

GROUP L STEERING

L 1 Removing and refitting steering.

Note: Equipment required for operation but in some cases not supplied in special tool kit, as various items are universal garage equipment

Fig. 1 Tools: Open ended spanner 10 mm, ring spanner 9/14 mm, socket spanner 9/14 mm, socket spanner 14/17 mm, screwdriver 6/10 mm, hammer, chisel, drift 8 mm, centre punch, plastic hammer, T-handle Allan wrench 6 mm.

Fig. 2 1. Remove split pin from thorough bolt in universal joint and withdraw the bolt. (cotter pin pliers, open ended spanner 10 mm, ring spanner 9 mm)

Fig. 3 2. Drive cross pin out of universal joint. (driver 8 mm, hammer)

Fig. 4 Caution: Pay attention to correct position of the bushings for the thorough bolt. When assembling make certain that the cross pin with the orifice for the thorough bolt is correctly fitted. 3. Protect the door spring shrouding with a carton cover to avoid damaging (see Group A Figure 5) 4. Slacken the four slotted-head screws on steering housing and unscrew the steering screw from steering nut by anticlockwise rotation.

Fig. 5 Caution: Steering screw and steering nut are punch-marked. When assembling make sure that the punch-marked spots are fitted together. In case they are not marked at all, mark them on dismantling. 5. Unhook return spring of accelerator pedal from frame tube. 6. Remove cotter pin at linkage end of accelerator pedal and withdraw the linkage rod. (cotter pin pliers) 7. Depress brake pedal, remove split pin and draw out the clevis attaching bolt. (cotter pin pliers) 8. Unhook clutch pedal return spring from the frame. 9. Depress clutch pedal, remove cotter pin, withdraw the clevis bolt. (cotter pin pliers) 10. Detach steering housing from bottom plate (socket spanner 14 mm with universal joint, on vehicles of recent construction key wrench 6) 11. Press the steering housing slightly rearward and remove it upward. (see also Group A Figure 9)

Fig. 6 12. Mark the position of steering shaft and steering intermediate arm on outer side of the shaft by means of a centre punch.

Fig. 7 13. Slacken steering arm clamping screw, withdraw the steering arm. (ring spanner 14 mm) 14. Remove rubber plug on steering box. 15. Punch-mark steering shaft and steering arm on inner side of the shaft.

Caution: When installing new parts carry out a basic adjustment of steering, as these parts are not marked (see L 10)

Fig. 8 16. Slacken clamping screw of steering arm on inner side of steering shaft. (socket spanner 14 mm)

Caution: The clamp screw must be fully removed. 17. Drive out steering shaft from inner side outwards, with the aid of a brass driver.

Fig. 9 18. Replace the ball bearing in the inner steering arm.
a) Straighten bent ear of lock washer. (hammer, chisel)
b) Discard ball bearing and fit a new one with the aid of a press.

Caution: After having pressed in place a new ball bearing clamp the spacer shims again by applying punch blows on the four points indicated on the arm.

Fig. 10 19. Replace ball bearing for the steering screw. a) Straighten bent ear of tab washer on steering screw lock nut. (hammer, chisel) b) Unscrew the nut on top of steering screw (socket spanner 17 mm) c) Drive steering screw out of universal joint yoke and ball bearing. (punch, hammer)

L 2 Removing and refitting steering wheel and steering column

Note: Equipment required for operation but in some cases not supplied in special tool kit, as various items are universal garage equipment.

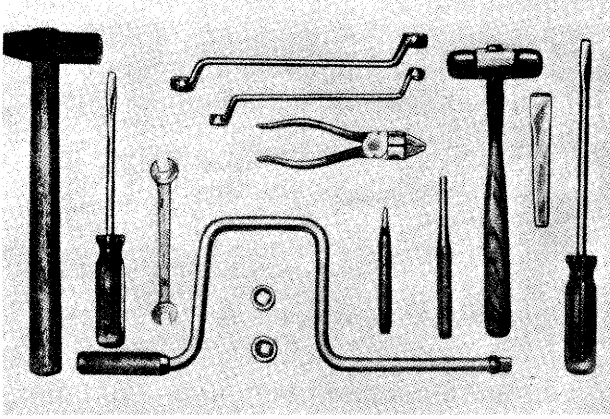
- Fig. 11 Tools: Steering wheel puller No. 532, ring spanner 32-27 mm, Electric screwdriver 2 mm.
- Fig. 12 1. Remove snap ring for horn blowing slide contact.
Caution: Hold the snap ring with the finger as otherwise it jumps away.
- Fig. 13 2. Grasp horn blowing ring and remove.
Caution: Do not use any tool in order to avoid damaging the horn blowing ring plate or the steering wheel hub. The horn plate can be easily raised with the finger nails.
- Fig. 14 3. Disconnect horn wire from horn blowing ring. (electric screwdriver)
4. Unscrew the steering wheel nut. (ring spanner 27 mm)
Caution: When assembling tighten steering wheel nut only so far as to obtain a play-free movement of the steering assembly.
- Fig. 15 5. Attach puller Tool No. 532 and remove steering wheel. (steering wheel puller, ring spanner 32 mm) 6. Remove steering column downwards.
Caution: The steering column is mounted on rubber guides that may be withdrawn upwards and downwards by means of two wire hooks. When assembling or fitting new rubber guides insert them with high-pressure grease.

L 10 Basic adjustment of steering

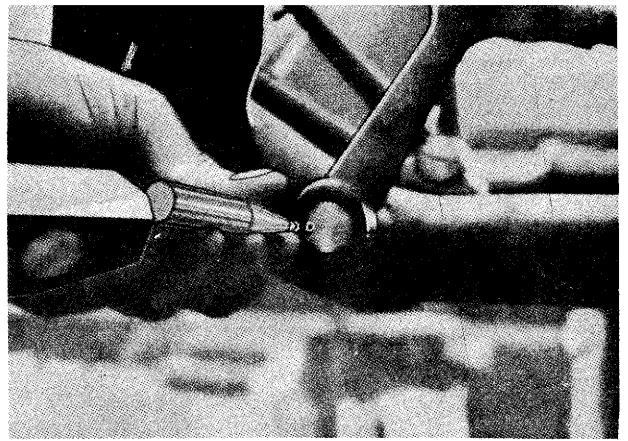
"L 1 Removing and refitting steering" belongs to this chapter.

- Fig. 16 Tools: Open ended spanner 22 mm, socket spanner 14 mm, ring spanner 17 mm, cotter pin pliers.
- Fig. 17 When using new parts adjust steering as follows:
1. Assemble steering shaft and its inner arm. 2. Move inner steering arm rearwards until it abuts on the steering gear housing. 3. Place outer steering arm in position so that it points horizontally - and parallel to the frame - in rearward direction.
- Fig. 18 Caution: Then if the inner steering arm is drawn forwards until it abuts at front, the outer steering arm stands vertically to the chassis.
4. The two steering arms are now situated at the prescribed angle to each other.
- Fig. 19 5. In this position tighten the steering arms by means of the clamping screws. 6. Attach steering drag link on the outer steering arm, tighten the nut and repin. (ring spanner 17 mm, cotter pin pliers) 7. Slacken lock nut on the steering drag link. (open ended spanner 22 mm)
- Fig. 20 8. Place the outer steering arm in central position, that is at an angle of 45 deg. to the chassis. 9. Place the front wheels in straight-ahead position. 10. Rotate clevis unit of steering drag link until the bolt for rear clevis connection goes easily through the steering knuckle arm. The steering drag link has now a length of 204 mm = 8 inches from eye to eye. 11. Enter the bolt, fit the nut and repin. (ring spanner 17 mm, cotter pin pliers) 12. Tighten lock nut on steering drag link. (open ended spanner 22 mm)

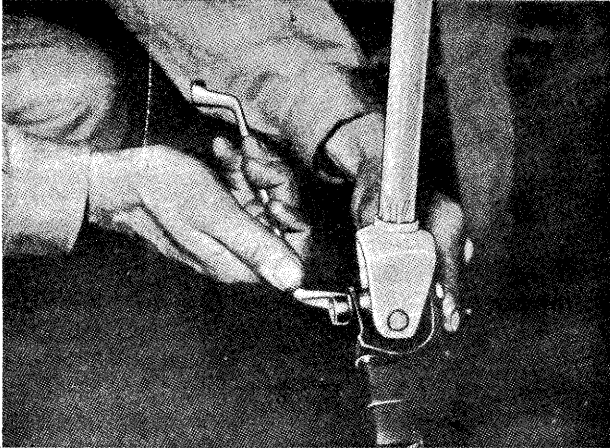
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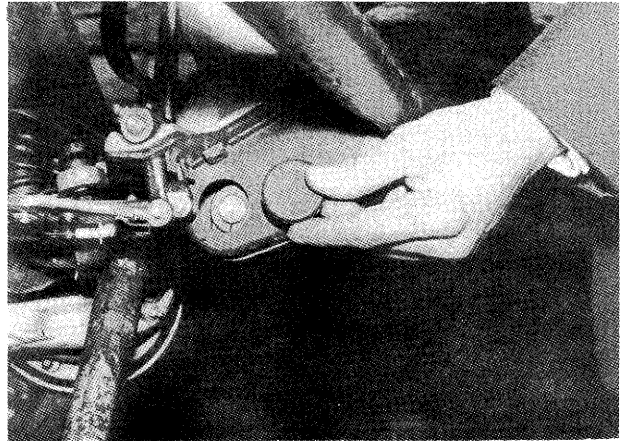
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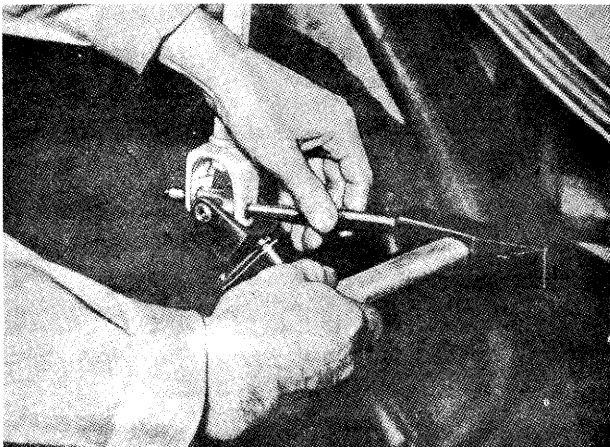
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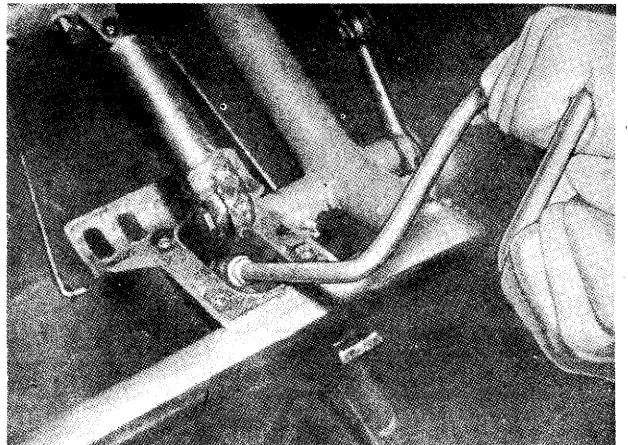
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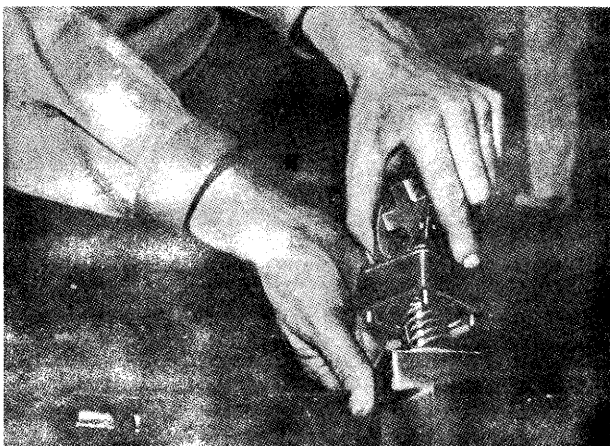
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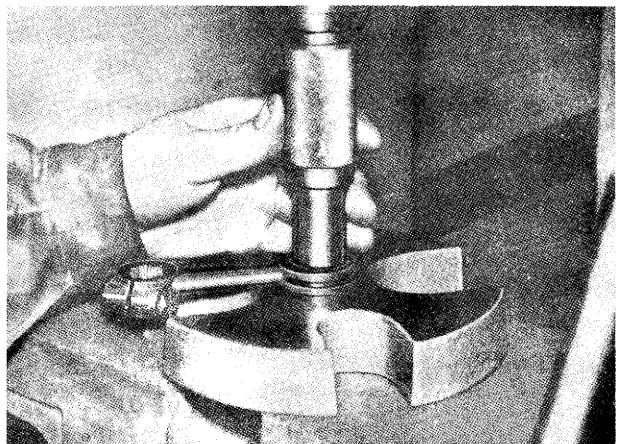
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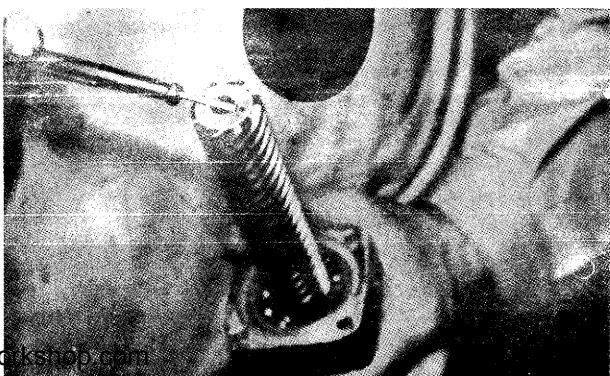
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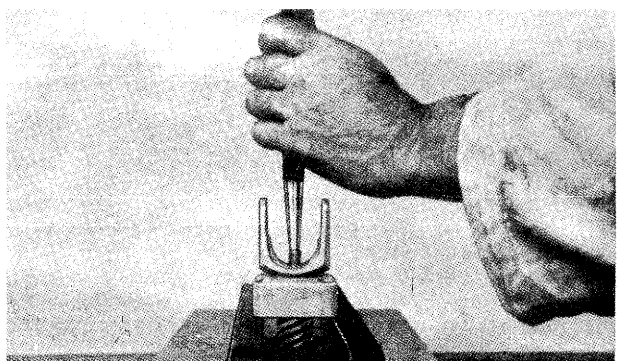
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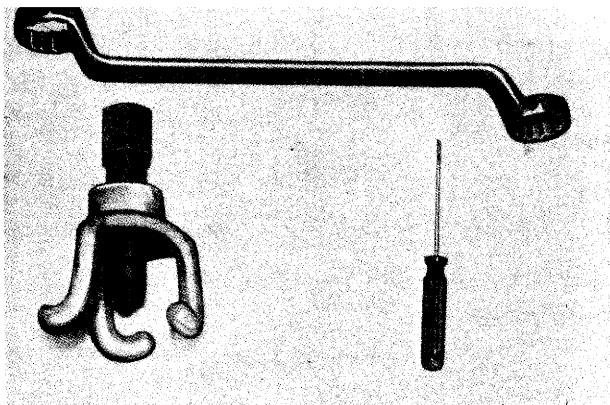
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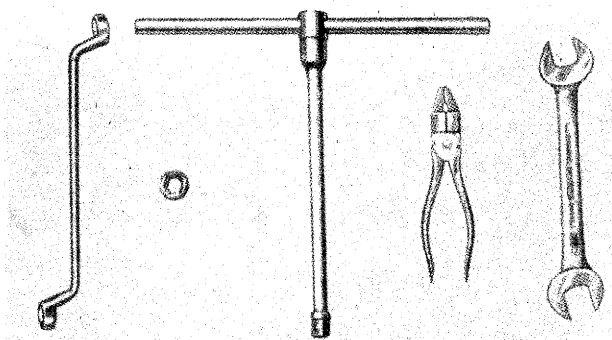
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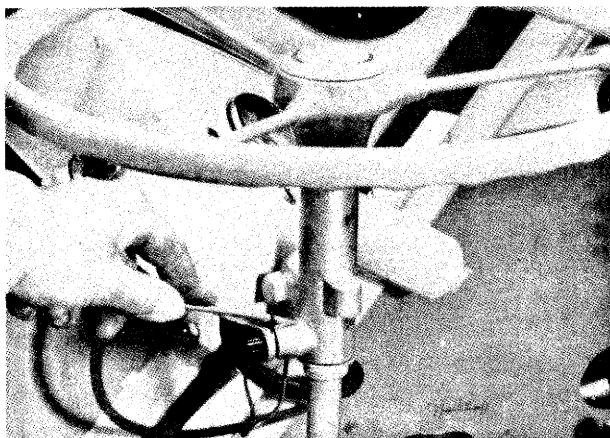
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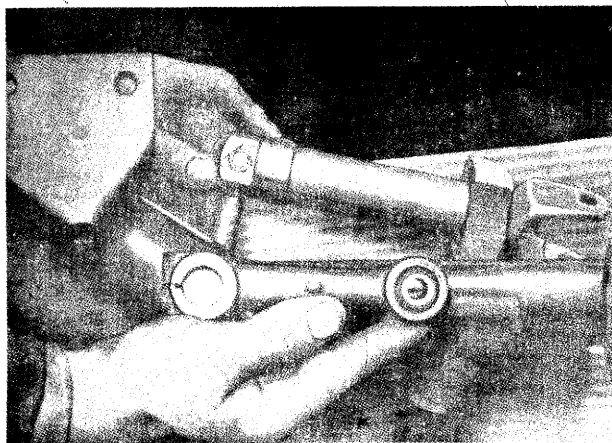
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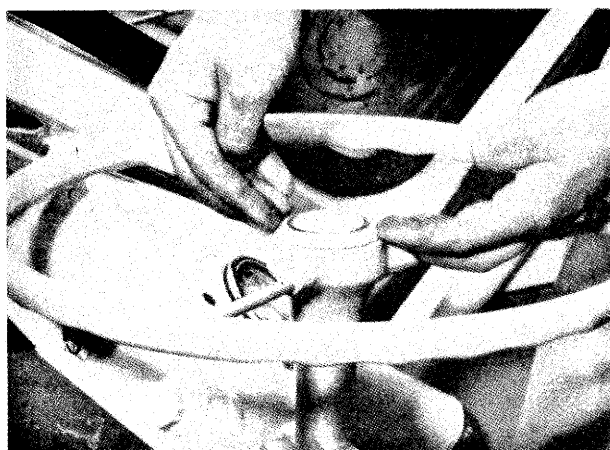
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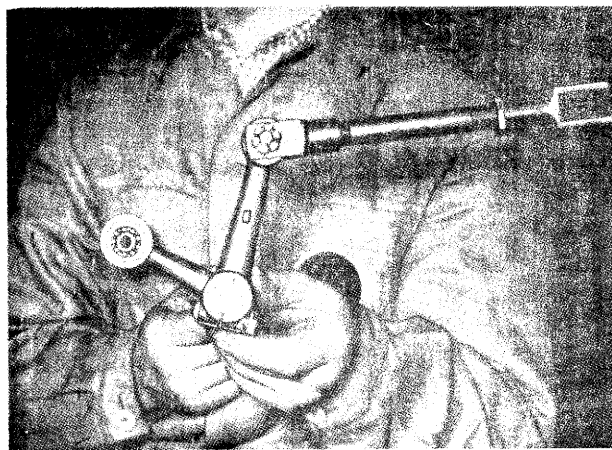
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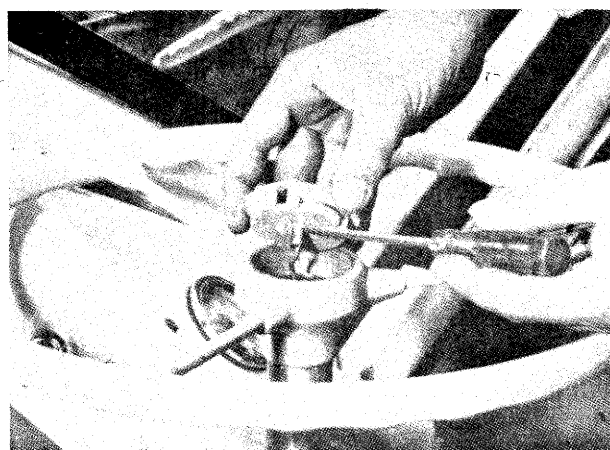
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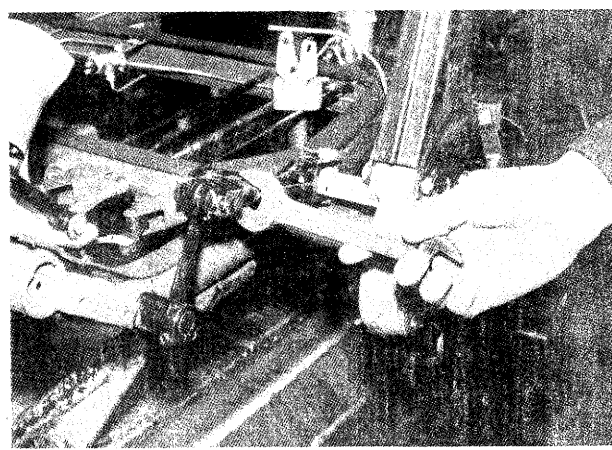
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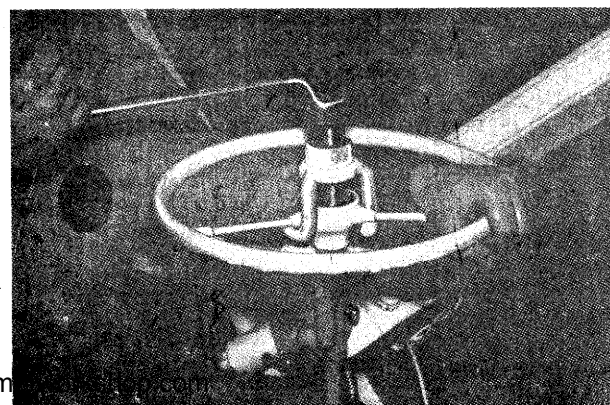
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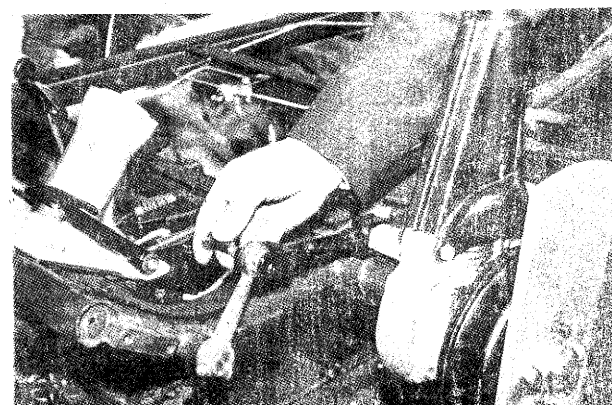
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GROUP B BRAKES, TYRES

B 1 Adjusting brakes

Note: Equipment required for operation but in some cases not supplied in special tool kit, as various items are universal garage equipment.

Fig. 1 **Tools:** Open ended spanner 7/8/12/19 mm, Girling crimson brake fluid, glass jar, rubber bleed tube.

Fig. 2 **Caution:** The rear brake should be adjusted somewhat lighter in order to ensure even braking on all four wheels.

1. Support the vehicle so that all four wheels are clear of the ground.
2. Bleed the three wheel cylinders. (a) Remove rubber cover from bleeder nipple and attach the bleeder hose. (b) Place other end of hose in a glass jar half full of Girling crimson brake fluid, as shown in figure 2. (c) Open bleeder valve 1/1 turn. (open ended spanner 7 mm)

Fig. 3 (d) Operate brake pedal slowly until fluid runs out of bleeder hose in a solid stream without air bubbles. (e) After expelling all traces of air, hold brake pedal in depressed position, tighten nipple and replace rubber dust excluder.

Caution: During the bleeding care should be taken to see that the reservoir is replenished frequently in order to keep the master cylinder filled while bleeding the brake system.

Fig. 4 **Bleeding order:** Rear right, front right, front left.

3. Adjust square-headed screw in a clockwise direction, at the same time rotating the wheel in driving direction until a light drag is noted. Then back off the adjusting screw until the wheel just turns freely.

Fig. 5 4. To adjust the hand brake slacken the lock nut on adjusting screw. (open ended spanner 14 mm) 5. Tighten the adjusting screw in an anti-clockwise direction until the rear brake just begins to rub. Then return until the rear wheels run freely and one turn more.

B 10 Relining brakes

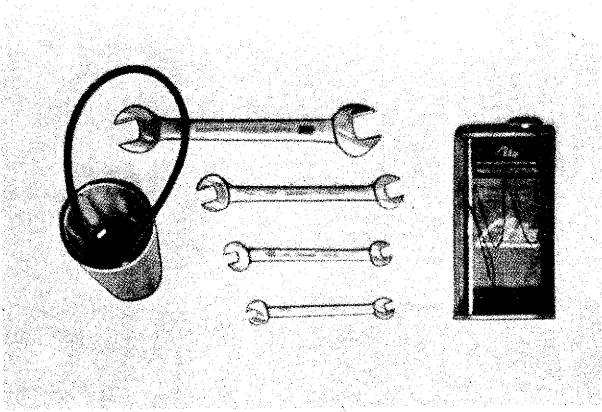
Fig. 6 **Tools:** Screwdriver 6/12 mm, ring spanner 10 mm.

1. Remove wheel cover plate, slacken wheel nuts, support the vehicle.
2. Remove the wheel, remove brake drum.

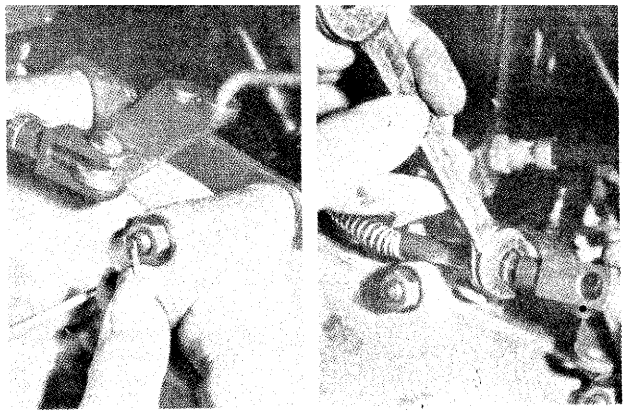
Fig. 7 3. With the aid of screwdrivers press brake shoes away from wheel cylinder and eccentric. (2 screwdrivers).

Fig. 8 and 9 4. With the quadrangular hub flange in a convenient position, press the brake shoes on their inner side outwards, support them upon the hub flange, tilt and remove the brake shoes. 5. Having exchanged the brake shoes carry out the reassembly in exactly the reverse order.

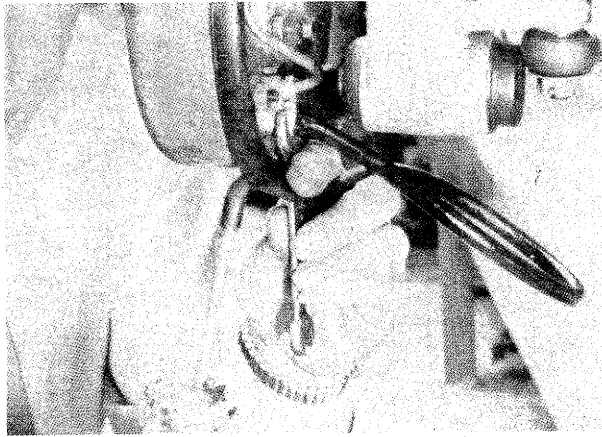
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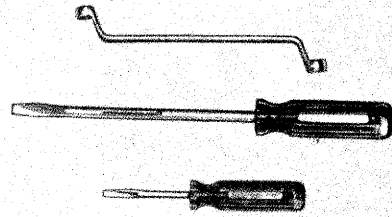
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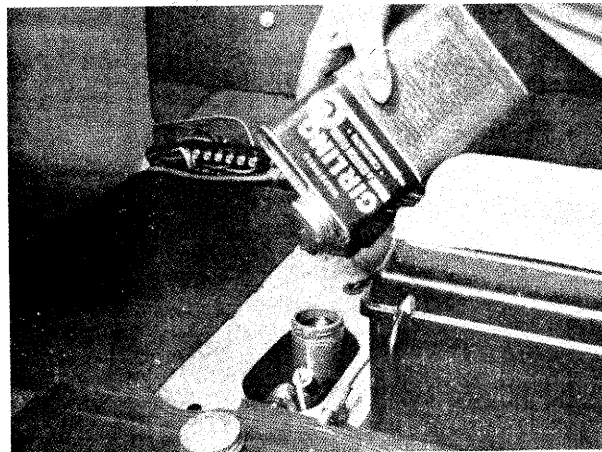
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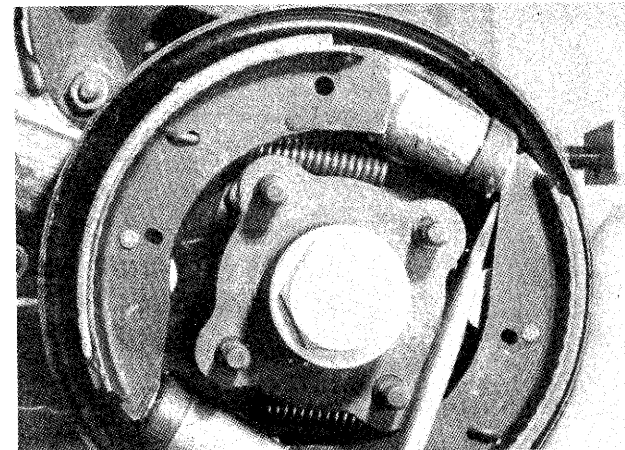
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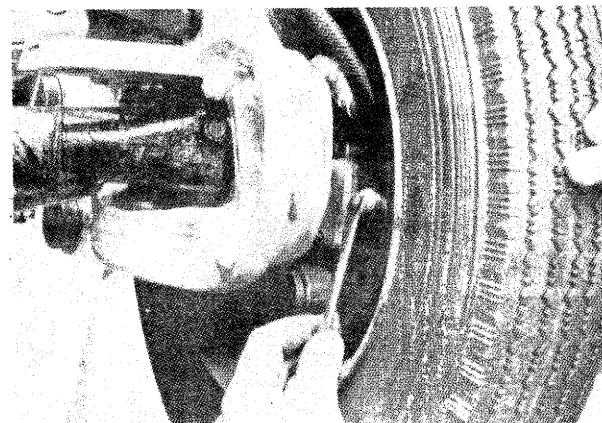
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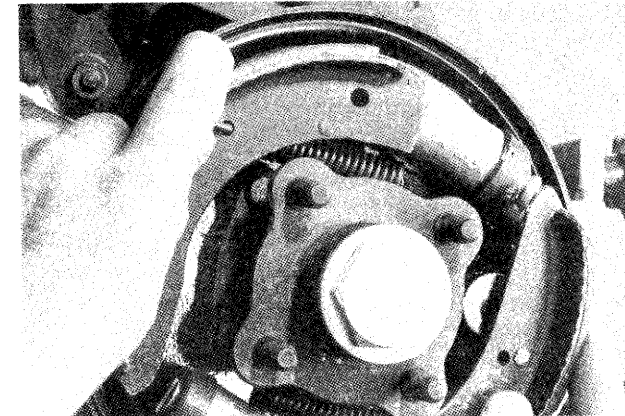
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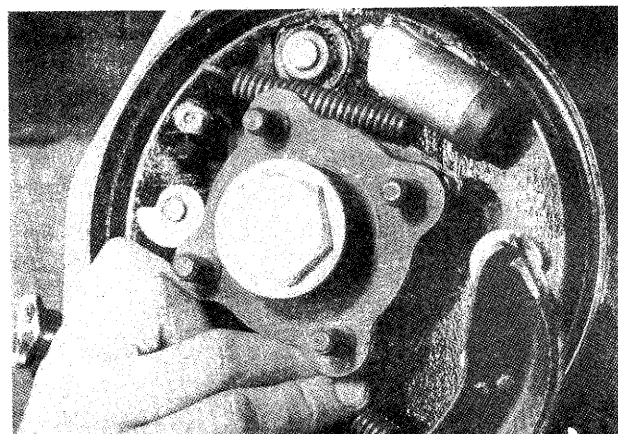
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B 13 Adjusting master cylinder

Note: Equipment required for operation but in some cases not supplied in special tool kit, as various items are universal garage equipment.

Fig. Tools: Cotter pin pliers, open ended
10 spanners 14/17 mm, screwdriver, Ø

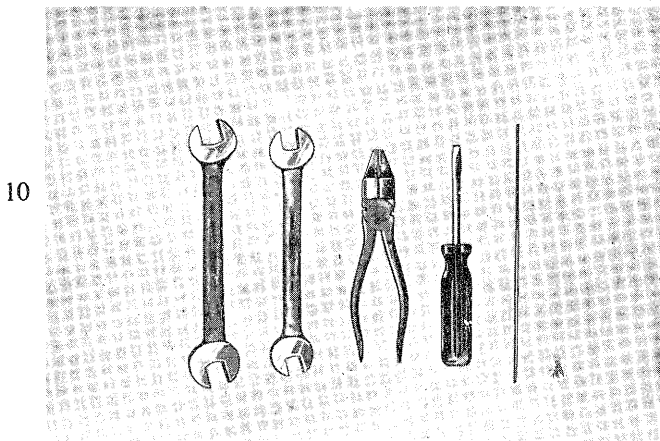
Fig. 1. Remove cotter pin from brake rod
11 securing bolt on pedal end. (cotter
pin pliers) 2. Remove brake rod
bolt.

Fig. 3. Slacken lock nut on adjusting nut.
12 (open ended spanner 14 mm, hold
brake rod with a 17 mm spanner).

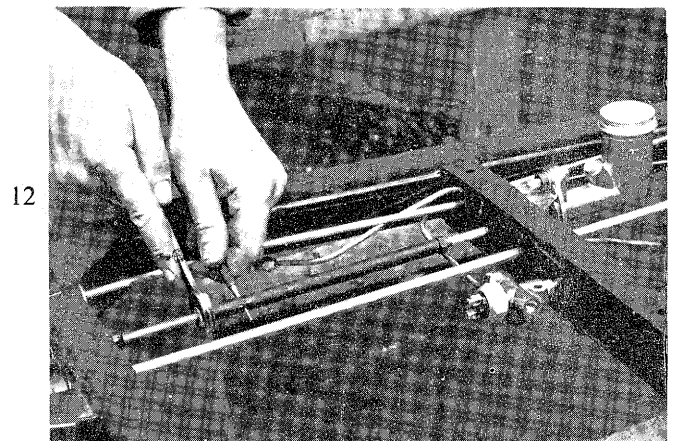
Fig. 4. Push in the brake rod. 5. In the
13 found position rotate brake rod
until the bolt may be easily slid
through clevis and brake pedal.

6. Locate adjusting nut in centre
position between the two brake rod
halves and secure by means of the
two 14 mm lock nuts. (open ended
spanner 14 mm and open ended
spanner 17 mm)

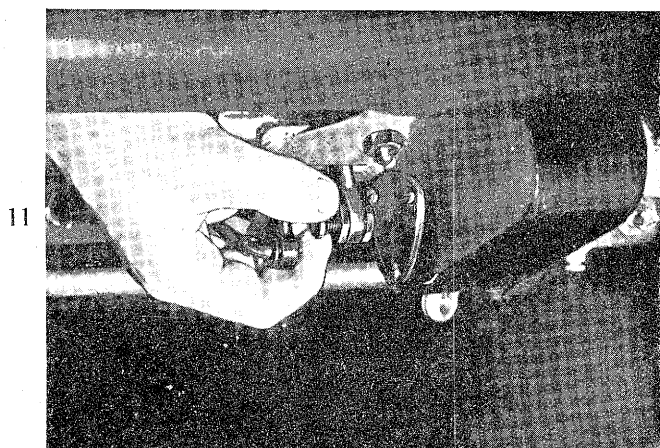
Caution: As of chassis No. 404 360
the adjusting nut features a right-
and-left-handed thread that
obviates the necessity of detach-
ing the brake rod in order to
adjust the brake. Jobs 1 and 2
are superseded by virtue of this
modification



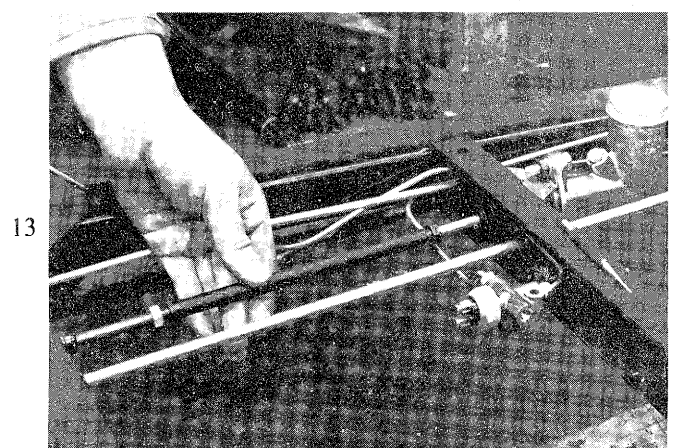
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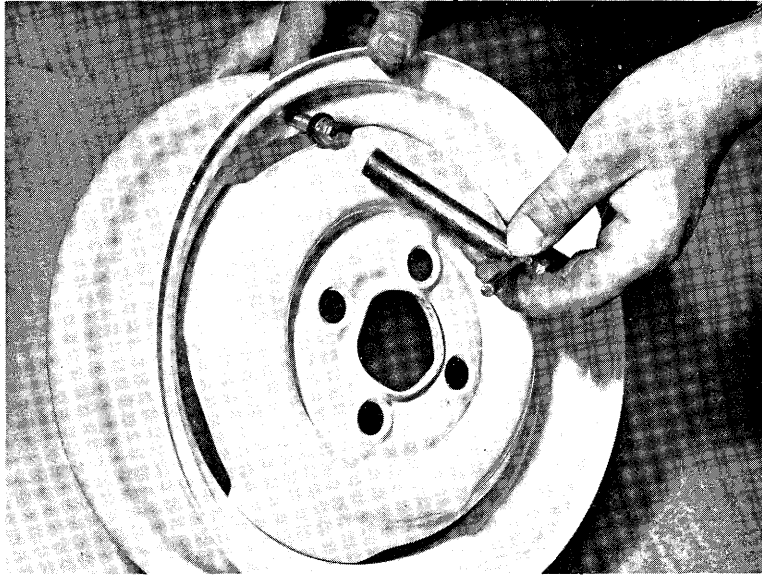


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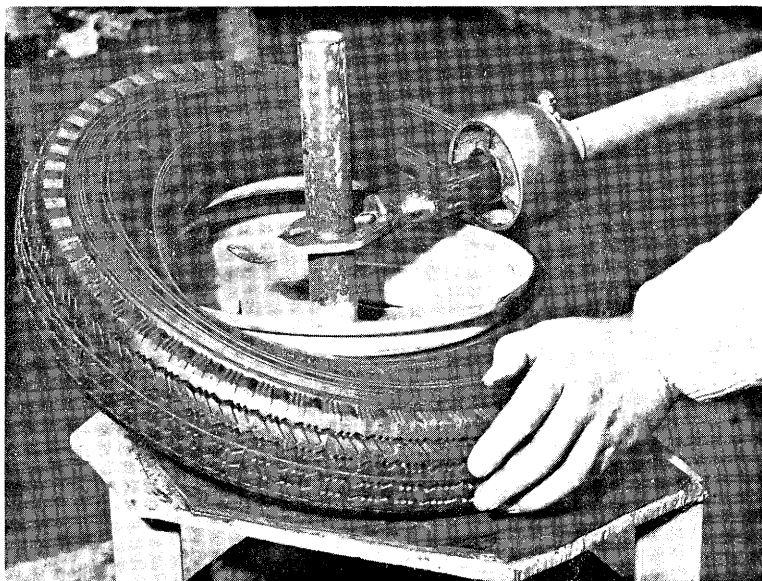


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TYRE FITTING



Fit valve into rim and make sure that it fits properly.
Rub some glycerine or soapy water around the tyre and fit on rim.



Inflate tyre to somewhat like 50 lbs. per sq. ins and check if it is airtight.
Then decrease tyre pressure to 17 to 19 lbs. per sq. ins.

GROUP A BODY

A 1 Removing and refitting body

Note: Equipment required for operation but in some cases not supplied in special tool kit, as various items are universal garage equipment.

Fig. 1 Tools: Socket spanner 9/10/14 mm with universal joint, open ended spanner 7/9/12/13 mm, cotter pin pliers, electric screwdriver 8 mm, T-handle Allan wrench 6 mm.

Caution: On the vehicles of recent construction it is necessary to slacken the two body fixing screws in the corners at left and right as well as the four screws securing the steering gear housing (see job 14), the width of 8 mm of hollow centre of which requires a 6 mm plug wrench.

A) Jobs to be carried out within the body

Fig. 2 1. Remove spare wheel and seat, remove rubber floor mat, and shut the fuel tap. 2. Dismount battery, disconnect negative cable from floor board (socket spanner 10 mm). Detach positive cable from battery (open ended spanner 11 mm)

Caution: The screw securing earth (ground) connection serves also as body fixation. 3. Slacken 7 body fixing screws. (socket spanner 10 mm)

Fig. 3 4. Slacken the two body securing screws at front, right and left. (socket spanner 14 mm). 5. Detach the support of hand brake lever, by removing two bolts. (socket spanner 14 mm). 6. Remove cotter pin from handbrake lever pin, withdraw the lever pin. (cotter pin pliers)

Fig. 4 7. Slacken adjusting nut for hand brake, lift out the cable, remove slotted bolt and push cable through in rearward direction. (open ended spanner 12 mm)

Caution: Make certain not to lose the rubber grommet. 8. Remove rubber sealing on the liquid reservoir of brake master cylinder. (screwdriver) 9. Disconnect two wires from cable connector unit, - blue-red/black. (electric screwdriver).

Fig. 5 10. Protect the doors spring shroud with a carton cover to prevent its damaging.

Fig. 6 11. Slacken four slotted screws on top of steering gear housing. (screwdriver 8 mm).

Fig. 7 12. Turn steering screw out of steering nut by rotating steering wheel in an anticlockwise direction.

Caution: Guide the steering column with the hand, so that the steering screw leaves the housing vertically.

Fig. 8 13. Envelop the steering screw with a clean cloth.

Caution: When assembling make sure that the punch mark on the steering screw registers with the correspondent mark on steering nut, eventually mark steering screws and nut together. 14. Slacken four screws fixing steering gear housing to the floor board. (socket spanner 14 mm, on vehicles of recent construction use plug wrench 6 mm)

Caution: The steering gear housing cannot be lifted unless job 15 and the following ones have been carried out.

B) Jobs to be carried out on the vehicle's underside at front

Fig. 9 15. Unhook accelerator pedal return spring on frame tube. 16. Remove cotter pin on accelerator pedal and push out the linkage. (cotter pin pliers) 17. Depress brake pedal, remove cotter pin from clevis pin and withdraw the latter. (cotter pin pliers) 18. Unhook clutch return spring on frame. 19. Depress clutch pedal, remove cotter pin and the linkage. (cotter pin pliers) 20. Disconnect horn wire from the electric horn. 21. Press steering gear housing slightly rearwards and remove upwards. Remove front bumpers on plus model.

C) Jobs to be carried out on engine side

22. Remove engine covering panel. 23. Draw the two disconnected wires, blue, red/black out of the body. (see job 9)

Fig. 24. Disconnect starter cable from engine. (open ended spanner 7 mm) 25. With-
10 draw petrol (gasoline) rubber hose from carburettor. 26. Bend up the sheet metal clip holding choke and accelerator (throttle) cables. 27. Disengage choke operating cable upon having pushed back the rubber grommet, and draw same out together with the choke piston. (open ended spanner 11 mm)

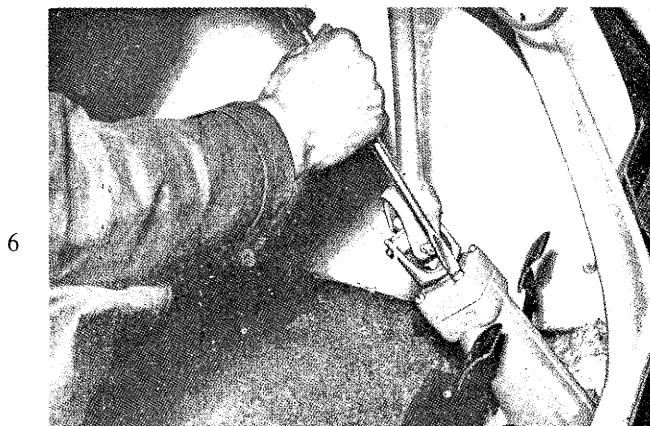
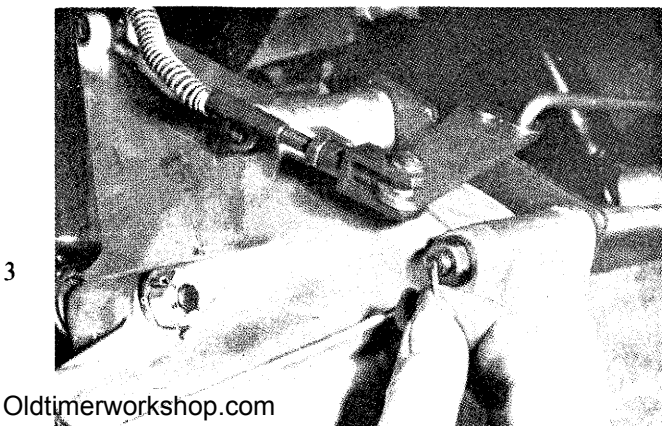
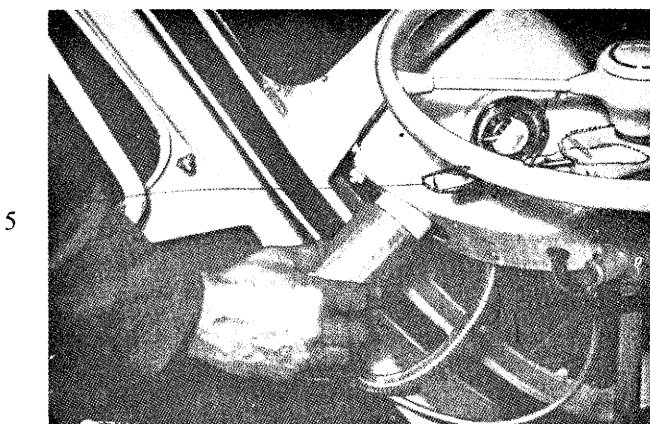
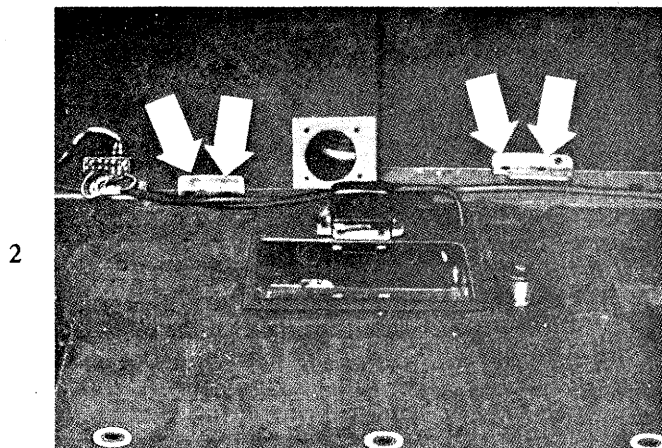
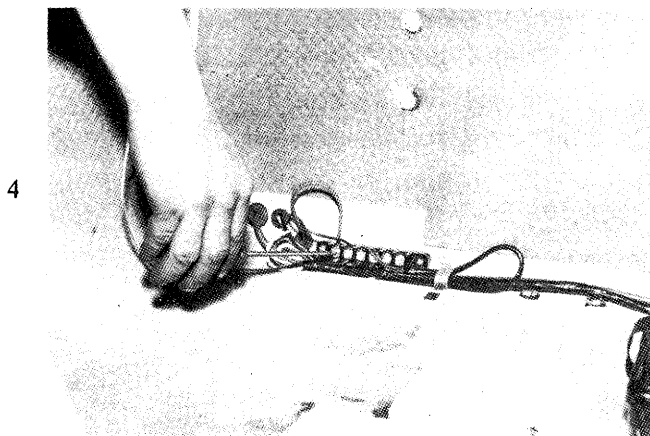
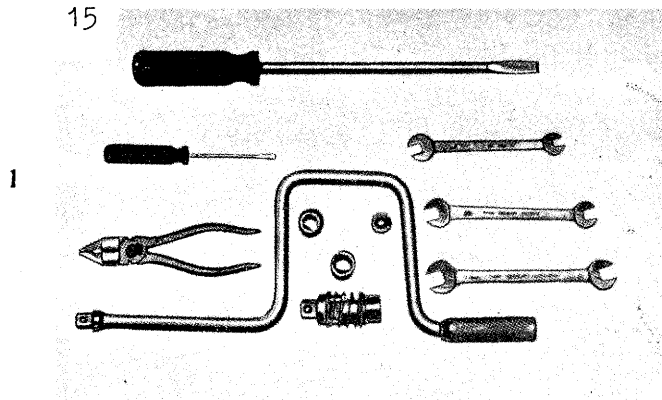
Fig. 28. Slacken the two body fixing bolts upon the engine carrying chassis member.
11 (socket spanner 10 mm and open ended spanner 10 mm.)

D) Jobs to be carried out on the side opposite to engine

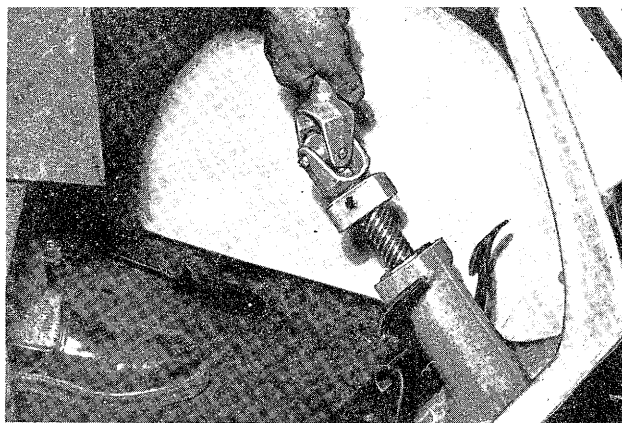
Fig. 29. Remove both transverse gear control rods from the selector mechanism by
12 removing cotter and clevis pins. 30. Remove speedometer (flexible drive) cable from chain case by unscrewing the union nut. 31. Push rubber hose connecting air intake arrangement to air silencer towards the latter. 32. Disconnect the cable leading to the stop light switch. (electric screw-driver)

Fig. 33. Lift the body with three men. Two men grasp the body on the front fenders,
13 one man on rear bumper. The stern of the body must be raised sufficiently high in order to get it clear over the engine top.

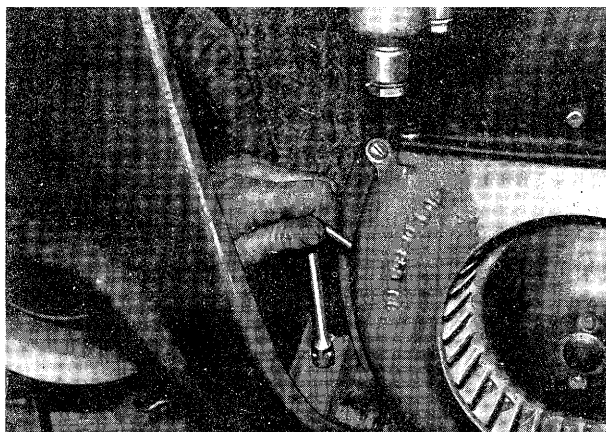
Fig. 34. Place the body upon a special support stand mounted on rolls as shown in
14 figure 14. To carry out the reassembly proceed in exactly the reverse
and 15 order.



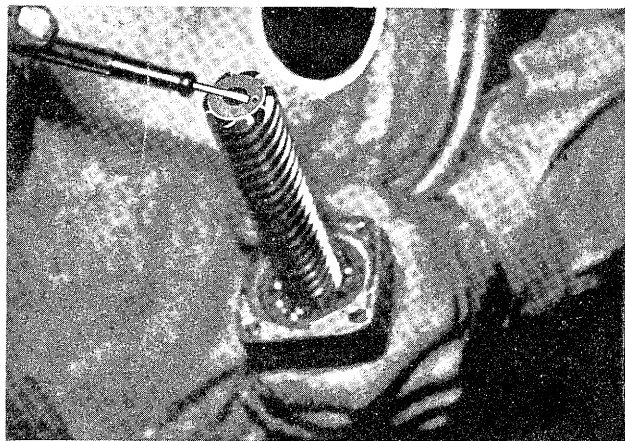
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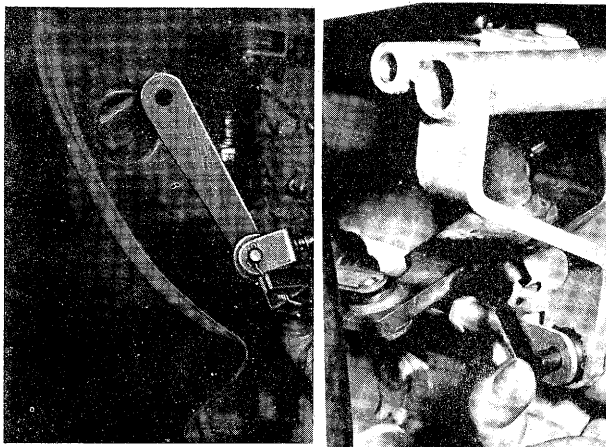
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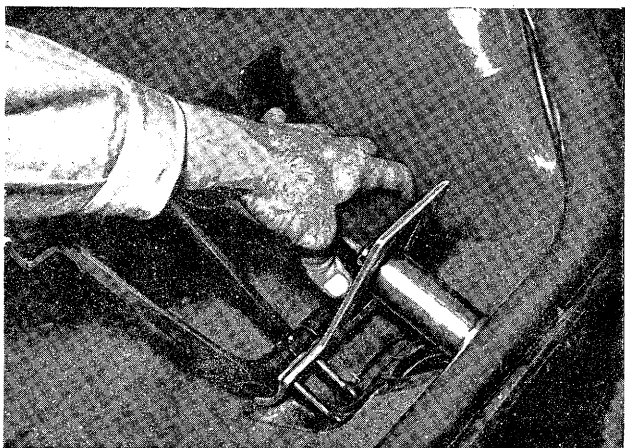
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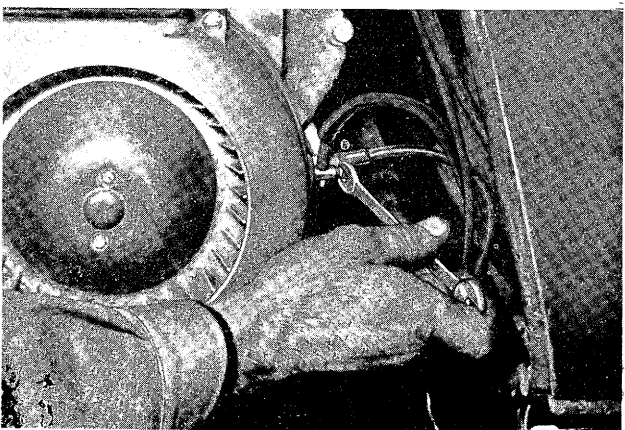
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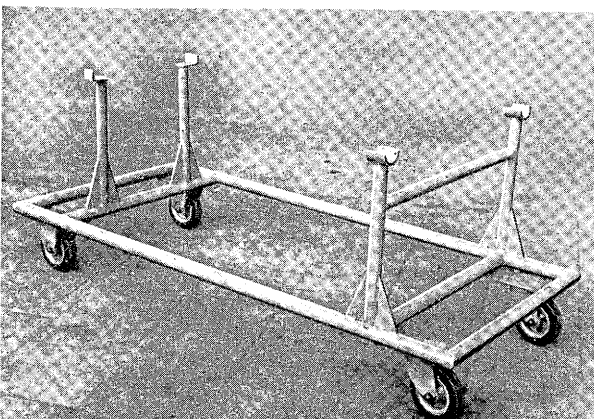
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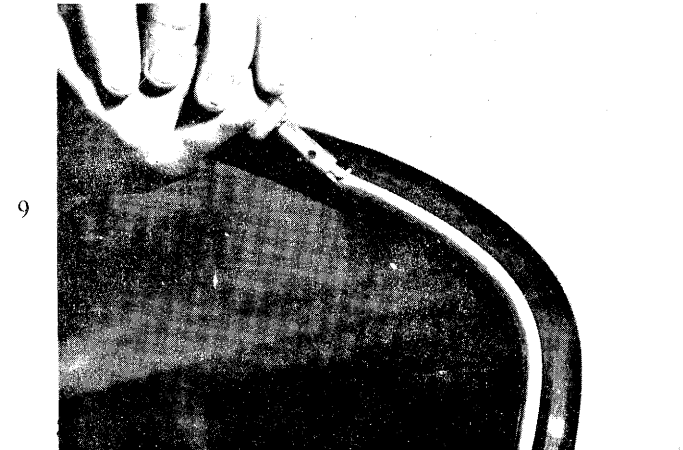
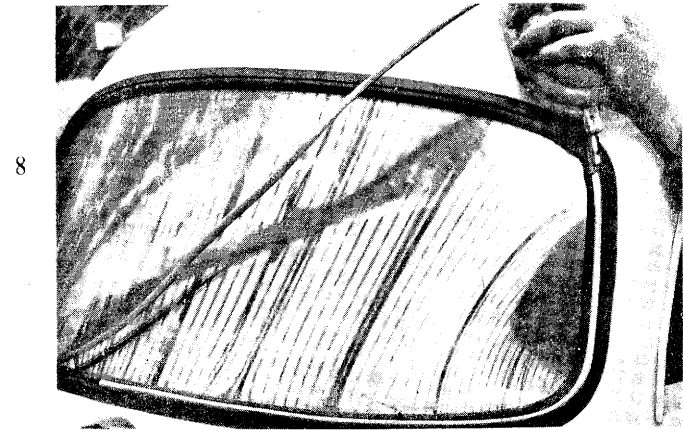
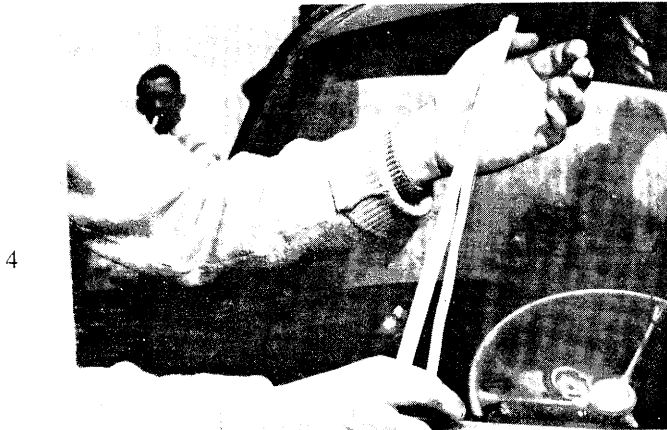
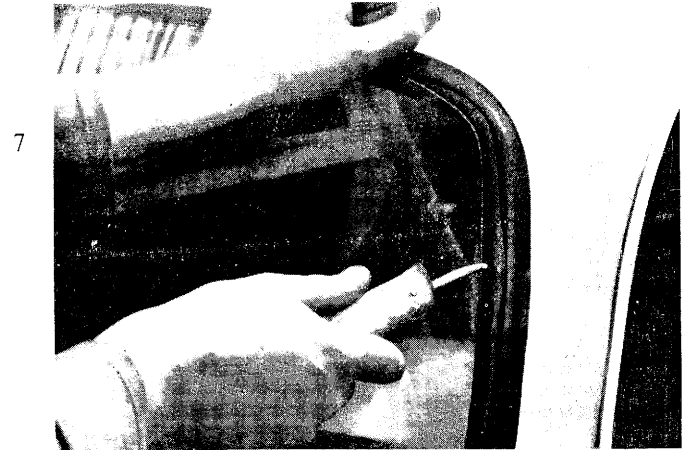
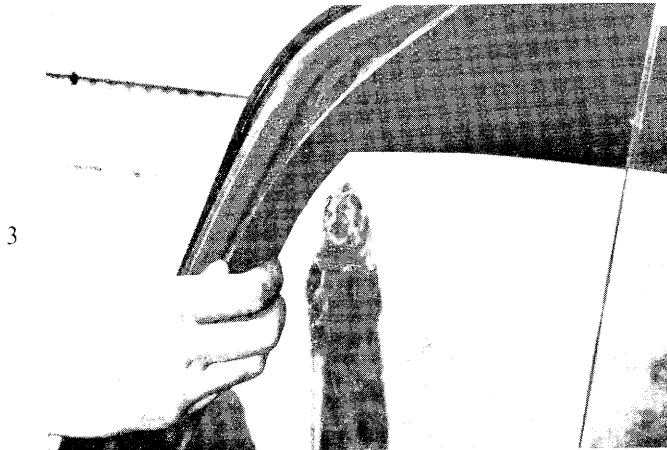
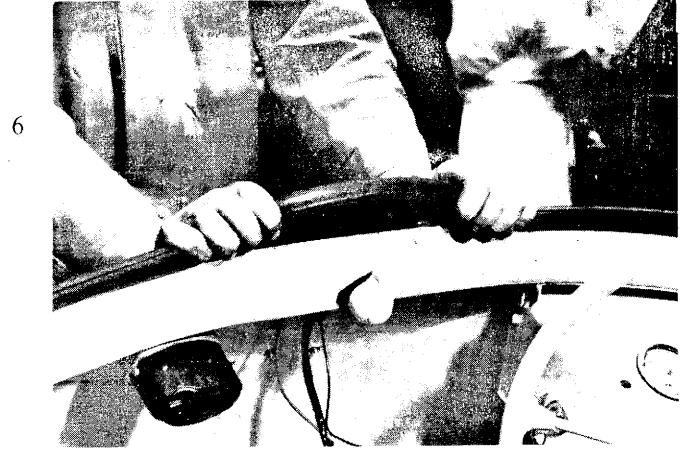
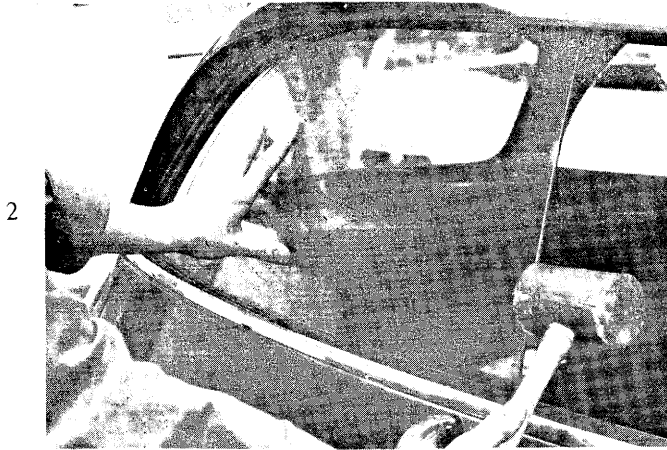
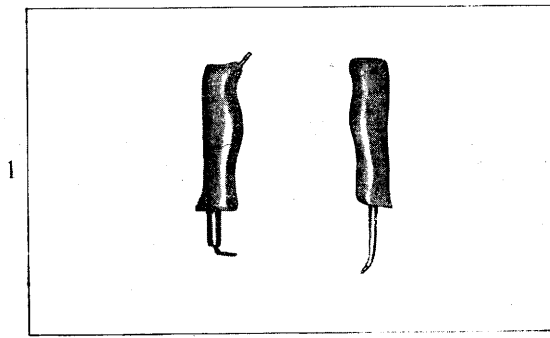


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GROUP A 5b

Replacing a sliding or rear side window.

Tools

Fig. Special tool for glass installation.

1 Special weather strip retainer tool.

The glass of the sliding window is easily removed by extracting and removing retainer from the bottom weather strip. After that press glass to the bottom of window frame and move out of the frame, but top first.

To replace rear side window, remove first the top weather strip of sliding window by pulling it out of the frame. Remove retainer from the bottom of weather strip and pull out rear side window of its foundation and of the weather strip.

Fig.

2

When assembling side windows :-

- (1) Firstly fit retainer in top of rear weather strip by use of special installing tool.
- (2) Place glass first with its bottom in frame and afterwards press into top.
- (3) Insert glass in panel of weather strip and push back into the frame by use of a wooden hammer.

Fig.

3

- (4) Fit retainer in bottom part of weather strip.
- (5) Cut top weather strip for correct length and slide over the fitted rear side window, put on some adhesive (like bostick) and place in frame panel.

Fig.

4

- (6) Fit vertical sliding strip with plastic clip on the rear side window.

Fig.

5

- (7) Cut bottom weather strip for sliding window in correct length, extract from it the drain holes as shown on alloy strip.
- (8) Put sliding window glass into top strip panel and by moving it backwards and forwards install bottom weather strip.
- (9) Fit retainer (locking strip) in weather strip, and cut for correct length.
- (10) Fit lock on sliding window and stopper for lock on frame of sliding window.

Caution If sliding windows should be tight or sticky use some soapy water which will make the rubber of the weather strip loose and softer.

GROUP A 5a

Replacing a front or rear glass panel

The window glass to be replaced is removed by carefully pulling retainer from weather strip and pushing out the glass panel. The weather strip will stay in place in the body opening from where it's easily removed.

Fig. 1. Push in place the weather strip all round the body
6 opening.

Fig. 2. Locate the glass over the opening and, pushing down the
7 glass, slide it into the glass groove of the weather strip. Use the special tool to force the lip of the weather strip over the glass, around its entire circumference. Use adhesive to bind the weather strip at the joint edges in order to prevent entry of water.

Fig. 3. Thread retainer (looking strip) in retainer installing tool,
8 and pulling same enter retainer in the corresponding groove
9 all around the weather strip.

4. Cut the retainer ends in order to obtain a proper joint and push them down into the weather strip.

GROUP R CHASSIS FRAME

R 1 Measuring frame after an accident

Fig. includes the following jobs: A 1, M 2, L 1, H 1, V 1.

1 Tools: Test about with insert cones, gauge for checking castor angle, gauge for checking king pin inclination and camber.

Fig.

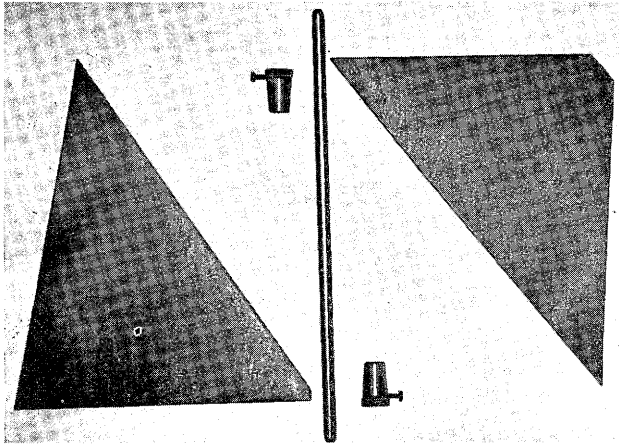
2 To check a frame for correct alignment it must be completely free. As measuring points serve: 1. Steering knuckle king pin bearing. 2. Holes in rear cross member for eye bolts of cantilever springs.

Since nearly all frontal accidents cause the bending of the short tube ends bearing the front suspension assemblies, these must first be checked for correct castor and toe position. This is made with the aid of triangular sheet metal gauges specially developed for this purpose. To check king pin inclination and camber, jam test arbour with the two cones in the bearing hole for steering knuckle king pin, place the gauge upon the cross tube and approach it to the test arbour until a visual test may be made. To do this make certain that the gauge applies evenly along the tube and remove body damping strips which might hinder this operation.

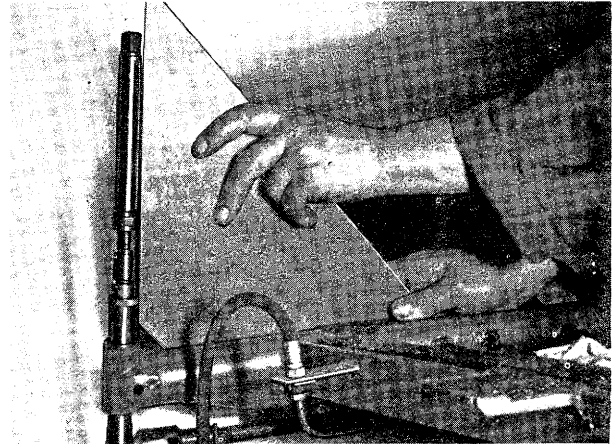
Fig. In the same manner check the castor angle. For this purpose place the gauge
3 upon the box-section side member behind the cross tube carrying the front suspension and push it ahead until a visual test may be made. The frame tube end for reception of steering knuckle king pin can after light accidents be straightened in cold condition, and in warm condition if the bent is due to a serious accident.

Fig. Furthermore the frame must be checked for distortion that may occur if the
4 blow hit the vehicle on a front corner. For this ascertain the centre line of frame by measuring and determine same by a well stretched steel wire. Then perform a diagonal measurement from king pin bearing hole to opposite cantilever spring eye-bolt hole. The two measuring lines must meet each other upon the centre line determined by the wire and may differ by a maximum of 3 mm in the length. This diagonal measurement greatly amplifies an eventual distortion, so that it is easily recognized.

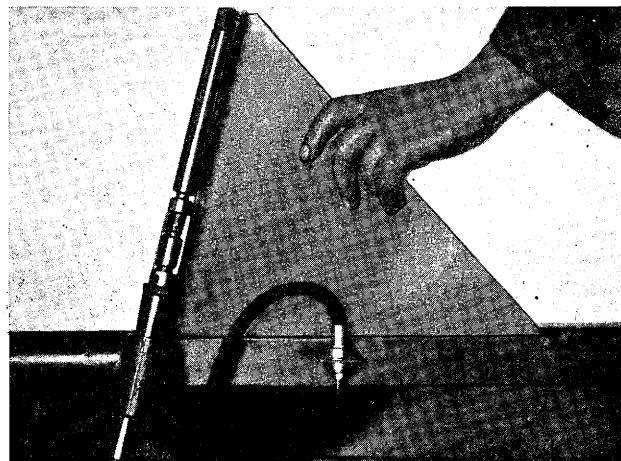
Fig. Finally the frame may be checked for distortion by aiming over from the side.
5 If a frame is badly distorted due to a serious accident and cannot be straightened in cold condition, it should be replaced.



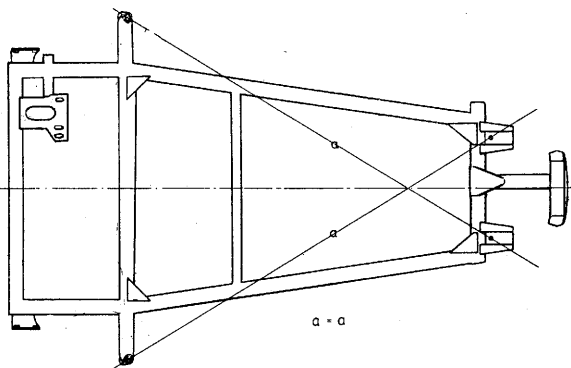
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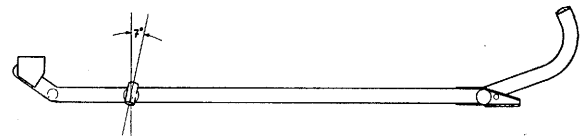
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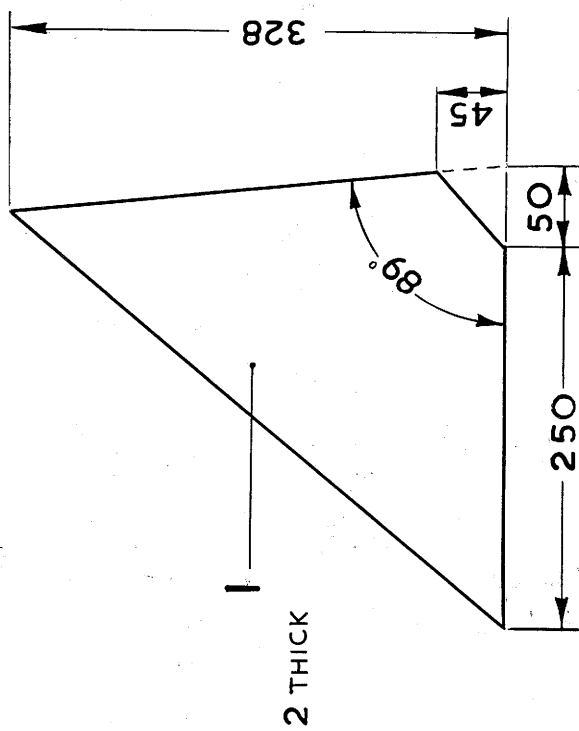
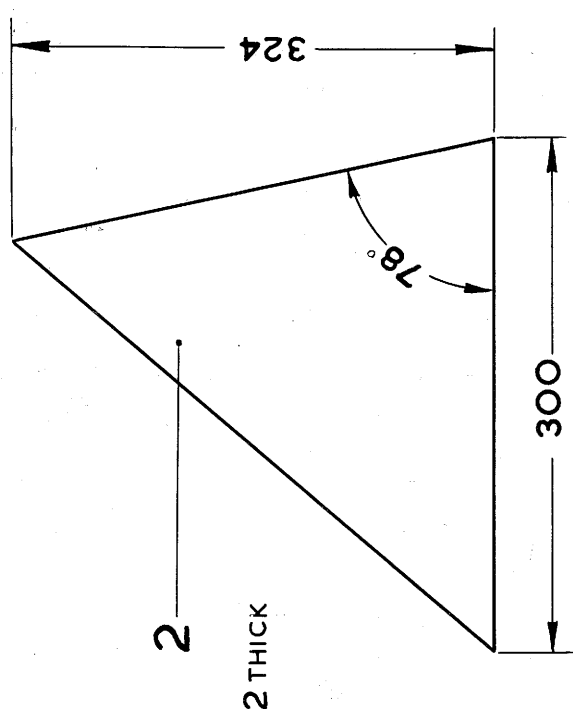
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4



5



PART	DESCRIPTION	UNITS	REMARKS
5	KNURLED SCREWS	2	M4x12 DIN 653-55
4	SLEEVE	2	ST 42-II N
3	MEASURING MANDREL	1	DIN 671 ST 34 K
2	'AFTER-RUN' GAUGE	1	SHEET METAL ST V 23
1	SPLAY GAUGE	1	SHEET METAL ST V 23
SGD. SCHIEFERER		SCALE 1:5, 1:2.5 1:1	BAYERISCHE MOTOREN WERKE A.G. MUNICH WORKS
DATE 30.8.55			
GAUGES FOR AFTER-RUN AND SPLAY			
SK 6			