehicle

F — MIG (plug) working from inside vehicle

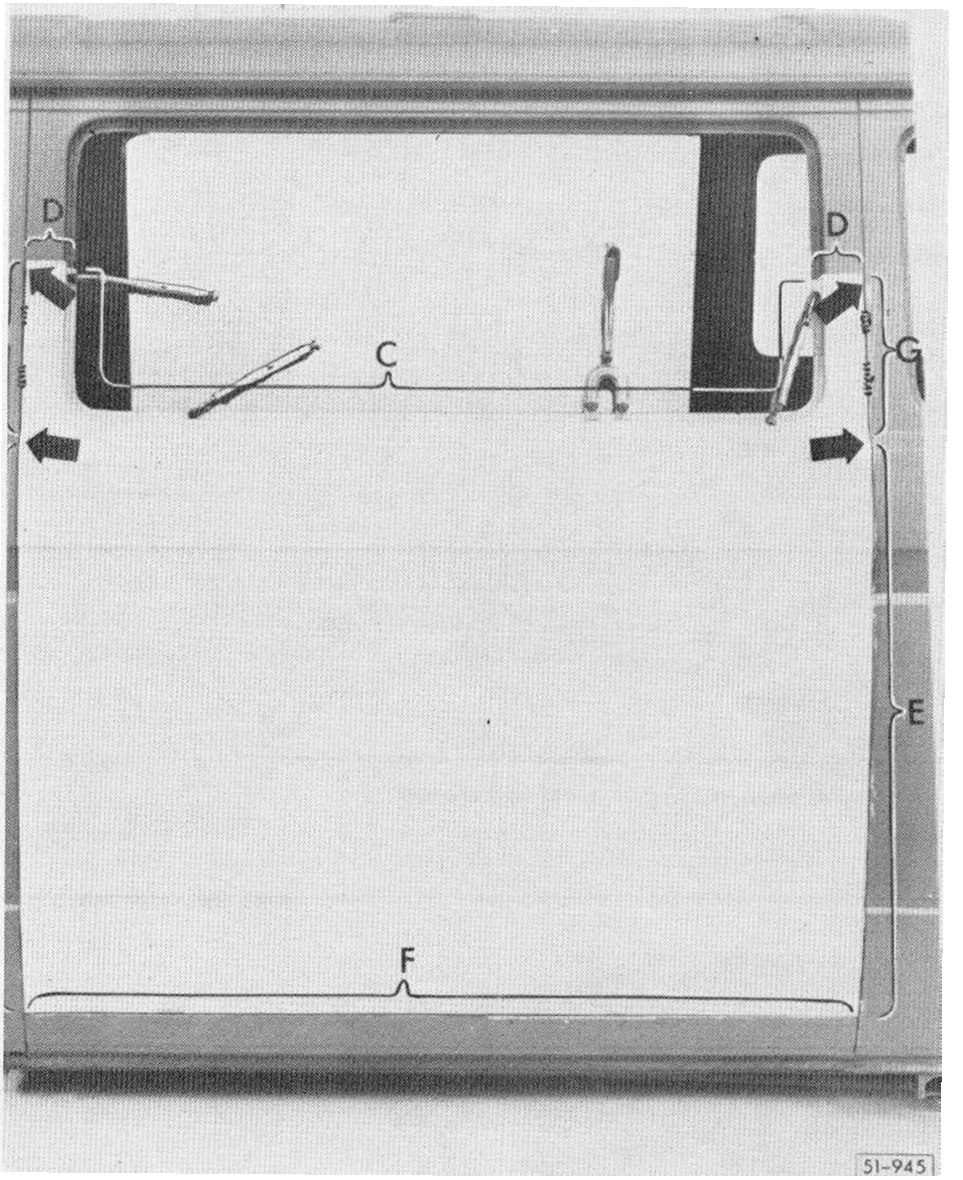
G — MIG (staggered)

Arrows—MIG (continuous)

Grind all visible weld seams smooth, fill with 2-component polyester material and sand down.

Clean all other welded seams with wire brush.

Prime all repaired areas. Apply standard seals.



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Cool adjacent areas with heat-absorbing material.

E — MIG (plug) working from inside vehicle

F — MIG (plug) working from inside vehicle

G — MIG (staggered)

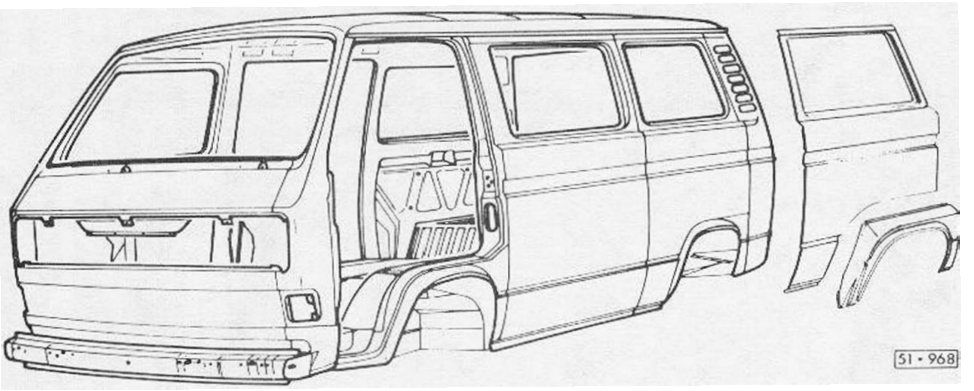
Arrows—MIG (continuous)

Grind all visible weld seams smooth, fill with 2-component polyester material and sand down.

Clean all other welded seams with wire brush.

Prime all repaired areas. Apply standard seals.

51 Rear Outer Side Panel



Replacing rear outer side panel - includes rear wheelhousing

Cutting: Figs. 1-4

Preparing new parts: Figs. 5-8

Aligning: Fig. 9

Welding: Figs. 9-11

Remove the following components to gain necessary access:

Disconnect battery

Center and rear seats

Carpeting

Trim panels

Rear wheel

Headliner trim (as necessary)

Camper trim (if applicable)

Window

Caution:

Protect interior from welding or grinding sparks

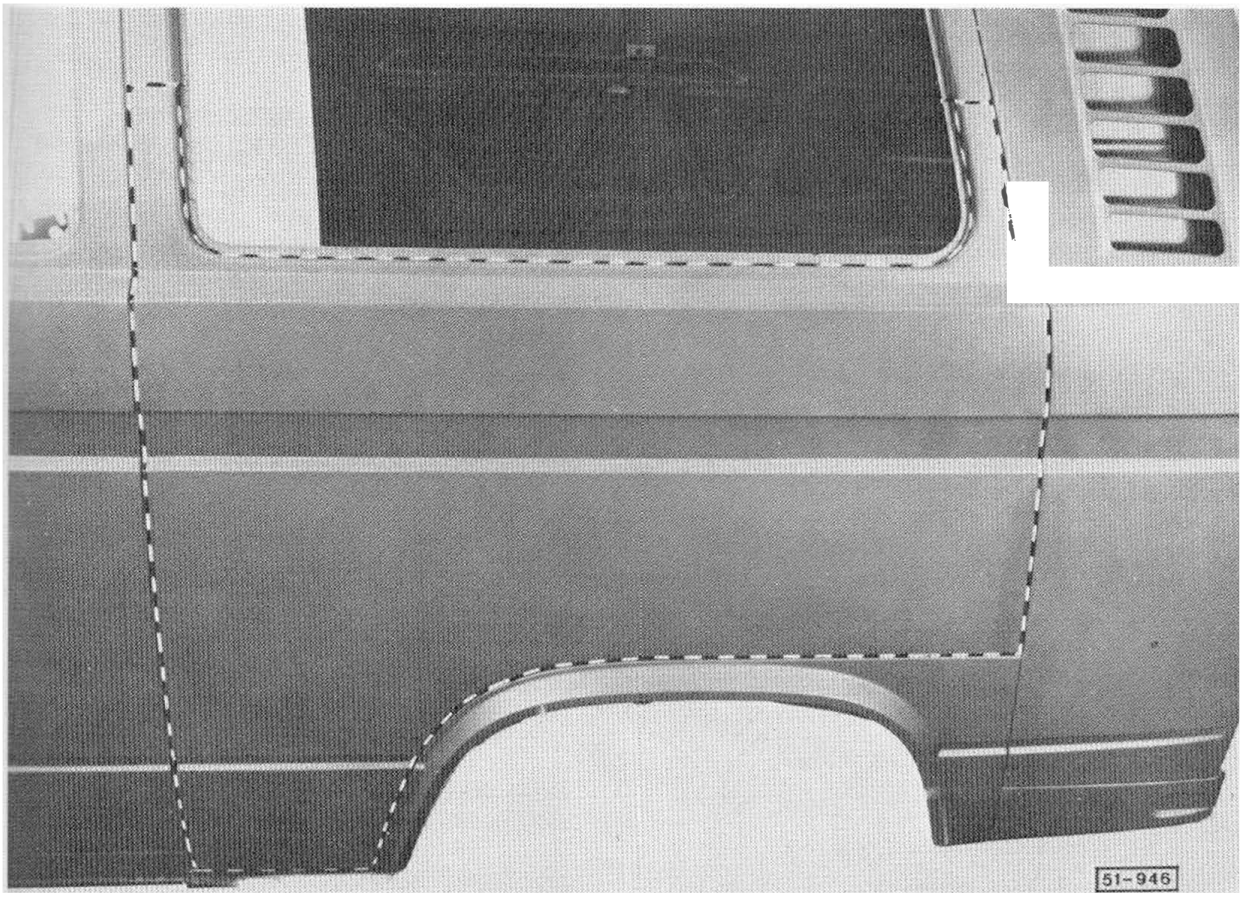


Fig. 1: Cutting out rear outer side panel

Air chisel

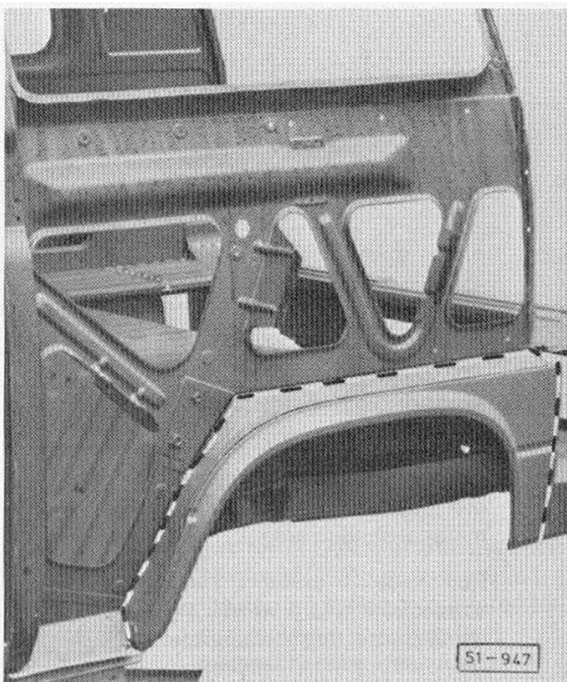


Fig. 2: Cutting out inner wheel housing

Air chisel

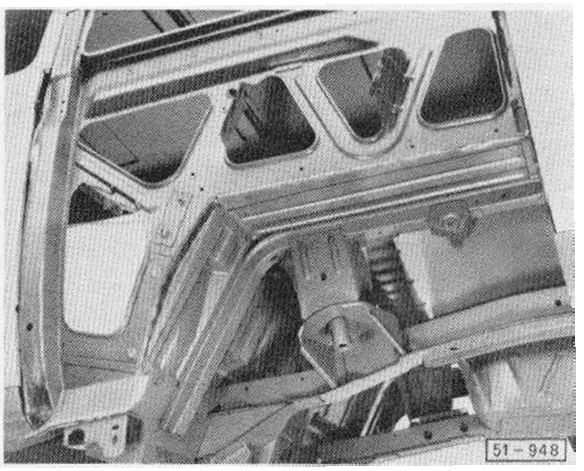


Fig. 3: Inner wheel housing

Remove scrap metal. Straighten and grind connecting areas clean.

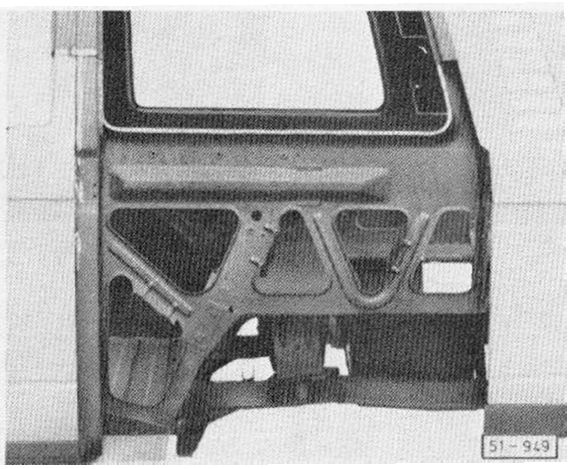


Fig. 4: Inner wheel housing and outer side panel

Remove scrap metal, straighten and grind connecting surfaces clean.

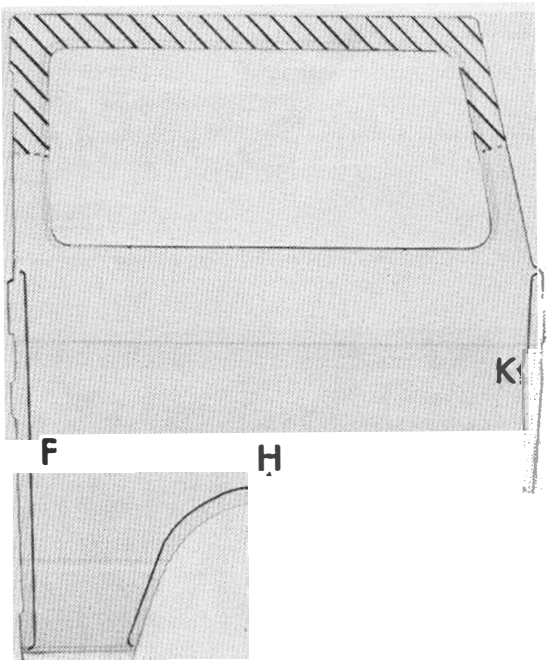


Fig. 5: Preparing outer side panel (new part)

Transfer the cutting line on to the new part without allowing extra material for overlapping, and remove surplus material-shaded areas-

Punch holes in areas F, H and K for subsequent MIG plug welding.
Grind connecting surfaces clean.

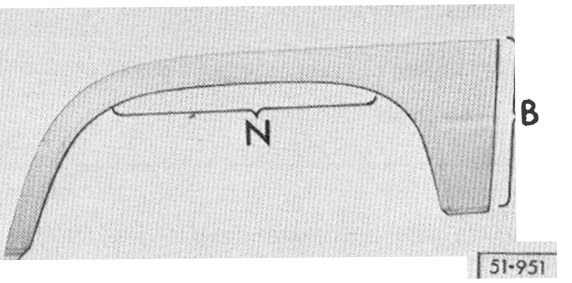


Fig. 6: Inner wheel housing (new part)

Punch holes in areas B and N for subsequent MIG plug welding.
Grind connecting surfaces clean.

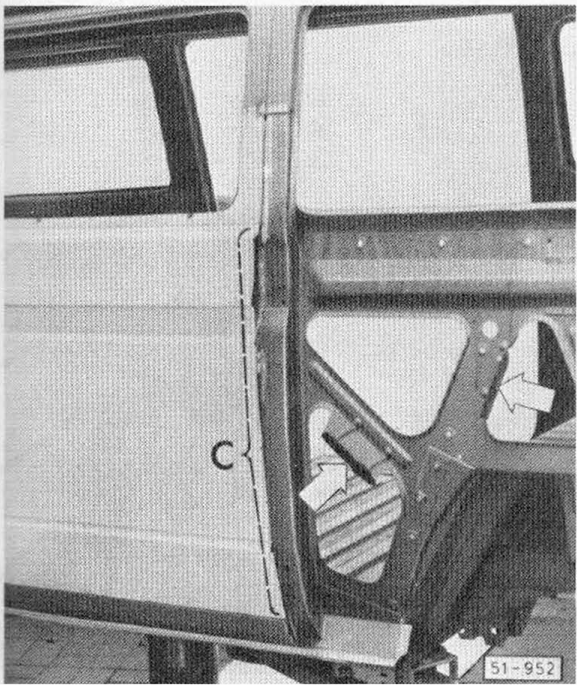


Fig. 7: Outer side panel-part section

Prepare vehicle body. Area C:
Drill 7 mm diam. holes in the front side panel flange (working from the vehicle interior) for subsequent plug welding.
Arrows: Place non-hardening sealing tape in these areas.

Drill.

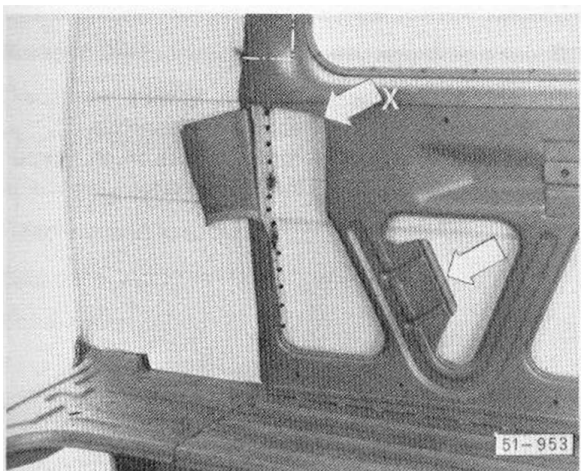


Fig. 8: Outer side panel-part section

Prepare vehicle body. Drill an 8 mm diam. hole at X (arrow) and cut out window.

Arrow: Place non-hardening sealing tape at this location.
Air chisel, drill.

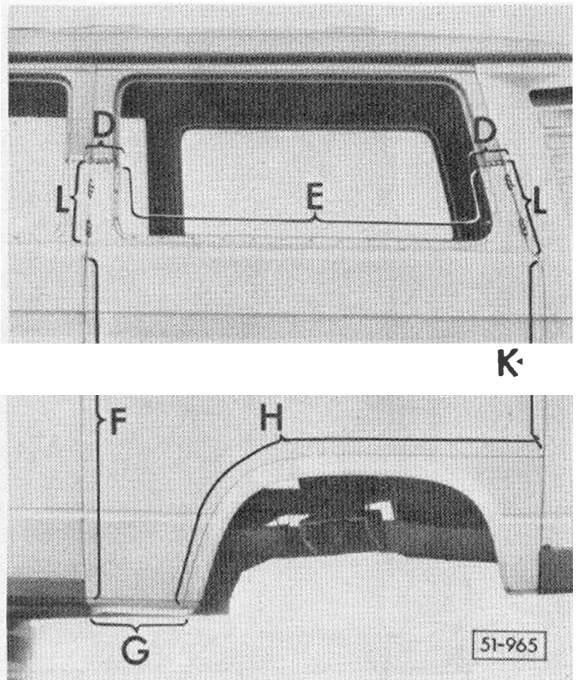


Fig. 9: Outer side panel-part section

Aligning and welding in position.

Areas:

D — MIG (continuous)

E — Spot weld

F — MIG (plug) Carry out welding operations from 'front outer side panel'

G — MIG (staggered)

H — MIG (plug) Weld from the interior of the vehicle.

K — MIG (plug) Weld from the interior of the vehicle.

L — MIG (tack)

Note:

Coat all areas which will no longer be accessible after welding, both on new part and vehicle body, with cold zinc paint.

*** Attention**

If the damage is located higher, the method of joining at area L is MIG plug weld. In this case the area L on the new part must be prepared for plug welding by making the necessary holes-described in Fig. 5-and a window must be cut in the inner panel as illustrated in Fig. 8.

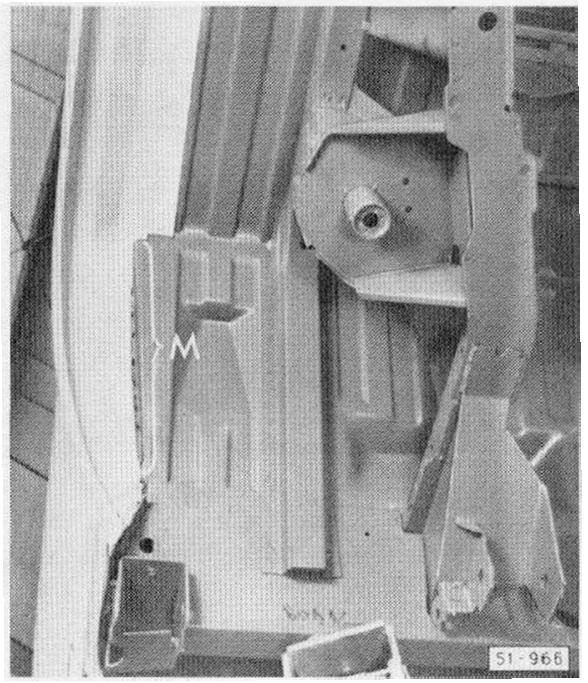


Fig. 10: Welding in inner wheel housing

Area:

M — MIG (staggered)

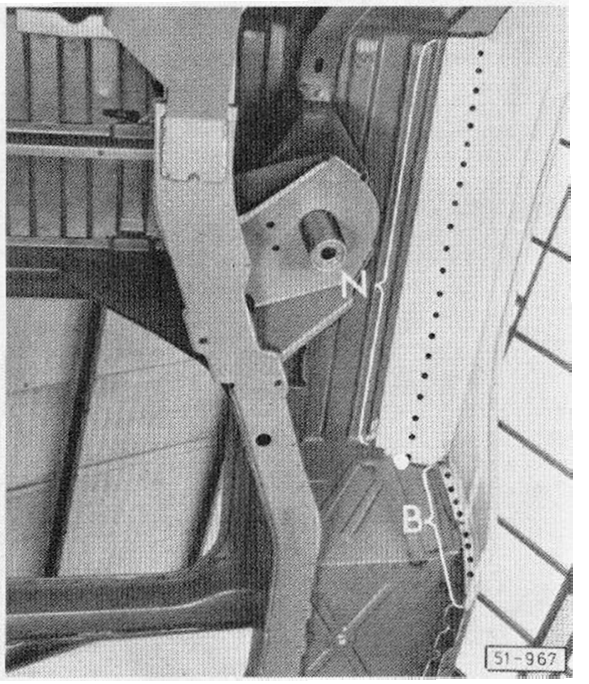


Fig. 11: Welding in inner wheel housing

Areas:

B — MIG (plug)

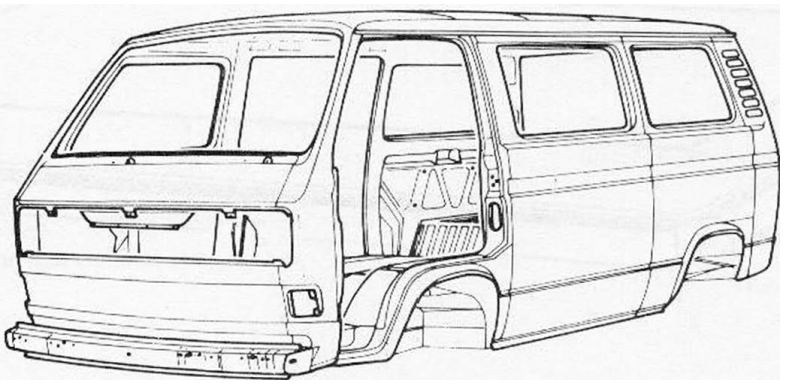
N — MIG (plug)

Note

The welding in area N should be spot welded if the inner wheel housing is welded in before the outer side panel.

Finishing-off operations:

Grind visible weld seams smooth, fill with 2-component polyester material and sand down. Clean all other welded seams with wire brush. Prime all repaired areas. Apply standard seals.



Replacing Roof

Cutting

Removing scrap metal

Preparing new parts

Note: Paint underside of new part before installing

Aligning

Welding

Remove the following components to gain necessary access:

Disconnect battery

Front windshield

Moldings (if applicable)

Headliner and associated trim

Side panel windows

Dome lights

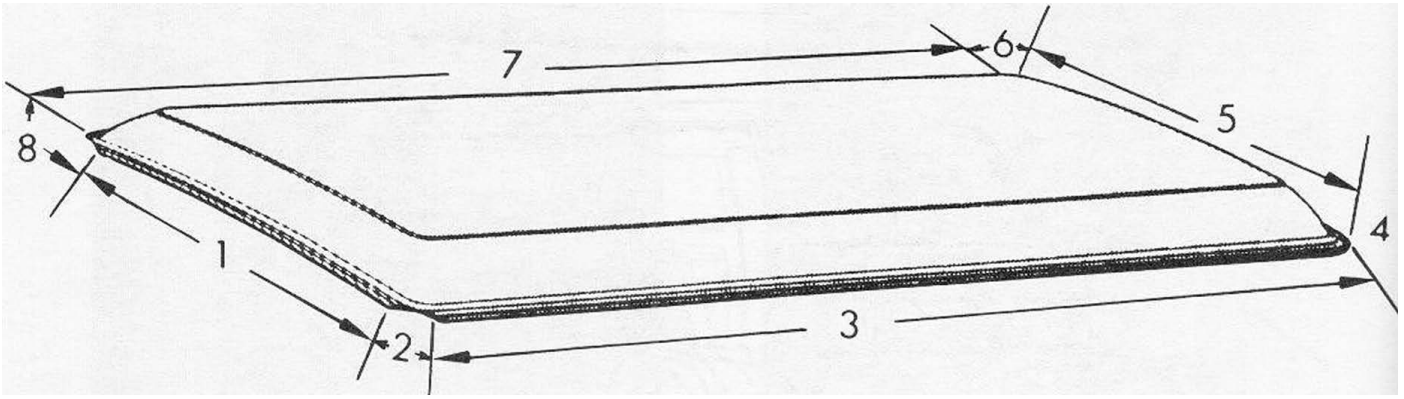
Rear lid

Air conditioning units (if applicable)

Rear radio speakers (if applicable)

Note: Cover interior trim to protect from grinding or welding sparks.

51 Roof



	Operation	Areas	Tools
1.	**Cutting**		
	Chisel	1 — 8	Air chisel
	Grind	1 — 8	Grinder

Note:
Warm the roof in the location of the roof supports with a heat gun to soften the adhesive sealant before removing.

2.	**Removing Scrap Metal**		
	Grind	1 — 8	Grinder
	Remove Excess	1 — 8	Pliers

Note:
The new roof can only be spot welded at original spot welding location which were used in production.
Use masking tape or a grease pencil to mark original spot welds.

Straighten and grind all connecting surfaces clean. Coat roof supports with adhesive sealant.

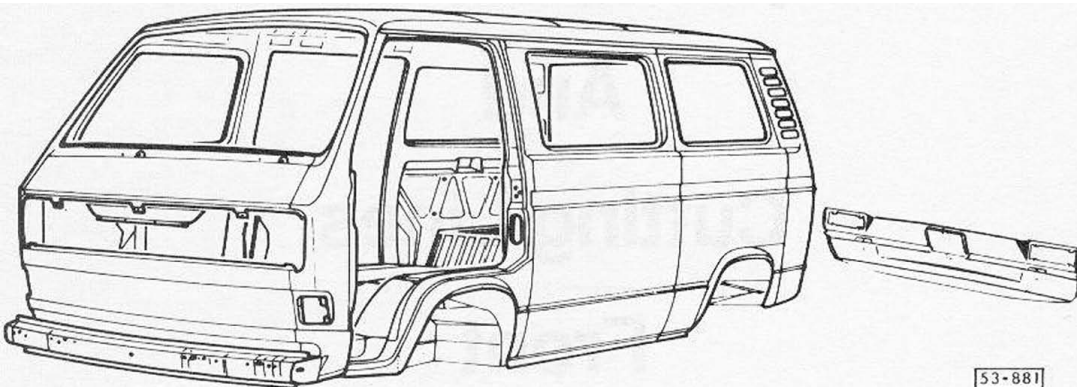
51.12 Vanagon

	Operation	Areas	Tools
3.	**Preparing New Parts**		
	Grind connecting surfaces clean	1 — 8	Grinder
	Anti-corrosion Protection	1 — 8	Cold zinc paint
4.	**Aligning**		
	Align	1 — 8	Clamps
5.	**Welding**		
	Spot weld	1, 3, 5, 7	Spot welder
	Braze	2, 4, 6, 8	Oxy-acetylene torch

Grind the brazed seams
Prime the repaired areas
Seal brazed areas and rain channel

Repair Procedures
And
Cutting Lines
Front
Group 53

53 Rear Apron



Replacing Rear Apron

Cutting: Fig. 1

Preparing New Part: Fig. 2

Aligning and Welding: Fig. 3

Remove The Following Components To Gain Necessary Access:

Disconect Battery

Rear Bumper Assembly

Tail Light Assemblies

License Plate and Light Assembly

Rear Lid Weatherstrip

Rear Wiring Harness

Reservoirs (If Applicable)

53.2 Vanagon

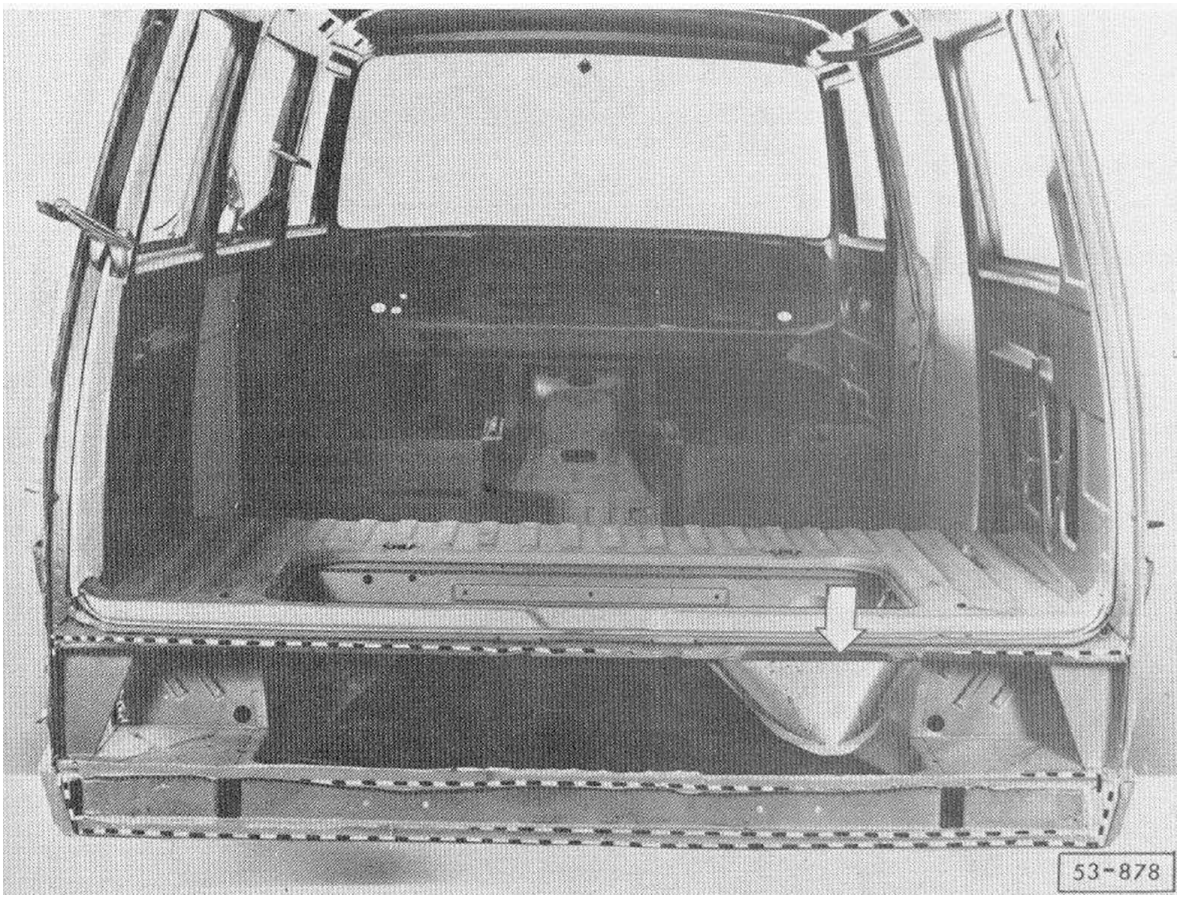


Fig. 1: Cutting out rear apron

Air chisel

Note: Do **not** damage air intake duct — arrow

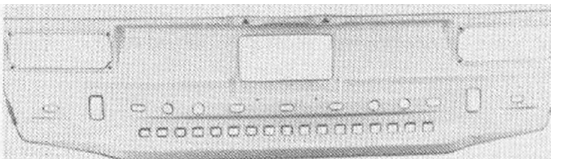


Fig. 2: Preparing rear apron (new part)

Grind connecting surfaces clean.

53 Rear Apron

Fig. 3: Aligning and welding in rear apron

Areas: A — Spot Weld

B — Spot Weld

C — MIG (Staggered)

D — MIG (Staggered) (working from inside vehicle)

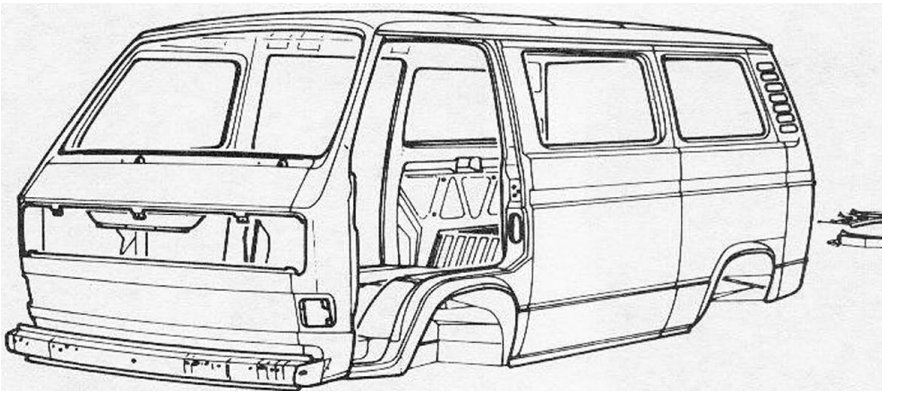
Finishing-off operations:

Clean weld seams with wire brush.

Prime all repaired areas and apply standard seals.

Carry out cavity preservation in repaired area.

53.4 Vanagon



Replacing Rear Floor Plate

Includes: Air Deflector Plate

Cutting: Figs. 1-6

Preparing New Parts: Figs. 7, 10

Note:
Coat all connecting areas which are inaccessible after welding, both on new parts and vehicle body, with cold zinc paint.

Aligning and Welding: Figs. 8, 9, 11

Remove The Following Components To Gain Necessary Access:

Disconnect Battery

Rear Lid Striker Plate

Rear Trim Panels

Rear Engine Cover and Weatherstrip

Sound Deadener

Rear Trim Panels

Rear Carpeting

Caution
Protect interior from welding or grinding sparks.

53 Rear Floor Plate

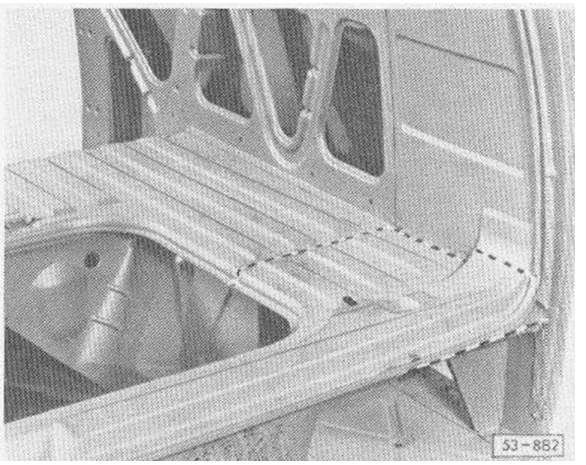


Fig. 1: Cutting out rear floor plate

Air chisel

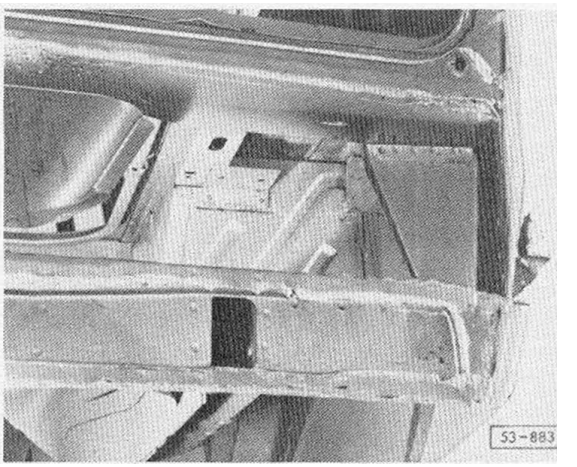


Fig. 2: Cutting out rear floor plate

Air chisel

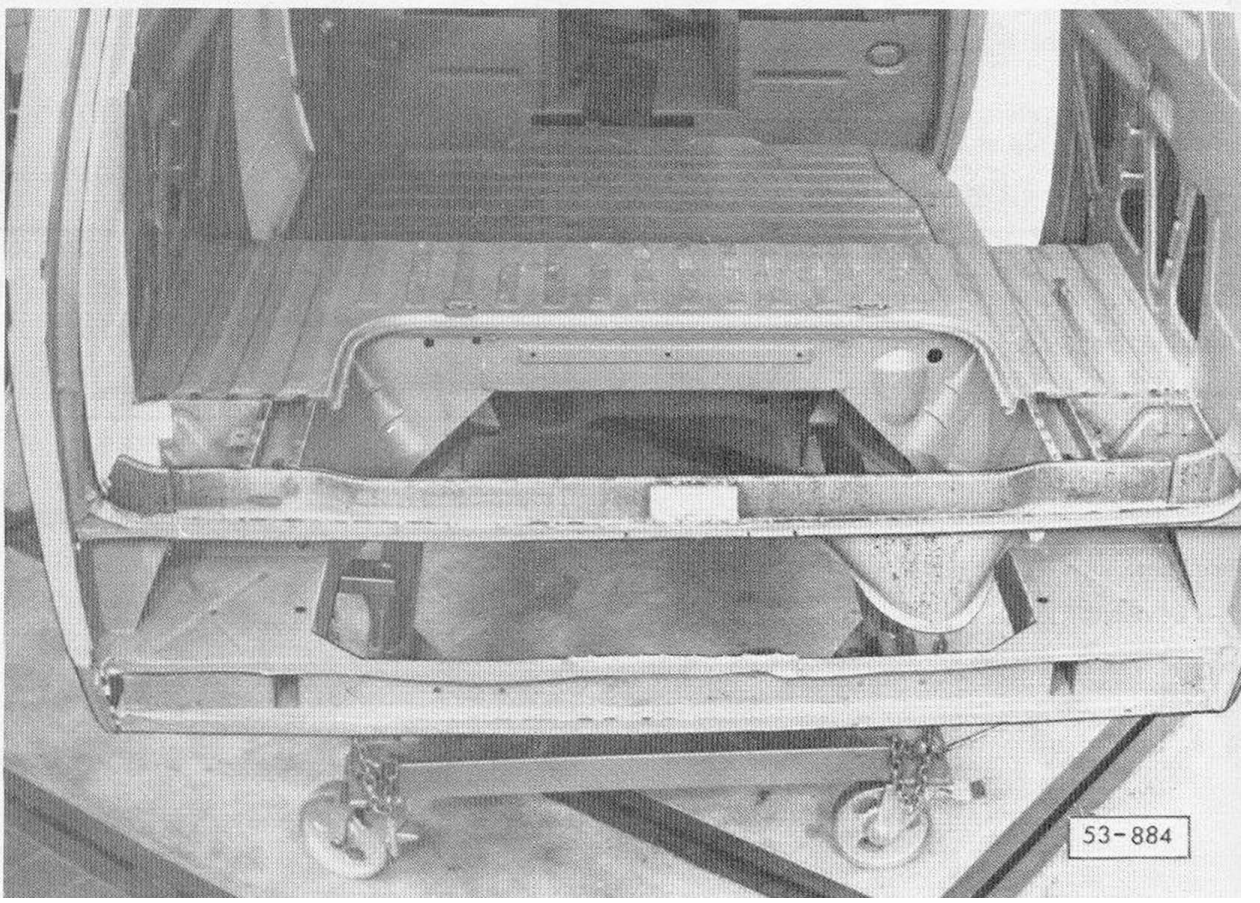


Fig. 3: Rear floor plate

Remove scrap metal, straighten and grind connecting areas clean.

Air chisel, sander, hammer and chisel

53.6 Vanagon

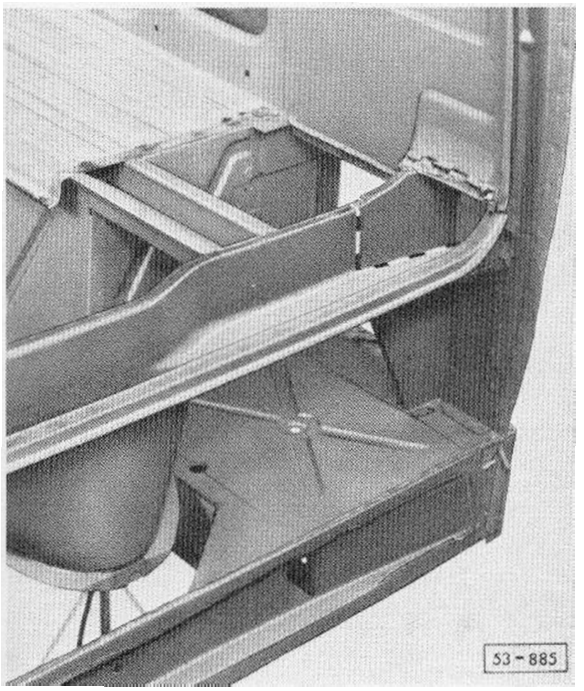


Fig. 4: Cutting out air deflector plate

Air chisel, sander

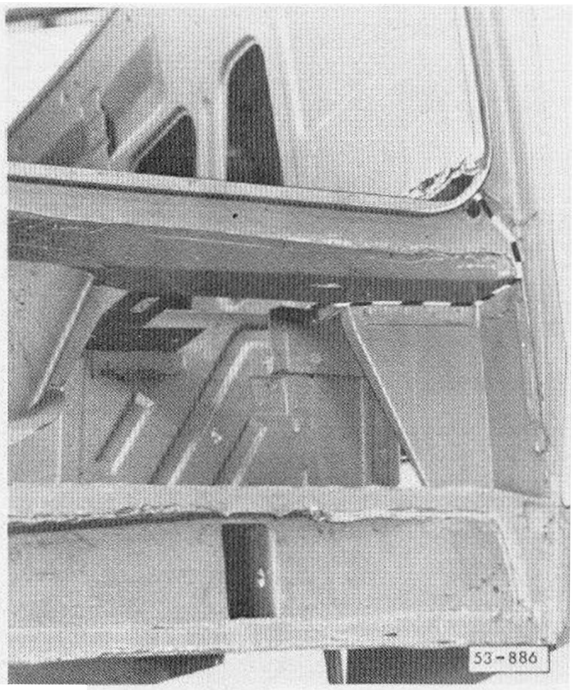


Fig. 5: Cutting out air deflector plate

Air chisel, sander

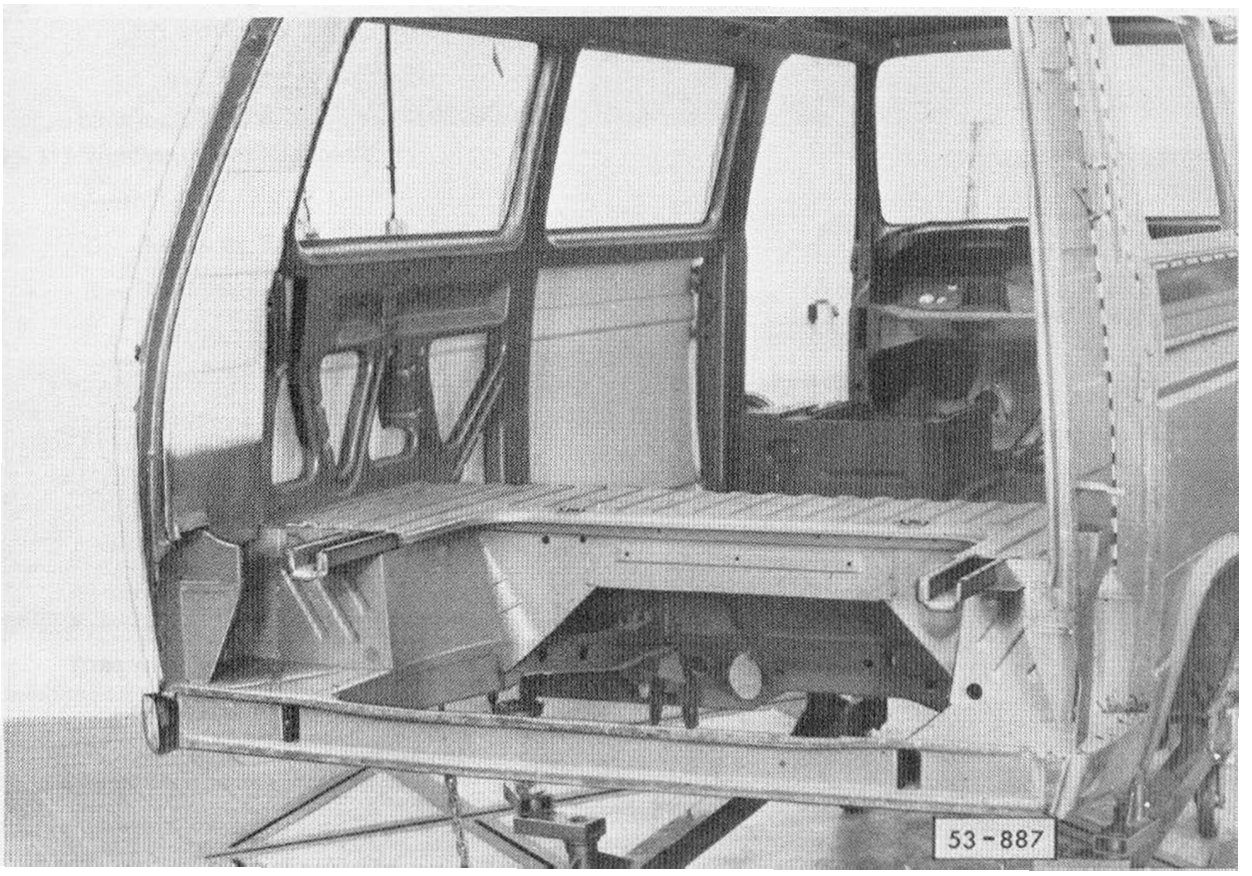


Fig. 6: Air deflector plate

Remove scrap metal, straighten and grind connecting surfaces clean.

Air chisel, sander, hammer, chisel

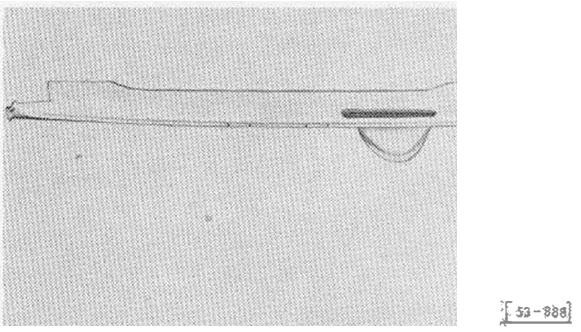


Fig. 7: Preparing air deflector plate (new part)

Grind connecting surfaces clean.

Grinder

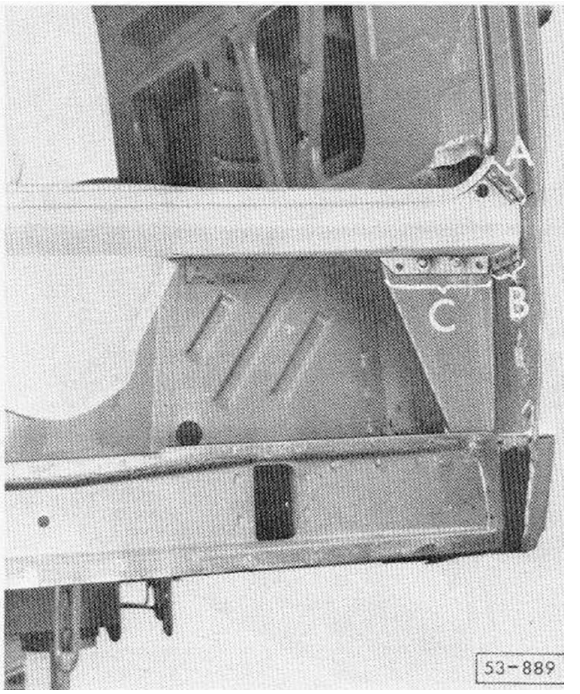


Fig. 8: Welding in air deflector plate

Areas:

A — MIG (Plug) or Spot Weld

B — MIG (Plug) (4 welds)

C — MIG (Plug) (4 welds) or Spot Weld

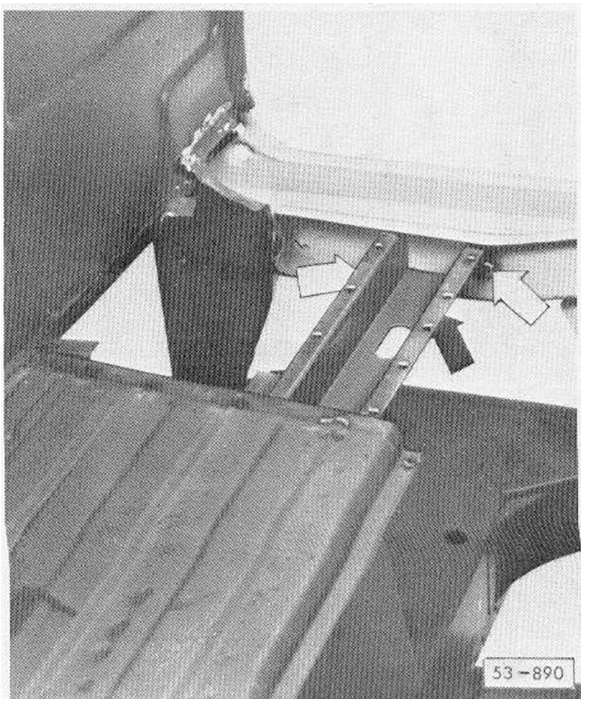


Fig. 9: Welding in air deflector plate

Arrows MIG (Staggered)

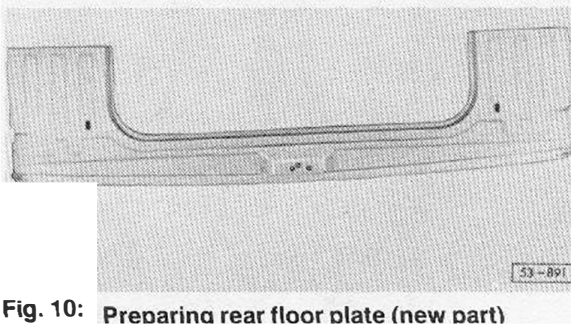


Fig. 10: Preparing rear floor plate (new part)

Grind connecting surfaces clean.

Grinder

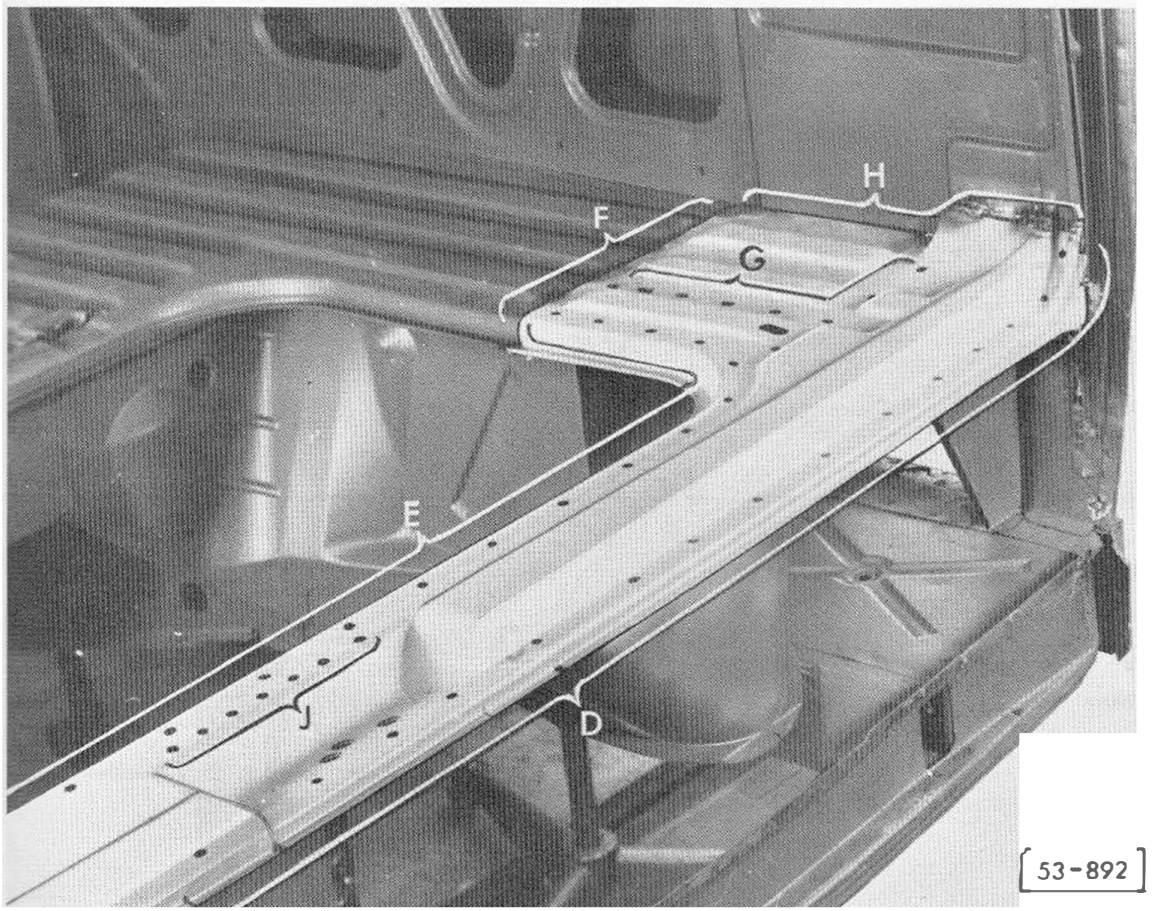


Fig. 11: Welding in rear floor plate

Areas:

D — Spot Weld

E — Spot Weld

F — MIG (Staggered)

G — Spot Weld

H — MIG (Staggered)

J — Spot Weld

Note:

For the areas F, G and H on the left hand side (not illustrated) the same welding methods are employed as illustrated for the right hand side in Fig. 11.

Finishing-off operations:

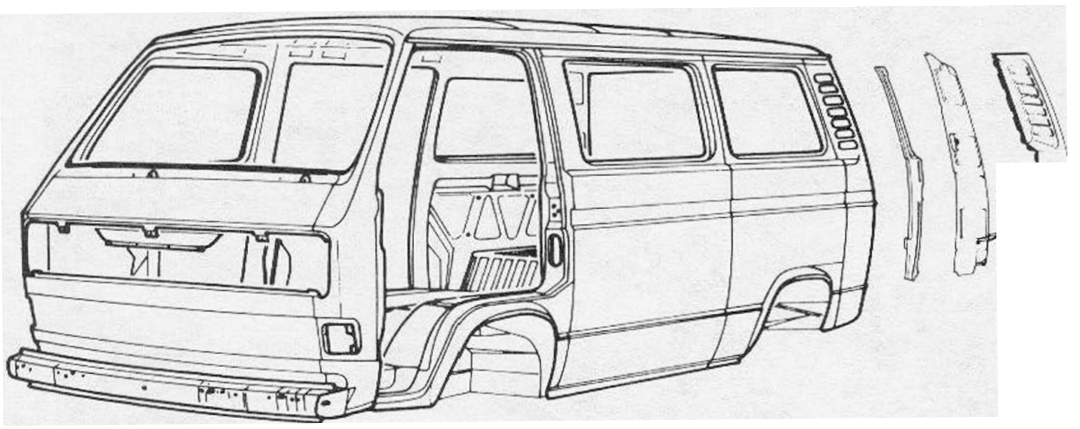
Grind all visible weld seams smooth, fill with 2-component polyester material and sand down.

Clean all other weld seams with wire brush.

Prime all repaired areas and apply standard seals.

Carry out cavity preservation in repaired area.

53 Corner Panel



Replacing Corner Panel

Includes: Inner panel and gusset plate

Cutting: Figs. 1-6

Preparing New Parts: Figs. 7-9

Note:
Coat all connecting areas which are inaccessible after welding — both on new parts and vehicle body — with cold zinc paint. Paint the inside of the panels before installation.

Aligning: Figs. 10, 11

Welding: Figs. 12-15

Remove The Following Components To Gain Necessary Access:

Disconnect Battery

Rear Bumper Assembly

Tail Light Assembly

Trim Panels

Headliner Trim (As Necessary)

Side Marker Assy.

Fresh Air Vent

Caution:
Protect interior from welding or grinding sparks.

Fig. 1: Cutting out corner panel

Air chisel, hammer, chisel

Fig. 2: Corner panel

Cut out corner panel gusset plate.

Air chisel, hammer, pliers

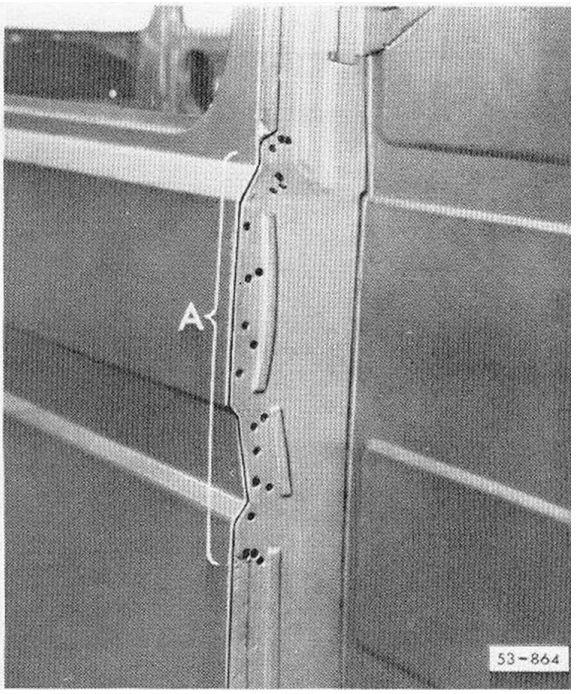
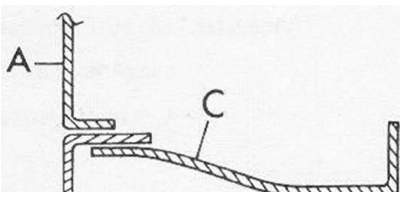


Fig. 3: Corner panel

Cut out gusset plate for corner panel

Area A: drill



B

D

E

[53-876]

Fig. 4: Illustration of outer side panel/corner panel/gusset plate
(left hand side)

Gusset plate and inner panel (for side panel) inner panel from outer side panel

A = Outer side panel

B = Inner panel from outer side panel

C = Gusset plate

D = Inner panel (for corner panel)

E = Corner panel

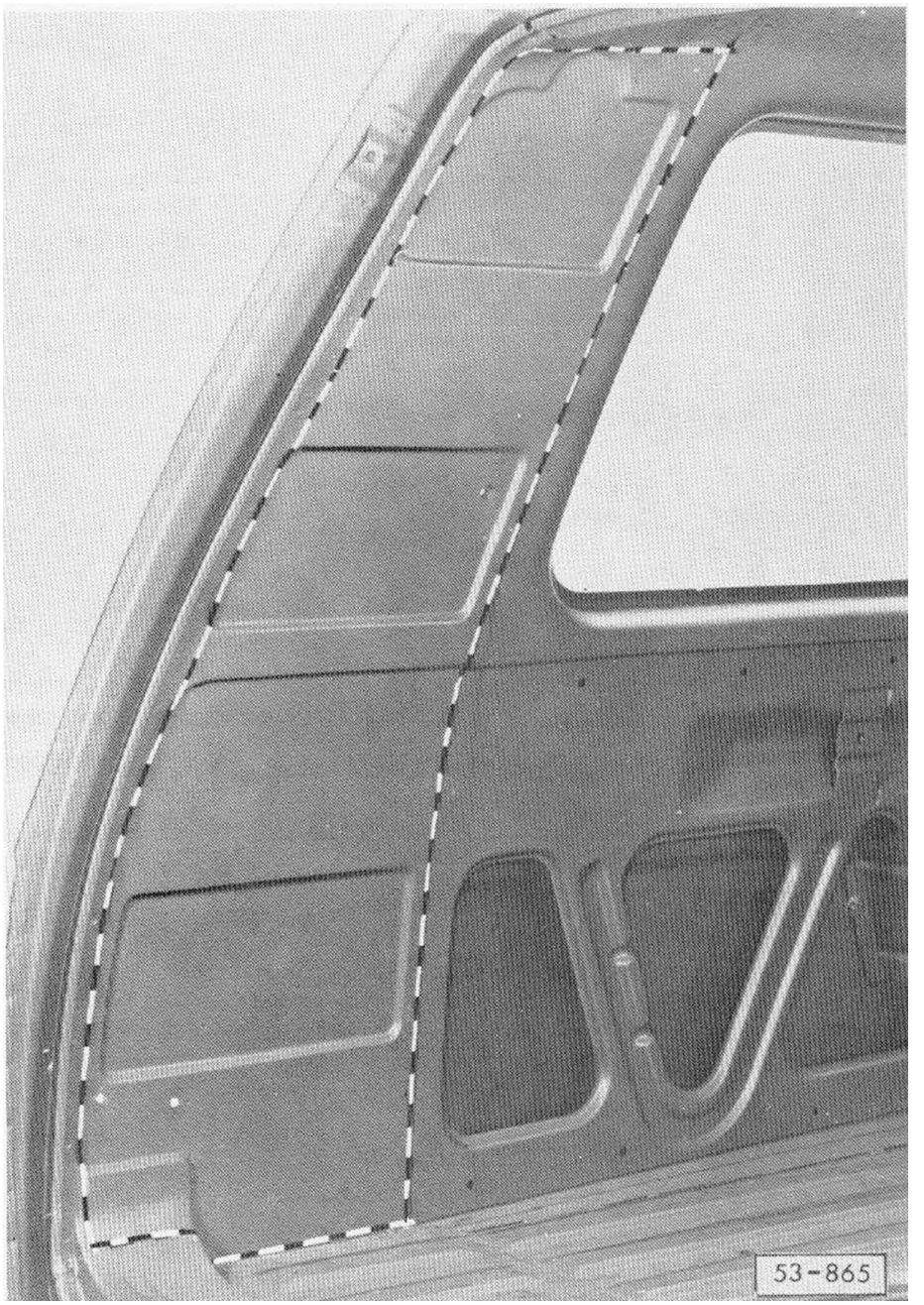


Fig. 5: Corner panel

Cut out inner corner panel

Air chisel

Fig. 6: Corner panel

Remove scrap metal, straighten and grind connecting surfaces.

Hammer, chisel, grinder

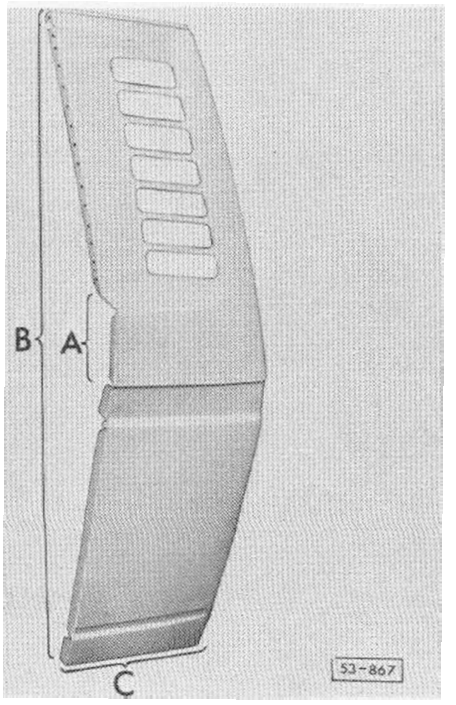


Fig. 7: Preparing corner panel (new part)

Areas: A — drill 7 holes together with gusset plate — see Fig. 8.

B — punch approx. 35 holes

C — punch 11 holes

Hole, punch drill

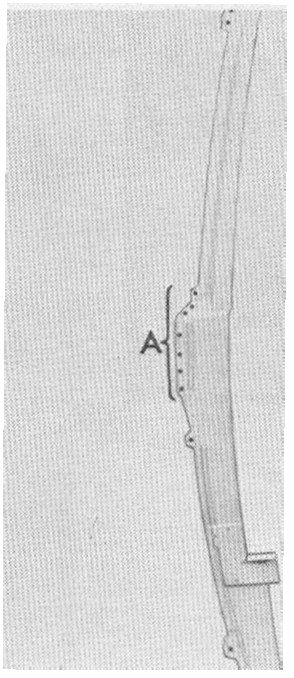


Fig. 8: Corner panel

Preparing gusset plate (new part).

Area A: drill 7 holes together with corner panel — see Fig. 7 —.

Drill.

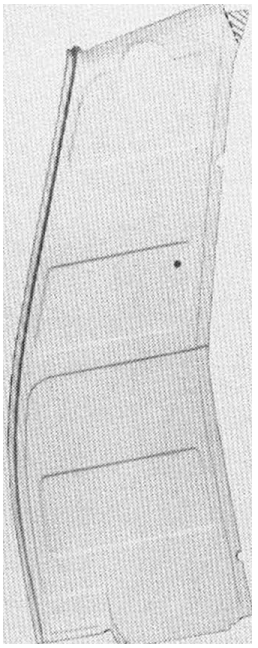


Fig. 9: Corner panel

Preparing inner panel (new part)

Cut off upper triangle.

Hacksaw, grinder

Note:

Figs. 7, 8, 9: Grind connecting surfaces clean.

Note: Coat all connecting areas which are no longer accessible after welding — both on new part and vehicle body — with cold zinc paint.

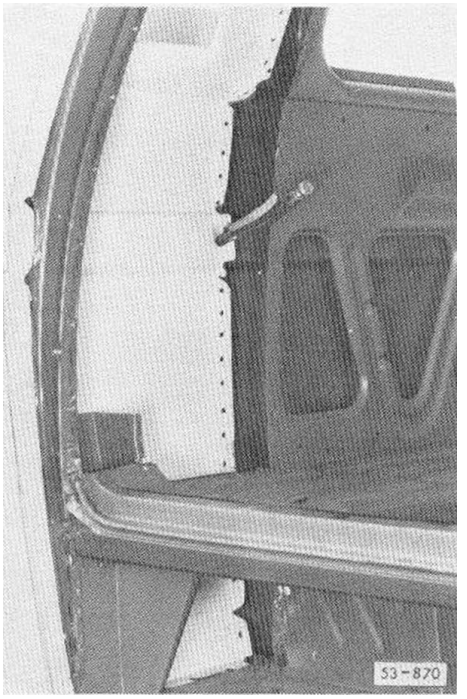


Fig. 10: Aligning corner panel

Note:

For photographic reasons the rear apron has been removed.

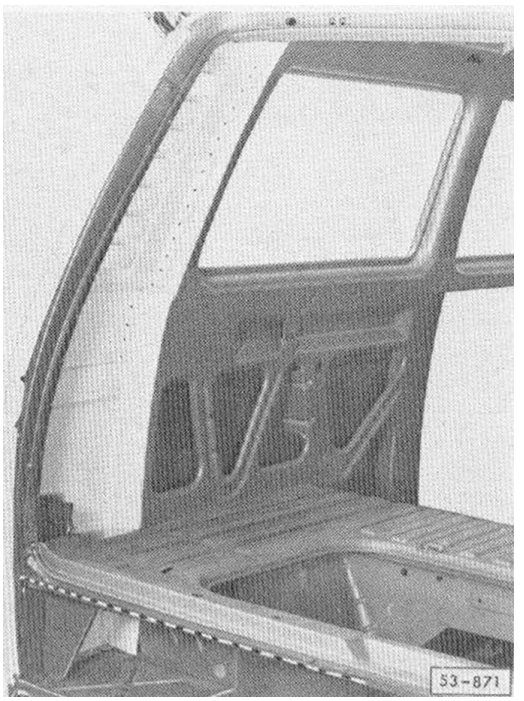


Fig. 11: Corner panel

Aligning gusset plate.

Tack weld.

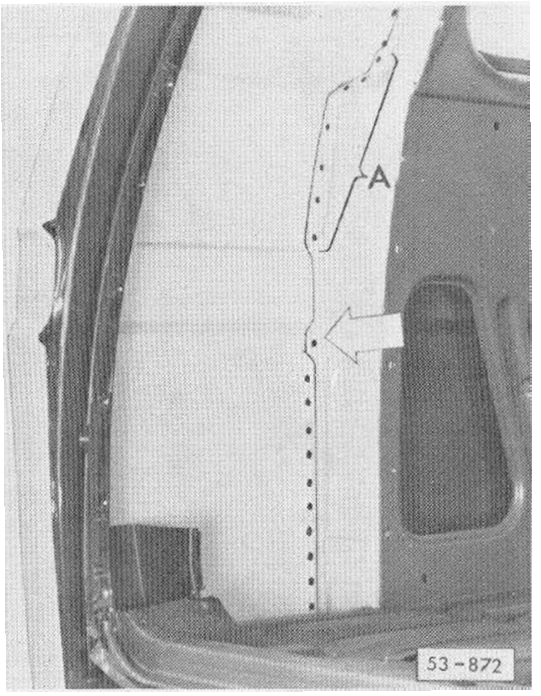


Fig. 12: Welding in corner panel with gusset plate

Areas: A, Arrow — MIG (plug)

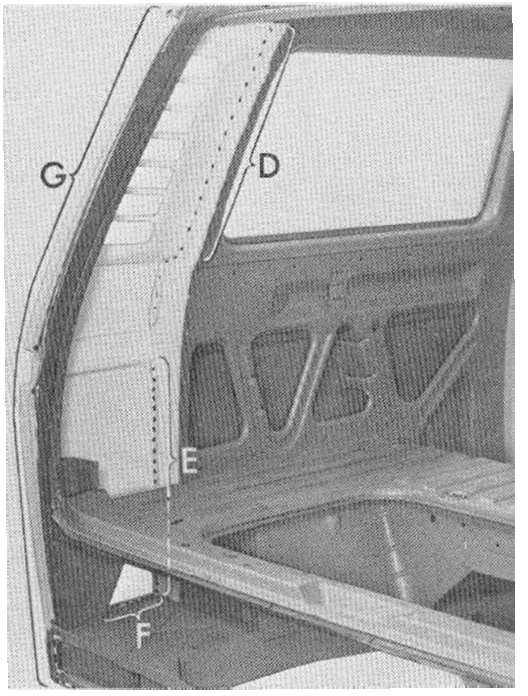


Fig. 13: Welding in corner panel and gusset plate

Areas: D — E — F — } MIG (Plug) G — MIG (staggered)

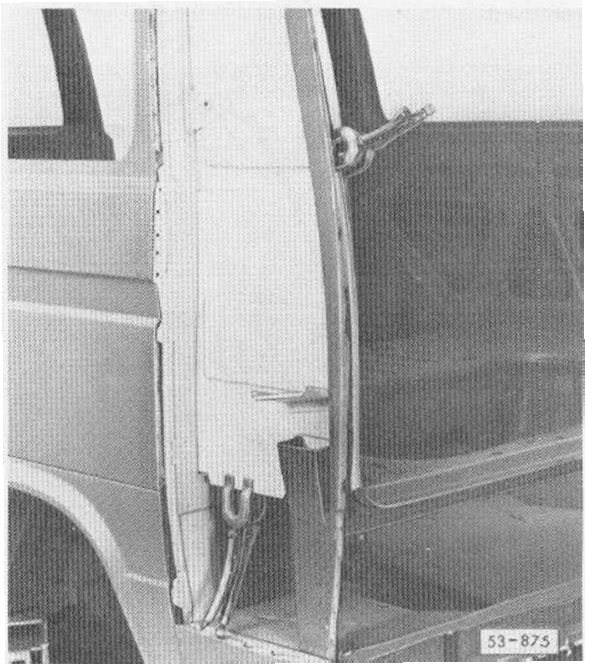


Fig. 14: Corner panel

Aligning and welding in inner panel.

Note: The Fig. clearly illustrates the installation position of the inner panel. If necessary, tack weld seat belt anchorage point on gusset plate.

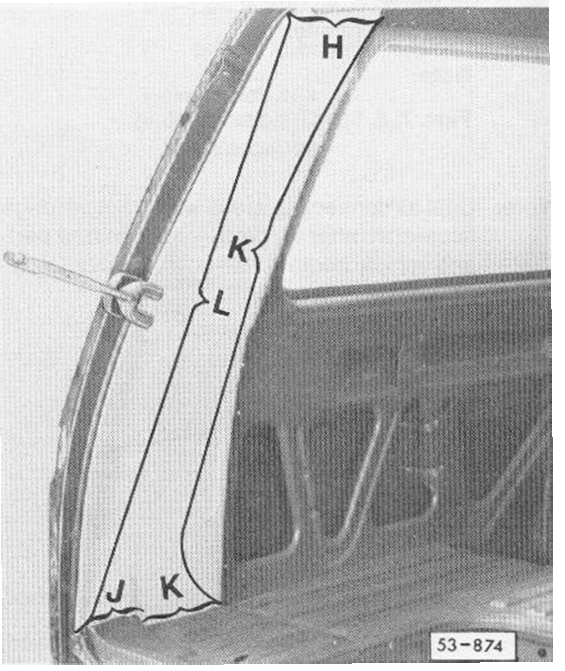


Fig. 15: Corner panel

Aligning and welding in inner panel.

Areas: H — MIG (Continuous)
J — MIG (Continuous)
K — Spot Weld
L — MIG (Staggered)

Grind all visible weld seams smooth, fill with 2-component polyester material and sand down. Clean all other welded seams with wire brush. Prime all repaired areas. Apply standard seals.