



R 109.180  
John Titus

REPAIR MANUAL No. 581

VOLUME 1

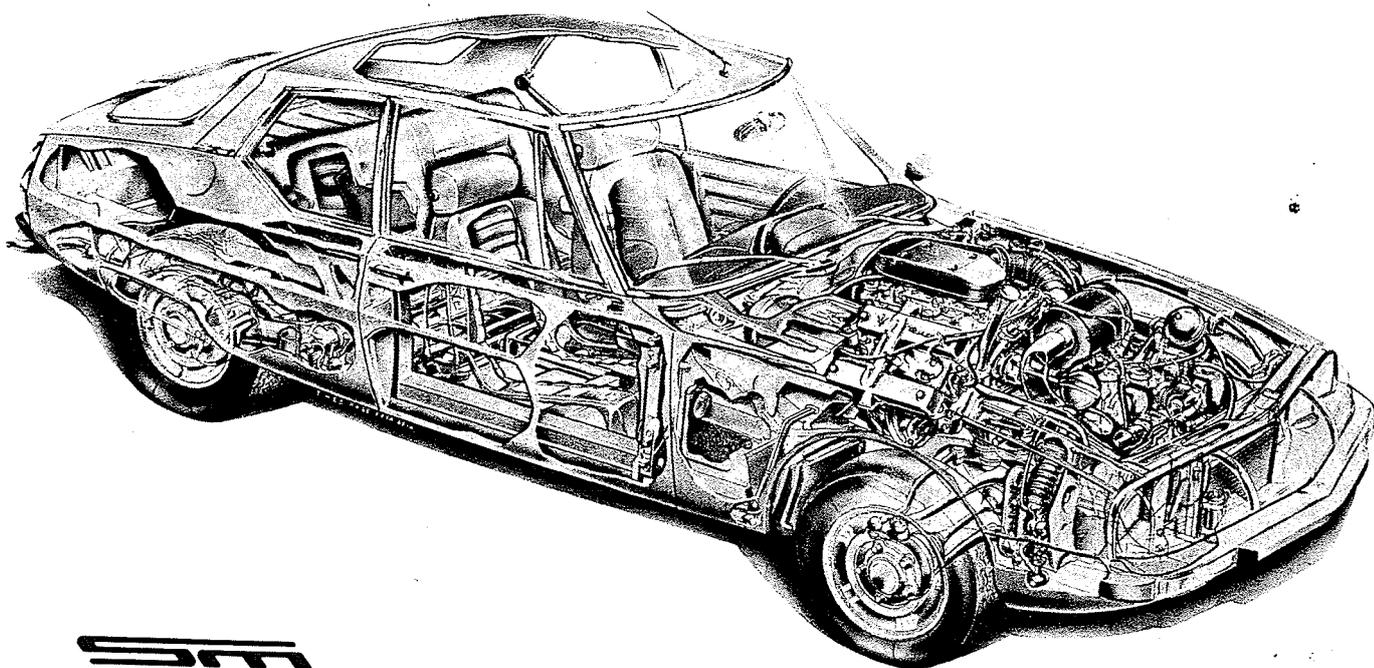
# SM MODEL

(SB Series SB)

• CHARACTERISTICS

• ADJUSTMENTS

• INSPECTIONS, CHECKS  
and TESTING



**SM**

CITROËN CARS CORPORATION  
Direct Factory Branches of S.A. Automobiles Citroën, Paris, France  
40 VAN NOSTRAND AVE., ENGLEWOOD, N.J. 07631 TEL. (201) 871-3100

## OPERATIONS

The order of operations has been researched to obtain the best quality of workmanship within the shortest time.

The numbers of the operations are coded and consist:

- a) of the indication of the model: "S"
  - b) of a three digit figure designating the unit or element of a unit
  - c) of a figure indicating the nature of the repair.
- the figures 0 0 0 indicating the characteristics of the model.
  - the figures 0 0 indicating the characteristics of the unit.
  - the figure 0 indicates the inspections and adjustments.
  - the figures 1, 4, 7 indicating the removals and replacements.
  - the figures 2, 5, 8 indicating stripping and assembling.
  - the figures 3, 6, 9 indicating the reconditioning.

Triangles corresponding to the operations list reference marks permit rapid location of the operation sought.

## TOOLING

The special tooling is indicated in the text by a number followed by the letter T.

These tools are sold by the PARTS DEPARTMENT, CITROEN CARS CORPORATION.

The complementary tooling is indicated in the text by a number preceded by the indication MR.

The plans of execution for these tools, classified by numerical order, appear at the end of each volume.

## TIGHTENING TORQUES

These torque specifications are expressed:

- in Newton meters (mAN), the legal unit of measurement for torque (except in the U.S.)
  - in meter kilograms (m.kg.) followed by its conversion to the U.S. equivalent in foot pounds (ft.lbs.)
- The torque wrenches in general use in the U.S. are graduated in foot pounds.

$$1 \text{ m.kg.} = 9,81 \text{ mAN}$$
$$1 \text{ m.kg.} = 7.233 \text{ ft.lbs. (U.S.)}$$

The values corresponding to the torques expressed in m.kg. are "rounded", i.e., they are brought to the nearest applicable figure. For example:

$$2 \text{ mAN} = 0, 2 \text{ m.kg.}$$
$$60 \text{ mAN} = 6 \text{ m.kg.}$$

Because of the calibration of torque wrenches used in the United States, the values expressed in m.kg. will be converted to the nearest "round" figure in ft.lbs. For example:

$$1 \text{ m.kg.} = 7 \text{ ft.lbs.}$$
$$10 \text{ m.kg.} = 72 \text{ ft. lbs.}$$

The values expressed in Newton meters (mAN), in most cases will be ignored.

◆NOTE: When the indication "torque wrench" is mentioned following the torque specification, the operation must IMPERATIVELY be executed with a torque wrench.

## IMPORTANT REMARK

For all technical information concerning these models, address inquiries to the:

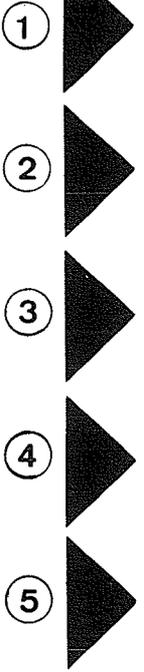
TECHNICAL DEPARTMENT, CITROEN CARS CORPORATION

East: 40 Van Nostrand Ave., Englewood, New Jersey 07631 (201) 871-3100

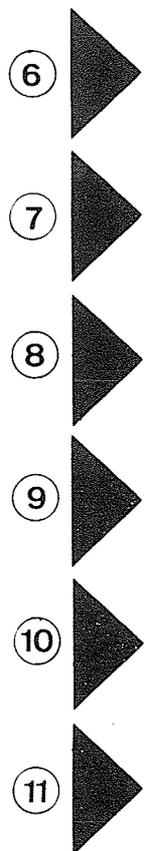
West: 12615 Beatrice Street, Los Angeles, California 90066 (213) 390-3505

**LIST OF OPERATIONS APPEARING IN VOLUME I OF THE MANUAL No. 581**  
*"SM" Model (SB Series SB)*

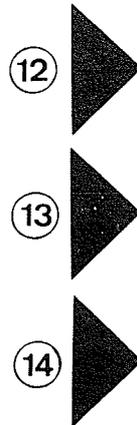
Operation No.	DESIGNATION
	<b>CHARACTERISTICS (SPECIFICATIONS)</b>  (1)
S. 000	General characteristics and specifications (basic dimensions, various capacities)
S. 00	Points for jacking and towing
S. 01	Protection of the electrical units
S. 02	Hydraulic work (precautions of assembly)
S. 03	Recommended supplies
	<b>MOTOR - CARBURETION - IGNITION</b>  (2)
S. 100-00	Characteristics of the motor
S. 112-0	Inspection and adjustment of the valve clearances
S. 120-0	Inspection and adjustment of the valve timing
S. 142-00	Characteristics and specifications of the carburetors
S. 142-0	Adjustments on the carburetors and linkage: <ul style="list-style-type: none"> <li>- Inspections and adjustment of the linkage</li> <li>- Inspections and adjustment of the carburetors</li> </ul>
S. 173-0	Characteristics and inspection of the fuel delivery <ul style="list-style-type: none"> <li>- Characteristics of the fuel pump</li> <li>- Particulars</li> <li>- Checking the regulated pressure</li> <li>- Replacement of a fuel filter</li> </ul>
S. 210-00	Characteristics and particulars of the ignition (Distributor, spark plugs, coils)
S. 210-0	Inspections and adjustments of the ignition <ul style="list-style-type: none"> <li>- Inspection of the ignition</li> <li>- Adjustment of the ignition</li> <li>- Adjustment of the ignition on a test bench</li> <li>- Checking an air ignition coil</li> </ul>
S. 220-0	Inspection and adjustment of the oil pressure on the car
S. 234-0	Inspections on the cooling circuit (and system of ventilation)
S. 236-0	Adjustments on the pulleys and belts <ul style="list-style-type: none"> <li>- Tension of the belts</li> <li>- Alignment of the pulleys</li> </ul>
	<b>CLUTCHING</b>  (3)
S. 312-00	Characteristics and particulars of the clutching
S. 314-0	Inspections and adjustments of the clutching control
	<b>GEAR BOX</b>  (4)
S. 340-00	Characteristics and particulars of the 5 speed gear box.
S. 344-0	Inspection and adjustment of the shift controls
	<b>DRIVE SHAFTS</b>  (5)
S. 372-00	Characteristics and particulars of the drive shafts
S. 372-0	Adjustment of the side play of the drive shaft universal crosses



Operation No.	DESIGNATION
<p>S. 390-00 S. 390-0</p>	<p><b>SOURCE AND RESERVE OF PRESSURE</b>  (6)</p> <p>Characteristics and particulars of the source of pressure and the hydraulic circuits                      Inspection of the hydraulic units on the car</p>
<p>S. 410-00 S. 410-0</p>	<p><b>FRONT AXLE</b>  (7)</p> <p>Characteristics and particulars of the front axle                      Inspections and adjustments on the front axle                      - Inspection and adjustment of the camber                      - Inspection of the caster                      - Adjustment of the parallelism (toe): see Op. S. 440-0</p>
<p>S. 420-00</p>	<p><b>REAR AXLE</b>  (8)</p> <p>Characteristics and particulars of the rear axle</p>
<p>S. 430-00 S. 430-0</p>	<p><b>SUSPENSION</b>  (9)</p> <p>Characteristics and particulars of the suspension                      Inspections and adjustments of the suspension and its controls                      - Pre-adjustment of the heights                      - Adjustment of the heights                      - Adjustments on the front anti-roll bar                      - Adjustment of the manual height control</p>
<p>S. 440-00 S. 440-0</p>	<p><b>STEERING</b>  (10)</p> <p>Characteristics and particulars of the steering                      Inspections and adjustments on the steering                      - Adjustment of the lateral position of the steering unit                      - Adjustment of the angular position                      - Bleeding the steering unit                      - Adjustment of the "straight ahead" position of the steering unit                      - Adjustment of the parallelism (toe)                      - Adjustment of the "point zero"</p>
<p>S. 441-0 S. 444-0</p>	<p>Adjustment of the control for unlocking the steering wheel                      Inspections and adjustments on the hydraulic control of the steering</p>
<p>S. 450-00 S. 453.0  S. 454-0</p>	<p><b>BRAKING</b>  (11)</p> <p>Characteristics and particulars of the braking system                      Inspections and adjustments of the braking control                      - Bleeding the circuits                      - Adjustment of the braking distribution                      - Checking the mano-contact                      - Adjustment of the stop light switch</p> <p>Inspections and adjustments of the emergency-parking brake                      - Adjustment of the mechanical brake stirrups                      - Adjustment for the locking of the hand brake lever                      - Adjustment of the brake cable                      - Adjustment of the hand brake contact switch</p>



Operation No.	DESIGNATION
	<b>ELECTRICITY</b>  (12)
S. 510-00	Wiring diagram (1st possibility)
S. 530-00	Characteristics and Inspections of the electrical units (alternator, voltage regulator, starter) - Inspection of an alternator (on the car) - Inspection of a regulator (on the car) - Inspection of a starter
S. 540-0	Adjustment of the headlights
S. 560-0	Inspection and adjustment of the windshield wipers (intermittence timer)
S. 640-00	Characteristics and particulars of the climatization system
S. 640-0	Inspections and adjustments of the climatization system
	<b>BODY</b>  (13)
S. 00-663	Assembly and mounting of a trailer hitch
S. 00-800	Dimensions of the interior and exterior
S. 840-0	Adjustments of the body elements
S. 841-0	Adjustments of the doors
S. 844-0	Adjustment of the trunk door
S. 852-0	Adjustment of the hood
	<b>TOOLING</b>  (14)
	List of special tools appearing in the volume Designs for execution of the special tools which are not sold



# CHARACTERISTICS

OPERATION No. S.000: *General Characteristics*

Op. S.000

1

## I - GENERAL CHARACTERISTICS

- Fiscal designation: .....	SB Series SB
- Commercial Name: .....	SM
- Factory Symbol: .....	S
- Production starting date: .....	July 1970
	Serial No. 00SB000 3
- Number of seats: .....	4
- Tires: Front and rear	
-Type: .....	195-380 X (195/70 VR 15 X tubeless)
- Pressure: } front wheels .....	32 p.s.i.
} rear wheels .....	29 p.s.i.
- Rim: .....	6"

## II - GENERAL DIMENSIONS

- Wheel base: .....	116 1/8"	- Clearance from the ground:	
- Track: front: .....	60 1/16"	- <i>low</i> position: .....	2 3/8"
rear: .....	52 3/16"	- <i>normal drive</i> position: .....	6 1/8"
- Length overall: .....	192 5/8"	- 1st <i>intermediate</i> position: .....	6 7/8"
- Width overall: .....	72 1/4"	- 2nd <i>intermediate</i> position: .....	9 1/16"
- Height - normal drive position: ...	52 1/8"	- <i>high</i> position: .....	10"
- Width - at the front seats: .....	56 11/16"	- Steering circle - between walls: (approx.) ...	45 ft. 3 in.
- at the rear seats: .....	56 11/16"	- between curbs: (approx.) ...	41 ft. 4 in.
- Volume of the rear trunk: .....	17 1/4 cu. ft.	- Curb weight: .....	3200 lbs.
		- Practical load: .....	860 lbs.
		- Total weight under load: .....	3970 lbs.

## III - VARIOUS CAPACITIES

- Fuel tank: .....	24 gal.
- Cooling system: .....	14 qts.
- Motor oil:	
- after draining: .....	6 3/8 qts.
- after changing oil filter (approx.) .....	7 3/8 qts.
- Gear Box Oil: .....	2 3/8 qts.
- Hydraulic system reservoir (LHM): .....	5 3/4 qts.
- Towing:	
- Maximum incline allowed with a trailer: .....	11%
- Towing Capacities:	
- without auxiliary braking: .....	1100 lbs.
- with inertia braking system: .....	2750 lbs.
- with continuous braking system: .....	3970 lbs.

**PROTECTION OF THE ELECTRICAL UNITS:  
PRECAUTIONS DURING REPAIRS ON A CAR**

*It is absolutely necessary to avoid erroneous tactics which risk destruction of certain electrical units or provoke a short-circuit (incendiary risk).*

- 1. Battery:**
  - a) Firstly, disconnect the cable clamp from the negative post of the battery, then the positive cable clamp from the positive post.
  - b) Be sure that the battery is correctly connected. The negative post should be attached to the ground.
  - c) With care, connect the two cable clamps to the battery posts. The clamp of the ground cable should be connected last. Before tightening the negative terminal, be sure there is no passage of current. To check this, intermittently touch the clamp to the negative post. There should be no sparks. If so, there is a short-circuit in the electrical installation, and it must be remedied.
  - d) Before activating the starter, be sure that the two clamps are correctly tightened on their respective posts.
  
- 2. Alternator—Regulator:**
  - a) Do not run the alternator without its being connected to the battery.
  - b) Before connecting the alternator, be sure the battery is correctly connected. (Negative post to ground).
  - c) Do not check the functioning of the alternator by placing the positive (+) and ground posts or the "EXC" (field) post and ground in short-circuit.
  - d) Do not invert the wires which are connected to the regulator.
  - e) Do not try to "re-polarize" an alternator: it is never necessary and will result in damage to the alternator and regulator.
  - f) Do not connect an anti-static radio condenser to the "EXC" (field) terminal of the regulator, or of the alternator.
  - g) Do not connect the battery posts to a charger and never use an electric welder (or place the electric welding ground clamp) on the chassis without having disconnected both the positive and negative cables from the battery.
  
- 3. Cooling system fans:** Do not operate the air conditioner unless both cooling system fans are connected. A rapid deterioration of the condenser will result due to the rise in temperature of the refrigerant recirculated under pressure.
  
- 4. Ignition coil:**
  - a) Connect the feed wire of the ignition coil onto the terminal of the external resistor and not onto the ignition coil itself.
  - b) Connect the radio anti-static condenser by tapping the feed post of the ignition coil. Especially, mount the condenser recommended by the factory.

## I. PRECAUTIONS TO TAKE FOR THE DIFFERENT REPAIRS ON THE HYDRAULIC UNITS AND CIRCUITS OF THE CAR

*The correct functioning of the entire hydraulic installation demands perfect cleanliness of the hydraulic liquid and units. It is, therefore, necessary to take meticulous precautions during repairs as well as for storage of the liquid and replacement parts.*

### 1. HYDRAULIC LIQUID

*The mineral hydraulic liquid (LHM) is the only liquid which is suitable and must imperatively be used for the hydraulic circuits of this car.*

The LHM liquid, *colored green*, is of a nature similar to motor oil.

The use of *any other liquid* will cause the *complete deterioration* of the rubber parts and seals.

### 2. RUBBER PARTS AND UNITS

The appropriate units are painted or marked *in green* and should only be replaced by *original units* also painted or marked green.

All the rubber parts (seals, hoses, diaphragms, etc.) are of *a special quality for the LHM liquid* and are marked in green (or in white).

### 3. STORAGE

The units should be stocked filled with fluid and plugged. Like the tubing, they should be kept protected from shocks and dust.

The rubber hoses and seals should be preserved under cover against dust, air, light and heat.

The hydraulic liquid LHM should be stored in the original containers and carefully capped. We advise the use of containers having a capacity of 1 liter (1 + quarts) for complementary purposes.

### 4. VERIFICATION BEFORE REPAIRS

If a functioning difficulty appears, it is necessary before undertaking any repair work to be sure:

a) *There exists no binding in the controls or mechanical linkages of the hydraulic unit or group of units involved.*

b) *That the high pressure circuit (H.P.) is pressurized:*

To do this:

The motor idling:

- Loosen the bleed screw of the pressure regulator 1 to 1½ turns: A slight thud, emanating from the pressure regulator, will become evident, indicating the escape of liquid under pressure.
- Retighten the bleed screw: listen for the cut-out, which becomes evident by a lessening of the operating noise emitted by the high pressure pump.

In case of the contrary, check in the following order:

- that there is a sufficient quantity of liquid in the reservoir.
- that the filter of the reservoir is perfectly clean and in good condition.
- that the high pressure pump is primed and there is no entrance of air from the suction circuit of the pump.
- that the bleed screw of the pressure regulator is correctly tightened.

## 5. PRECAUTIONS TO TAKE BEFORE ANY OPENING OF THE HYDRAULIC CIRCUITS

- a) *Carefully clean* the area of the repair, the connections and the unit to be removed.
  - Disconnect the cable from the negative post of the battery.
  - To clean the area use gasoline only; do not use any other product.
- b) *Exhaust the pressure* in the hydraulic circuits.
  - If necessary, place the car in *high* position and support it on jack stands.
  - Loosen the bleed screw of the pressure regulator.
  - Place the manual height control lever in *low* position.

## 6. PRECAUTIONS TO TAKE DURING THE COURSE OF DISASSEMBLY

- a) *Plug the metal lines* with caps and the rubber hoses with round pins of the appropriate diameter.
- b) *Block the orifices of the units* with the appropriate plugs.

REMARK: All the plugs and pins should be carefully cleaned before use.

## 7. INSPECTIONS OR TESTS OF THE HYDRAULIC ORGANS

- Use the *test bench 3651-T* which is equipped and provided for the LHM liquid.  
This test bench is *painted in green* and its accessories carry a green reference mark.
- Never use it with any liquid other than the original or for checking units functioning with another liquid (for example: "D" models functioning with LHS 2).

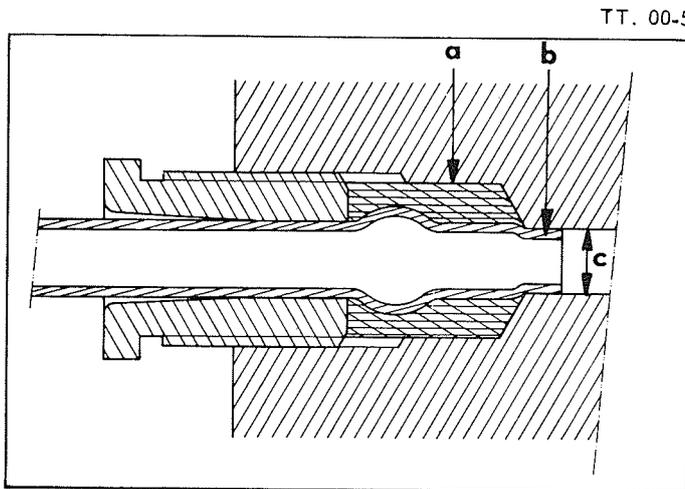
## 8. PRECAUTIONS TO TAKE DURING THE COURSE OF ASSEMBLY

- a) *Cleaning:*
  - the steel tubes should be blown with compressed air,
  - the rubber hoses and rubber seals should be washed with gasoline and dried with compressed air,
  - the hydraulic units should be cleaned with gasoline and dried with compressed air.

NOTE: At each repair it is necessary to change the seals.
- b) *Lubrication:*
  - Follow the schedule outlined in the Repair Manual.
  - The seals and internal parts should be soaked before assembly (use LHM liquid only).
  - If the parts in contact with the hydraulic organs must be lubricated, use a mineral grease exclusively (universal joint or bearing grease).

c) *Assembly:*

- Use only those seals, the quality of which corresponds to the LHM liquid.
- To couple a union, proceed as follows:



- Place the sleeve "a" soaked with LHM fluid onto the tube "b"
- Center the tube into the hole "c" by presenting it in line with the axis of the hole and avoiding any "cocking" (be sure that the end "b" of the tube penetrates the small bore "c").
- Take the union nut by the hand.
- Tighten the nut moderately; an excess tightening will occasion a leak because of the deformation of the tube

NOTE: Tightening torques:

Tube dia. = 3,5 mm	} (6-7 ft. lbs.)
Tube dia. = 4,5 mm	
Tube dia. = 6 mm	(7-8 ft. lbs.)

By design, the different seals become tighter as the pressure is raised higher. You cannot increase the sealing efficiency by making the unions tighter.

- In order to connect a rubber hose it is necessary to interpose between this hose and the clamp, a rubber ring of the appropriate diameter

## 9. INSPECTIONS AFTER REPAIRS

After any repairs on the units or the hydraulic circuits, verify:

- the sealing of the unions*
- the clearance existing between the tubes:* the tubes should not touch each other and should not touch or bind against another fixed or mobile organ.

## II. REPAIR OF A PLASTIC TUBE

### REMARKS:

- a) This operation can be done by making a sleeve on the tubing.
- b) If two sleeves are to be made on the same tube, they should be spaced approximately 32 inches so as to retain the flexibility of the tubing assembly.
- c) Obtain some plastic cement.

(Plastic cement tends to attack the skin; do not touch it with the fingers; use a wooden spatula)

1. Cut the tube at the section to be repaired. Using No. 600 abrasive paper, deglaze the ends along a length of approximately 3½ inches.
2. With trichlorethylene, carefully degrease the deglazed ends as well as those of the sleeve.
3. Heat the plastic cement in a water bath warmed to a temperature of 140° F.

*Do not exceed this temperature.*

NOTE: This operation is indispensable to reduce drying time.

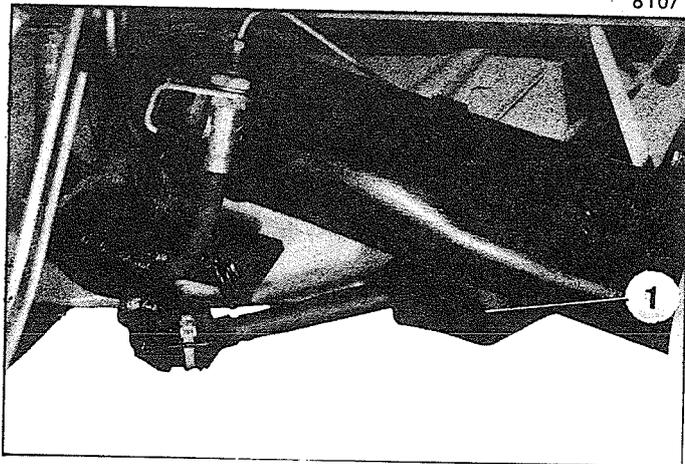
4. Coat with cement, the deglazed ends of the tube and the inside of the sleeve.

Allow the pieces to dry a few minutes.

Introduce the ends of the tube into the sleeve.

Allow the assembly to dry 3 to 4 hours before re-using the repaired line.

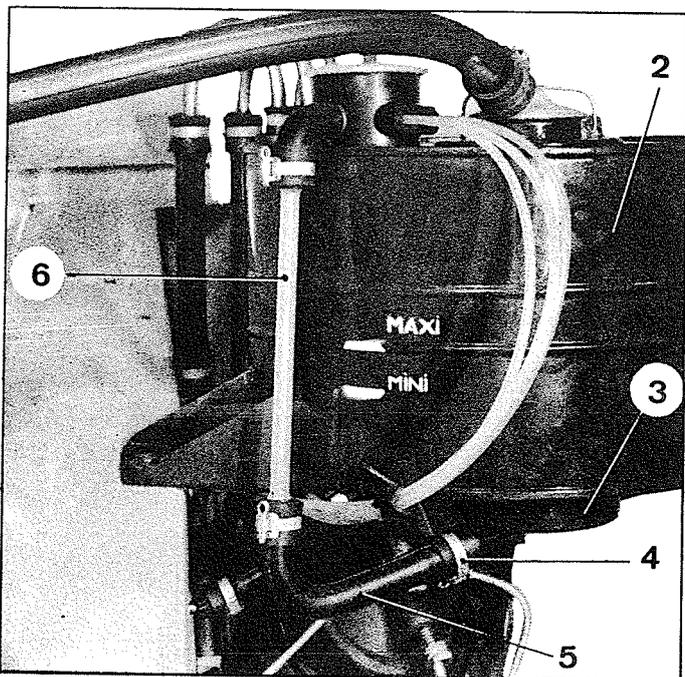
### III. DRAINING THE HYDRAULIC CIRCUIT



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#### DRAINING

1. Place the car on a lift or over a pit.
2. Place the car in *low position*.
3. Open the bleed screw of the pressure regulator.
4. Turn the steering to the left then to the right several times.
5. *Exhaust all the pressure in the brake circuits.*  
Open a bleed screw or operate the brake control unit by applying the brakes a number of times in order to drop the pressure in the brake accumulator.
6. *Empty the rubber boots (1) of the rear suspension cylinders.*  
Press the boots (1) by hand, in such a manner as to make the liquid contained in these boots return to the reservoir to the maximum.
7. *Drain the reservoir (2).*  
Loosen the collar (4).  
Disengage the hose (5) from the cap (3).  
Drain the reservoir.



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#### REFILLING

8. Connect the hose (5) to the cap (3) and tighten the collar (4).
9. Clean the filter of the reservoir with gasoline. Dry it with compressed air.
10. Refill the reservoir with *hydraulic LHM liquid (colored green)*.
11. *Prime the high pressure pump.*  
Refill the pump with hydraulic liquid through the filter housing of the reservoir.  
Start the motor and let it run a few moments.
12. Tighten the bleed screw of the pressure regulator.
13. *Complete the level of hydraulic liquid in the reservoir.*  
Place the car in *high position*. The height of the hydraulic liquid in the reservoir should stabilize between the "mini" and "maxi" of the transparent gauge (6).

**RECOMMENDED INGREDIENTS  
MENTIONED IN THE REPAIR MANUAL**

## LOCTITE

LOCTITE is a sealant available in two strengths according to the application. It is sold in automotive supply stores or hardware stores catering to the machine tool industry.

LOCQUIC-T is a quickener used in conjunction with LOCTITE.

## USE:

The quickener LOCQUIC-T is an activating wash designed for those parts to which one intends to apply the sealant LOCTITE. Non-metallic parts require a pre-treatment with the quickener LOCQUIC-T.

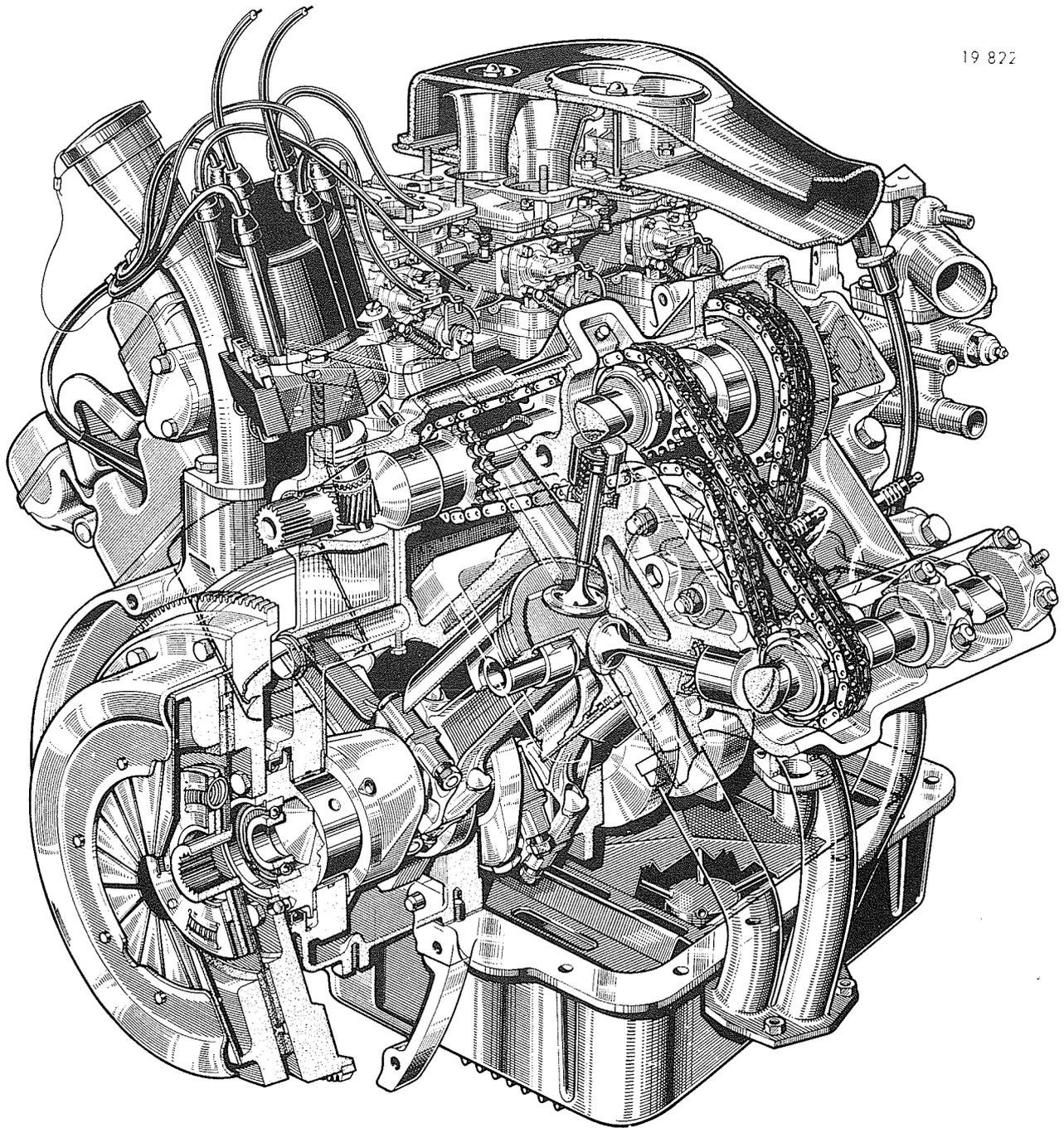
Most of the parts in zinc, cadmium, aluminum or stainless steel also require this treatment in order that the LOCTITE sealant will grip hard and rapidly. The quickener LOCQUIC-T can serve to degrease the parts. It can also be used to prepare dull surfaces.

Spray the quickener onto the surface to which the LOCTITE sealant is to be applied. Brush or wipe to remove the grease. Spray again to clean perfectly. Repeat, if necessary. Apply the LOCTITE only after the quickener is *perfectly dry*.

ATTENTION: **Precautions:** Proceed only with adequate ventilation. Avoid prolonged or repeated contact with the skin. Do not swallow. Avoid spraying painted areas. Preserve the container of LOCQUIC-T at a temperature below 110° F.

## I. CHARACTERISTICS

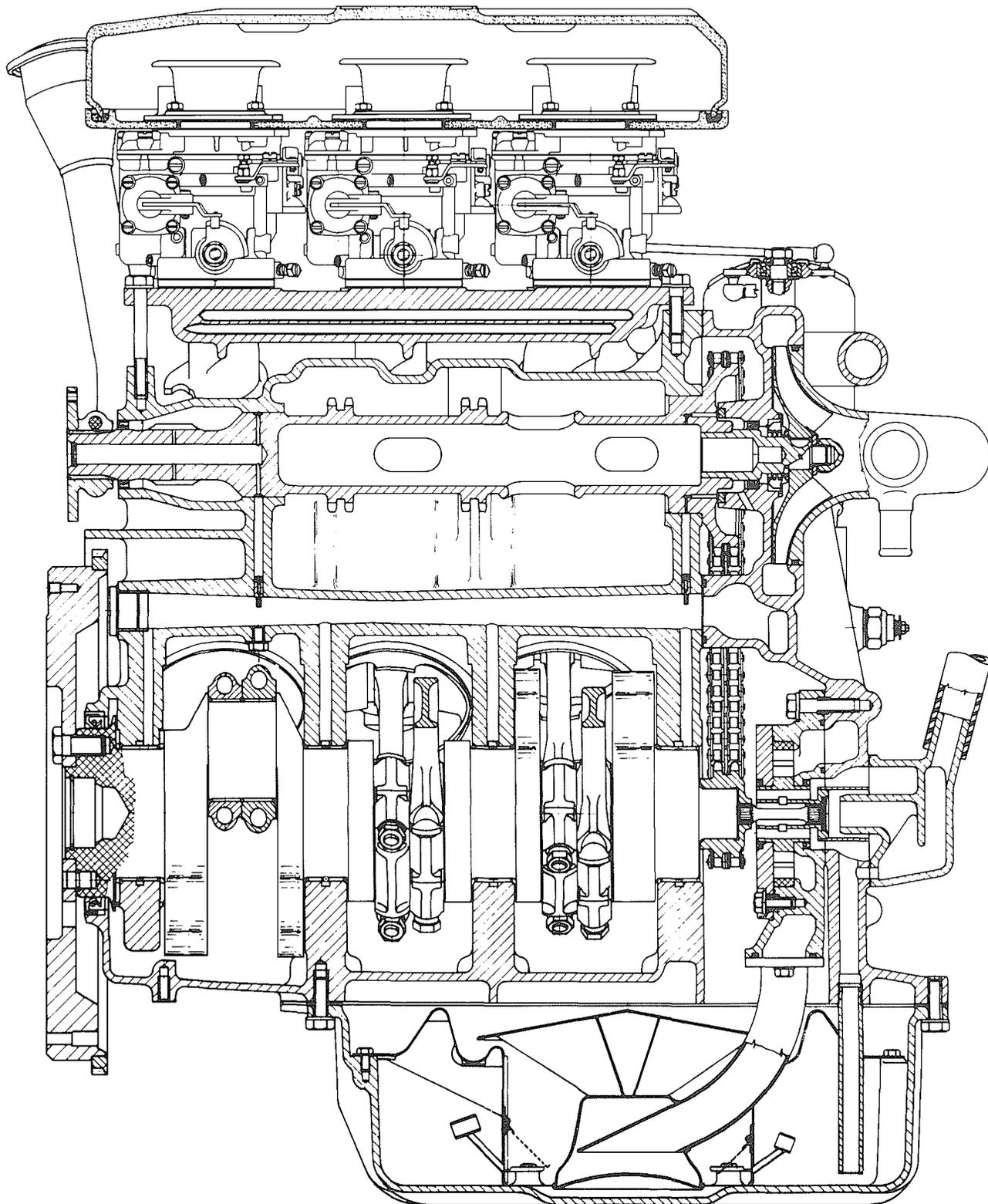
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Type.....	MASERATI C. 114/1	Compression .....	9/1
Fiscal horsepower.....	15 CV	Max. H.P. (DIN) .....	170 @ 5500 R.P.M.
Number of cylinders.....	6	Max. H.P. (SAE) .....	180 @ 6250 R.P.M.
Arrangement.....	V at 90°	Max. torque (DIN) .....	170 ft. lbs. @ 4000 R.P.M.
Bore.....	87 mm (3.425")	Max. torque (SAE) .....	172 ft. lbs. @ 4000 R.P.M.
Stroke.....	75 mm (2.953")	Max. R.P.M. in 5th .....	6100
Displacement.....	2670 cm <sup>3</sup> (162.931 cu. in.)		

## LONGITUDINAL SECTION

S. 10.1



## II. PARTICULARS

### Motor Suspension:

- Height of the elastic motor mounts under load
    - at the left: ..... 19,5 ± 1 mm (.768'' ± .040'')
    - at the right: ..... 18,5 ± 1 mm (.728'' ± .040'')
- (Distance between the motor-support and the upper face of the elastic motor mount)

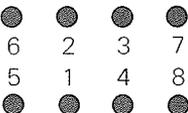
### Cylinder Heads:

- The position of each cylinder head is referenced in relation to the cylinder-block by the letters AA and BB stamped at the center of the upper faces of the cylinder head and the block.

- Tightening of the cylinder head bolts: *Cold*

1st tightening ..... 36 ft. lbs.

2nd tightening ..... 80 ft. lbs.

Tightening sequence: 

- Valve clearances: *Cold*

◆ Intake: ..... .012'' to .014''

Exhaust: ..... .020'' to .022''

- Bore of the valve guides:

Intake: .....  $7,85 \begin{matrix} + 0,022 \\ - 0 \end{matrix} \text{ mm} \left[ \begin{matrix} .309'' + .0009'' \\ - 0 \end{matrix} \right]$

Exhaust: .....  $8,85 \begin{matrix} + 0,022 \\ - 0 \end{matrix} \text{ mm} \left[ \begin{matrix} .348'' + .0009'' \\ - 0 \end{matrix} \right]$

Valve stem seals are mounted on the intake guides only.

- Valve seats:

Width:

Exhaust ..... 2,2 mm (.087'') max.

Intake ..... 2,5 mm (.098'') max.

Angles:

Intake and exhaust ..... 90°

- Calibration of the valve springs (intake and exhaust):

Length under a load of 40-50 lbs. .... 33 mm (1.3'')

Length under a load of 150-160 lbs. .... 24 mm (.945'')

### Cam Shafts:

- The bearing caps of the cam shafts are machined with the cylinder heads and referenced for matching.

- Markings of the cam shafts:

Marks:

Intake ..... V

Exhaust ..... I<sub>1</sub>

Located on one of the six faces of the integral hexagonal section of the cam shaft forging.

### Cylinder-block:

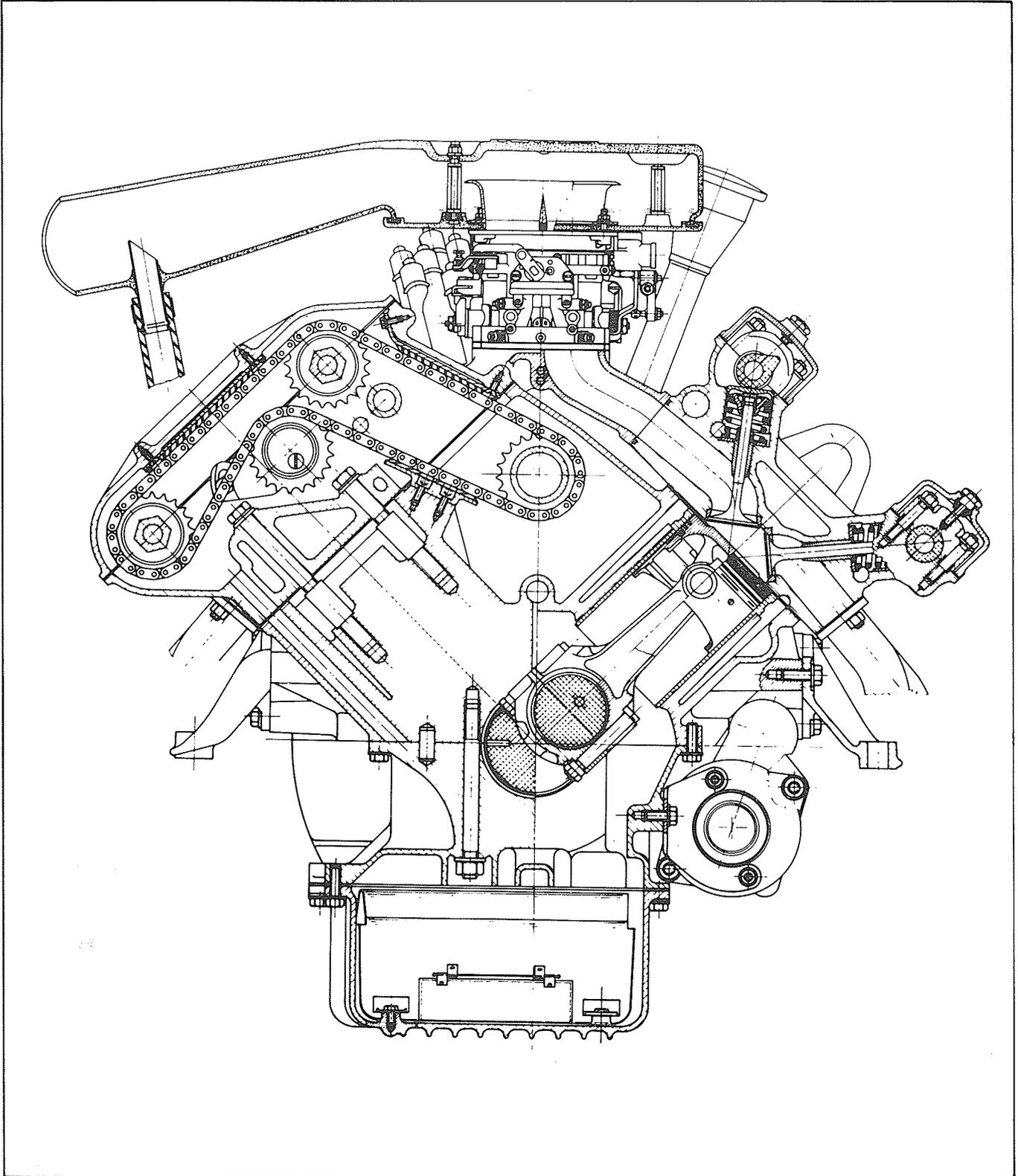
- The sleeves are rectified after assembly in the cylinder-block and cannot be replaced.

- Bore of crankshaft main bearing seats:

(nominal dimension): .....  $79,83 \begin{matrix} + 0,01 \\ - 0 \end{matrix} \text{ mm} \left[ \begin{matrix} 3.1429'' + .0004'' \\ - 0 \end{matrix} \right]$

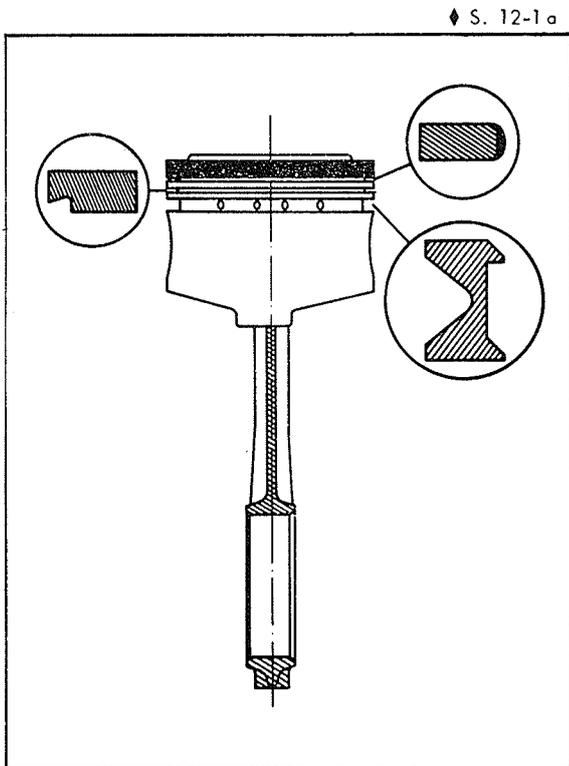
◆ CROSS SECTION

S. 10-2



- **Pistons and Rings:**

- The wrist pins are mounted "tight" in the connecting rod and "free" in the pistons.
- There exists three classes of pistons corresponding to three classes of the bore of the sleeves (2 production classes and 1 repair class).
- Each class is divided into two groups corresponding to the two classes of the bores of the piston for receiving the wrist pin.
- Orientation of the pistons on assembly: the slope of the piston skirt and the head of the connecting rod are machined off center. The longer slope of the skirt and the heavier side of the connecting rod head must be assembled on the same side.



- **Connecting Rods:**

- Orientation of the connecting rods on assembly:  
The chamfers on the connecting rods should be placed:
  - toward the front for cylinders: 1 - 2 - 3
  - toward the rear for cylinders: 4 - 5 - 6

- **Crankshaft (nominal dimensions):**

- Diameter of the main bearing journals: 3,00" ± .0002"
- Diameter of the crankpins: 2,260"  $\begin{bmatrix} - .0012'' \\ - .0016'' \end{bmatrix}$
- Sealing of the bearing caps:  
Use a paste type sealant.
- Torque of the bearing caps: 65 to 72 ft. lbs.
- Front bearing seal  
The oil return slinger should be turned in the direction opposite that of the rotation of the motor.

- **Flywheel:**

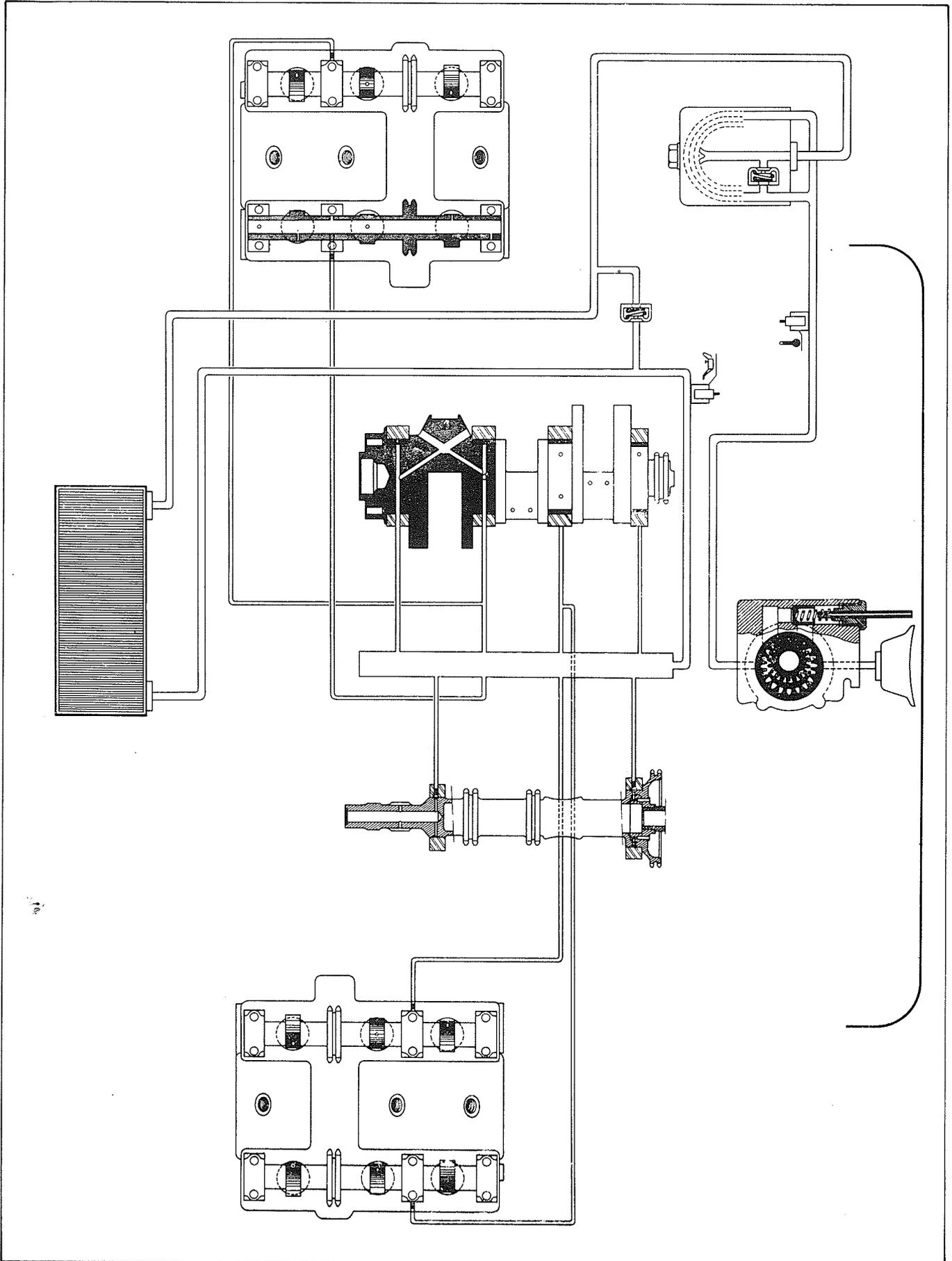
- Distance between the support surface of the clutch housing and the support surface of the clutch disc: 0,35 - <sup>0</sup>0,15 mm  $\begin{bmatrix} .014'' + 0 \\ - .006'' \end{bmatrix}$
- Rectification of the flywheel should not exceed 0,50 mm (.020")
- Tightening torque of the flywheel mounting bolts 12 m.kg. (87 ft. lbs.)
- Tightening torque of the pressure plate mounting screws 2,75 m.kg. (20 ft. lbs.)

- **Valve Timing:**

- Calibration of the timing:
  - a) Clearance between the tensioners and the chains 0,2 mm (.008")
  - b) Valve adjustments for the practical clearance
  - c) Turn the crankshaft so as to place the piston No. 1 at T.D.C. with the valves in "balance" (use a dial indicator).
  - d) Turn the camshafts to obtain:
    - lifting of the intake valve 1 mm (.040")
    - lifting of the exhaust valve 1,3 mm (.050")
  - ♦ e) Repeat the above operation for cylinder No. 6 (piston No. 6 being at T.D.C. with the valves in "balance").

- **Oil Circuit:**

- Quality 20 W 50 (10 W 30 in cold countries)
- Capacity (after draining) 6 liters (6-3/8 qts.)  
(after changing the oil filter (approx.)) 7 liters (7-3/8 qts.)
- Pressure (at a temperature between 212° and 230° F.) the pressure should be:
  - @ 1000 r.p.m. 1,5 bar (22 p.s.i.) min.
  - @ 6000 r.p.m. 5,5 bars (80 p.s.i.)



## REMOVAL AND FITTING OF AN ENGINE/GEARBOX ASSEMBLY

## REMOVAL.

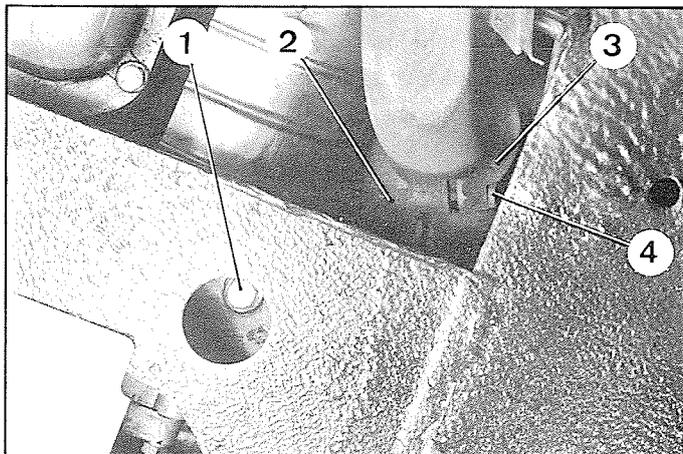
1. Place the vehicle on a lift or over a pit.

Remove :

- the securing bolts ( 1 ) of the engine mountings,
- the nuts ( 2 ),
- the exhaust manifold bolts ( 4 ) and clamps ( 3 ).

Return the vehicle to the ground.

Disconnect the negative battery lead.



2. Remove the bonnet :  
( Mark the position of the hinges using a scriber )

3. Place the front of the vehicle on stands.

Drain the radiator.

4. Remove the front wheels and the drive shafts.

5. Release the pressure in all the circuits.

Remove the front suspension units ( block the apertures in the suspension cylinders and spheres ).

6. Remove air filter assembly, coils and bracket :

a) Disconnect :

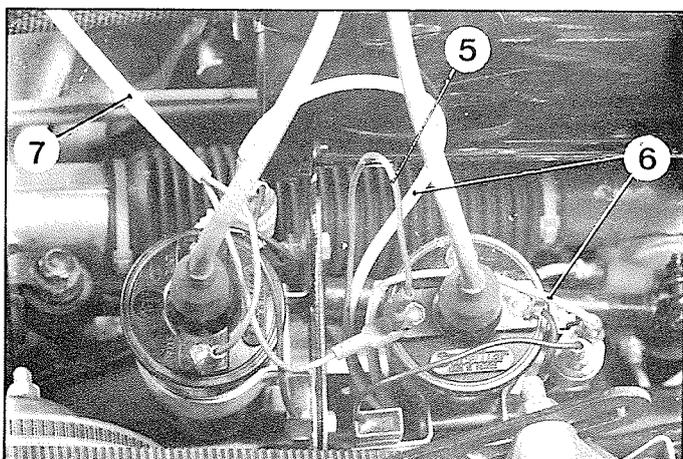
- the feed leads ( 6 ) and tachometer lead ( 5 ) from the coils,
- the high tension leads from the distributor,
- the connecting leads ( 7 ) from the condensers.

b) Remove :

- the connecting tube between air filter and air box, after uncoupling the gas recycling tube from the connecting tube,
- the rubber straps for intake tube and air filter,
- the bolt securing air filter assembly and coil bracket on the front crossmember.

Remove the lug supporting the connecting tube between gearbox and heat exchanger.

Remove the air filter assembly and coils from the coil bracket.

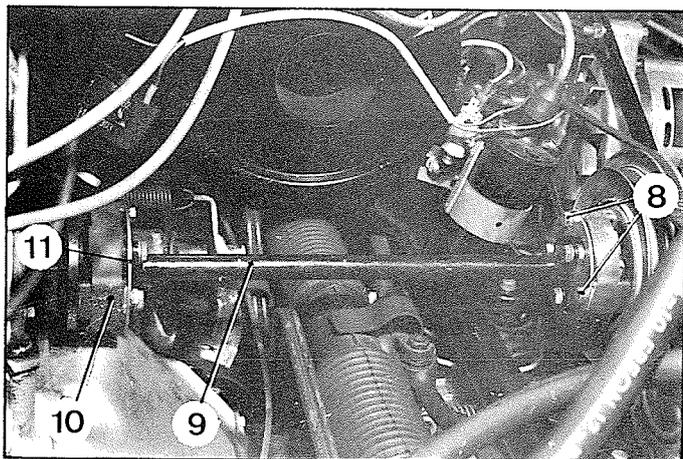


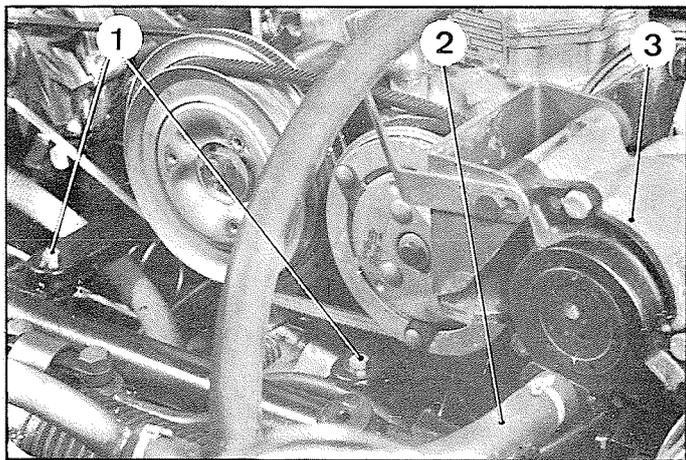
7. Remove the HP pump control shaft :

a) Remove the bolts ( 8 ) securing the flexible couplings ( 10 ) from the control shaft ( 9 ).

b) Remove the shaft ( 9 ) metal washers ( 11 ) and flexible couplings ( 10 ) assembly.

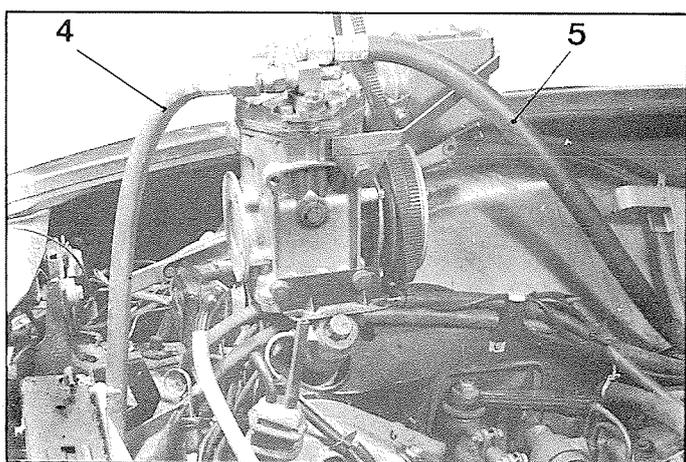
8. Uncouple the speedometer cable from the gearbox leaving the socket ( cast iron ) in its housing.





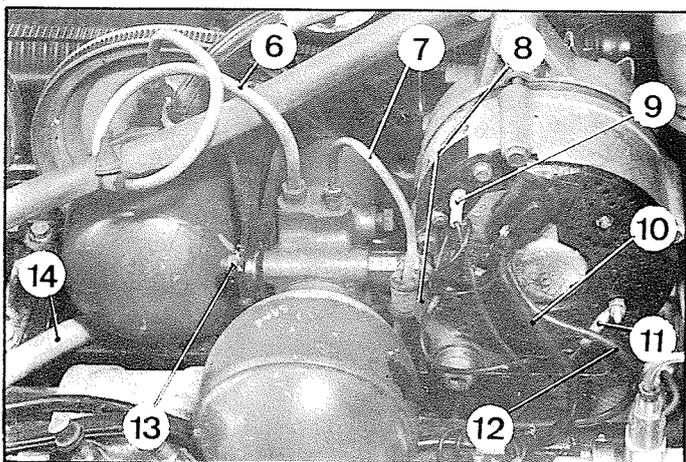
**9. Remove the compressor ( Vehicles with air-conditioner option ) :**

- a) Uncouple the outlet tube ( 2 ) from the air pump ( 3 ).
- b) Remove the nuts and bolts securing the gusset supports for the compressor on the crossmember.
- c) Disengage the compressor control belt from the H.P pump. Disconnect the cut-in feed lead from compressor.
- d) Disengage compressor and air pump assembly towards the R.H side, *without uncoupling flexible tubes ( 4 ) and ( 5 ) from the refrigeration circuit.*



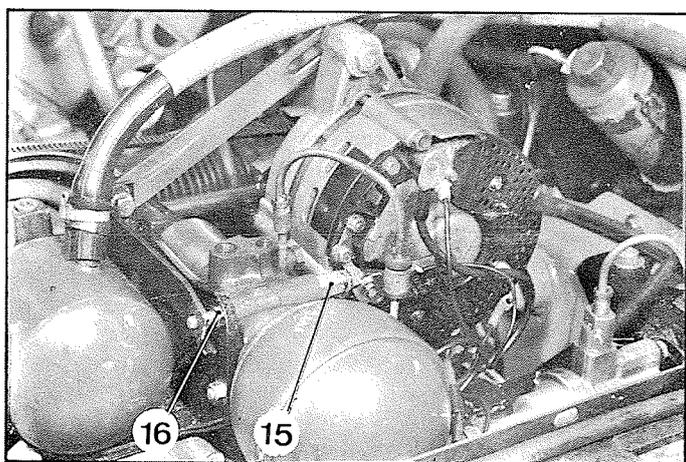
**10. Remove the pressure regulator :**

- a) Uncouple the HP outlet tube ( 7 ) and its retaining lug ( 8 ) from the pressure regulator.
- b) Remove the HP pump - regulator connecting tube ( 6 ).
- c) Remove the two regulator securing bolts, the nuts ( 13 ) and ( 16 ) and the shouldered screw ( 15 ).
- d) Remove the regulator and uncouple the return tube ( 14 ).

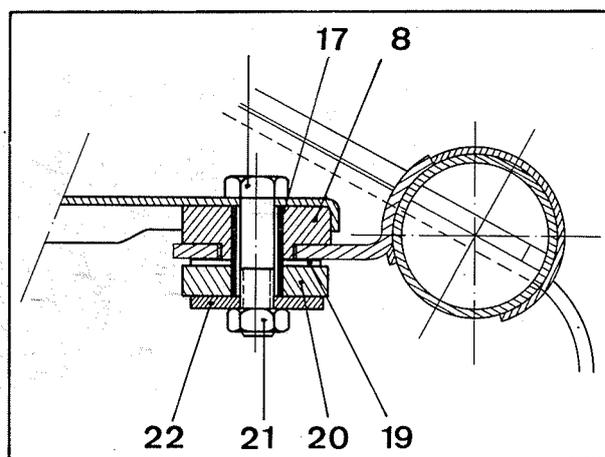


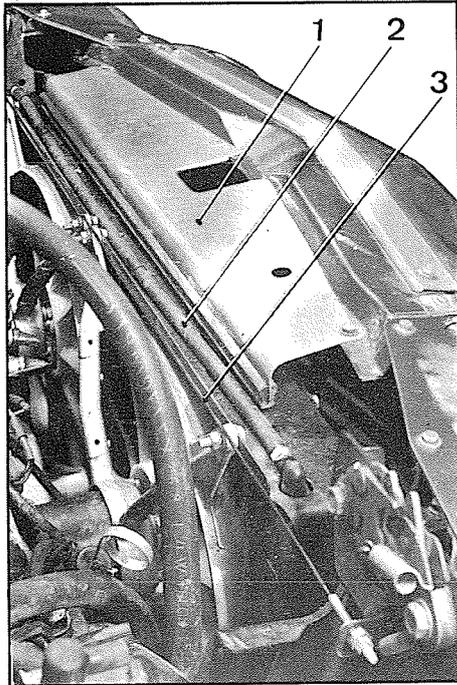
**11. Remove the plate supporting the components**

- a) Disconnect the leads ( 9 ), ( 10 ), ( 11 ) and ( 12 ) from the alternator.
- b) Remove the two bolts ( 1 ) securing the plate to the reinforcement crossmember. Remove nuts ( 21 ) washers ( 22 ) rubber bushes ( 20 ), shim ( 19 ) shouldered rubber bushes with spacers ( 17 ).



- 12. Disconnect the brake wear warning lamp leads from the brake pads. Remove the electrical harness and the speedometer cable, from the L.H front wheel arch.**

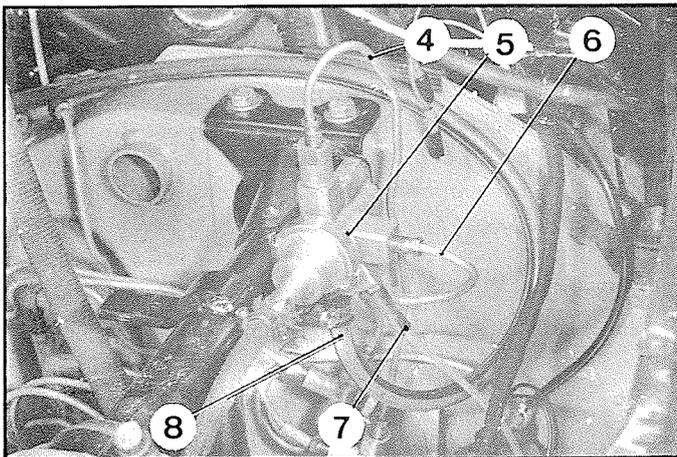




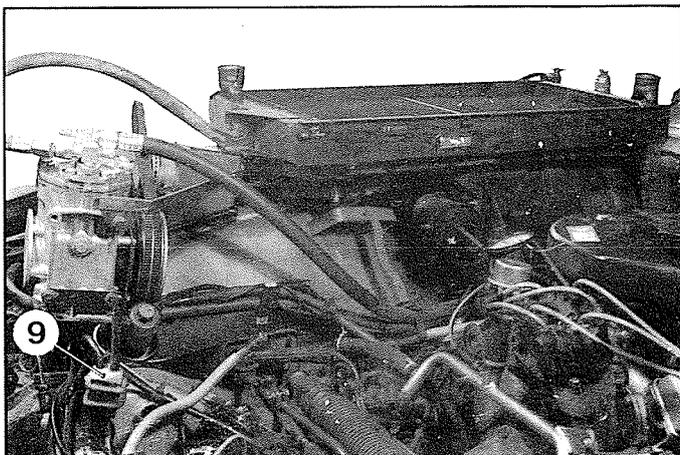
### 13. Remove the radiator and fans assembly

(and condenser, on vehicles with air-conditioner option) :

- a) Remove closing plate (1).
- b) Disconnect the feed wires from the fan motors and from the radiator thermal switch.
- c) Uncouple the vapour tube (2) from the radiator.
- d) Uncouple the bonnet lock connecting cable from L.H lock and remove it.
- e) Remove the feed tube (4) from the steering governor (5).
- f) Remove the radiator water pipes.
- g) Remove the two radiator securing nuts. Raise the radiator/fan motor assembly, to gain access to the lower securing bolts of the fan brackets.
- h) Remove the securing bolts of the fan brackets. Disengage the fans and brackets assemblies towards the rear, to permit the removal of the radiator, condenser and refrigerating fluid tank (vehicle with air-conditioner option).
- i) Remove the radiator, condenser and tank assembly, without removing the flexible tubes of the refrigeration circuit and rest it on the R.H side of the vehicle.



14. Remove the feed pipe (6) of the flow output regulator. Uncouple the return tube (8) and the overflow return tube (7), from the governor (5).

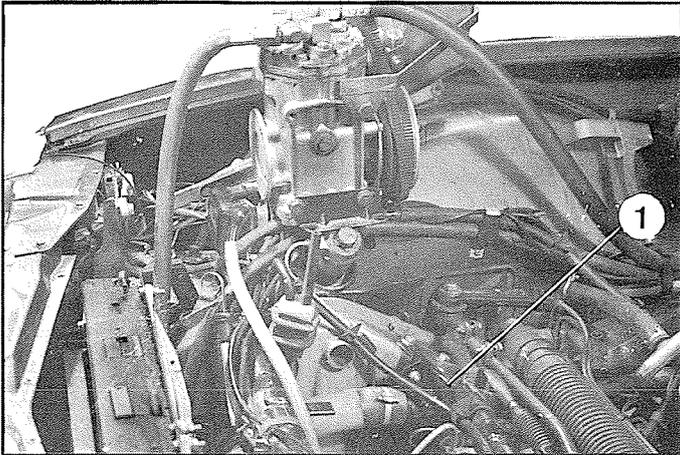


15. Remove the two retaining clips of the electrical harness on the front crossmember support for the gearbox. Remove the crossmember securing bolts.

16. Remove the gearbox breather (9), without removing the flexible tubes.

17. Remove the shouldered securing screws of the air filter bracket and remove this bracket.

18. Remove the reinforcement crossmember ( 1 ).



19. Remove the steering rack.

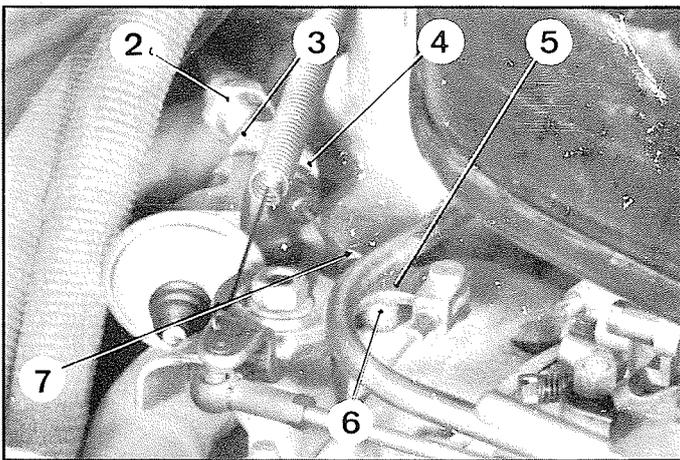
20. Remove the mechanical brake units :

- a) Remove the brake cable retaining spring on gearbox.
- b) Remove the securing bolts of the brake units on the converter housing.
- c) Remove the brake unit and cable assembly on the R.H side of the vehicle.

21. Remove the HP outlet tube from the pressure regulator. Uncouple the feed tubes to the brake units, from the unions on the left side-member.

22. Uncouple the accelerator control :

- a) Remove the retaining clip and uncouple the accelerator cable end piece ( 6 ), from the return lever ( 5 ).
- b) Slacken the lock-nut ( 3 ) and unscrew the end-piece ( 2 ) to uncouple it from the boss ( 4 ).
- c) Slacken the lock-nut ( 7 ) and remove the accelerator cable endpiece ( 6 ).
- d) Remove the accelerator control from the boss(4).



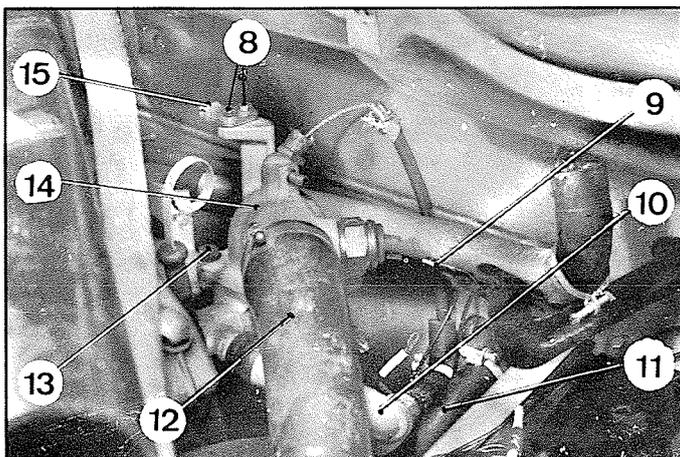
23. Uncouple the choke control cable from the carburettor control cable clamp.

Loosen the two screws ( 8 ) and remove the sheath endpiece from the lug ( 15 ).

24. Uncouple the breather tube from the thermostat housing.

Remove the two securing screws ( 13 ) of the housing ( 14 ) and remove the water pipe ( 12 ) and housing ( 14 ) assembly.

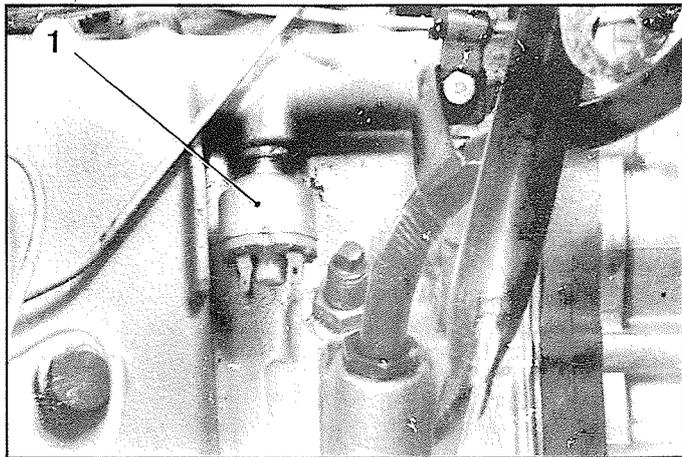
Remove the thermostat.



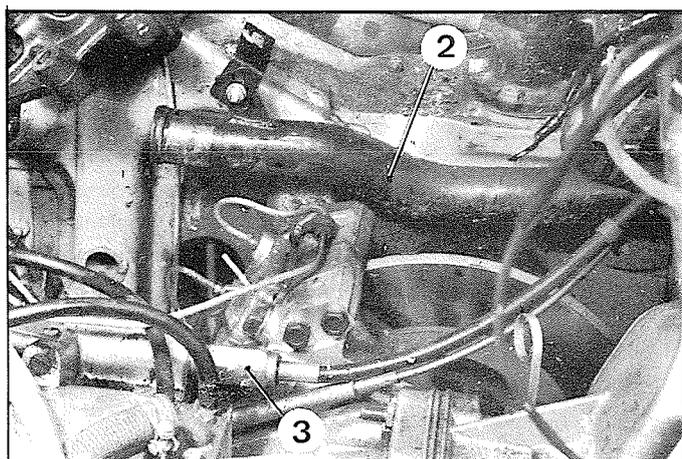
25. Remove the water header tank and disconnect the leads ( 9 ) of the faulty components detector from the main electrical harness.

Uncouple :

- the heating feed duct ( 17 ) from the steel tube on the bulkhead,
- the return duct ( 10 ) from the engine coolant piping,
- the petrol feed pipe from the pipe on carburettors.



26. Disconnect the starter-motor feed cable from the positive battery terminal.  
Remove the cable terminal securing screw to uncouple the front harness.

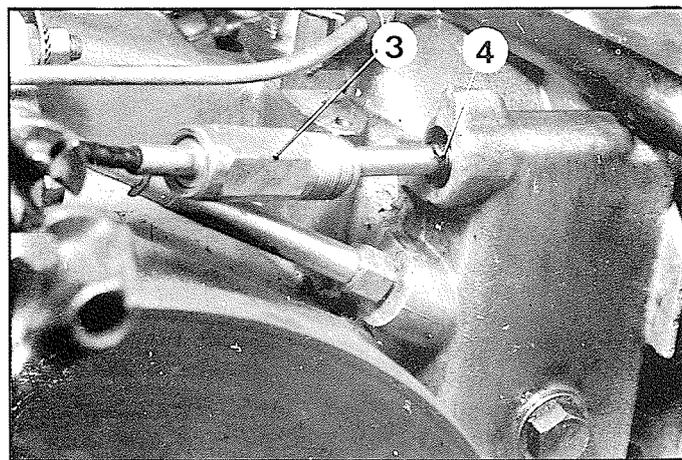


27. Disconnect the wires for the reversing lamp switch and the starter-motor control ( 1 ).

28. Uncouple the speed selector cable from the gearbox :

Unscrew the end-piece( 3 ), free the spring ( 4 ) from the groove of the cable end-piece and remove the cable.

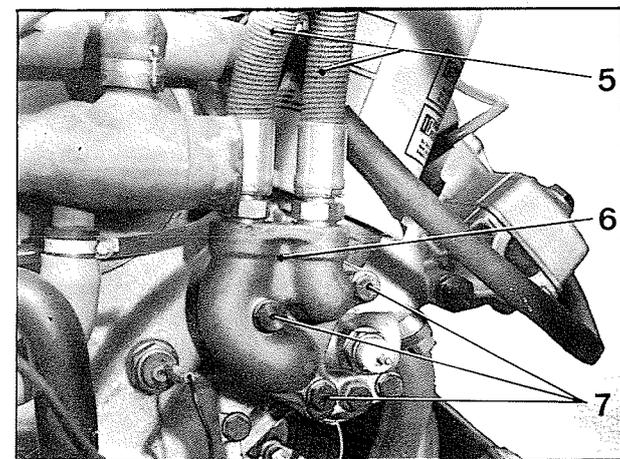
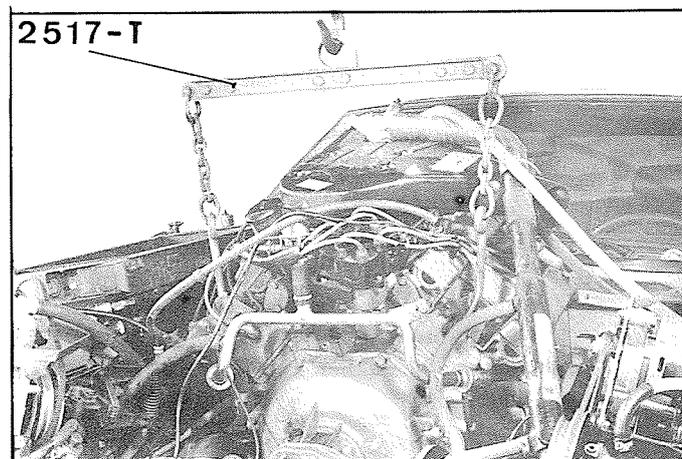
29. Remove the water pipe ( 2 ) on the R.H side and the securing bolts of the rear engine mountings on the chassis.

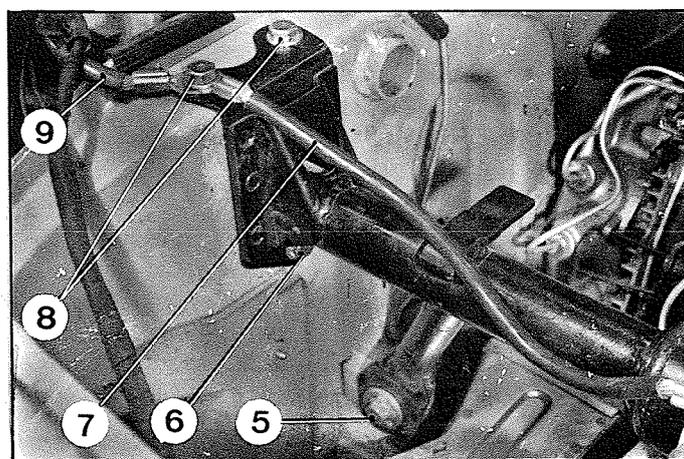
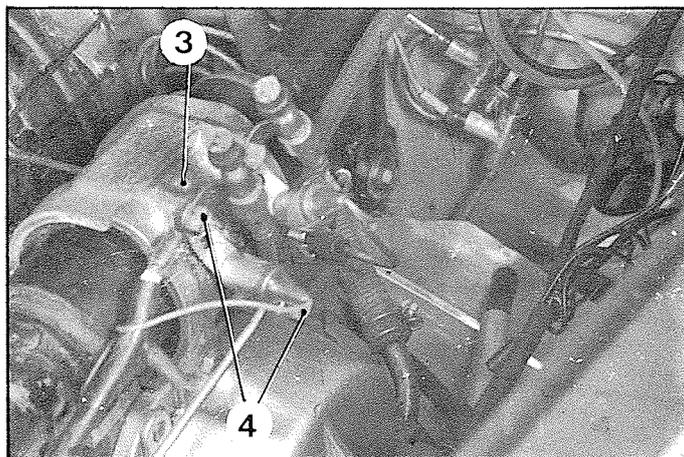
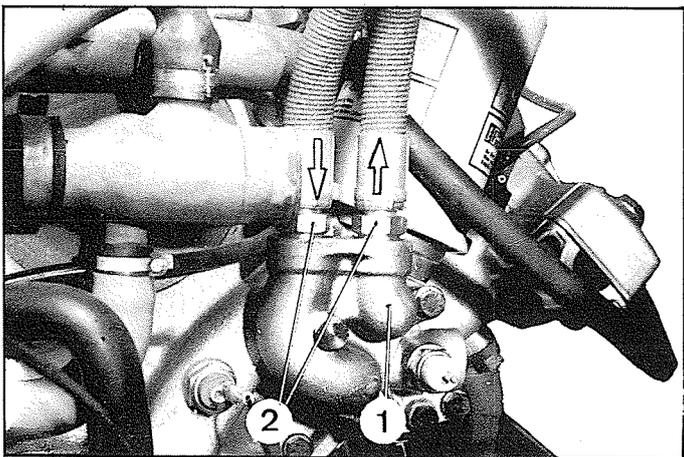
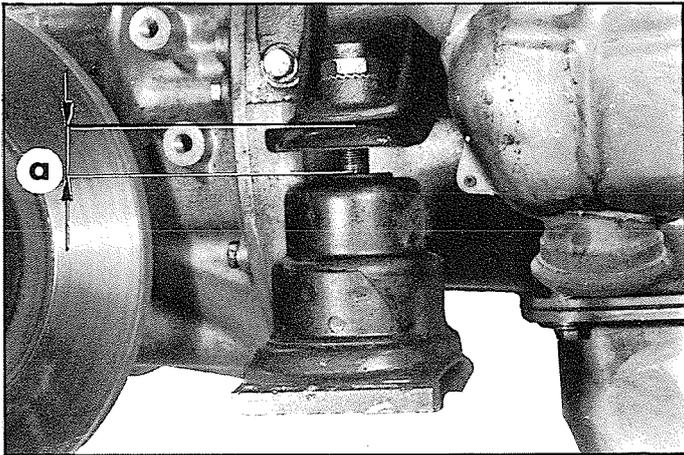


30. Start to raise the engine/ gearbox assembly ( sling 2517-T ) and turn the rear engine mountings a quarter of a turn. Remove the engine/ gearbox assembly, to the limit allowed by the connecting tubes ( 5 ) between the engine and the oil cooler.

31. Remove the screws ( 7 ) and free the housing ( 6 ) and connecting tubes ( 5 ) assembly.  
( Beware of engine oil ).

32. Complete the removal of the engine/ gearbox assembly.





## FITTING.

**33. Adjust the rear engine mountings :**

Operate on the nuts to obtain a distance :

$$a = 26 \pm 0.5 \text{ mm, left side}$$

$$a = 23.5 \pm 0.5 \text{ mm, right side}$$

This preadjustment is valid for new flexible mountings not under load.

Under load, when the assembly is in place in the vehicle, the following distances should be obtained :

$$a = 19.5 \pm 1 \text{ mm, left side}$$

$$a = 18.5 \pm 1 \text{ mm, right side}$$

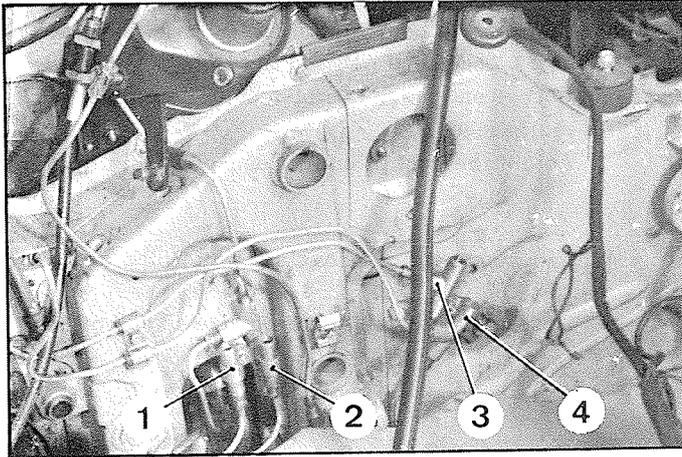
**34. Put the engine / gearbox assembly in place.**  
(sling 2517-T)

NOTE : If the engine has been replaced, remove the thermostat and its housing.

- 35.** If the connecting tubes to the oil cooler have been uncoupled, recouple them to the housing (1) (take note of the marks made when dismantling). Tighten the unions (2) to between 30 and 35 mAN (3 and 3,5 m.kg or 22 and 25,3 ft.lbs) If the tubes have not been uncoupled, position the housing (1) and tighten the securing bolts to 20 mAN (2 m.kg or 14.44 ft.lbs).

- 36.** Ensure that the thrust plates of the engine mountings are parallel to the engine and lower the engine / gearbox assembly to about 10 mm from the thrust face for the mountings. Position the front crossmember, then the engine mountings using the two bolts and complete the positioning of the engine / gearbox assembly. Check the adjustment of the mountings (see § 33 distances under load). Tighten the securing bolts of the engine mountings (contact washer).

- 37. Fit the front crossmember supporting the gearbox :**
- Unscrew the four securing bolts (4) of the half-collar (3) holding the gearbox on the front crossmember.
  - Position without tightening, the lower securing bolts of the crossmember (thick flat washer and contact washer).
  - Tighten the four securing bolts (4) of the half-collar (3).
  - Adjust the lateral position of the front crossmember, to obtain on each side the same distance between the brake disc and sidemember within about 2 mm using the shims placed between the crossmember and sidemember, under the bolts (6).
  - Tighten the upper securing bolts (8) (contact washer). Fit the cables to earth (7) and (9) under the front R.H bolt. Fit the lug for the gearbox oil breather under the rear R.H bolt. Tighten the bolts (8).

**38. Connect the brake pipes :**

Connect the feed pipe of the R.H brake unit to the two-way union (2) and the feed pipe of the L.H brake unit to the union (1). Tighten the securing screw of the support plate for the two pipes on the L.H sidemember.

**39. Fit the feed pipe (5) of the governor and the connecting tube (6) to the flow output regulator.**

Connect tube (5) to union (4) and tube (6) to union (3).

Connect return pipe (8) and overflow return pipes (7) to governor.

**40. Fit the drive shafts.****41. Fit the R.H engine coolant tube.****42. Fit the mechanical brake calipers :**

Position the calipers.

Hand tighten the securing screws.

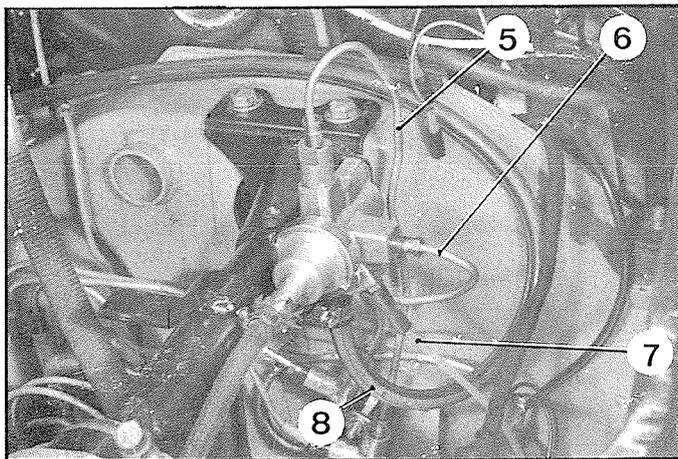
*Ensure that there is a clearance of 5 mm between the lever return springs and the brake disc.*

Tighten the caliper securing screws to between 100 and 110 mAN (10 and 11 m.kg - 72 and 79 ft.lbs).

Fit cable retaining spring on gearbox cover.

Check clearance between brake pads and discs.

Adjust if necessary.

**43. Adjust the brake bands of the gearbox :**

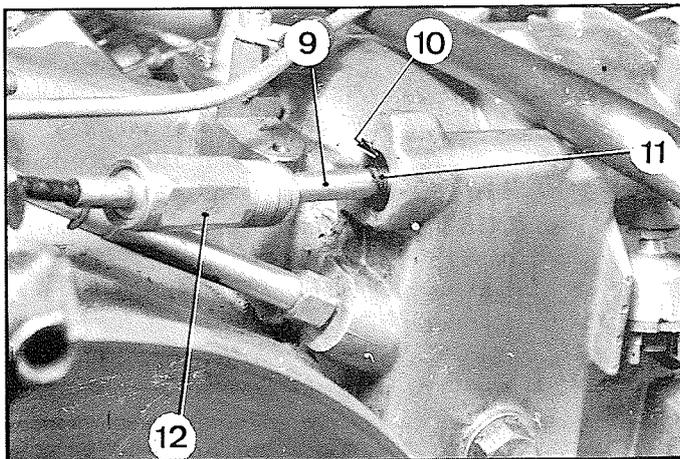
(If the operation has not already been done).

**44. Connect speed selector cable to the gearbox :**

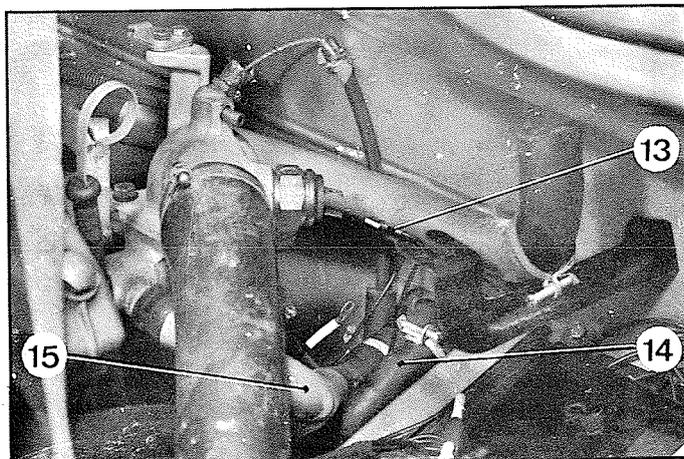
a) Fit cable end-piece (9) onto the extremity of the control valve (10) and position the spring (11). Ensure that the spring is fully engaged in the valve groove.

b) Screw in end-piece (12), tighten it to 30AN (3 m.kg - 22 ft.lbs)

c) *Check adjustment of selector cable.*

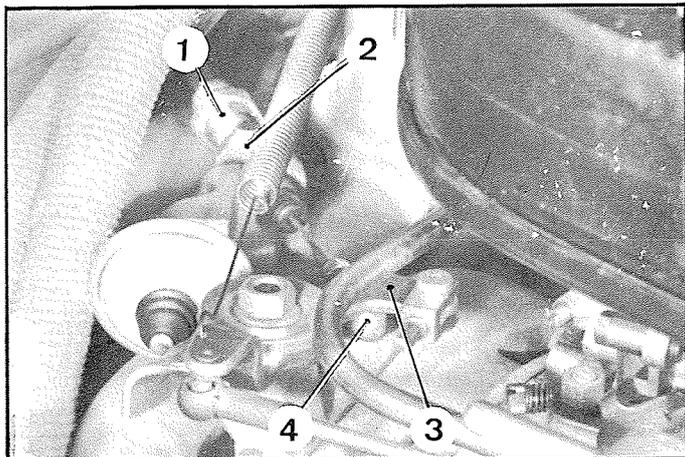
**45. Connect the leads of the brake pad wear warning lamp to the brake pads. Connect the starter motor control harness and the reversing light harness to the switch on the gearbox.**

*Check adjustment of switch.*

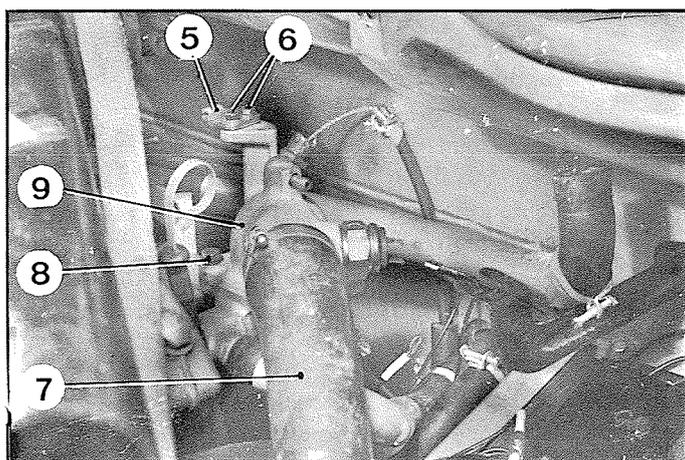
**46. Connect**

- the heating feed duct (14), to the steel tube on the bulkhead,
- the return duct (15) to the engine coolant piping.

**47. Connect the harness (13) of the faulty components detector to the main electrical harness.**



48. **Connect the accelerator control to the engine :**  
Screw end-piece ( 1 ) into lug ( 2 ).  
Couple end-piece ( 4 ) of accelerator cable to return lever ( 3 ).  
Adjust the control and fit end-piece circlip ( 4 ).



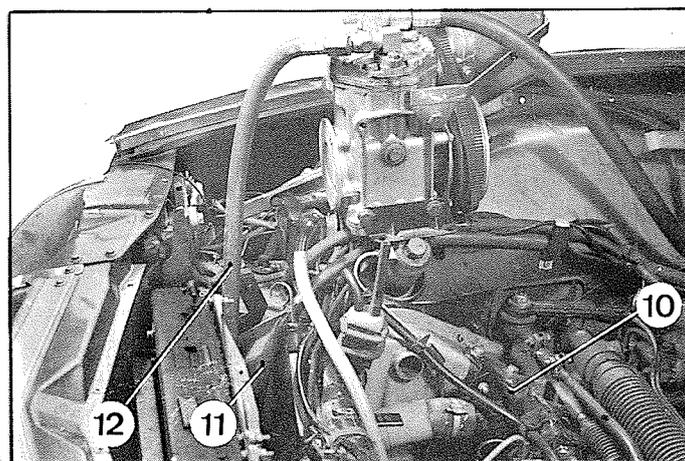
49. **Fit thermostat and housing/ water-pipe assembly ( 9 ) ( 7 ).**  
Moderately tighten securing screws ( 8 ) of housing ( 9 ).

50. **Connect choke control cable to the carburettor control cable clamp and position the sheath end-piece in the lug ( 5 ).**  
Moderately tighten the screw ( 6 ).  
Ensure that the control works correctly.

51. **Fit the water header-tank.**

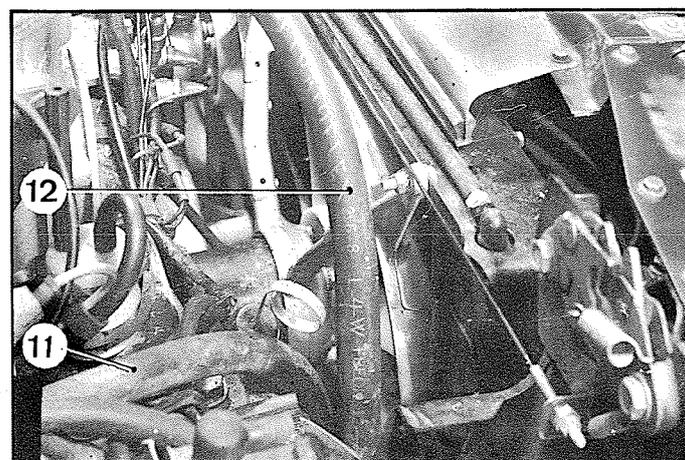
52. **Fit and adjust the steering rack.**

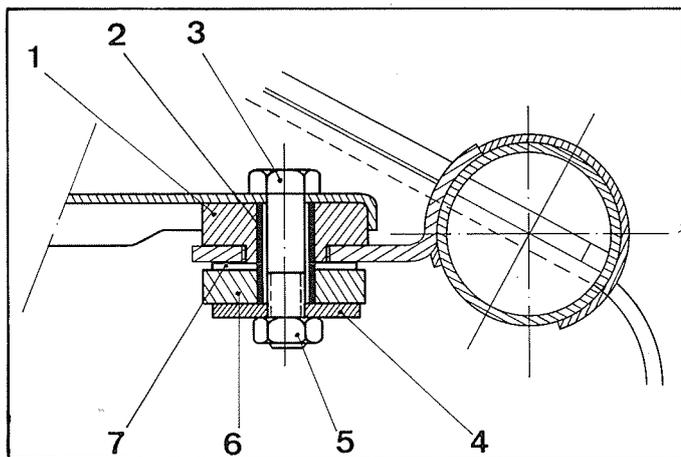
53. **Fit the reinforcement crossmember ( 10 ).**  
Tighten the securing bolts ( contact washer ).  
Fit air filter bracket screw, L.H side. Tighten the second shouldered securing screw of the air filter bracket.



54. **Fit the radiator/ fans assembly : ( and condenser for a vehicle with air-conditioner option ) :**

- Place the fan motors on the brake cooling ducts, pushing them as far back as possible
- Offer up the radiator/condensor/ fluid tank assembly, engaged R.H side first ( Ensure that the rubber blocks are in place on the radiator ).  
**IMPORTANT :** When fitting the radiator, push tubes ( 11 ) and ( 12 ) of the air-conditioning system between the radiator and the R.H side-member under the radiator securing bracket.
- Position the fan motors on the radiator. Tighten the securing screws ( flat and star washers ).
- Connect the two pipes and the vapour tube to the radiator. Tighten the clips.
- Position the radiator and tighten the two Nylstop securing nuts ( wide flat washers ).
- Connect the leads to the thermal-switch for fan control and to the motors.  
Keep the front harness on the crossmember with rubber clips.





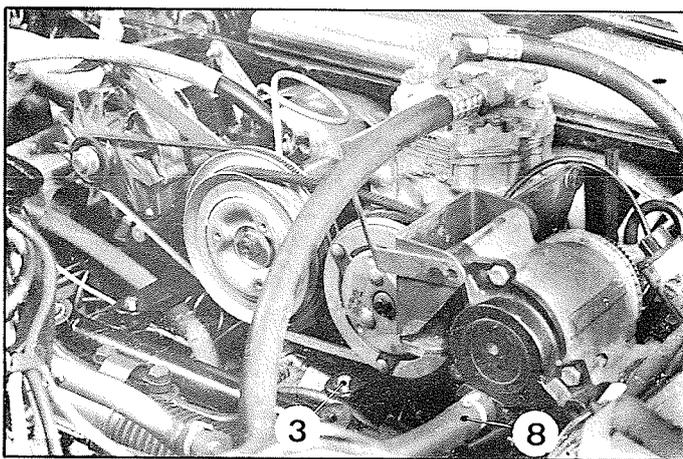
55. Connect the HP output tube of the pressure regulator to the two unions on the L.H sidemember.

56. Fit the plate supporting the components :

Position the plate and fit on the reinforcement crossmember.

Fit in this order :

- the shouldered rubber bush ( 1 ),
- the spacer tube ( 2 ),
- the shim ( washer ) ( 7 ),
- the rubber bush ( 6 ),
- the bolt ( 3 ),
- the washer ( 4 ),
- the nut ( 5 ).



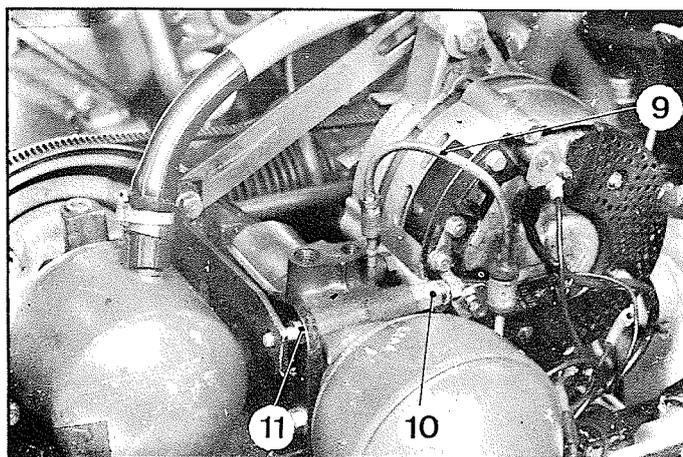
57. Fit the compressor / air pump assembly :

Hand tighten bolts and securing nuts of the compressor gussets ( contact washer ).

Connect tube ( 8 ) to the air pump. Tighten the clip.

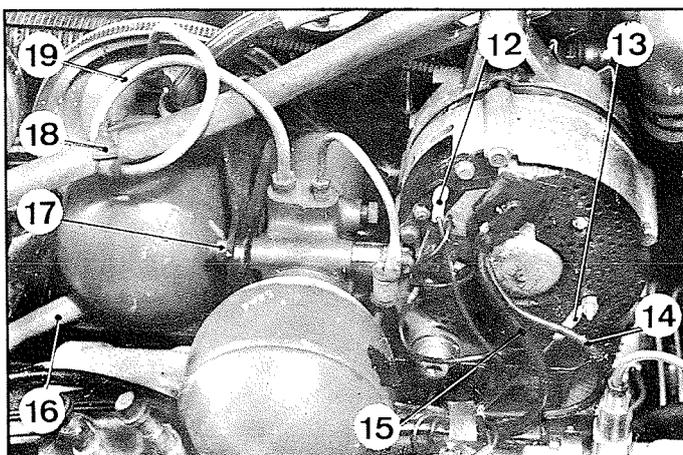
Tension the compressor belt and tighten the compressor gusset securing screws.

*Check tension of alternator and air pump belts.*

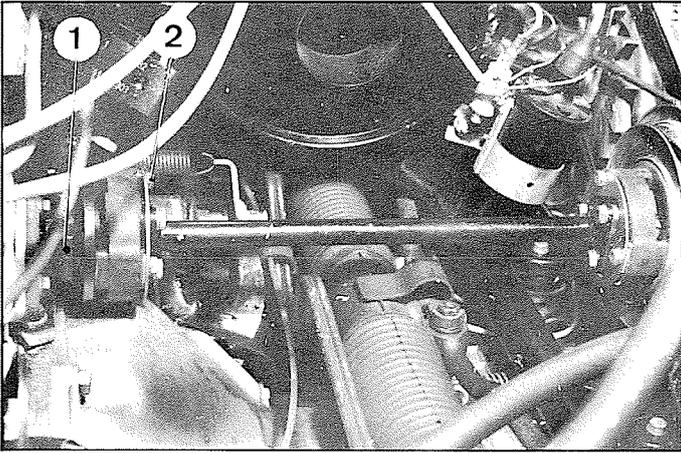


58. Fit the pressure regulator :

- a) Connect return tube ( 16 ) to regulator.
- b) Position the regulator. Fit shouldered screw ( 10 ) nuts ( 11 ) and ( 17 ) and the two securing screws ( contact washer ).
- c) Fit the tube joining the H.P pump to the regulator ( 19 ) while running the speedometer cable as indicated in the appropriate figure opposite. Fit the rubber clip ( 18 ).
- d) Connect HP output tube ( 9 ), to the regulator. Fix the support tube clamp ( 9 ) to the regulator ( star washer under the nut ).



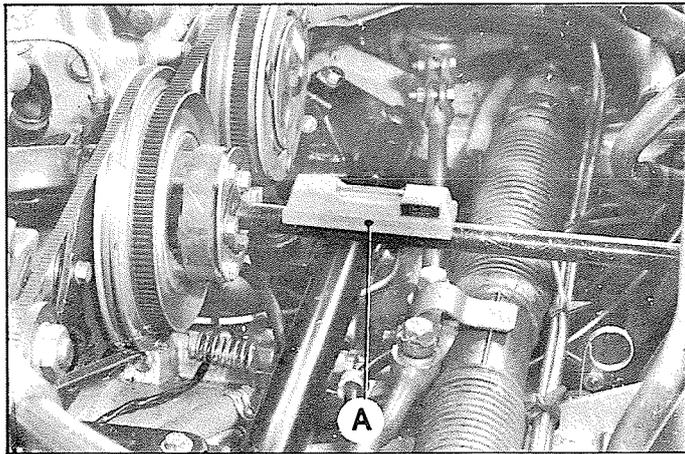
59. Connect leads ( 12 ), ( 13 ), ( 14 ) and ( 15 ) to the alternator.



#### 60. Fit the HP pump control shaft :

- a) Ensure that the control shaft drive (1) slides freely but without play on the intermediate timing shaft ( TOTAL MULTIS grease ).
- b) Position the shaft. Tighten securing screws (2) to 10 mAN ( 1 m.kg - 7.22 ft.lbs ) ( contact washer ).
- c) Check the control shaft alignment :
  - Place a spirit level on one of the cylinder head covers and bring the bubble to zero.
  - Then place the spirit-level on the control shaft : the bubble should lie between zero and 1° ( slope of 17.5 mm per metre )

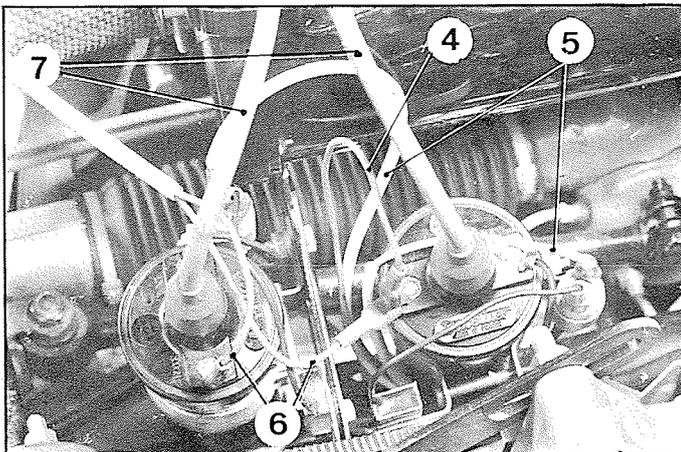
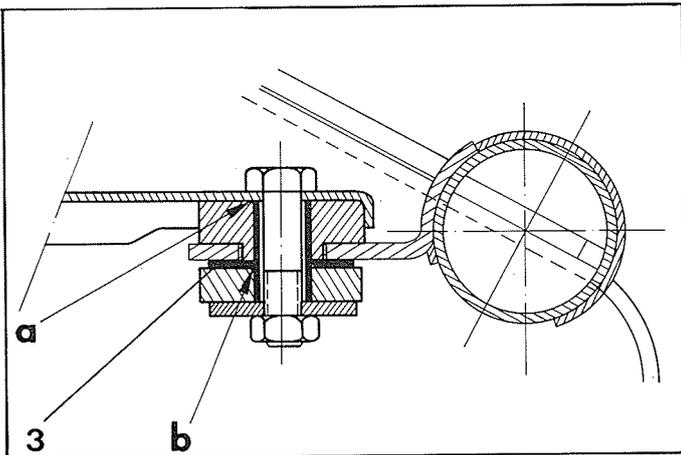
If this is not the case, add adjusting shims as necessary at « a » after removing the one at « b » ( attachment for the plate supporting the components on the reinforcement crossmember ).



#### 61. Connect the petrol feed pipe to the pipe of the carburetors.

#### 62. Fit the air filter/coils/bracket assembly :

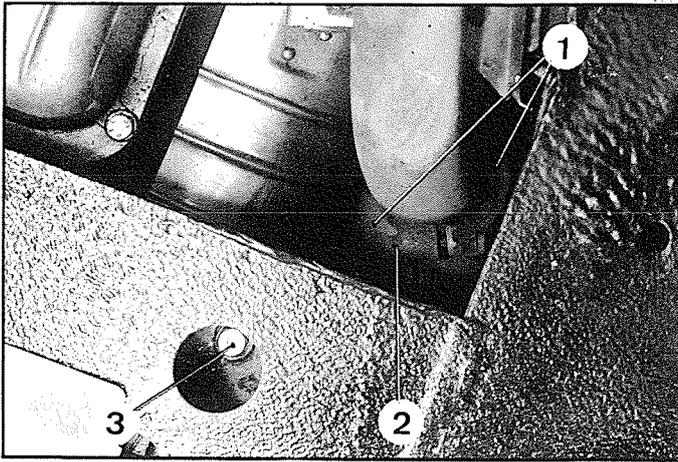
- a) Position this assembly and tighten the securing screw on the crossmember ( contact washer ).
- b) Fit the clamps for the air filter and the inlet tube.
- c) Fit the tube linking the filter to the air box.
- d) Fit the support clamp of the rear connecting duct between the gearbox and the heat exchanger.
- e) Connect :
  - the feed (5) and tachometer (4) leads to the coils,
  - the high tension lead (7) to the distributor,
  - the outlet lead (6) to the condenser.



#### 63. Fit front suspension units. Turn until finger-tight.

#### 64. Connect the cables to the battery.

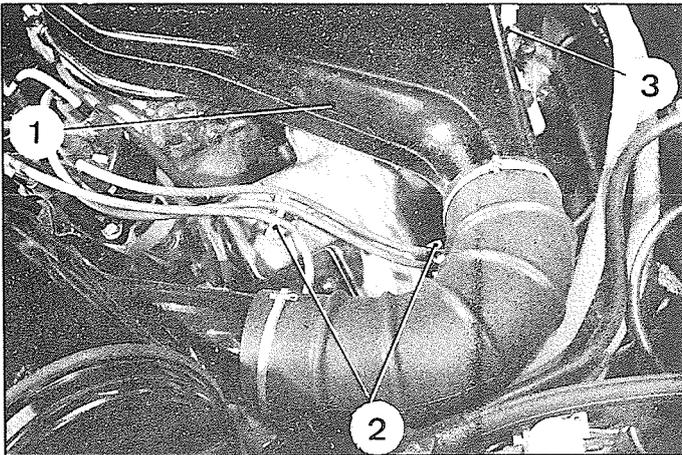
#### 65. Fill the engine with oil. Check the oil-level of the differential housing ( TOTAL HIGH PRESSURE SAE 80 oil ).



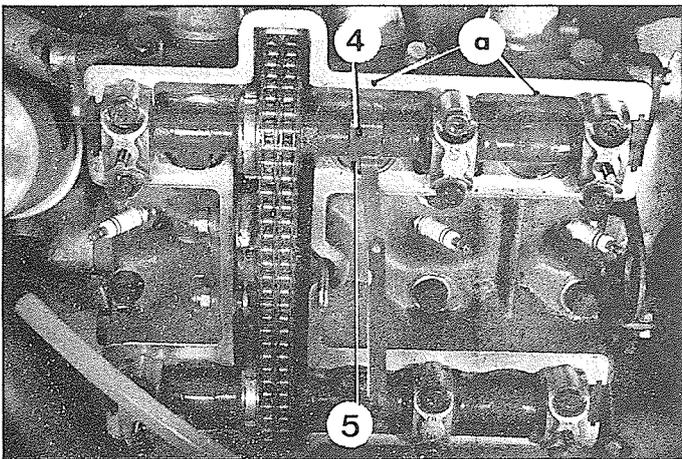
66. Lower the vehicle to the ground.  
Re-pressurise the circuits.  
Re-fill the cooling circuit with heating control open and engine running.
67. Check the gearbox oil-level, engine running ( TOTAL ATF 33 oil ).
68. Position the vehicle on a lift or over a pit.  
Connect the exhaust down pipe to the cylinder head exhaust manifold.  
Tighten the securing nuts ( 2 ) of the clamps ( 1 ) ( contact washer ).  
Check the tightness of the engine mountings securing bolts ( 3 ) and position the rubber plugs.
69. Connect the bonnet fastener connecting cable to the L.H lock and check the operation of the control.
70. Fit the bonnet, taking note of the marks made when removing.
71. Bleed :
  - the steering,
  - the front brakes.
72. Check :
  - the operation of the heating system,
  - the steering straight-ahead position ( road -test ).

◆ CHECKING AND ADJUSTMENT OF THE VALVE CLEARANCES

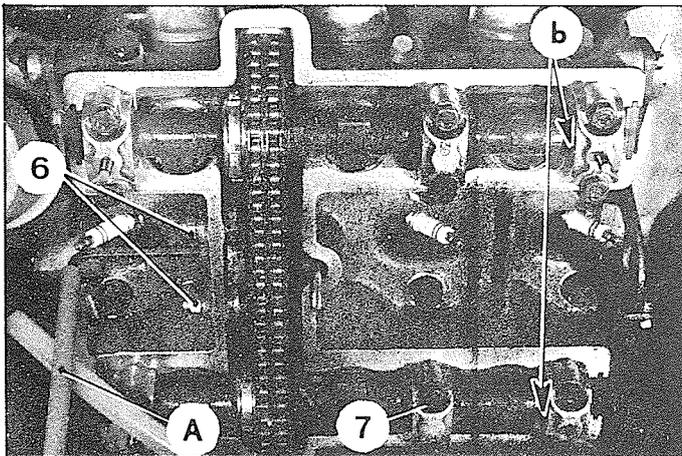
8.5.55



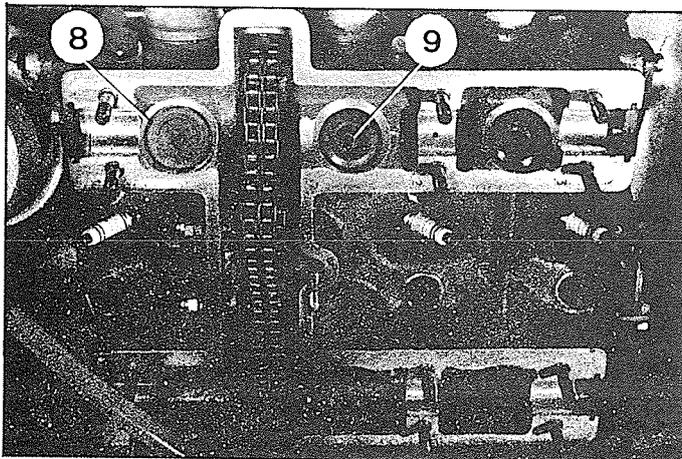
8.5.41



8.5.43



8.5.47



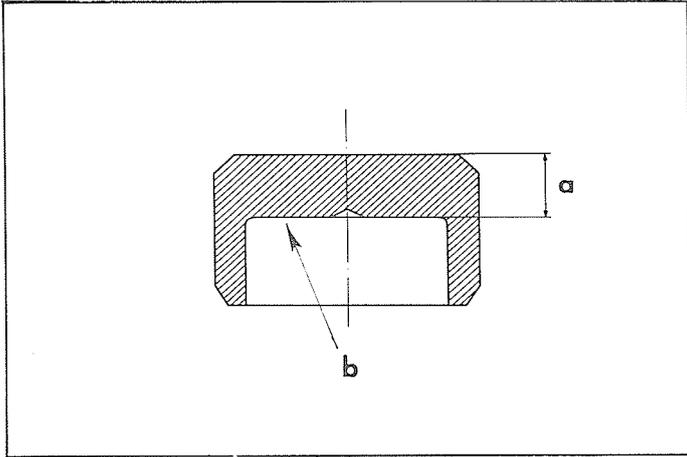
## CHECKING.

REMARK - *This operation should be done separately on each of the two cylinder heads.*

1. *Strip the right cylinder head (cylinders No. 1 - 2 - 3):*  
Disengage the assembly of the wire holders and the wires of the spark plugs.  
Disconnect the tube from the vacuum tank.  
Loosen the nuts and remove the cylinder head cover. (nuts held by circlips).
2. *Strip the left cylinder head (cylinders No. 4 - 5 - 6):*  
Uncouple the ducts of the air intake and gas recycling system from the cover (1) of the air intake assembly. Remove the cover (1).  
Disengage the assembly of the wire holders (2) and the wires of the spark plugs.  
Remove the oil dipstick (3).  
Loosen the nuts and remove the cylinder head cover (nuts held by circlips).
3. *Measure the clearance of the valves:*  
*This clearance should be:*  
Intake = 0,30 to 0,35 mm (.012" to .014")  
Exhaust = 0,50 to 0,55 mm (.020" to .022")  
a) Raise one front wheel, shift into 5th speed and rotate the front wheel in order to bring a cam (4) *to its position of maximum clearance* in relation to its corresponding lifter (5).  
b) Measure this clearance with feeler gauges and, with a suitable crayon or pencil, note it at "a" on the gasket surface of the cylinder head.  
To obtain greater precision, use if need be, brass or steel shim stock 0,03 mm (.001") thick.  
c) Proceed likewise for the other valves and note the clearances read at each valve.

## ADJUSTMENT

4. *Remove the camshafts:*  
Rotate the raised wheel (in the forward direction) in order to turn the motor, and bring the reference marks "b" of the camshafts in line with the reference marks stamped on the bearing caps.  
ATTENTION: On the camshafts of the left cylinder head there are two types of reference marks. *Use the shorter ones. Do not uncouple the timing chains.*  
Mark (with a touch of paint) the position of the timing pinions in relation to the chain.  
Loosen the nuts (6) and slacken the chain (6 mm. Allen wrench and extension A).  
Remove the nuts (7) and the bearing caps.  
Remove the exhaust camshaft first, then remove the intake camshaft.
5. Remove the lifters (8) by hand, with the help of a suction cup. *Do not mix them.*  
Disengage the adjusting spacers (9).  
*Place them with their corresponding lifters.*



6. Be sure that the inside support surface "b" of the adjustment spacer is in good condition and measure the thickness "a" of each spacer.

Choose, from among those sold by the Parts Department, the spacers which will permit obtaining the correct clearance of the valves.

**7. Install the camshafts:**

- a) Set in place, the spacers (2) and the lifters (1) previously oiled.
- b) Position the intake camshaft.
- c) Position the exhaust camshaft while respecting the reference mark (touch of paint) made on disassembly.
- d) Mount the bearing caps (respect the reference marks stamped on the bearing caps and the cylinder head). Tighten the nuts to 19-20 ft. lbs. (use flat washers).
- e) Tension the timing chain to 15 ft. lbs. or 22 lbs. if using a tensiometer (6 mm. Allen wrench, extension MR 630-13/5 and tensiometer). Tighten the nuts (3) to 15 ft. lbs.
- f) Check the position of the reference marks. (See paragraph 4).
- g) Check the valve clearances:  
Intake : .012" - .014"  
Exhaust: .020" - .022"

8. Proceed in the same manner for the other cylinder head. (See paragraphs 3 to 7).

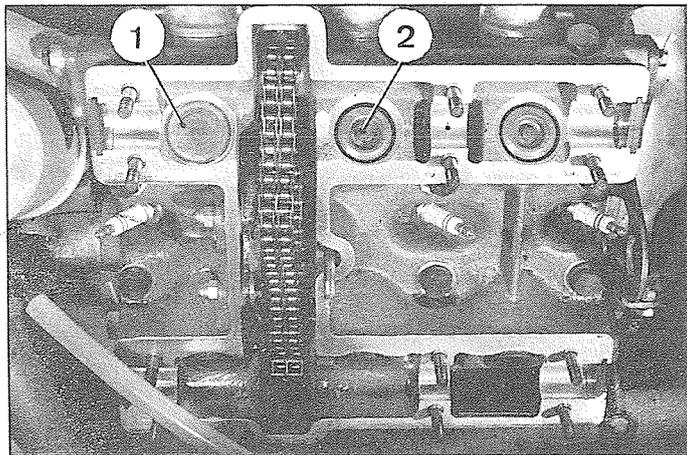
**9. Redress the right cylinder head:**

Replace the cylinder head cover, insert the gasket. Tighten the nuts (5) to 7-8½ ft. lbs. Replace the assemblies of the spark plug wires and wire holders (4). Reconnect the tube (6) to the vacuum tank (7).

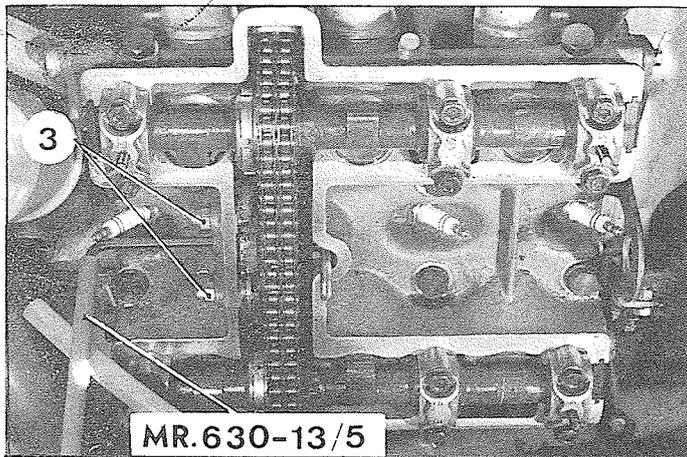
**10. Redress the left cylinder head:**

Replace the cylinder head cover; insert the gasket. Tighten the nuts to 7-8½ ft. lbs. Replace the oil dipstick (8) and the assembly (9) of the spark plug wires and the wire holder. Replace the cover (10) of the air intake assembly. **Be careful of the gasket**, and moderately tighten the nuts (flat washer). Connect the flexible ducts of the air intake and gas recycling system to the air intake assembly.

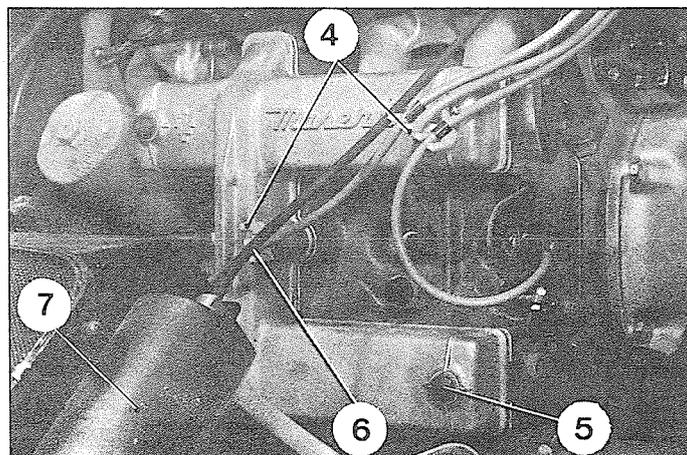
S. 12-2



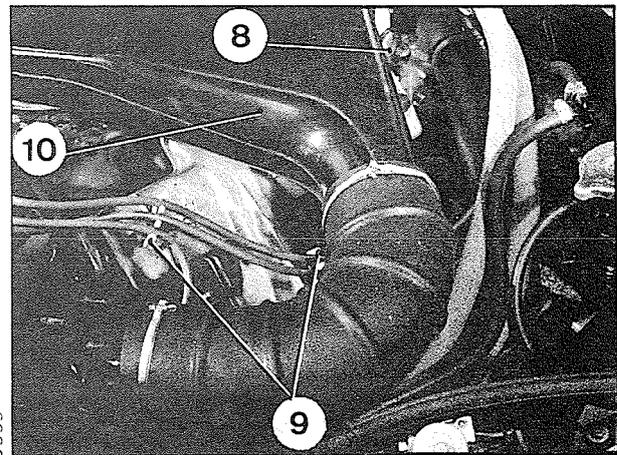
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8.543



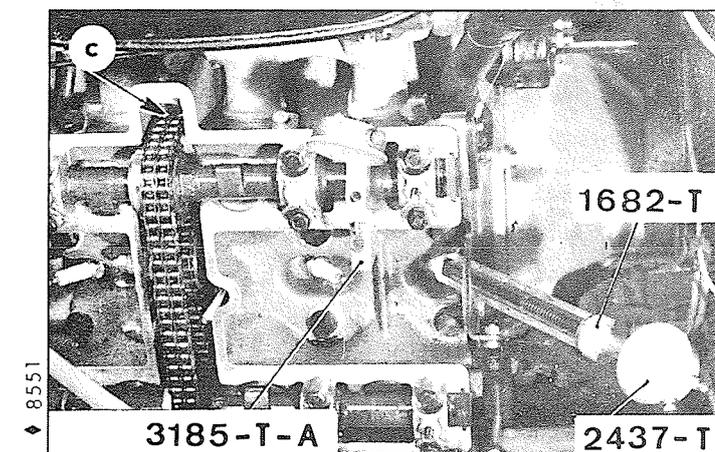
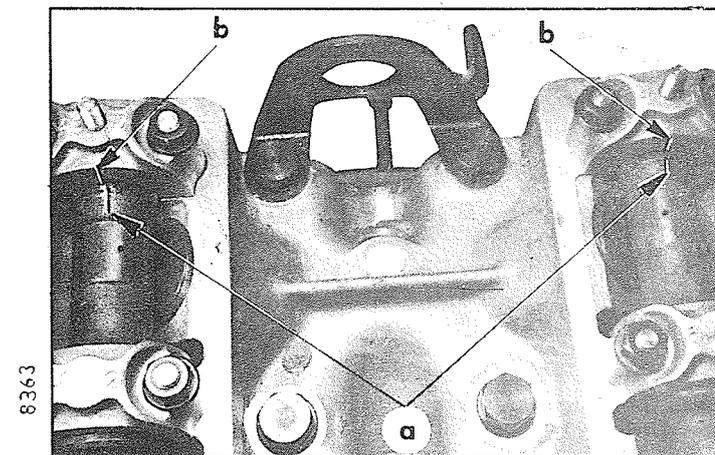
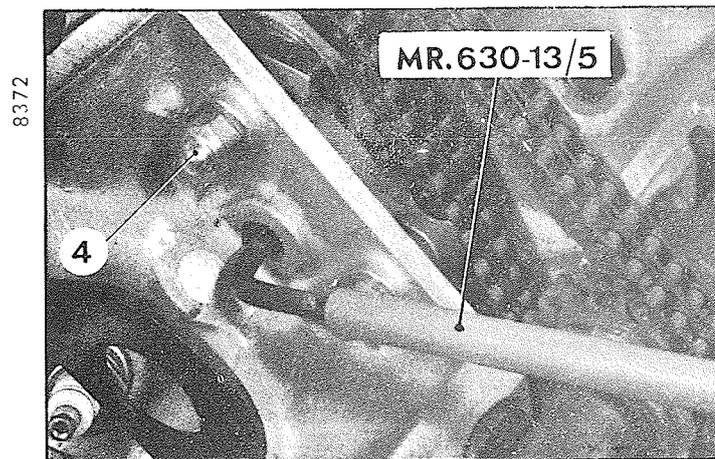
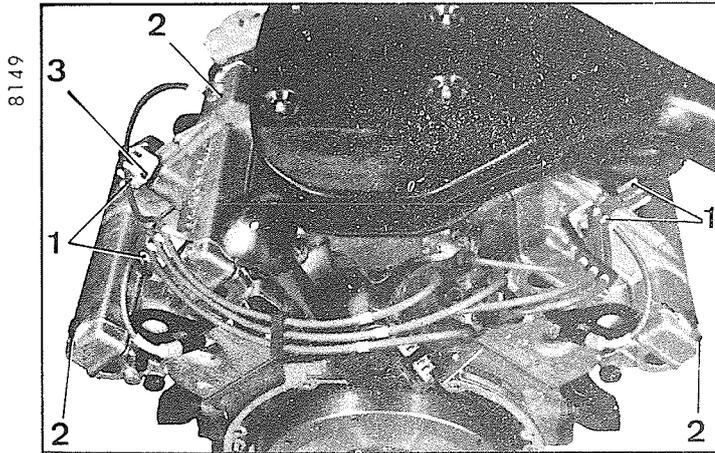
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## CHECKS AND ADJUSTMENTS OF THE VALVE TIMING

### (Adjustment of the pressure of the chains)



- ◆ 1. Raise and support one side of the car in such a manner as to have one front wheel suspended. Shift into 5th speed.
- 2. Remove:
  - the nuts (3) and the wire holders (1).
  - the nuts (2) fastening the cylinder head covers.
  - the cylinder head covers.
- 3. Check the clearance of the valves of cylinders No. 1 and No. 6 (motor cold)
  - Intake : .012" to .014"
  - Exhaust: .020" to .022"
- 4. Adjust the tension of the timing chains:
  - Loosen the nuts (4).
  - With the help of the wrench MR 630-13/5, tension each chain to a torque of 15 ft. lbs. (or 22 lbs. if using a tensiometer attached to the end of the wrench).
  - Lock the nuts (4).

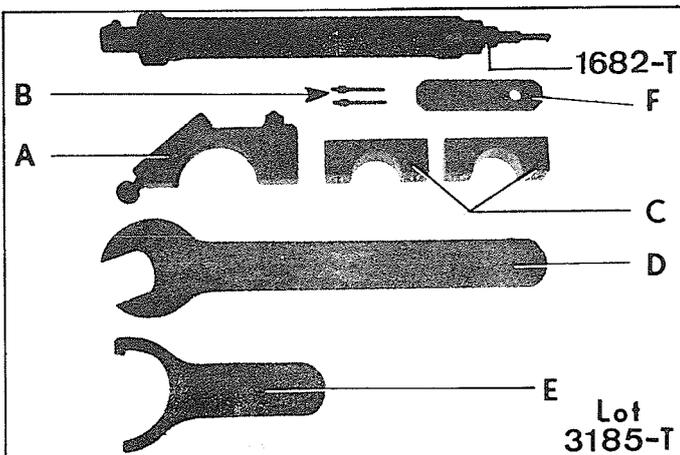
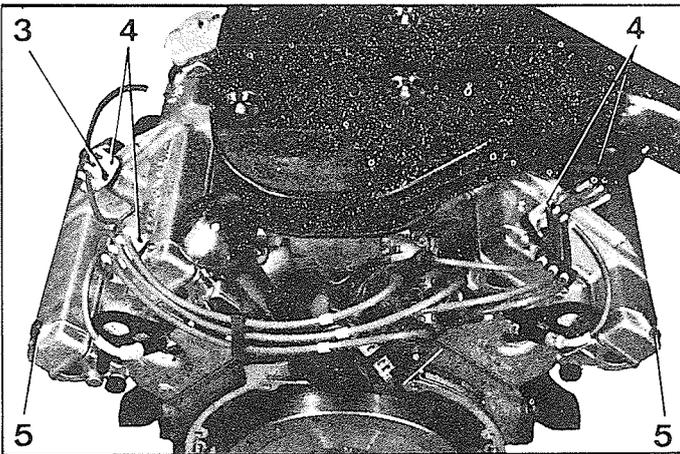
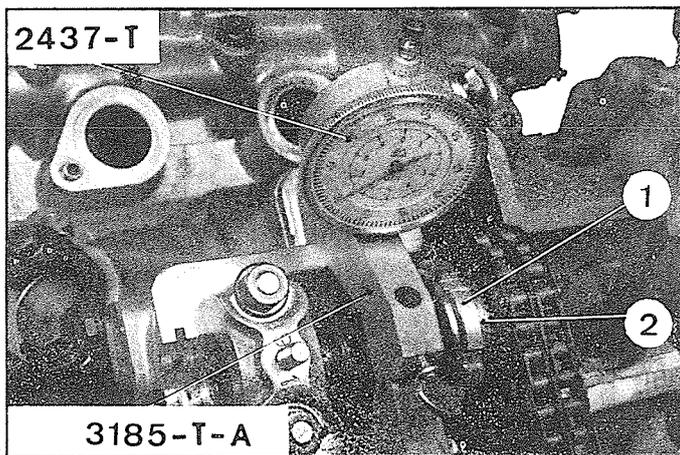
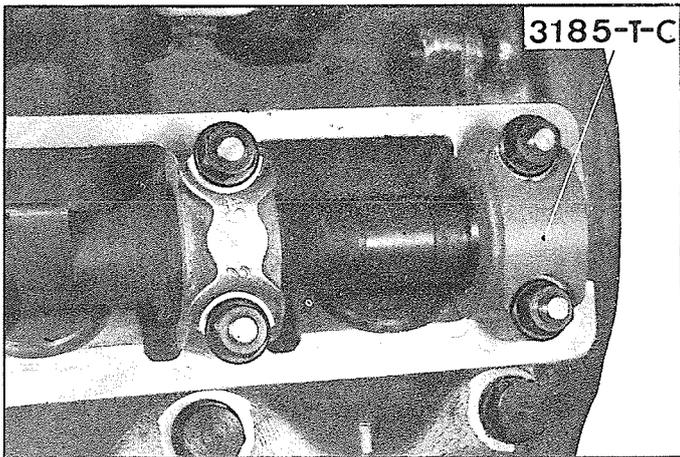
**VERY IMPORTANT:** *It is imperative that the clearance of the valves and the tension of the chains be correctly adjusted. If not, the operation will be faulty.*

- ◆ 5. Check the adjustment of the valve timing:
    - a) Remove the spark plug of cylinder No. 1 and mount in its place the support 1682-T fitted with the dial indicator 2437-T.
    - b) Turn the raised wheel (in the forward direction) in order to bring piston No. 1 to TDC, the valves being in "balance" (exhaust valve at the end of exhaust, intake valve at the beginning of intake). At this moment the reference marks "a" of the camshafts should be found in line with the stationary reference marks "b" of the bearing caps (for a new motor) and the reference mark "o" stamped on the intermediate timing shaft is visible through the hole "c" of each of the two cylinder heads.
- If not, it is necessary to proceed with the calibration of the, or those, camshafts which are not correctly adjusted.

**ATTENTION:** On the camshafts of the left cylinder head there are two reference marks. The longer one corresponds to the TDC (balance) of piston No. 1. The shorter one corresponds to the TDC (balance) of piston No. 6.

To calibrate the camshafts of the left cylinder head, place piston No. 6 at TDC (balance) which should be 90° (flywheel) after TDC of the piston No. 1.

**REMARK:** For the TDC position of piston No. 6 there is no reference mark "o" on the intermediate timing shaft.



◆ 6. *Adjust the intake camshafts (if necessary):*

a) The motor being always in the position described in paragraph 5, lock the camshaft by replacing one of its bearing caps by a false cap, tool No. 3185-T-C.

b) Unlock the ring nut (1) and disengage the washer (2) from its notches.

c) Loosen the false cap 3185-T-C. Set in position (see figure) the support 3185-T-A together with the dial indicator 2437-T (equipped with the extension finger 3185-T.B.). Hold the support with the help of the plate 3185-T.F.

The extension finger of the dial indicator should rest on the lifter of the intake valve of cylinder No.1 (right cylinder head) or No.6 (left cylinder head).

The camshaft, no longer being solid with its drive train, the intake valve is returned to its seat. Bring the "zero" of the movable dial of the indicator in line with the large needle.

With the help of the wrench 3185-T.D., turn the camshaft by small fractions of a turn to obtain: *a forcing down of the lifter equal to 1 mm (.040")*.

d) Choose a position of the washer (2) so that its teeth engage all the way into those of the pinion. Tighten the ring nut (1).

e) Lift the extension finger of the dial indicator and turn the motor approximately  $\frac{1}{4}$  turn opposite to its normal running direction.

Check the timing (see paragraph 5).

f) Remove:

- the plate 3185-T.F.
- the support 3185-T.A.
- the support 1682-T
- the false cap 3185-T.C.

Mount the camshaft bearing and the spark plug of cylinder No.1 (right cylinder head) or No.6 (left cylinder head).

7. *Adjust the exhaust camshaft (if necessary):*

Proceed in the same manner as for the intake camshaft, so as to obtain, on the exhaust valve of cylinder No.1 (right cylinder head), or No.6 (left cylinder head): *a forcing down of the lifter equal to 1,3 mm (.050")*.

8. Replace the cylinder head covers. Tighten the nuts (5) mounting the cylinder head covers. Replace the wire holders (4). Tighten the screws (3). Reposition and connect the spark plug wires.

9. Set the car on the ground. Place the shift lever in "neutral" position.

NOTE: The special tools, necessary for the checking and adjustment of the valve timing, are sold as a kit, under the number 3185-T. The kit comprises:

- the support for the dial indicator 1682-T
  - the support for the dial indicator
  - two extension fingers for the dial indicator
  - two false bearing caps
  - the wrench (for the camshafts)
  - the wrench (for the camshaft nut)
  - the holding plate
- A  
B  
C  
D  
E  
F

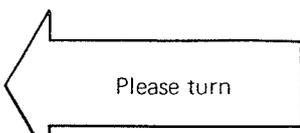
# CARBURETION

## I. CHARACTERISTICS OF THE CARBURETORS

1. **REFERENCE:** 3 Carburetors..... WEBER 42 - DCNF 2

2. **SPECIFICATIONS:**

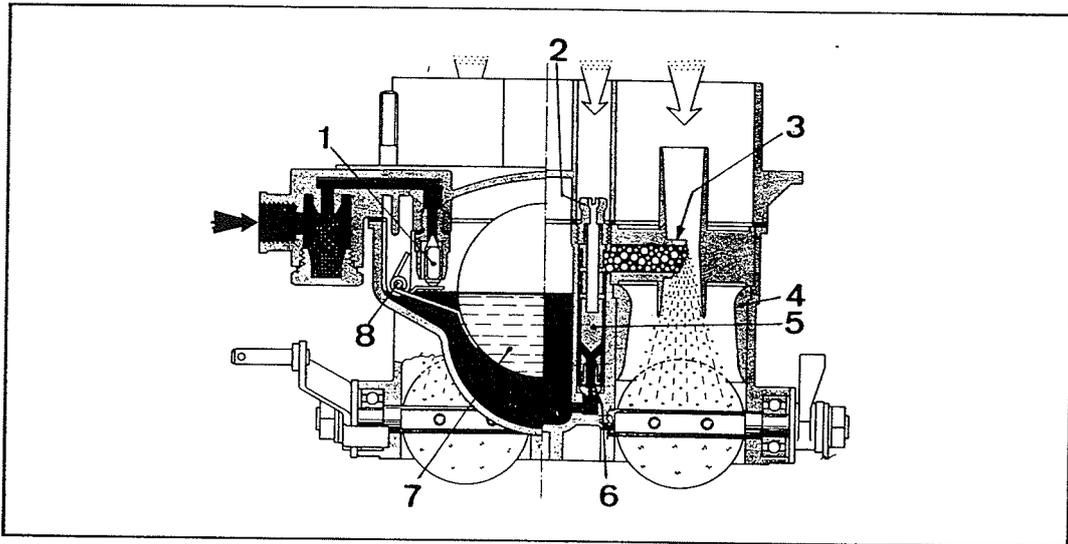
Designation	Size (mm)	Number Required
Venturi.....	32	2
Nozzle.....	3,5	2
Main Jet.....	1,30	2
Emulsion Tube.....	F .25	2
Air Correction Jet.....	1,80	2
Idling Jet.....	0,50	2
Accelerator Pump Jet.....	0,40	1
Choke Jet.....	F .7/80	2
Needle and Seat.....	1,75	1
Accelerator Pump Check Valve.....	1	1



## II. FUNCTIONING SCHEMATICS

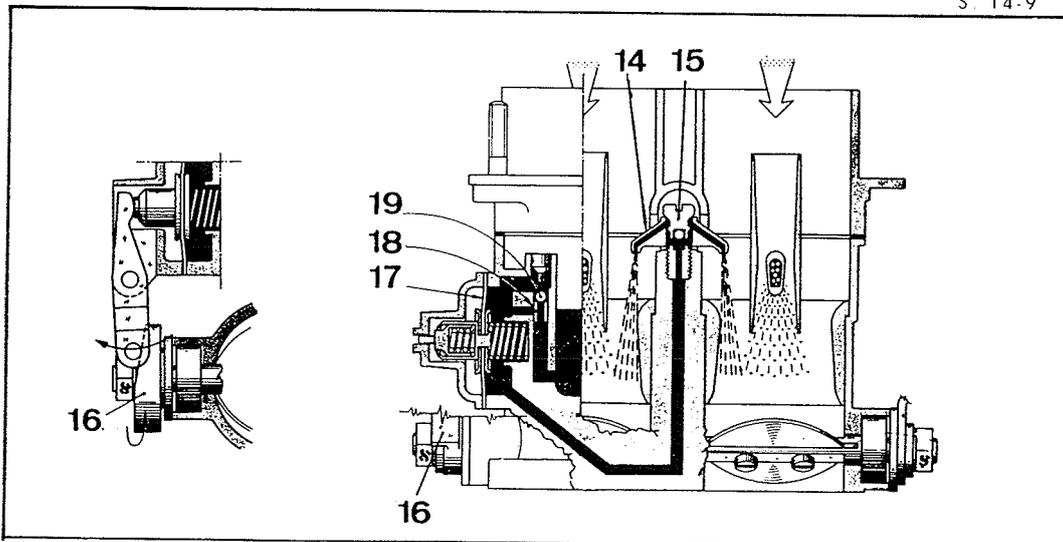
1 - Normal running circuit

S. 14-8



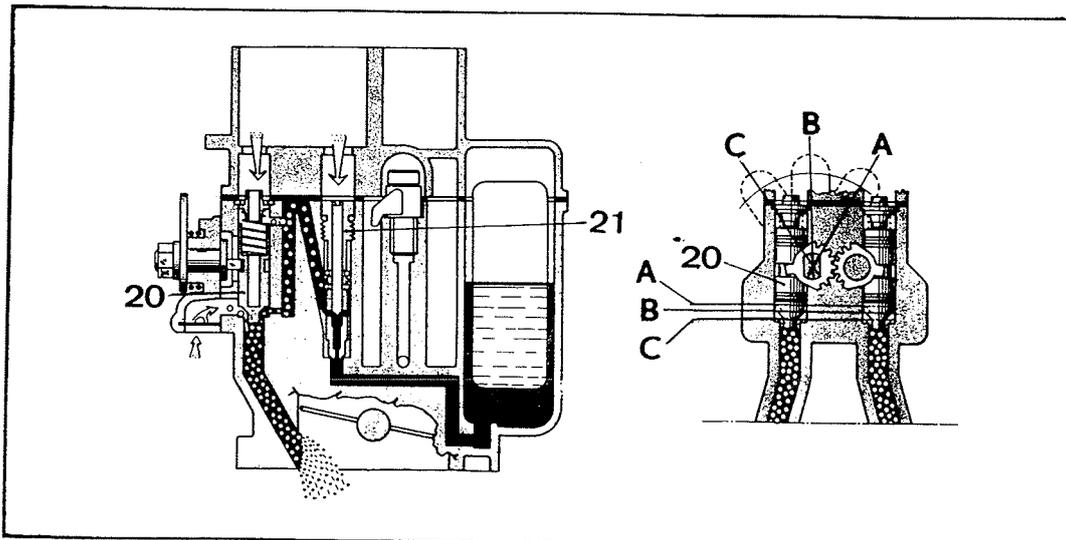
2 - Accelerator pump circuit

S. 14-9



3 - Choke circuit

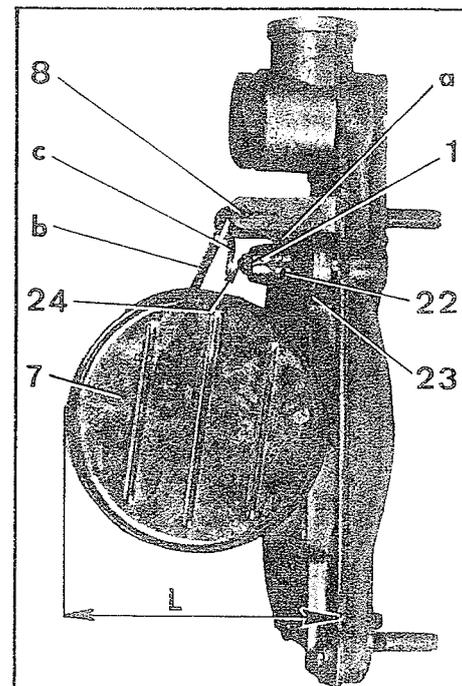
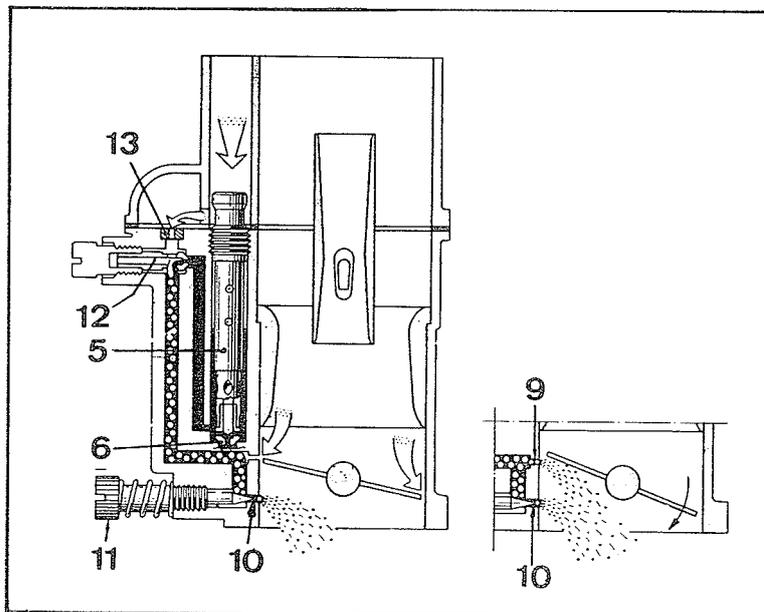
S. 14-10



8385

## 4 - Idling circuit

S. 14-11



## 5 - Legend of the schematics of operation:

- 1: Needle and seat - 2: Air correction jet - 3: Nozzle - 4: Venturi - 5: Emulsion tube - 6: Main jet - 7: Float - 8: Float pin - 9: Idling progression port - 10: Idling port - 11: Mixture screw - 12: Idling jet - 13: Idling air jet - 14: Accelerator pump jet (injector) - 15: Accelerator pump check valve - 16: Cam of the accelerator control - 17: Accelerator pump diaphragm - 18: Passage for feeding and return of excess fuel from the accelerator pump - 19: Suction valve of the accelerator pump - 20: Choke piston chamber - 21: Choke jet.

- Position A of the choke: corresponds to the starting of a cold motor.
- Position B of the choke: corresponds to a luke warm motor.
- Position C of the choke: corresponds to a hot motor. The effect of the choke is nullified.

## 6 - Adjustment of the float level:

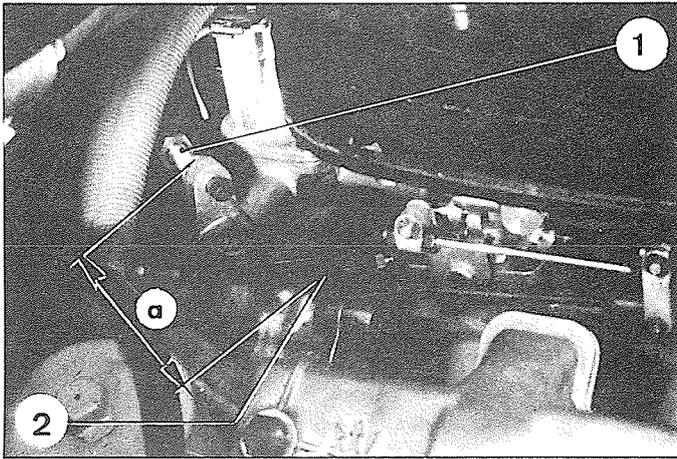
- a) Be sure that the seat (22) of the needle is correctly threaded into its recess with its gasket (23).
- b) Hold the cover of the carburetor vertically, the weight of the float (7) should drop the ball (24) mounted on the spring inside the needle (1).
- c) Verify that the float moves freely on its pin (8).
- d) Adjust the level of the float (7).

- **At the closed position of the needle (1):** Incline the cover in such a manner that the tongue "c" of the float (7) comes in *slight contact* with the ball (24). Measure the distance "L".

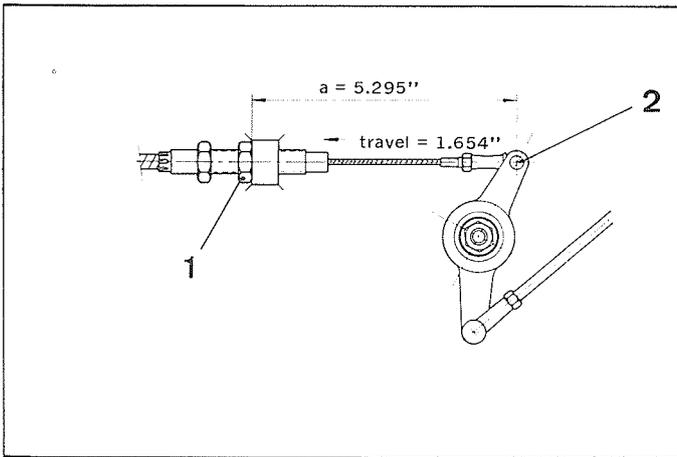
The dimension (L) is measured between the plane of the cover *without the gasket* and the lowest rim of the float (7). In this instance, (L) should be 48 mm  $\pm$  0,25 (1.88" to 1.99"). If not, slightly bend the arm "b" being sure that the tongue "c" remains perpendicular to the axis of the needle (1) and that its surface presents no roughness which can influence the movement of the needle.

- **At the fully opened position of the needle (1):** Incline the cover so that the tongue "a" comes to rest against the seat (22) of the needle. Measure the distance "L". In this instance "L" should be 56,5 mm (2.224"). If not, slightly bend the tongue "a".

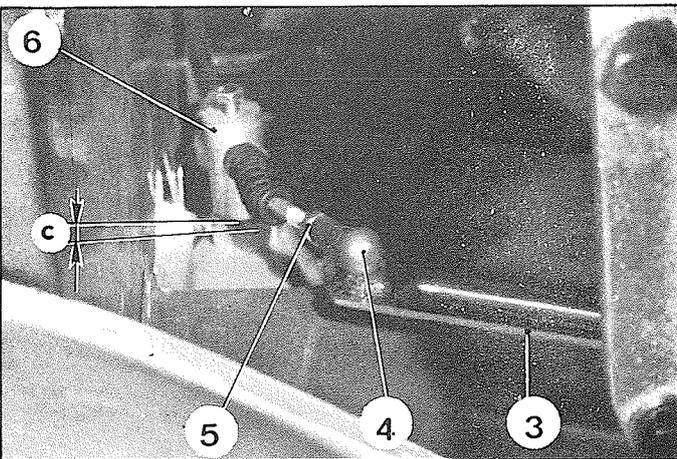
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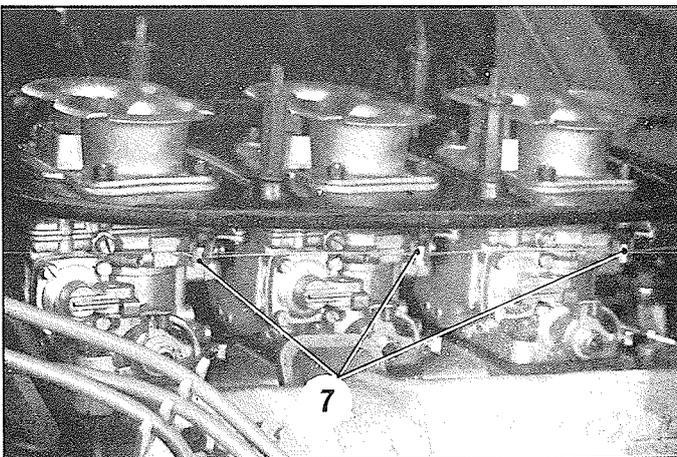
S. 14-7



8605



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**INSPECTION AND ADJUSTMENT OF THE LINKAGE**

**1. Adjustment of the control cable:**

- a) Verify that:  $a = 134,5 \text{ mm (5.295" )}$   
(distance between the axis of the ball joint (2) of the control rod, and the pressure face of the lock-nut (1), locking the cable housing).  
If not, work the lock-nut (1).
- b) Verify that:  $c = 1 \text{ to } 2 \text{ mm (.040" - .080" )}$   
(distance between the stop of the cable housing (6) and the nut welded onto the chassis).  
If not, disengage the housing from the stop (6) and screw the stop in or out.

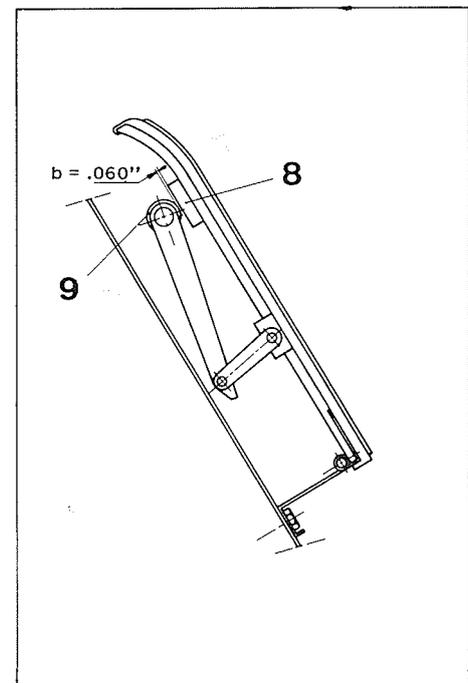
**2. Adjustment of the accelerator pedal:**

- a) Set the throttle valve butterflies to "full open" position.
- b) Verify that:  $b = 1,5 \text{ mm (.060" )}$   
(distance between the thrust plate (8) on the accelerator pedal and the support (9) for the return lever shaft ).  
If not:
  - disengage the ferrule (4) of the ball and socket joint by removing the retaining circlip.
  - unlock the counter-nut (5) and screw the ferrule (4) in or out in order to obtain the dimension "b".
 Engage the ferrule (4) on its ball joint and replace the retaining circlip. Tighten the counter-nut (5).

**3. Adjustment of the choke control:**

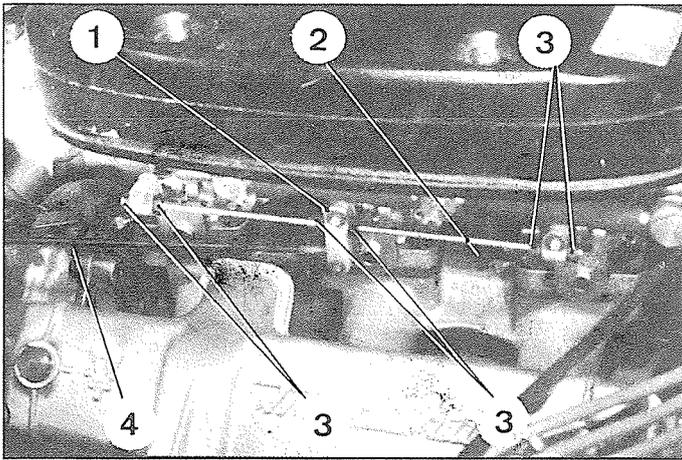
- The choke cable being pushed all the way in, be sure that:
- a) The three choke control levers (7) are pushed all the way toward the front (levers "bottomed" against the carburetor bodies).
  - b) *The clearance* between the knob of the choke cable and the dashboard is:  
 $1 \text{ to } 2 \text{ mm (.040" to .080" )}$

S. 14-6



## INSPECTION AND ADJUSTMENT OF THE CARBURETORS

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4. *Adjustment of the connector rod (2):*

*The adjustment of this connector rod is of great importance. It determines the synchronization of the three carburetors.*

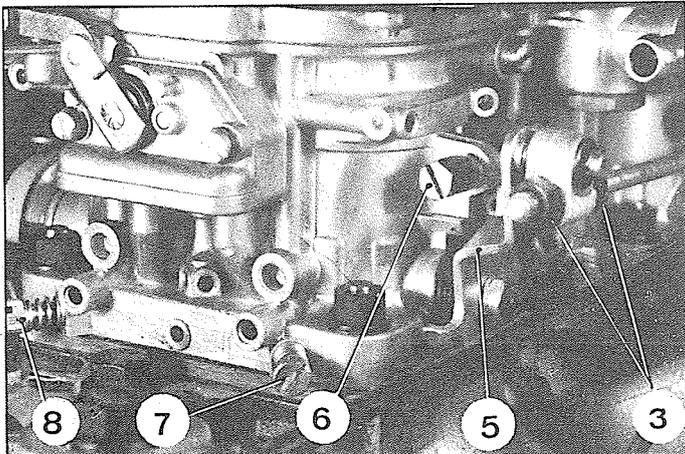
a) Adjust an equal opening of the throttle valve butterflies on each of the carburetors. To do this:

- Disconnect the control rod (4) from the center carburetor.
- Loosen the six nuts (3) (on both sides of the throttle lever (5) ).
- Loosen the three stop screws (6).
- Moderately move the lever (5) in order to close the throttle valves.

*Hold the lever (5) in this position and bring the stop screw (6) in contact with the lever (5). From this position turn the screw in one turn exactly.*

Proceed in the same manner on the other two carburetors.

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b) Adjust the connector rod (2):

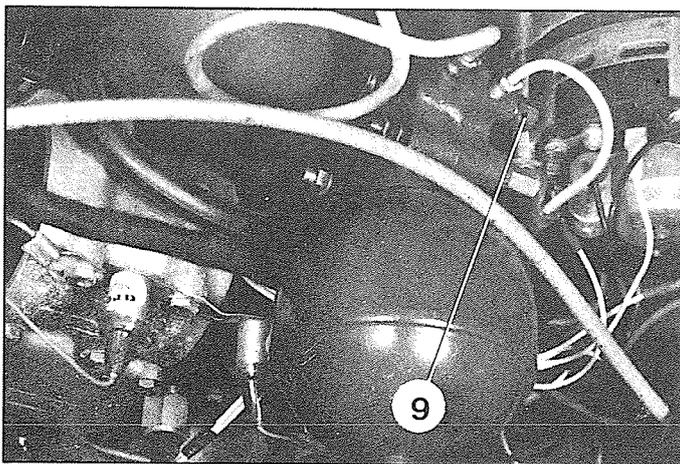
The connector rod (2) being fully free, with no binding, tighten the nuts (3) of the center carburetor.

- Slightly pull the rod (2) to the rear (closed position of the throttle valves).
- By hand, bring the nuts (3) up to both sides of the throttle lever (5) of the rear carburetor in such a manner that the *stop screw (6) rests in contact with the lever (5)*. Tighten the two nuts (3) by turning them at identical angular values and *without pulling or straining the throttle levers (5)*. Proceed in the same manner for the adjustment of the front carburetor.

*With a feeler gauge (for example) check that the levers (5) are bearing against the stop screws (6).* If not, repeat the respective adjustment of the nuts (3).

Reconnect the control rod (2).

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5. *Adjustment of the idling:*

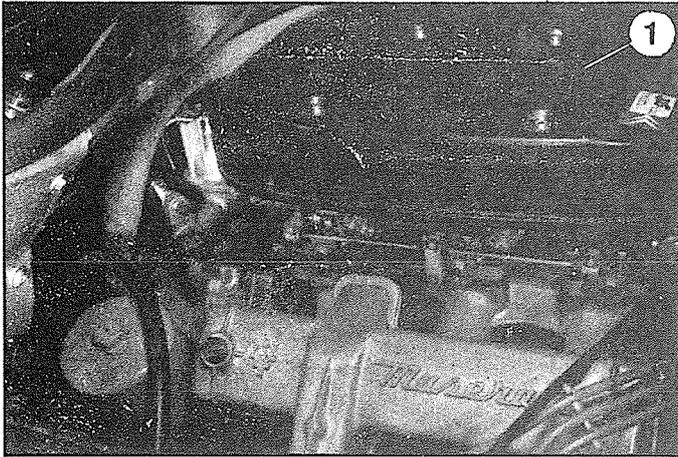
This adjustment can only be done on a hot motor in good running order.

a) *Pre-adjustment:* the connector rod (2) being correctly adjusted, loosen the stop screw (6) of the front and rear carburetors: adjust the stop screw of the center carburetor *separately*.

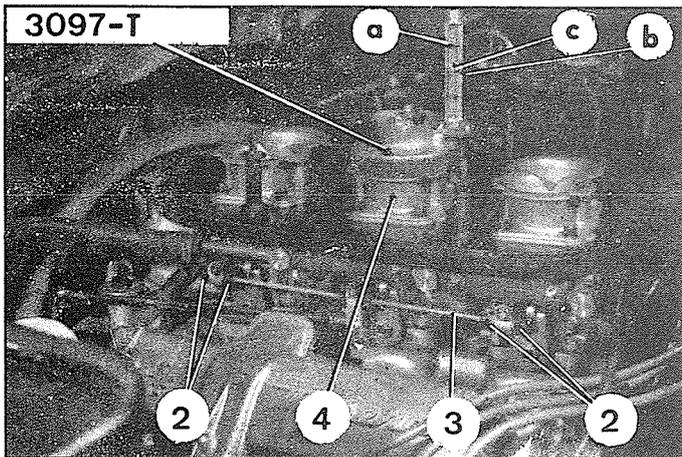
**ATTENTION:** On each carburetor, turn the idle mixture screws (7) and (8) all the way in *without force*, then turn them out *1½ turns*.

- Open the bleed screw (9) of the pressure regulator and be sure that the electrical units are not affected.

8618



9477



- b) **Adjustment:** Connect a tachometer to one of the coils.
  - Remove the cover (1) of the air intake tank (on top of the carburetors).
  - The motor turning at idle, work the stop screw of the *center carburetor* in order to bring the speed of the motor to 900/1000 R.P.M.
- c) **Check and, if necessary, retouch the adjustment of the carburetors, using the tool Synchro-Test 3097-T.** Adjust the *Synchro-Test 3097-T* to the air flow of the *center carburetor*.

To do this:

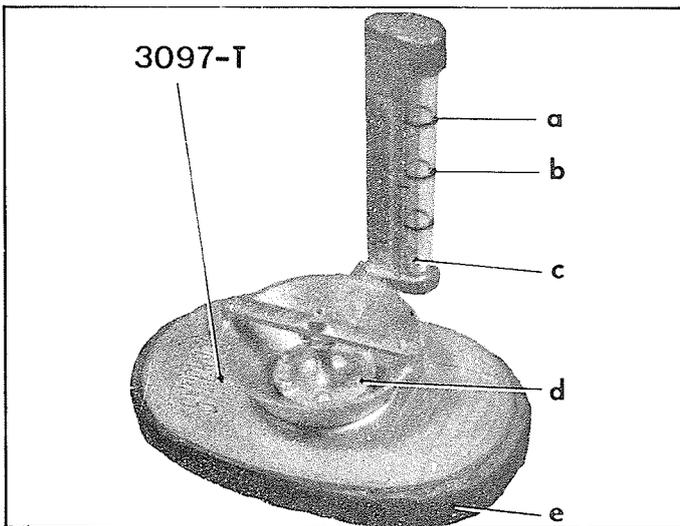
Place the *Synchro-Test* on top of the *center carburetor* so that the shoe "E" correctly covers the rim of the carburetor air horns (4).

Exercise a slight pressure on the SYNCHRO-TEST in order to seal the shoe "E" on the air horns (4) and turn the center part "d" just until the ballast "c" rises inside the glass tube and stabilizes between the two upper reference marks "a" and "b". Make no further adjustments on the SYNCHRO-TEST.

Check the air flow of the front and rear carburetors. The ballast "c" should stabilize itself between the two upper reference marks "a" and "b". If not, eventually retouch the adjustment of the connector rod (3) by working on the nuts (2) of the carburetor requiring re-adjustment, just to the point where this condition must be obtained.

NOTE: During the use of the SYNCHRO-TEST, be sure the speed of the motor does not vary. Replace the cover (1) of the air intake tank.

9478



- d) **Adjustment of the mixture screw:**

IMPORTANT:

*This adjustment can only be done on a motor warm and "decarboned," equipped with spark plugs in perfect condition.*

Work on the mixture screw (7) of cylinder No.1 so as to obtain the maximum speed of the motor while observing the tachometer.

If necessary, work the stop-screw (6) of the *center carburetor* to bring the speed of the motor to 900/1000 R.P.M.

Proceed likewise for adjusting the mixture screw of cylinder No. 2, 3, 4, 5 and 6.

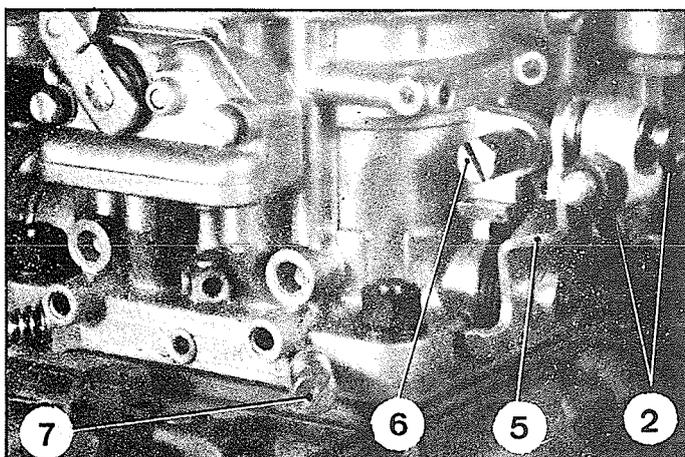
Finally, work the stop screw (6) of the *center carburetor* to adjust the idling speed of the motor between *900 and 1000 R.P.M.*

- Bring the stop screws (6) of the front and rear carburetors in contact with the levers (5) (without varying the idling speed).

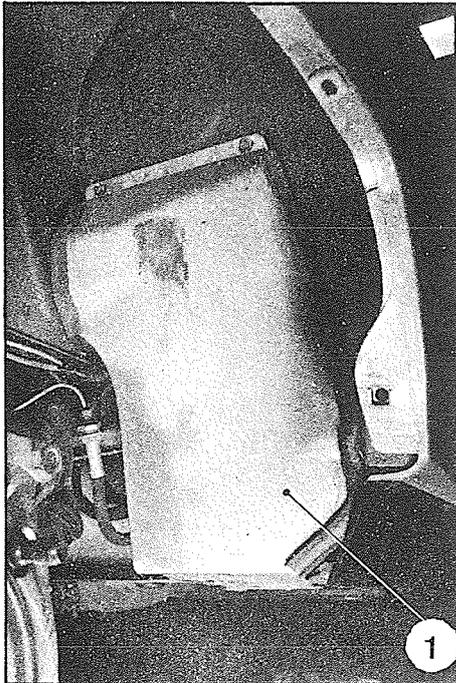
Stop the motor. Close the bleed screw of the pressure regulator.

Remove the tachometer.

8479



8469



**I - CHARACTERISTICS OF THE FUEL PUMP**

Electric fuel pump:

Reference: BENDIX 476 087 - 12 V.

Output: 21 gal/hr. mini for a current equal to or higher than 12 volts.

Regulated pressures at zero delivery to the carburetors:

- 2.1 p.s.i. max., under 12 volts
- 2.18 p.s.i. max., under 13 volts
- 2.25 p.s.i. max., under 14 volts
- 2.32 p.s.i. max., under 15 volts

Consumption. . . . . 3 amps. max.

Replacement of the fuel filter:

- every 18,000 miles

**II - PARTICULARS**

Tightening torque of the couplings (3) for the suction and delivery hoses . . . 4 ft. lbs. The delivery hose (5) of the pump should pass behind the flexible hose (6) of the right rear brake and must be clamped onto the feed hose of the right rear brake by means of the collar (2).

**III - INSPECTION OF THE REGULATED PRESSURE**

Connect a pressure gauge A, graduated in ounces to approximately 3 to 5 p.s.i. by tapping into the feed line of and before the three carburetors. Turn the ignition on but do not start the motor. Measure the pressure regulated by the fuel pump *with no fuel flow*. (The different values are indicated in "Characteristics of the fuel pump").

**IV - REPLACEMENT OF THE FUEL FILTER**

REMOVAL.

1. Remove:

- the right rear wheel.
- the protection pan (1).

2. With a wrench, turn the lower cover (4) of the pump so as to unlock it.

3. Remove the cover (4) with the filter (7).

REMARK: Clean the magnetized pastille (8) in order to remove all metallic particles.

REPLACEMENT.

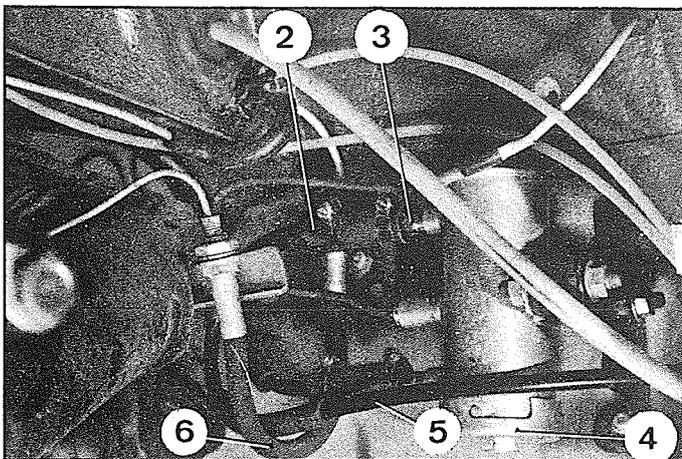
4. Center the magnetized pastille (8) in the cover (4). Center the filter (7) in the cover (4).

5. Lock the cover (4) on the pump with the help of a wrench.

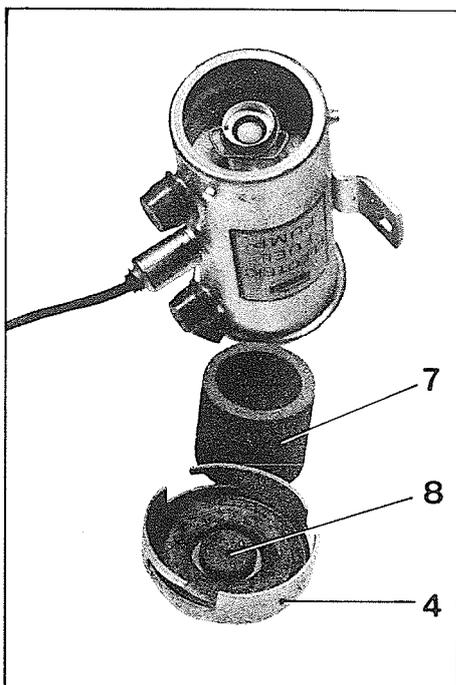
6. Set in place:

- the protection pan (1).
- the right rear wheel.

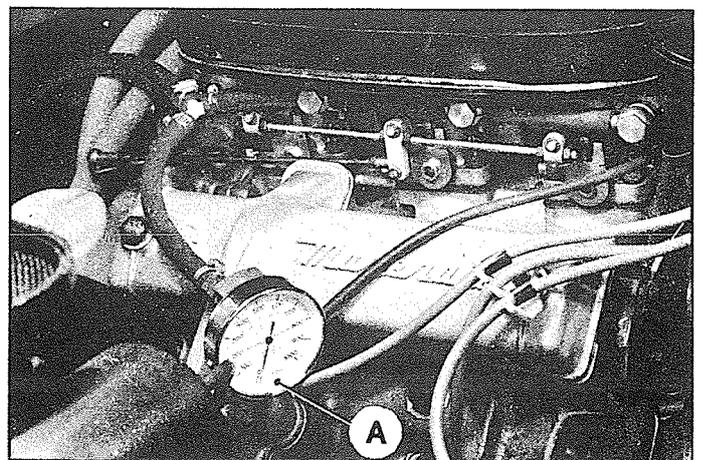
8468

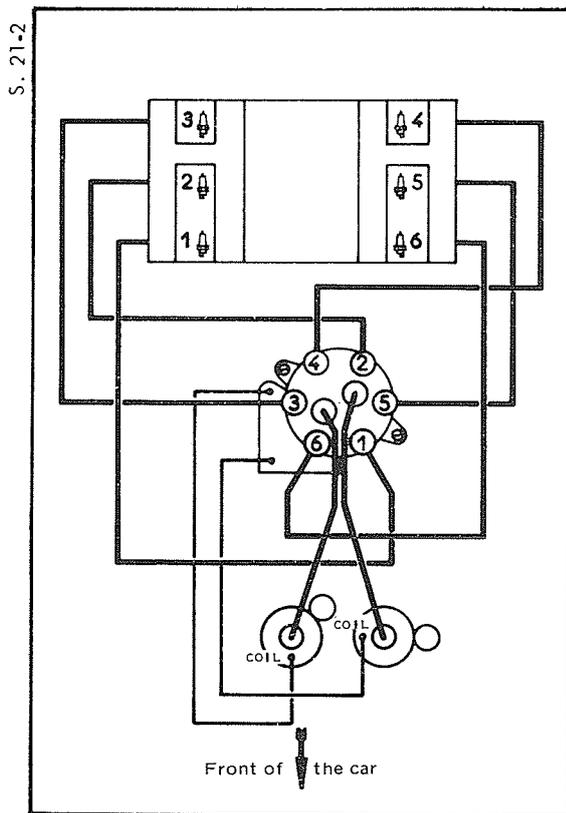


8476

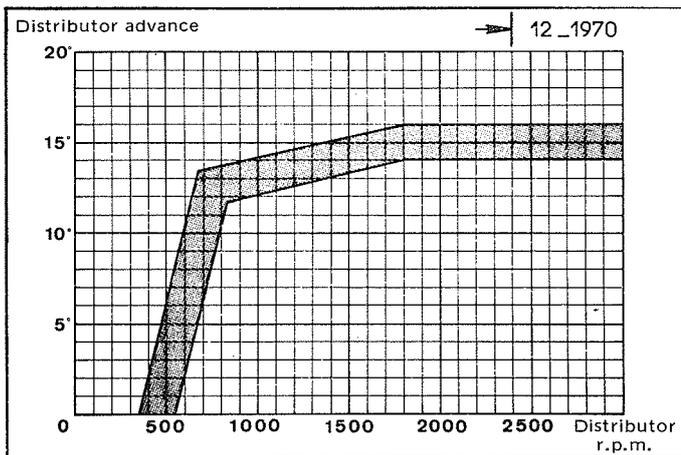


8492

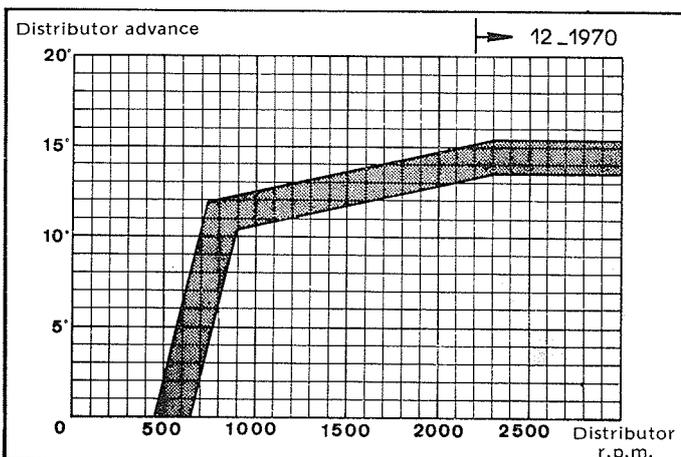




Cars produced until 12/1970



Cars produced until 12/1970



## I - CHARACTERISTICS

### 1. Distributor:

Type: Double cassette (1 set of breaker points in each cassette)

Brand: . . . . . SEV-MARCHAL

Reference: . . . . . 08-1, 09-1, 10-1, etc.

Firing order: . . . . . 1-6-2-5-3-4

Direction of rotation:

(viewed from the driver's seat) . . . clockwise

Centrifugal advance:

Reference of the curve: . . . . . E 931 4127

Breaker point gap: . . . . . .014" to .018"

Angle of cam opening: . . . . .  $32^\circ \pm 4^\circ$

Angle of cam closing: . . . . .  $88^\circ \pm 4^\circ$

Dwell ratio: . . . . .  $73\% \pm 3\%$

Dynamic timing: on the motor flywheel

@ 2000 motor R.P.M. . . . . .  $27^\circ$  BTDC

Angular spacing between two consecutive openings of the contact points (within  $1^\circ$ ):

-  $45^\circ$  between ignition of cylinders 1 and 6

-  $75^\circ$  between ignition of cylinders 6 and 2

-  $45^\circ$  between ignition of cylinders 2 and 5

-  $75^\circ$  between ignition of cylinders 5 and 3

-  $45^\circ$  between ignition of cylinders 3 and 4

-  $75^\circ$  between ignition of cylinders 4 and 1

Resistance of the rotor blades:  $5000\Omega \pm 20\%$

### 2. Spark plugs:

BOSCH . . . . . W 200 T 30

CHAMPION . . . . . N 6Y

AC . . . . . 42 XLS

LODGE . . . . . GOLDEN H.L.

Gap of the electrodes: . . . . . .024" to .028"

Tightening torque (Cold) . . . . . 14-18 ft. lbs.

### 3. Coils:

Two coils with external resistors of the "BALCO" type:

DUCELLIER . . . . . 2777B

"BALCO" resistance . . . . .  $0.9\Omega$  (@  $68^\circ$  F)

Primary resistance . . . . .  $1.3\Omega$  (@  $68^\circ$  F)

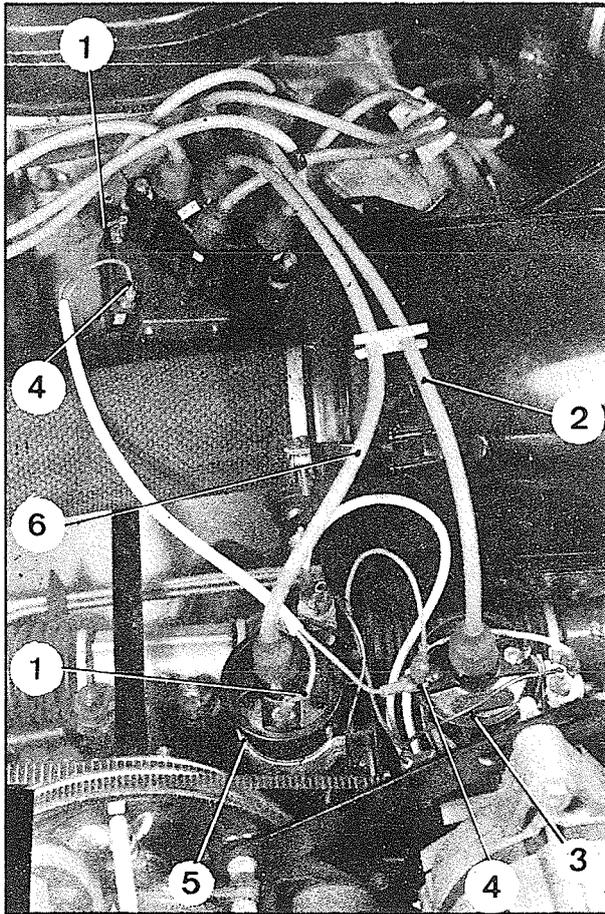
Secondary resistance . . . . .  $5900\Omega \pm 10\%$  ( $68^\circ$  F)

or SEV-MARCHAL . . . . . E 44 910 312

"BALCO" resistance . . . . . 1.1 to  $1.2\Omega$  ( $68^\circ$  F)

Primary resistance . . . . .  $1.5\Omega$  min ( $68^\circ$  F)

Secondary resistance . . . . .  $6050\Omega \pm 10\%$  ( $68^\circ$  F)



8435

4. High tension wires:

- Brand: . . . . . ELECTRIFIL-BOUGICORD  
 Reference: . . . . . 400 RTF-33-0  
 Resistance of the wires (@ 68° F):
- Coils to distributors. . . . . 510 to 784Ω
  - Distributor to cylinder No.1 . . 676 to 1037Ω
  - Distributor to cylinder No.2 . . 736 to 1127Ω
  - Distributor to cylinder No.3 . . 1000 to 1523Ω
  - Distributor to cylinder No.4 . . 904 to 1379Ω
  - Distributor to cylinder No.5 . . 844 to 1289Ω
  - Distributor to cylinder No.6 . . 568 to 875Ω

5. Ignition condensers:

- Capacity. . . . . 0.25 to 0.30 μF  
 Resistance (min.) . . . . . 5 MΩ

II - PARTICULARS

Ignition circuit:

a) Ignition coil (5) right side:

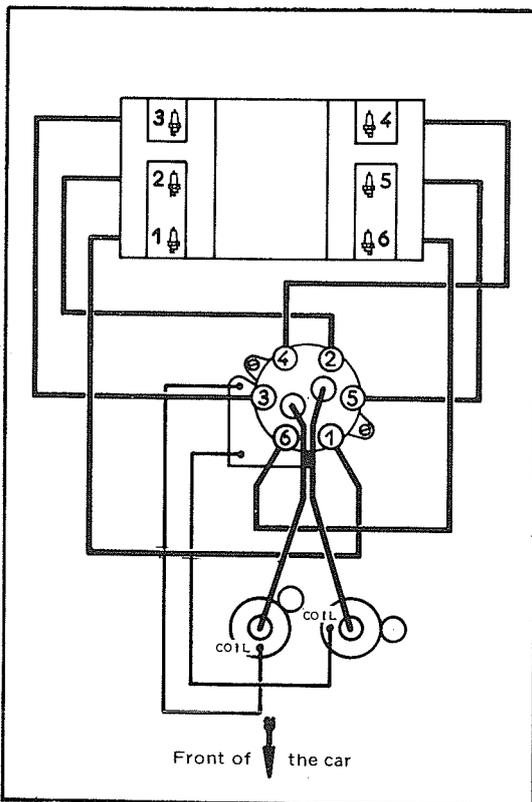
This fires cylinders 1, 2 and 3

The primary wire (1) of the upper cassette connects to the terminal marked *B1* on the distributor.  
 The high tension wire (6) connects onto the distributor cap at the post marked *B1*

b) Ignition coil (3) left side:

This fires cylinders 4, 5 and 6.

The primary feed wire (4) of the lower cassette connects to the terminal marked *B2* on the distributor.  
 The high tension wire (2) connects onto the distributor cap at the post marked *B2*



S. 21-2

**I - INSPECTION OF THE IGNITION****1. Verify the adjustment of the gap of the distributor breaker points in place on the car.****a) With the help of a cam angle meter or an oscilloscope:**

The motor running, read a closing angle of the points equal to  $88^{\circ} \pm 4^{\circ}$ .

**b) With the help of a dwell meter:**

The motor running, read a "dwell ratio" equal to  $73\% \pm 3\%$ .

**2. Verify the adjustment of the breaker point gap on a distributor removed from the car:****a) With the help of a distributor test bench:**

See paragraph 12.

**b) Using a set of feeler gauges A (see figure):**

Remove: - the distributor cap  
- the rotor

Disengage the support assembly (1) of the condensers from the distributor body. Turn the distributor shaft so as to open the points to the maximum. At this point check the gap of the contacts. It should be .014" to .018". Repeat this inspection on the other set of breaker points.

**3. Verify the synchronization of the two sets of points in place on the car:****a) Using a stroboscopic (timing) light:**

The motor being warm (stable speed) allow it to run at idle.

- Connect the high tension wire of the strobe light (B) to the post of the distributor cap corresponding to the wire of cylinder No.1. After having removed the rubber plug, flash the timing hole "a" of the clutch housing and read the advance on the flywheel.

- Connect the high tension wire of the strobe light (B) to the post of the distributor cap corresponding to the wire of cylinder No.5. Flash the hole "a" and read the advance on the flywheel. It should be:

*the figure read previously +  $30 \pm 2^{\circ}$ .*

**b) Using a continuity test lamp:**

Raise the left front wheel (left side supported) and shift to 5th speed. Turn the ignition on but do not start the motor.

- Connect the test lamp to ground and to the "RUP" terminal of the right side ignition coil.

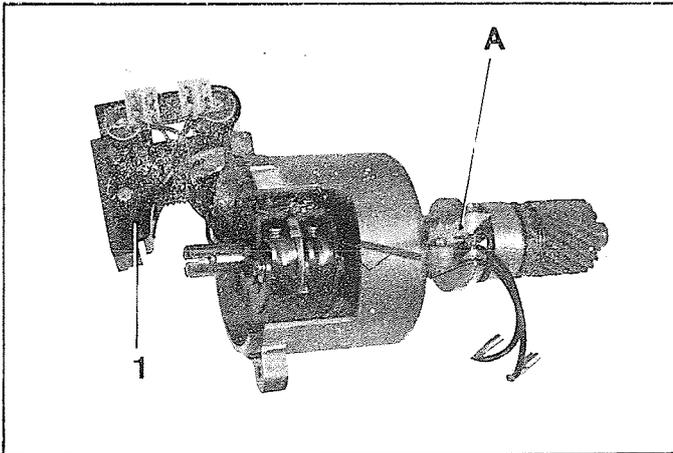
- Turn the left front wheel just to the moment when the cylinder No.1 reaches the point of ignition (the test lamp lights).

Through the timing hole "a" read the advance on the flywheel.

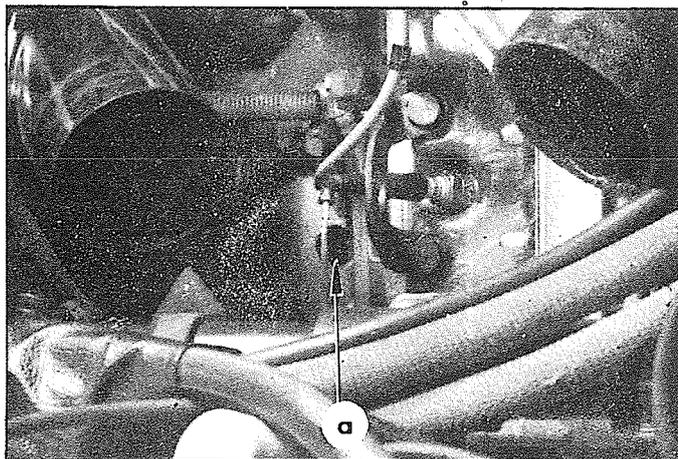
- Connect the test lamp to ground and the "RUP" post of the left side ignition coil. Turn the left front wheel (a little less than 1 turn of the motor) just to the moment when cylinder No.5 reaches the point of ignition (the test lamp lights). Read the advance on the motor flywheel. It should be equal to:

- the previous figure +  $30 \pm 2^{\circ}$ .

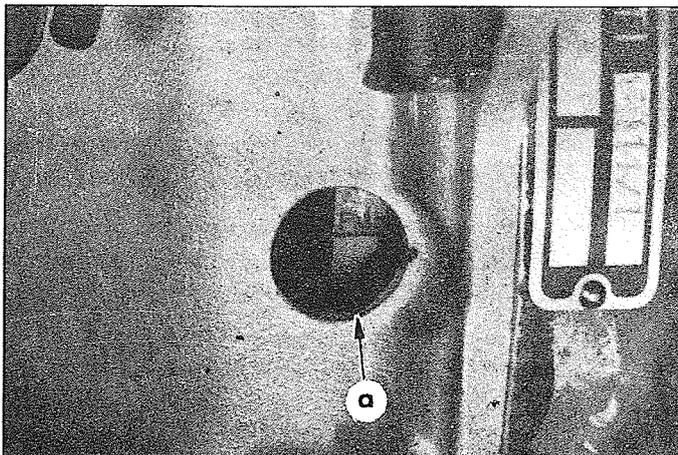
8192



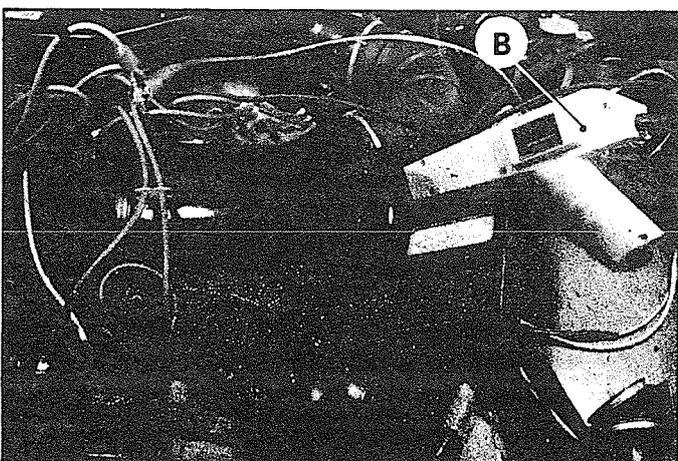
8448



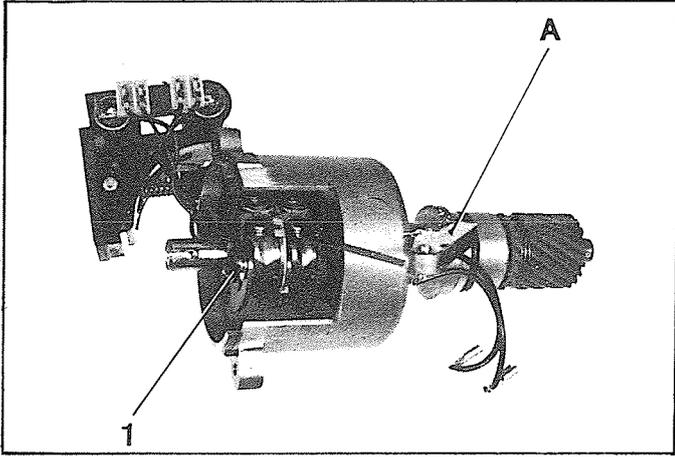
8477



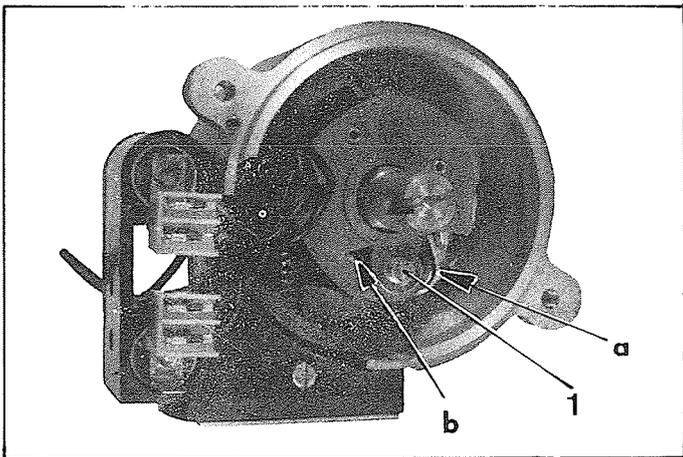
8445



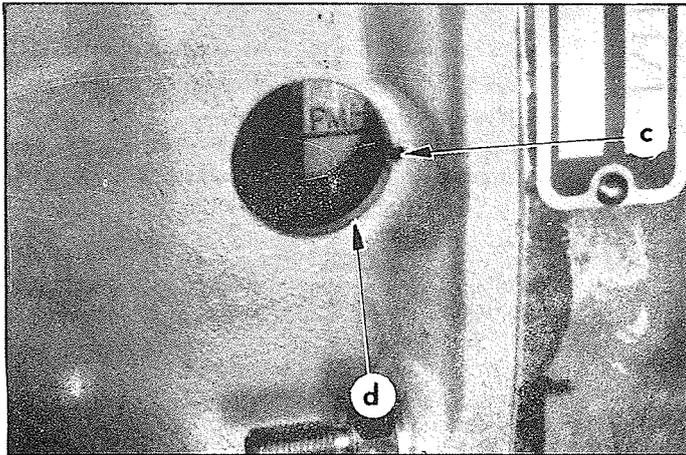
8192



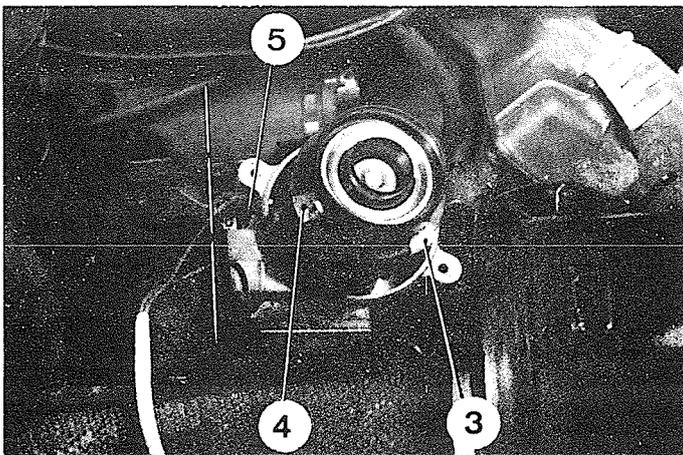
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8433



4. **Verify the synchronization of the two breaker sets on a distributor removed from the car:**  
This inspection should be done on a distributor test bench: see paragraph 13.

5. **Verify the calibration of the distributor with a stroboscopic (timing) light:**  
The high tension wire of the timing light being connected to the post of the distributor cap corresponding to the wire of cylinder No.1, flash the flywheel through the timing hole "d".  
Run the motor at: **2000 R.P.M.**  
Read the advance on the flywheel in line with the stationary mark "C" (on the clutch housing).  
◆ This should be: ..... 27° BTDC

**II. ADJUSTMENT OF THE DISTRIBUTOR**

6. **Adjustment of the gap of the breaker points on a distributor removed from the car:**

- a) **On a distributor test bench:** See paragraph 12. (the adjustment on a test bench is easier and more precise).
- b) **Using a set of feeler gauges A:**  
Remove: - the distributor cap  
          - the rotor

Disengage the support assembly (2) of the condensers from the distributor body. Turn the distributor shaft in order to open the lower set of points to the maximum (it is advisable to start with the lower cassette).

◆ Slightly loosen the screw (1): using a screw driver, work on the lug "a" to obtain a contact gap of .014" to .018".

Adjust the points of the upper cassette in the same fashion by working on the lug "b". Tighten the screw (1).

**IMPORTANT:** It is necessary that the gaps on both contact sets be equal.

- It is necessary to recheck the gap of the contacts on each of the two cassettes (after retightening the screw (1)).

7. **Adjustment of the synchronization of the two breaker point sets:**

This adjustment is delicate and can only be done on a distributor test bench. (See paragraph 13).

8. **Pre-adjustment of the distributor** (in case it has been removed):

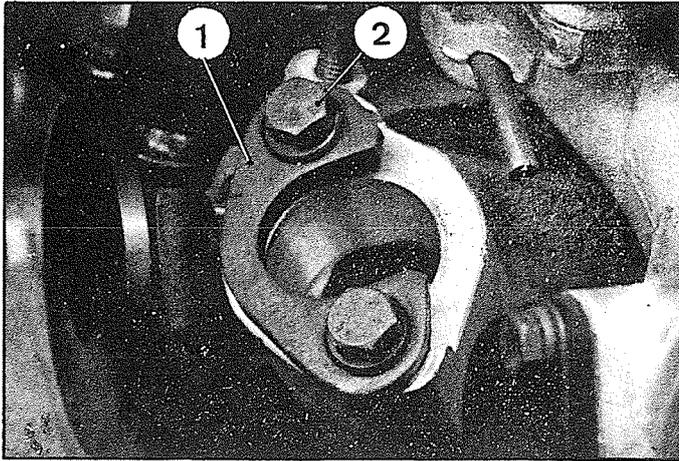
a) Set the cylinder No.1 at TDC. To do this:

- Raise the left front wheel (left side of the car supported) and shift into 5th speed.
- Remove the spark plug of cylinder No.1. Plug the spark plug hole with the thumb. Make the left front wheel turn and stop when the thumb is repulsed by the compression of the cylinder. Gently turn the wheel so as to bring the TDC reference mark on the motor flywheel in line with the fixed timing mark "c".

b) The distributor cap being removed, engage the pinion of the distributor drive so that the two fingers (3) and (4) of the rotor occupy approximately the position indicated in the adjacent photo.

At this point, the support (5) of the condensers is found approximately in line with the axis of the motor.

8478



c) Turn the ignition on but do not start the motor.

Connect a continuity test lamp to ground and the "RUP" post of the right side ignition coil. Turn the distributor (3) just to the point when the lamp lights.

Set the distributor clamp (1) in place and slightly tighten the screw (2) (flat washer under the head).

9. *Adjust the distributor with a stroboscopic (timing light):*

Connect the high tension wire of the strobe light A to the post of the distributor cap corresponding to the wire of cylinder No.1. Flash the motor flywheel (5) through the timing hole "b".

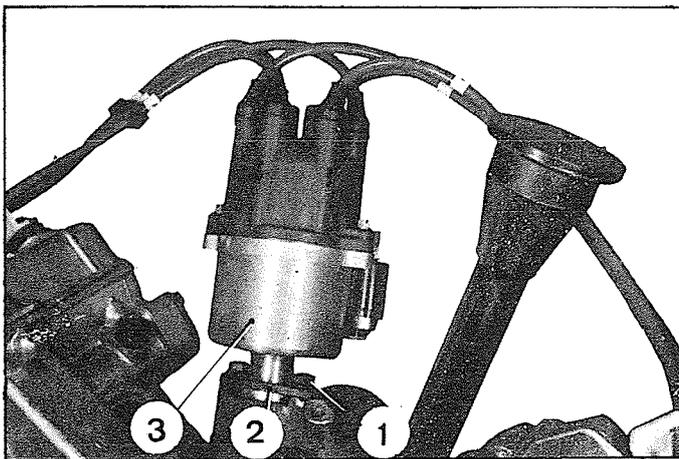
The motor running at: . . . . . 2000 R.P.M.

◆ The advance should be: . . . . . 27° BTDC (read the advance on the graduations of the motor flywheel (5), in line with the fixed timing mark "a").

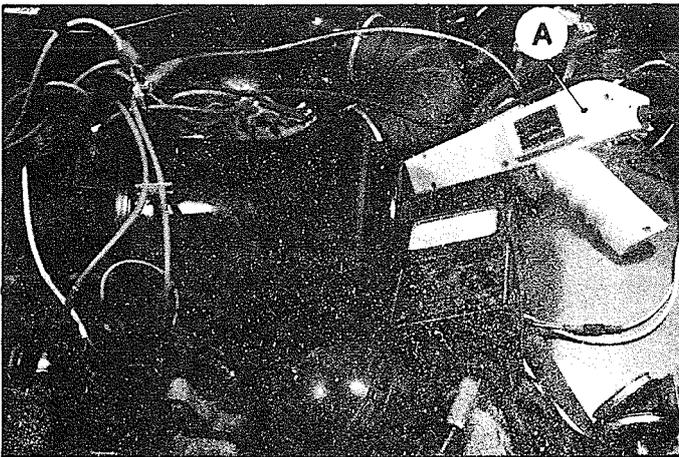
NOTE: The advance increases by turning the distributor clockwise.

Tighten the screws (2) to 25 ft. lbs.

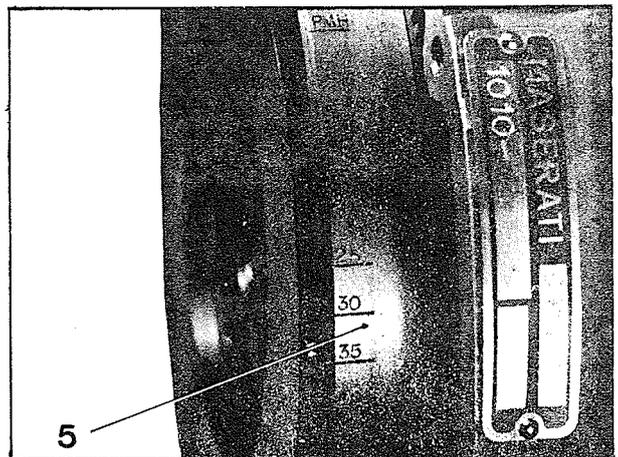
8163



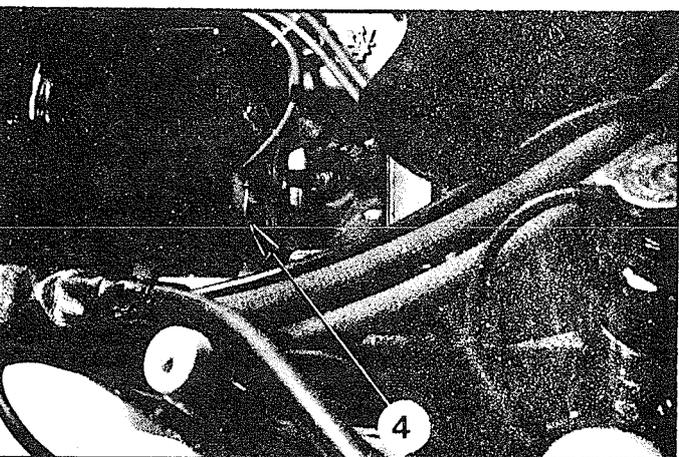
8445



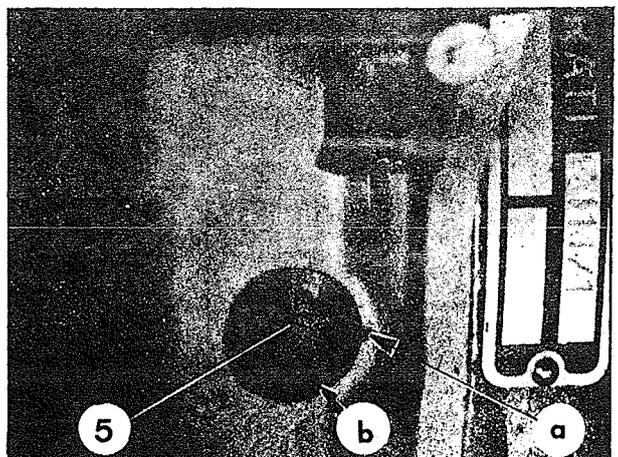
8183

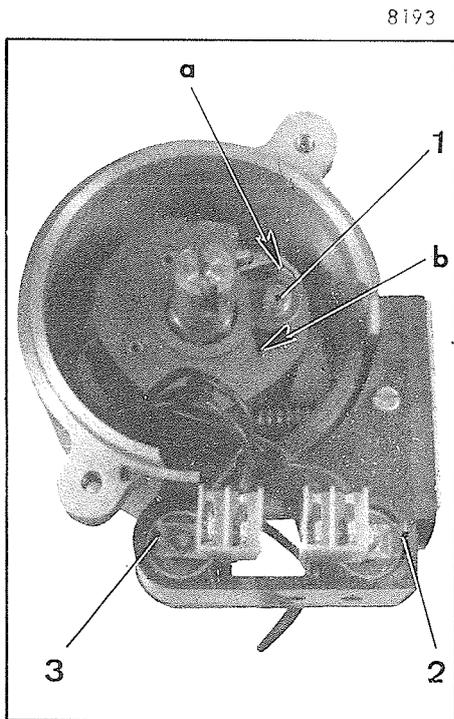


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### III. ADJUSTMENT OF THE DISTRIBUTOR ON A TEST BENCH

10. Place the distributor on the test bench.

Remove: - the distributor cap  
- the rotor

11. *Inspect the condition of the breaker contacts.*

If they are defective, replace the assembly of the two cassettes.

12. *Adjust the gap of the breaker points:*

The distributor turning at a stable speed (direction of rotation: counter-clockwise), slightly loosen the screw (1).

a) Attach a "live" lead (2) to the lower cassette (it is advisable to start with the lower cassette). Work on the lug "a" with a screw driver to obtain a cam opening angle equal to  $32^\circ \pm 4^\circ$ .

b) In the same manner, adjust the upper cassette by attaching the feed wire at (3) and by working on the lug "b".

**IMPORTANT:** It is necessary that the cam opening angle of both breaker sets be *equal*.

It is necessary to check the cam opening angle on each of the cassettes (after tightening the screw (1).)

13. *Adjust the synchronization of both breaker sets:*

The distributor turning at a steady speed (direction of rotation: counter-clockwise).

a) Firstly, attach a feed wire at (2) on the lower cassette. Move the graduated ring of the distributorscope so that "O" coincides with the beginning of the opening of the contacts. Lock the ring.

b) Then, attach the feed wire at (3) on the upper cassette. *The beginning of the opening of the upper contacts must occur  $45^\circ \pm 1^\circ$  after that of the lower contacts.*

If not, work on the upper lug "b" just to the point where this condition is reached.

**NOTE:** It is necessary to check the adjustment of the synchronization after tightening the screw (1).

14. *Check the arrangement of the flashes (flash pattern):*

*The angular spacing must not exceed  $1^\circ$  at any speed (maximum speed of the distributor: 3700 R.P.M.)*

Make this check on each set of breaker points.

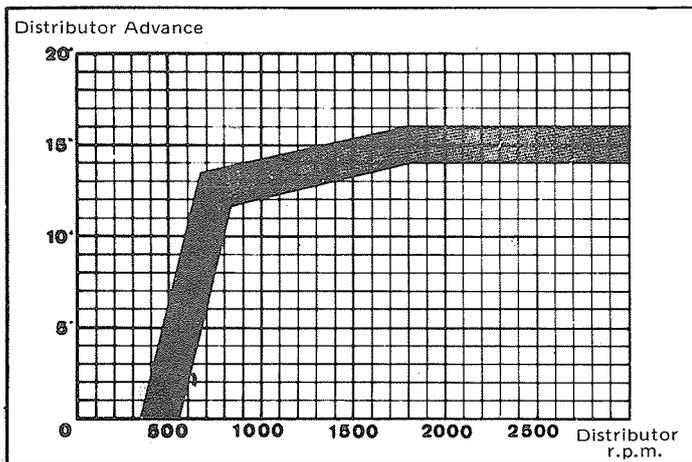
(There are three flashes spaced at  $120^\circ$  per revolution and per breaker set). If this condition is not obtained replace the cam section of the distributor shaft.

15. *Check the adjustment of the automatic advance curve:*

a) Make a spot check of the advance curve (see schematic) for the increasing speeds from 0 to 3000 R.P.M., and the decreasing speeds from 3000 to 0 R.P.M. with no oscillating motion of the distributor. These spot checks should fall within the "mini" and "maxi" of the curve at any particular point.

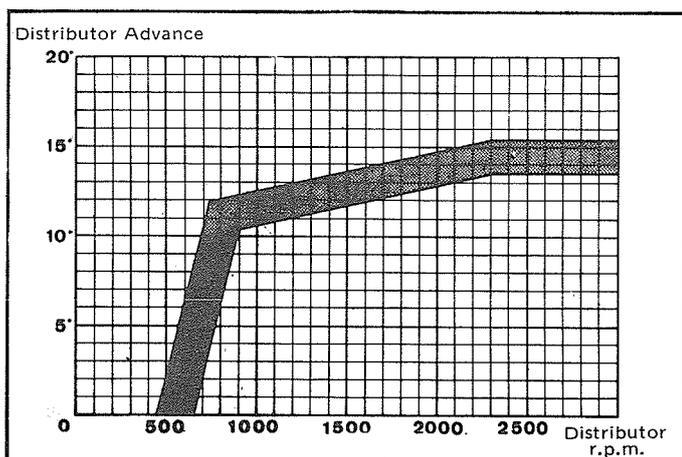
Cars produced until 12/1970

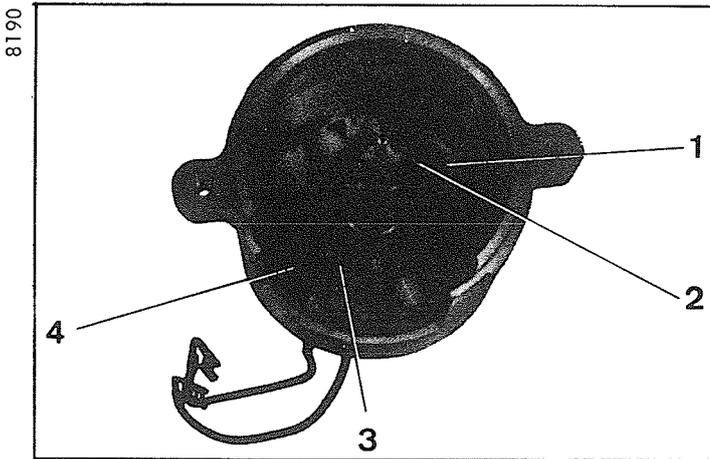
S. 21-1 a



Cars produced after 12/1970

◆ S. 21-3 a





b) To a certain extent, it is possible to rectify the advance curve.

To do this, modify the tension of the springs by bending the spring hooks (1) and (4), or replacing the springs (2) and (3).

REMARK: If flashes are produced apart from the three normal positions at speeds lower than 3500 R.P.M., it is necessary to replace the cassette carrier assembly.

IV - INSPECTION OF AN IGNITION COIL

1. References:

DUCELLIER .....	2777 B
S.E.V. - MARCHAL .....	E. 44 910 312 (B 12 volts)

◆ 2. Inspection of the primary circuit:

a) Check the insulation of the circuit by using an ohmmeter connected between the post marked "BAT" and the case of the coil:

*The resistance should be infinite*

b) Check the resistance of the circuit by using an ohmmeter connected between the post marked "BAT" and the post marked "RUP":

*The resistance should be:*

- DUCELLIER COIL	=	1,3 Ω @ 68° F.
- S. E. V. - MARCHAL COIL	=	1,5 Ω @ 68° F.

c) Check the value of the "BALCO" resistor mounted in series with the primary circuit.

*The resistance should be:*

- DUCELLIER COIL	=	0,9 Ω @ 68° F.
- S. E. V. - MARCHAL COIL	=	1,1 to 1,2 Ω @ 68° F.

◆ 3. Inspection of the secondary circuit:

Check the resistance of the secondary circuit by connecting an ohmmeter between the post marked "RUP" and the center tower of the coil.

*The resistance should be:*

- DUCELLIER COIL	=	5900 Ω ± 10% @ 68° F.
- S. E. V. - MARCHAL COIL	=	6050 Ω ± 10% @ 68° F.

4. Check the coil on a test bench:

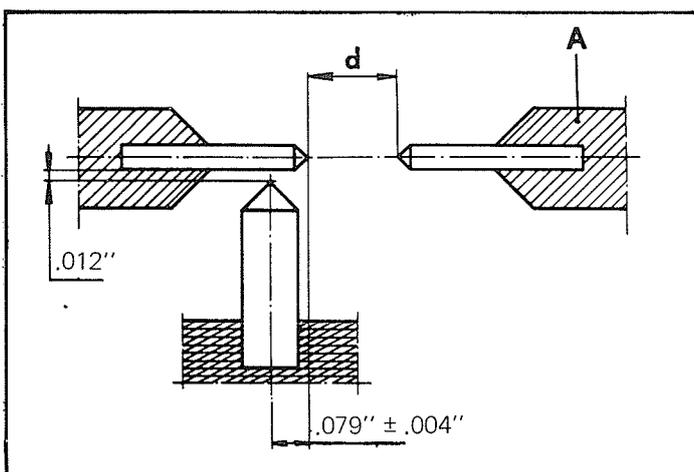
Place the coil, fitted with its "BALCO" resistor, on a test bench equipped with a shunted spark gap (50 KΩ) adjusted as indicated in the schematic.

a) Turn the distributor at 500 R.P.M. The gap being spaced at least 15 mm (.590"), slowly bring the movable finger A toward the stationary finger and stop when the first flash appears. At this moment measure the space "d" of the spark gap. Repeat this test at least three times and determine the average of the spaces "d" measured.

*This average should be a minimum of 9 mm (.354").*

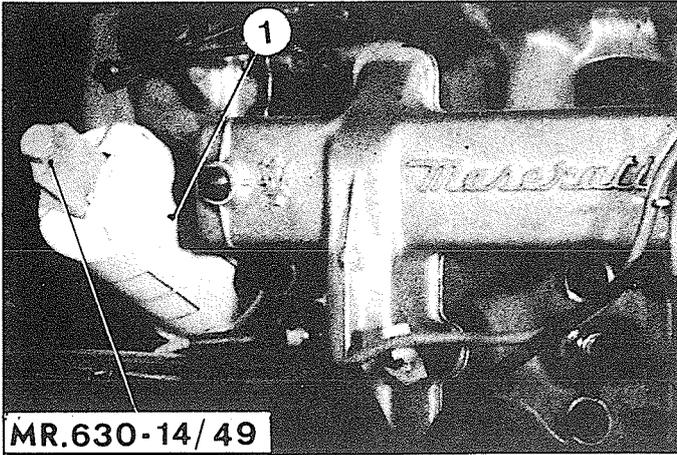
b) Turn the distributor at 3000 R.P.M. Redo the test as indicated above.

*The average gap should be a minimum of 5 mm (.197").*

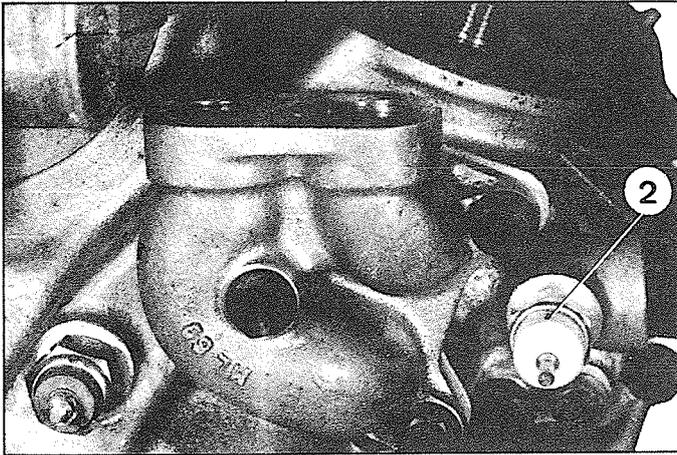


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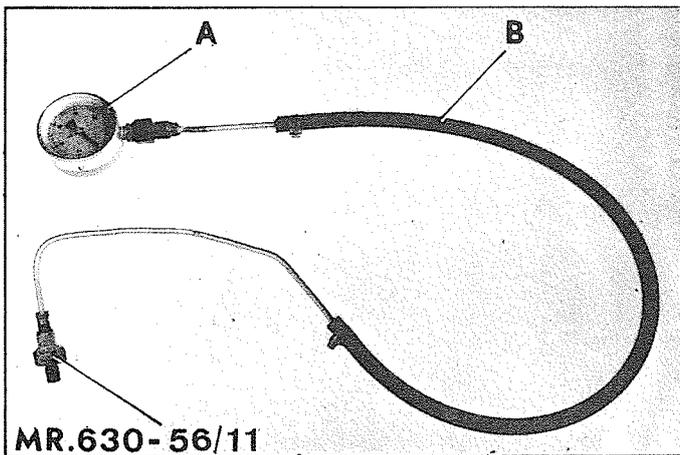
8822



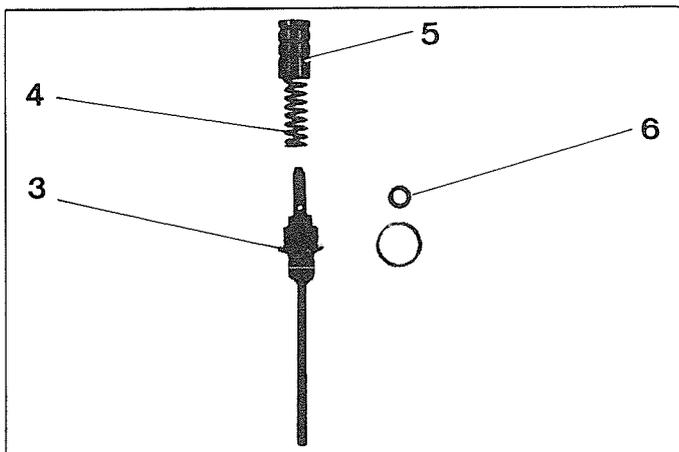
8185



8823



8092



**I. PREPARATION**

1. Remove the cartridge (1) of the oil filter with the help of the tool MR. 630-14/49.
2. Disconnect the wire from the pressure switch (2) and remove the switch.
3. Equip the union MR. 630-56/11 with a flexible hose B (length = 20'' approx.) for connection to an oil pressure gauge graduated from 0 to 10 bars (0 to 145 p.s.i.).
4. Set the union in the position of the pressure switch (2).

Replace the filter cartridge (1).

NOTE: For pressure specifications see Operation No. S. 100-00.

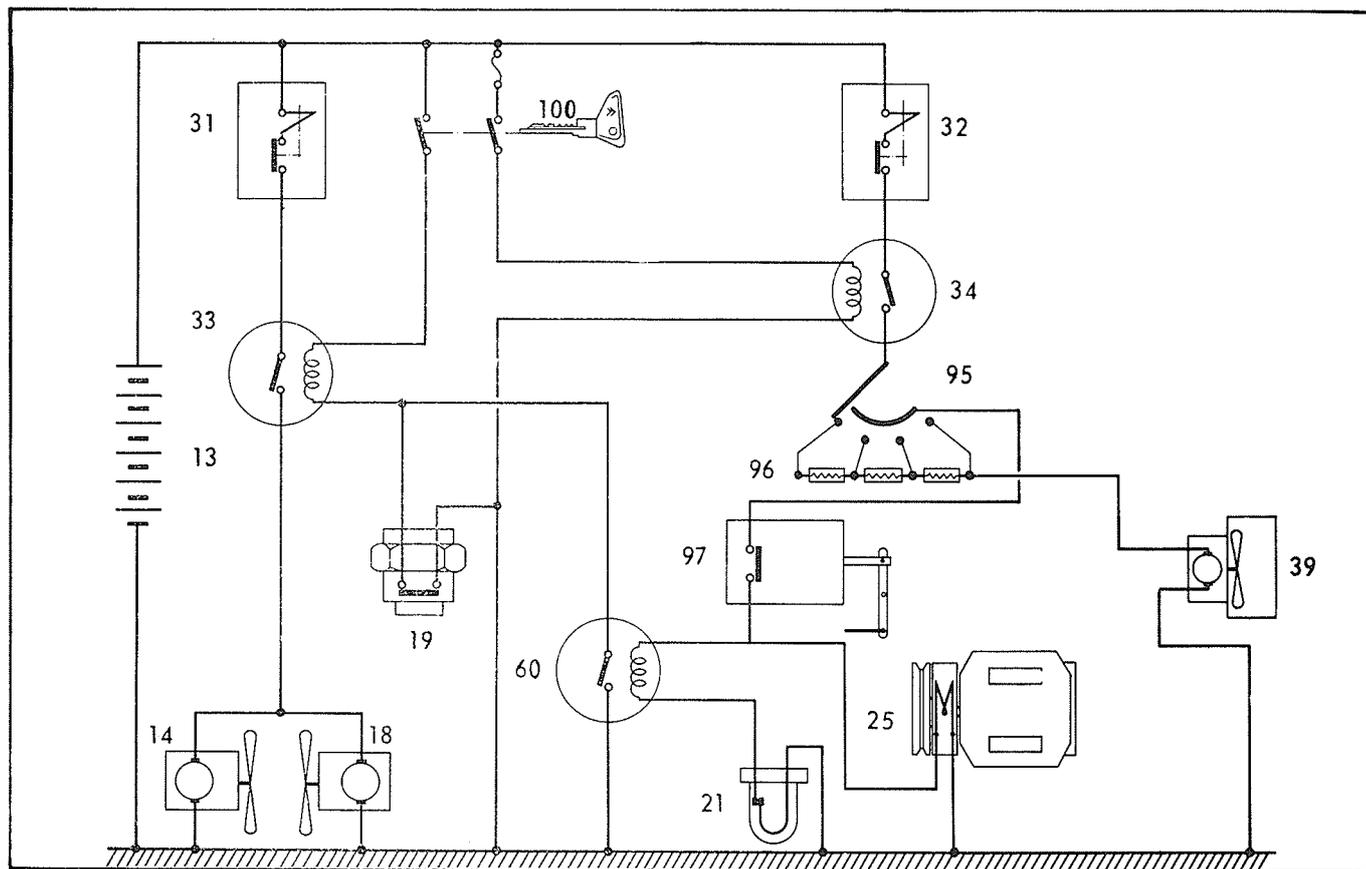
**II. ADJUSTMENT OF THE OIL PRESSURE**

5. Drain the motor.
6. Remove the lower oil pan.
7. With the help of the tool MR. 630-12/33, remove the cap (3) of the discharge valve, the adjusting shims (6), the spring (4), and the piston (5).
8. Modify the thickness of the adjusting shims (6) to obtain the correct oil pressure.
9. Replace the piston (5), the spring (4), the adjusting shims (6) and the cap (3) of the discharge valve.
10. Replace the drain plug.
11. Refill the motor with oil, 6 liters = 6-3/8 qts. - 20 W 50 SAE).

VENTILATION

Principle of the electrical control of the cooling system fans.

S. 51-2



Legend:

NOTE: The reference numbers of the units are identical to those used in the wiring diagram.

- |           |                                                           |     |                                                                                                            |
|-----------|-----------------------------------------------------------|-----|------------------------------------------------------------------------------------------------------------|
| 13        | Battery                                                   | 34  | Control relay for the air conditioning system                                                              |
| 14 and 18 | Cooling system fans                                       | 39  | Climatization air blower                                                                                   |
| 19        | Thermo-contact of the water radiator                      | 60  | Relay of the mano-contact (21) (attached to the group on the left front fender)                            |
| 21        | Mano-contact of the steering oil pressure                 | 95  | Control switch for the air conditioning system and rheostat for the air blower (39) (on the dash console). |
| 25        | Electro magnetic clutch of the air conditioner compressor | 96  | Resistors controlling the speeds of the blower (39)                                                        |
| 31        | Circuit breaker for the fans                              | 97  | Ambiance thermostat (on the evaporator)                                                                    |
| 32        | Circuit breaker for the air conditioner and the power     | 100 | Ignition switch                                                                                            |
| 33        | Control relay for the fans                                |     |                                                                                                            |

Principle of operation:

The two fans (14) and (18) of the cooling system have the purpose:

- 1) Of cooling the water in the radiator of the motor cooling system.
- 2) Of cooling the air conditioner condenser, when the compressor recirculates the refrigerant under pressure.

**Current flow to the fans (14) and (18):** This is done through the circuit breaker (31) and the contacts of the relay (33). The passage of current through the exciting coil of the relay (33) conditions thusly, the running of the fans (14) and (18).

**Circuit of the exciting coil of the relay (33):** The coil of the relay (33) is fed when:

- the ignition switch (100) is turned on.
- one of the contacts of either the thermo-contact (19) or the relay (60) is closed.

(The thermo-contact (19) is controlled by the temperature of the water in the radiator).

(The mano-contact (21) is controlled by the pressure of oil of the steering (centrifugal regulator), which itself is subjected to the speed of the car).

**Circuit of the exciting coil of the relay (60):** The coil of the relay (60) is fed when:

- the ignition switch (100) is turned on (control of the relay (34).)
- the contact (95) is established (control lever of the air blower in first position).
- the contact of the ambiance thermostat (97) is closed. (Sufficient temperature inside the car).
- the contact of the mano-contact (21) is closed (oil pressure of the steering less than  $1600 \pm 73$  p.s.i.).

The current flows through the circuit breaker (32).

NOTE: The current to the clutch (25) of the air conditioner compressor is conditioned by the ambiance thermostat (97).

The current of the blower (39) is affected by the resistors (96) of the rheostat (95).

This rheostat regulates the speed of the blower (four positions), consequently the volume of air blown.

**INSPECTION OF A THERMOSTAT**

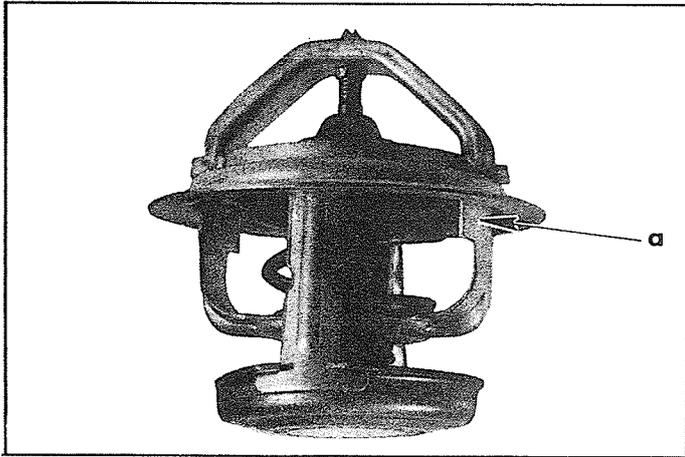
NOTE: Reference: 75 (marked at "a")

1. Submerge the thermostat in water and heat it gradually.

When the water reaches a temperature between 165° – 175° F the valve should begin to open.

The thermostat, submerged and agitated in the water at 185° F should be completely open, having travelled a distance of 7,5 mm (.295") min.

If the thermostat does not meet these conditions, it is necessary to replace it.



9104

**WATER TEMPERATURE SENSOR OF THE MOTOR COOLING SYSTEM**

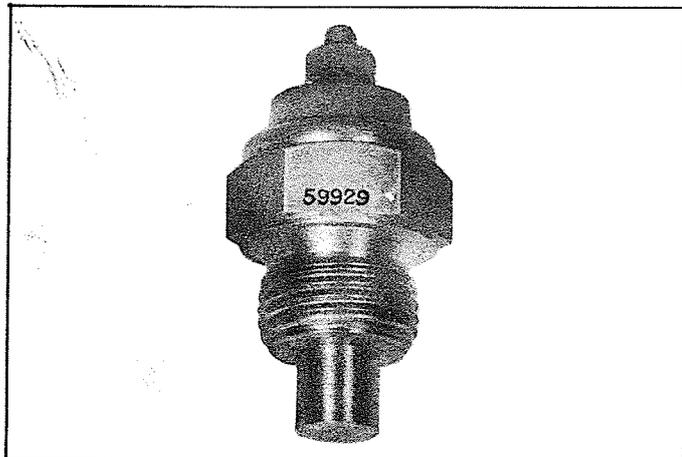
NOTE: This unit is located on the thermostat housing.

2. Measure the resistance of the sensor between the wire terminal and the body.

At a temperature of 176° F, the resistance of the sensor should be:  $255 \pm 26 \Omega$

At a temperature of 212° F the resistance of the sensor should be:  $135 \pm 11 \Omega$

If the unit does not satisfy these conditions, it is necessary to replace it.



9430

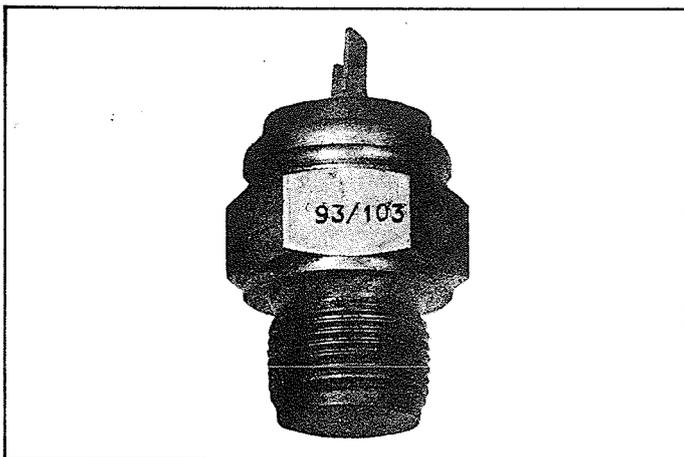
**INSPECTION OF A THERMO-CONTACT INDICATING THE CRITICAL TEMPERATURE OF THE WATER OF THE MOTOR COOLING SYSTEM**

NOTE: This unit is located on the cover of the thermostat housing. (reference number: 93/103).

3. Connect the terminal of the thermo-contact to the positive (+) post of the battery and the body to the negative (-) post by interposing a continuity test lamp. Then proceed as indicated in paragraph 4.

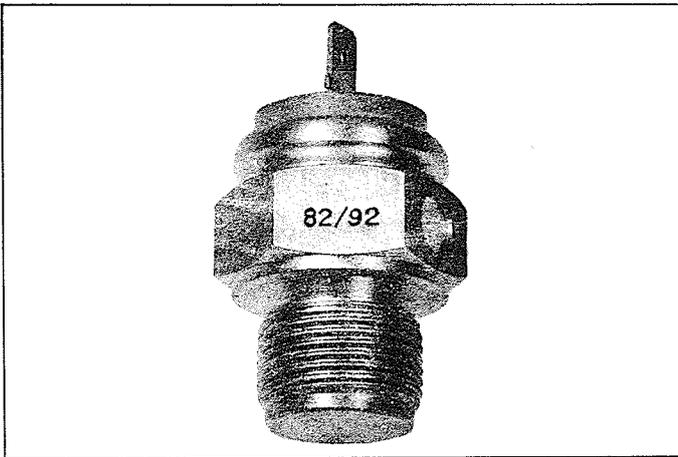
The lamp should light for a temperature between 215° F and 220° F. It should extinguish for a temperature between 204° F and 198° F.

If the unit does not satisfy these conditions, replace it.



9432

9427



**INSPECTION OF A THERMO-CONTACT CONTROLLING THE FANS OF THE MOTOR COOLING SYSTEM**

NOTE: This unit is located on the left side of the radiator above the water hose. (reference mark: 82/92)

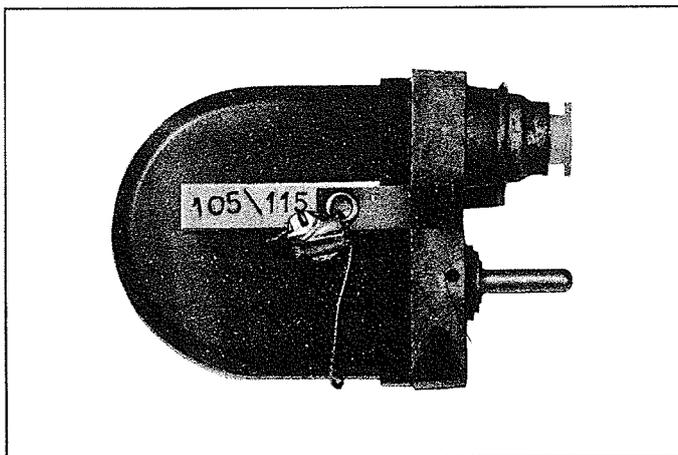
4. Connect the terminals of the thermo-contact to the posts of a battery interposing a continuity test lamp. Respect the polarities. Submerge the thermo-contact in new motor oil and heat it gradually.

When the oil reaches a temperature between 195° and 200° F, the lamp should light.

Let the oil cool by itself. The lamp should extinguish at a temperature between 185° and 175° F.

If the unit does not satisfy these conditions, it is necessary to replace it.

9426



**INSPECTION OF A MANO-CONTACT CONTROLLING THE FANS OF THE MOTOR COOLING SYSTEM (Cars with optional air conditioner)**

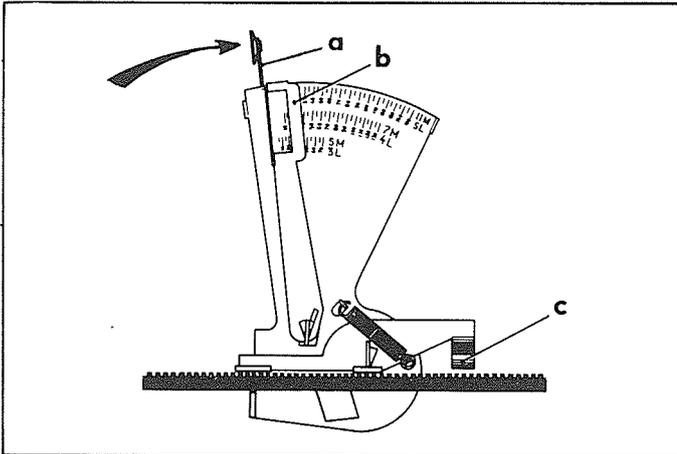
NOTE: This unit is located against the left chassis beam, at the height of the front cross-bar supporting the gear box (reference mark: 105/115).

Connect one of the orifices of the pump from the hydraulic test bench 3654-T (green paint) to the mano-contact, the other orifice of the pump being connected to a manometer graduated from 0 to 200 bars (0 to 3000 p.s.i.).

Connect the terminal of the mano-contact to the positive (+) post of a battery and the body (metallic) to the negative (-) post, by interposing a continuity test lamp.

The lamp should light for a pressure between 105 and 115 bars (1525 and 1670 p.s.i.). If not, it is necessary to replace the unit.

S. 23-1 a



### INSPECTION AND ADJUSTMENT OF THE TENSION OF THE BELTS

REMARKS: To do this operation, it is absolutely indispensable to use the tensiometer GATES 150, sold under the part number 1688-T.

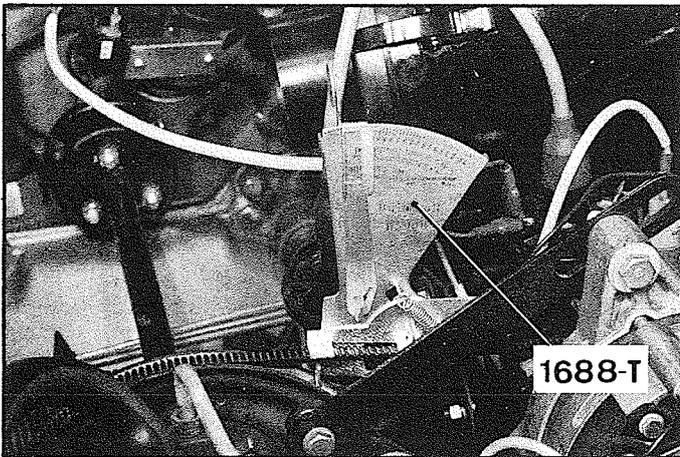
#### 1. Check the tension of the belt driving the alternator:

- a) Place the tool on the belt as indicated in the adjacent figure; the index "b" against the lever "a".  
Without touching the body of the tool, press on the end of the lever "a" in the direction of the arrow, just to the precise point where the finger "c" comes in contact with the belt.
- b) At this moment relax the pressure exercised on the lever "a" and read the tension of the belt on the corresponding scale. The scale 7M-4L must be used for the belt of the alternator.
- c) If the belt is new, the tension should be between 85 and 90 lbs.
- d) If the belt is not new, the tension should be between 55 and 65 lbs.
- e) If the tension does not correspond to the values given, loosen the mounting screws of the alternator and its tie-rod and tension the belt.
- f) Retighten the screws and recheck the tension.

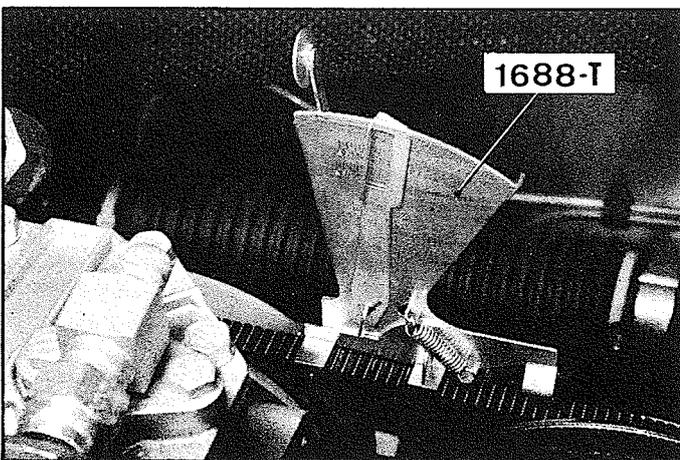
#### 2. Check the tension of the belt driving the compressor: (cars equipped with an air conditioner)

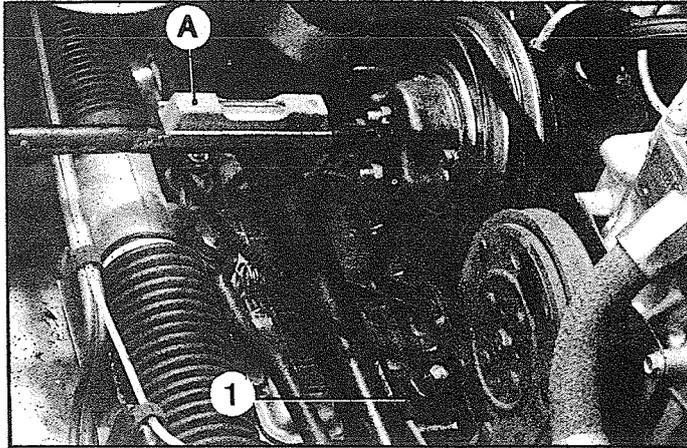
- a) Set up the tool 1688-T as indicated in paragraph 1 above.
- b) Read the tension of the belt on the scale 11M-5L corresponding to the belt.
- c) If the belt is new, the tension should be between 60 and 65 lbs.
- d) If the belt is not new, the tension should be between 40 and 50 lbs.
- e) If the tension does not correspond to the values given, loosen the mounting screws of the right-angled bracket of the compressor and tension the belt.
- f) Retighten the screws and recheck the tension of the belt.

8689



8482





8691

### **INSPECTION AND ADJUSTMENT OF THE ALIGNMENT OF THE PULLEYS**

#### **3. Check the alignment of the height of the high pressure pump pulley:**

The vehicle being sensibly horizontal, place a bubble level A (lengthwise and horizontal) on the drive shaft of the high pressure pump.

The bubble should be at  $0 \pm 1^\circ$ . If not, place adjusting shims under the legs of the cross bar supporting the various units.

REMARK: To do this operation correctly it is indispensable to use the tool 3085-T.

The adjustments start with the pulley of the high pressure pump.

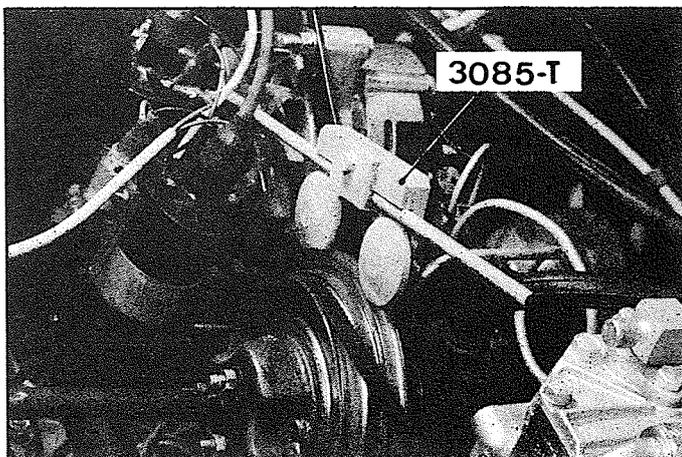
#### **4. Check the alignment of the alternator pulley:**

- a) Loosen the mounting screws of the alternator and the tie-rod. Disengage the belt.
- b) Place the tool 3085-T in the groove of the high pressure pump pulley. The pin of the tool should center in the corresponding groove of the alternator pulley.
- c) If not, decrease or increase the thickness of the adjusting washers located behind the alternator pulley.
- d) Tension the belt (see paragraph 1 of this operation).

#### **5. Check the alignment of the compressor pulley: (cars equipped with an air conditioner)**

- a) Loosen the mounting screws of the right-angled bracket of the compressor on the cross bar and disengage the belt.
- b) Place the tool 3085-T in the groove of the high pressure pump pulley. The pin should center in the corresponding groove of the compressor pulley.
- c) If not, loosen the screws fastening the right-angled bracket onto the compressor and move it toward the front or rear.
- d) Tension the belt (see paragraph 2 of this operation).

REMARK: If the adjustment of the alignment of the pulleys is impossible to accomplish, in accordance with the instructions above, insert an adjustment washer between one of the legs of the shelf supporting the high pressure pump and its support.



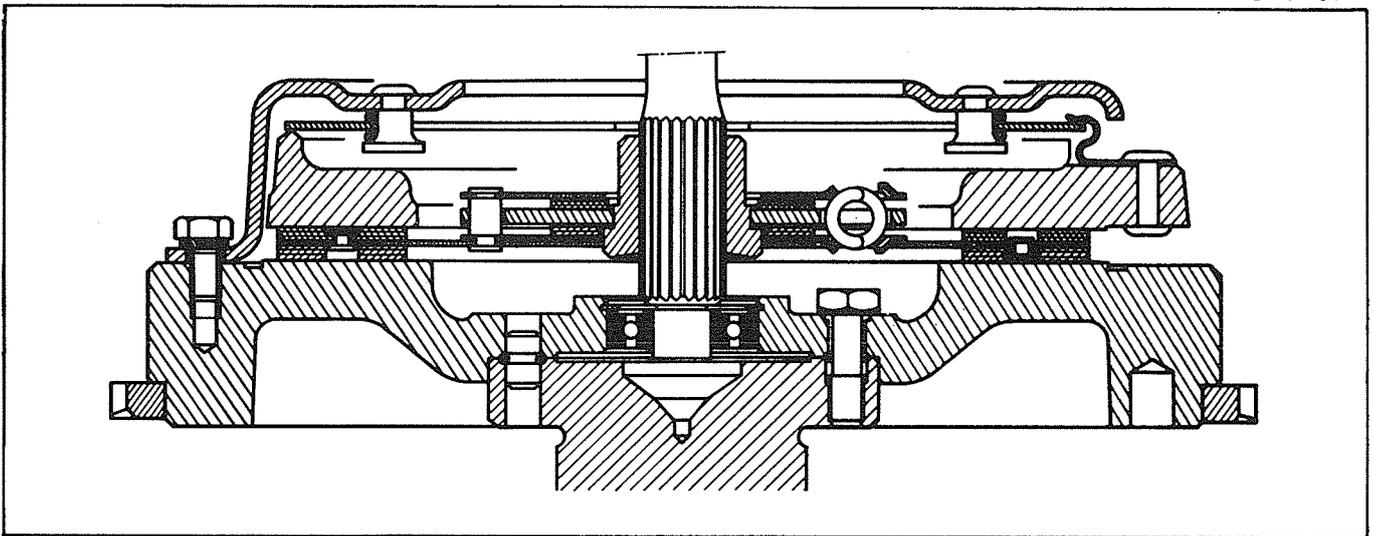
8690

## CHARACTERISTICS

Diaphragm type pressure plate FERODO type 230. DIB. 530

The pressure plate cannot be repaired.

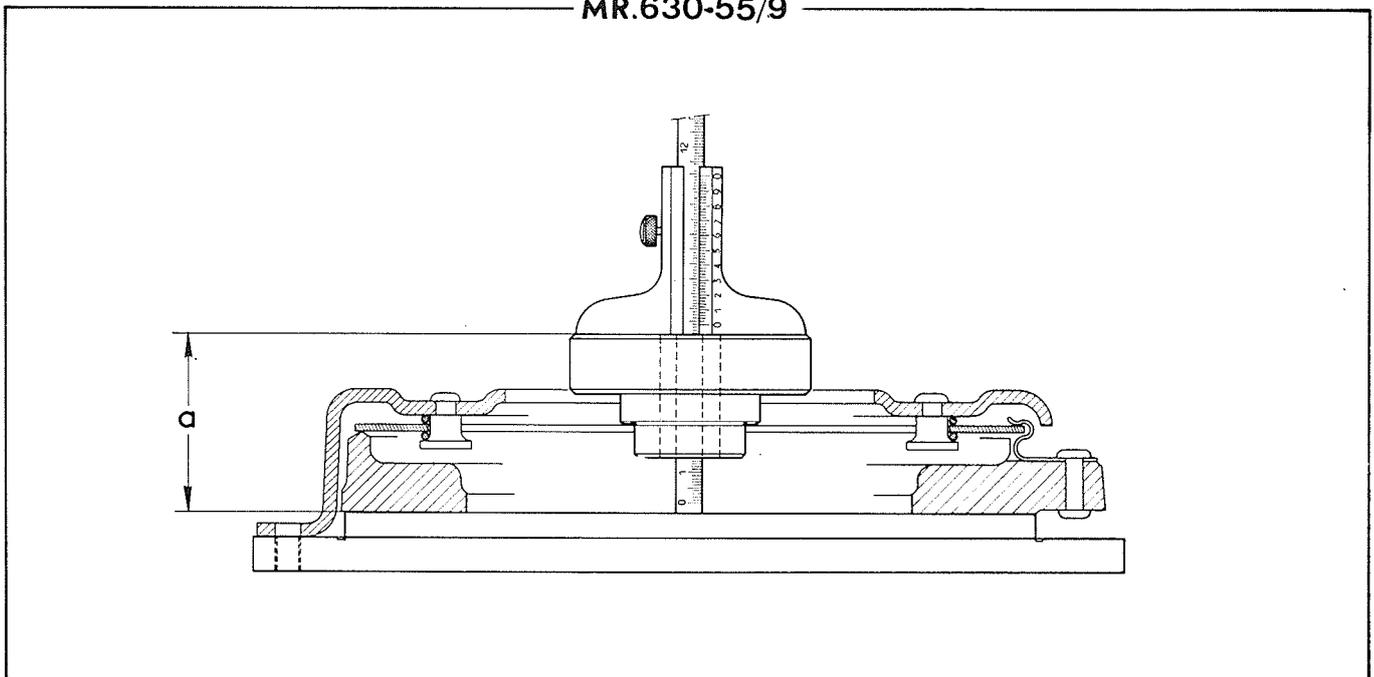
D. 31-51



## PARTICULARS

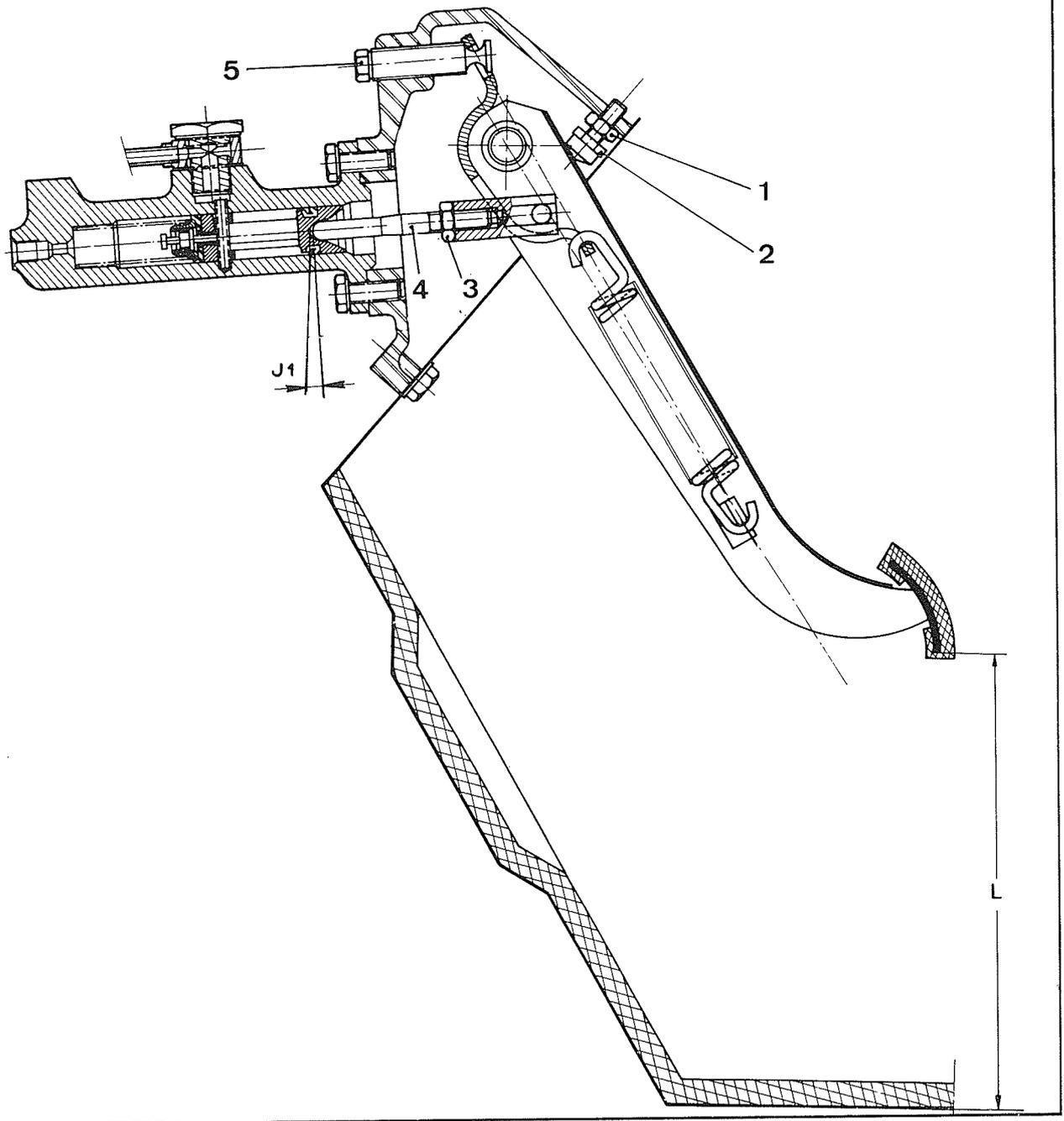
- Tightening torque of the screws mounting  
the pressure plate on the flywheel (star washers) ..... 26 - 30 ft. lbs.
- After rectifying the flywheel, the distance between the pressure surface of the flywheel  
and the face of the pressure plate should be .....  $.014 \begin{matrix} 0 \\ \pm .006 \end{matrix}$ "
- The checking of the pressure plate can only be done on a special assembly  
(assembly MR. 630-55/9) as indicated below.
- The dimension "a" should fall between 2.256" and 2.366".  
If not, the pressure plate must be replaced.

### MR.630-55/9



## ADJUSTMENTS OF THE CLUTCHING CONTROL

◆ S. 31-3

**1. ADJUSTMENT OF THE HEIGHT OF THE PEDAL:**

Work the screw (2) to obtain a dimension  $L = 180 \begin{smallmatrix} +5 \\ 0 \end{smallmatrix} \text{ mm}$  ( $L = 7.087''$  to  $7.285''$ ) from the lower edge of the pedal plate (rubber pad removed) to the bare metal of the floorboard, or a dimension  $L = 160$  to  $165 \text{ mm}$  ( $L = 6.3''$  to  $6.5''$ ) from the lower edge of the pedal plate (rubber pad removed) to the upper side of the carpet. Tighten the lock-nut (1).

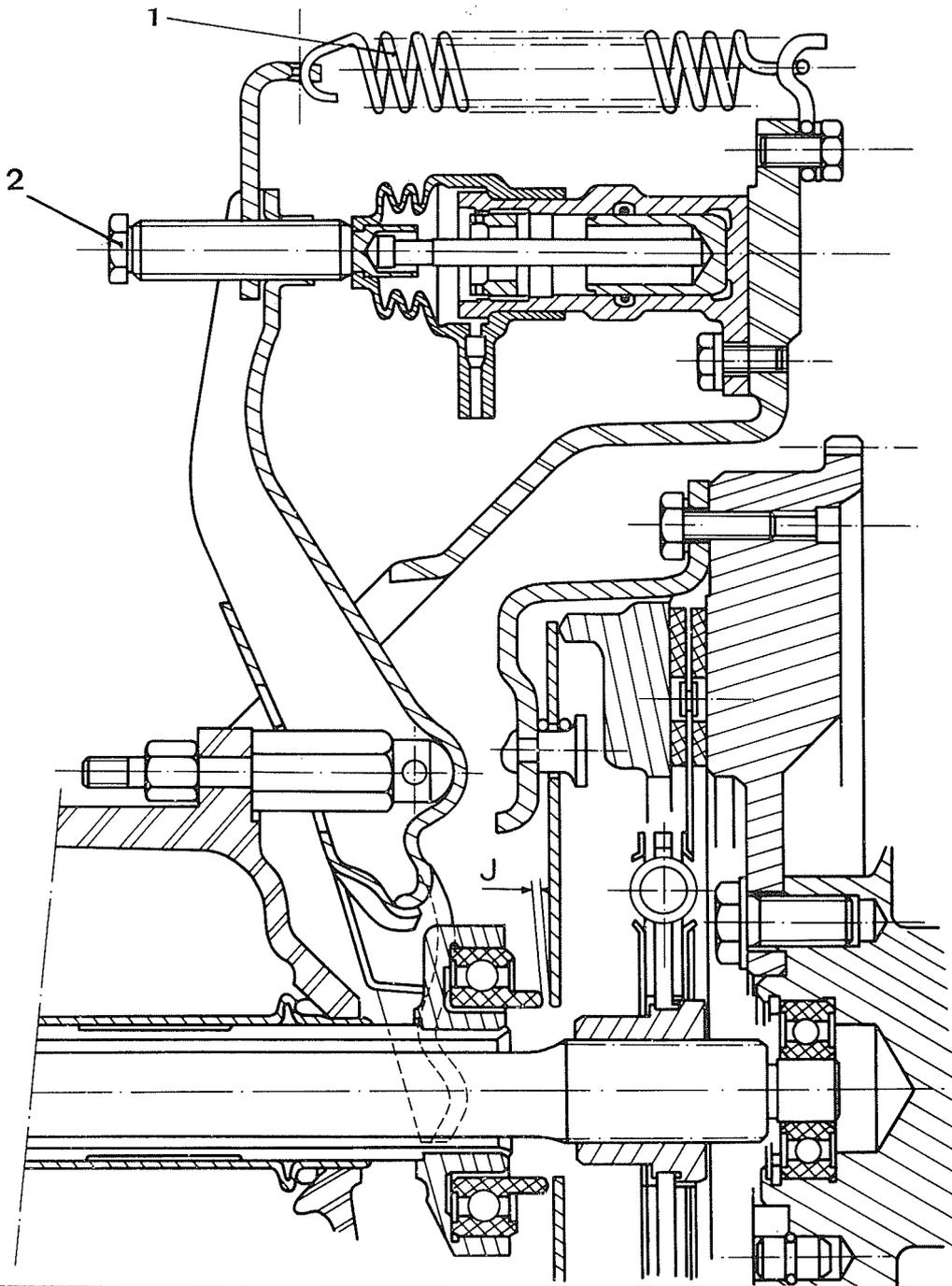
**2. ADJUSTMENT OF THE PEDAL ASSISTANCE SPRING:**

Loosen the lock-nut (3) and turn the rod (4) to obtain zero clearance,  $J1 = 0$ .

Unscrew the adjustment screw of the clutch fork to obtain zero clearance at the release bearing, then turn the screw in  $3\frac{1}{2}$  turns and work the screw (5) in order to return the pedal to its stop on the screw (2).

**3. ADJUSTMENT OF THE PLAY AT THE PEDAL:**

Work on the rod (4) so as to obtain at  $J1$  a clearance of 0 to  $.020''$  ( $\frac{1}{2}$  turn of the rod (4) max.). Tighten the counter-nut (3). Be sure of the return of liquid to the reservoir after one declutching stroke of the pedal.



◆ 4. **BLEEDING THE DECLUTCHING CIRCUIT:**

Remove the cap of the bleed screw of the declutching cylinder. Replace it with a transparent tube, the end of which will be submerged in a container partially filled with "LHM" fluid.

Loosen the bleed screw approximately  $\frac{1}{2}$  turn and work the clutch pedal slowly just until a bubble of air appears in the bleed tube.

At this moment, the pedal being held all the way down and the bleed tube kept submerged in the liquid, tighten the bleed screw.

Check the circuit for leakage.

◆ 5. **ADJUST THE CLEARANCE OF THE RELEASE BEARING:**

- Remove the return spring (1).
- Screw in the fork adjustment screw (2) just until the release bearing comes in contact with the diaphragm (J=0).
- Unscrew the adjustment screw (2)  $1\frac{1}{2}$  turns to obtain a clearance of .040" to .060".
- Replace the spring (1).

# GEAR BOX

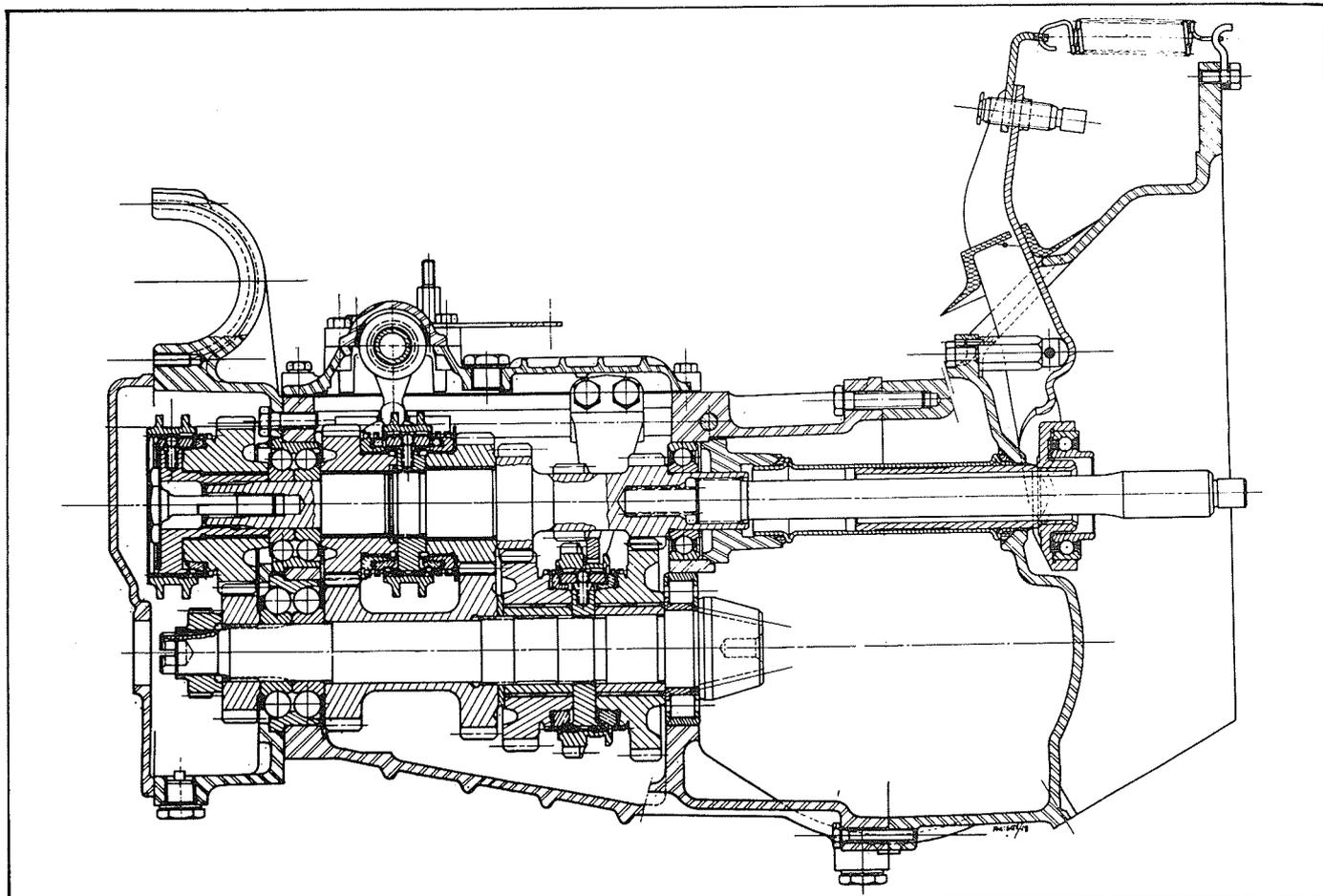
OPERATION No. S. 340-00: *Characteristics and particulars of the 5 speed gear box*

Op. S. 340-00

1

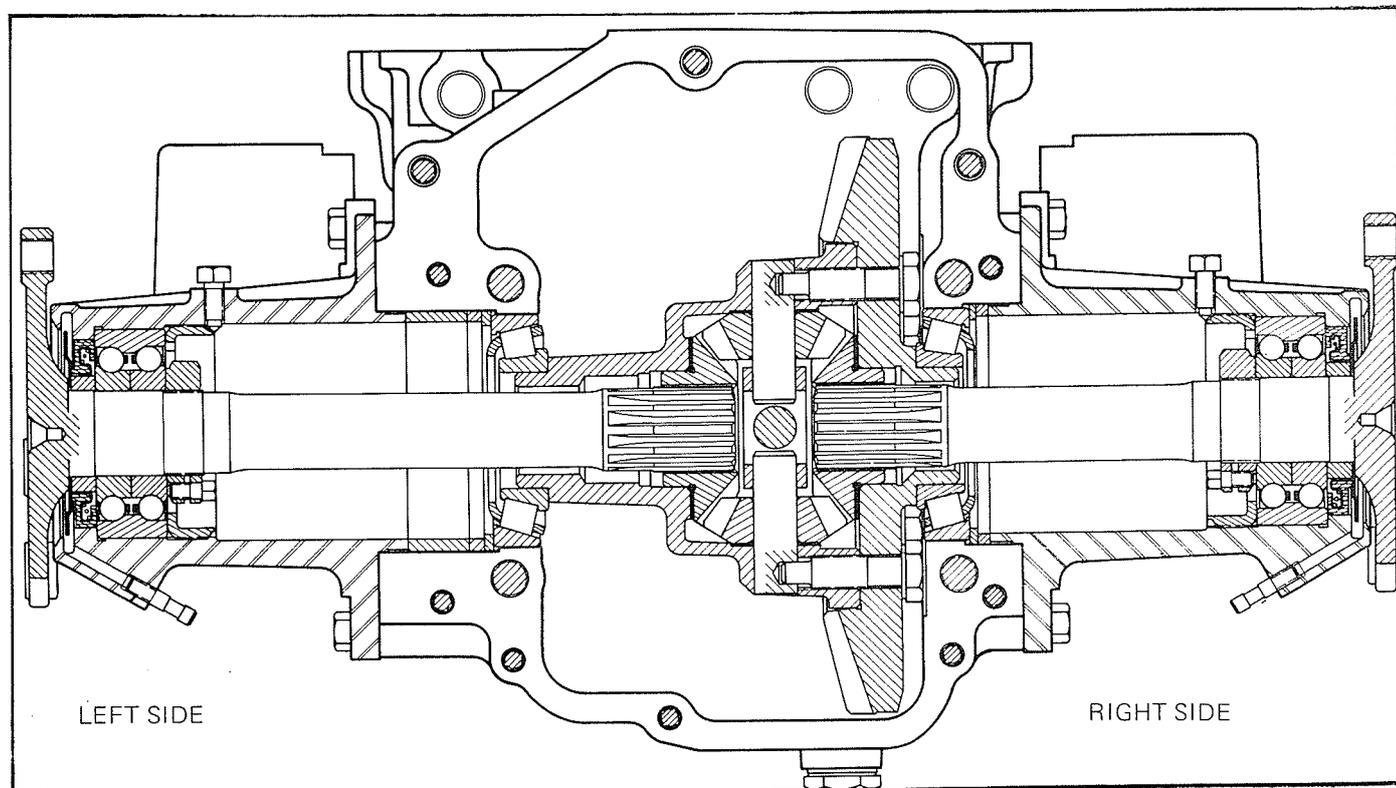
LONGITUDINAL SECTION OF THE GEAR BOX

S. 33-3



CROSS SECTION OF THE DIFFERENTIAL

D. 34-1



**I CHARACTERISTICS****1. Ratio of the speeds:**

NOTE: The speeds are given for cars equipped with 195/70 VR 15 X tires developing 7,925 ft. under load.

SPEED	REDUCTION	G.B. RATIO	DIFFERENTIAL	TOTAL REDUCTION	SPEED IN M.P.H. (1000 MOTOR R.P.M.)
1st	$\frac{13}{38}$	0.3421		0.0781	5.841
2nd	$\frac{17}{33}$	0.5151	8/35	0.1177	8.796
3rd	$\frac{28}{37}$	0.7567	= 0.2285	0.1729	12.922
4th	$\frac{33}{32}$	1.0312		0.2356	17.609
5th	$\frac{37}{28}$	1.3214		0.3019	22.574
R	$\frac{13}{41}$	0.3170		0.0724	5.414

**2. Reduction ratio of the speedometer:**

Differential: 8/35: ..... 0,2941 - 5/17

**3. Capacity and quality of oil:**

- Capacity: ..... 2,25 liters (2-3/8 qts.)  
 - Oil : ..... SAE 80 EP

**II PARTICULARS**1. *Side clearance of the 3rd and 4th speed synchronizer:* ..... J = .004" max.**2. Tightening torques:**

- Locking screws of the forks or shift fingers: ..... 29 ft. lbs.  
 - Plug for draining or refilling: ..... 25 - 33 ft. lbs.

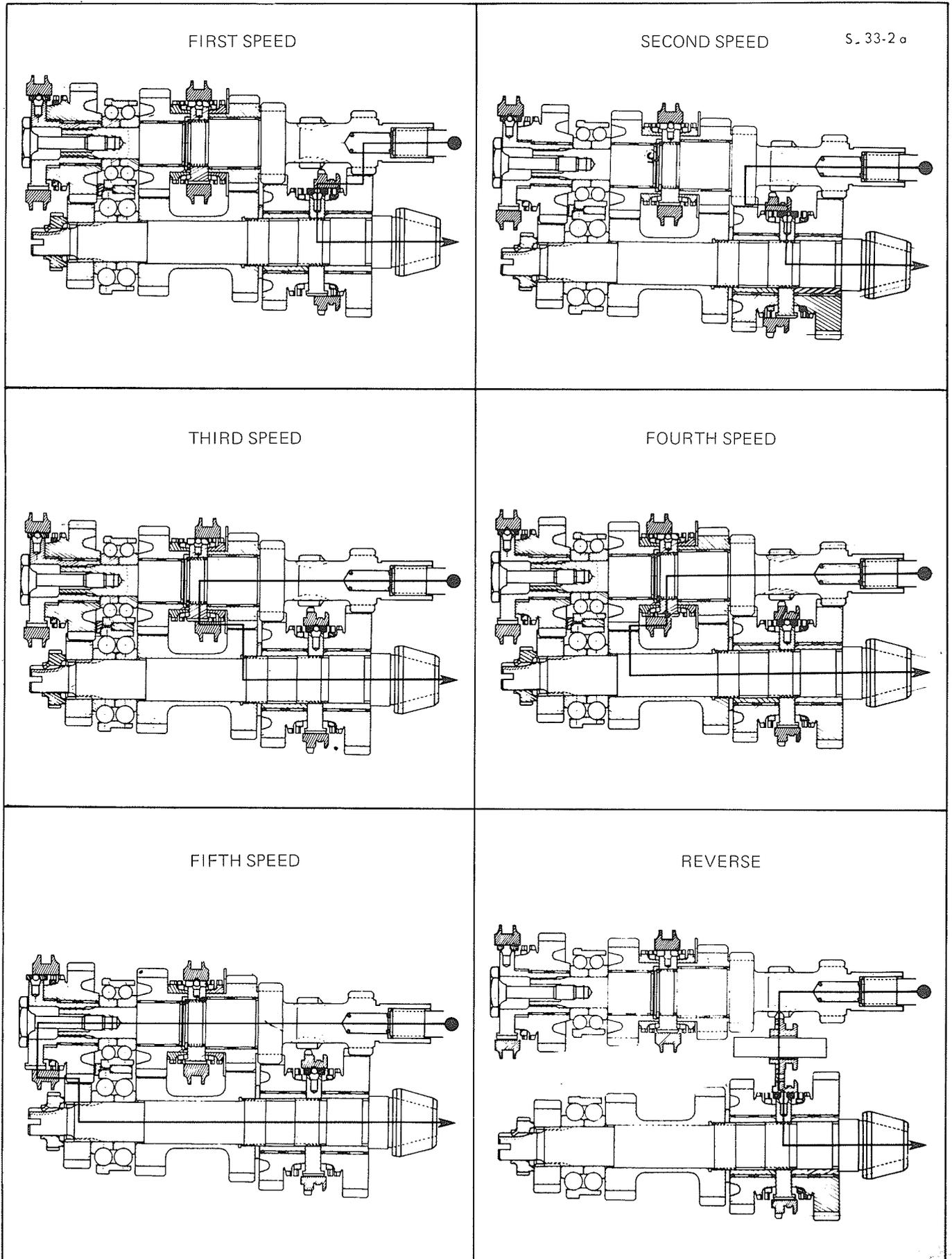
**3. Adjustments on the bevelled pinion and differential:**

- Bevelled pinion:  
 Depth: Etched on the upper face of the drive pinion.  
 Mating Number: Etched on the upper face of the drive pinion.  
 Clearance between the teeth (at the outside diameter of the ring gear): ..... .006" to .009"  
 - Differential:  
 Lateral planetary clearance at the point of minimum play: ..... .004"  
 Lateral clearance of the satellites: ..... .012"

**4. Tightening torques (bevelled pinion and ring gear):**

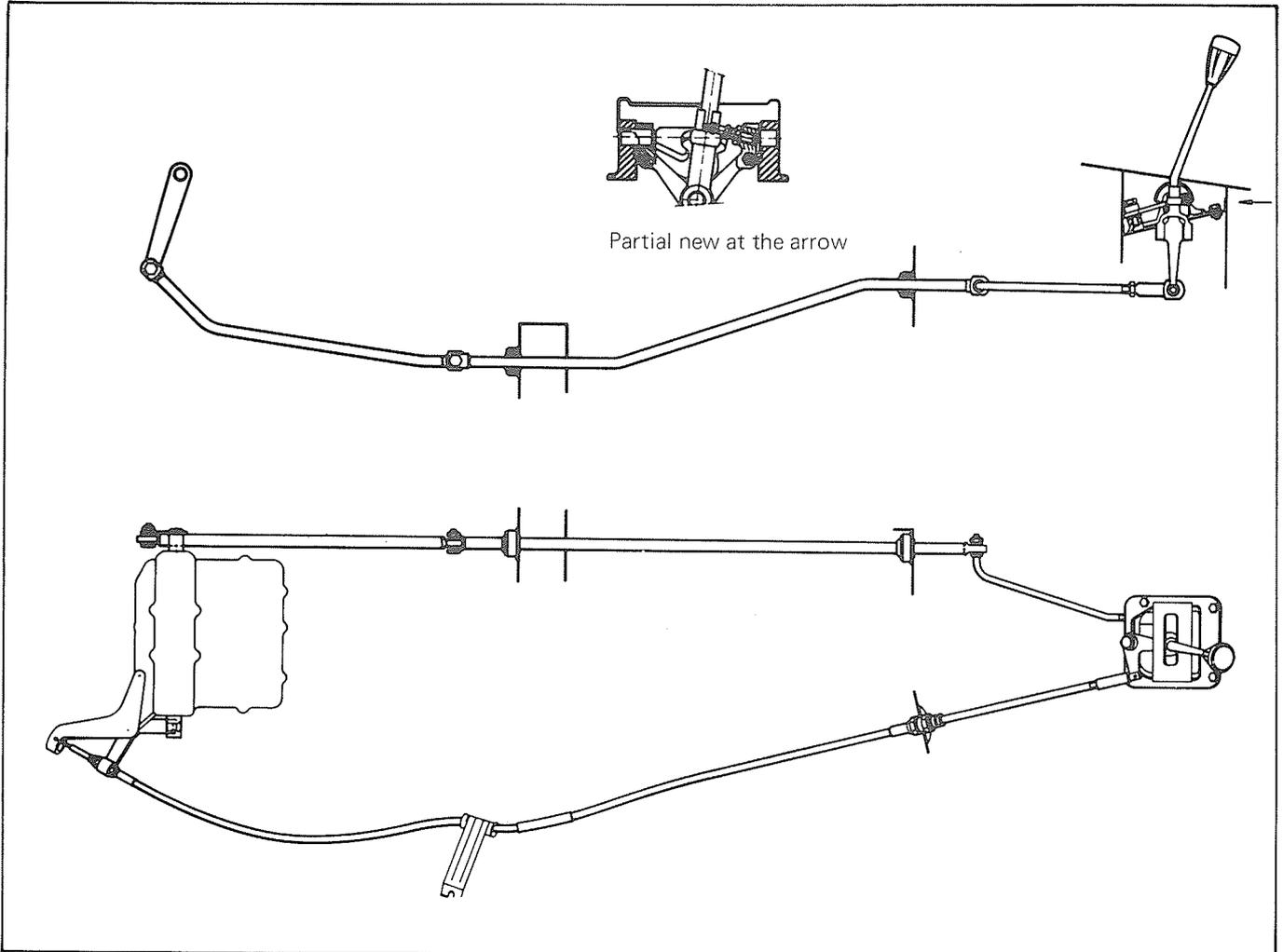
- Differential shaft:  
 Ring nut (outer cage of the bearing) ..... 72 ft. lbs.  
 Nut (inner cage of the bearing) ..... 108 ft. lbs.  
 - Lock screw of the nut (inner cage of the bearing) ..... 7 ft. lbs.  
 - Mounting screws of the ring gear and differential housing ..... 83 - 94 ft. lbs.  
 - Mounting screws of the extension shaft housings: ..... 15 - 22 ft. lbs.

POWER FLOW OF THE SPEEDS



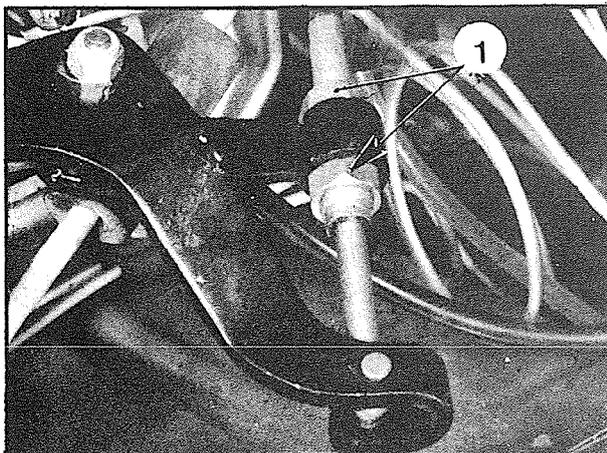
## ADJUSTMENTS OF THE SHIFT CONTROLS

S. 33-4



NOTE: *Aim of the operation:* Adjust the position of the shift lever so that the shifting gate does not strain the passage or the selection of speeds.

1951



### I. ADJUSTMENT OF THE CONTROL FOR SELECTION OF THE SPEEDS (SELECTOR RELAY LEVER)

#### 1. Adjustment of the length of the housing for the speed selector cable:

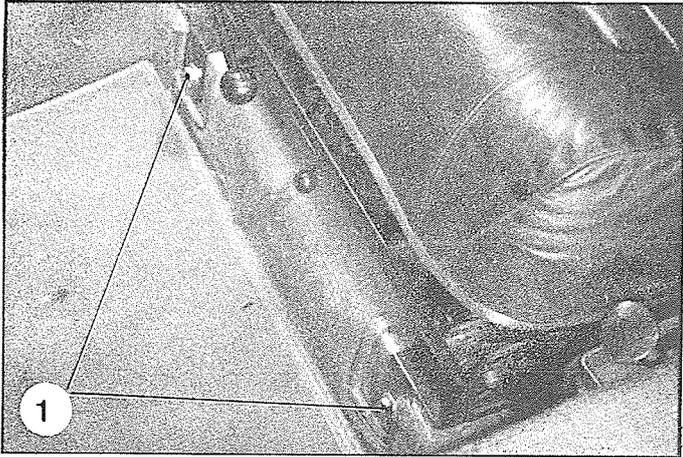
Vary the length of the housing by working on the two lock-nuts, (1).

Verify that the speeds shift correctly.

Tighten the lock-nuts (1).

If this adjustment does not give results, it is necessary to adjust the length of the selector cable.

8556

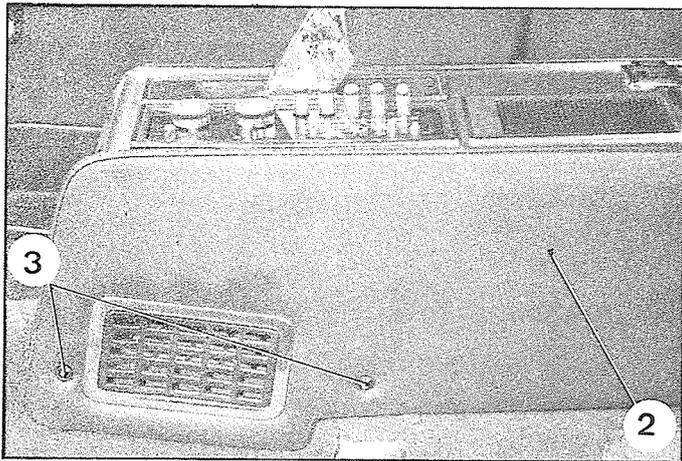


## 2. Strip the center console:

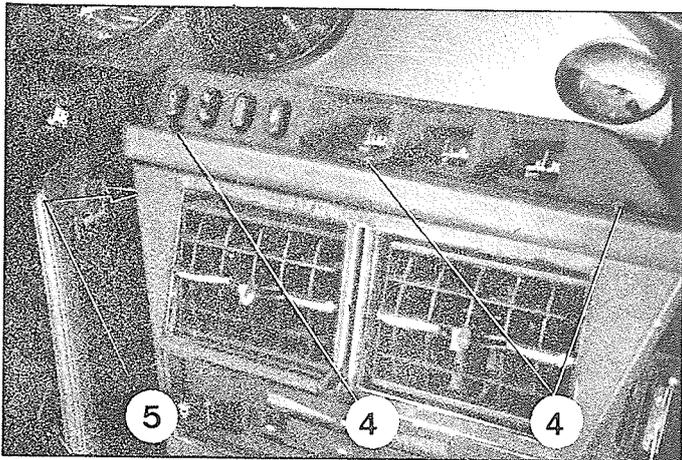
Disconnect the battery, and remove:

- the four screws (1) and the front seats,
- the two screws (3) and the right side trim panel (2),
- the three screws (4) and the temperature gauge panel,
- the lower mounting screws (3) and the upper screws (5) and remove the left trim;
- the screws (7) and the two side chrome trim strips (6).
- the screws (9) (Phillips screwdriver) and the grille (8) of the shift positions,
- the knob, of the shift lever (12).
- the screws (10) and the selector trim (11).

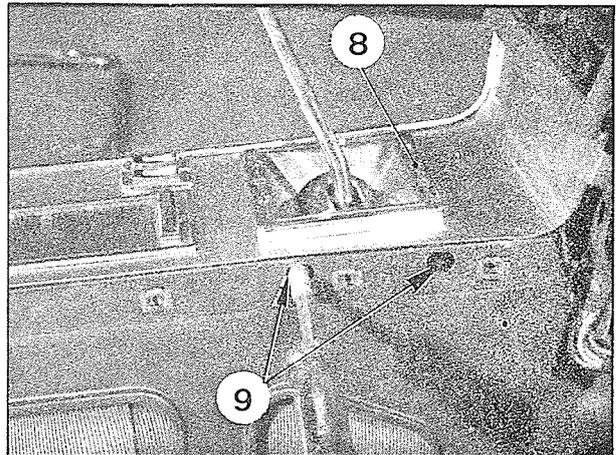
8669



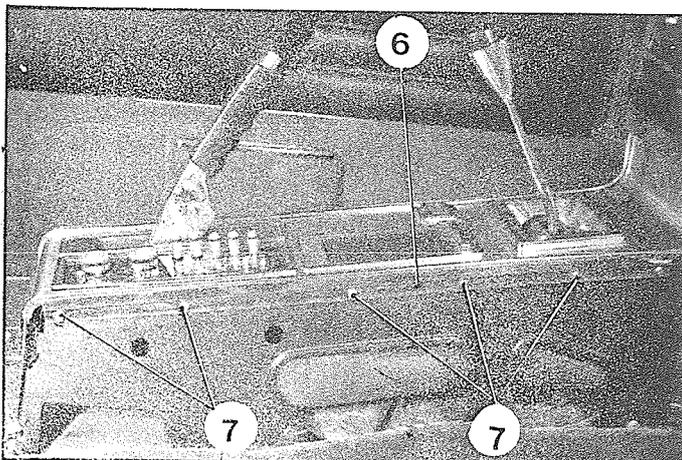
8672



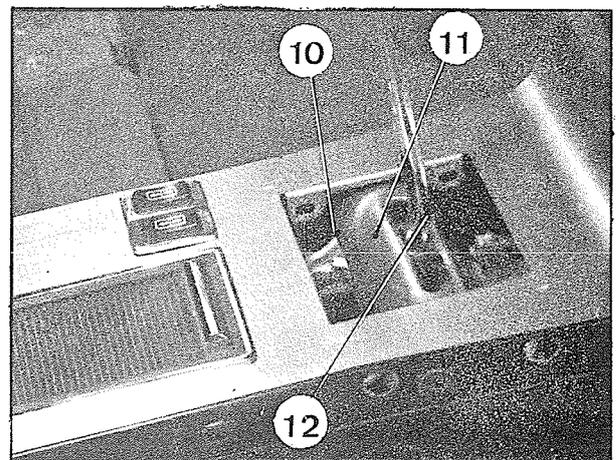
8671



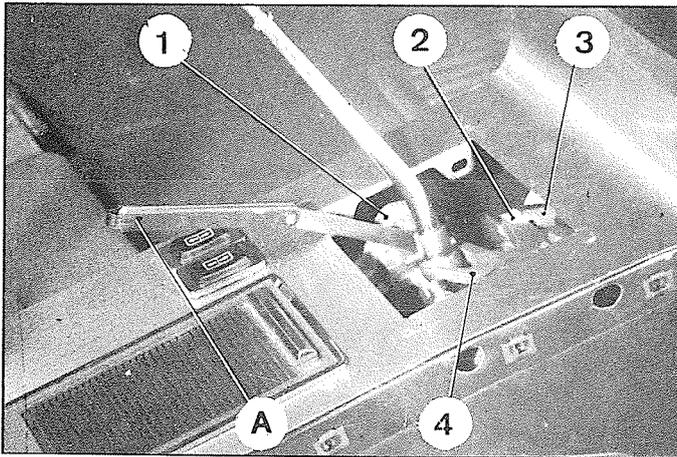
8670



8673



8674



3. *Adjustment of the length of the speed selector cable:*

Extract the cotter pin and remove the pin (2).

Work on the joint (3) to adjust the length of the selector cable, and obtain:

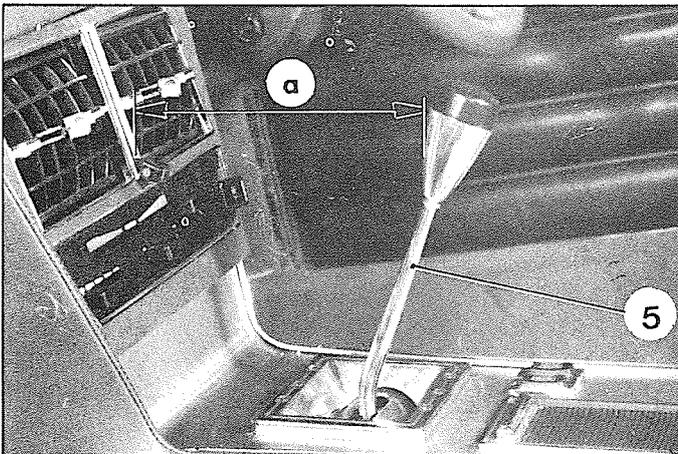
a clearance of approximately 1 mm (.040") (feeler gauges A) between the fork (4) and the support (1) when the shift lever is "bottomed" toward the left, between the first and second speeds.

II *ADJUSTMENT OF THE CONTROL FOR PASSAGE OF THE SPEEDS (SHIFT RODS)*

4. Shift to 1st speed. In this position (see figure) there should be a distance of:  $a=90$  mm (3.543") (between the knob of the shift lever (5) and the grill of the climatization controls).

If not, it is necessary to adjust the position of the shift lever (5) by working on the length of the shift rod.

8669



5. *Adjustment of the length of the shift rod:*

a) Replace the shift pattern grille (7).

Shift to 3rd, then to 4th speeds. In each of these two positions the clearance between the shift lever (5) and the shift pattern grille (7) should be identical.

b) If not:

- Remove the duct (10).
- Loosen the lock-nut of the adjustable end joint (8).
- Remove the pin (9).

c) Adjust the position of the joint (8) so that the forward end of the joint will be plumb with the *forward surface of the central console*, when the shift lever (5) is at "neutral".

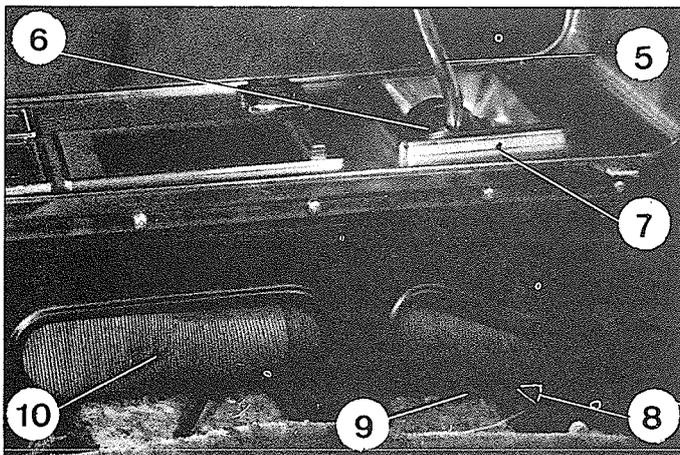
d) Replace the pin (9). Shift to 3rd, then to 4th speed. Verify that in each of these two positions, the clearance between the lever and the grille is identical.

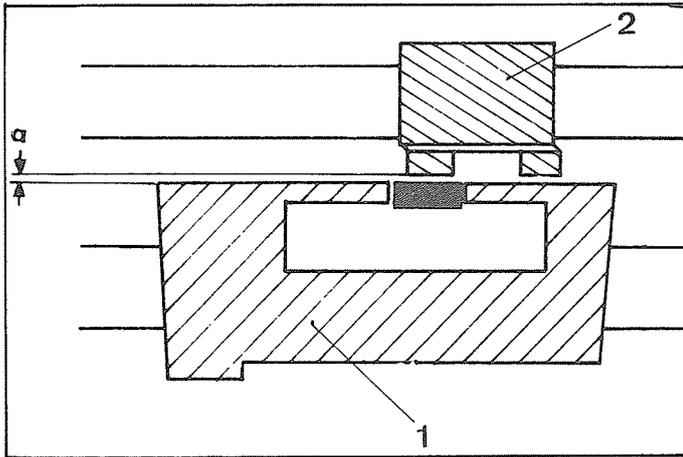
Tighten the lock-nut of the adjustment joint (8).

Replace the duct (10).

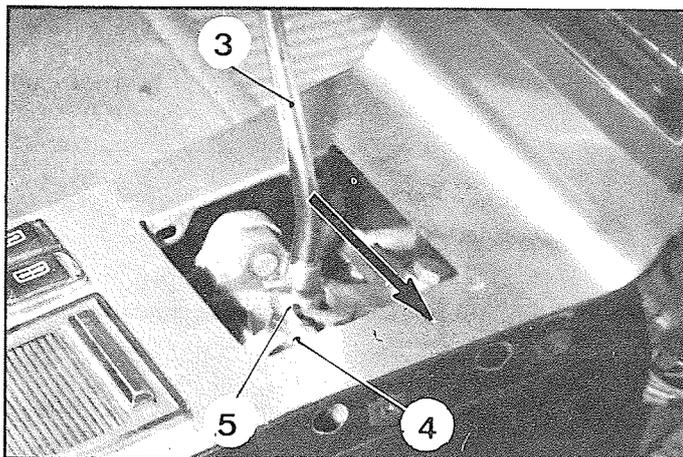
e) Remove the shift pattern grille (7).

8670

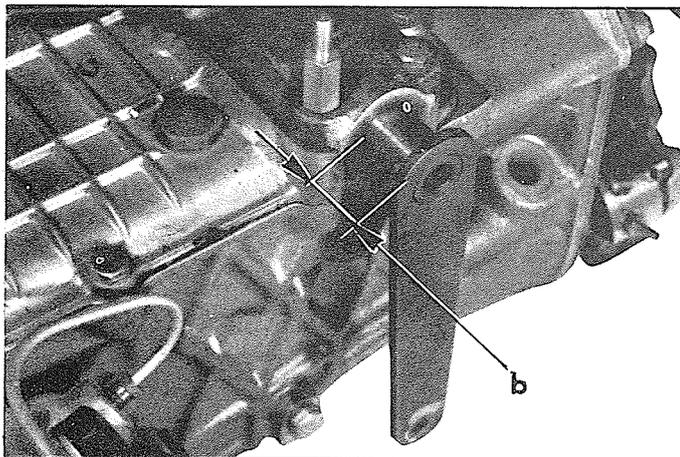




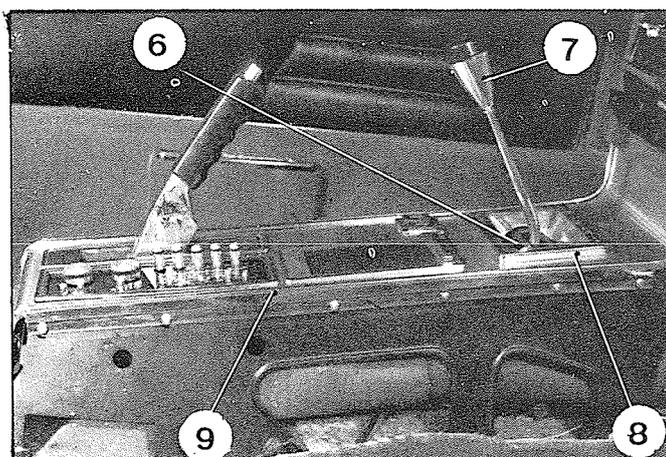
8676



8712



8670



#### 6. Adjustment of the stop of 5th speed:

REMARKS: The aim of this adjustment is to obtain (inside the gear box) a clearance

$$a = 0,2 \text{ to } 0,5 \text{ mm } (.008'' \text{ to } .020'')$$

between the control relay finger (1) of 5th speed and the reverse drive finger (2).

- This adjustment can be obtained only on condition that the controls for selection and shifting of the speeds are correctly adjusted.

a) Loosen the lock-nut (4) and remove the 5th speed stop screw (5).

b) Shift to 5th speed, and hold the shift lever (3) by pressure toward the right (in the direction of the arrow).

With an assistant, measure the movement "b" of the control lever spindle of the forks (on the cover of the gear box). Note this dimension.

c) Reset the shift lever (3) at "neutral".

Replace the 5th speed stop screw (5) and its lock-nut (4).

d) Repeat the operation indicated at line b). Work on the stop screw (5) to obtain a movement "b" greater by 0,5 mm (.020'') than that measured previously.

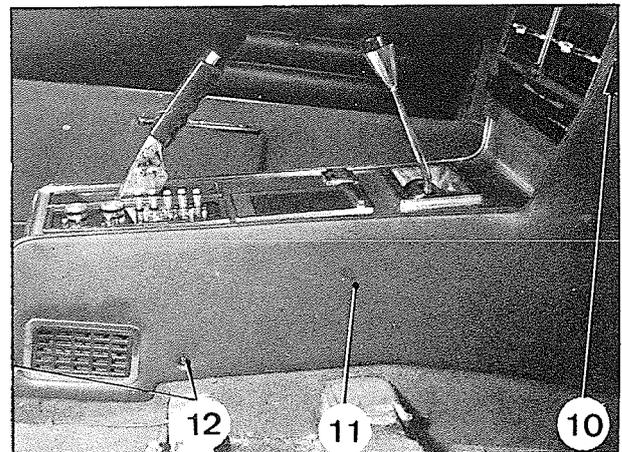
Tighten the lock-nut (4).

#### 7. Dress the central console:

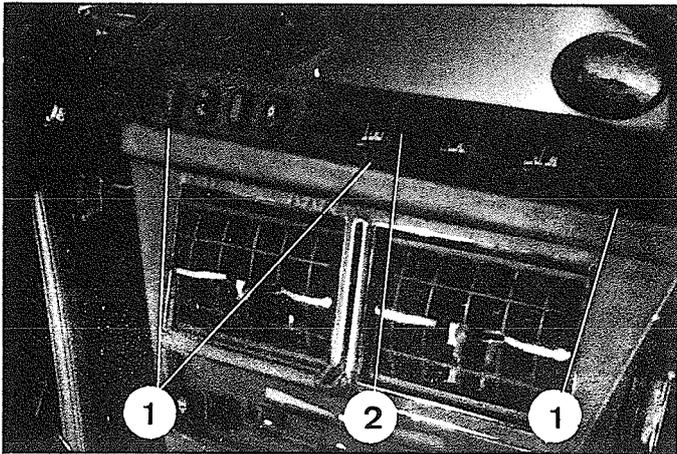
Replace:

- the selector protection cover (6). Tighten the mounting screws.
- the shift pattern grille (8), (magnetized screw driver).
- the shift lever knob (7).
- the two lateral chrome strips (9).
- the right and left side trim panels (11), tighten the upper mounting screws (10) (left trim panel only) and the lower screws (12).

8669

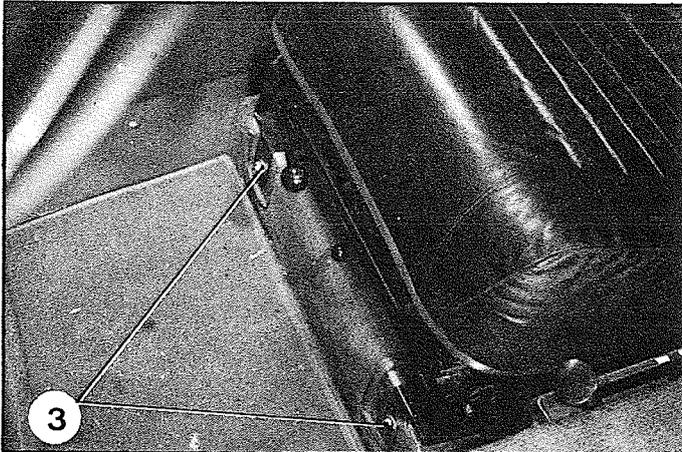


8672



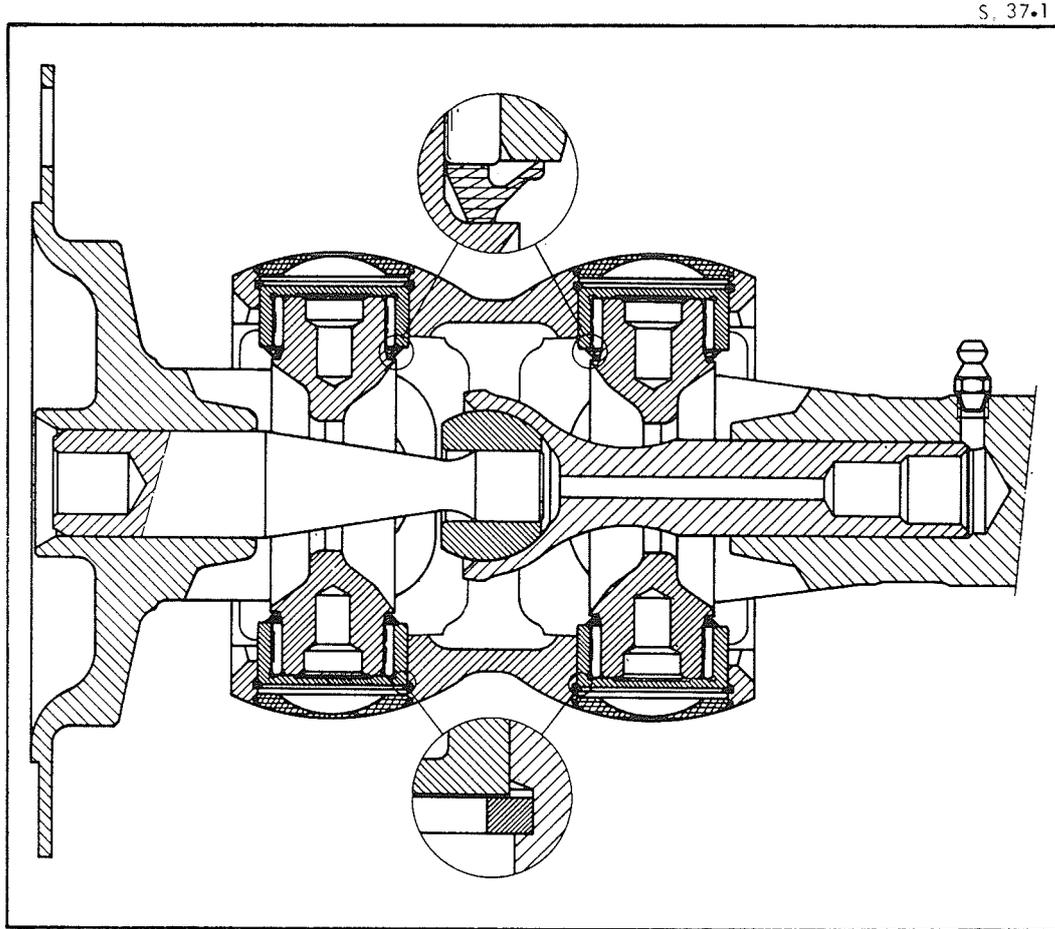
Replace the temperature gauge panel (2).  
Tighten the mounting screws (1).

8556



Replace the two front seats.  
Tighten the front and rear mounting screws (3).  
Connect the battery.

# DRIVE SHAFTS



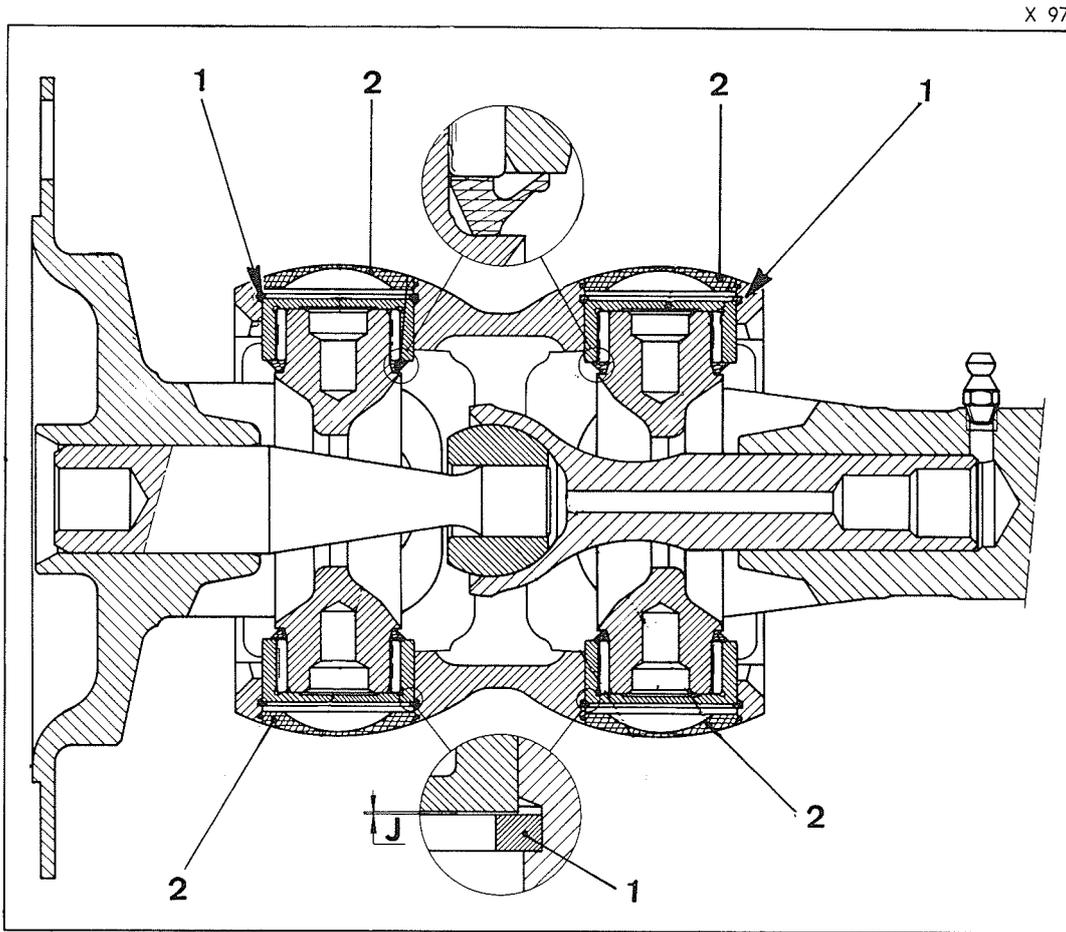
## *PARTICULARS*

### *1. Tripod joint:*

Divide 4½ oz. of bearing grease in the drive housings, on the bearing balls and the tri-axle.

Tightening torques:

- Nuts for mounting the drive housings . . . . . 76 - 98 ft. lbs.
- Nut for the upper ball joint . . . . . 43 ft. lbs.
- Nut for the lower ball joint . . . . . 43 ft. lbs.



**ADJUSTMENT OF THE LATERAL CLEARANCE OF THE CROSSES**

The adjustment of the lateral clearance of the drive shaft universal crosses is accomplished by the circlips (1) locking the needle bearings.

The Parts Department sells the circlips in seven different thicknesses referenced by lines etched on the tongs (total the number of lines).

No.	Thickness $+ 0$ $-.002''$	Number of Lines Etched
DX. 372-6f	.067''	6
DX. 372-6e	.065''	5
DX. 372-6d	.063''	4
DX. 372-6c	.061''	3
DX. 372-6b	.059''	2
DX. 372-6a	.057''	1
DX. 372-6	.055''	None

1. Remove the four bearing plugs (2) with a scriber or a pick.  
REMARK: On one side of the double yoke of the drive shaft, the two circlips installed are always the circlips marked 3 (DX. 372-6c thickness = .061'').  
*Do not remove these.*

2. Remove the other two circlips (1) mounted on the opposite side of the double yoke.

If necessary, replace them by thicker circlips, to obtain a lateral clearance of the cross  $J = .003''$  max.

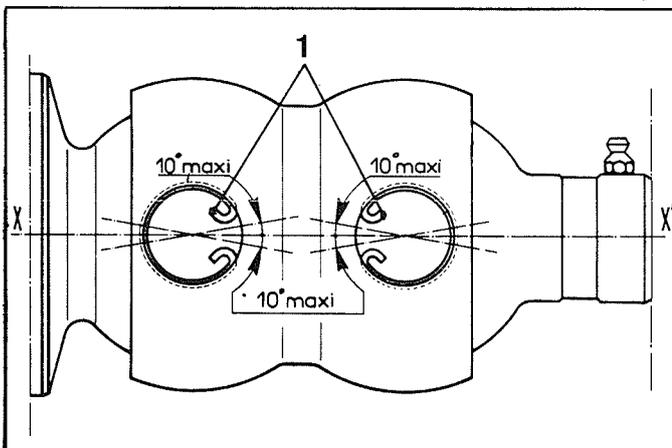
**ATTENTION:**

The symmetric axis of the circlips should be within  $10^\circ$  of the axis  $XX'$  of the drive shaft, the tongs of both circlips (1) being oriented as shown in the sketch.

3. Mount the four bearing plugs (2).

It is necessary to replace these at each repair.

D. 37-3



# SOURCE AND RESERVE OF PRESSURE

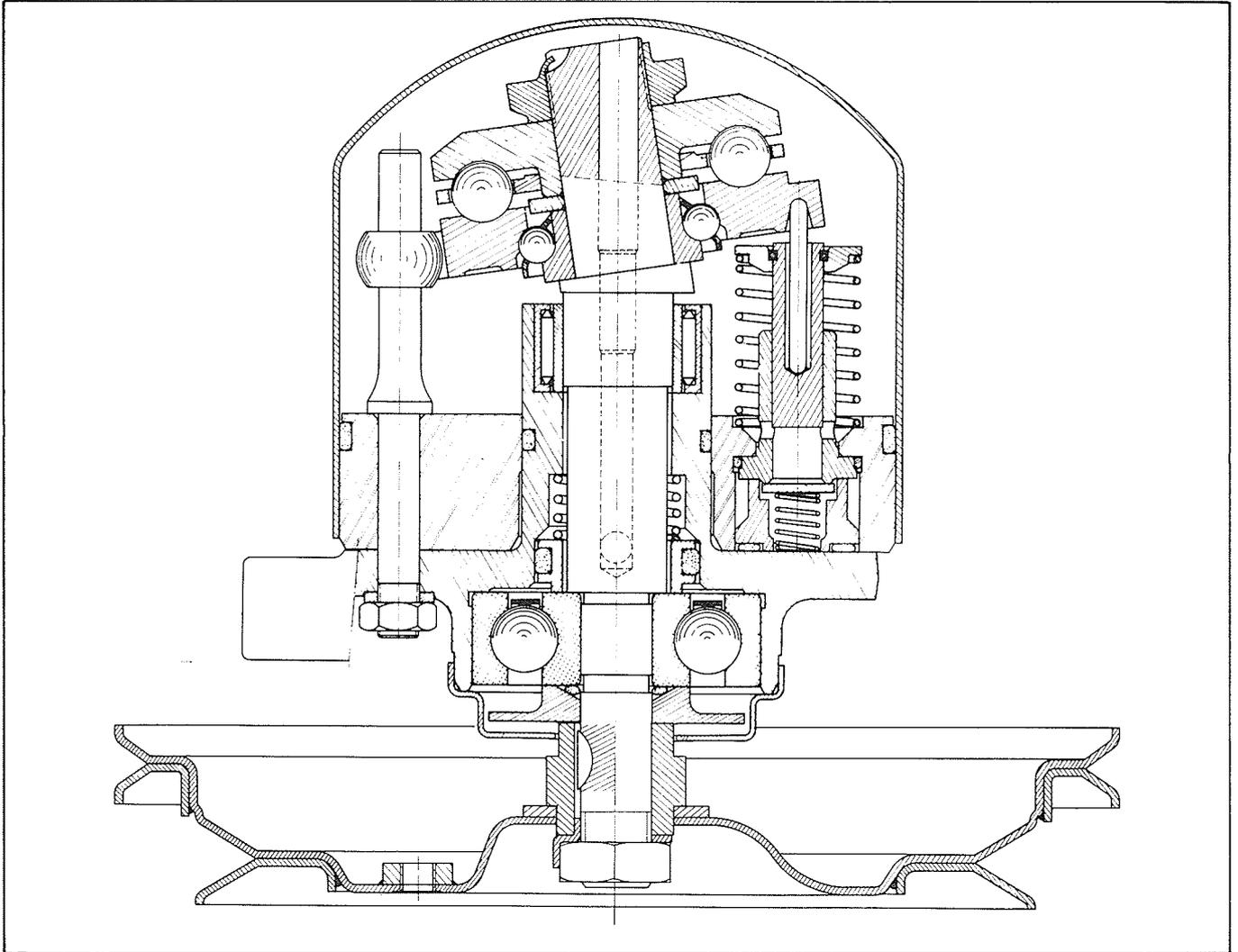
OPERATION No. S. 390-00: *Characteristics and particulars of the source and reserve of pressure. Hydraulic circuits.*

Op. S. 390-00

1

## I HIGH PRESSURE PUMP

S. 39-2



### CHARACTERISTICS

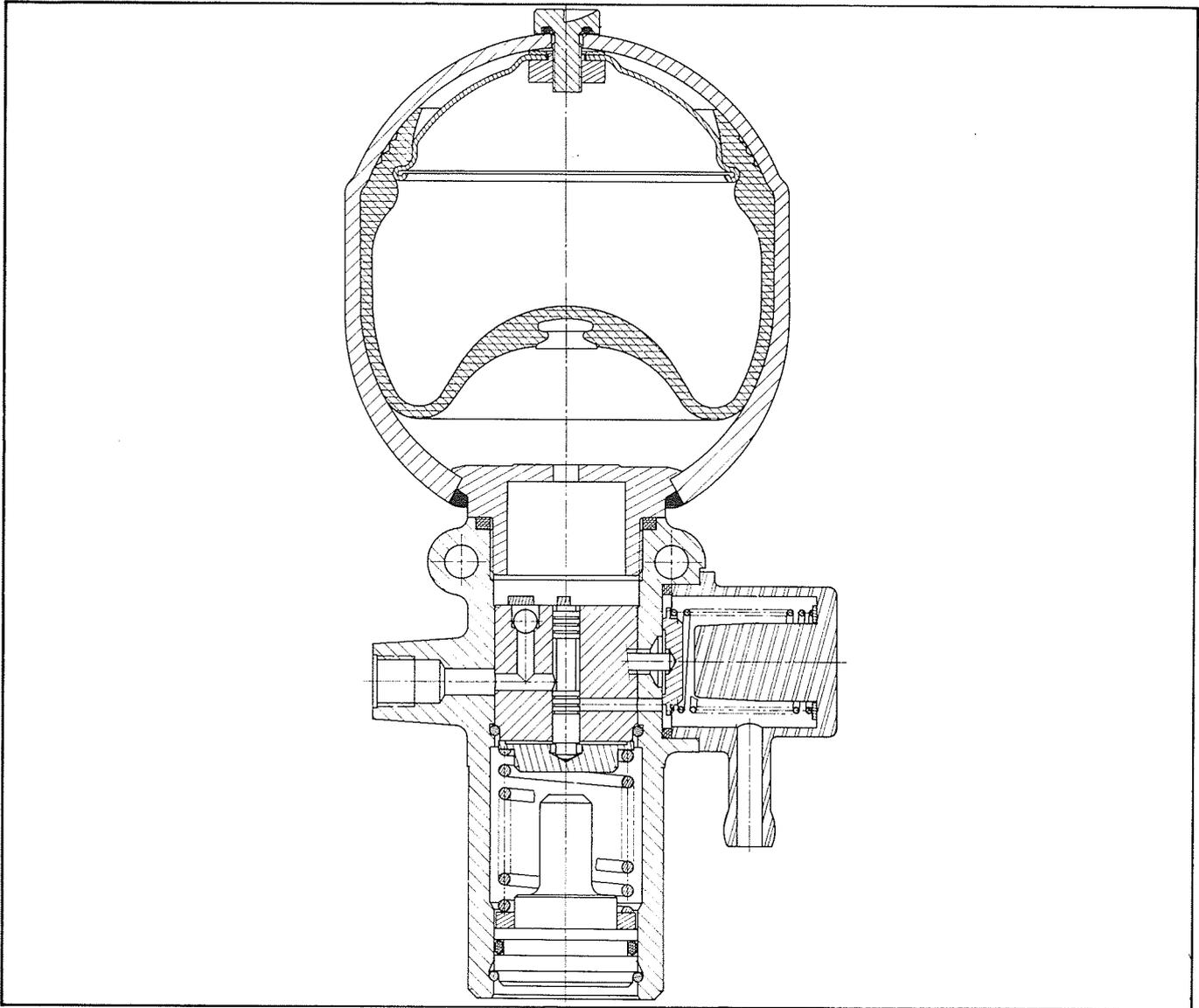
- The pump turns at half the speed of the motor:
- Output: For one turn of the pump =  $2,8 \text{ cm}^3$  (.1708 cu. in.); or for 600 motor r.p.m. . .  $840 \text{ cm}^3/\text{mn}$  (51.24 cu. in./minute).
- Leak tightness of the pump body . . . . . 150 bars (2176 p.s.i.)

### PARTICULARS

- Piston rods: length (0,1 X 0,1 mm = .004" X .004"): . . . . . 28,8 to 30,5 mm (1.134" to 1.201")
- Clearance between the upper face of the piston (TDC) and the check valve: . . . . . 0,5 mm (.020")
- Tightening of the drive pulley nut: . . . . . 4 m.kg. (29 ft. lbs.)
- Tightening of the nuts and screws mounting the bearing plate on the pump body: . . . . . 3,5 m.kg. (25 ft. lbs.)

## II PRESSURE REGULATOR – MAIN ACCUMULATOR

D. 39-15



## CHARACTERISTICS

1. *Pressure regulator:*

Pressures - of cut-in: .....	140 to 150 bars (2031 - 2176 p.s.i.)
- of cut-out: .....	160 to 175 bars (2321 - 2539 p.s.i.)

2. *Main accumulator:*

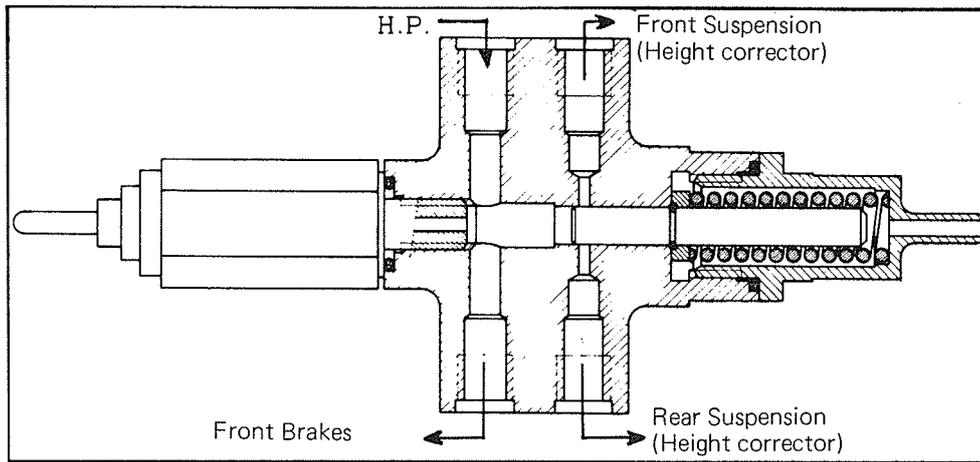
- Volume: .....	0,380 liter (.402 qts.)
- Calibrated pressures: .....	$65 \begin{smallmatrix} + 5 \\ - 15 \end{smallmatrix}$ bars ( $843 \begin{smallmatrix} + 72 \\ - 218 \end{smallmatrix}$ p.s.i.)

## PARTICULARS

- Adjusting shims, thickness (cut-out) .....	$0,95 \begin{smallmatrix} - 0 \\ 0,05 \end{smallmatrix}$ mm ( $0,0373 \begin{smallmatrix} + 0 \\ - ,002 \end{smallmatrix}$ in.)
- Adjusting shims, thickness (cut-in) .....	$0,7 \begin{smallmatrix} - 0 \\ 0,05 \end{smallmatrix}$ mm ( $0,0276 \begin{smallmatrix} + 0 \\ - ,002 \end{smallmatrix}$ in.)
- Cut-in chamber: 1 washer varies the pressure: .....	3 bars (44 p.s.i.)
- Cut-out chamber: 1 washer varies the pressure: .....	4 bars (58 p.s.i.)

III PRIORITY VALVE

◆ D. 39-5



CHARACTERISTICS

Priority Valve

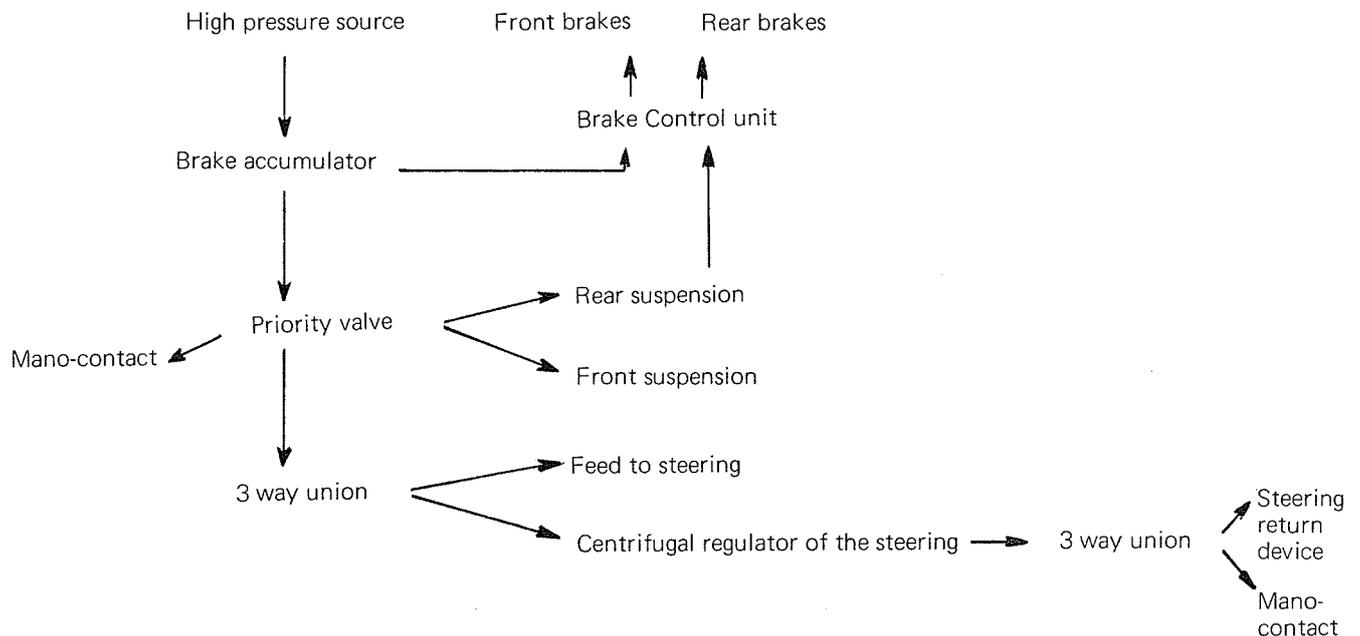
- Calibration of the slide valve return spring ..... 110 to 130 bars (1596 to 1886 p.s.i.)
- Leakage tightness of the valve ..... 175 bars (2539 p.s.i.)

PARTICULARS

- Thickness of the adjusting shims ..... 0,9 mm (.0354")
- Tightening torque of the pressure switch: ..... 9 ft. lbs.
- Tightening torque of the cap plug ..... 12 to 16 ft. lbs.

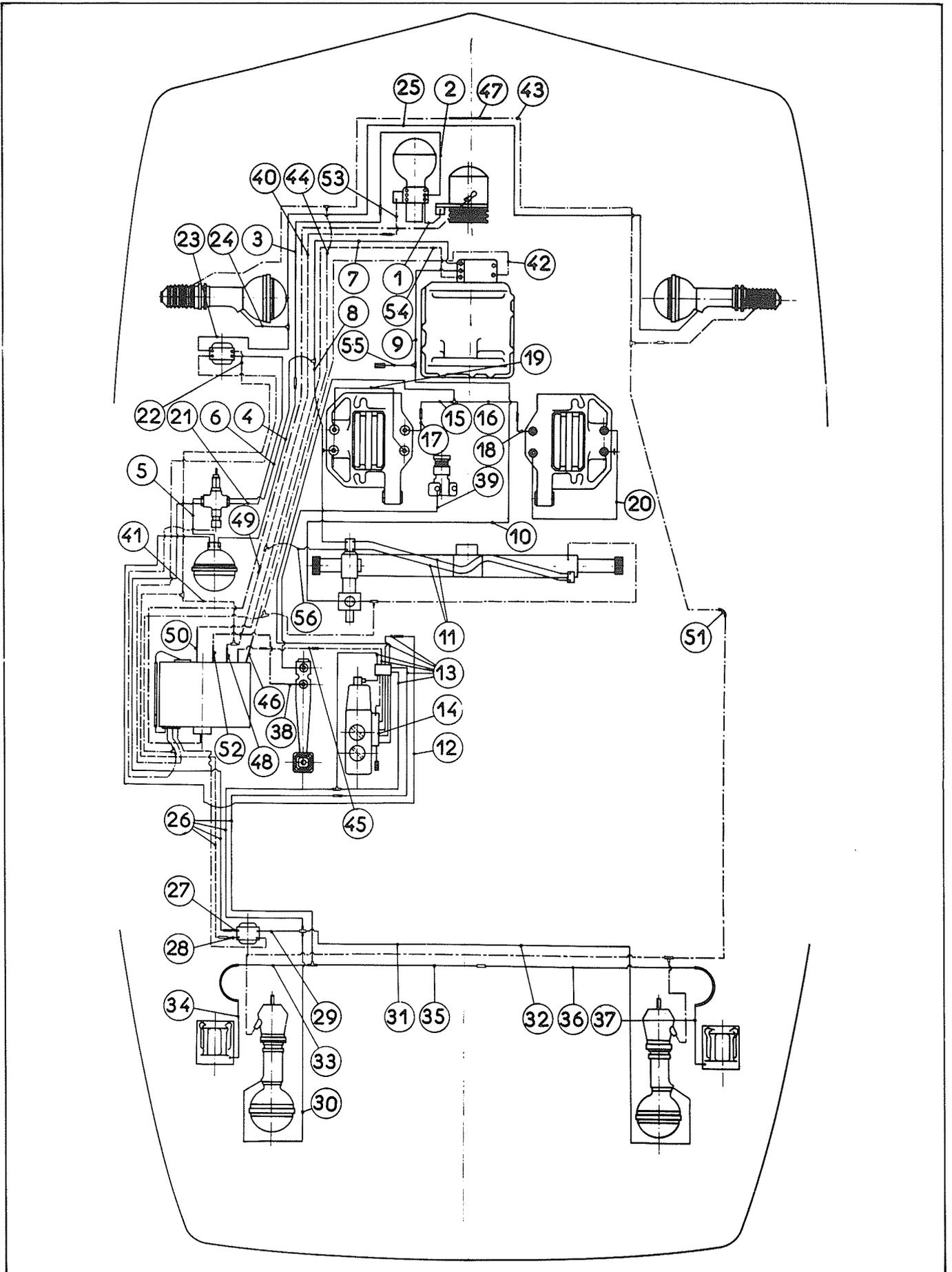
IV. HYDRAULIC CIRCUIT

◆ 1. Schematic of the principle



## *2. Hydraulic lines – Schematic of the general assembly*

1. Connector – H.P. pump to pressure regulator.
2. Connector – Pressure regulator to two way union.
3. Connector – Two way union to two way union.
4. Connector – Two way union to brake accumulator.
5. Connector – Priority valve to brake accumulator.
6. Connector – Priority valve to three way union.
7. Three way feed – To the centrifugal regulator.
8. Feed – To the steering.
9. Connector – Centrifugal regulator to three way union.
10. Connector – Three way union to the steering.
11. Feed lines – Steering.
12. Connector – Brake accumulator to brake control unit.
13. Rear general lines (front part).
14. Lines of the brake control unit.
15. Feed to the left front brake.
16. Feed to the right front brake.
17. Connector – Two way union to the left front brake.
18. Connector – Two way union to the right front brake.
19. Connector – Left and right brake pistons on the left front brake.
20. Connector – Left and right brake pistons on the right front brake.
21. Feed to the front height corrector.
22. Return line of the front height corrector.
23. Feed to the front suspension.
24. Feed to the left front suspension cylinder.
25. Feed to the right front suspension cylinder.
26. General lines.
27. Feed to the rear height corrector.
28. Return line of the rear height corrector.
29. Feed to the rear suspension.
30. Feed to the left rear suspension cylinder.
31. Feed to the right rear suspension - left section.
32. Feed to the right rear suspension - right section.
33. Connector – Rear flexible hose to three way union.
34. Feed to the left rear brake.
35. Feed to the right rear brake - left section.
36. Feed to the right rear brake - right section.
37. Feed to the right rear brake.
38. Feed to the declutching master-cylinder.
39. Feed to the declutching cylinder.
40. Return collector line – Front section pressure regulator-steering.
41. Return collector line – Pressure regulator-steering-height correctors.
42. Return tube – Centrifugal regulator.
43. Return collector line – Right rear and right front suspension cylinders.
44. Return collector line – Rear and front suspension cylinders.
45. Return – Brakes to the reservoir.
46. Return from the suspension cylinders – Reservoir end.
47. Connector – Return collector lines for the suspension.
48. Return – Pressure regulator-steering-height correctors.
49. Connector – Front and rear collector lines- returns of the pressure regulator, steering, height correctors.
50. Return – Centrifugal regulator to reservoir.
51. Connector – Return collector line of the rear suspension to the front collector line.
52. Connector – Master cylinder to reservoir.
53. Connector – Pressure regulator to return collector line.
54. Connector – Centrifugal regulator to return collector line.
55. Connector – Three way union to mano-contact.
56. Return of the steering.



## I CHARACTERISTICS (On the cars)

### 1. Caster:

Caster angle: ..... 1° 42'

### 2. Camber:

Difference between the right side and the left side ..... 15' max.

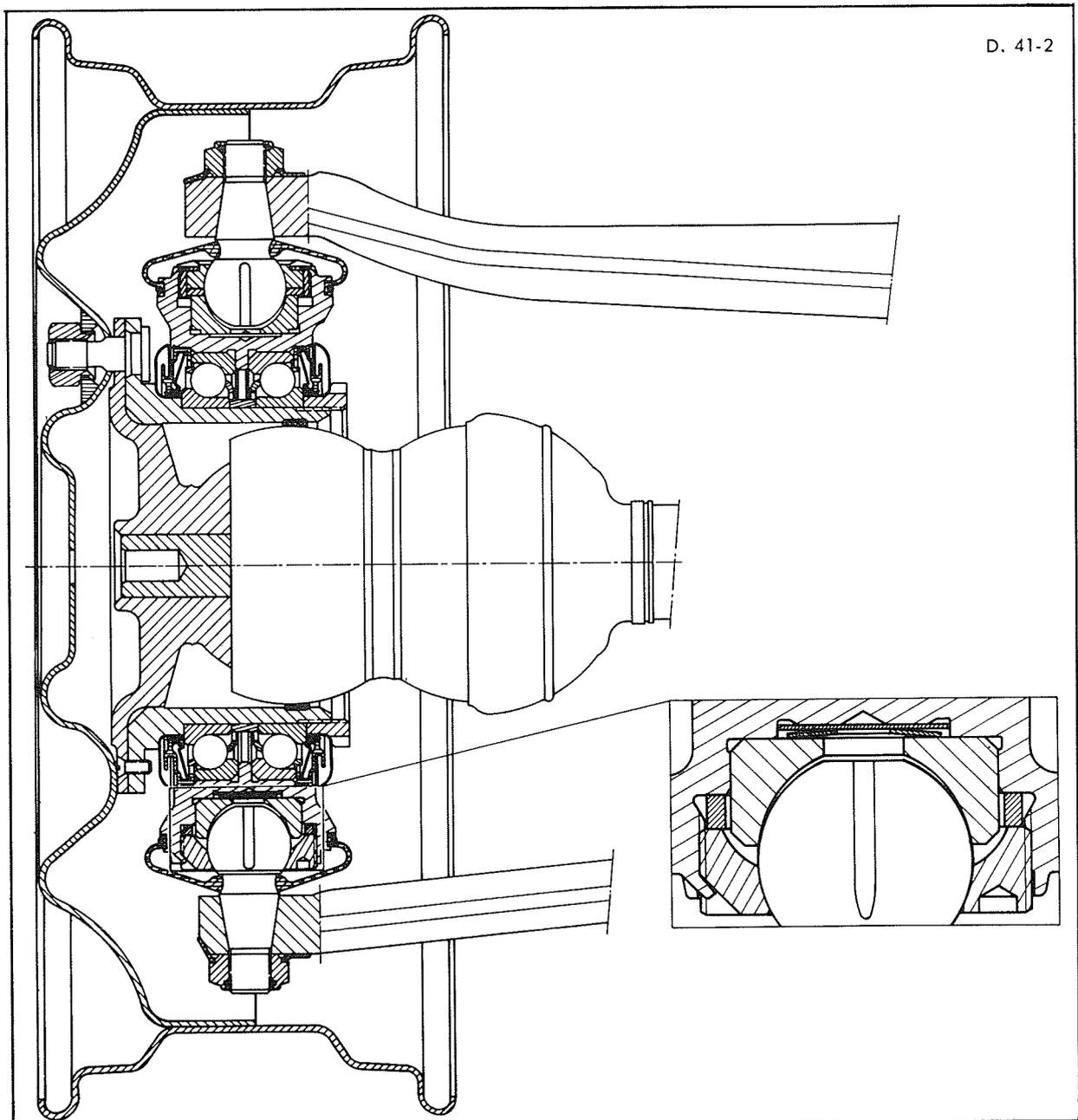
Distance between the ball joint of the anti-roll bar and the ball joint of the suspension control lever:

- Left side: ..... 199 mm (7.835")

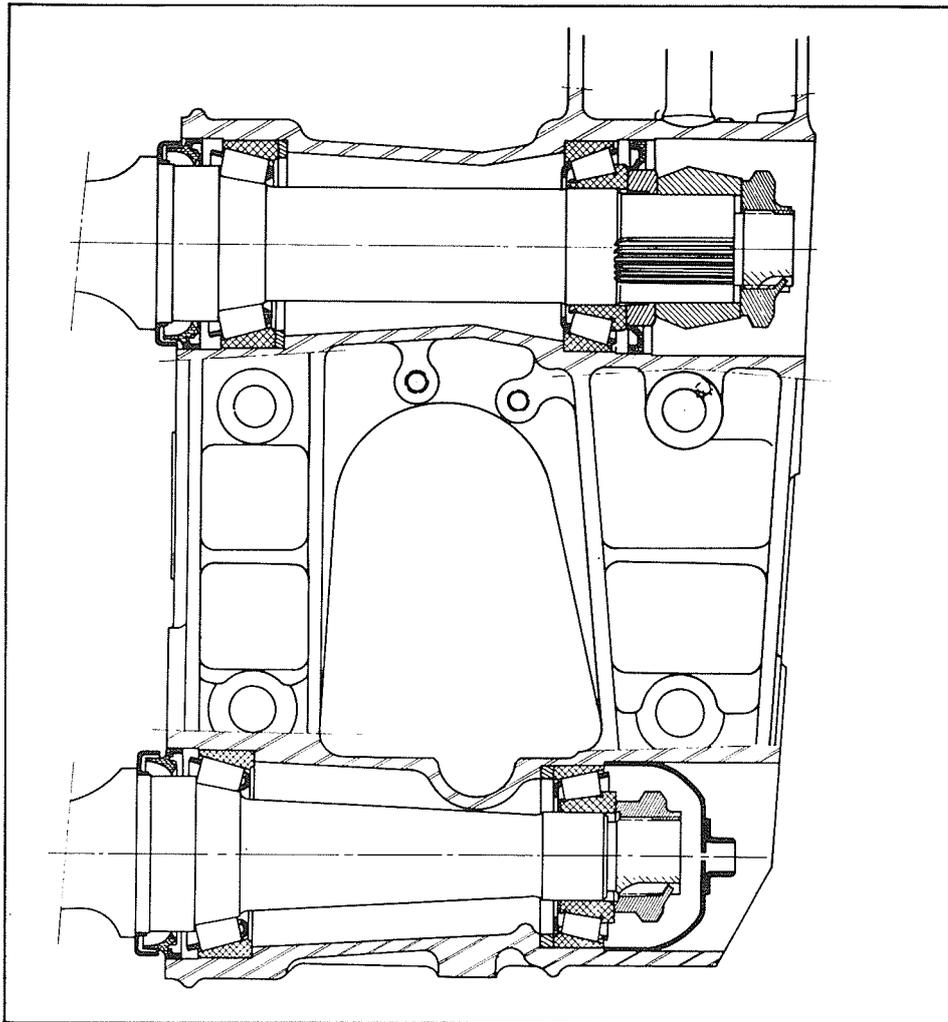
- Right side: ..... 198 mm (7.795")

### 3. Toe:

Wheels parallel: .....  $0 \pm 1$  mm ( $0 \pm .040$ ")



S. 41-1



*II PARTICULARS*

*PIVOT (Wheel Bearing)*

Do not clean the pivot assembly by immersion.

The pivot bearings cannot be replaced without special tools.

Tightness of the upper ball joint nut on the arm .....	60 to 80 ft. lbs.
Tightness of the lower ball joint nut on the arm .....	72 ft. lbs.
Tightness of the nut locking the bearings on the pivot .....	700 to 1000 ft. lbs.
Tightness of the lower ball joint nut on the pivot .....	290 ft. lbs.

Because of these high torques, it is impossible to replace the ball joint on the car without damaging the pivot of the drive shaft.

Calibrate, with precision, the thickness of the adjustment shim of the lower ball joint.

The adjustment shim of the upper ball joint is sold matched with the assembly of the ball pin and cages.

Tightness of the upper ball joint nut on the pivot .....	1000 ft. lbs.
----------------------------------------------------------	---------------

To prevent destruction of the pivot, do not set the cup of the upper ball joint in its seat by hammering or by using an arbor press.

Tightness of the wheel lugs .....	58 to 72 ft. lbs.
-----------------------------------	-------------------

**HALF-AXLE****1. Removal**

The rod of the suspension piston cannot be disengaged unless the holes for passage of the connecting pin, in the rod and in the lever, are parallel. It is necessary, for this, to apply pressure on the arm.

**2. Replacement**

Tightness of the half-axle mounting bolts: . . . . . 50 - 65 ft. lbs.

Anti-roll bar:

Lateral positioning by displacement of the right stop clamp, obtaining a dimension of  $110 \pm 0,5$  mm ( $4.33 \pm .020''$ ), between the outer face of this stop clamp and the inner face of the forging for the ball joint, right side.

Tightness of the anti-roll bar bearing caps: . . . . . 9 ft. lbs.

The bar should be able to turn under an effort of: . . . . . 4 to 6 kg. (9 to 13 lbs.)

Lateral clearance of the bar: . . . . . 0,2 to 1 mm (.008'' to .040'')

To couple the anti-roll bar to the suspension levers, operate in a manner to obtain a difference between centers, between the ball joint of the lever and the ball joint of the bar, of 198 mm (7.795'') for the right side and 199 mm (7.834'') for the left side.

**3. Assembly**

The outer face of the rear seal of the upper arm should be  $1,5 \pm 0,25$  mm ( $.059'' \pm .010''$ ) from the outer face of the inner bearing cup.

The outer face of the front seal of the upper arm should be  $5 \pm 0,25$  mm ( $.197'' \pm .010''$ ) from the outer face of the support.

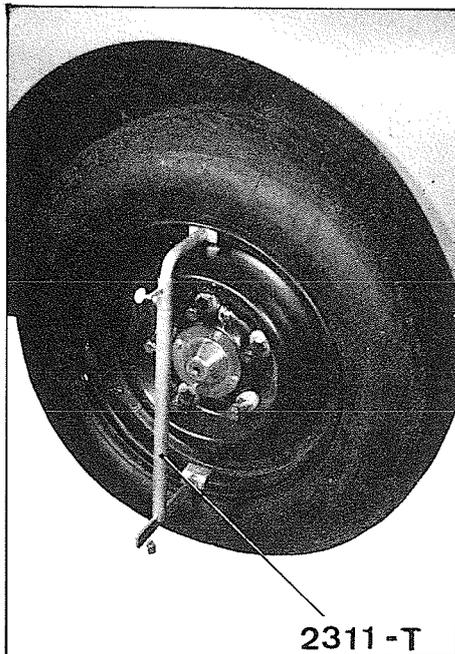
Tightness of the mounting nuts of the upper and lower arms: . . . . . 65 ft. lbs.

Then loosen 1/12 turn.

Adjust the caster *of the removed half-axle* with the tool 2321-T.

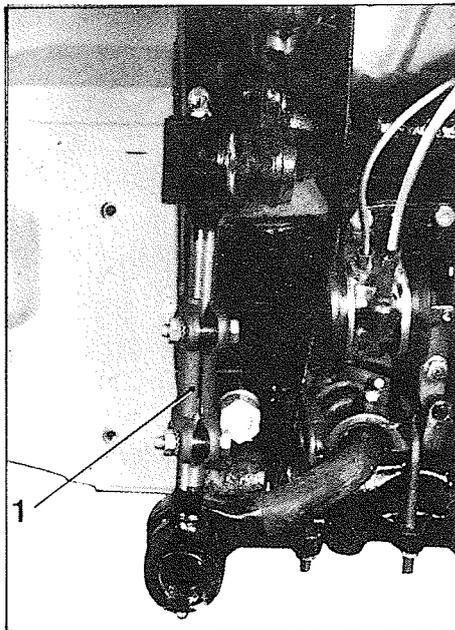
The dimension read on the tool should be . . . . . 29,50 to 30 mm (1.161'' to 1.181'')

8452



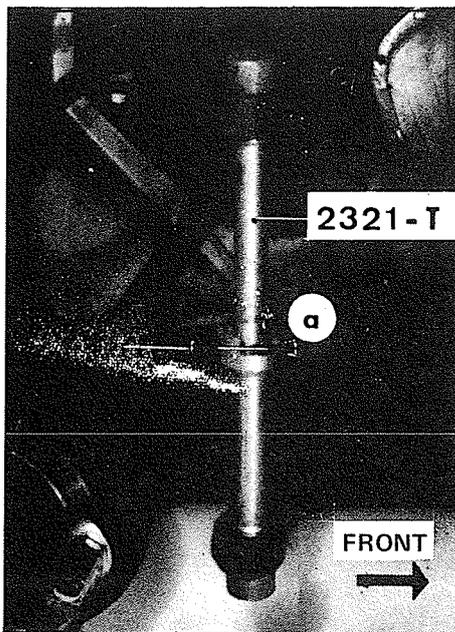
2311-T

8100



1

8829



2321-T

a

FRONT

## I ADJUSTMENT OF THE CAMBER

### 1. Check the heights:

Verify the tire pressures:

At the front: 32 p.s.i. at the rear: 29 p.s.i.

Check the heights:

At the front:  $196 \pm 5$  mm ( $7.717 \pm .197$ "")

At the rear:  $355 \pm 5$  mm ( $13.976 \pm .197$ "")

Adjust, if necessary.

### 2. Check the camber:

**IMPORTANT:** This operation must be executed on a flat and horizontal surface.

*The difference of camber between the left side and the right side should not exceed  $0^\circ 15'$ .*

#### a) Use the tool: 2311-T:

Set the tool in position on one of the front wheels.

Read the indication given by the wire of the plumb on the scale of the tool.

Do the same on the other wheel.

**NOTE:** The scale of the tool is graduated in degrees.

#### b) Use of commercial apparatus:

Follow the instructions of the manufacturer.

### 3. If the camber is incorrect (bad division):

#### a) Remove the side metal protection pans.

#### b) Work on the sleeves (1) to divide the camber equally on the two wheels.

## II INSPECTION OF THE CASTER

**IMPORTANT:** This operation must be executed on a flat and horizontal surface.

Only a light beam projection apparatus (or a level) permits inspecting the caster of the car. The mounting plane of the axle on the chassis, being inclined toward the rear, the tool 2321-T allows checking the position of the axle arms only.

**NOTE:** The adjustment of the caster necessitates the dismantling of the upper arm of the half axle.

The camber of the car should be:  $1^\circ 42' \pm 0^\circ 4'$ .

The dimension "a" measured with the tool 2321-T should be between: 29,50 and 30 mm ( $1.161$ " and  $1.181$ "").

# REAR AXLE

OPERATION No. S. 420-00: *Characteristics and particulars of the rear axle*

Op. S. 420-00

1

## 1. CHARACTERISTICS

### 1. *Camber (non-adjustable)*

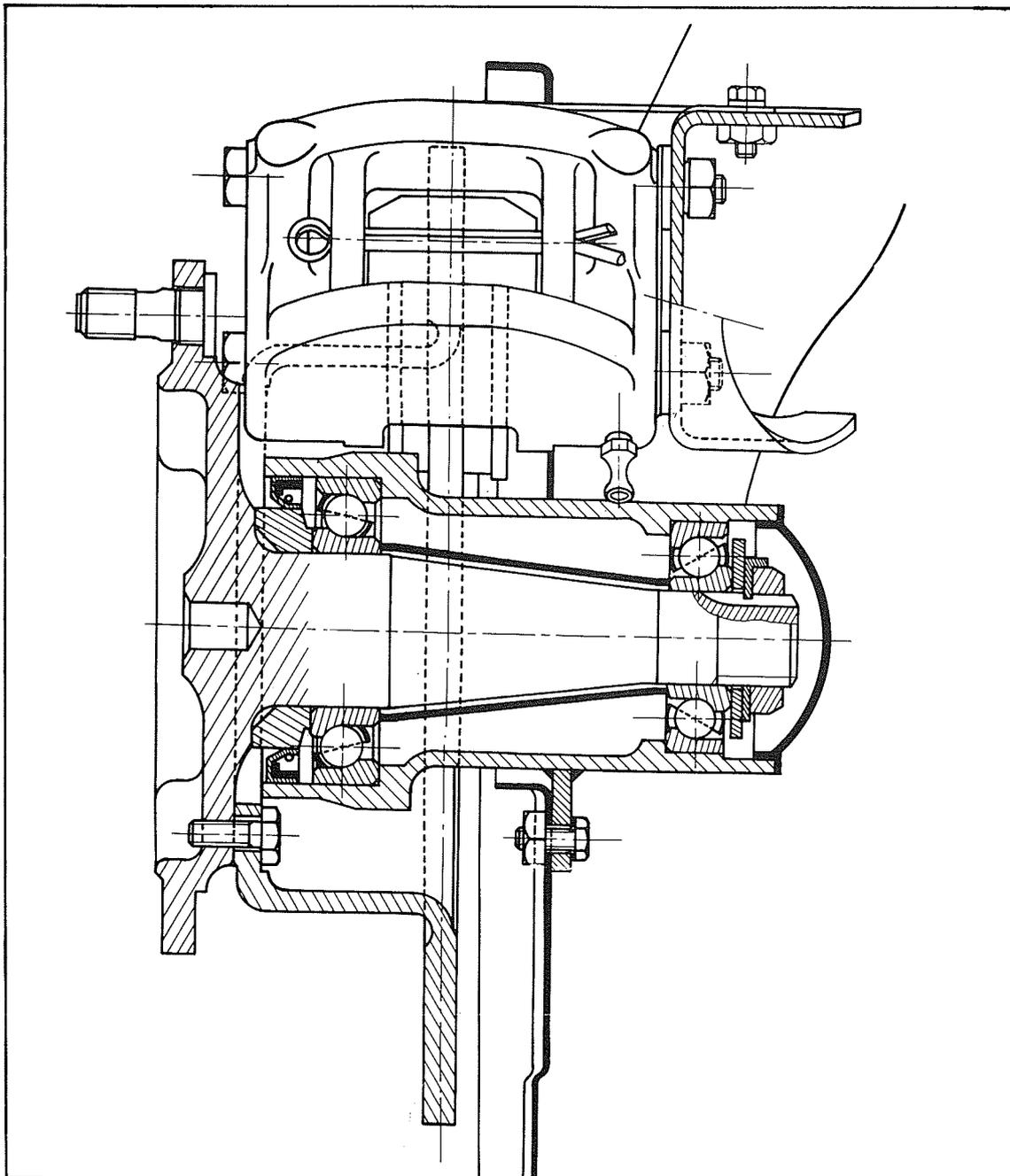
- Difference between right side and left side ..... 0° 15'

### 2. *Toe*

- Toed in toward the front (non-adjustable): ..... 0 to 2 mm (0 to .080")

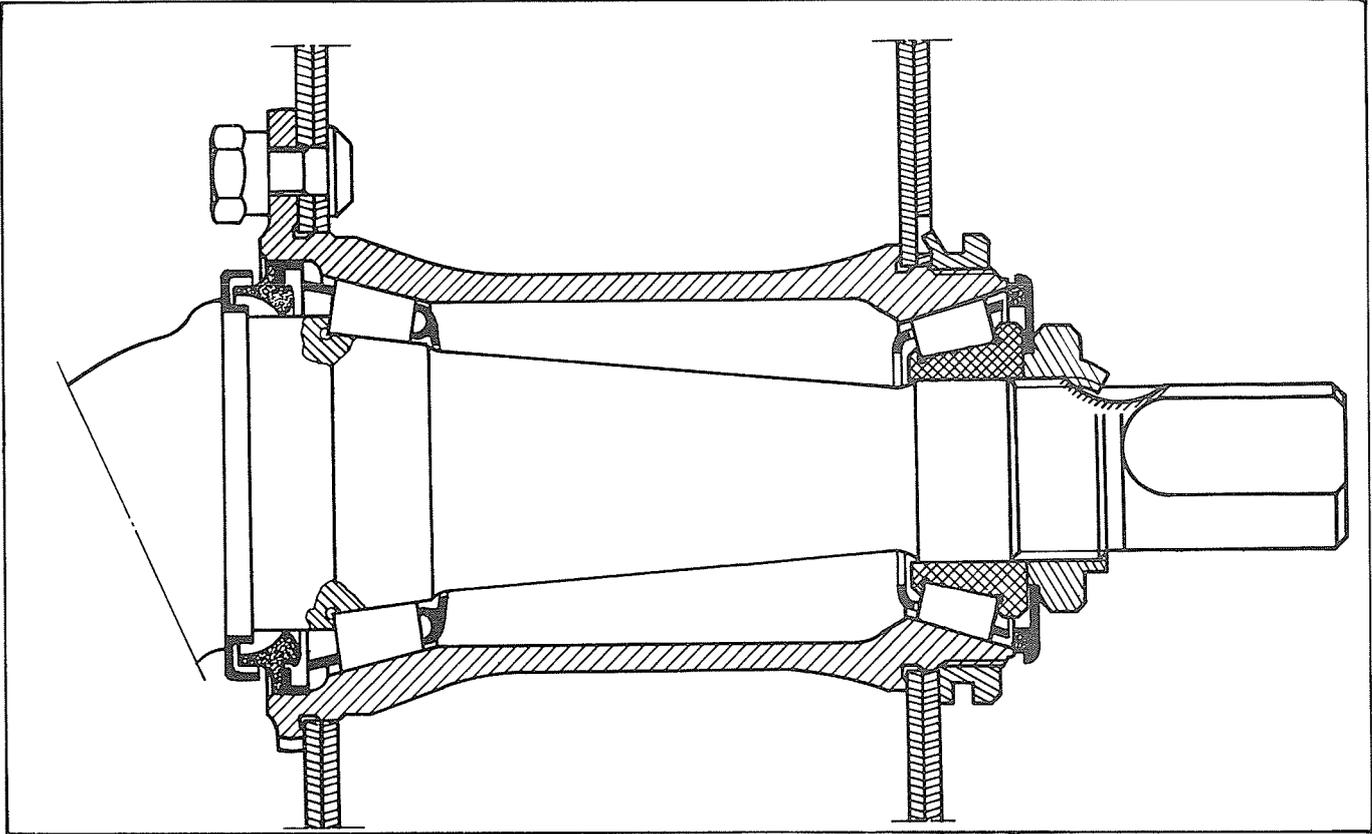
### 3. *Hub*

S 42-1



## 4. Housing of the articulation bearings:

D. 42-1



## II PARTICULARS

## 1. Hub:

- Length of the tapered spacer of the stub axle bearings: ..... 72,78 ± 0,02 mm (2.8653 ± .0008")
- Adjusting washers of the stub axle bearings (25,1 X 31,8 mm = .988" X 1.253"),  
thicknesses progressing by 0,04 mm (.0016"): ..... (.078" to .1457")
- Depth of the outer face of the bearing seal in its bore ..... 0 to .020"
- Special grease for the bearings in the housing ..... 2 oz. approx.

## 2. Arms:

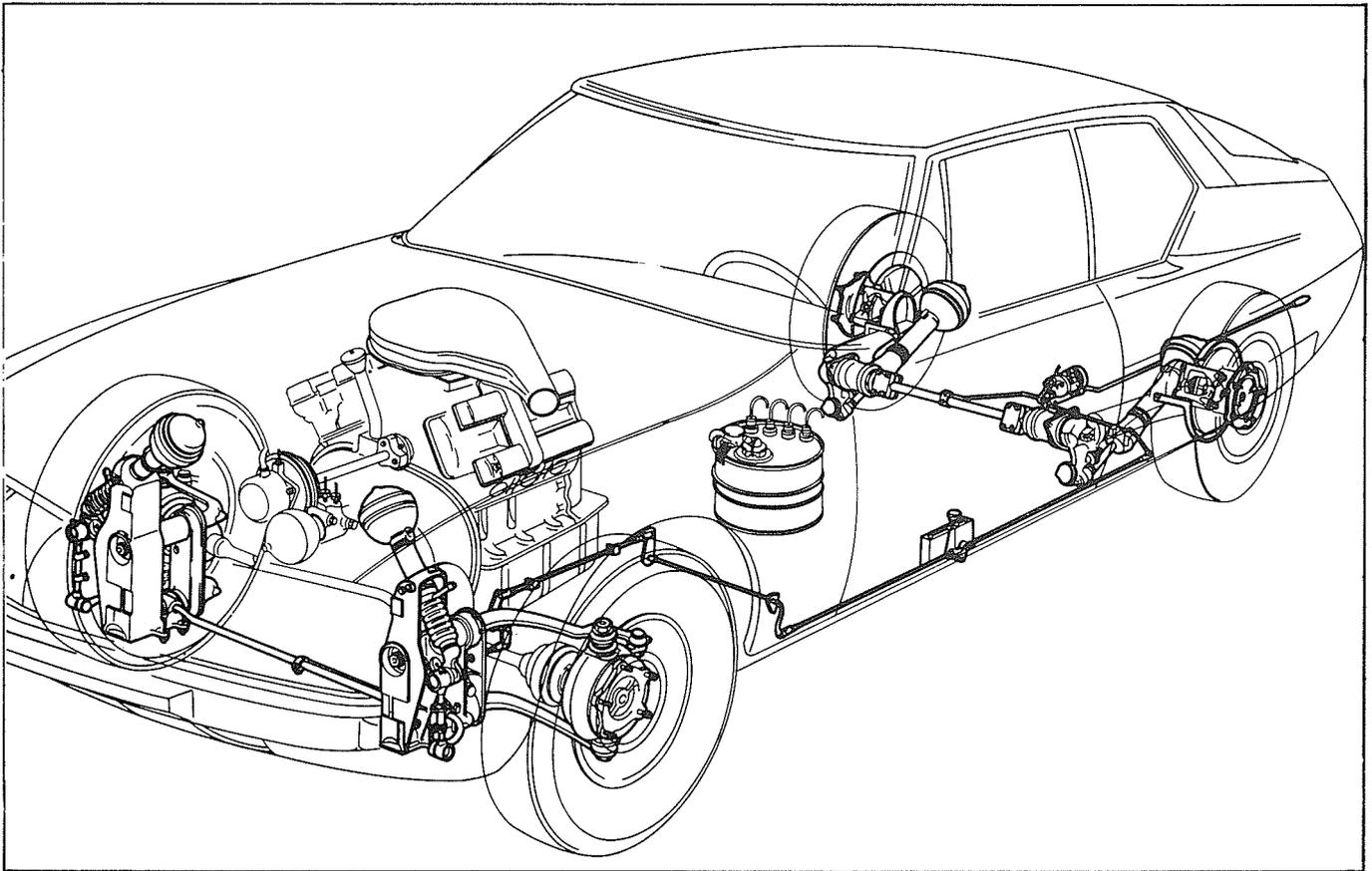
- Minimum clearance between the arms and the metal stop on the chassis: ..... 0,5 mm (.020")

## 3. Tightening torques:

- Nut for locking the stub axle: ..... 10 m. kg. (72 ft. lbs.)
- Nut of the articulation axle of the arm: ..... 8 to 9 m. kg. (58 to 60 ft. lbs.)  
then loosen 1/6 turn.
- Tightness of the screws mounting the brake disc: ..... 2 to 2,5 m. kg. (14 to 18 ft. lbs.)
- Lugs for tightening the wheels: ..... 8 to 10 m. kg. (58 to 72 ft. lbs.)

## CHARACTERISTICS

198 23



### 1. Adjustment of the heights:

NOTE: The tires must be correctly inflated (at the front: 32 p.s.i. at the rear: 29 p.s.i.)

At the front: Height between the underside of the anti-roll bar and the supporting surface of the wheels: . . . . . 242 ± 5 mm (9.528 ± .197")

At the rear: Height between the underside of the anti-roll bar and the supporting surface of the wheels: . . . . . 355 ± 5 mm (13.976 ± .197")

After adjustment, the difference in camber of the front wheels should not be more than. . . . 0° 15'

### 2. Suspension spheres:

Inflation pressures — Front: . . . . . 40 <sup>+2</sup>/<sub>-10</sub> bars (580 <sup>+30</sup>/<sub>-145</sub> p.s.i.)

— Rear: . . . . . 26 <sup>+2</sup>/<sub>-10</sub> bars (377 <sup>+30</sup>/<sub>-145</sub> p.s.i.)

## PARTICULARS

### 1. Pre-adjustment of the heights (car on supports, axles suspended):

At the front: the corrector being at full intake (all the way toward the rear), exert a slight tension on the control rod toward the front and tighten the clamp.

At the rear: position the suspension arms so as to have a distance of 35 mm (1.378") between the upper edge of the cup retaining the rubber bumper and the metal stop plate on the chassis.

### 2. Adjustment of the anti-roll bars:

Distance between the stop clamp and the inside face of the forging encasing the ball joint, right side: . . . . . 110 ± 0,5 mm (4.33 ± .020")

Clearance between the left stop clamp and the lower bushing, the right stop clamp being held against its bushing: . . . . . 0,5 to 1 mm (.020" to .040")

Tightness of the nuts of the bushing cap "U" bolts . . . . . 11 ft. lbs.

Rotation torque of the anti-roll bars (applied at the end of the bar): . . . . . 9 - 13 lbs.

### 3. Spheres and suspension cylinders:

Tightness of the nuts mounting the shock absorbers: . . . . . 29 ft. lbs.

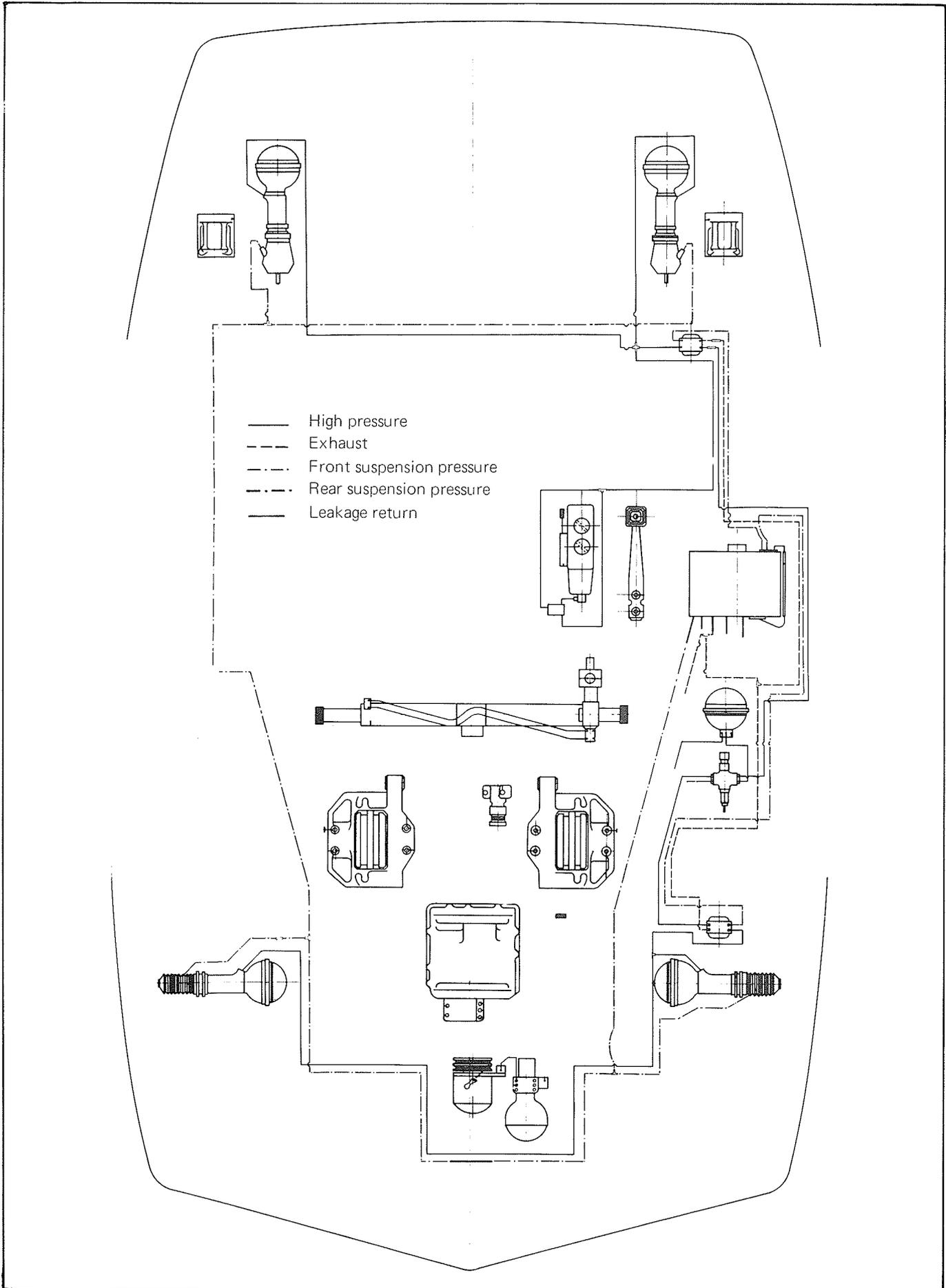
Tightness of the pivot screws holding the front suspension cylinders: . . . . . Hand tight

Tightness of the corresponding lock-nuts: . . . . . 14 ft. lbs.

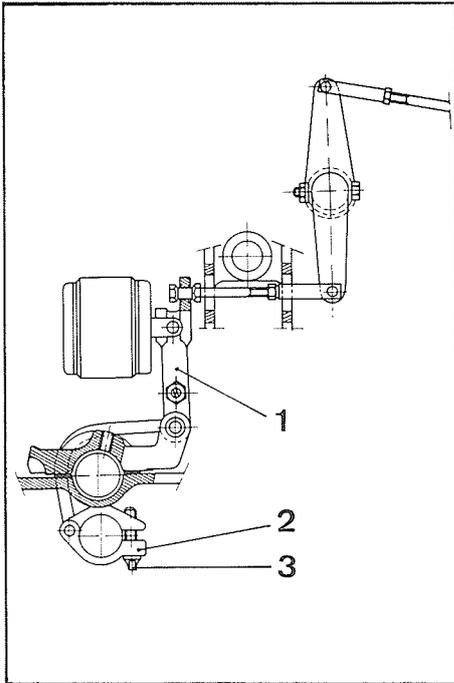
Tightness of the spheres on the suspension cylinders: . . . . . Hand tight

*SCHEMATIC OF THE SUSPENSION CIRCUIT*

S. 39-5



S. 43-1/1

**PRE-ADJUSTMENT OF THE FRONT HEIGHTS**

1. Set the front of the car on jack supports, the wheels suspended.
2. Place the manual height control lever in *high position*.

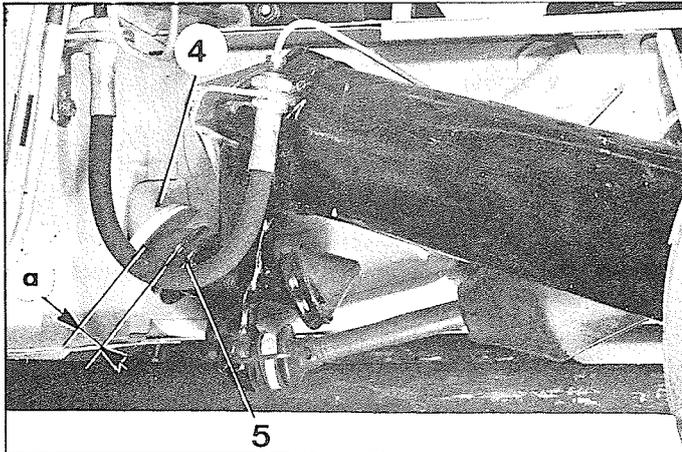
Be sure that the slide valve of the height corrector is at full intake position. Check this by trying to move the valve toward the rear, using a screw driver bearing against the support of the suspension arm.

REMARK: Do not allow the screw driver to take leverage on the height corrector. This will cause cutting of the rubber cup.

3. Loosen the screw (3) of the clamp (2) locking the control rod on the anti-roll bar (wrench 1677-T).
4. Exert a slight torsion (toward the front) on the clamp, always holding the end of the control rod in full intake position, and tighten the screw of the clamp.

Be sure there exists a *clearance of approximately 1 mm (.040")* between the ball of the corrector and the bottom of the stirrup of the control lever (1).

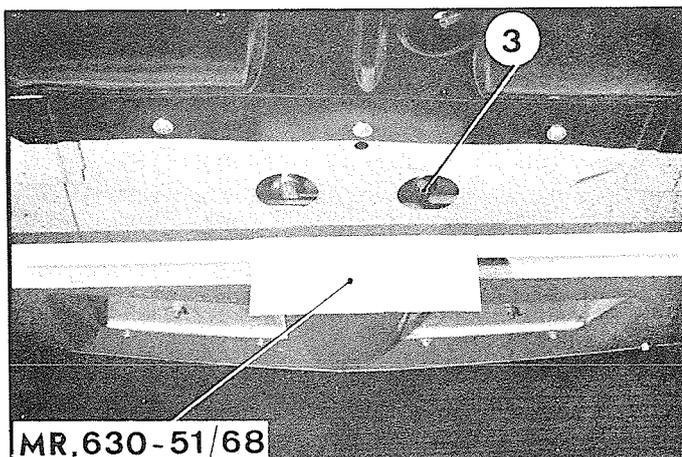
9778

**PRE-ADJUSTMENT OF THE REAR HEIGHTS**

5. Set the rear of the car on jack supports.
6. Position the two rear arms in such a manner as to obtain a distance  $a = 35 \text{ mm } (1.378\text{'})$  between the upper rim of the front cup (5) and the pressure face for the rubber bumper, on the metal stop-plate (4).
7. Place the corrector in full intake position (toward the front) and tighten the clamp of the control rod.

Be sure there exists a *clearance of approximately .040"* between the ball of the corrector and the bottom of the stirrup of the control lever.

8624

**ADJUSTMENT OF THE HEIGHTS**

To do this operation, the car must be ready to drive.

8. Check the tire pressures:

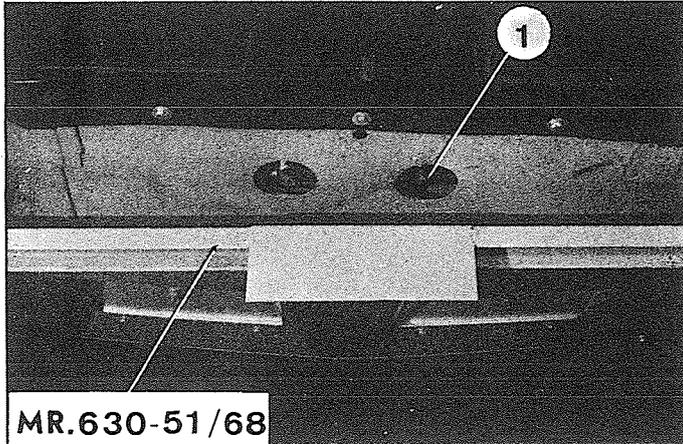
Front: 32 p.s.i. Rear: 29 p.s.i.

9. Place the car on a lift or over a pit. Place the manual height control lever at the "normal drive" position. Let the motor run at idle speed.

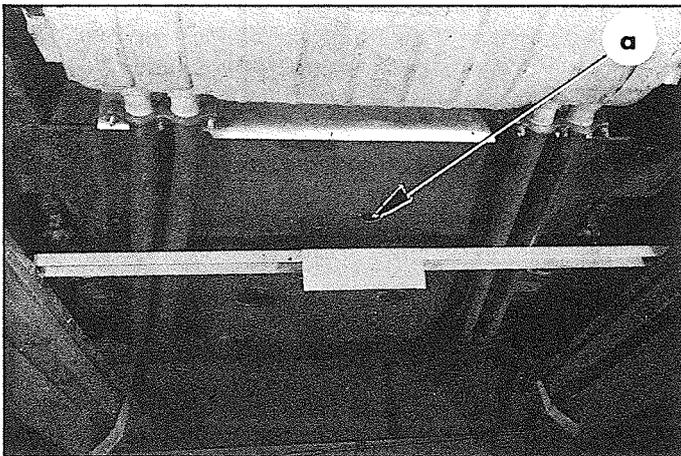
Release the hand brake. Do not chock the wheels.

REMARK: If this operation is done on a lift, use the gauge MR 630-51/68 in order to read the measurements.

8624



8622



### 10. Check the front heights:

- a) Support the gauge (MR 630-51/68) on the guide rails of the lift or the pit, plumb with and parallel to the anti-roll bar. The lower face of the gauge should be exactly in line with the plane of the surface supporting the wheels.

- b) Raise the car by hand at the front bumper. Release the car when the weight becomes too great.

The car descends, then rises again and stabilizes. At this moment, read the dimension between the underside of the anti-roll bar, at both ends, and the plane of the surface supporting the wheels. These two dimensions should not have a deviation of more than 3 mm (.118"). If not, work on the threaded sleeve of the anti-roll bar coupling turnbuckle. Find the average of the two dimensions read, for example: 198 mm (7.795").

- c) Lower the car by pressing on the front bumper. Release the car when you sense a strong resistance.

The car rises, then descends and stabilizes.

Read the dimensions between the underside of the anti-roll bar, at both ends, and the plane of the surface supporting the wheels. Find the average of both dimensions read, for example: 202 mm (7.953").

Find the average of the numbers arrived at in paragraphs b and c; or in the example chosen:

$$\frac{198 \text{ mm (7.795")} + 202 \text{ mm (7.953")}}{2} = 200 \text{ mm (7.874")}$$

*This average should be between 237 and 247 mm (9.33" and 9.72").* If not, adjust the front heights (see paragraph 12).

### 11. Check the rear heights:

- a) Support the gauge MR 630-51/68 on the guide rails of the lift or a pit, plumb with and parallel to the anti-roll bar.

- b) Disengage the rubber caps from the floor-board.

- c) Raise the car by hand, at the rear bumper. Release the car when its weight becomes too great.

The car descends, then rises and stabilizes.

At this moment, read the dimension between the underside of the anti-roll bar and the plane of the surface supporting the wheels (introduce the measuring tape through the hole "a" of the floor-board, the end of the tape resting on the anti-roll bar, for example: 357 mm (14.055").

- d) Lower the car by pressing down on the rear bumper. Release the car when you sense a strong resistance.

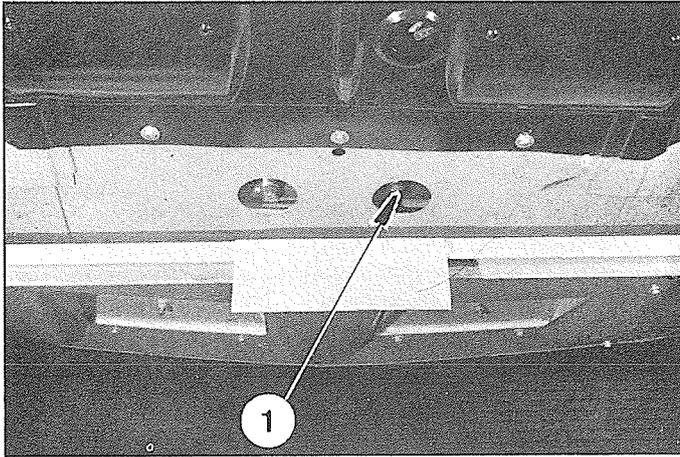
The car rises, then descends and stabilizes.

Read the dimension between the underside of the anti-roll bar and the plane of the surface supporting the wheels, for example: 352 mm (13.858"). Find the average of the dimension, for example:

$$\frac{357 \text{ mm (14.055")} + 352 \text{ mm (13.858")}}{2} = 354,5 \text{ mm (13.957")}$$

*This dimension should be between 350 and 360 mm (13.80" and 14.17"),* if not, adjust the rear heights (see paragraph 13).

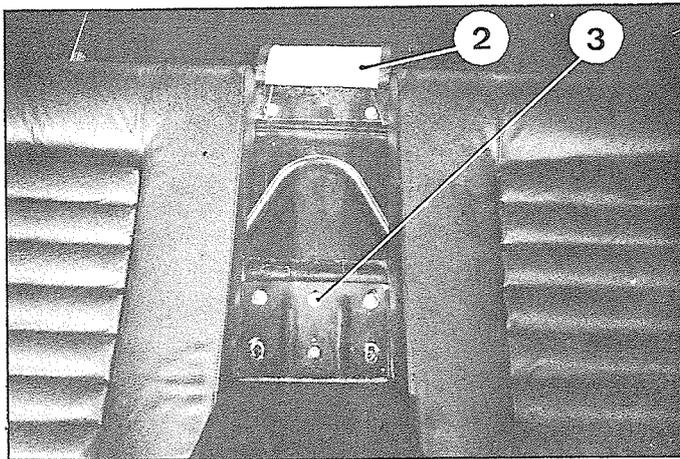
8624

**12. Adjust the front heights:**

Slightly loosen the screw (1) of the positioning clamp for the control rod of the height corrector. Turn the clamp in the direction most convenient so as to obtain an average height of  $242 \pm 5$  mm ( $9.53 \pm .197''$ ) from the underside of the anti-roll bar and the plane of the surface supporting the wheels. Proceed by fractions of a turn. (By turning the clamp toward the front, you increase the height of the car, and you decrease the height by turning the clamp to the rear).

Retighten the screw (1) of the clamp (wrench 1677-T).

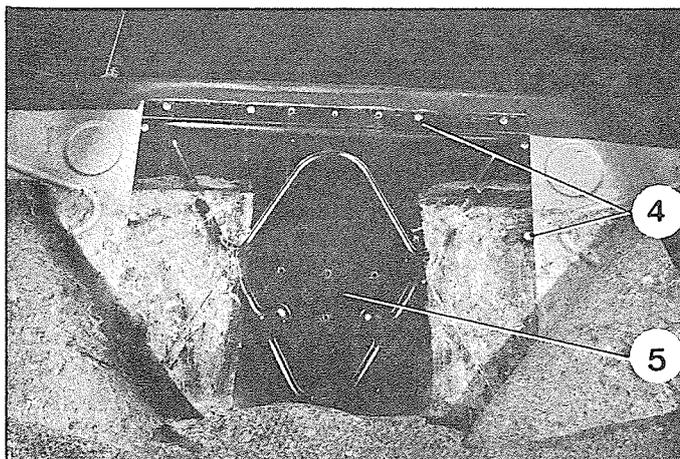
8726

**13. Adjust the rear heights:**

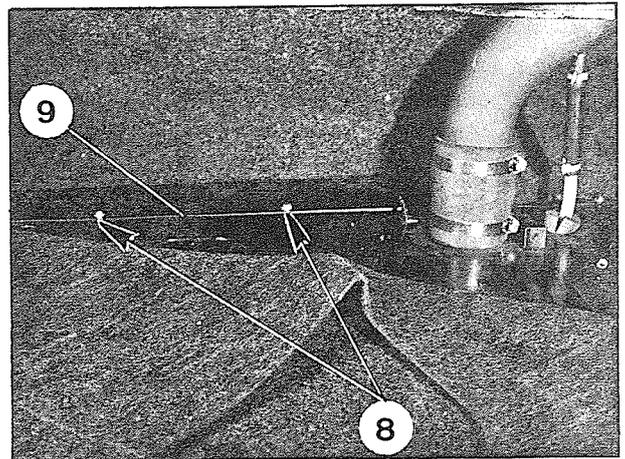
- Unglue the upholstery (2) and remove the mounting screw (3) of the rear seat. Disengage the seat. Remove the screws (4) and disengage the closure plate (5).
- Remove the two screws (6) and disengage the protection shield (7) of the fuel refilling tube. Unglue the lining from the back of the trunk, remove the screws (8) and disengage the metal closure plate (9) from the rear cross bar.
- Operate according to the instructions outlined for the adjustment of the front heights (see paragraph 12), by working on the clamp (5).

*The height to obtain is  $355 \pm 5$  mm ( $13.98 \pm .197''$ ) from the underside of the anti-roll bar to the ground. Reglue the upholstery with a suitable adhesive.*

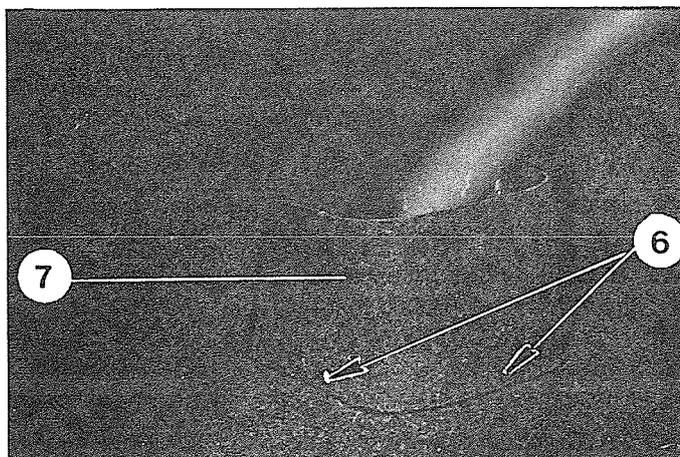
8727



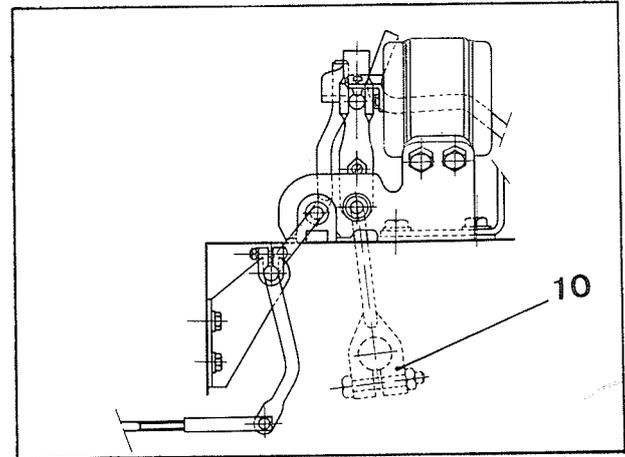
8729



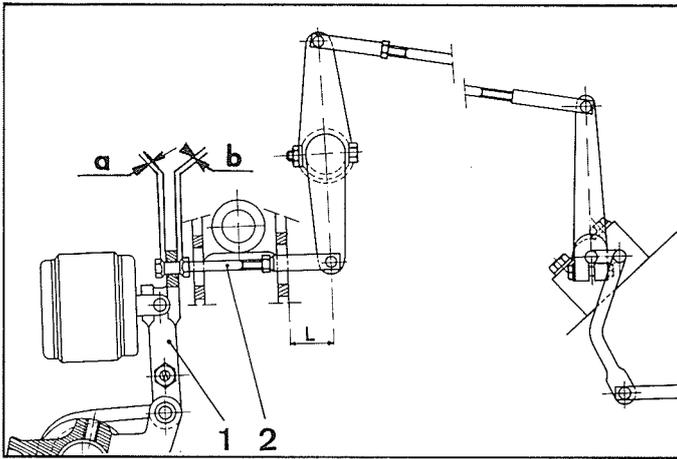
8730



S. 43-1/2



S. 43-1 3



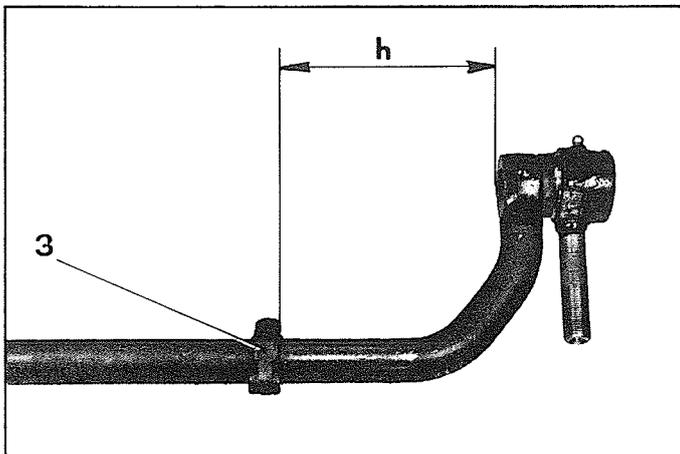
#### 14. Adjust the connecting rods of the manual height control:

Set the control at the *normal drive* position.

- At the front:** Be sure of the existence of the clearance "a", the corrector being at the end of its intake travel (lever (1) pushed toward the rear), and the clearance "b", the corrector being at the end of its exhaust travel (lever (1) pushed toward the front), (clearance measured between the lever (1) and the nut). If necessary, work on the rod (2).
- At the rear:** Check the control in the same manner and conditions. Adjust, if necessary.
- Check the functioning of the manual height control. Especially, be sure that the control levers do not tend to bind against the body. If so, adjust the positions of the control rod bushings.

REMARK: In case it will be impossible to adjust the heights by working on the control rods, proceed with the pre-adjustment of the heights (see paragraphs 1 to 4 of this operation for the front, and paragraphs 5 to 7 of this operation for the rear).

1686



#### ADJUSTMENTS ON THE FRONT ANTI-ROLL BAR

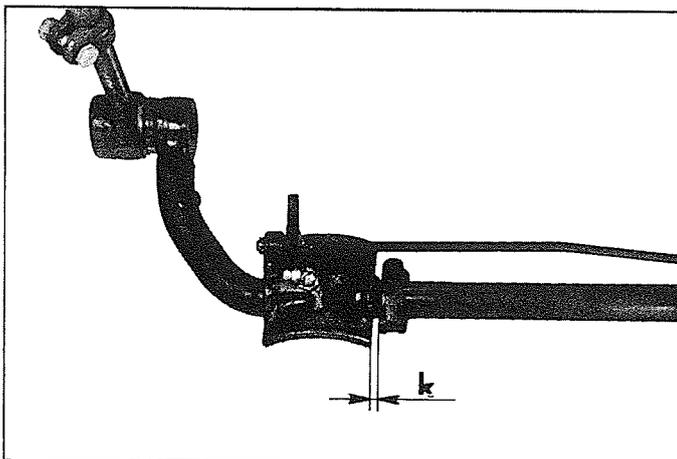
##### 15. Adjust the lateral position of the anti-roll bar.

- Remove the side and bottom protection pans.
- Measure the distance "h" between the stop clamp (3) and the inside face of the forging encasing the right ball joint.

This measurement is facilitated by placing a rule against the forging, holding this rule by hand and measuring the distance "h" with a tape measure (between the clamp and the outer face of the rule).

If necessary, move the collar in the convenient direction in order that *the distance "h" will be equal to  $110 \pm 0,5 \text{ mm}$  ( $4.33 \pm .020$ )*. Tighten the screw of the clamp.

1687



##### 16. Adjust the lateral clearance of the anti-roll bar:

Push the bar in order to set the right stop clamp against the bushings of the right bearing.

Move the left stop clamp in a convenient direction so as to obtain a *clearance "k" of 0,5 to 1 mm (.020" to .040")* between the clamp and the lower bushing of the left bearing.

To do this, remove the front corrector.

**17. Adjust the bearings of the anti-roll bar:**

- a) Set the bearing cap with the bushing on the bar as indicated in the figure. Hold it in this position and measure the space "j" with feeler gauges. Example:  
 $j = 1,80 \text{ mm } (.070'')$

REMARK: These bearings are mounted with a slight torque. Choose, among the shims sold by the Parts Department, those of which the thickness will be equal to  $j - 0,2 \text{ mm } (.008'')$  or in the example above:

$$\frac{1,80 \text{ mm } (.070'') - 0,2 \text{ mm } (.008'')}{2} = 0,8 \text{ mm } (.031'')$$

(shim for each side)

- b) Coat the bushings with graphite grease and mount the bearing caps.  
 Insert the two shims determined above between the cap and the bearing seat.
- c) Tighten the nuts of the right "U" bolts to 11 ft. lbs. Check the rotation torque of the anti-roll bar. This should turn under an effort of 4½ to 6½ lbs. applied on the ball joint. If not, then modify the thickness of the shims.
- d) Tighten the nuts of the left "U" bolts to 11 ft. lbs. Check the rotation torque of the anti-roll bar; this should turn under an effort of 9 to 13 lbs. If not, modify the thickness of the shims.

**18. Mount the front height corrector and the protection pans.****ADJUSTMENT OF THE MANUAL HEIGHT CONTROL**

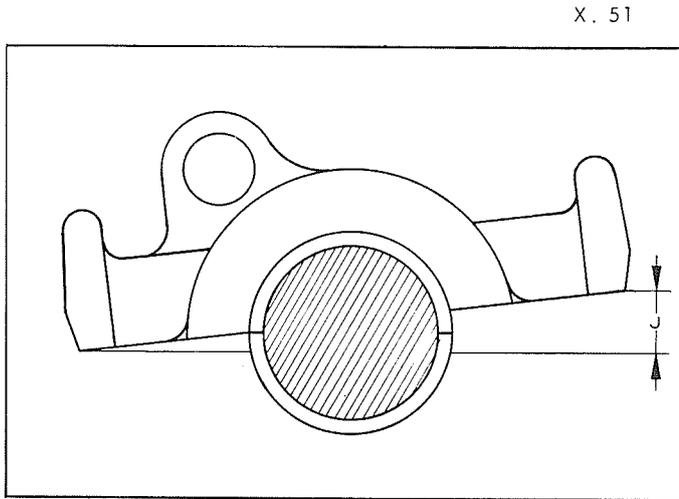
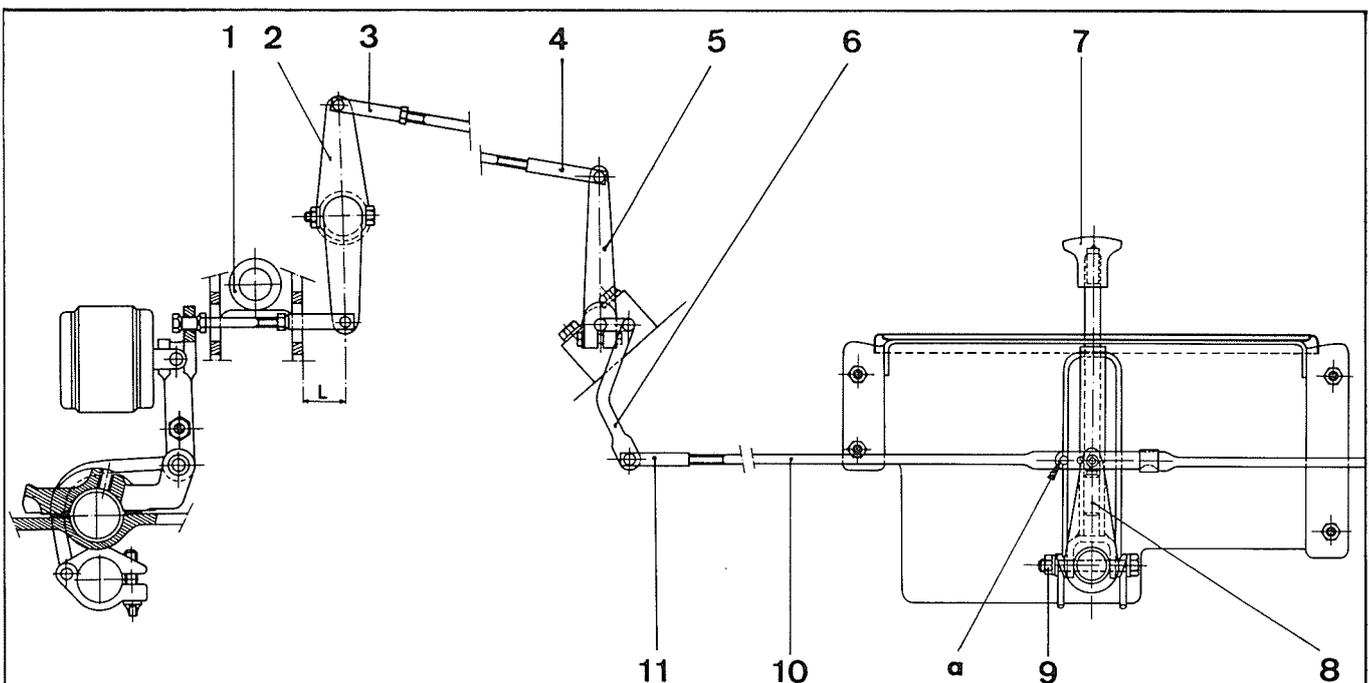
REMARK: In the case of an inspection, do this with the motor running.

In the case of assembling a chassis, loosen the clamps of the corrector control rods (on the front and rear anti-roll bars).

**19. Adjust the front section of the control linkage:**

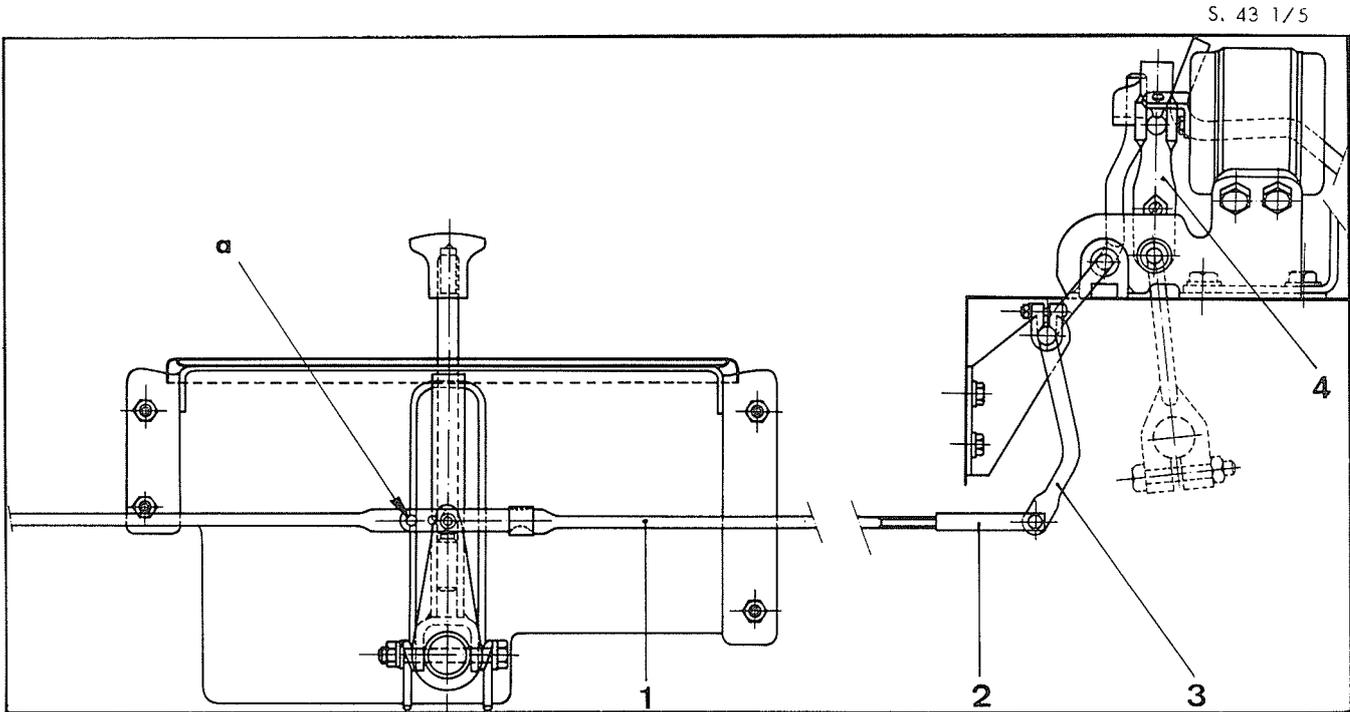
- a) Place the control lever (7) in the *normal drive* position.
- b) The lever (8), being positioned vertically, tighten the nut (9).
- c) The lever (5), being tight on the front torsion rod (6), position it vertically by the choice of one of the holes "a" on the connecting rod (10) and the adjustment of the sleeve (11).
- d) Bring the lever (2) to a dimension  $L = 30 \pm 2 \text{ mm } (.118'' \pm .079'')$  by adjusting the sleeves (3) and (4).
- e) Adjust the front connecting rod (1) (See paragraph 14).

S. 43-1/4



20. *Adjust the rear section of the control linkage:*

- a) Bring the rear torsion rod (3) to the middle of the notch of the control lever (4) of the rear corrector by the choice of one of the holes "a" on the connecting rod (1) and the adjustment of the sleeve (2).



21. *Check the functioning of the control mechanism:*

- Verify that the front and rear torsion rods are not caught in their wheel housings at the *high and low positions*.

22. *Check the functioning of the linkage for locking the rear corrector:*

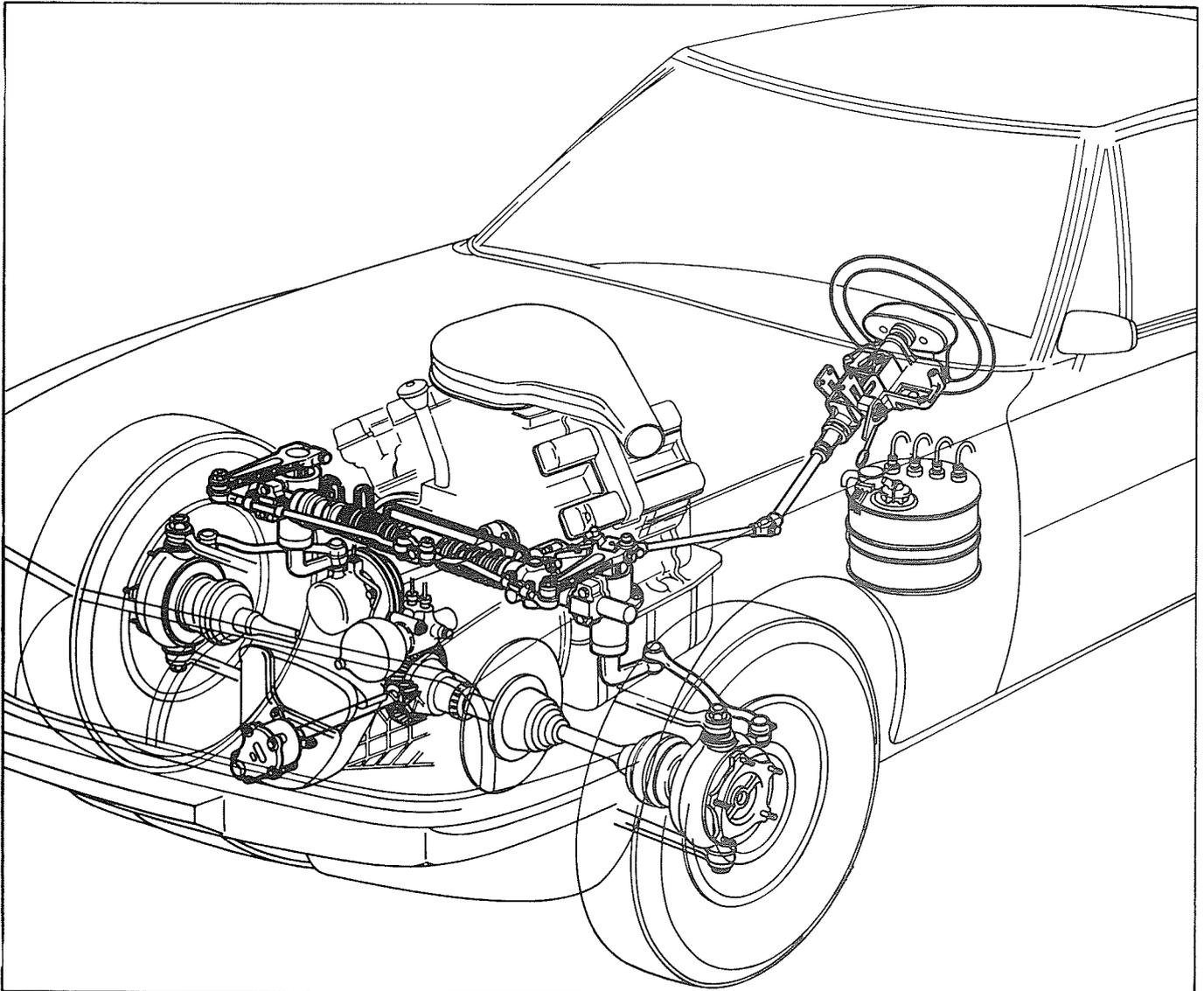
The car being in the *high* position, unhook the locking control rod from its notch.

Return the height control lever to *low* position:

At this moment the front of the car should be in *low* position and the rear of the car in *high* position. Verify this condition by working on the slide valve of the corrector.

## CHARACTERISTICS

19.824



Toe: .....	$0 \pm 1$ mm (0 to .040")
Steering angle (non-adjustable) .....	$45 \begin{smallmatrix} +0 \\ -1 \end{smallmatrix}$ degrees
Lateral position (Distance between the axis of the left relay lever and the axis of the pressure pad of the rack): .....	$99 \pm 2,5$ mm ( $3.898 \pm .098$ ")
Angular position (inclination of the rear of the pinion toward the bottom): .....	$5^\circ 30' \pm 1^\circ$
Position of the steering wheel spoke (wheels straight ahead): .....	Vertical

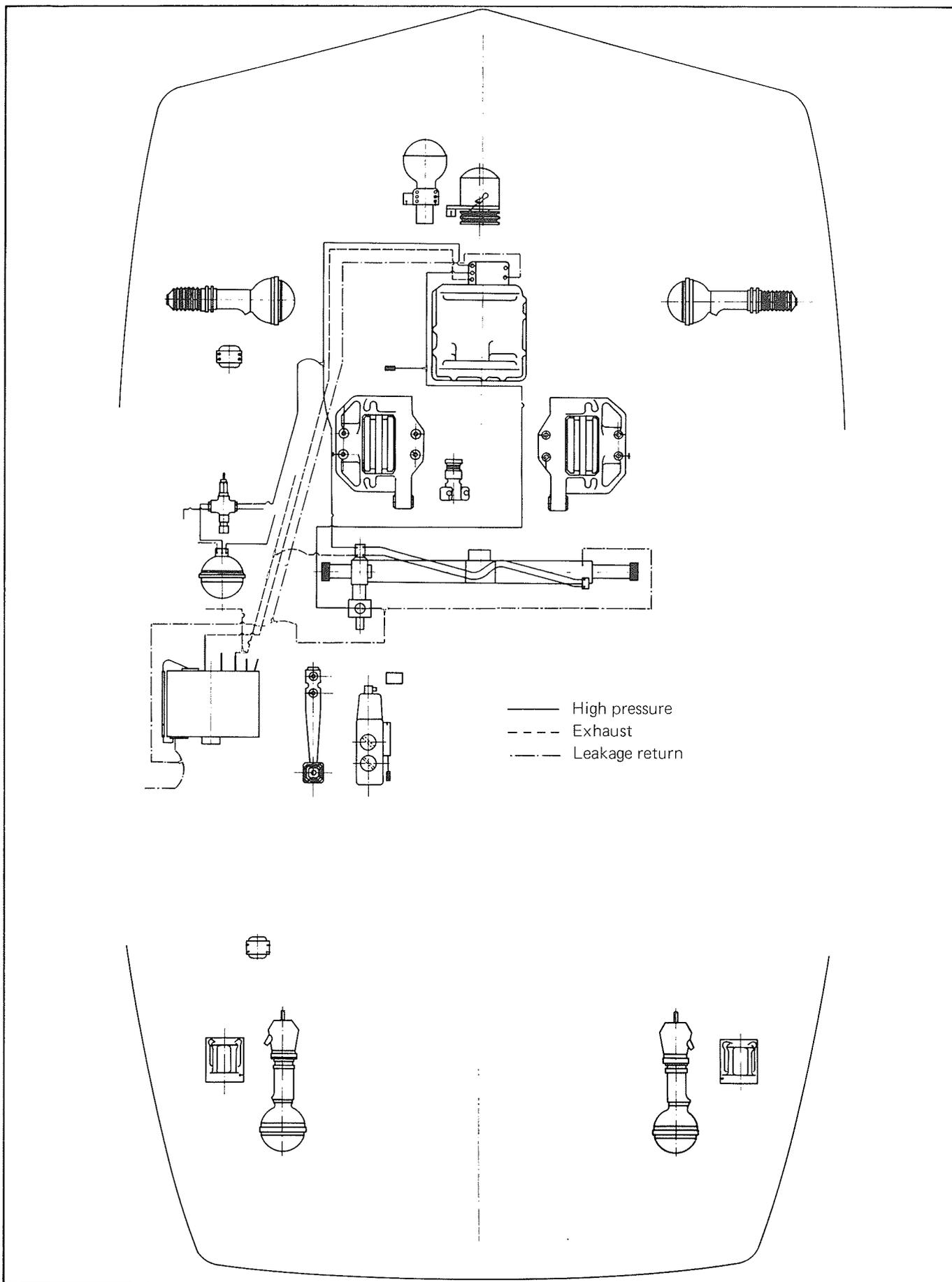
## PARTICULARS

### Tightening torques:

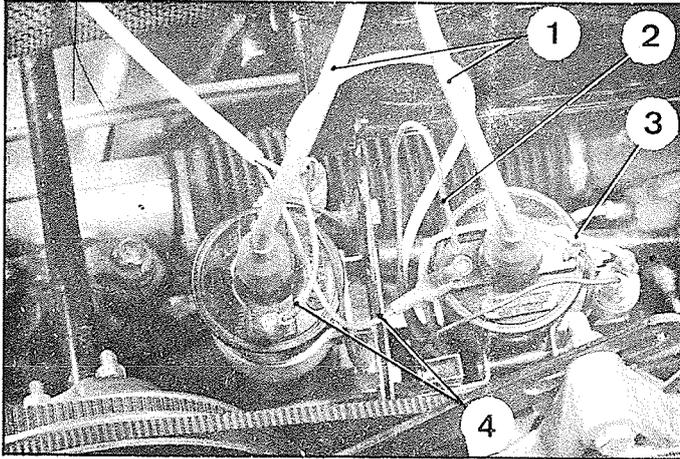
Nut fastening the center shackle: .....	29 ft. lbs.
Nut fastening the steering rods on the center shackle: .....	22 ft. lbs.
Nut of the clamps on the adjustment sleeve of the tie-rod end: .....	7 ft. lbs.
Nut of the tie-rod end ball joints: .....	44 ft. lbs.
Nut of the ball joints on the coupling rods connecting the relays and the pivots: .....	44 ft. lbs.
Screws for mounting the bearing caps: .....	15 ft. lbs.
Screws for mounting the steering relays: .....	25 to 29 ft. lbs.

SCHMATIC OF THE HYDRAULIC ASSISTANCE CIRCUIT

S. 39-8



8510



### I. ADJUSTMENT OF THE LATERAL POSITION OF THE STEERING

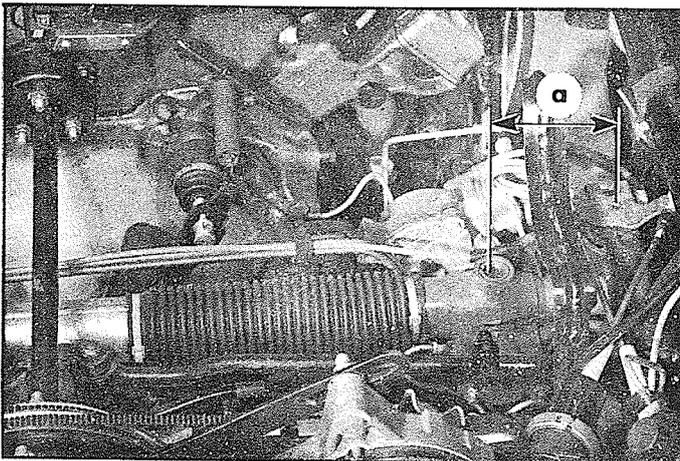
1. Disconnect the battery.
2. Disconnect:
  - the feed wires (3) and (2) of the tachometer, from the coils,
  - the high tension wires (1) of the ignition,
  - the connecting wires (4) of the condensers.
3. Remove:
  - the duct connecting the air filter to the air tank,
  - the clamping straps of the suction duct and the air filter,
  - the screws fastening the air filter assembly and the support of the coils on the cross bar,
  - the air filter assembly and the coils.
4. Loosen the screws fastening the bearing caps of the steering and move the unit in its bearings to obtain the dimension:

$$a = 3.898 \pm .098'' (99 \pm 2,5 \text{ mm})$$

(distance between the axis of the left relay and the axis of the pressure pad nut on the rack).

5. Catch the mounting screws of the bearing caps and adjust the angular position of the steering.

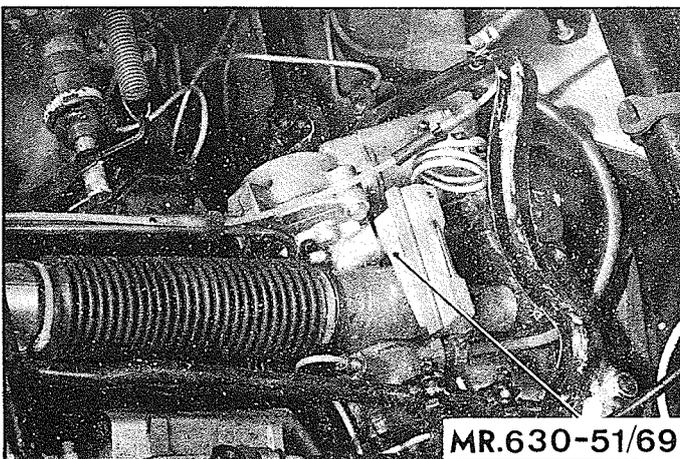
8741



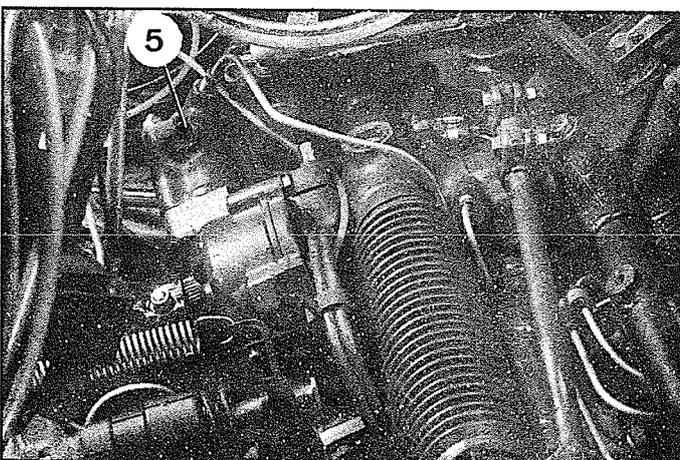
### II. ADJUST THE ANGULAR POSITION OF THE STEERING

6. Place the gauge MR 630-51/69 (the thicker part toward the rear) on the boss receiving the nut of the rack pressure pad. Place a bubble level (non-adjustable) on the gauge.  
*Orient the steering (up or down) to bring the level to zero.* Tighten the screws of the bearing caps to 15 ft. lbs.
7. Replace and fasten:
  - the air filter assembly and the coil supports,
  - the duct connecting the air filter to the air tank.
8. Connect:
  - the feed wires (3) and (2) of the tachometer, to the coils,
  - the high tension wires (1), to the ignition,
  - the connecting wires (4), to the condensers.

8782

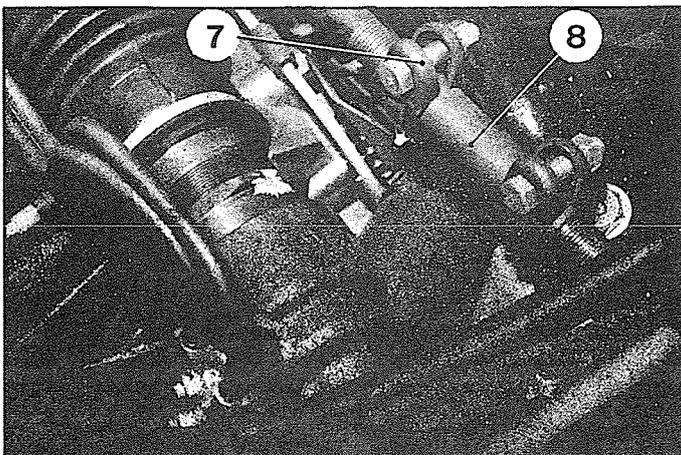
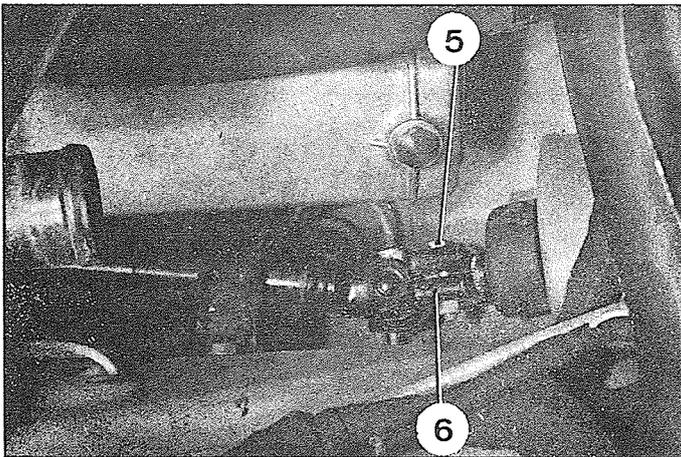
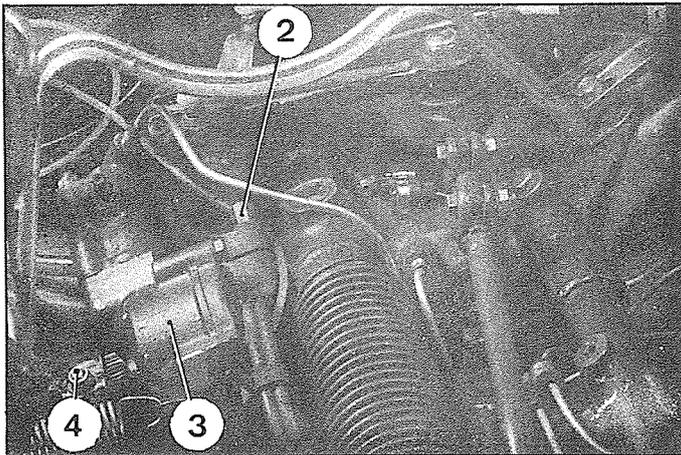
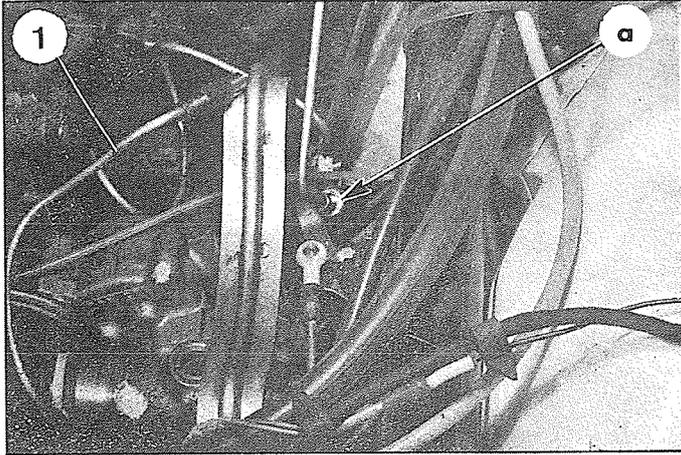


9060



### III. BLEED THE STEERING

9. Connect the bleed screw (5) to the reservoir of L.H.M. fluid with the aid of a flexible transparent plastic tube.
10. Loosen the bleed screw  $\frac{1}{4}$  turn approximately and turn the steering wheel slowly to one side then to the other until air bubbles no longer appear in the transparent tube.
11. Retighten the bleed screw (5). Stop the motor.



#### IV. ADJUSTMENT OF THE STEERING "STRAIGHT AHEAD" POSITION

##### 12. *Set the wheels of the car in a straight line:* (statically).

Utilize a light beam projection apparatus and follow the instructions of the manufacturer.

##### 13. Uncouple the steering cardan shaft from the drive pinion.

##### 14. *Set the steering in the "straight ahead":*

a) Plug the tube (1) feeding the cam pressure regulator (metal cap and seal) and connect the orifice "a" to the pump of the hydraulic test bench 3654-T.

b) Loosen the nut (2) and turn the housing (3) so as to place it at the center of its travel.

Retighten the screw (2). Place the circuits under pressure.

c) Pump the pressure to 150 bars (2176 p.s.i.). This will hydraulically lock the steering in the "straight ahead".

At this moment, the wheels of the car should be in a straight line (see paragraph 12).

If not, hold the pressure at 150 bars (2176 p.s.i.) in order to lock the steering and manipulate the toe adjusting sleeves (8).

d) Couple the steering cardan shaft to the drive pinion. Tighten the (NYLSTOP) nut (4).

Being sure that the spoke of the steering wheel is vertical, the screw (5) of the cardan shaft clamp (6) is to be found at the horizontal.

If not, uncouple the clamp (6) from the steering shaft and choose another position on the splines in order to achieve this condition.

e) Connect the feed tube of the cam pressure regulator to the housing.

#### V. ADJUSTMENT OF THE TOE

**IMPORTANT:** *Execute this operation with the motor running and the car in the normal drive position.*

##### 15. Proceed with this adjustment always conserving the position of the wheels in a straight line.

a) Loosen the clamps (7) of the left and right adjusting sleeves (8).

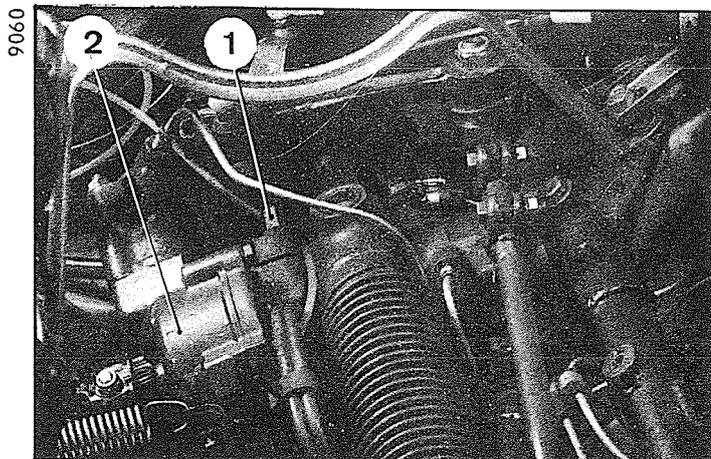
b) Turn each sleeve (8) at the same value, operating by fractions of a turn.

Tighten the clamps (7).

**NOTE:** One quarter of a turn *on one sleeve only* corresponds to a variation of the toe of approximately 2 mm (.080").

**IMPORTANT:**

- At the finish of the adjustment, the length of the steering rods should be *equal within* 1 mm (.040").
- The screws of the sleeve clamps (7) should be oriented toward the top as shown (to avoid interference with the leakage return tubes).



#### VI. ADJUSTMENT OF THE "POINT ZERO"

REMARK: This adjustment is very important. It conditions the road holding ability of the car.

16. This adjustment should be done on the road:

- a) Drive on a straight, uncrowned road, at moderate speed.
- b) If the vehicle wanders, loosen the screw (1) and turn the housing of the servo-return (2) *in the direction opposite to that of the wander*.

Proceed by fractions of a turn.

Retighten the screw (1).

NOTE: It is possible to check immediately the adjustment of the "point zero" on the road.

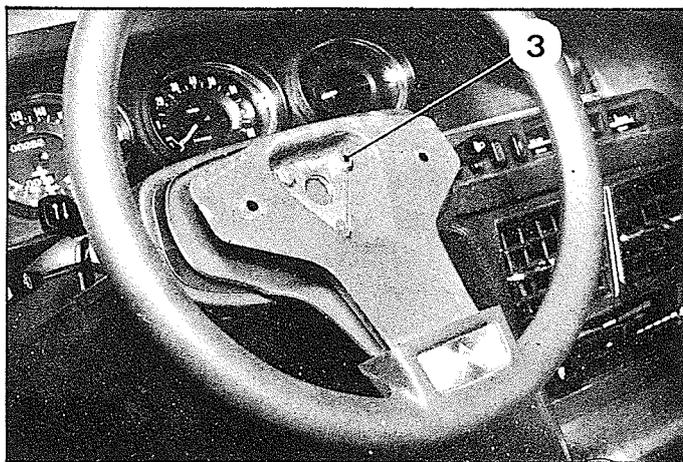
In this case, one can meet with the impossibility of a correct adjustment (the housing (2) having reached the end of its adjustment travel): it is then necessary *to proceed, in sequence, with all of the adjustments* described in Chapters I to V.

17. *Adjust the position of the steering wheel* (if necessary):

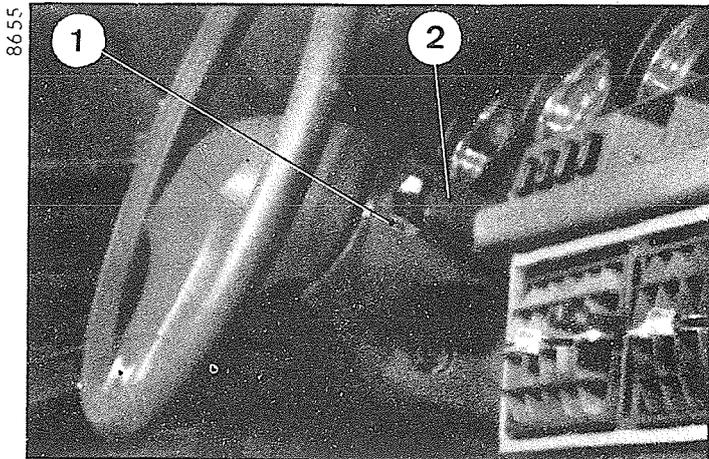
The steering being in the "straight ahead" position, the spoke of the steering wheel should be vertical.

If not, proceed as follows:

- a) Remove the two nuts fastening the cover of the steering spoke (these nuts are accessible through the holes of the metal plate underneath the cover).
- b) Loosen the three screws (3) attaching the steering wheel onto the steering tube and holding the tube in position (at the front of the support) angularly displace the steering wheel in the convenient direction to bring the spoke to the vertical (setting by elongated slots).
- c) Tighten the attachment screws (3) of the steering wheel to 11 to 15 ft. lbs.



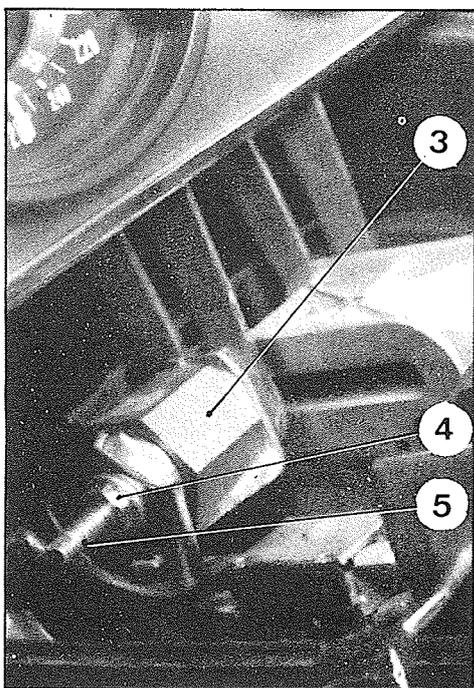
ADJUSTMENT OF THE CONTROL LEVER FOR UNLOCKING THE STEERING WHEEL



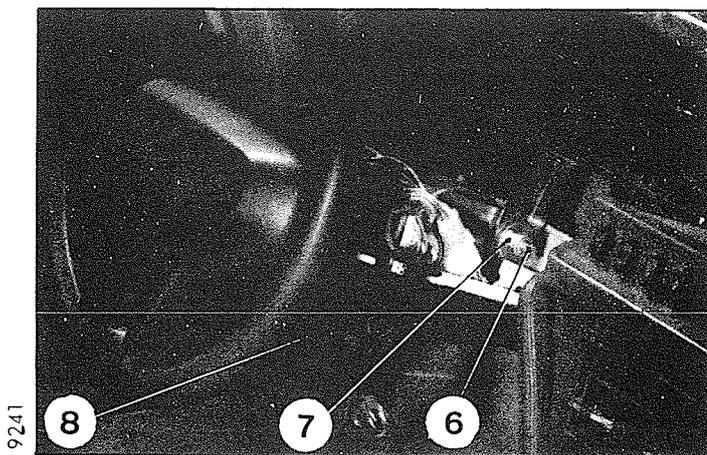
1. Remove:
  - the two chrome strips (1).  
(by sliding them toward the rear)
  - the upper cover (2).

2. Adjust the lever:

- a) Unlock the counter-nut (4) and loosen the screw (5) approximately 1/2 turn, so that in the *locked* position the lever (8) falls of its own weight 1/3 turn. This is to avoid any strain on the flexible washers found inside the bushing (3).
- b) Set the lever (8) in the *unlocked* position.  
Work on the NYLSTOP nut (7) (by holding the spindle (6)), so as to obtain a soft sliding motion, with no harshness, of the system for adjusting the position of the steering wheel assembly.
- c) Set the lever (8) in the *locked* position and check the locking at different positions of the steering wheel.
- d) The lever being always in the locked position, turn the screw (5) in order to reduce its end play to a value almost nil.  
Lock the counter-nut (4).



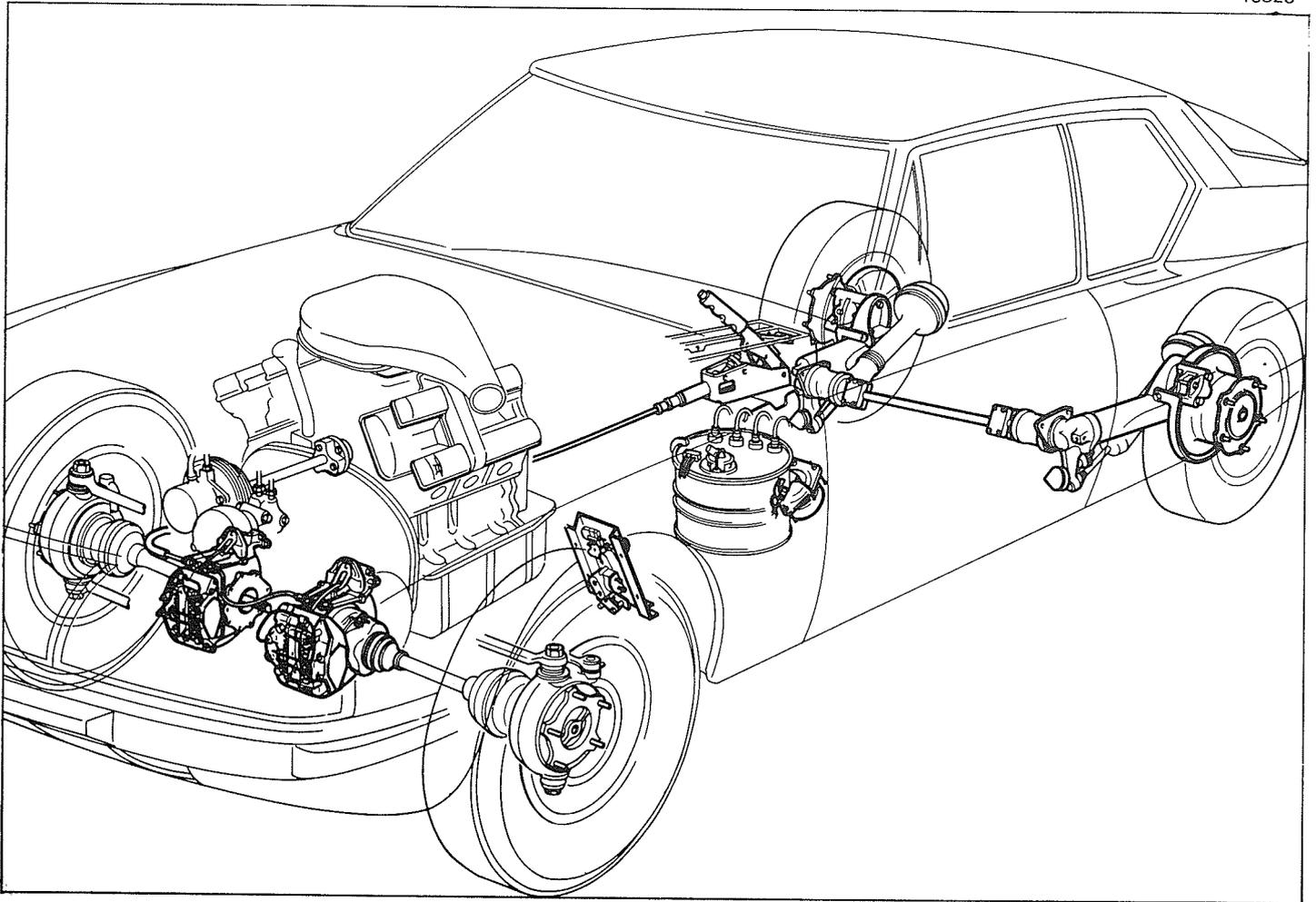
3. Replace:
  - the upper cover (2).
  - the two chrome strips (1).



# BRAKES

## CHARACTERISTICS

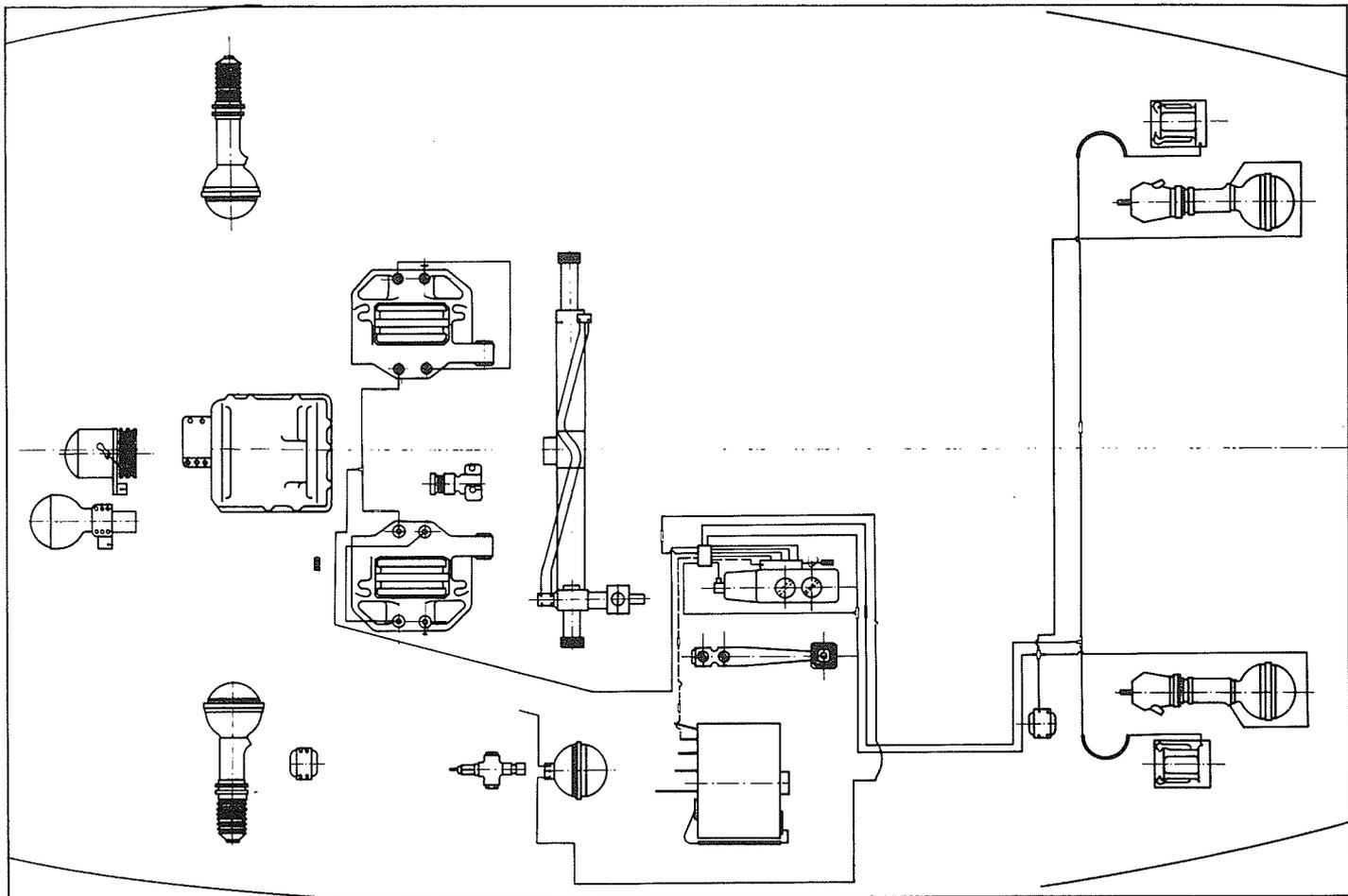
19825



- |                                      |                                                                        |                                                  |                  |
|--------------------------------------|------------------------------------------------------------------------|--------------------------------------------------|------------------|
| <b>1. Front brakes:</b>              | Disc:                                                                  | - diameter: .....                                | 300 mm (11.811") |
|                                      |                                                                        | - thickness: .....                               | 12 mm (.4724")   |
|                                      |                                                                        | - minimum thickness (after rectification): ..... | 11 mm (.433")    |
|                                      | Wheel cylinders:                                                       | - Number (per stirrup): .....                    | 2 (opposed)      |
|                                      |                                                                        | - diameter: .....                                | 60 mm (2.362")   |
|                                      | Lining:                                                                | - type .....                                     | FERODO 623       |
|                                      |                                                                        | - thickness: .....                               | 11,5 mm (.4528") |
| <b>2. Rear brakes:</b>               | Disc:                                                                  | - diameter: .....                                | 256 mm (10.08")  |
|                                      |                                                                        | - thickness: .....                               | 7 mm (.276")     |
|                                      |                                                                        | - Minimum thickness (after rectification): ..... | 6 mm (.236")     |
|                                      | Wheel cylinders:                                                       | - Number (per stirrup): .....                    | 2 (opposed)      |
|                                      |                                                                        | - diameter: .....                                | 32 mm (1.260")   |
|                                      | Lining:                                                                | - type: .....                                    | FERODO 623       |
|                                      |                                                                        | - thickness: .....                               | 7,5 mm (.2953")  |
| <b>3. Emergency - parking brake:</b> | 2 plaques per disc. Mechanical control independent of the main brakes. |                                                  |                  |
|                                      | Lining:                                                                | - type: .....                                    | FERODO 583       |
|                                      |                                                                        | - thickness: .....                               | 5,25 mm (.2067") |
| <b>4. Brake accumulator:</b>         | - number: .....                                                        | 1                                                |                  |
|                                      | - inflation pressure: .....                                            | 40 bars (580 p.s.i.)                             |                  |
| <b>5. Braking surface:</b>           | - main brake (hydraulic) .....                                         | 308 cm <sup>2</sup> (47.74 sq. in.)              |                  |
|                                      | - emergency brake (mechanical) .....                                   | 95 cm <sup>2</sup> (14.725 sq. in.)              |                  |

SCHMATIC OF THE BRAKING CIRCUIT

S 39-4



PARTICULARS

1. Organs of the braking system:

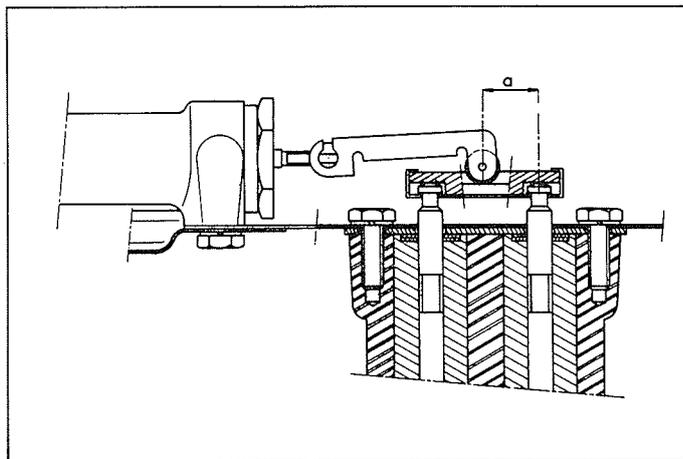
- Maximum warpage of the front and rear brake discs: . . . . . 0,15 mm (.006")
- Maximum difference in thickness (taken at the median  $\phi$ ) around the periphery of the disc: . . . . . 0,02 mm (.0008")
- Tightness of the bolts mounting the front brake blocks on the extension housing of the gear box: . . . . . 95 to 110 ft. lbs.
- Tightness of the bolts mounting the rear brake blocks on the arms of the axle: . . . . . 29 to 33 ft. lbs.
- Tightness of the bolts mounting the mechanical brake blocks on the clutch housing: . . . . . 72 to 80 ft. lbs.
- Adjustment of the plates of the mechanical brakes (at the maximum "run-out" of the disc): . . . . . clearance = 0,1 mm (.004")

2. Hydraulic control (main brakes):

- Adjustment of the braking distributor: (for a pressure of 66 bars (958 p.s.i.) in the cylinder): . . . . .  $a = 14 \pm 0,25$  mm (.551  $\pm$  .010")
- Adjustment of the mano-contact: . . . . . 15 to 25 bars (218 to 363 p.s.i.)
- Clearance of the stop light switch contact: . . . . . 0,8 mm (.032") max.

3. Mechanical control (emergency - parking brake):

D. 45-2



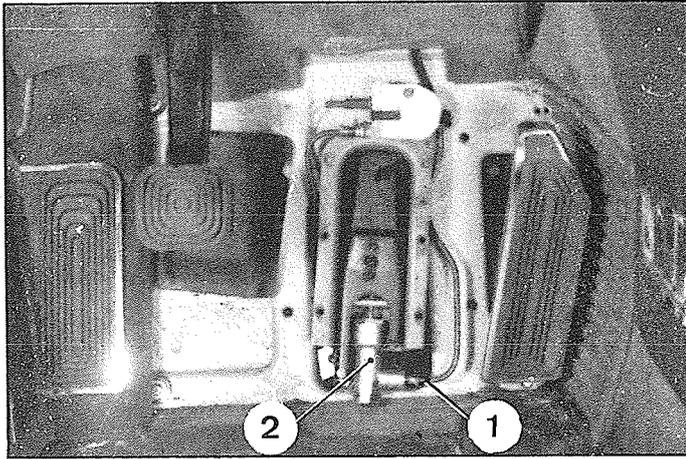
### I. BLEEDING OF THE FRONT BRAKES

This bleeding should be done without pressure in order to avoid emulsion of the liquid and consequent eventual formation of air pockets in the circuit.

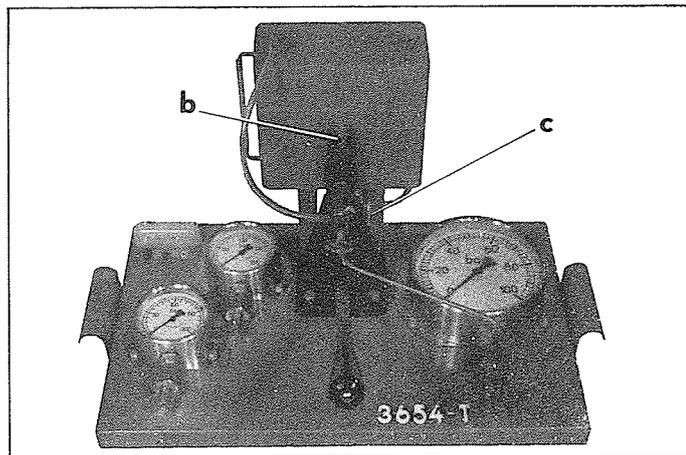
1. Motor stopped, loosen the bleed screw of the pressure regulator.
2. Connect the bleed screws of the brake blocks to the reservoir, by means of flexible, transparent, plastic bleed tubes.
3. Hold the pedal down all the way.  
Loosen the two front bleed screws (the liquid will flow under the pressure contained in the brake accumulator).
4. The brake pedal being held down, start the motor.  
Tighten the bleed screw of the pressure regulator.  
Allow the liquid to flow through the flexible bleed tubes until there are no more air bubbles.  
At this moment, tighten the bleed screws.
5. Release the brake pedal and remove the flexible bleed tubes.
6. Verify the leakage tightness of the bleed screws by pressing the brake pedal all the way down.
7. Stop the motor.
8. Remove the flexible hoses from the bleed screws and replace the protection caps.

### II. BLEEDING OF THE REAR BRAKES

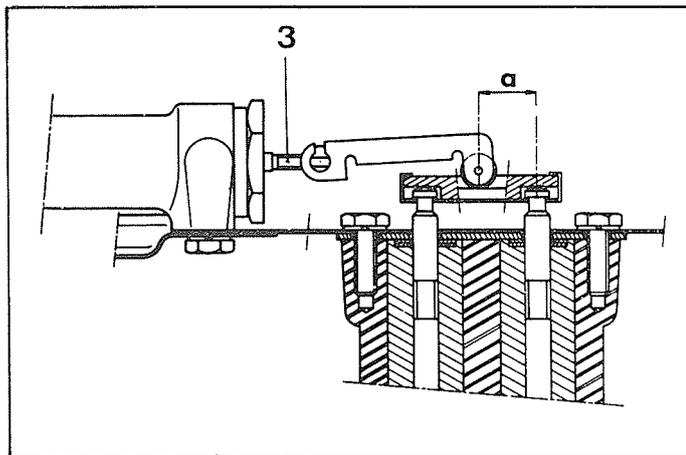
9. Start the motor.  
Lift the rear of the car and place it on jack supports.
10. With flexible, transparent plastic tubes, connect each bleed screw to a clean container partially filled with hydraulic liquid.
11. Place the manual height control lever in *high position*.
12. Hold the brake pedal all the way down.
13. Loosen the bleed screw.  
When the liquid flows with no more air bubbles in the flexible tubes, tighten the bleed screws.
14. Release the brake pedal.  
Remove the flexible bleed tubes.
15. Depress the brake pedal all the way and verify the leakage tightness of the bleed screws.  
Set the rubber protection caps on each bleed screw.
16. Set the car on the ground.
17. With the motor always running:  
Establish the level of liquid for the hydraulic circuit in the reservoir. (The manual height control lever being in the *high position*).
18. Stop the motor.



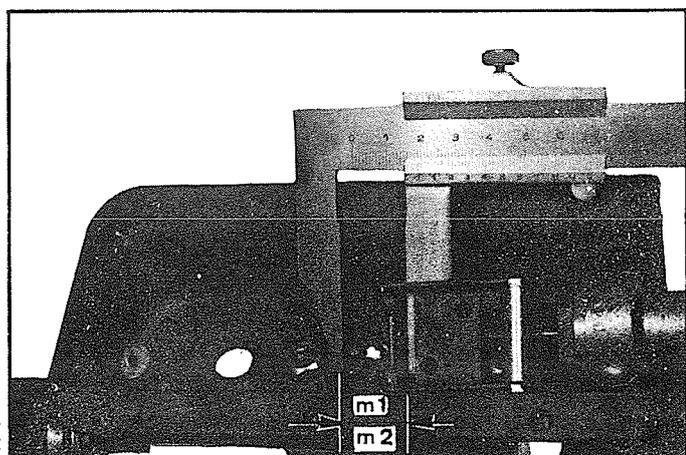
9344



4745



D. 45-2



3171

### III. ADJUSTMENT OF THE BRAKING DISTRIBUTION

REMARK: Use the test bench 3654-T (painted green). Connect the pressure gauge graduated from 0 to 100 bars (0 - 1500 p.s.i.).

1. Place the manual height control lever in *low position*. Remove the pedal board and the pedal.
- ◆2. Uncouple the feed tube (1) of the braking distributor. With a separate tube, connect the braking distributor (2) to the connection "b" of the test bench pump.
3. Pump the pressure to approximately 100 bars (1500 p.s.i.). Gently, open the bleed screw "c" of the pump to drop the pressure to 66 bars (960 p.s.i.). Measure the distance "m1" with a slide caliper. (m1 = distance between the outer circumference of the valve nipple and the outer circumference of the trolley roller.)
4. Drop the pressure.
5. Again, pump the pressure to 66 bars (960 p.s.i.). Measure the distance "m2".
6. a) Find the average of the two dimensions

$$m3 = \frac{m1 + m2}{2}$$

- b) To obtain the dimension of adjustment "a" (distance between the axis of the valve and the axis of the trolley) it is necessary to subtract from the dimension m3:

- the radius of the slide valve, for example:

$$\frac{6,35 \text{ mm } (.250'')}{2} = 3,175 \text{ mm } (.125'')$$

- plus the radius of the roller, for example:

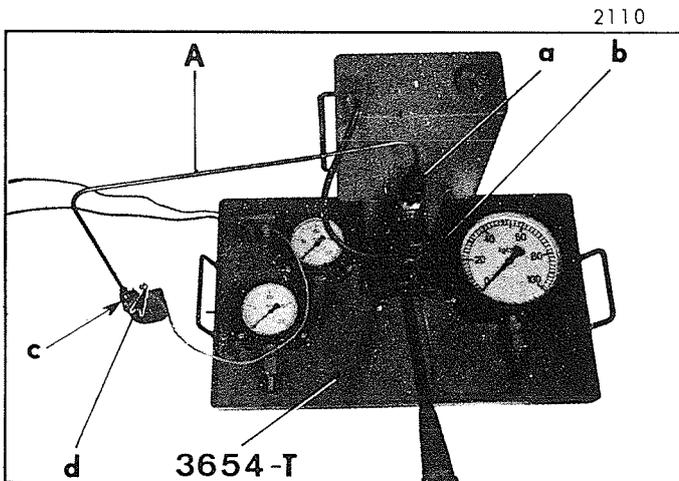
$$\frac{11 \text{ mm } (.433'')}{2} = 5,5 \text{ mm } (.2175'')$$

or a total of 8,675 mm (.3425'')

$$a = m3 - 8,675 \text{ mm } (.3425'').$$

- c) If the dimension thus found is not equal to  $14 \pm 0,25 \text{ mm } (.551 \pm 0.010'')$ , work on the screw (3).

7. Drop the pressure by loosening the bleed screw "c" of the test bench.
- ◆8. Uncouple the tube connecting the pump to the distributor. Couple the tube (1) to the braking distributor (2).
9. Replace the pedal board, the pedal and the trim.



10. Start the motor and place the manual height control lever in *high position*.

11. Bleed the brakes.

#### IV. VERIFICATION OF THE MANO-CONTACT

REMARK: Employ the test bench 3654-T (painted green). Connect the pressure gauge graduated from 0 to 100 bars (0 - 1500 p.s.i.).

1. Connect the orifice "c" of the mano-contact to the orifice "a" of the pump by means of the tube A.

Connect the green and blue terminals of the electric wires delivered with the test bench to the posts of corresponding colors.

Connect the "alligator" clip of the wires to the posts of a 12 volt battery. Using the yellow wire, connect the terminal "d" of the mano-contact to the free post of the test bench.

The luminous indicator should light, if not the mano-contact is defective.

2. Tighten the bleed screw "b" and pump so as to raise the pressure progressively just to 100 bars (1500 p.s.i.).

The lamp should extinguish for a pressure higher by 25 bars (360 p.s.i.).

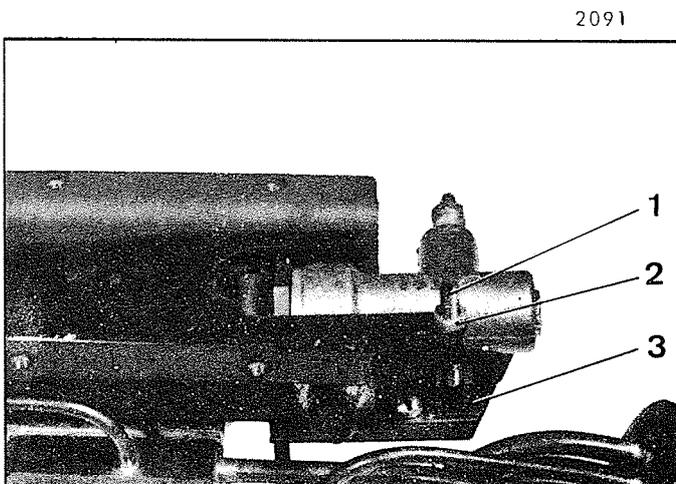
Slightly open the bleed screw "b" to allow the pressure to descend slowly. The lamp should light for a pressure lower by 15 bars (220 p.s.i.). In the contrary case, the mano-contact is to be replaced.

3. Drop the pressure by loosening the bleed screw "b".

Disconnect the battery.

Remove the electric wires and the tube A.

REMARK: It is possible to do this operation on the car.



#### V. ADJUSTMENT OF THE STOP LIGHT SWITCH

1. Remove the pedal board.

Connect a continuity test lamp between the switch and ground.

Work on the adjustment screw (1) just to obtain the extinction of the light.

Then turn the adjustment screw (1) down exactly one turn and lock the counter-nut (2).

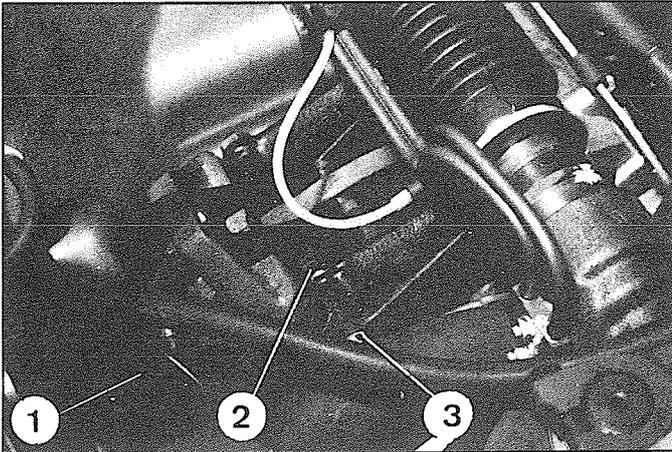
REMARK: The screw should be perpendicular and sensibly at the center of the plate (3).

If necessary, file the end of the screw lever.

2. Replace the pedal board.

## ADJUSTMENTS OF THE EMERGENCY BRAKE

8848

*Adjustment of the mechanical brake stirrups*

NOTE: The left stirrup is more accessible from underneath the car.

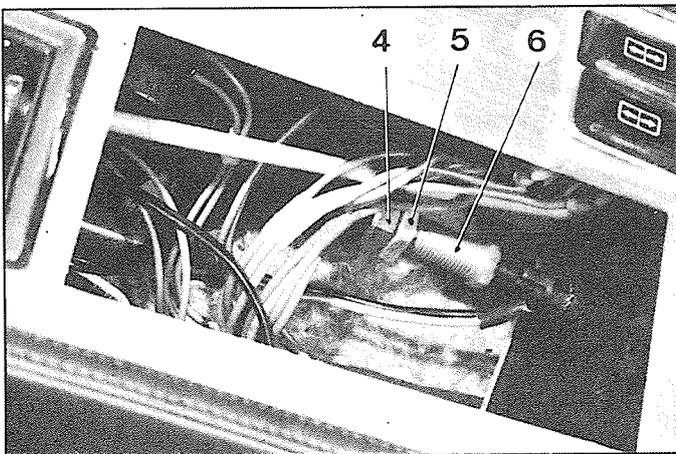
1. Loosen the screws (1) and place a shim 5 mm (.197") thick between the brake disc and the return spring of the levers.
2. Tighten the screws (1) to 10-11 m.kg. (72 to 80 ft. lbs.).

*Adjustment of the clearance between the plates and the brake discs*

NOTE: The left stirrup is more accessible from the underside of the car.

3. Release the brake control lever.
4. Place, between the brake plates and the disc, on each side, a piece of shim stock 0,10 mm (.004") thick having a surface area equal to those of the plates.
5. Unlock the counter-nuts (3) (wrench 3559-T).  
Work on the screws (2) (14 mm extra thin wrench) in order to bring the brake plates in contact with the shim stock. Tighten the counter-nuts (3).
6. Remove the shim stock placed as indicated in paragraph 4 and be sure that the wheels turn freely.

8875

*Adjustment of the locking of the hand brake lever*

7. Remove the assembly of the ash tray and its casing from the central console.
8. Unlock the counter-nut (5).  
Unscrew the nut (4) and screw the threaded ferrule (6) so as to slacken the brake cable.
9. Loosen the mounting screws (10) of the lock (8). At this point, if the cable is sufficiently slackened, the lock (8) should be able to oscillate freely.

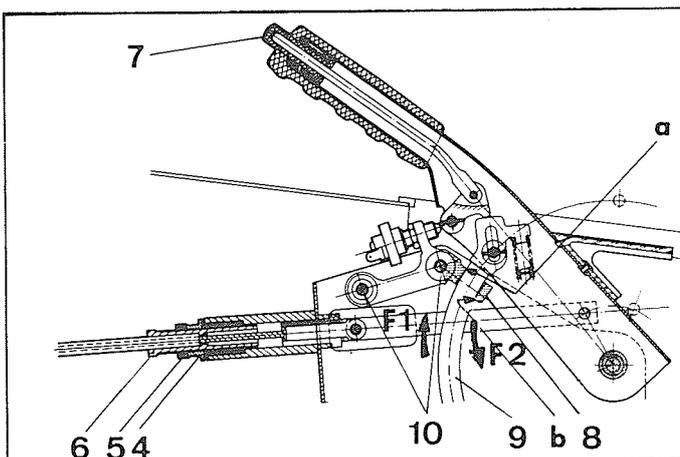
If not, remove the mounting screw (1) of the right mechanical brake stirrup, disengage the stirrup and remove the brake plates in order to slacken the cable completely.

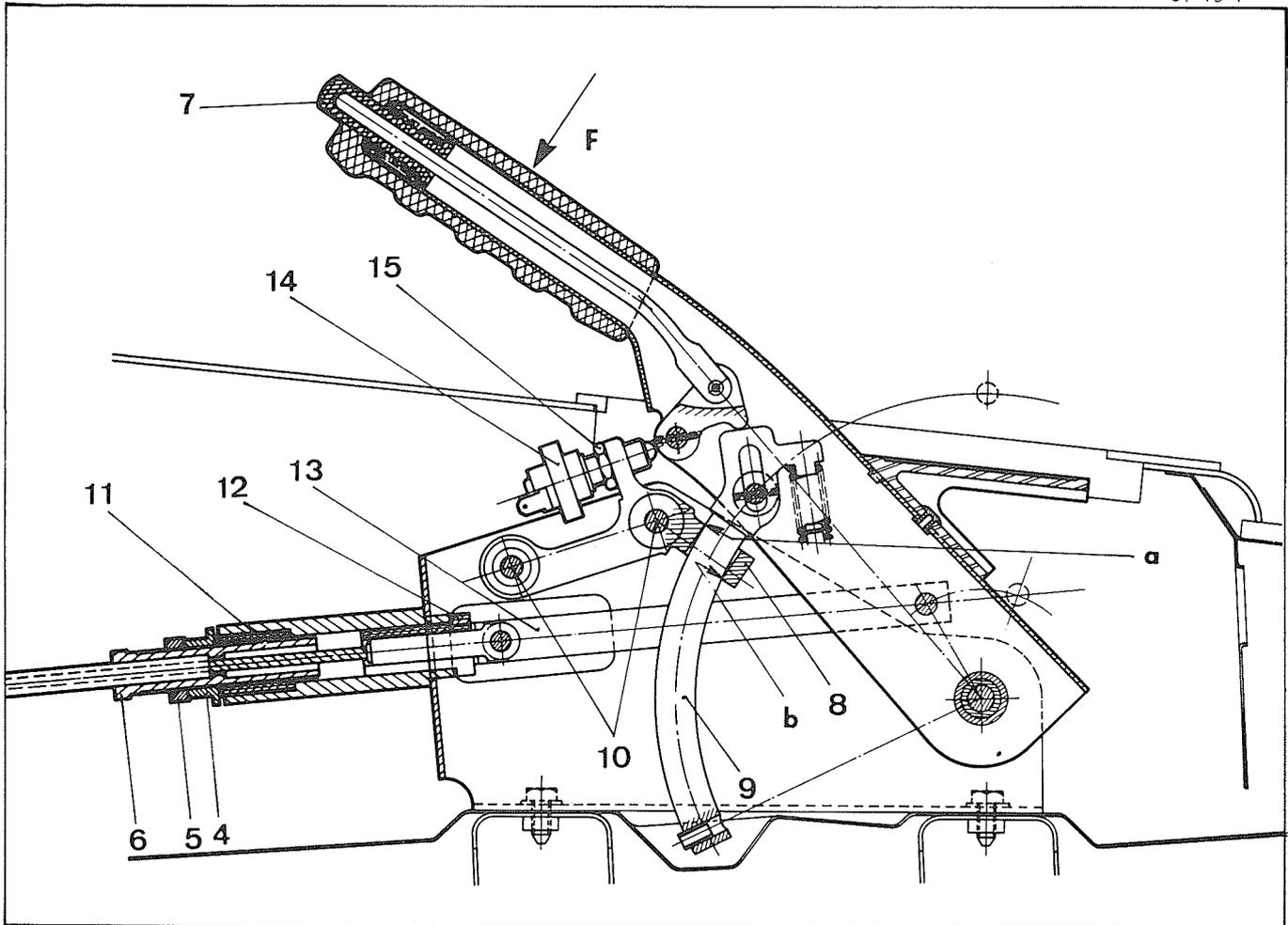
10. Adjust the lock (8) so as to bring it in contact with the sector (9) at the points "a" and "b".  
Tighten the mounting screws (10) of the lock (8) to 3 m. kg. (22 ft. lbs.).

11. Re-tension the cable by working on the ferrule (6).  
(Mount the right brake stirrup, if it has been removed).
12. The push button (7) being pressed flush with the handle, the sector (9) should slide freely in the lock (8) in the direction of the arrows F1 and F2.

The push button (7) being released, the sector (9) should not slide in the direction of the arrow F2.

S 45-1





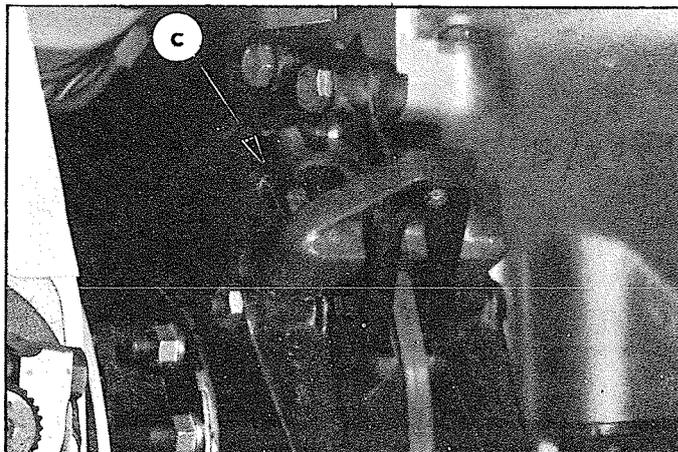
#### *Adjustment of the brake cable*

13. Apply about one dozen energetic strokes of the hand brake in order to "set" the cable housing.
14. Press the brake lever in the direction of the arrow (F) under an effort of approximately 15 kg. (33 lbs.) and insert between the nut (4) and the anti-rattle bushing (11) a spacer 0,5 mm (.020") thick.
15. Always maintaining the pressure on the lever, tighten the nut (4) just sufficiently to obtain a clearance of 0 to 0,05 mm (0 to .002") between the rear section of the brake shoe levers and the body of the mechanical brake stirrups, at "c".  
Lock the counter-nut (5).

#### *Adjustment of the hand brake contact switch*

16. The hand brake being released, bring the rod (3) up against the elastic bushing (12).
17. Make the contact. See that the signal on the alert block is working.
18. Screw the contact switch (14) just to the point where it cuts the circuit (the yellow flashing signal of the alert block extinguishes).  
Then screw in the contact switch exactly one turn and lock the counter-nut (15).
19. Verify, after applying the hand brake, that the circuit is re-established (the flashing signal should light).

8665



ALTERNATOR

CHARACTERISTICS

Alternator: Three-phase, six diode rectifier bridge.  
 Reference: PARIS-RHONE A 13 R 92.  
 Rotation: Counter clockwise, viewed from the driver's seat.  
 Maximum Output: 780 W @ 8000 alternator R.P.M.  
 Maximum mechanical power absorbed: ..... 2500 W  
 Beginning of charging ..... 670 motor R.P.M.  
 ..... 1200 alternator R.P.M.

Resistance of the inductors: ..... 4.6 Ω  
 Brushes: minimum length after use. .... 10 mm (.394")  
 tension of the springs on new brushes:  
 ..... 2,9 N (2 ft. lbs.)  
 Drive belt: ..... GATES Polyflex 7 M 775  
 Ratio alternator/motor ..... 1,79

CHARGING CIRCUIT

(THREE PHASE)

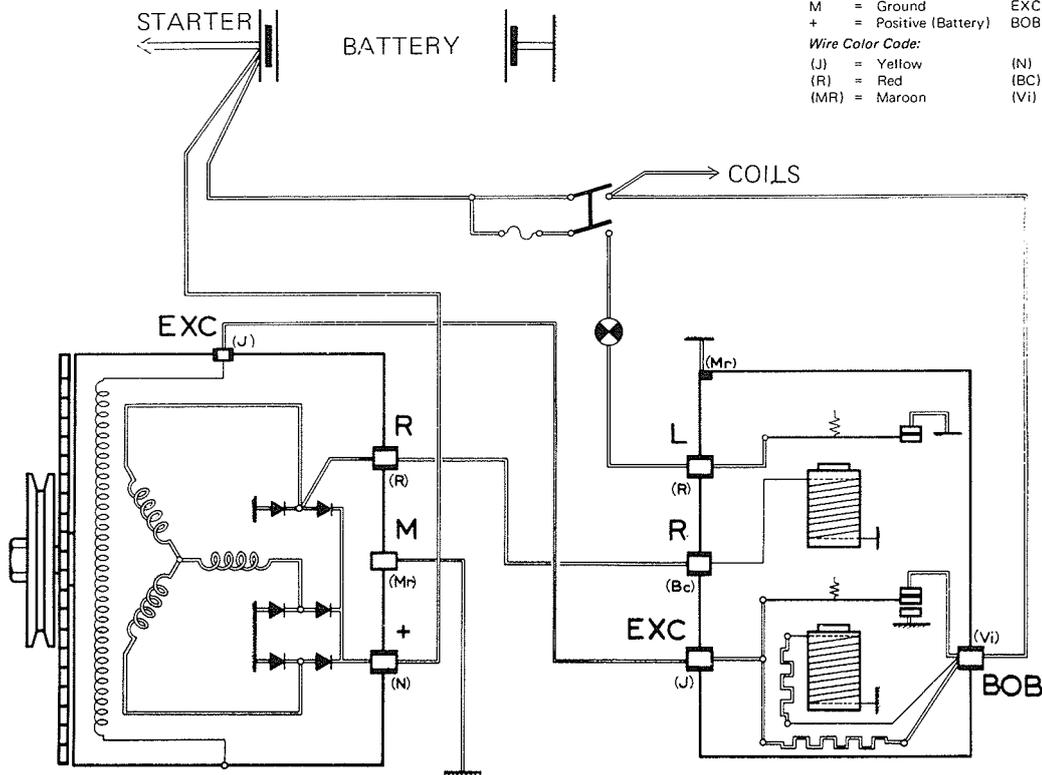
Legend:

Terminals: Alternator

EXC = Field  
 R = Rectifier  
 M = Ground  
 + = Positive (Battery)

Regulator

L = Charging indicator  
 R = Rectifier  
 EXC = Field  
 BOB = Coil  
 (N) = Black  
 (BC) = White  
 (Vi) = Violet



S. 53-1

**INSPECTION OF THE OUTPUT ON THE CAR**

NOTE: The output of the alternator should be measured while operating at a warm temperature and at maximum field excitation.

- The output of the alternator should be checked with a fully charged battery.

**1. Connecting the checking apparatus:**

- a) Disconnect the cable clamp from the negative (-) post of the battery.
  - Disconnect the exciter wire (yellow tip) from the "EXC" post (2) and the charging wire (black tip) from the positive (+) post (1) of the alternator (insulate the ends of the two wires against grounding).
- b) - Using a separate wire (the diameter of which will be equal to 12 gauge minimum), connect the positive (+) post (1) to the "EXC" (2) of the alternator.

**b) Connect ammeter in series and a rheostat in parallel in the charging circuit.**

To do this connect:

- the positive (+) post (1) of the alternator to the positive (+) clip of the ammeter.
- the negative (-) clip of the ammeter to the disconnected charging wire (black tip).
- the rheostat between the negative (-) post of the ammeter and ground.

**c) Connect a voltmeter by tapping into the charging circuit:**

To do this connect:

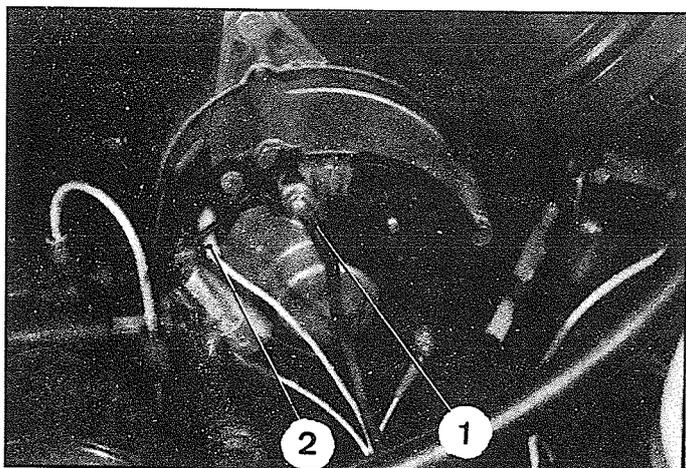
- the positive (+) clip of the voltmeter to the positive (+) post of the battery.
- the negative (-) clip of the voltmeter to ground.

Connect the ground cable clamp to the negative (-) post of the battery.

**2. Measure the output of the alternator:**

- a) Start the motor and let it run at idle speed. Slowly accelerate the *motor just to 925 R.P.M. (1650 alternator R.P.M.)* and maneuver the rheostat to obtain a *voltage strength of 14 volts*.  
The current flow should be equal to: **20 amps**.
- b) Bring the speed of the *motor to 2000 R.P.M. (3600 alternator R.P.M.)* and maneuver the rheostat in order to maintain *the voltage strength at 14 volts*.  
The current flow should be equal to: **48 amps**. If these outputs are not obtainable, verify the tension and condition of the belt. If not, inspect or recondition the alternator. Stop the motor.

3. Disconnect the ground cable clamp from the negative (-) post of the battery. Remove the voltmeter, the ammeter and the rheostat. Connect the charging wire and the exciter wire to the alternator. Connect the ground cable clamp to the negative (-) post of the battery.



## REGULATOR

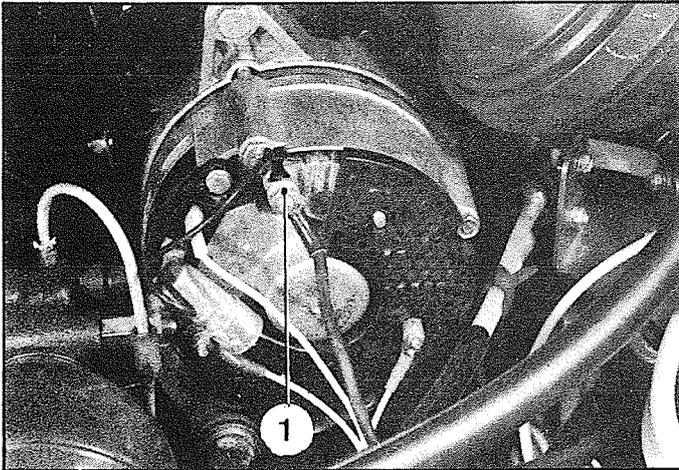
## CHARACTERISTICS

Reference:

PARIS-RHONE AYD 212

The regulator comprises (see schematic):

- a) A *two-step voltage regulator* which regulates the value of the current circulating in the inductors (fields) of the alternator, in order to maintain a near constant regulated voltage to the posts of the battery.
- b) A *simple relay* which controls the extinction of the signal indicating the charging of the alternator.



## INSPECTION OF THE VOLTAGE REGULATION

(on the car)

## 1. Connecting the checking apparatus:

- a) Disconnect:
  - the ground cable clamp from the negative (−) post of the battery.
  - the charging wire (black tip) from the positive (+) post (1) of the alternator, and insulate it against grounding.
- b) *Connect an ammeter in series and a rheostat in parallel in the charging circuit.* To do this, connect:
  - the positive (+) post of the ammeter to the positive (+) post (1) of the alternator.
  - the negative (−) post of the ammeter to the disconnected charging wire (marked black).
  - the posts of the rheostat between the negative (−) post of the ammeter and ground.
- c) *Connect a voltmeter by tapping* onto the exciter circuit. To do this, connect:
  - the positive (+) post of the voltmeter to the "BOB" terminal (marked violet) of the regulator.
  - the negative (−) post of the voltmeter to ground.

## 2. Measure the voltage regulation:

Connect the ground cable clamp to the battery and start the motor. Let it run at idle speed.

Cut the ignition for a short time in order to demagnetize the regulator.

Accelerate the motor just to a speed of approximately 2250 R.P.M. (4000 alternator R.P.M.).

Work the rheostat so as to increase the current delivered by the alternator, *never going back*, and read the corresponding voltage.

Take more readings and refer to the corresponding graph. These should fall within the dark area, if not the regulator must be inspected or reconditioned.

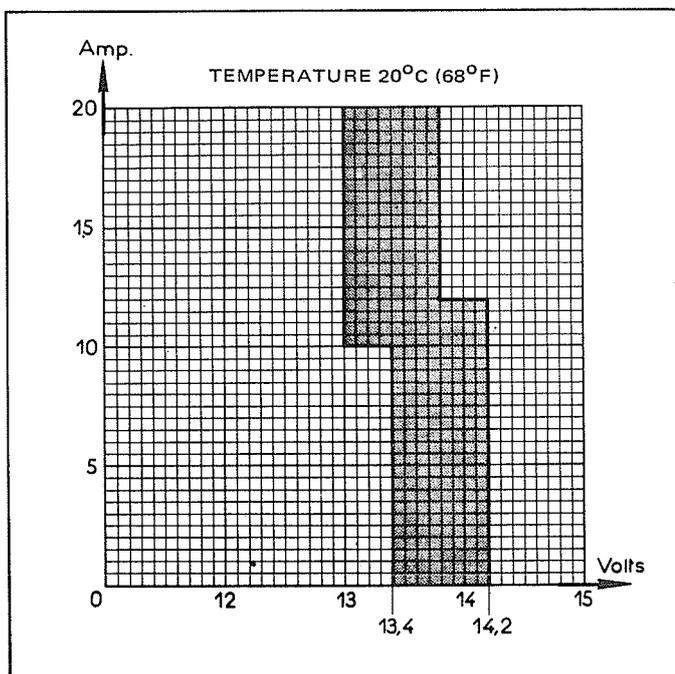
NOTE: The graph shown, corresponds to measurements read at a temperature of 20°C (68°F). In case the ambient temperature is different, it is necessary to modify the values indicated on these graphs.

The voltage varies inversely to the temperature by an average of 0,15 volts per 10°C (50°F).

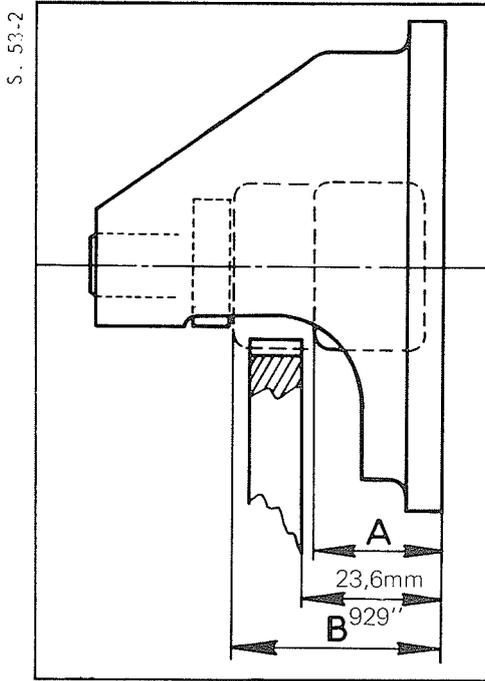
Stop the motor.

3. Disconnect the ground cable clamp from the negative (−) post of the battery. Remove the voltmeter, the ammeter and rheostat. Connect:

- the charging wire to the alternator,
- the ground cable clamp to the negative (−) post of the battery.



STARTER



CHARACTERISTICS

**Starter:** 12 volts with positive drive solenoid.

Reference: DUCELLIER 6 211 A.

Brushes: Minimum length after use: . . . . . 7 mm (.276")

Fields: Resistance: . . . . . 6,5 to 6,6 mΩ

Armature: Min. dia. of the commutator  
after cutting . . . . . 38,5 mm (1.516")

**Drive:**

Reference: DUCELLIER 608 358.

Adjustment: The drive pinion should occupy the positions indicated in the drawing.

Solenoid at rest: . . . . . A = 22 mm (.866")

Solenoid excited: . . . . . B = 36,2 mm (1.425")

**Solenoid:**

Reference: DUCELLIER 608 819.

Resistance of the *primary winding* (1): . . . . . 0,25 Ω  
(Winding of heavy wire connected in series with the fields of the starter).

NOTE: The current of the primary winding (1) is established through the fields, the armature and the brushes.

Resistance of the *holding winding* (2): . . . . . 1,02 Ω  
(fine wire winding connected in parallel).

INSPECTION OF A STARTER

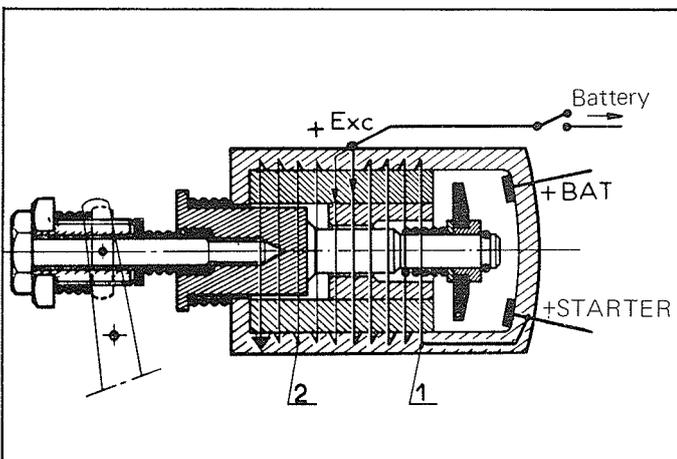
1. Tests on the car:

Be sure the battery is correctly charged and measure:

- a) the current absorbed with the pinion locked: . . . . . 560A
- b) the current absorbed running free, starter removed . . . . . 60A
- c) the current absorbed when the starter drive engages the motor, starter in action . . . . . 300A approx.

2. Tests on the test bench:

- a) Average torque @ 1000 R.P.M.: .1 m.kg (7.2 ft. lbs.)  
Current absorbed by this torque: . . . . . 360A
- b) Maximum power: . . . . . 1.5 H.P.  
Corresponding torque at the maximum power: . . . . . 0,7 m.kg (5 ft. lbs.)  
Current absorbed by this torque: . . . . . 300A



G. 53-1

## INSPECTION AND ADJUSTMENT OF THE WINDSHIELD WIPER

## I. WINDSHIELD WIPER MOTOR

## CHARACTERISTICS

Type: Ferrite fields.

Brand: BOSCH

Reference: 0.390.346.093

Armature: Resistance  $0,6 \pm 0,06 \Omega$

Nominal diameter of the commutator = 23 mm (.906")

Minimum diameter of the commutator after correction = 22,2 mm (.874")

Brushes: Reference: 1.394.320.014

Minimum length after use = 7,5 mm (.295")

Ratio: 1/49

## INSPECTION OF THE WINDSHIELD WIPER MOTOR

## 1. First Speed:

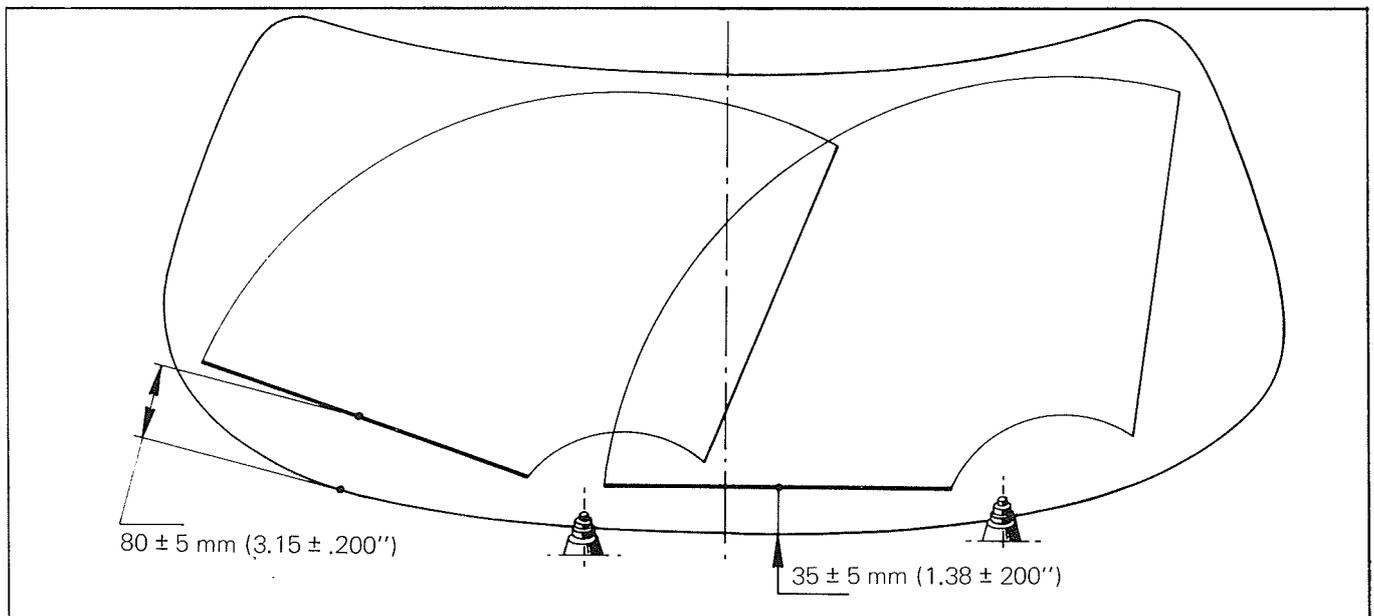
- a) Torque, motor locked, @ 13,5 volts = 1.8 m.kg (13 ft. lbs.) min. — corresponding current = 18.7 A max.
- b) Torque at 20 R.P.M. @ 13.5 volts = 0,95 m.kg (7 ft. lbs.) min. — corresponding current = 11.4 A max.
- c) Torque at 40 R.P.M. @ 13,5 volts = 0,1 m.kg (8½ in. lbs.) — corresponding current = 4 A max.

## 2. Second Speed:

- a) Torque, motor locked @ 13.5 volts = 1,5 m.kg (11 ft. lbs.) min. — corresponding current = 20.8 A max.
- b) Torque at 30 R.P.M. @ 13.5 volts = 0,78 m.kg (6 ft. lbs.) min. — corresponding current = 12.8 A max.
- c) Torque at 57 R.P.M. @ 13.5 volts = 0,1 m.kg (8½ in. lbs.) min — corresponding current = 5.5 A max.

## ADJUSTMENT OF THE WINDSHIELD WIPER

S. 56-1



With the windshield wiper motor in the "automatic park" position, adjust the wiper blades to obtain the dimensions indicated in the drawing above.

These dimensions are measured between the articulating joints of the blades and the upper edge of the molding sealing the windshield. If not, loosen the nut fastening the windshield wiper arm and change its position on the pivot just sufficiently to obtain a correct adjustment.

Tighten the nut of the windshield wiper arm to 1-1,4 m.kg. (7 to 10 ft. lbs.)

## II. TEMPORIZER OF THE WINDSHIELD WIPER (INTERMITTENCE TIMER)

### CHARACTERISTICS

Brand: S.E.I.M.

Reference: 2.1089

### PRINCIPLE OF OPERATION

NOTE: The purpose of the temporizer is to provide the possibility of intermittent sweeps of the wipers during light rain or drizzle as well as cleaning slush and spray from preceding vehicles. The sweep of the wipers can be variably timed from zero intermittence (continuous operation) to a delay of up to 12 seconds maximum between sweeps.

NOTE: The references of the units and the wiring in the schematics of the principle of operation, shown on page 3, correspond to those of the general electrical wiring diagram.

50 - Windshield wiper motor.

103 - Temporizer (intermittence timer) of the windshield wiper.

104 - Windshield wiper switch.

#### 1. *First speed: not temporized* (See Fig. 2):

Turn the temporizer control button all the way to the left and overcome the hard point.

NOTE: The control button is located underneath the steering block.

The contact "a" is closed and shunts the system of temporization. When the wiper switch is turned to first speed, the current of the temporizer circuit flows as shown by the solid arrows.

*Automatic parking:* (See Fig. 1):

With the wiper switch returned to its "off" position, the motor is fed only until the wipers are stopped by the cam in a desired position (automatic parking). The current flows along the path indicated by the broken arrows.

#### 2. *First speed: temporized:* (See Figures 3 and 4):

##### a) *Wiping period:*

Turn the temporizer control knob to the right. The contact "a" is opened. When the wiper switch is at first speed, the plate P occupies the position shown in figure 3 (the contact "b" is closed), and the current flows along the path indicated by the solid arrows.

The magnetic body "e" (resistor wire coiled in the form of a spiral) attracts the bar magnet N-S, fabricated as one piece with the plate P in order to receive the maximum of the magnetic field. The current flows in the resistor wire "e" and heats the wire until it reaches its "*point de Curie*." The "*point de Curie*" corresponds to that elevation of temperature in the resistor wire "e" at which its magnetic permeability is nullified.

At this moment, the attraction exercised by the adjustable magnetic body "f" becomes predominant and pulls the bar magnet N-S toward itself. The plate P swings and occupies the position shown in figure 4 (contact "b" opened, contact "c" closed).

The time of passage of current (see figure 3) corresponds to *one or two sweeps* of the wipers. This time is determined by the heating of the resistor wire "e", which itself depends on the variable current crossing it. (the value of this current depends on the opposition caused by the varying friction of the wipers on the windshield).

*Automatic parking:* It permits obtaining *one or two complete sweeps*. Since the contact "b" opens, the contact "c" closes and the current flows along the path indicated by the broken arrows shown in figure 4, only to the point, where the automatic parking cam (see figure 1) interrupts the circuit.

##### b) *Temporized rest period:*

The temporizer is found in the position shown in figure 4. The plate P swings (contact "b" opened, contact "c" closed). The flow of current is interrupted, the resistor wire "e" is cooled and its magnetic permeability increases just to the point where its attraction of the bar magnet N-S recovers its predominance in relation to the attraction exercised by the adjustable magnetic body "f". The temporizer is again found in the position indicated in figure 3 and the cycle repeats.

According to the position of the control knob, this rest period (temporization) can reach 12 seconds maximum (control knob turned all the way toward the right). The magnetic body "f" is brought as close as possible to the bar magnet N-S in order to diminish the air gap.

*Automatic parking:* (see figures 1, 3 and 4):

With the wiper switch returned to its "off" position (see figure 1), the automatic parking is effected in accordance with the position of the temporizer shown in figures 3 and 4. The current flows along the path indicated by the broken arrows.

#### 3. *Second speed:*

The second speed is not temporized. When the wiper switch is at the second speed position, the current flows in the temporizer circuit along the path of the solid arrows shown in figure 5. The current flows through the coil "g" and attracts the plate carrying and opening the contact "d". When passing from the first temporized speed to the second speed, the temporizer eventually occupies the position of rest (see figure 4), the contact "d" opens, obstructing the current flowing through the automatic parking circuit (see figure 4) along the path of the broken arrows and simultaneously obstructing the current feeding the motor in first and second speeds.

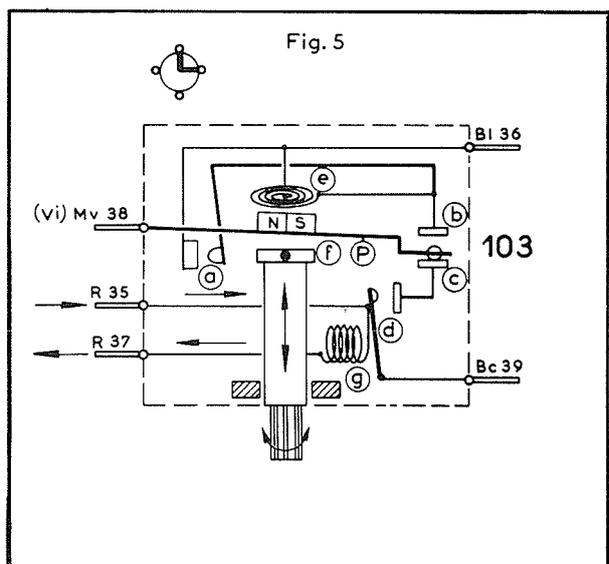
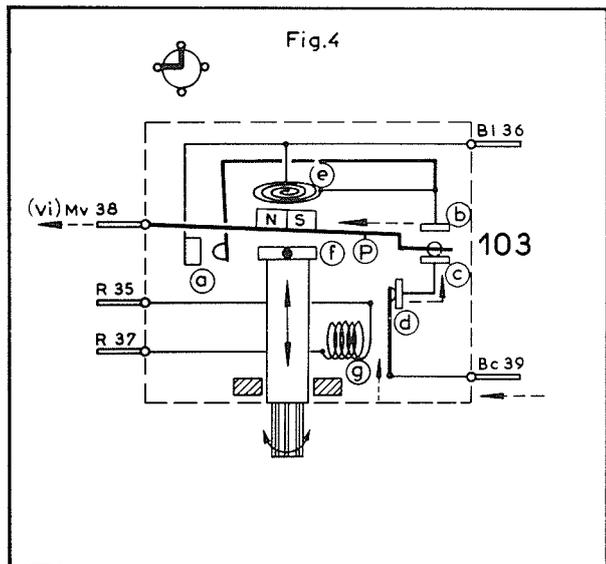
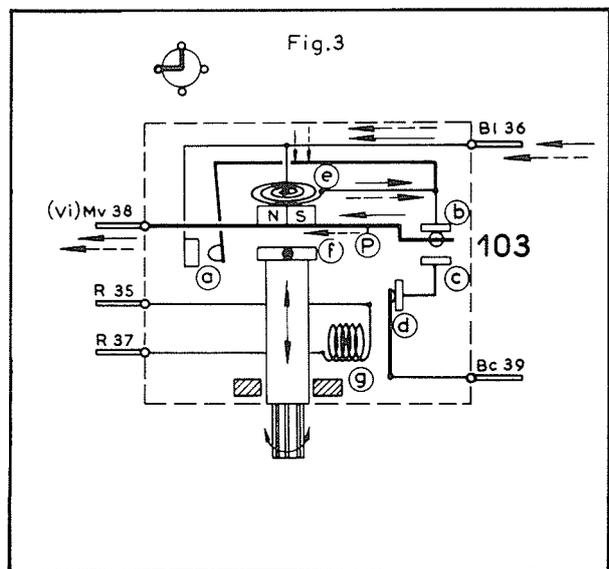
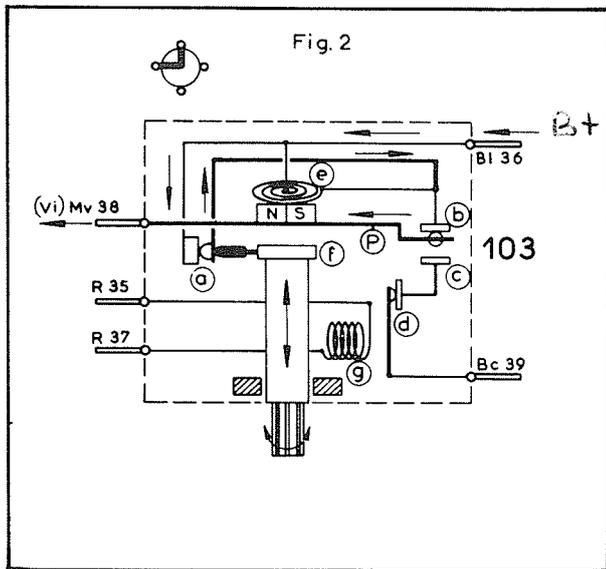
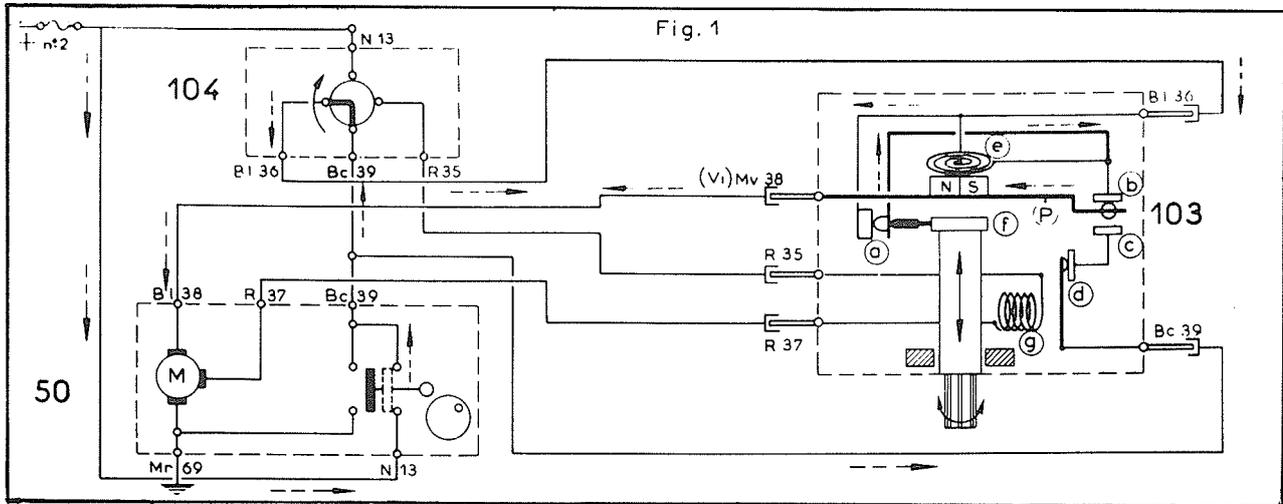
*Automatic parking* (see figures 1, 3 and 4):

With the wiper switch returned to its "off" position (see figure 1) the automatic parking is effected according to the position of the temporizer shown in figures 1, 3 or 4. The current flows along the path of the broken arrows.

**Color Code:**

- |    |   |       |         |   |                |
|----|---|-------|---------|---|----------------|
| N  | — | Black | R       | — | Red            |
| Bl | — | Blue  | (Vi) Mv | — | (Violet) Mauve |
| BC | — | White | Mr      | — | Maroon         |

S. 56-2



---

*CHARACTERISTICS AND PARTICULARS OF THE SYSTEM OF CLIMATISATION AND AIR CONDITIONING*

I CHARACTERISTICS

The system of climatisation groups as one assembly the apparatus for heating and refrigerating the air entering the interior of the car.

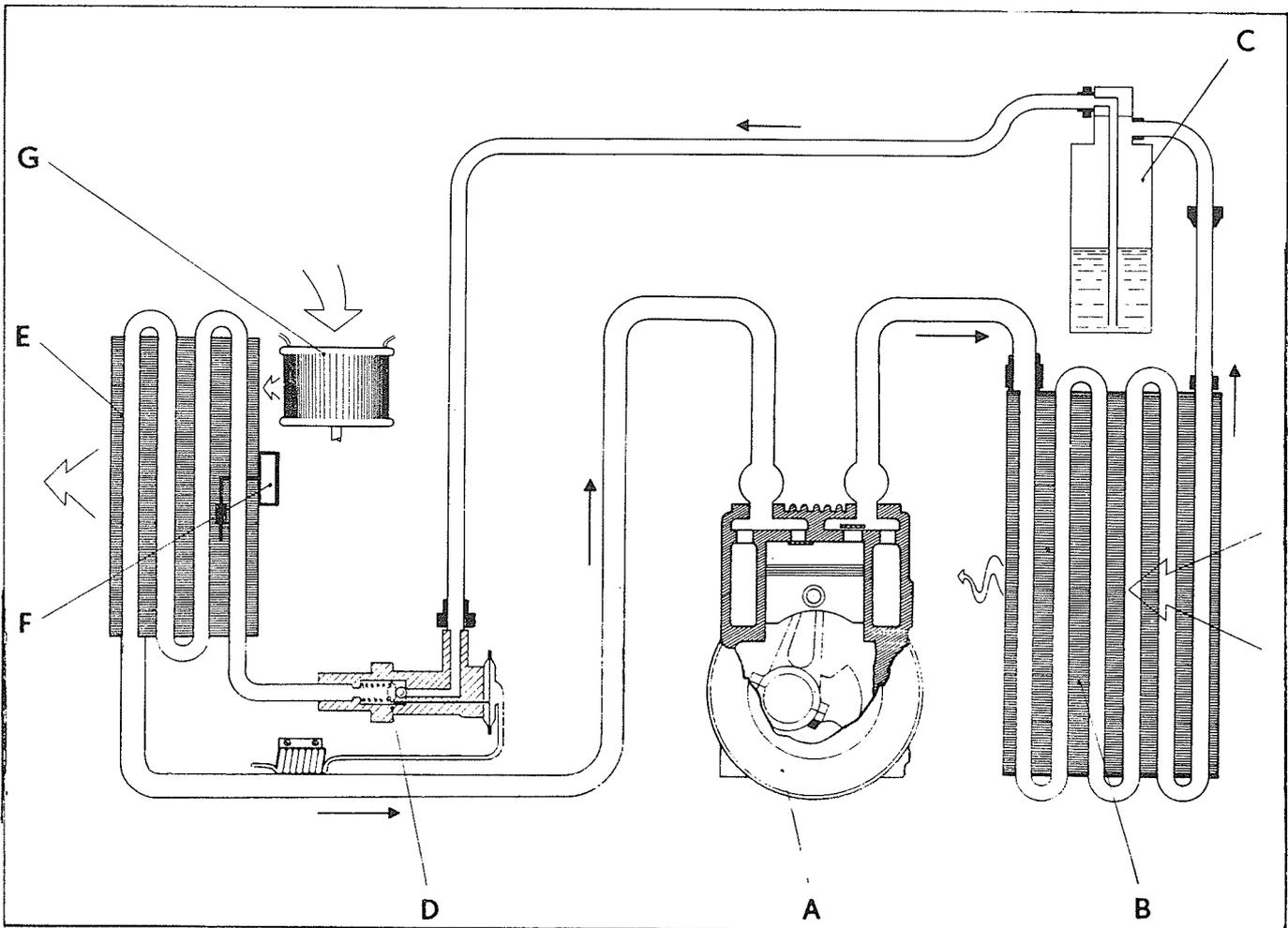
- **Heating:** It is the standard method: the air circulates across the elements of a radiator fed by the water of the motor cooling system.
- **Refrigeration:** It permits cooling the air of the interior while simultaneously drawing off a part of its humidity (decrease of the misting).

1. *Characteristics of the elements constituting the refrigeration system:*

Compressor: .....	YORK
Receiver-dryer: .....	MITCHELL (MARK IV)
Condenser: .....	CHAUSSON
Evaporator unit: .....	SOFICA
Blower unit: .....	SOFICA
Flexible hoses: .....	STRATOFLEX 256-8
Refrigerant: .....	R. 12
Weight of the refrigerant charge: .....	1 kg. (2¼ lbs. approx.)
Oil for lubricating the compressor: .....	SPECIAL COMPRESSOR OIL
Reduction ratio - compressor/motor: .....	1/2

2. *Principle of operation of the refrigeration system:*

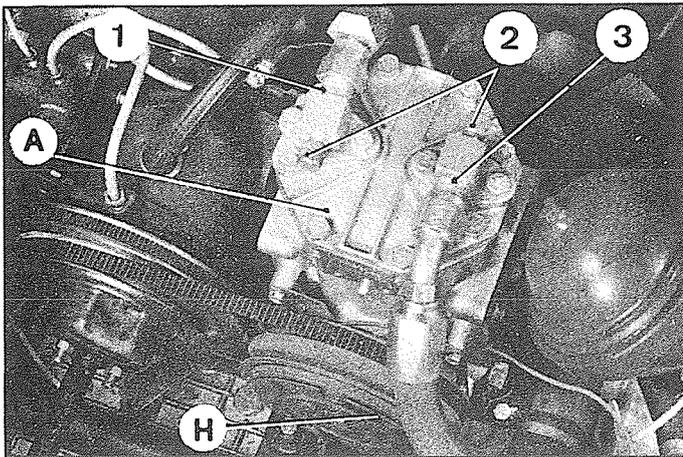
S - 64 - 1a



A: .....	Compressor	E: .....	Evaporator
B: .....	Condenser	F: .....	Ambiance thermostat
C: .....	Receiver - Dryer	G: .....	Air blower
D: .....	Expansion Valve		

3. Description of the principal elements of the refrigeration system:

8512

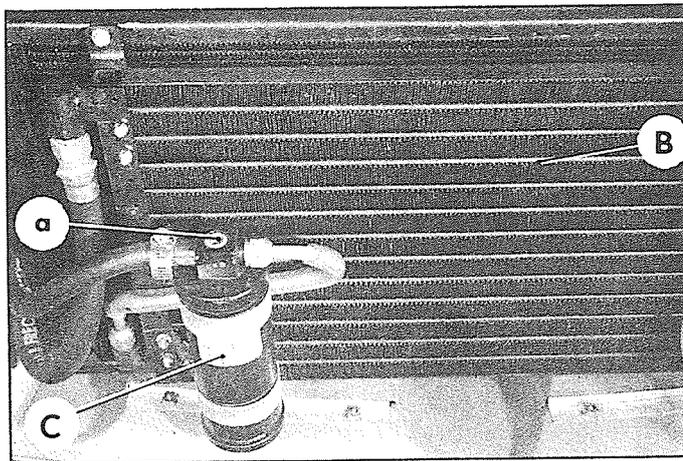


a) **The compressor A:** It is driven by the motor by means of a belt and an electro-magnetic clutch H. Its drive is intermittent: this is controlled by the ambience thermostat F.

Its purpose is to compress the fluid in its vaporized state in order to increase its pressure and make it circulate within the system.

- (1): discharge valve
- (2): protection cap
- (3): suction valve

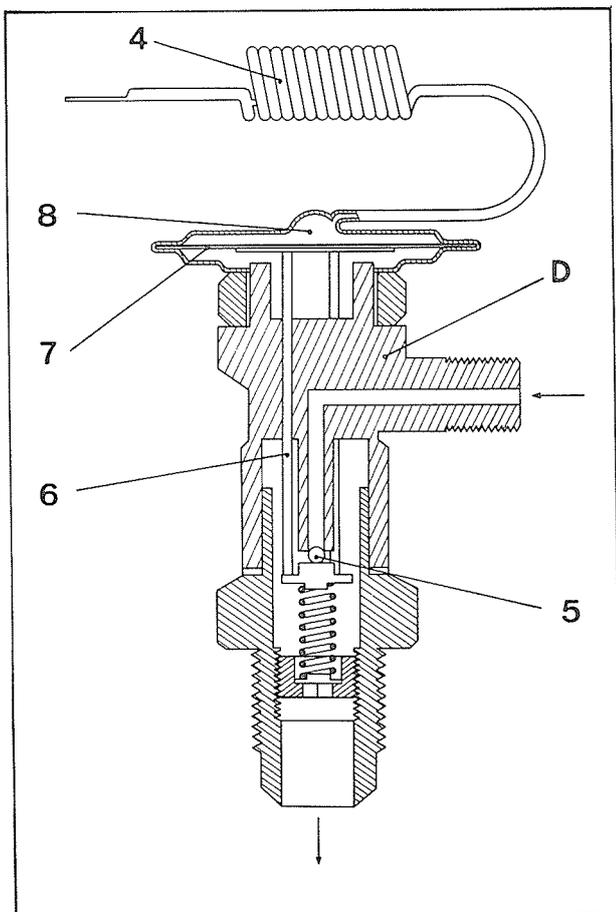
8684



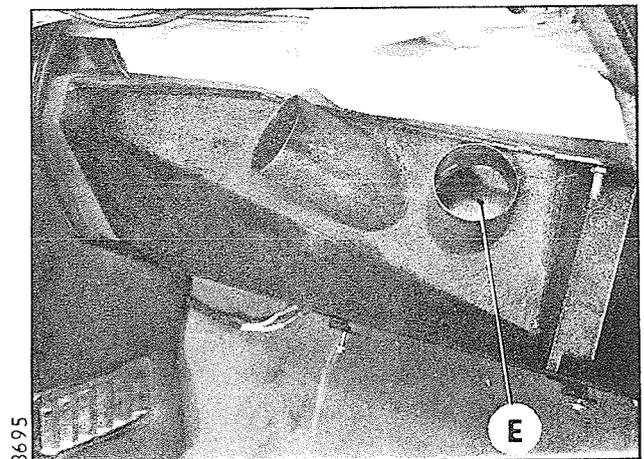
b) **The condenser B:** It is placed before the water radiator of the motor: the cooling air flows across and lowers the temperature of the refrigerant fluid (in the condition of saturated vapor) for the condenser.

c) **The receiver - dryer C:** It is mounted onto the condenser. This is an "accumulator", the aim of which is to purify and dehydrate the refrigerant fluid (in the liquid state) through a dehydrating element (SILICAGEL). It also serves as a reserve of fluid.

d) **The expansion valve D:** It is situated before the evaporator. Its purpose is to lower the pressure of the refrigerant fluid and control the flow into the evaporator by function of the temperature of the fluid at the exit of the evaporator. The variations of temperature provoke a variation of the pressure of the liquid contained in the sensor bulb (4) and the capsule (8): the diaphragm (7) deforms and works on the valve (5) by means of the rod (6).

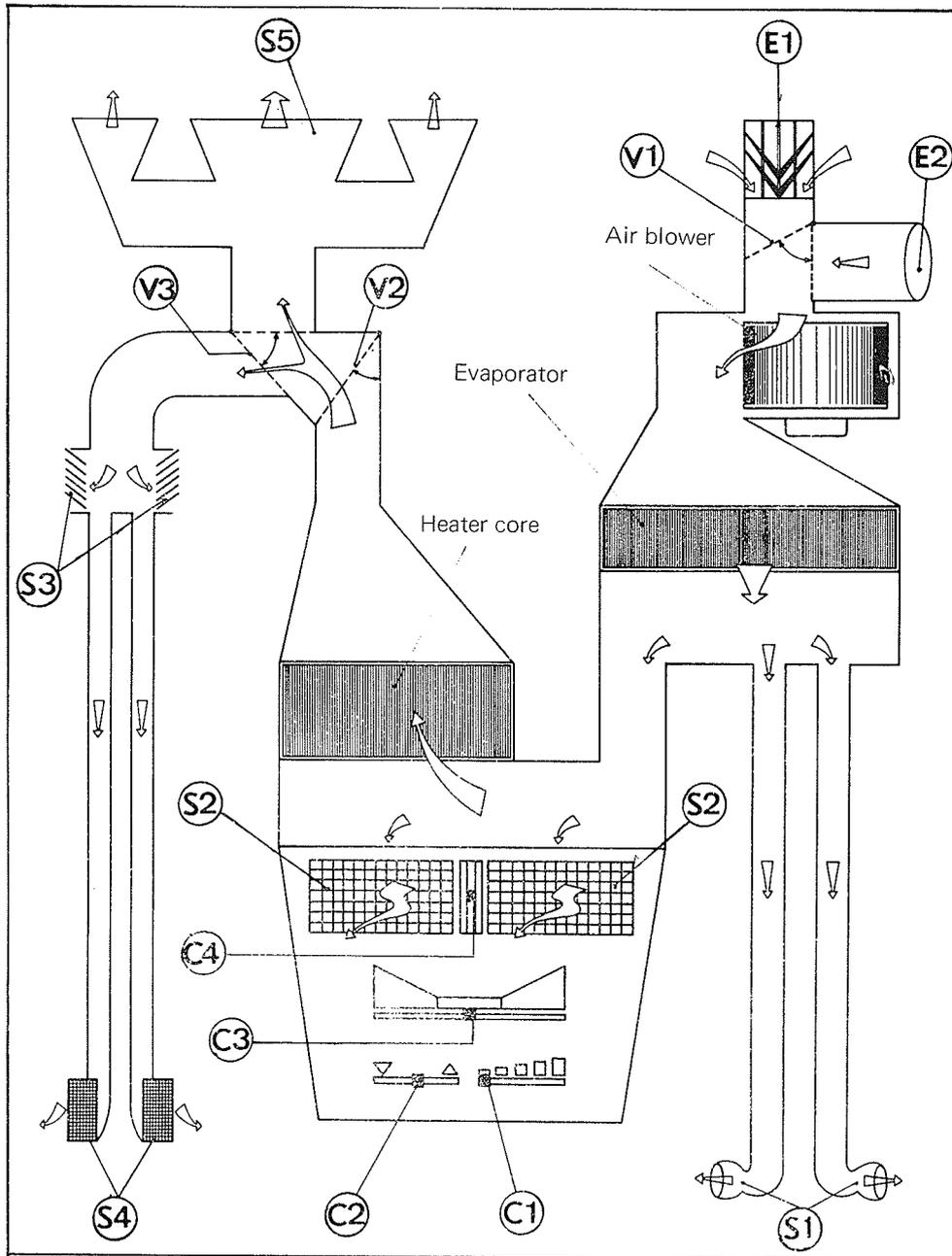


e) **The evaporator E:** It is located under the right side dashboard. On entering the evaporator, the refrigerant fluid is in the liquid state. It goes out again in the form of vapor: the heat necessary to its evaporation is taken, by the walls of the evaporator core, from the air penetrating the interior which itself is also cooled.



## 4. Circuit of the climatized air:

S - 64 - 5

*Intakes of air for the blower:*

- E1:** Intake of outside air on the motor hood.
- E2:** Intake of recycling air under the dashboard (right side).

*Exits of climatized air inside the car:*

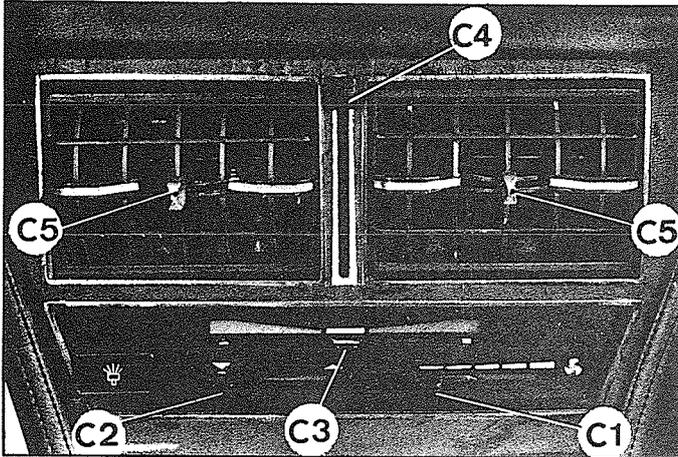
- S1:** Ventilator of the dash board (right and left sides).
- S2:** Central ventilators of the console.
- S3:** Front outlets of the console (right and left sides).
- S4:** Rear outlets of the console (right and left sides).
- S5:** Defrosting, demisting of the windshield.

*Distribution of the climatized air:*

- V1:** Distribution flap between the intake of outside air and interior air (controlled by C3).
- V2:** Flap for closing the outlets S3, S4, S5 (controlled by C3)
- V3:** Flap for distribution between the outlets S3 - S4 and S5 (controlled by C2).

5. *Controls of the temperature and distribution of the climatized air:*

8725



**Lever C1:** Five positions

- In first position (extreme left): complete stop.
- By pushing toward the right, two functions:
  - a) adjustment of the delivery of the climatized air (four speeds of the blower).
  - b) from the first position, feeding electricity:
    - to the control circuit of the compressor clutch (its operation then is conditioned only by the ambience thermostat).
    - to the control circuit of the cooling system fans.

**Lever C2:** Distribution of the climatized air between the windshield and the floor board.

It operates the shutter V3:

- Extreme left position: all the air exits through S3 and S4.
- Extreme right position: all the air exits through S5.
- Intermediate positions: the air is divided between these two directions.

**Lever C3:** Adjustment of the temperature of the climatized air.

Controls at the same time, the shutters V1 and V2. Three zones:

a) **Red zone (toward the left): Hot air**

- Adjustment of the heat by progressive opening of the thermostatic valve feeding heated water to the heater core (maximum to the extreme left).

**Note:** In certain cases (according to the outside temperature) the air penetrating through E1 can be refrigerated (eliminating part of the humidity) in the evaporator before being reheated by the radiator.

- Closing of E2 by the shutter V1: the outside air enters through E1.
- Opening the shutter V2: the climatized air exits through S3 - S4 and S5 (according to the position of C2).

b) **White zone (at the center): Shut-off**

- Closing of the thermostatic valve.
- Closing of E2 by the shutter V1: the outside air can penetrate through E1.
- Closing of the shutter V2: the outside air can only enter the interior of the car through S2 (according to the position of C4) and through S1.

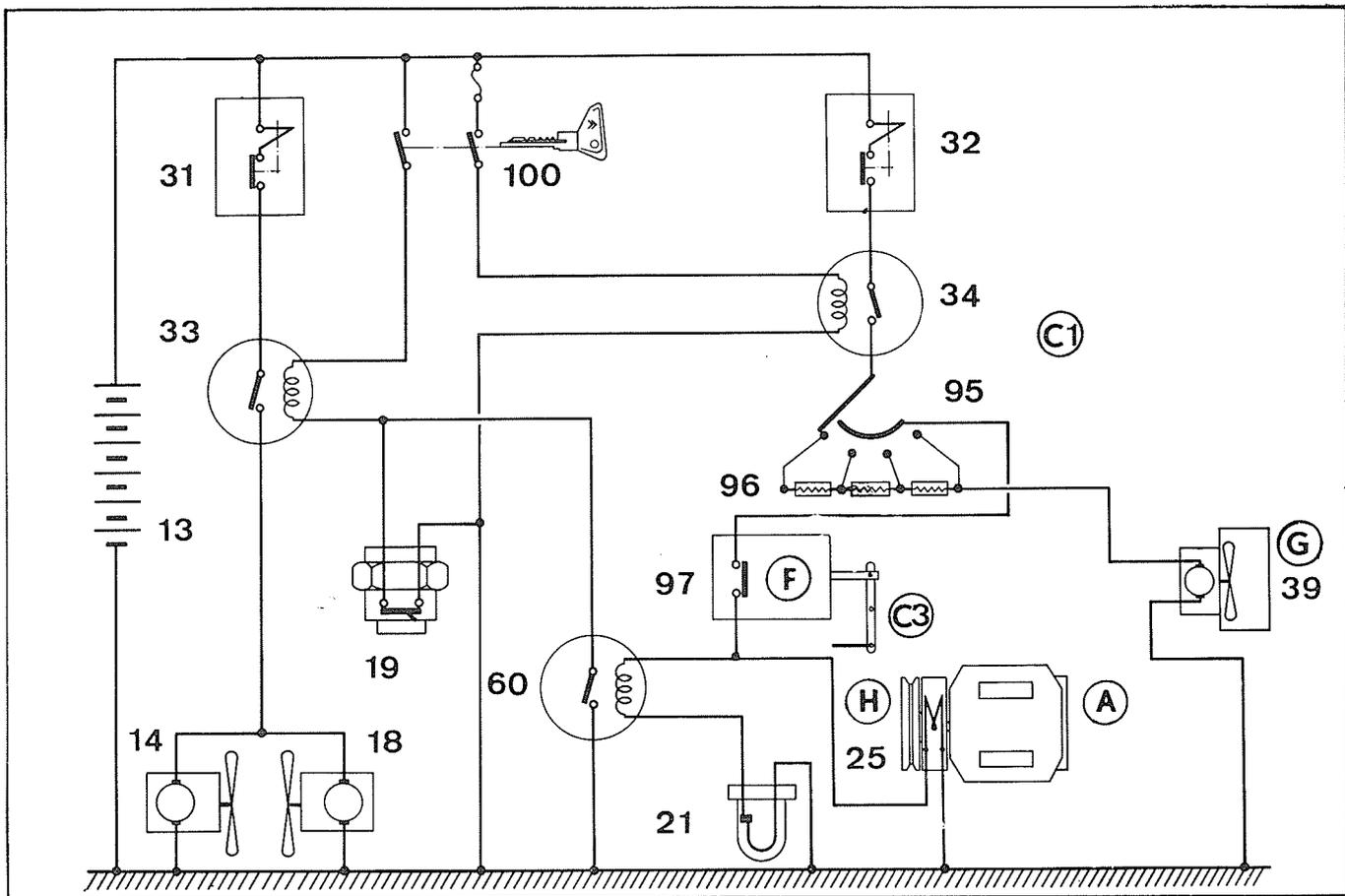
c) **Blue zone (toward the right): Cold air**

- Adjustment of the cooling through intermediation of the ambience thermostat (maximum to the right).
- Closing of E2 by the shutter V1: the outside air can penetrate through E1.
- In the extreme right position, closing of E1 by the shutter V1: the interior air is recycled through E2.
- Opening the shutter V2: the climatized air exits through S3 - S4 and S5 (according to the position of C2) as well as through S1 and S2 (according to the position of C4).

**Lever C4:** Controls the opening (low position), or the closing (high position) of the central aerators S2.

**Note:** The aerators S2 and S1 can deliver either outside air or cooled air, but not hot air.

**Lever C5:** Directs the air coming through the central aerator S2.

6. *Principle of the control of the motor cooling system fans and the air conditioning system.***Legend**

- |                                                                            |                                                                |
|----------------------------------------------------------------------------|----------------------------------------------------------------|
| 13. Battery                                                                | 33. Relay controlling the cooling system-fans                  |
| 14 and 18. Cooling system fans                                             | 34. Relay controlling the air conditioning system              |
| 19. Thermo-contact of the water radiator                                   | 39. Air blower G                                               |
| 21. Mano-contact under pressure of the oil from the steering               | 60. Relay on the mano-contact (21)                             |
| 25. Electro-magnetic clutch H                                              | 95. Switch for the air conditioning system                     |
| 31. Circuit breaker of the cooling system-fans                             | 96. Resistors for controlling the speeds of the blower G (39). |
| 32. Circuit breaker of the air conditioner and the electric window lifters | 97. Ambience thermostat F (on the evaporator)                  |
|                                                                            | 100. Ignition switch                                           |

NOTE: The rheostat switch (95) is controlled by the lever C1.  
The ambience thermostat F (97) is controlled by the lever C3.

**Principle of operation:**

The two fans (14) and (18) of the cooling system have the purpose:

- 1) of cooling the water in the radiator of the motor cooling system.
- 2) of cooling the condenser, when the compressor A recirculates the refrigerant fluid under pressure.

**Current supply to the fans (14) and (18):** This is effected through the circuit breaker (31) and the contacts of the relay (33). The passage of current through the exciting coil of the relay (33) consequently conditions the running of the fans (14) and (18).

**Circuit of the exciting coil of the relay (33):** The coil of the relay (33) is fed when:

- the contact of the ignition switch (100) is established.
- one of the contacts of the thermo-contact (19) or the relay (60) is closed.

(The thermo-contact (19) is controlled by the temperature of the water in the radiator).

(The mano-contact (21) is controlled by the oil pressure of the steering unit (centrifugal regulator), which, itself, depends on the speed of the car).

**Circuit of the exciting coil of the relay (60):** The coil of the relay (60) is fed when:

- The contact of the ignition switch (100) is established (controlled by the relay (34)).
- The contact (95) is established (lever C1 on the first position).
- The contact of the ambience thermostat F (97) is closed (sufficient temperature inside the car, according to the position of the lever C3).
- The points of the mano-contact (21) are closed (pressure of oil in the steering unit less than  $110 \pm 5$  bars —  $1600 \pm 70$  p.s.i.). The current circulates across the circuit breaker (32).

NOTE: The current of the clutch H is conditioned by the ambience thermostat F (97).

The current of the blower G (39) is effected through the resistors (96) of the rheostat switch (95).

This rheostat adjusts the speed of the blower (4 speeds) and consequently the volume of air blown.

## II PARTICULARS

### 1. *Precautions to observe when working on the air conditioning system*

- a) It is **OBLIGATORY** to use goggles.
- b) Do not smoke: the refrigerant R.12, in the presence of flame, transforms itself into a toxic gas.
- c) Never heat one section of the refrigeration circuit.
- d) Never start the refrigeration system if the two cooling system fans are not connected.
- e) Never inspect the oil level of the compressor, without having previously drained the refrigerating circuit.
- f) To lubricate the compressor, never use other than the correct refrigeration oil.
- g) Never use a refrigerant other than R.12.

REMARK: The refrigerant fluid can be sold under various brand names such as FREON "12". The most important consideration in such brand names is the figure "12" which denotes the quality of the fluid.

### 2. *Inspection of the refrigeration functioning:*

A defective functioning can be due to:

- An insufficient charge of R.12 provoked by poor refilling or a leakage.
- A presence of water in the circuit.

An insufficient charge can be discovered by observing the transparent indicator "a" of the receiver-dryer C (See page 3). It is characterized by the appearance of bubbles during the course of operation.

A presence of water is characterized by the formation of some ice at the expansion valve, which causes irregular functioning of the system.

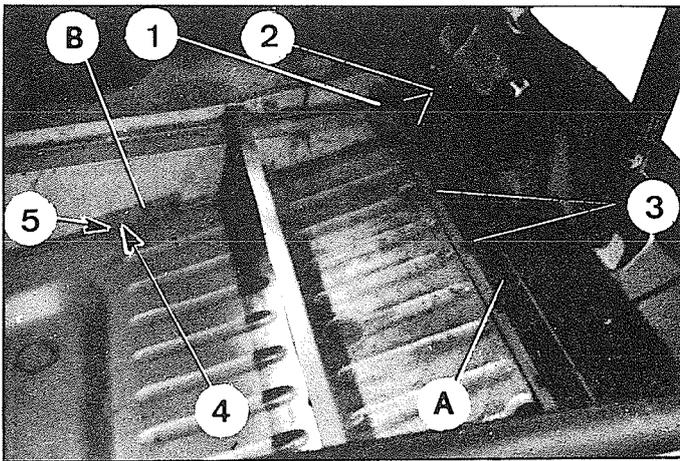
In these two cases, it is necessary to drain, then evacuate the air in the circuit, (to eliminate traces of water) and recharge the circuit with R.12.

### 3. *Adjustments*

Inspect, and adjust, if necessary, the alignment of the pulley and the tension of the belts driving the compressor.

**MOUNTING A TRAILER HITCH**

9302



**1. Prepare the car:**

- a) Place the car on supports and remove the rear wheels.
- b) Remove the fuel tank.
- c) Remove the exhaust pipes.
- d) Remove the lower bumper blade.

**CONSTRUCTION**

**2. Prepare the elements constituting the hitch:**

Execute the detail parts by conforming to the plans of pages 3, 4 and 5.

**3. Assemble the elements:**

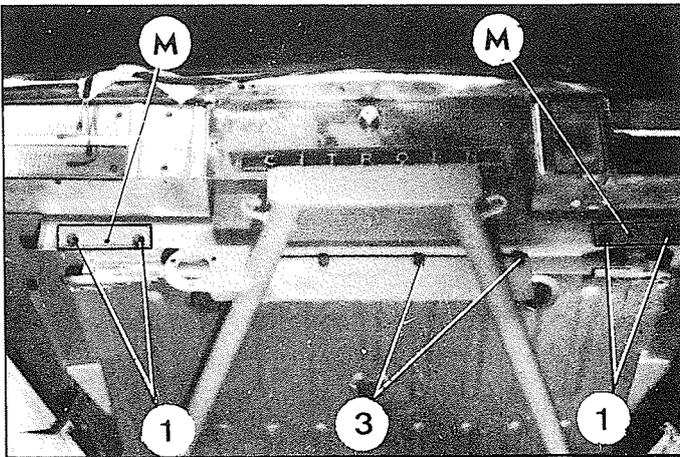
Position and weld the different elements by conforming to the plan of assembly on page 2.

**ASSEMBLY**

**4. Set the reinforcement plate A in place:**

- a) Position the plate against the rear skirt and the side chassis beams. Counterdrill the ten holes for passage of the mounting bolts (2) and (3) on the skirt, and the mounting bolts (1) on the side beams.
- b) Attach the plate A. Mount (contact washer under the nuts):
  - the four bolts (2) interposing (to the outside) the counterplates M,
  - the two mounting bolts (1) on the side beams.

9303



**5. Mount the hitch:**

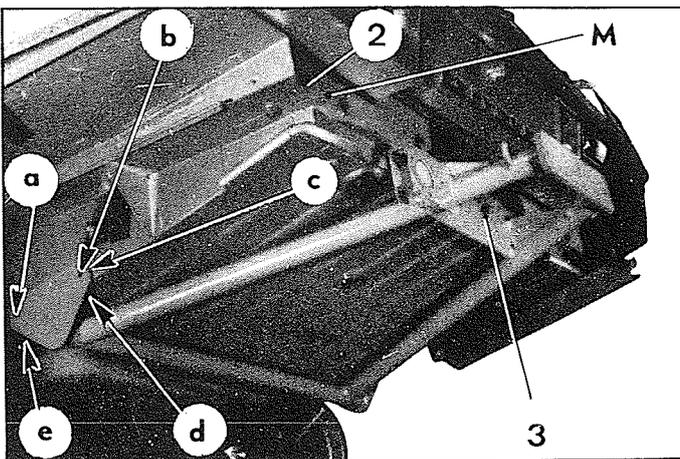
- a) Position the hitch: hold it with the help of the four rear mounting bolts (3).  
**On each side**, counter drill the four holes for passage of the front mounting bolts:
  - in "a" and "b" on the side beams,
  - in "d" and "e" on the bottom of the trunk.
- b) Remove the hitch.
- c) Position the reinforcing angle plates B.  
 Hold them in their positions and counter-drill the holes for passage of the two bolts (5) and the two bolts (4).
- d) Mount the hitch definitely:  
 Place and tighten (contact washer under the nuts):
  - the four bolts (3).
  - the two bolts (4) and the two bolts (5) interposing the angle plates B (from each side).

**NOTE:** Loosen the nuts fastening the rear signal blocks, before tightening the mounting bolts of the hitch on the rear skirt.

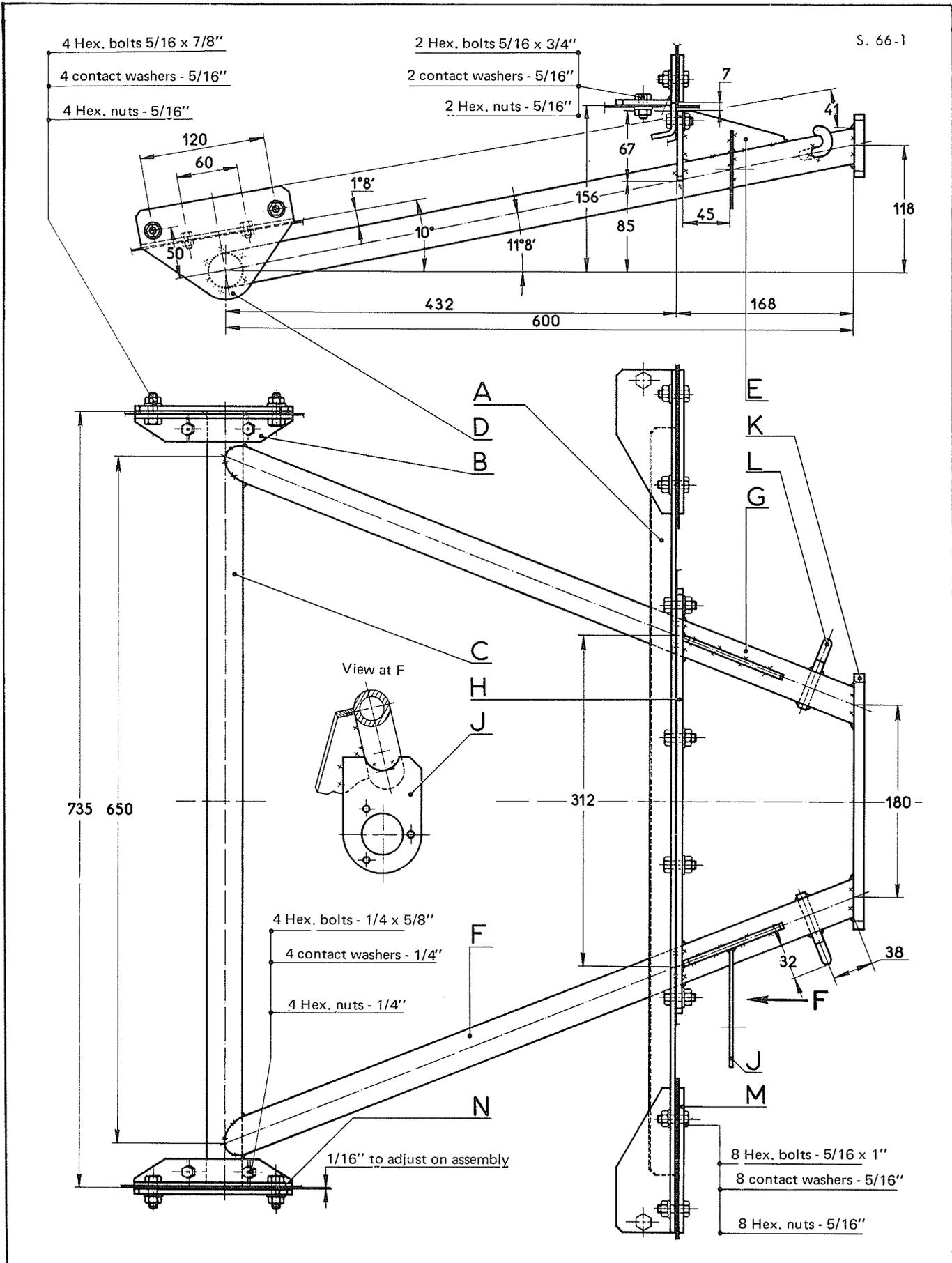
**6. Replace:**

- the lower blade of the bumper.
- the exhaust pipes.
- the fuel tank.
- the rear wheels.

9301



**7. Set the car on the ground.**



"All lengths are in millimeters. Multiply by .03937 to obtain U.S. equivalent in inches."

"To assure correct fitting, adhere to the angles shown in degrees."

S. 66-1

Ref.	Q'ty	Material	Sketch
A	1	1 piece A <sup>1</sup> Thickness of metal = #9 gage  2 pieces A <sup>2</sup> Thickness of metal = #6 gage	
B	2	Thickness of metal = #11 gage	
C	1	Steel tube = 1 x 1 3/8"	
D	2	Thickness of metal = #6 gage	
E	2	Thickness of metal = #6 gage	

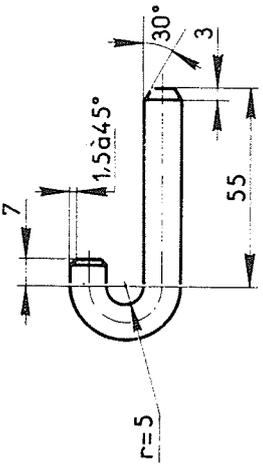
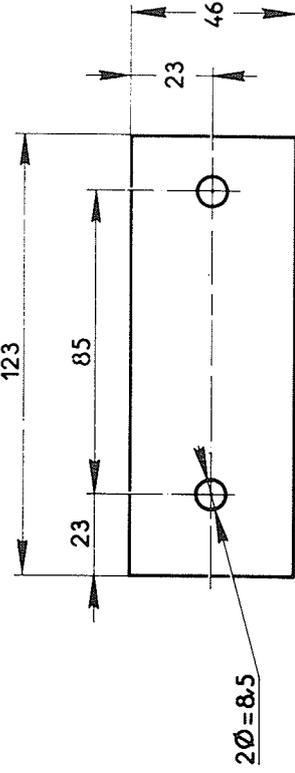
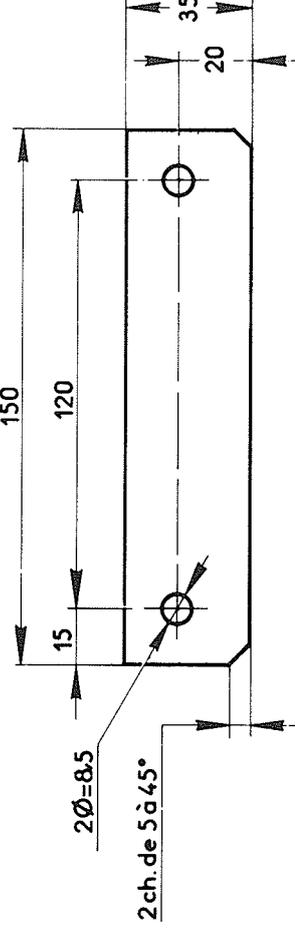
All dimensions are in millimeters. Multiply by .03937 to obtain U.S. equivalent in inches.  
 To assure correct fitting, adhere to the angles shown in degrees.

Ref.	Q'ty	Material	Sketch
F G	1 1	Steel tube = 1 x 1 3/8" Steel tube = 1 x 1 3/8"	<p>F - Left traction tube (according to design) G - Right traction tube (symetric)</p>
H	1	Thickness of metal = #6 gage	
J	1	Thickness of metal = #14 gage	
K	1	Thickness of metal = 3/8"	

All dimensions are in millimeters. Multiply by .03937 to obtain U.S. equivalent in inches.

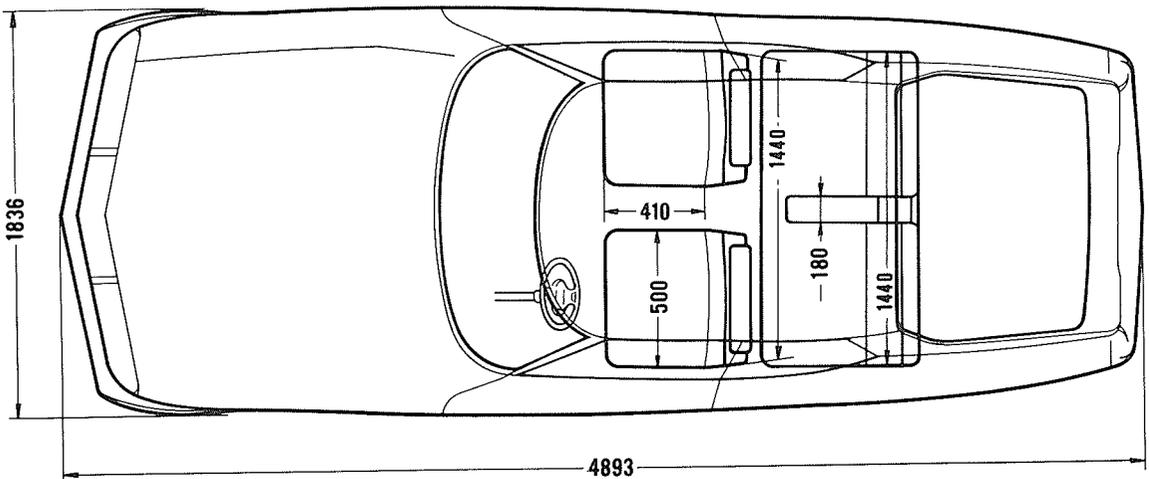
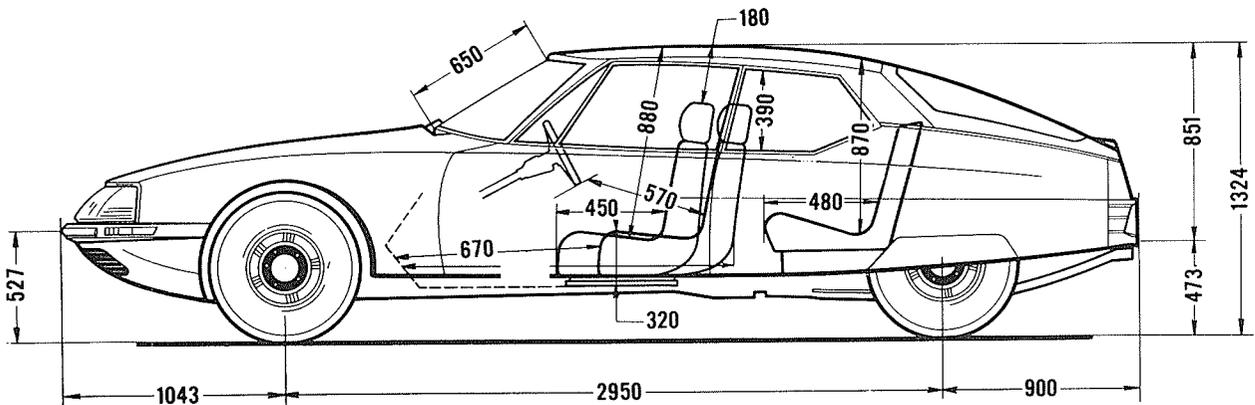
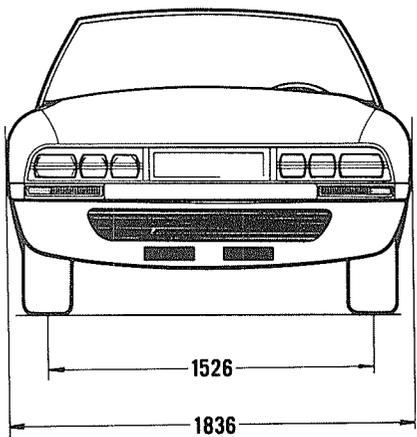
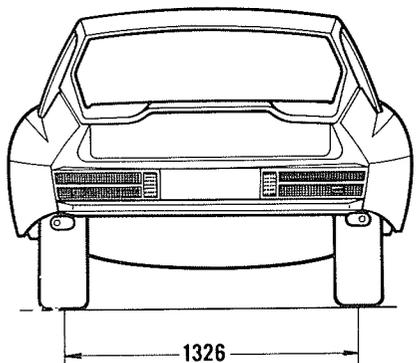
To assure correct fitting, adhere to the angles shown in degrees.

S. 66-1

Ref. Qty.	Material	SKETCH
<b>L</b> 2	3/8" steel rod	
<b>M</b> 2	Thickness of metal = #6 gage	
<b>N</b> 2	Thickness of metal = #16 gage	

INTERIOR AND EXTERIOR DIMENSIONS

19763



"The figures shown represent dimensions in millimeters. Multiply by .03937 to obtain U.S. equivalents in inches."

## ADJUSTMENT OF THE BODY ELEMENTS

8425



- Clearance between the rear fender and the door: ..... 4, 5 ± 2 mm (.177" ± .080")  
     Maximum parallelism tolerance: ..... 1 mm per 500 mm (.040" per 20")
- Clearance between the front fender and the door: ..... 4, 5 ± 2 mm (.177" ± .080")  
     Maximum parallelism tolerance: ..... 1 mm per 500 mm (.040" per 20")
- Clearance between the front fender and the hood: ..... 4, 5 ± 2 mm (.177" ± .080")  
     Maximum parallelism tolerance: ..... 1 mm per 500 mm (.040" per 20")
- Parallelism tolerance between the front fender and the front bumper: ..... 1, 5 mm (.060") maximum
- Clearances between the lower windshield molding and the hood: ..... 4, 5 ± 2 mm (.177" ± .080")  
     Maximum parallelism tolerance: ..... 1 mm per 500 mm (.040" per 20")
- Maximum projection between the door and the front fender  
     (from the front toward the rear): ..... 2 mm (.080")

## ADJUSTMENT OF THE BODY ELEMENTS

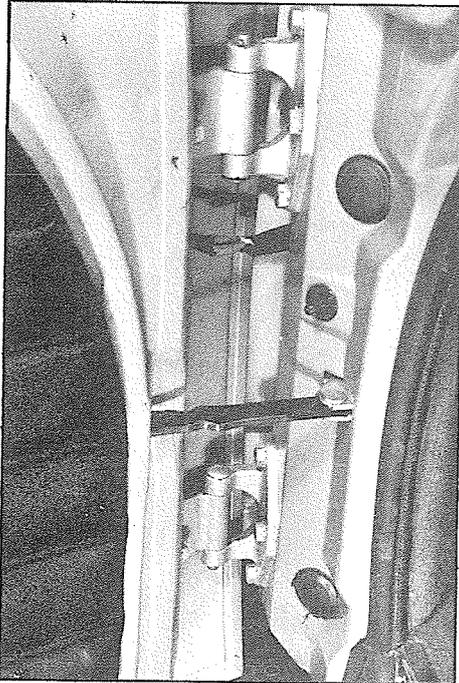
8426



- Clearance between the roof and the trunk lid: .....	$4,5 \begin{smallmatrix} +3 \\ -1 \end{smallmatrix} \text{ mm } (.177'' \begin{smallmatrix} +.118'' \\ -.040'' \end{smallmatrix})$
Maximum parallelism tolerance: .....	$\pm 0,5 \text{ mm } (.020'')$
- Clearance between the quarter panel and the trunk lid: .....	$4,5 \begin{smallmatrix} +3 \\ -1 \end{smallmatrix} \text{ mm } (.177'' \begin{smallmatrix} +.118'' \\ -.040'' \end{smallmatrix})$
Maximum parallelism tolerance: .....	$\pm 0,5 \text{ mm } (.020'')$
- Clearance between the rear fender and the trunk lid: .....	$11 \begin{smallmatrix} +3 \\ -1 \end{smallmatrix} \text{ mm } (.433'' \begin{smallmatrix} +.118'' \\ -.040'' \end{smallmatrix})$
Maximum parallelism tolerance: .....	$\pm 0,5 \text{ mm } (.020'')$
- Clearance between the rear bumper and the trunk lid: .....	$7,5 \begin{smallmatrix} +3 \\ -1 \end{smallmatrix} \text{ mm } (.295'' \begin{smallmatrix} +.118'' \\ -.040'' \end{smallmatrix})$
- Side clearance between the bumper and the trunk lid: .....	$7,5 \begin{smallmatrix} +3 \\ -1 \end{smallmatrix} \text{ mm } (.295'' \begin{smallmatrix} +.118'' \\ -.040'' \end{smallmatrix})$
Maximum parallelism tolerance: .....	$\pm 0,5 \text{ mm } (.020'')$
- Clearance between the rear wheel skirt and the rear fender: .....	$3,4 \begin{smallmatrix} +1 \\ -0 \end{smallmatrix} \text{ mm } (.133'' \begin{smallmatrix} +.040'' \\ -0 \end{smallmatrix})$
- Maximum projection between the rear fender and the door (from the front toward the rear): .....	$2 \text{ mm } (.080'')$

## ADJUSTMENT OF A SIDE DOOR

8487



1. Loosen the screws fastening the striker plate.

2. *Adjust the door longitudinally*

Loosen the screws fastening the hinges on the front door post.

Move the door hinge (forward or rearward) to obtain a clearance of 2 mm (.080") between the counter-plate of the striker and the plate of the lock housing.

Obtain this adjustment by maintaining a constant clearance of  $4, 5 \pm 2$  mm (.177"  $\pm$  .080") between the door and the front and rear fenders. If not, place adjusting shims under the striker and repeat the adjustment.

3. *Adjust the door laterally:*

Loosen the screws fastening the hinges on the door.

Move the door laterally to obtain a projection in relation to the front fender, of less than 2 mm (.080").

*The door should not be adjusted in such a manner that its front edge will be further in than the fenders.*

4. *Adjustment of the height of the door:*

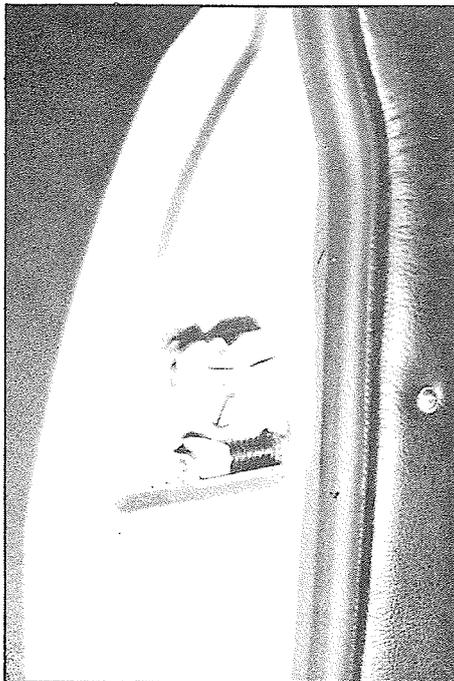
The adjustment of the height of the door can be obtained:

- Either by loosening the hinge on the front door post,
- or by loosening the hinge on the door.

5. *Check the continuity of the "line of sight."*

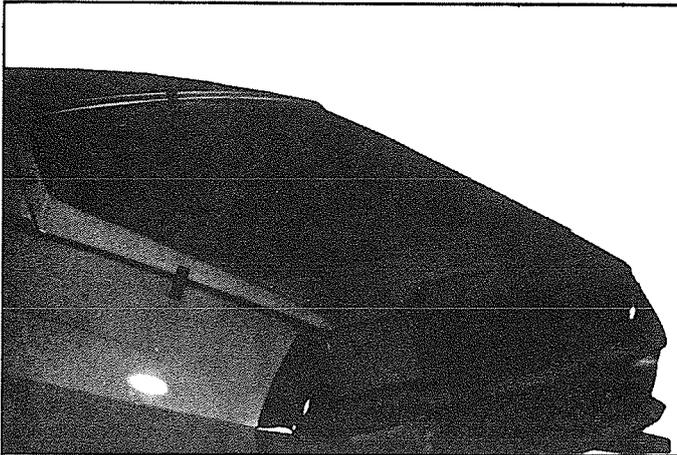
6. Tighten the screws after adjustment.

8797



## ADJUSTMENT OF A TRUNK DOOR

8426



## ALIGNMENT

## 1. Adjustment of the height:

Loosen the mounting screws (1) of the hinge on the upper cross frame of the trunk lid.

Slide the hinge up or down so as to obtain a projection comprised between + 1 mm and - 3 mm. (+ .040" and -.118").

## 2. Lateral and longitudinal adjustment:

Loosen the mounting screws (2) of the hinge on the trunk lid. Slide the lid so as to obtain a projection equally divided on the two sides, and comprised between: +0,5 mm and -3 mm (+.020" and -.118").

- The clearance between the rear fender and the trunk lid should be  $11 \begin{smallmatrix} +3 \\ -1 \end{smallmatrix}$  mm (.433"  $\begin{smallmatrix} +.118 \\ -.040 \end{smallmatrix}$ "), with a parallelism tolerance of 1 mm (.040") per 500 mm (20").

- The clearance between the rear bumper and the trunk lid should be  $7,5 \pm 3$  mm (.295"  $\pm .118$ "), with a parallelism tolerance of 1 mm (.040") per 500 mm (20").

## LOCKING

## 3. Adjustment of the trunk lock:

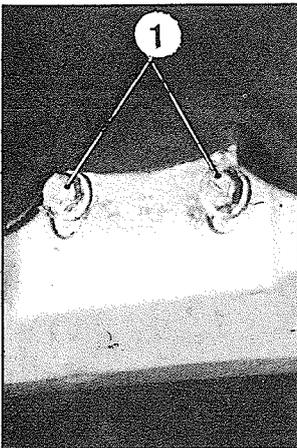
Adjust the height of the lock by loosening the 4 mounting screws (3), (two on each side). Be sure the striker on the trunk lid engages in the lock. If necessary, adjust by loosening the screws (4).

Turn the adjustment screw (5), of the lock push button, in or out to adjust the correct releasing of the latch.

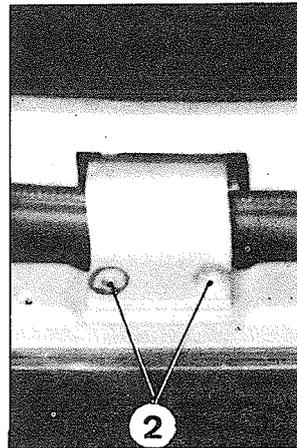
The adjustment is correct if, after raising the lid approximately 200 mm (8") and then pushing it down with a slight effort, it locks normally.

## 4. Lock the bolts after adjustment.

8785



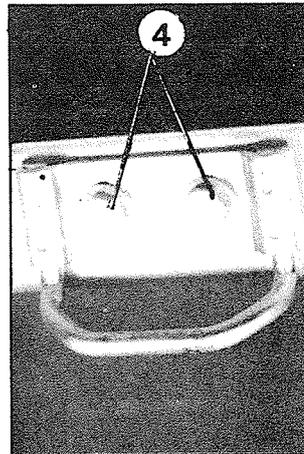
8784



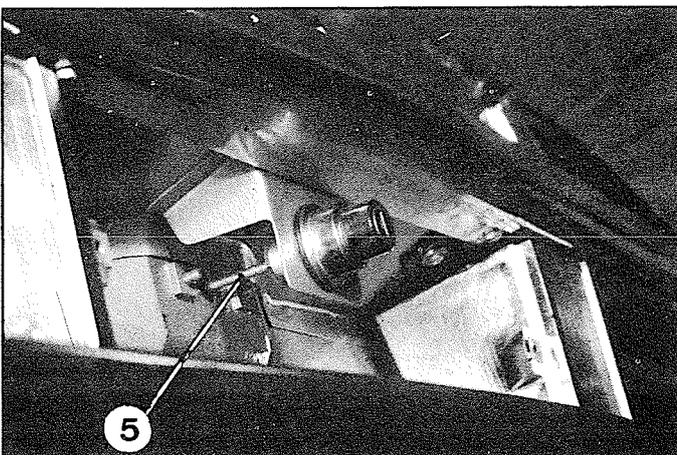
8799



8786

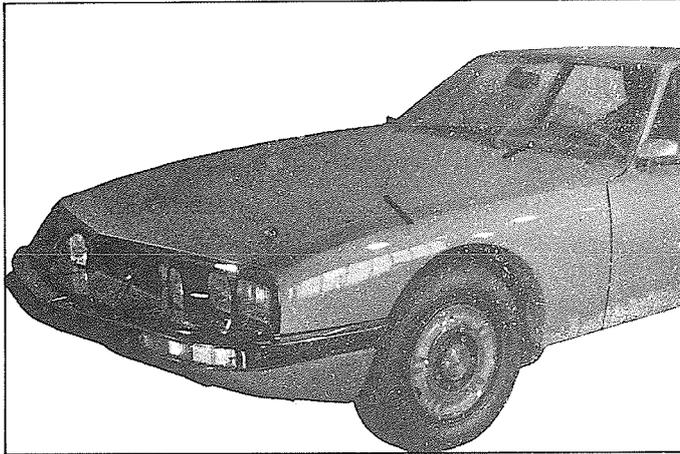


8804



## ADJUSTMENT OF THE HOOD

8425



## ALIGNMENT

## 1. Adjustment for height:

Loosen the mounting screws (1) and (2) of each hinge on the lower cross support of the windshiled. The height of the hood in relation to the upper edge of the fender should be between  $\frac{+0,5}{-3}$  mm ( $\frac{+.020}{-.118}$ ").

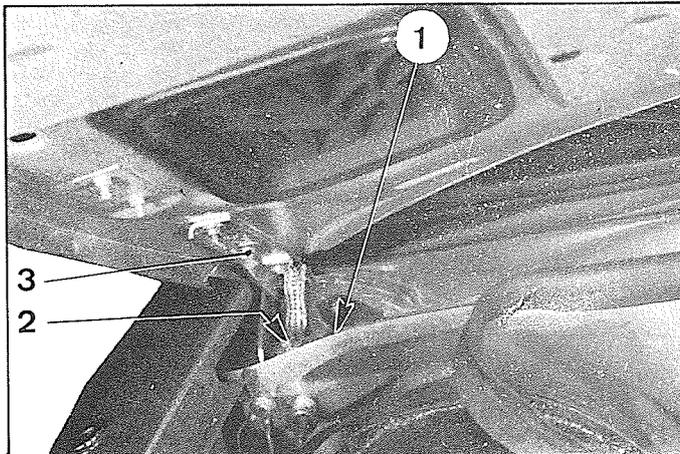
If necessary, insert adjustment shims between the hinges and the cross support to obtain this condition.

## 2. Longitudinal and transverse adjustment:

Loosen the three screws (3) mounting the hood on the hinge. Move the hood left to right, or front to rear, to obtain:

- a) A clearance of  $4,5 \pm 2$  mm (.177"  $\pm$  .080"), between the lower support of the windshield and the hood, with a maximum parallelism tolerance of 1 mm (.040") per 500 mm (20").
- b) A clearance of  $4,5 \pm 2$  mm (.117"  $\pm$  .080") between the front fender and the hood, equally divided on each side, with a maximum parallelism tolerance of 1 mm (.040") per 500 mm (20").

8507



## LOCKING

## 3. Adjustment of the locking of the hood:

Adjust the height of the hood locks by loosening their supports.

Be sure the strikers (4), on the hood, properly engage the locks.

Adjust, if necessary.

Adjust the control for opening the hood.

Hood opened, locks and pull cables at rest against their stops, cables tensioned to the maximum without pulling the locks; slacken the control cable to obtain a clearance of 0,5 mm (.020") to 1,5 mm (.060") between the stop plate (5) and the end of the cable housing, then slacken the transverse cable of the left to right locks to obtain a clearance of 0,1 to 1 mm (.004" to .040").

*By dropping it from a height of 250 mm (10"), the hood should be completely closed and the locks returned to their position of rest.*

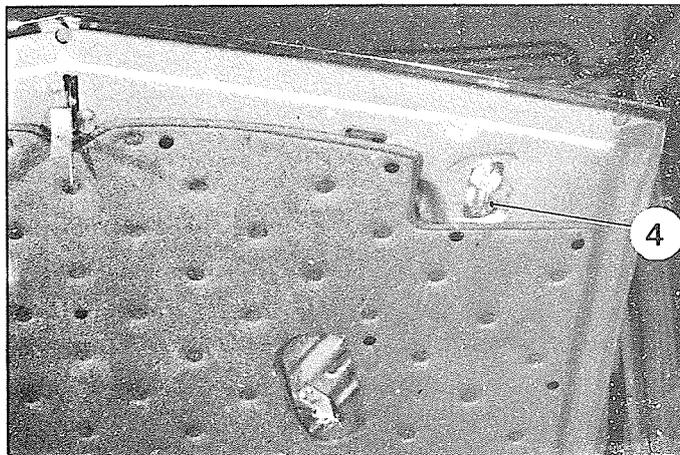
## 4. Adjustment of the hood safety latch:

Loosen the mounting screws of the latch and adjust the "holding" guaranty so as to obtain a clearance of 0,1 mm (.004") to 1 mm (.040") between the latch and its seat in the cross plate of the lights.

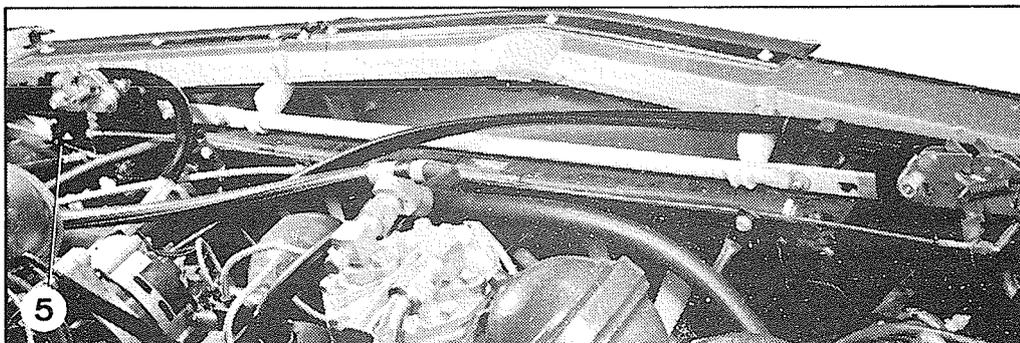
*The hood resting on the safety hook, the latch should clinch by the weight of the hood alone.*

## 5. Lock the adjusting screws.

8888



8615

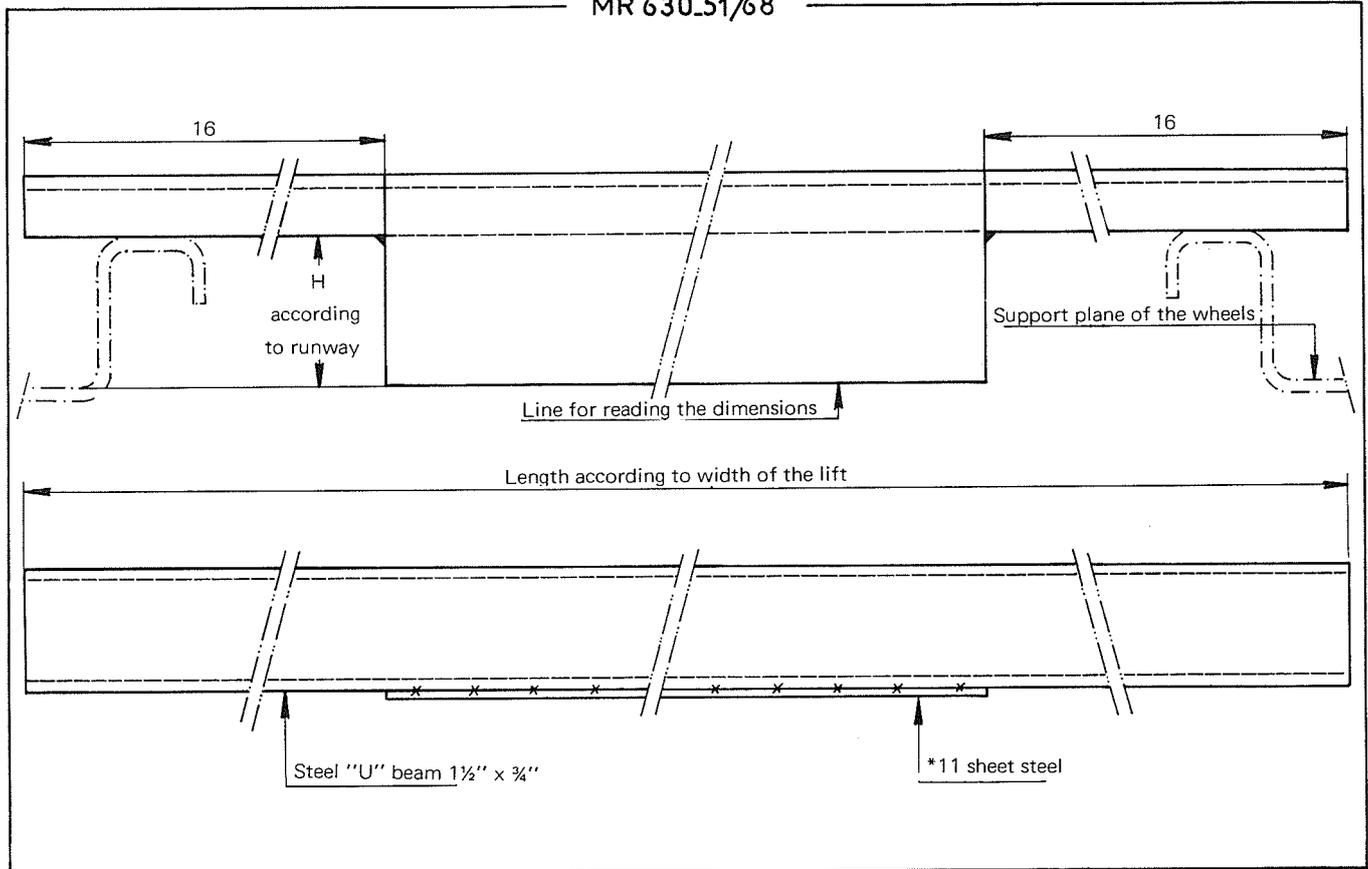


*LIST OF SPECIAL TOOLS APPEARING IN THE REPAIR MANUAL No. 581-1*

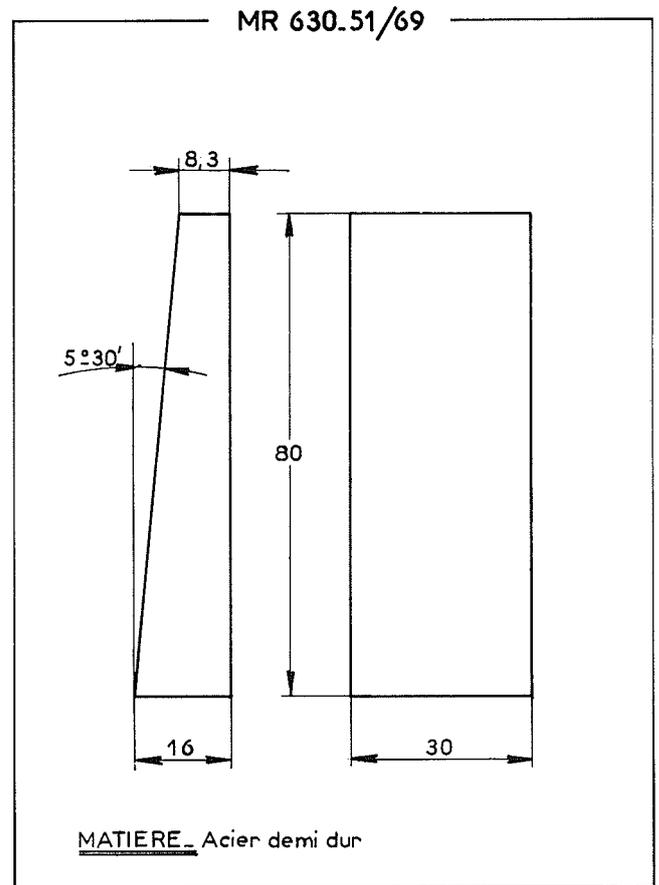
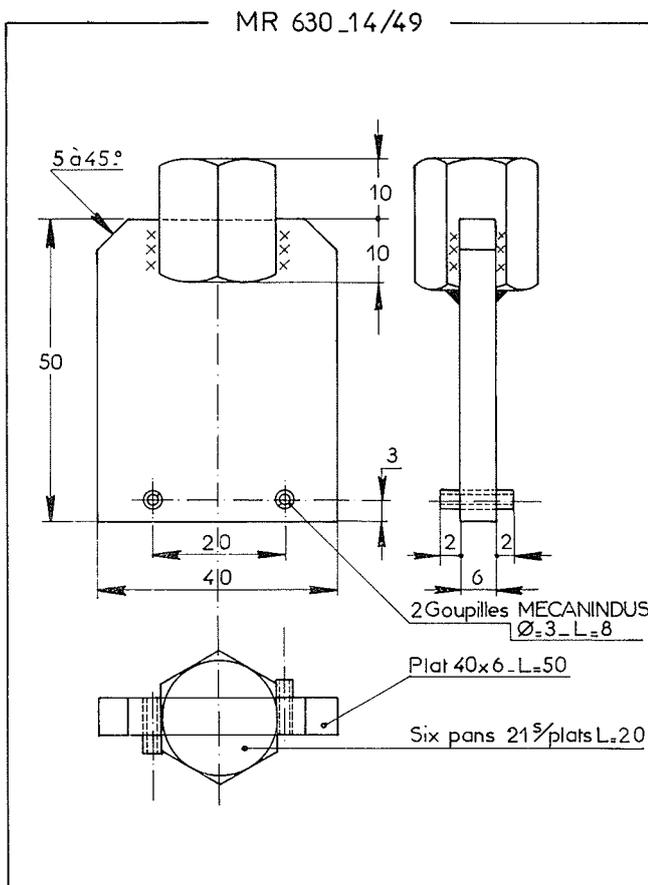
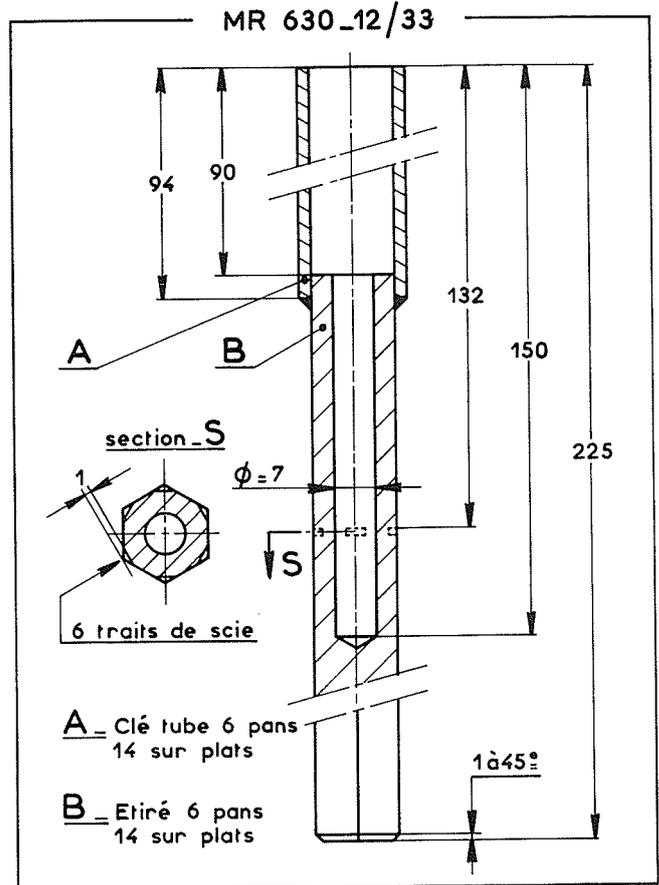
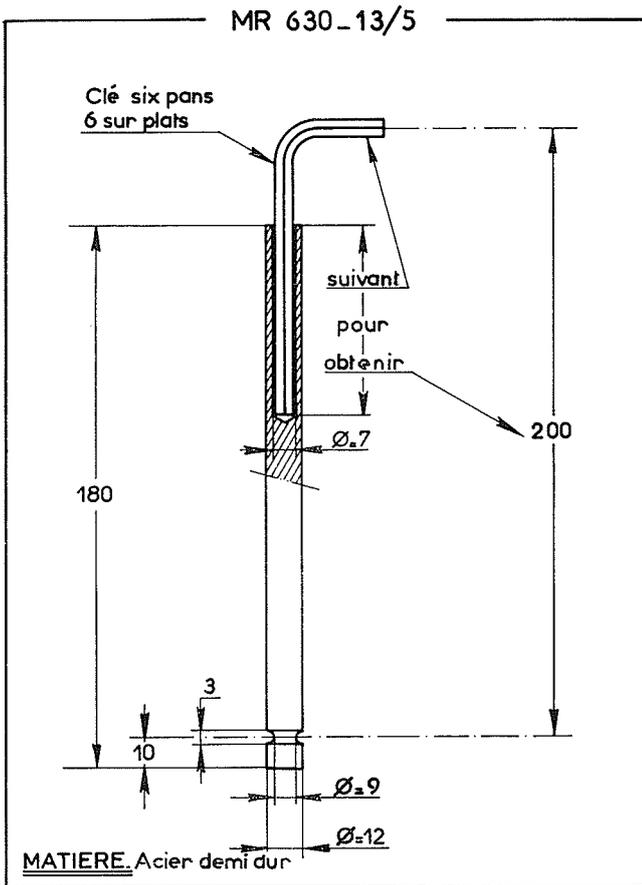
DESIGNATION	M.R. NUMBER	REFERENCE OF THE TOOL SOLD	OBSERVATIONS
<b>MOTOR</b>			
Wrench for tensioning the timing chains .....	MR 630-13/5	1682-T 3185-T	Del'd, also with 3185-T
Dial indicator support for checking TDC. ....			
Set of tools for work on the timing. ....			
Wrench for removing the oil filter (cartridge) .....	MR 630-14/49	1688-T 3085-T	GATES No. 150
Connection for taking the oil pressure .....	MR 630-56/11		
Wrench for removing the plug of the discharge valve. ....	MR 630-12/33		
Apparatus for checking the tension of the belts .....			
Apparatus for checking the alignment of the pulleys. ....			
<b>CLUTCHING – GEAR BOX</b>			
Apparatus for checking the clutch mechanism .....	MR 630-55/9		
<b>FRONT AXLE</b>			
Tool for checking camber .....		2311-T	
Tool for checking caster .....		2321-T	
<b>REAR AXLE</b>			
Tool for checking camber .....		2311-T	
<b>SUSPENSION</b>			
Gauge for checking the heights .....	MR 630-51/68	1677-T	
Wrench for bolts with half flat heads. ....			
<b>STEERING</b>			
Gauge for adjustment of the angular position of the steering unit .....	MR 630-51/69	3654-T	
Hydraulic test bench (for L.H.M.) .....			

PLANS FOR MAKING THE TOOLS NOT SOLD

MR 630.51/68

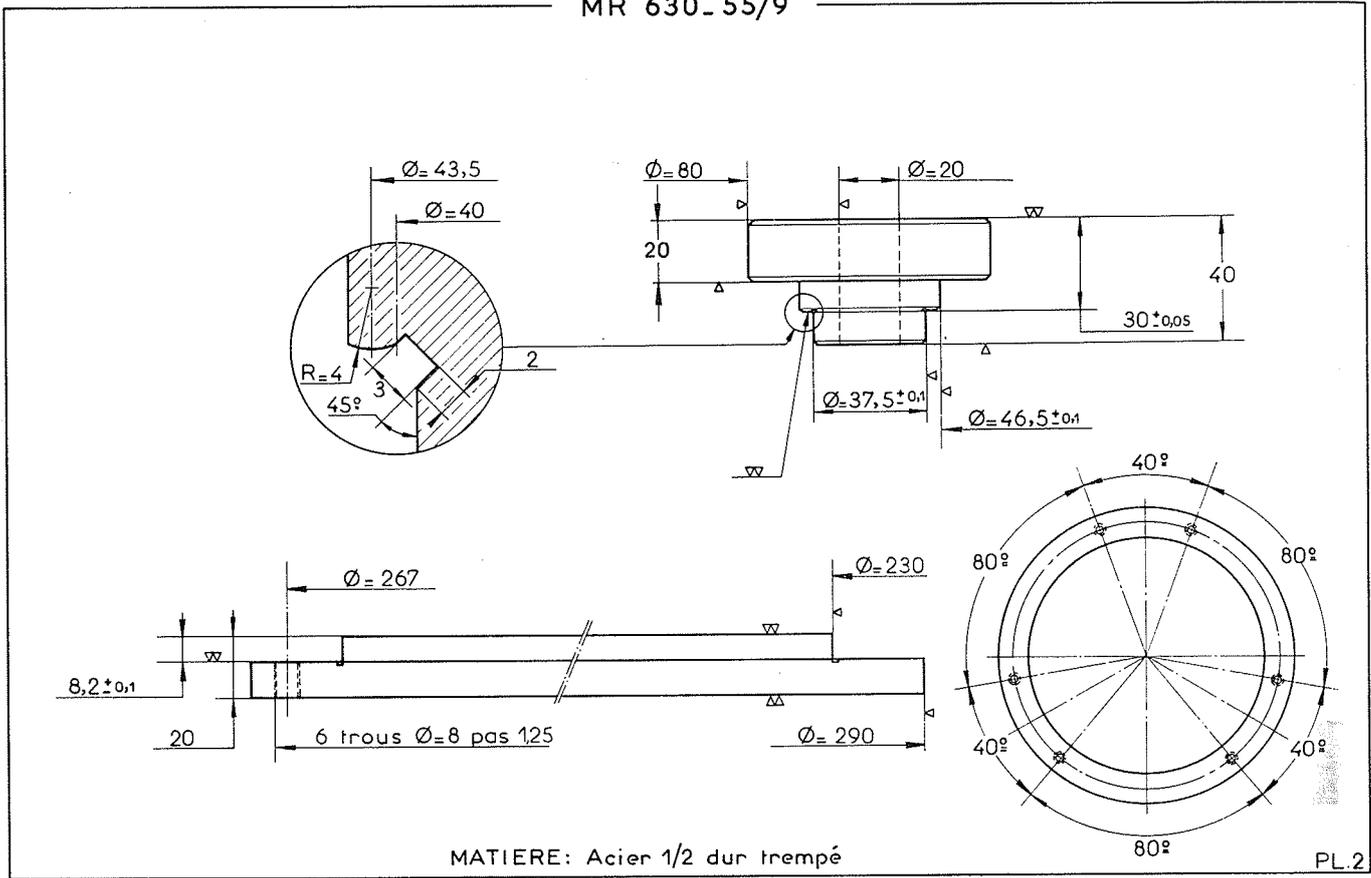


PLANS FOR MAKING THE TOOLS NOT SOLD

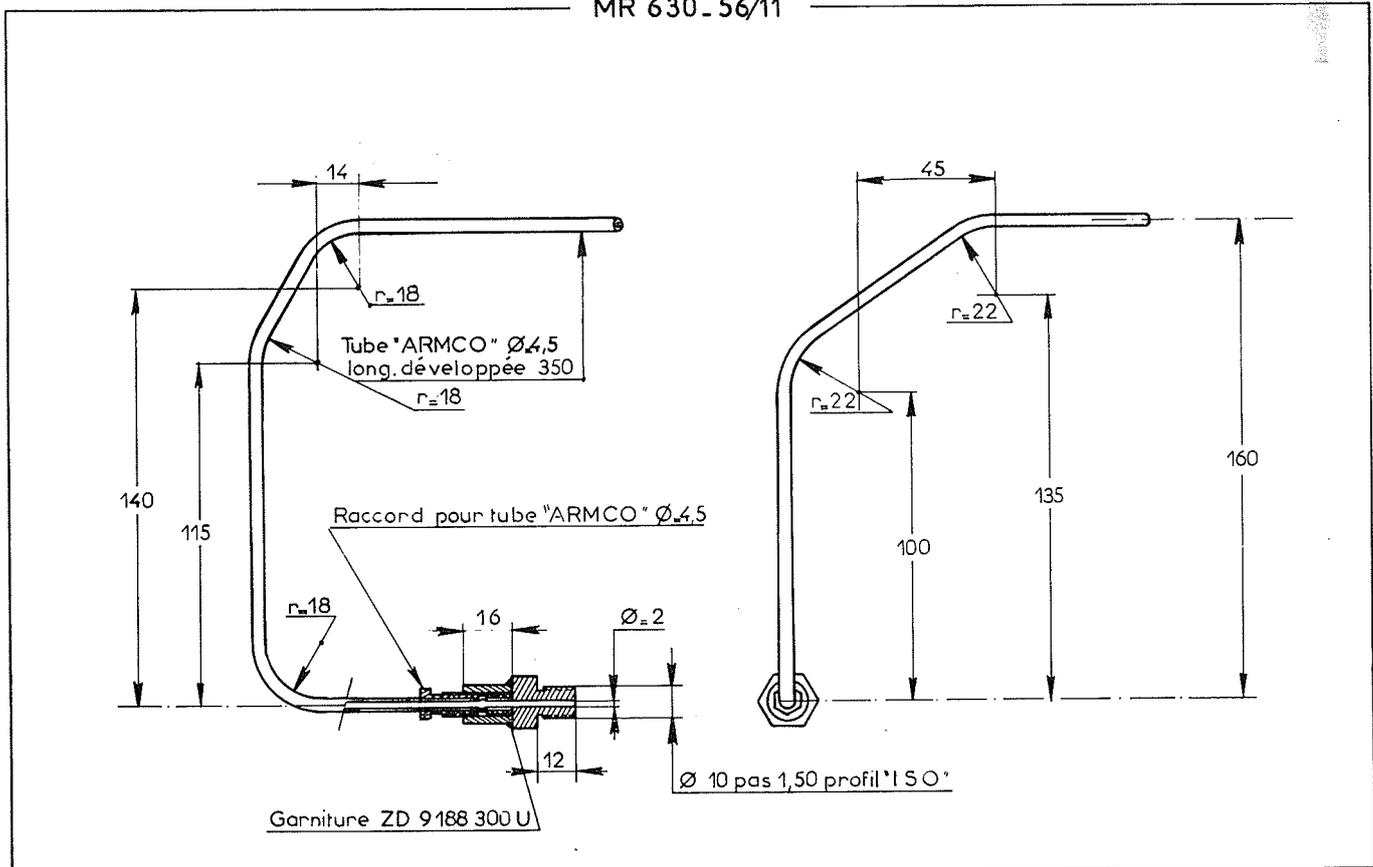


PLANS FOR MAKING THE TOOLS NOT SOLD

MR 630\_55/9



MR 630\_56/11



All dimensions are in millimeters.  
Multiply by .03937 to obtain U.S. equivalent in inches.