FIAT SERVICE DEPARTMENT

1600S CABRIOLET

MAIN SPECIFICATIONS AND FEATURES
ASSEMBLY DATA
AND SERVICING INSTRUCTIONS

Fig. 1. - The "1600 S Cabriolet".

MAIN SPECIFICATIONS

Engine

Fiat, type 118 A.000, 4-stroke, gasoline-fed.

GENERAL DATA

Number of cylinders, in line	4
Bore and stroke	80 x 78 mm (3.15" x 3.07")
Total piston displacement	1568 cc
Maximum power (on bench, run in, less fan and silencer, at sea level) at 6000 RPM	90 HP
Compression ratio	8,6 to 1
Maximum torque (on bench, run in, less fan and silencer, at sea level) at 4000 RPM	1210 kgcm (87.5 ft.lbs)

Aluminium cylinder head with valve seat inserts; hemispherical combustion chamber.

Crankshaft on five supports, counterweighted.

Valve gear: inclined O.H.V. controlled by two overhead camshafts, one for intake and one for exhaust valves. Twin, double-chain drive.

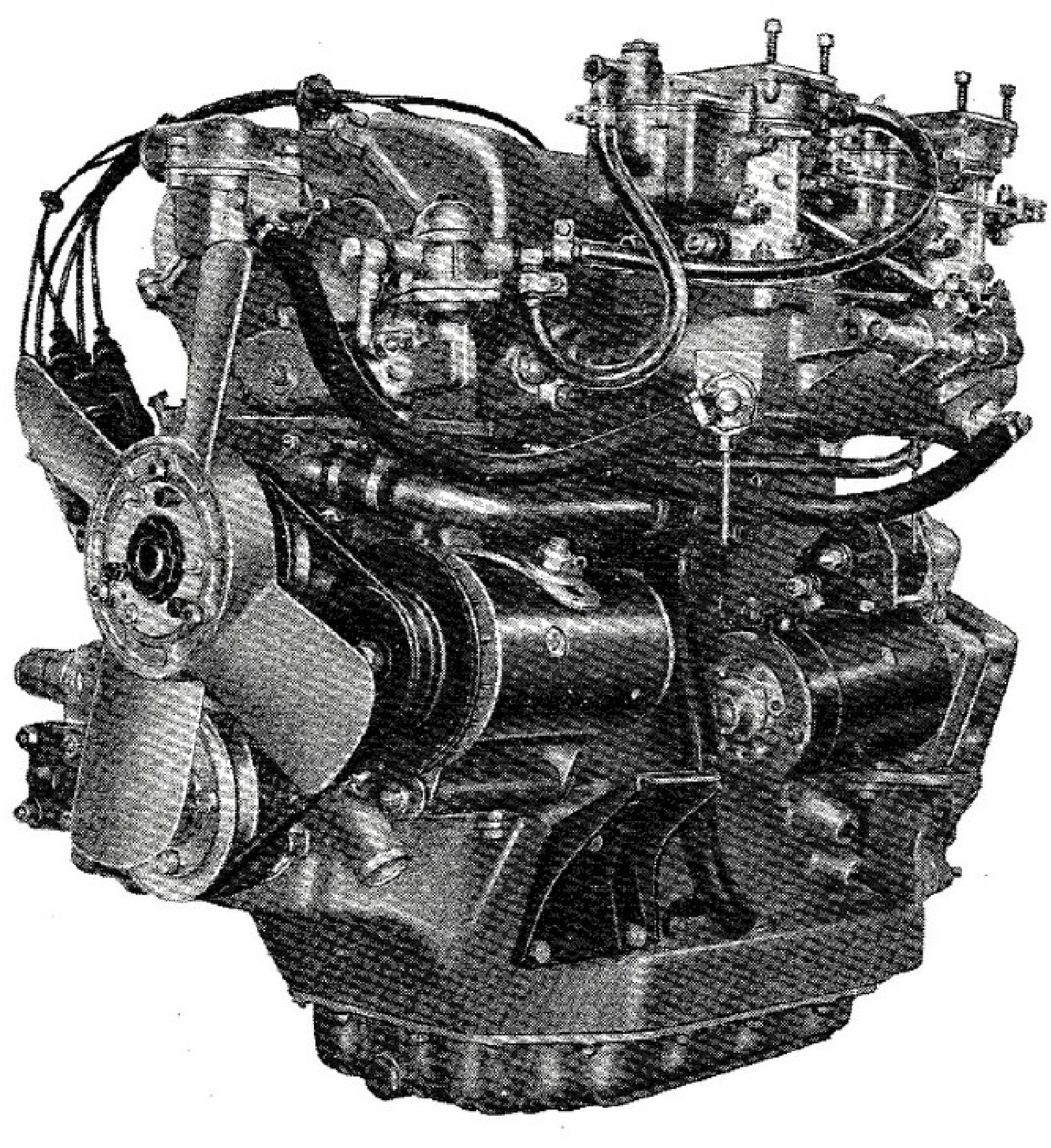


Fig. 2.

Engine type 118 A.000 - Front three-quarter view from intake side.

TIMING DATA

Intake (with 0,30 mm - .012" - tappet clearance:

opens	28° **B.T.D.C.**
closes	64° **A.B.D.C.**

Exhaust (with 0,35 mm - .014" - tappet clearance):

opens	63° **B.B.D.C.**
closes	23° **A.T.D.C.**

Final tappet operation clearance adjustment, cold engine:

intake	**0,30 mm (.012")**
exhaust	**0,35 mm (.014")**

Intake valve seat diameter		**34,5 mm (1.358")**
Exhaust valve seat diameter		**30 mm (1.181")**
Valve lift	**intake**	**8,55 mm (.337")**
	exhaust	**8,10 mm (.319")**

Carburetor: Two, dual-barrel Weber 28/36 DCD 12 and 28/36 DCD 13, downdraft, with starting device (choke). Pleated paper cartridge air cleaner and intake silencer.

CARBURETOR DATA

	Primary throat mm	Secondary throat mm
Barrel diameter	**28**	**36**
Primary Venturi diameter	**19**	**24**
Main jets	**0,90**	**1,20**
Idling speed jet diameter	**0,40**	**0,80**
Main air jet diameter	**2,30**	**1,85**
Starting jet	**0,80 F 1**	
Accelerating pump jet diameter	**0,40**	
Needle seat	**1,75**	
Drain diameter (accelerating pump)	**0,45**	
Wells	**F 33**	**F 25**

Carburetor feed: by series-connected mechanical diaphragm pump and electric pump.

Lubrication: forced, by chain driven gear pump. Centrifugal oil filter and paper cartridge by-pass filter. Pressure relief valve in the delivery line.

Lubrication pressure, gauge reading . . 6 kg/cm² (85.3 p.s.i.)

Cooling: water circulated by centrifugal pump. Thermostat. Electromagnetic fan, thermostatically controlled.

Capacity of cooling system (radiator, pump, jackets and lines) . . . . 6 liters (6.3 U.S. qts - 5.3 G.B. qts)

Ignition: by battery, coil and shaft-driven Marelli 4/70-12 V var. 9 distributor. Automatic advance.

IGNITION DATA

Firing order	**1-3-4-2**
Static advance	**0° ± 1°**
Automatic advance (on engine)	**33° ± 2°**
Coil: Marelli 12 V, Var. 5.	
Spark plugs (long-reach: M 14-19)	**Champion N 9 Y.**

Starting: electric starter motor engaged by electromagnet.

Power plant suspension on rubber pads.

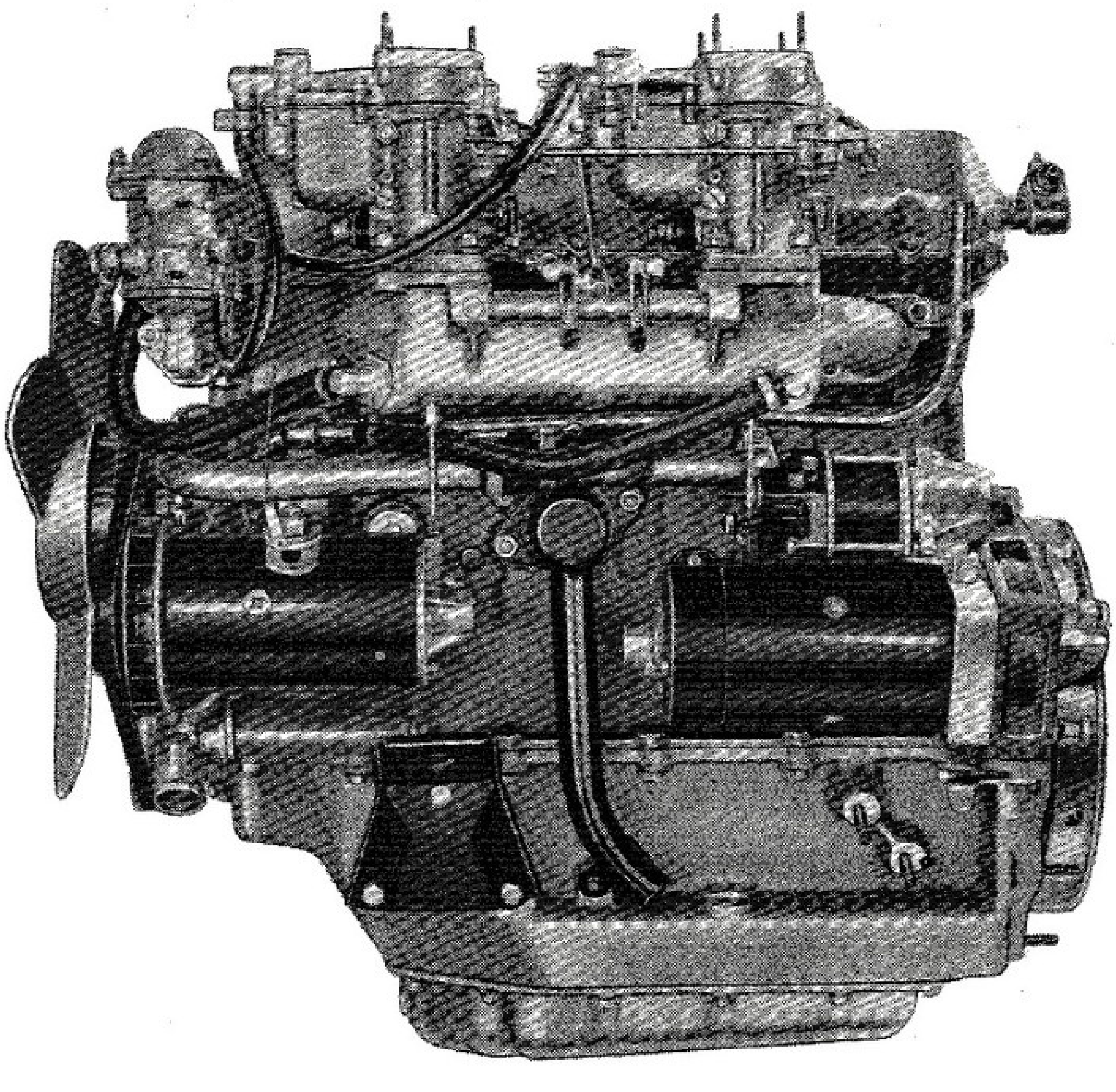


Fig. 3.

Engine - Viewed from carburetors, generator and starter side.

Running gear

Integral construction body.

Front suspension: by swinging arms, coil springs and double-acting, telescopic, oleo-pneumatic shock absorbers with progressive-action compression valve.
Stabilizer bar.

Rear suspension: by leaf springs and double-acting, telescopic, oleo-pneumatic shock absorbers with progressive-action compression valve.
Stabilizer bar.

Ratios:

— 1st gear	3.086:1
— 2nd gear	1.977:1
— 3rd gear	1.380:1
— 4th gear	1 :1
— Reverse	3.086:1

Propeller shaft: in two sections with intermediate pillow block; needle universal joints (central and rear) and rubber flexible joint (front).

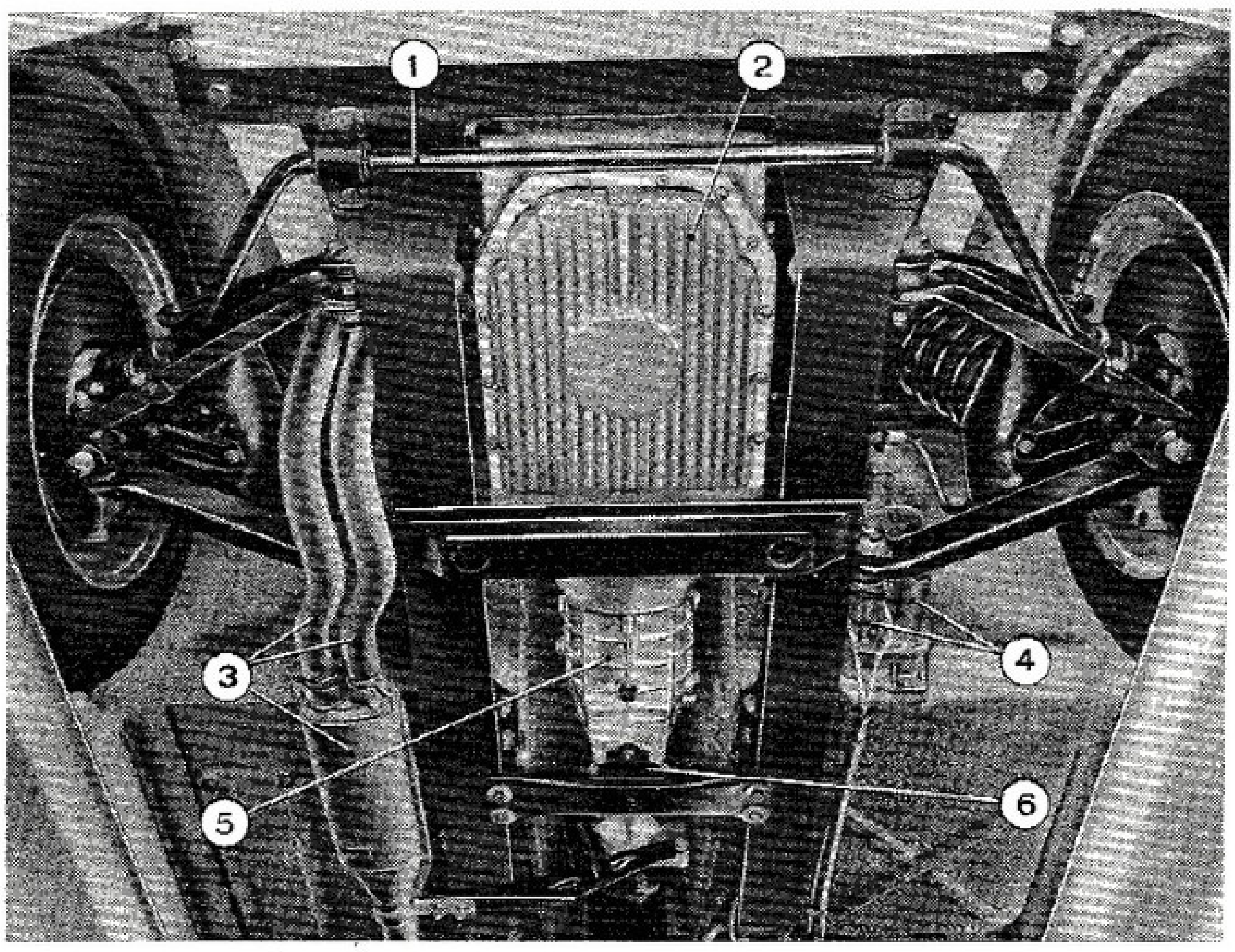


Fig. 4.

Car front and bottom view.
1. Stabilizer bar - 2. Oil sump - 3. Front exhaust pipe and silencer - 4. Brake and clutch master cylinders - 5. Transmission - 6. Power plant rear support.

Steering linkage: by symmetric and independent track rods to each wheel. Central relay lever.

Steering gear: worm screw and roller.

Steering wheel position: LHD (RHD optional).

Radiator: upright-pipe type, ahead of engine.

Clutch: single plate, spring cushioned, working dry.

Transmission: 4 speeds forward and reverse. Constant mesh second and third speed gears. Synchronized (by free ring) second, third and fourth gears.
Gear shifting by hand lever on floor, between front seats. Aluminum transmission casing.

Rear axle: of pressed sheet steel. Hypoid final drive with 10-to-43 ratio. Cast iron differential carrier.

Service brakes: disc type, front and rear.

— Front and rear disc diameter	270 mm (10.63")
— Master cylinder diameter	7/8"
— Dia. of the two front outboard caliper cylinders	38,195 mm (1.5037")
— Dia. of the front inboard caliper cylinder	54 mm (2.1260")
— Dia. of the two rear outboard caliper cylinders	30,251 mm (1.1910")
— Dia. of the rear inboard caliper cylinder	42,874 mm (1.6879")

— Pressure regulator in rear brake hydraulic circuit.

Parking brake: operating mechanically by separate pads on rear brake discs.

Wheels: disc type, with rims 4½ J x 15".

Tires: 155 x 15" (radial ply type).

Inflation pressure (front and rear):

— for moderate speeds . . . 1,7 kg/cm² (24.2 p.s.i.)
— for high speeds . . . . . 1,9 kg/cm² (27 p.s.i.)

Fuel tank: at rear underneath body bottom. Capacity 45 liters (12 U.S. Gals - 10 G.B. Gals).

Ventilation and heating equipment. Interior heating and windshield demisting by air intake on cowl; fan on air distributing unit; heater radiator of the horizontal type on the engine cooling system circuit.

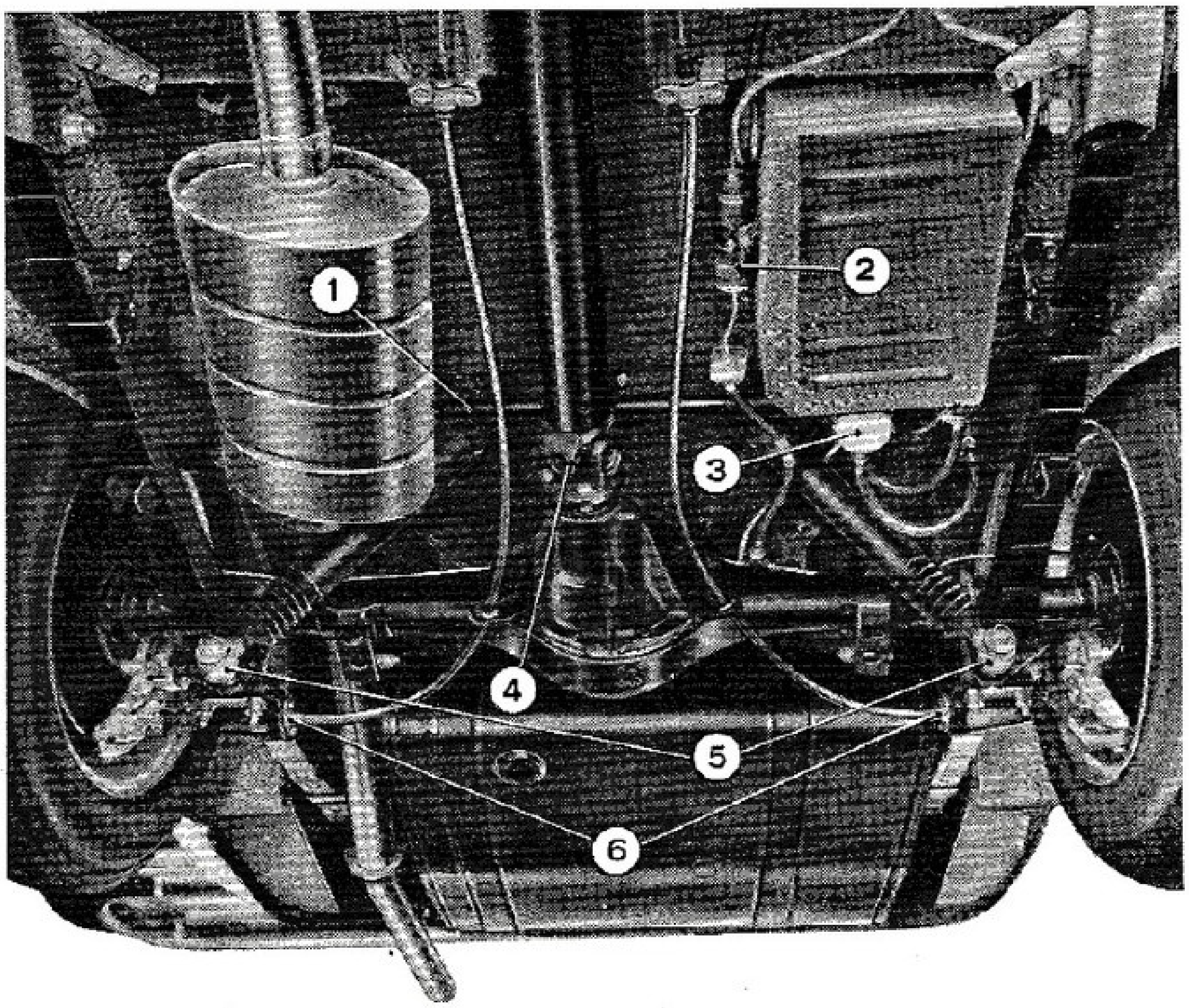


Fig. 5.
Car bottom rear view.

1. Stabilizer bar - 2. Rear brake circuit pressure regulator - 3. Electric fuel pump - 4. Universal joint - 5. Shock absorber mounts - 6. Parking brake controls.

Electric system

Voltage: 12 volts.

Generator: 230 Watts, belt driven.

Regulating unit: including voltage regulator, current regulator and cutout.

Starter: controlled by lock switch through relay switch. Overrunning clutch type pinion.

Ignition: by battery, coil and distributor.

Battery: 48 Amp/hr.

Lighting:

— Headlamps (high and low beams) sunk in fenders. Asymmetric low beams.
— Engine compartment lamps (two).
— Front direction indicator and parking lamps.
— Direction indicator side repeaters.
— Two-bulb number plate lamp.
— Two rear parking, direction indicator and stop lamps, with reflex reflector.
— Luggage compartment light.
— Dash light.

Turn signalling: flashing, controlled by lever self-cancelling switch under steering wheel.

Headlamp flashing and change-over switch: lever type, under steering wheel.

Windshield wiper, electrical, twin bladed, with automatic blade parking.

Two tuned horns, with control button on steering wheel hub.

Sending unit for fuel gauge with reserve indicator. The unit incorporates the fuel suction pipe and strainer.

Rear view mirror with anti-glare device.

Electrofan, for heating, demisting and defrosting.

Receptacle for inspection lamp.

Instruments and accessories on panel: windshield washer; lock switch; instrument cluster light switch; windshield wiper switch; direction indicator pilot light (green); parking light indicator (green); headlamp indicator (blue); outer lighting switch; electrofan switch; speedometer, with mileage totalizer and trip recorder, including fuel gauge with reserve indicator, and generator charge indicator; revolution counter including oil gauge and heat indicator; cigarette lighter and ash tray; electric clock.

Dimensions

Wheelbase	2340 mm (91.2")
Front track	1242 mm (49.6")
Rear track	1215 mm (47.8")
Ground clearance (laden)	120 mm (4.72")
Minimum turning circle diameter	10,50 m (34½ ft)
Overall length (bumpers included)	4030 mm (158.7")
Overall width	1520 mm (59.8")
Height (unladen)	1300 mm (51.2")
Front overhang	730 mm (28.7")
Rear overhang	960 mm (37.8")

Weights

Car weight, as sold in Italy (with spare wheel, tools and accessories)	985 kg (1,995 lbs)
Curb weight	1025 kg (2,260 lbs)
Useful load	2 persons + 50 kg (100 lbs)
Gross weight (incl. 2 persons)	1215 kg (2680 lbs)
Gross weight load distribution:	
— on front axle	615 kg (1357 lbs)
— on rear axle	600 kg (1323 lbs)

Performances

Maximum **speeds**, with fully laden car, on level, well kept road, with run-in engine:

	km/h	m.p.h.
— 1st gear	50	31
— 2nd gear	80	50
— 3rd gear	115	71
— 4th gear	175	108
— Reverse	50	31

Climbable **gradients**, with fully laden car, on well kept road, with run-in engine:

— 1st gear	42 %
— 2nd gear	24 %
— 3rd gear	15 %
— 4th gear	10,5 %
— Reverse	42 %

Body

Integral construction, two-seater cabriolet.

Front air intakes: one on cowl, with grille, for interior ventilation and one on hood, for carburetors.

Hood: front hinged with latch control inside car.

Windshield: fixed, with curved, laminated safety glass.

Doors: front hinged. Windows with fixed front pane and drop type rear pane.

Side arm rests: fixed on door inner panels.

Adjustable bucket seats: with tiltable squabs.

Central arm: with utility recess.

Matting: of rubber-and-moquette on front floor and of rubber on luggage compartment floor.

Heater: under instrument panel, centrally arranged.

Instrument panel: of pressed sheet metal, with painted and chromium plated garnish trims; padded lower portion.

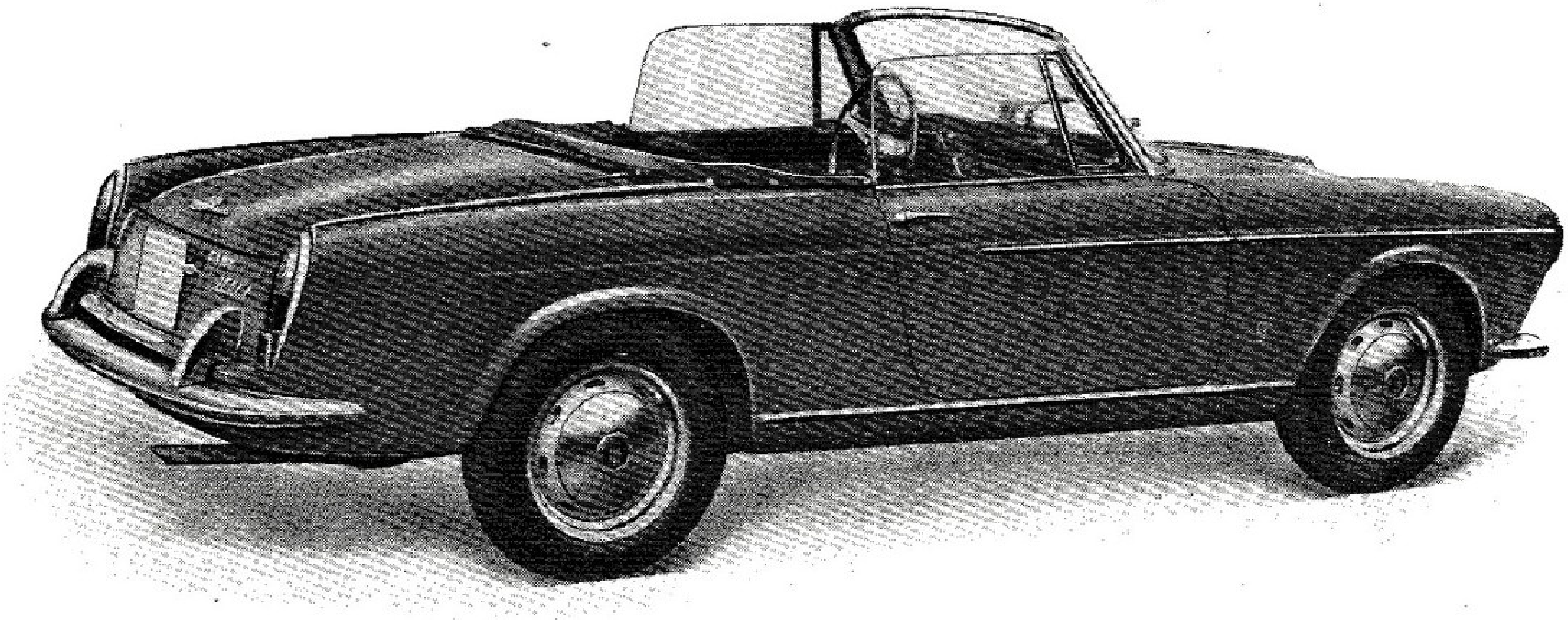


Fig. 6. - Car rear threequarter view.

Top: folding, with metal framing.

Luggage compartment: with front hinged lid locked by key, with push button release.

Spare wheel: stowed under luggage compartment floor.

Front and rear bumpers: with chromium plated ornaments.

Rear number plate: mounted below deck lid.

Front number plate: mounted under bumper.

Rear view mirrors: one centrally located at top of instrument panel and one on driver's side fender.

Inner trimming: plastic upholstery.

Door handles, inner and outer: chromium plated.

Foot rest, for passenger: tiltable.

Grab handle for passenger: on instrument panel.

Tool kit: in luggage compartment.

Gauges and controls

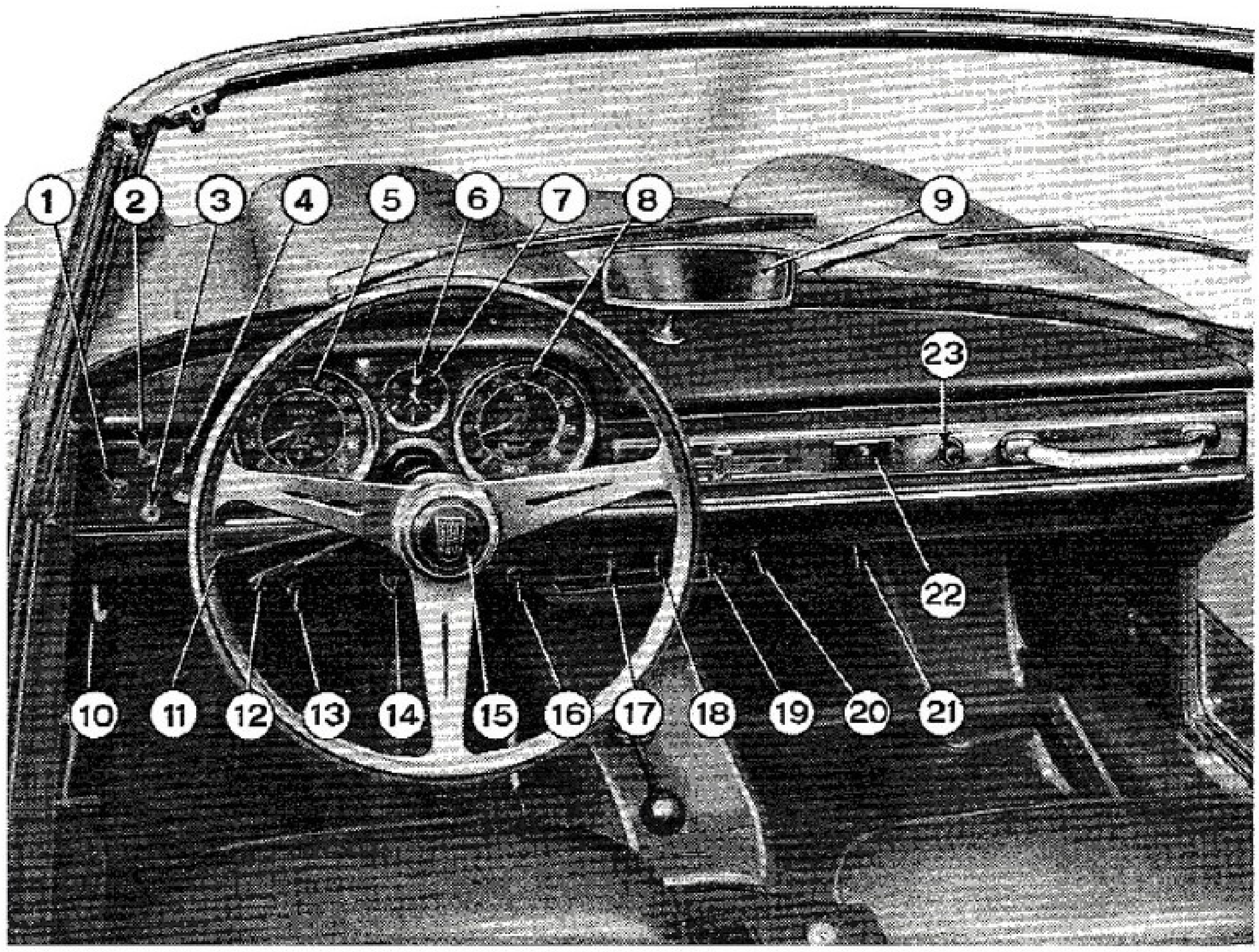


Fig. 7.
Gauges and controls.

NOTA - Facia top is removable for access to instruments.

1) **Outer lighting switch:** turns ON (with lock switch key turned to first click position, either right or left) the front and rear parking lamps, number plate lamps and energizes the switch controlled by lever (12).

2) **Parking and number plate lamps indicator** (green) (*).

3) **Direction indicators pilot light** (green) (*): it flashes when indicators are ON.

4) **Lock switch:** controls ignition, starting and services (**).

(*) Light intensity may be adjusted by rotating the lens.

(**) With key in 1st click right position the following circuits are energized: fuel gauge and reserve indicator; generator charge indicator; heat gauge; headlamps, high and low beams and high beam indicator; headlamp flasher; parking lights and relevant indicator; number plate lights; engine compartment lights; luggage compartment light; direction indicators, side repeaters and pilot light; rear stop lights; electrofan motor; windshield wiper motor; instrument cluster light; cigarette lighter housing indicator; electric fuel pump; water radiator electromagnetic fan.

5) **Speedometer, incorporating:**

a) **Generator charge indicator** (red): goes out when engine speed exceeds 1130 RPM (car at about 30 km/h - 18.6 m.p.h. - in fourth gear).

b) **Headlamp high beams indicator** (blue).

c) **Totalizer.**

d) **Trip recorder.**

e) **Fuel level gauge.**

f) **Fuel reserve indicator** (red): lights up when only 4,5-7 liters (1.2 to 1.8 U.S. Gals or 1 to 1.5 G.B. Gals) of fuel remain in tank.

g) **Trip recorder zeroing knob** (to be rotated clockwise): **never attempt any resetting** with car in motion.

6) **Clock resetting knob:** pull out and turn clockwise.

7) **Electric clock:** for « fast » and « slow » adjustments use the control on clock back face.

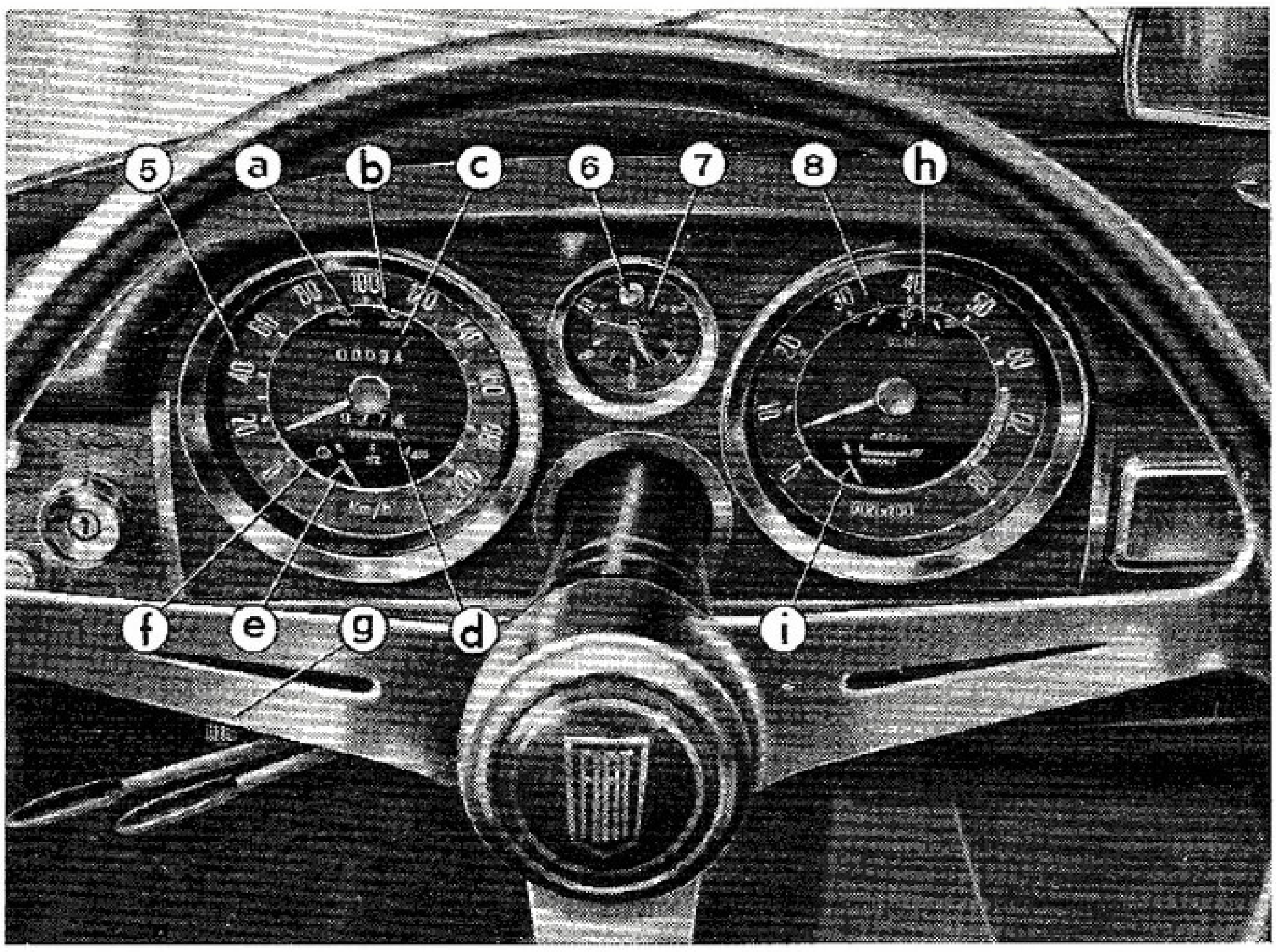


Fig. 8.
Instrument cluster detail.

8) Engine revolution counter: danger zone is marked in red.

h) Oil pressure gauge: correct lube oil pressure is 6 kg/cm² (85.3 p.s.i.).

i) Heat gauge: if the pointer dwells on the light sector of dial, the engine operation temperature is regular. When the pointer moves to the red sector it is a warning of engine overheating. If this occurs when car is driven at prevailingly high speeds, stop the car and find out the cause, which shall be eliminated. Dwelling of the pointer on the red sector can be tolerated when the car is operated in town at low speeds as under this condition radiator ventilation is sensibly reduced.

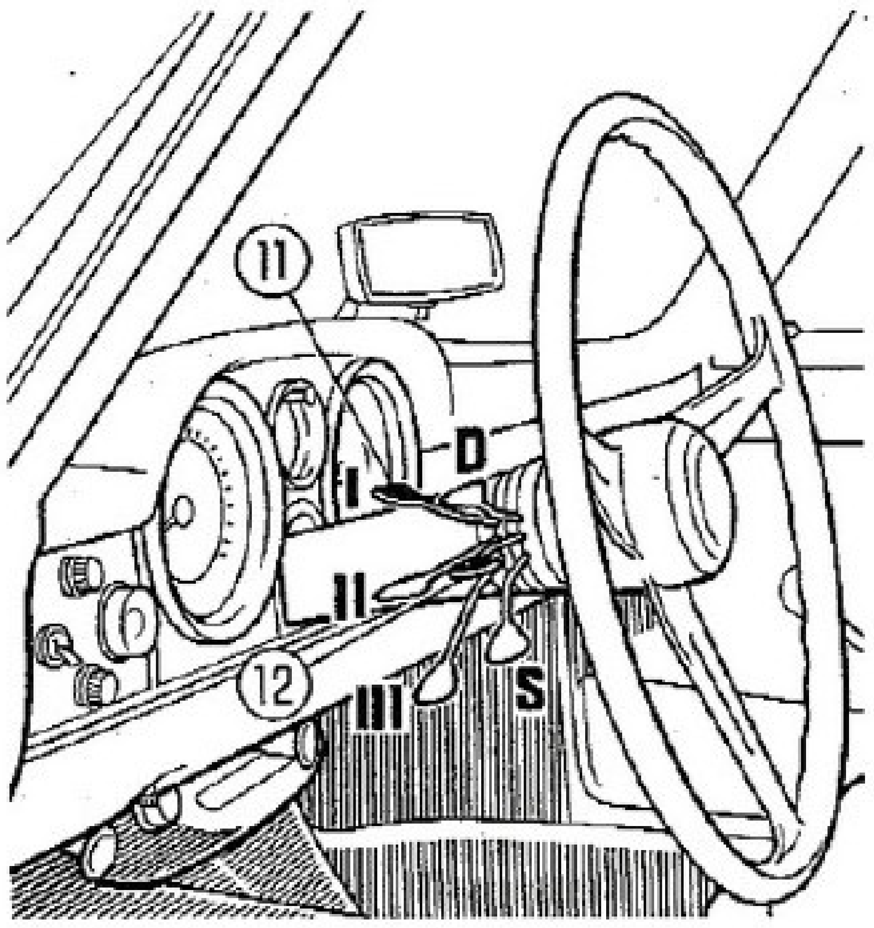


Fig. 9.
Outer lighting change-over switch lever and direction indicators control lever.

9) Rear view mirror: with antiglare position control lever.

10) Hood catch release lever.

11) Outer lighting change-over switch lever (operative when switch 1, fig. 7, is ON).

- **I:** number plate lamp, front and rear parking lamps (fig. 9);
- **II:** number plate lamp, front and rear parking lamps and headlamp low beams;
- **III:** number plate lamp, front and rear parking lamps and headlamp high beams.

In positions **I** and **III**, **by tripping the lever towards the steering wheel** flashing of headlamp low beams is obtained.

With switch **1**, fig. 7, OFF the low beam flashes can be obtained with lever in any of the three positions.

12) Direction indicators control lever, self-cancelling (operative when lock switch key is in 1st click right position):

D = right turn.
S = left turn.

13) Throttle knob.

14) Windshield washer knob: to clean windshield, press knob repeatedly and turn on windshield wiper switch (17).

15) Dual-tone horn button.

16) Choke knob.

17) **Windshield wiper switch,** with automatic parking of blades (energized when lock switch is « ON »).

18) **Cluster light switch:** (energized when lock switch is « ON »).

19) **Electrofan switch** (operative when lock switch is « ON »).

20) **Dash light switch.**

21) **Inspection lamp receptacle.**

22) **Ash tray:** to open ash tray pull down the ornament. For periodical emptying, take off the tray by pulling it outwards.

23) **Cigarette lighter:** press in to operate. Lighter stays in about 15 seconds and automatically pushes out, ready for use. With outer lighting switch ON, an indicator (amber) illuminates the lighter housing.

24) **Clutch pedal.**

25) **Brake pedal.**

26) **Accelerator pedal.**

27) **Auxiliary brake hand lever.**

28) **Gear shifting lever.**

FILL-UP DATA

ITEM	Quantity				REFILL
	lt	kg	U.S. gals	G.B. gals	
Fuel tank	45	—	12	10	Premium gasoline (O. R. 98 - Research Method)
			U.S. qts	G.B. qts	
Radiator, cylinder jackets and heating system	6	—	6.3	5.3	Water (1)
Engine sump (3)	6,115	5,5	6.4	5.4	FIAT Oil (4)
Transmission	1,075	1,000	1.18	.97	FIAT W 90 Oil (SAE 90 EP)
Rear axle casing	0,615	0,570	.65	.53	FIAT W 90 Oil (SAE 90 EP)
Steering box	0,165	0,150	.17	.14	FIAT W 90 Oil (SAE 90 EP)
Hydraulic brake system	0,315	0,315	.33	.28	Special FIAT (Blue Label) brake fluid or equivalent HD non-mineral type
Clutch control hydraulic system	0,130	0,130	.14	.12	Special FIAT (Blue Label) brake fluid or equivalent HD non-mineral type
Windshield washer	—	(2)	—	—	Water and FIAT D.P./1 liquid (concentrated solution) or TRICO XAW 30 solution

(1) When temperature is close to 0° C change to good commercial grade anti-freeze mixtures.

(2) 0,75 kg pure water plus 0,017 kg (2,3% in weight) (Summer) or 0,034 kg (4,5% in weight) (Winter) of cleaner.

(3) Total capacity of sump, filter and pipings is 6,000 kg (6,650 lt = 7 U.S. qts - 6 G.B. qts). The amount indicated in the table is the requirement for **periodic oil changes.**

(4) See following table for grades:

Lowest anticipated outdoor temperature	FIAT Service MS (API) oil	FIAT "Multigrado" oil
Below —15° C (10° F) (minimum)	**VS 10 W** (SAE 10 W)	—
Between 0° and —15° C (32° to 10° F) (minimum)	**VS 20** (SAE 20)	**10 W - 30**
Above 0° C (32° F) (minimum)	**VS 30** (SAE 30)	**10 W - 30**
Above 30° C (90° F) (average)	**VS 40** (SAE 40)	**20 W - 40**

WARNING: Do not top up with oils of other grades or Make. Before pouring detergent oils in used engines, flush lubrication system accurately.

TIRE PRESSURE	kg/cm²	p.s.i.
For high speeds (front and rear)	1,9	27
For moderate speeds (front and rear)	1,7	24,2

ASSEMBLY DATA AND SERVICING INSTRUCTIONS

Engine

CRANK GEAR FIT CLEARANCES

	mm	in.
Piston diameter to cylinder barrel:		
on axis perpendicular to pin: at 7 mm (.28") from skirt top	0,140 to 0,160	.0055 to .0063
on axis perpendicular to pin: at skirt bottom	0,095 to 0,115	.0037 to .0045
Ring-to-piston groove land:		
1st groove - Compression ring	0,011 to 0,025	.0004 to .0010
2nd groove - Oilscraper ring	0,011 to 0,025	.0004 to .0010
3rd groove - Slotted oilscraper ring	0,027 to 0,072	.0011 to .0028
Piston pin-to-boss bore	0,002 to 0,008	.00008 to .00032
Piston pin-to-connecting rod small end bush	0,004 to 0,010	.00016 to .00039
Crankshaft main bearing-to-journal	0,057 to 0,082	.0022 to .0032
Connecting rod bearing-to-crankpin	0,044 to 0,076	.0017 to .0030
Crankshaft journal shoulders-to-rear main bearing provided w/thrust washers	0,090 to 0,280	.0035 to .0110
Piston ring gap (rings in barrel):		
Compression ring (1st groove)	0,30 to 0,45	.0118 to .0177
Oilscraper ring (2nd groove)	0,20 to 0,35	.0079 to .0138
Slotted oil scraper ring (3rd groove)	0,25 to 0,35	.0098 to .0138

VALVE GEAR FIT CLEARANCES

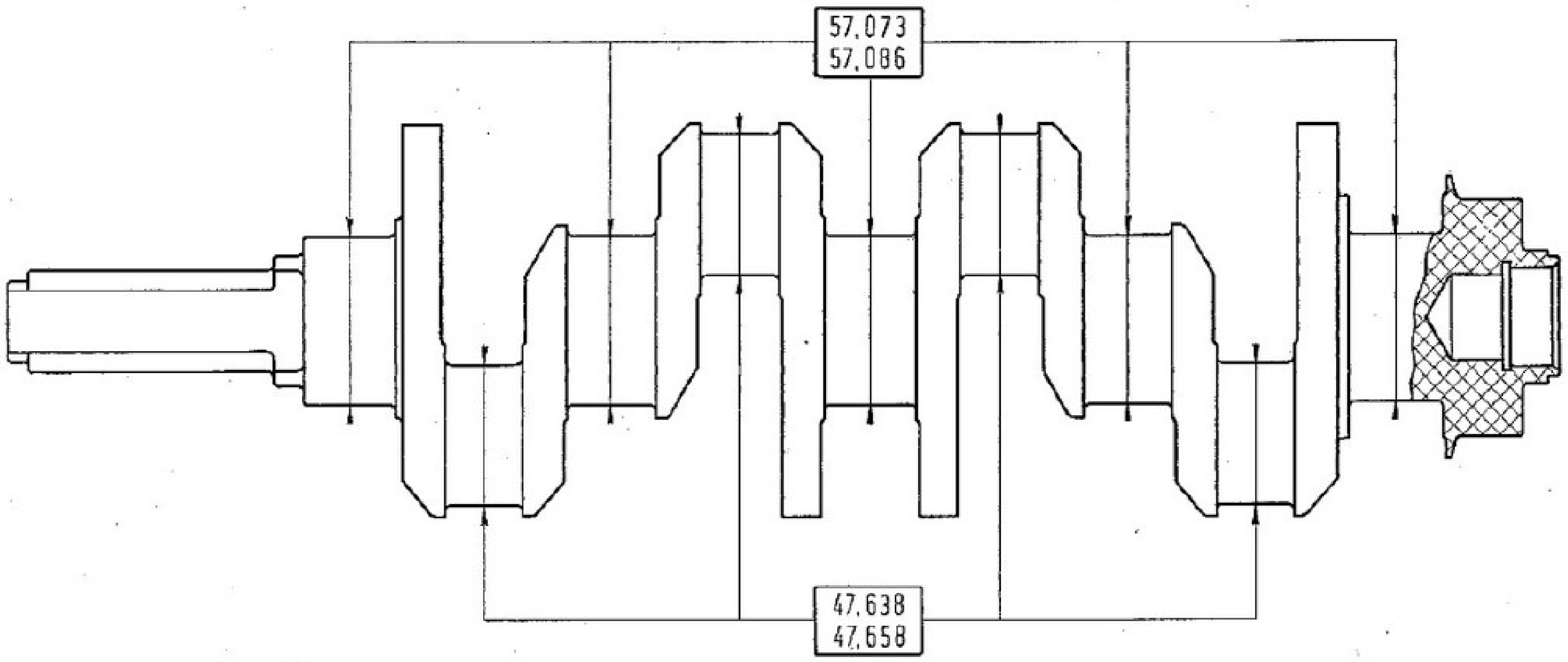
	mm	in.
Camshaft journals-to-seats:		
Front, Central, Rear	0,007 to 0,041	.00028 to .00161
Valve tappets-to-seats	0,005 to 0,041	.00019 to .00161
Valve guides-to-seats . . . pinch fit	0,034 to 0,062	.0013 to .0024
Valve stems-to-guides	0,010 to 0,040	.00039 to .00575

CRANK GEAR DATA

	mm	in.
Cylinder liner diameters (*)	80,000 to 80,040	3.1496 to 3.1511 (*)
Standard piston diameters (measured on axis perpendicular to piston pin):		
— at skirt bottom (see fig. 15) (*)	79,895 to 79,935	3.1455 to 3.1470 (*)
— at 7 mm (.28") from skirt top (see fig. 15)	79,850 to 79,890	3.1437 to 3.1453 (*)
Spare piston diameter oversizes	0,2-0,4-0,6	.0078-.0157-.0236
Piston pin bore diameter	19,996 to 20,002	.7872 to .7875 (▲)
Standard piston pin diameter	19,991 to 19,997	.7880 to .7882 (▲)
Spare piston pin diameter oversizes	0,20 to 0,50	.0078 to .0196
Land-to-land distance:		
1st groove (compression ring)	2,010 to 2,030	.0791 to .0799
2nd groove (oilscraper ring)	2,010 to 2,030	.0791 to .0799
3rd groove (slotted oilscraper)	3,957 to 3,972	.1558 to .1564
Compression and oilscraper rings thickness (1st and 2nd grooves)	1,978 to 1,990	.0779 to .0784
Slotted oilscraper ring thickness (3rd groove)	3,900 to 3,930	.1535 to .1547
Crankshaft journal diameters	57,073 to 57,086	2.2470 to 2.2474
Main bearing seat diameters	60,833 to 60,845	2.3950 to 2.3955
Standard main bearing thickness	1,845 to 1,851	.0727 to .0729
Spare main bearing undersizes	0,254-0,508-0,762-1,016	.01-.02-.03-.04
Crankpin diameters	47,638 to 47,658	1.8755 to 1.8763
Connecting rod bearing seat diameters	51,333 to 51,346	2.0210 to 2.0215
Standard connecting rod bearing thickness	1,816 to 1,822	.0715 to .0717
Spare connecting rod bearing undersizes	0,254-0,508-0,762-1,016	.01-.02-.03-.04
Connecting rod small end bush seat diameter	21,939 to 21,972	.8637 to .8651
Connecting rod small end bush O.D.	21,979 to 22,000	.8653 to .8661
Connecting rod small end bush I.D. (after press-fitting)	19,998 to 20,004	.7873 to .7875
Rear bearing halves thrust washer thicknesses	2,310 to 2,360	.0909 to .0929
Rear bearing halves thrust washer oversizes	0,1	.0039
Oil seal disc thrust ring thickness	5,000	.1970

(*) Liners and pistons are selected in accordance with four classes based on diameters: A-B-C-D. Classes differ by a 0,01 mm (.0004") diameter variation.

(▲) These diameters are divided in two classes, each with a tolerance range of 0,003 mm (.0012"). On this basis, each piston class is hence subdivided in two further sub classes 1 and 2 referred to the piston pin boss I.D. The pin is supplied as spare together with its piston.



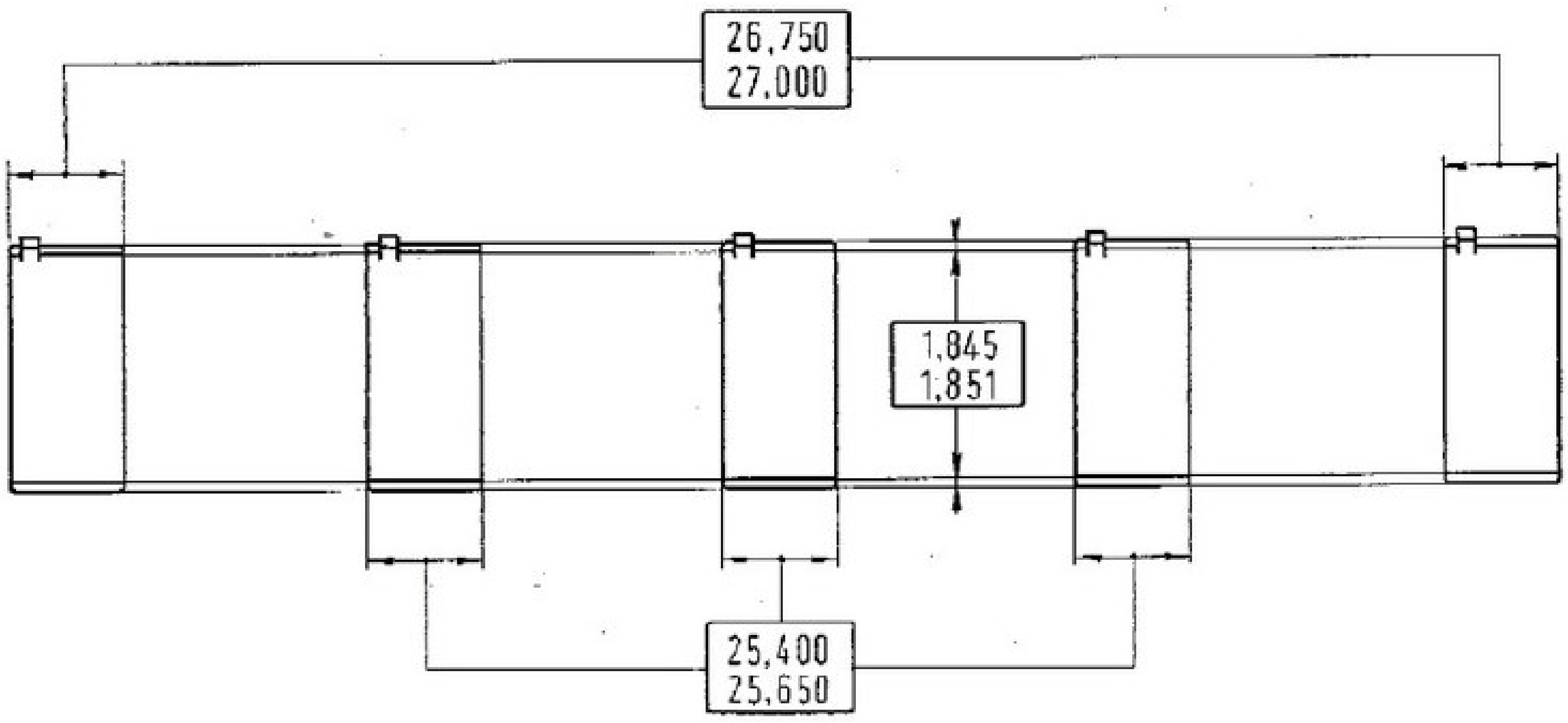


Fig. 10. - Crankshaft journals and main bearings data.

JOURNAL DIAMETERS

Standard	Undersizes			
	0,254 mm (.01″)	0,508 mm (.02″)	0,762 mm (.03″)	1,016 mm (.04″)
57,073 mm (2.2470″) to 57,086 mm (2.2474″)	56,719 mm (2.2370″) to 56,832 mm (2.2374″)	56,565 mm (2.2270″) to 56,578 mm (2.2274″)	56,311 mm (2.2170″) to 56,324 mm (2.2174″)	56,057 mm (2.2070″) to 56,070 mm (2.2074″)

CRANKPIN DIAMETERS

Standard	Undersizes			
	0,254 mm (.01″)	0,508 mm (.02″)	0,762 mm (.03″)	1,016 mm (.04))
47,638 mm (1.8755″) to 47,658 mm (1.8763″)	47,384 mm (2.8655″) to 47,404 mm (1.8663″)	47,130 mm (1.8555″) to 47,150 mm (1.8563″)	46,876 mm (1.8455″) to 46,896 mm (1.8463″)	46,622 mm (1.8355″) to 46,642 mm (1.8363″)

THICKNESS OF MAIN BEARING HALVES

Standard	Undersizes			
	0,127 mm (.005″)	0,254 mm (.010″)	0,381 mm (.015″)	0,508 mm (.020″)
1,845 mm (.0727″) to 1,851 mm (.0729″)	1,972 mm (.0777″) to 1,978 mm (.0779″)	2,099 mm (.0827″) to 2,105 mm (.0829″)	2,226 mm (0.877″) to 2,232 mm .(0879″)	2,353 mm (.0927″) to 2,359 mm (.0929″)

THICKNESS OF CONNECTING ROD BEARING HALVES

Standard	Undersizes			
	0,127 mm (.005″)	0,254 mm (.010″)	0,381 mm (.015″)	0,508 mm (.020)
1,816 mm (.0716″) to 1,822 mm (.0718″)	1,943 mm (.0766″) to 1,949 mm (.0768″)	2,070 mm (.0816″) to 2,076 mm (.0818″)	2,197 mm (.0866″) to 2,203 mm (.0868″)	2,324 mm (.0196″) to 2,330 mm (.0918″)

ENGINE ASSEMBLY

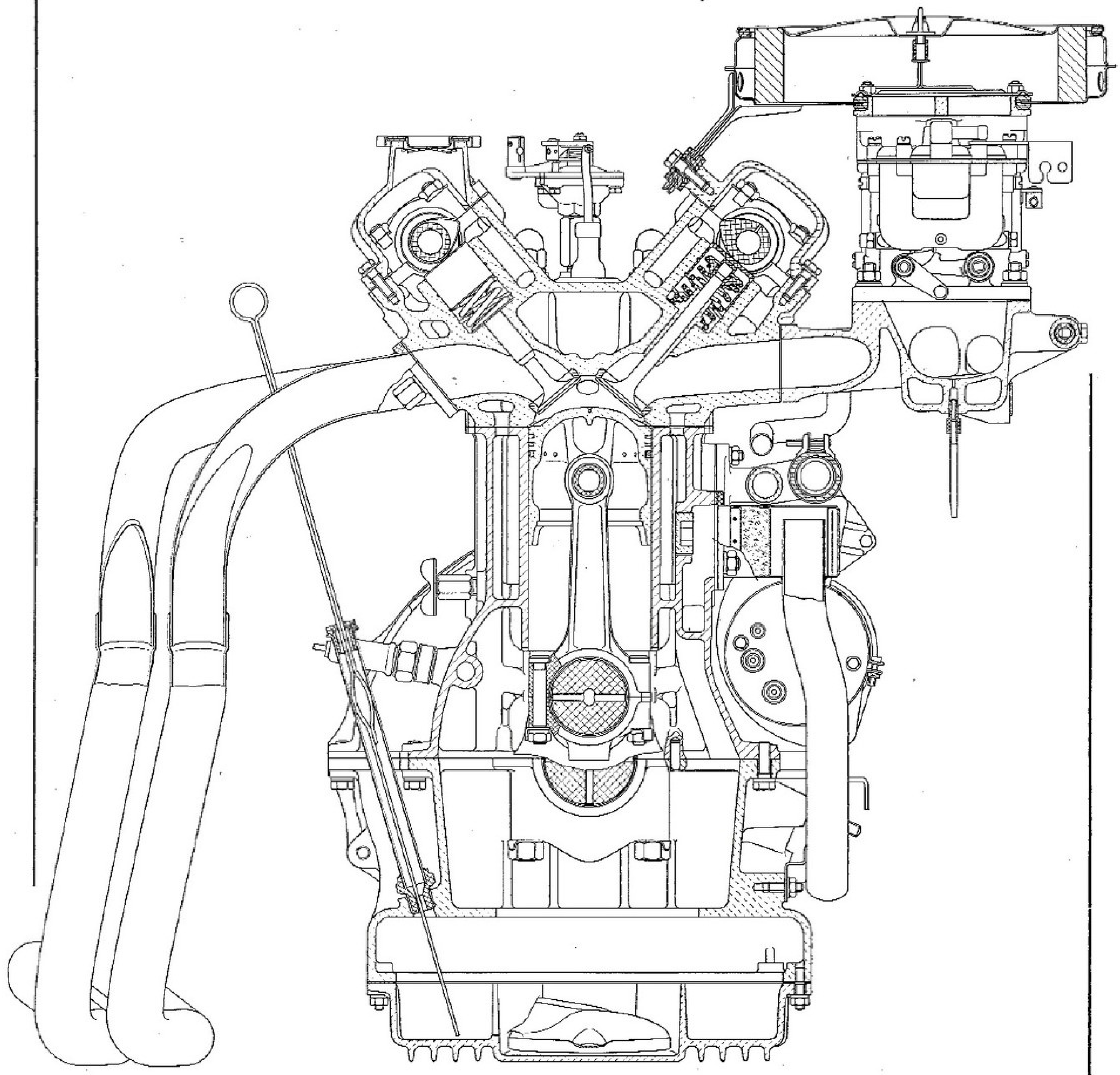


Fig. 11. - Engine type 118 A.000 - Section through piston, connnecting rod and valves (exhaust on the left and intake on the right).

ENGINE ASSEMBLY

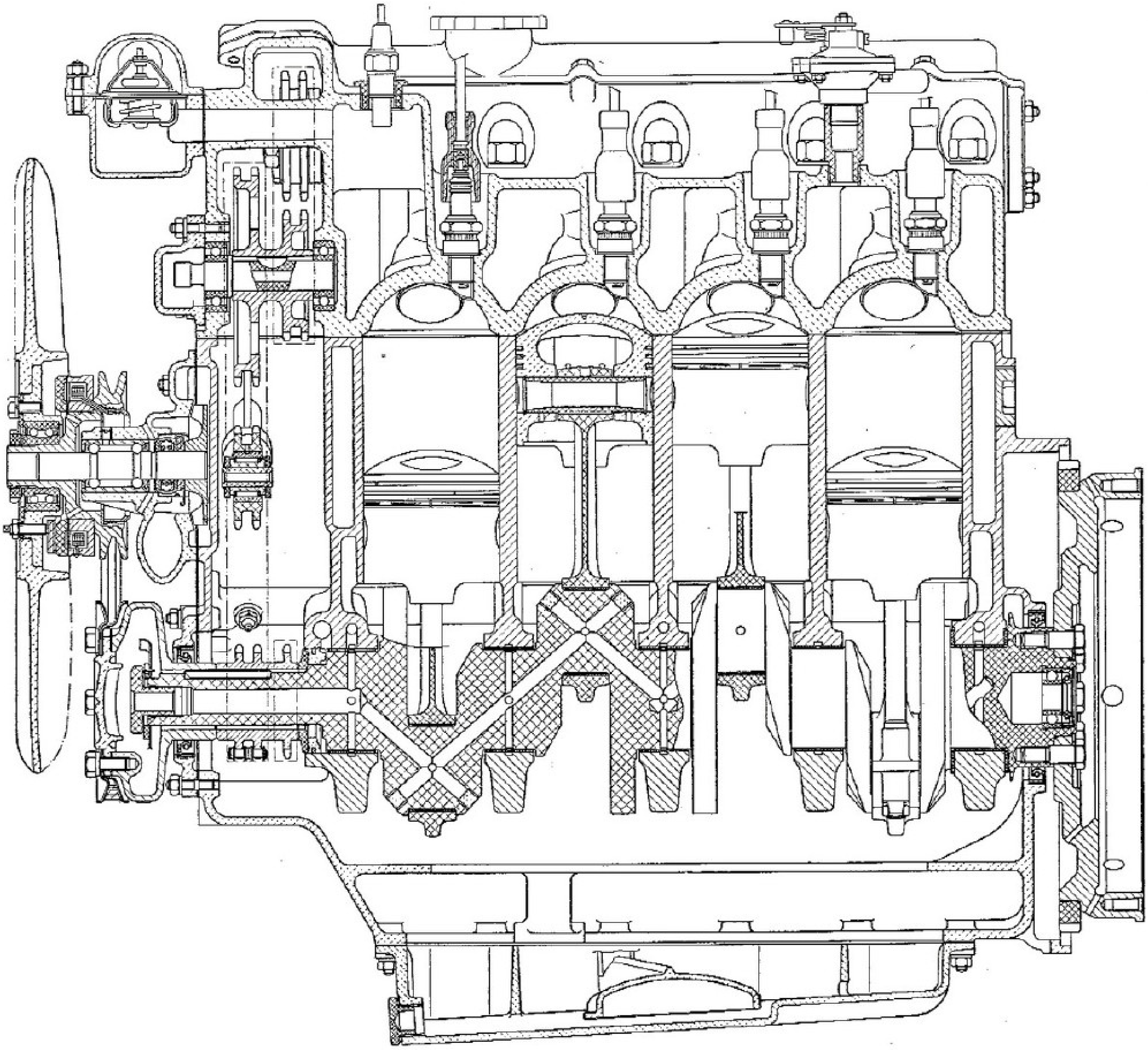
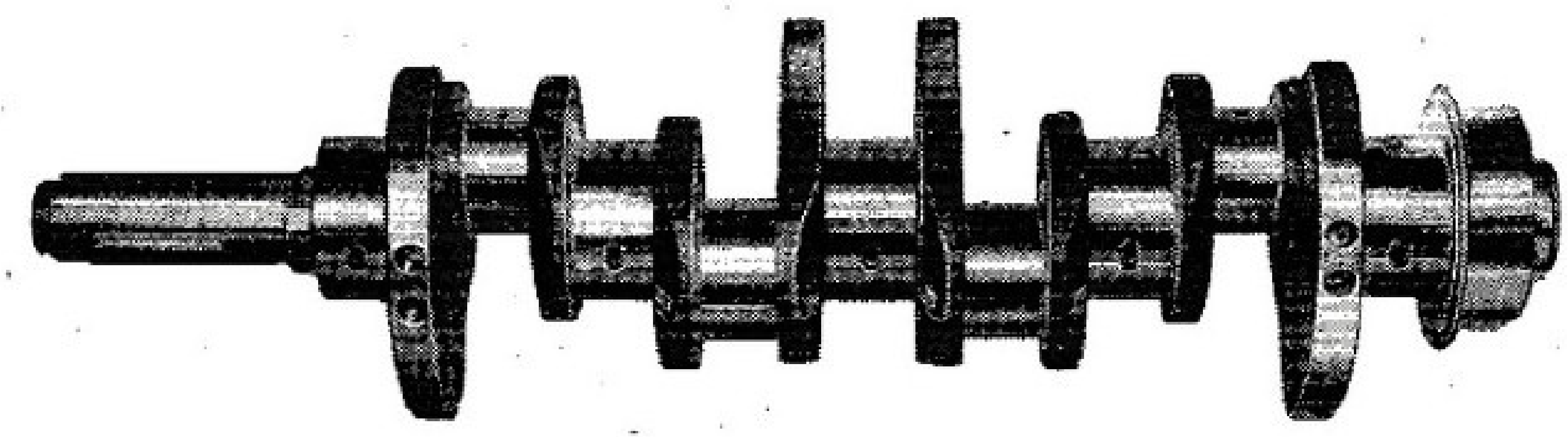


Fig. 12. - Type 118 A.000 engine - Longitudinal section on crankshaft, pistons, fan-water pump, and spark plugs.

Fig. 13. - **Crankshaft.**

Shaft balancing holes are visible in counterweights.



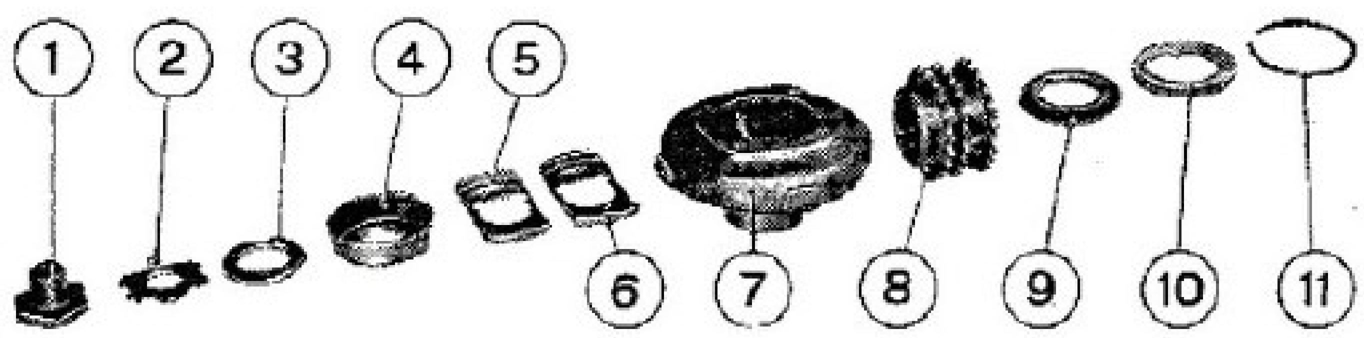
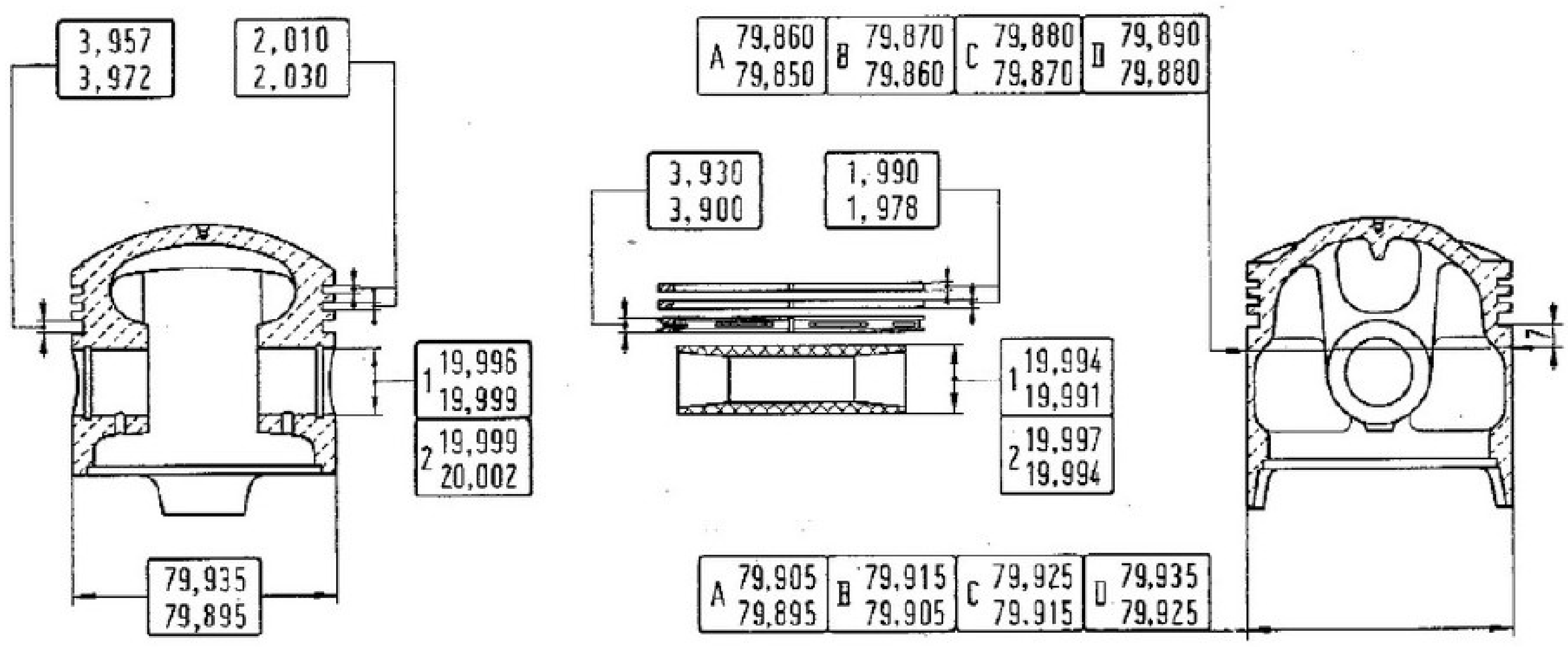


Fig. 14. - **Parts mounted on crankshaft front end.**

1. Centrifugal oil filter mounting screw - 2. Lock plate - 3. Washer - 4. Oil slinger - 5 and 6. Baffle plates - 7. Centrifugal oil filter - 8. Timing gear drive sprocket - 9. Thrust ring - 10. Oil seal disc - 11. Oil seal ring.



Fig, 15. - **Main data - Pistons, pins and rings.**

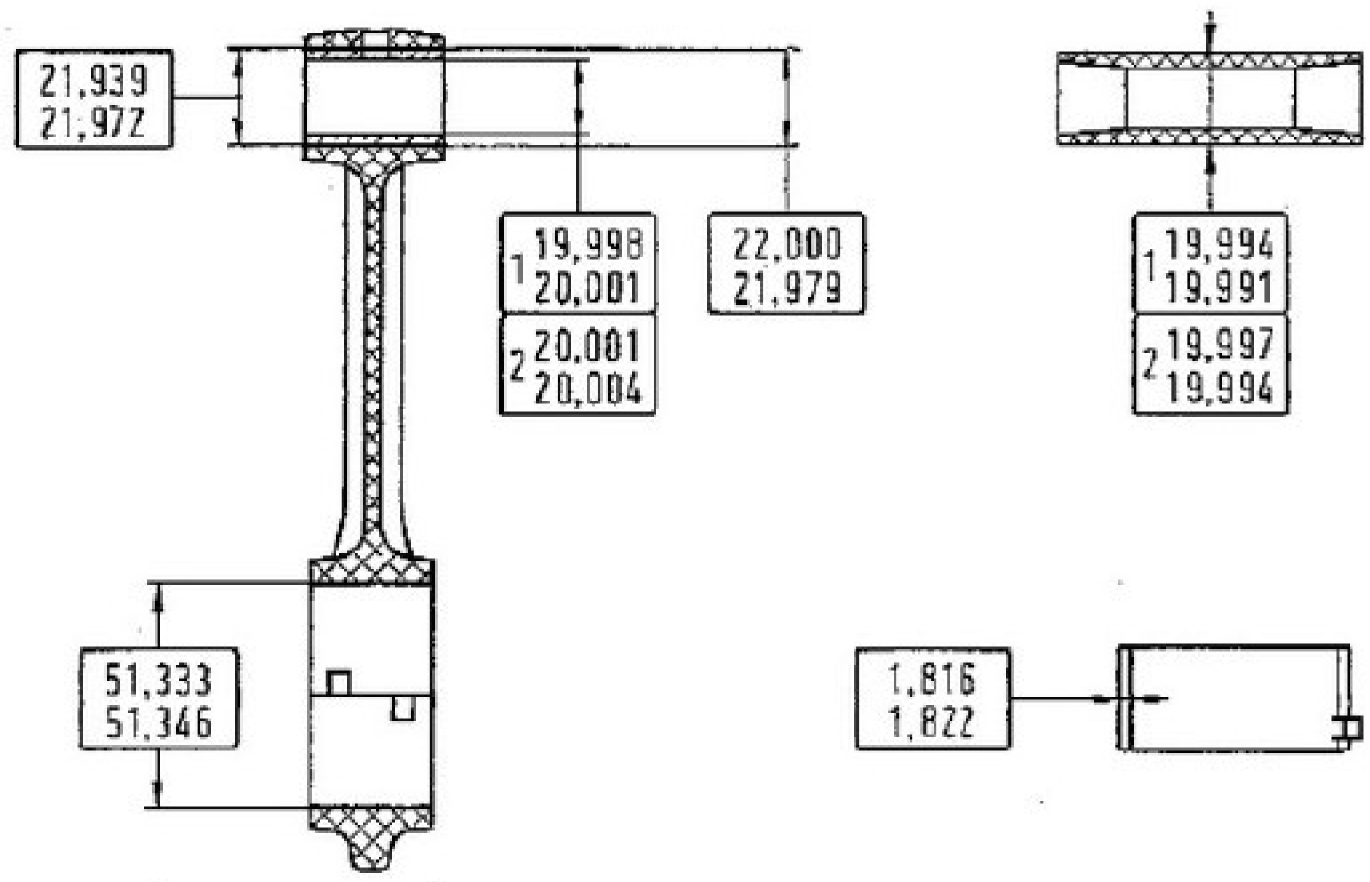


Fig. 16. - Main data - Connecting rod, piston pin and bushes.

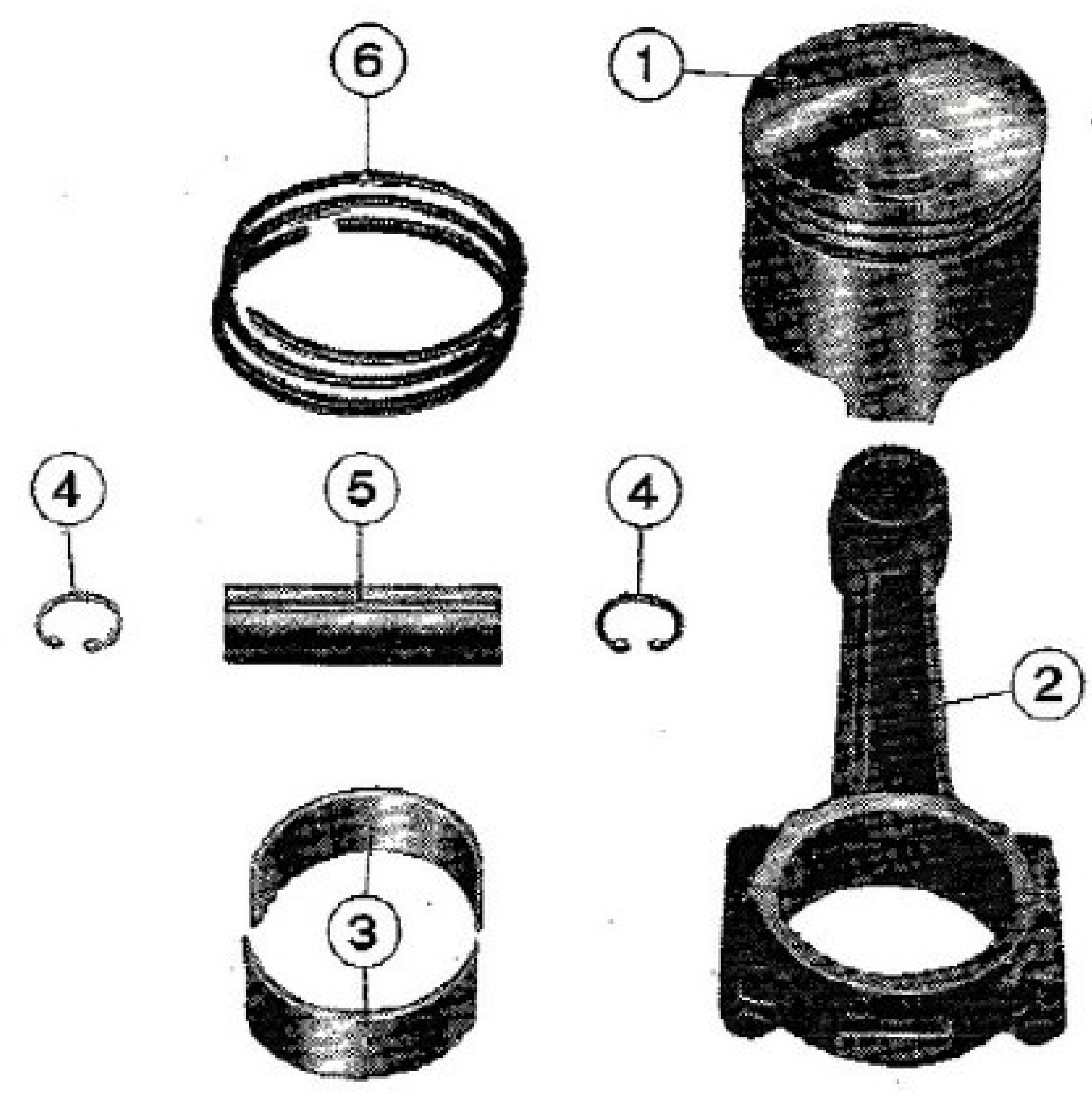


Fig. 17. - **Detail of a complete connecting rod, piston and piston rings set.**

1. Piston - 2. Connecting rod, with cap - 3. Bearing halves - 4. Circlips - 5. Piston pin - 6. Piston rings.

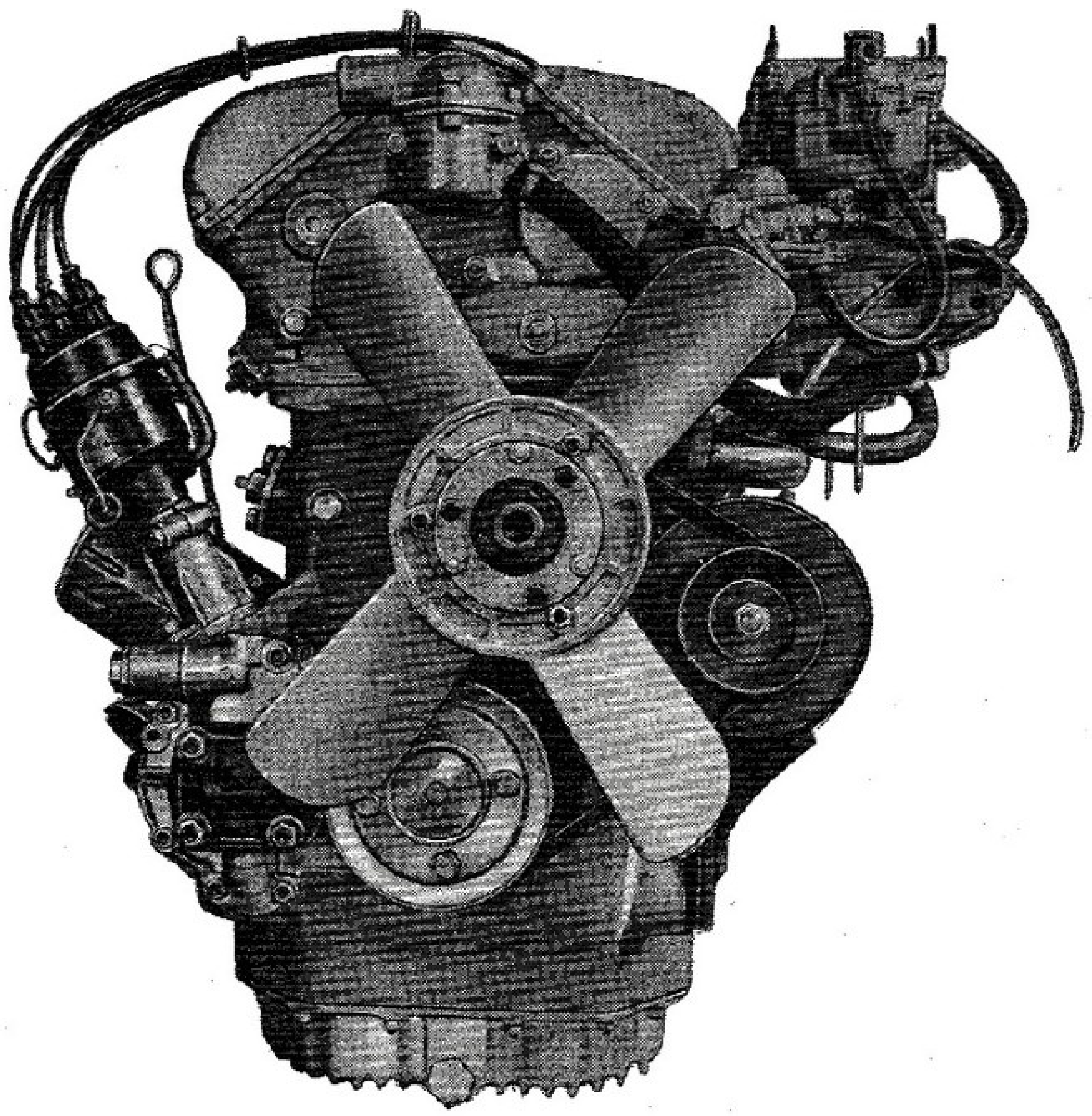


Fig. 18.
118 A.000 engine assembly - Front view.

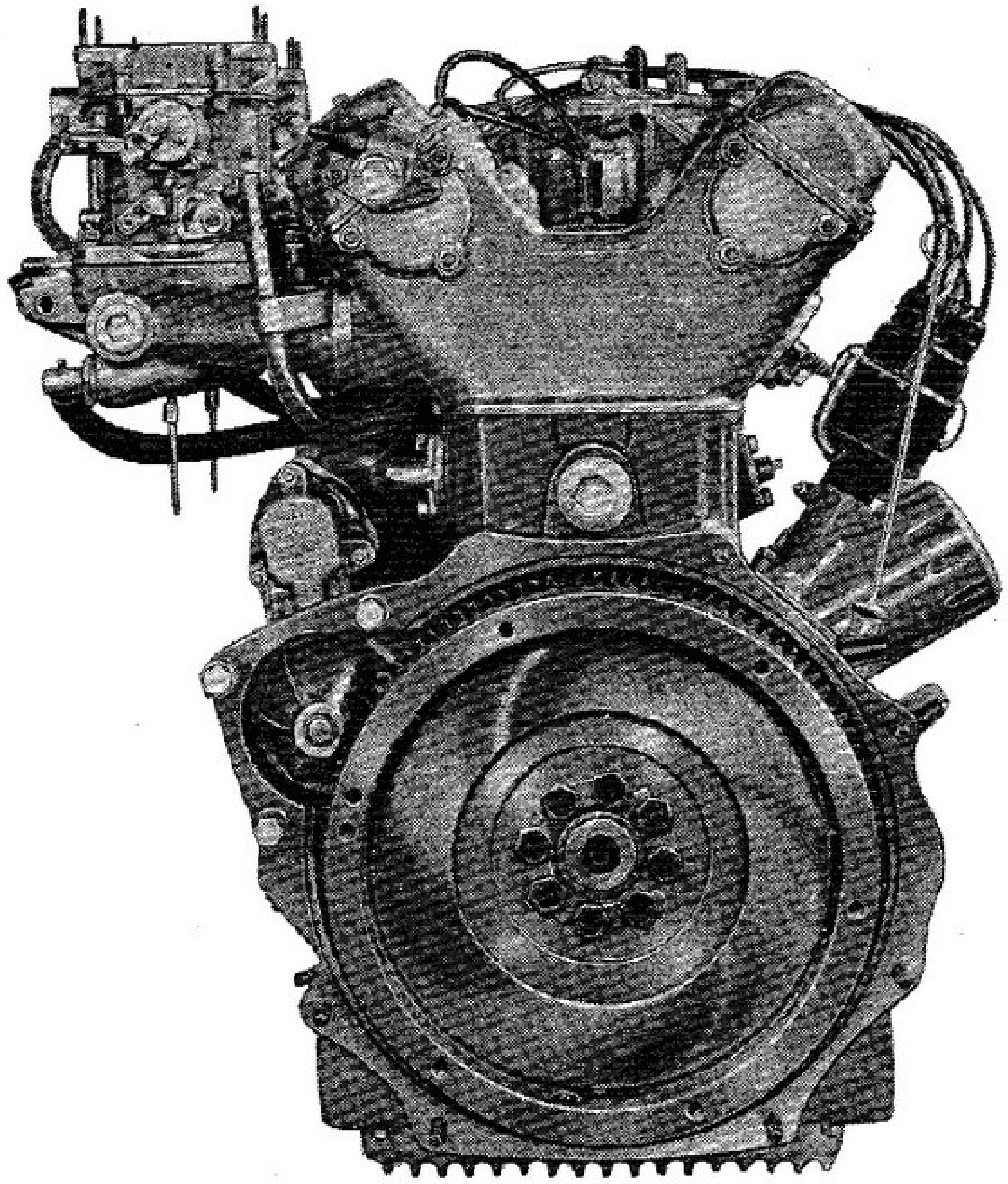


Fig. 19.
118 A.000 engine assembly. Rear view.

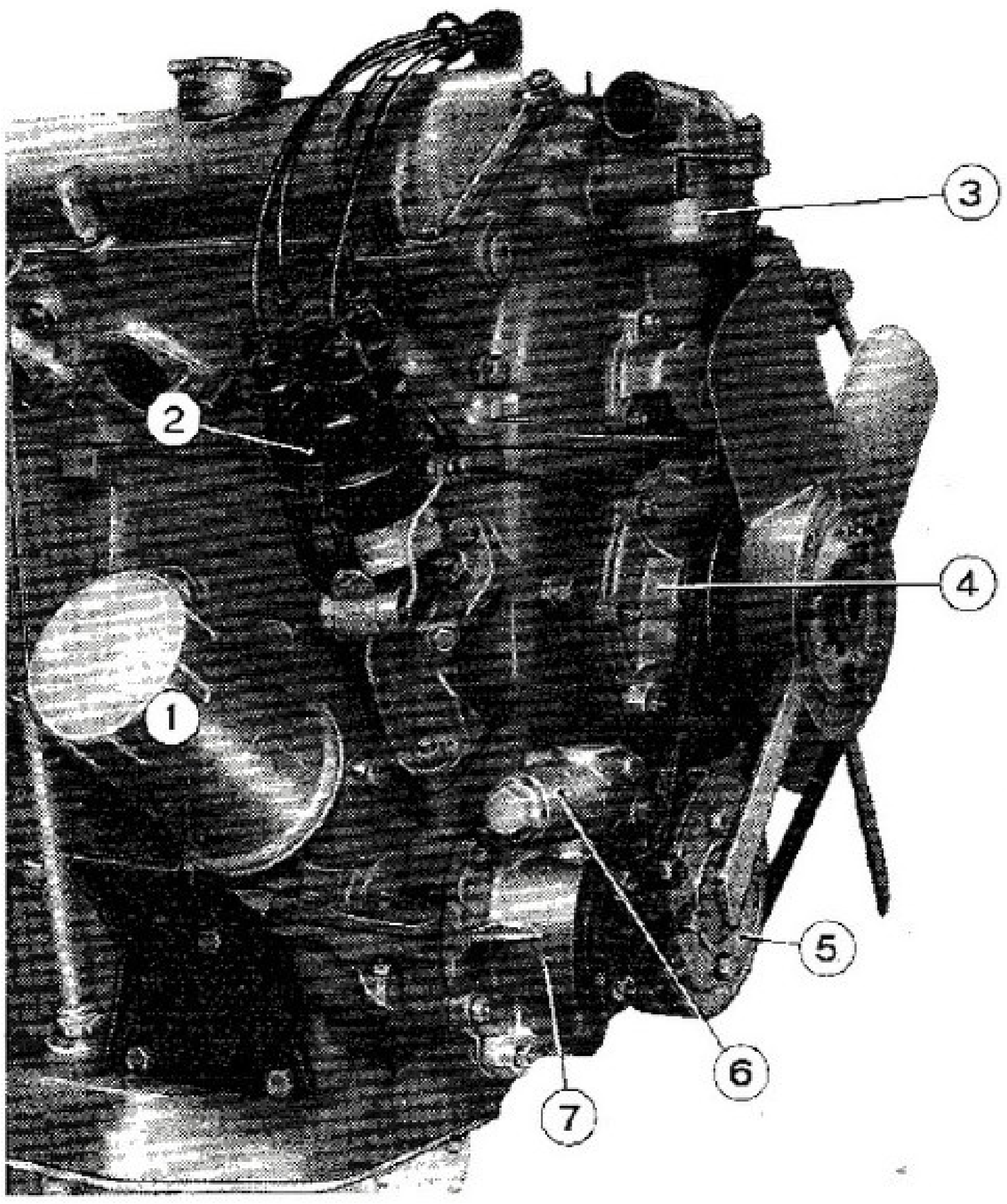


Fig. 20. - Detail of engine - Right 3/4 front view.

1. By-pass oil filter - 2. Ignition distributor - 3. Thermostat - 4. Water pump - 5. Centrifugal oil filter - 6. Oil pressure regulating valve - 7. Oil pump.

Engine lubrication is of the forced type, by gear pump. Oil clarification is ensured by a centrifugal filter mounted on crankshaft front end and a by-pass cartridge filter branched from the main oil duct.

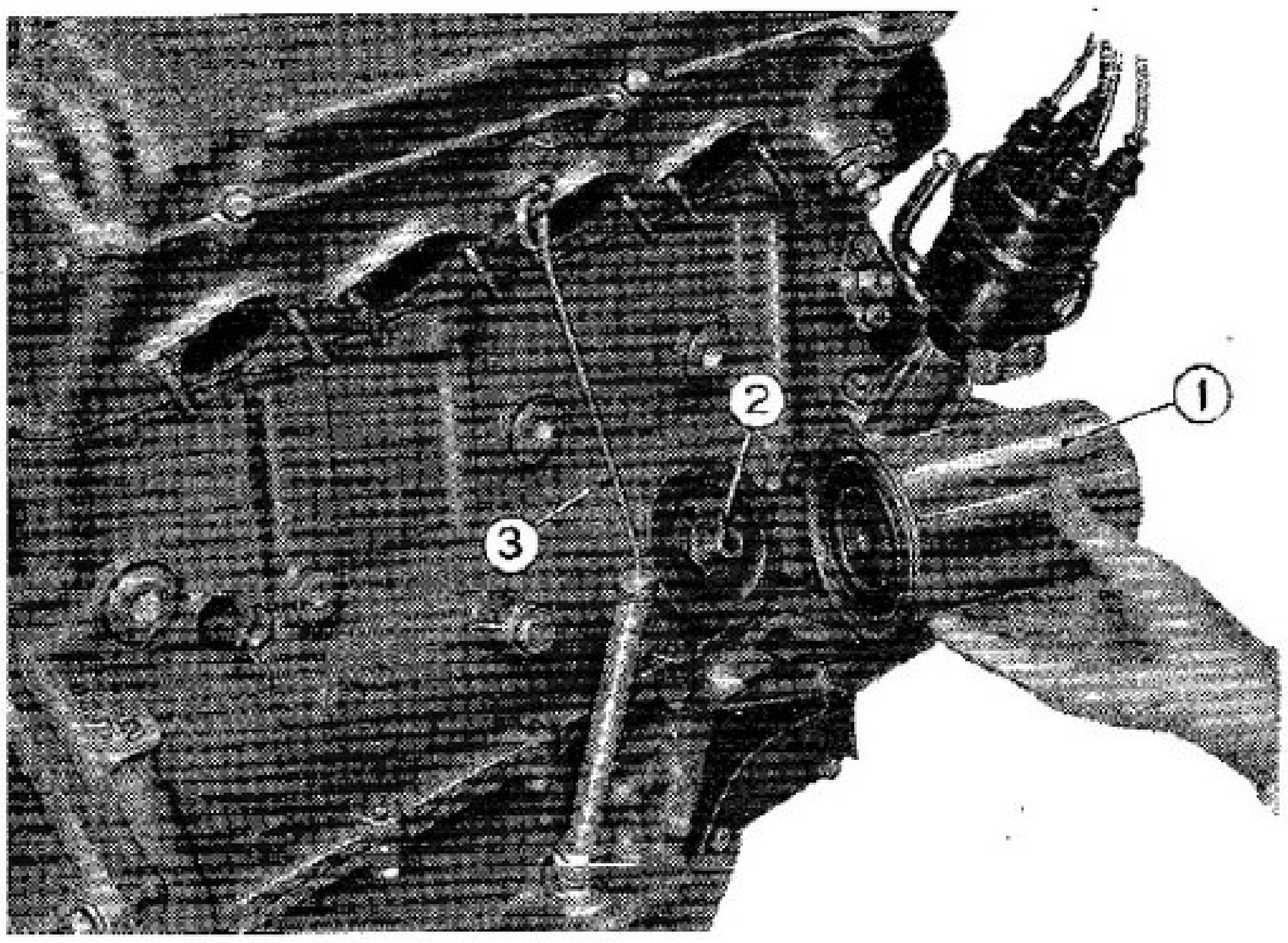


Fig. 21. - By-pass oil filter.

1. Cartridge container - 2. Connection to main on line - 3. Oil level indicator rod.

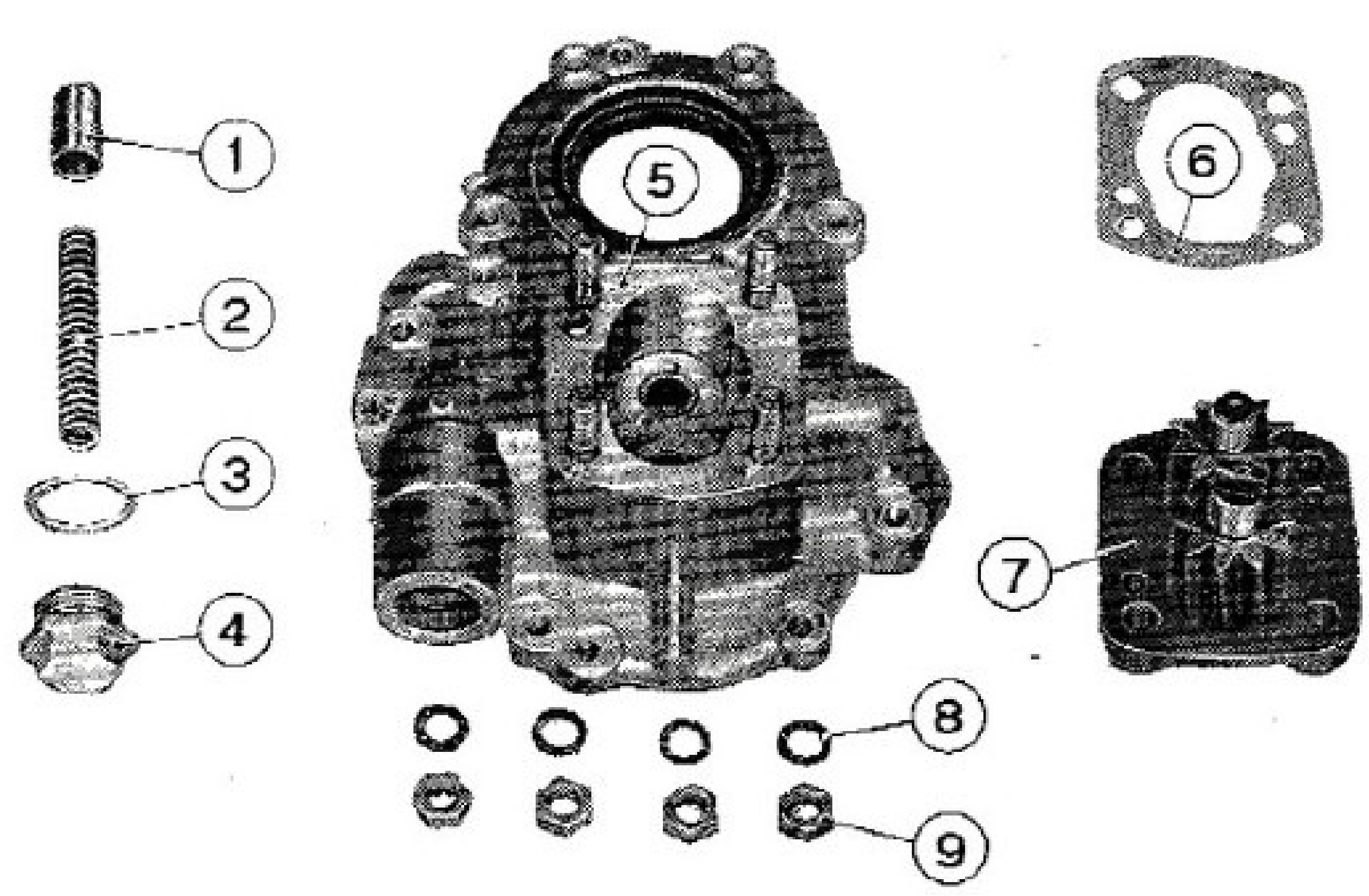


Fig. 22. - Disassembled oil pump.

1. Oil pressure regulating valve - 2. Regulating valve spring - 3. Seal - 4. Regulating valve plug - 5. Oil pump body - 6. Gasket - 7. Drive gears and cover - 8. Spring washers - 9. Pump-to-crankcase mounting nuts.

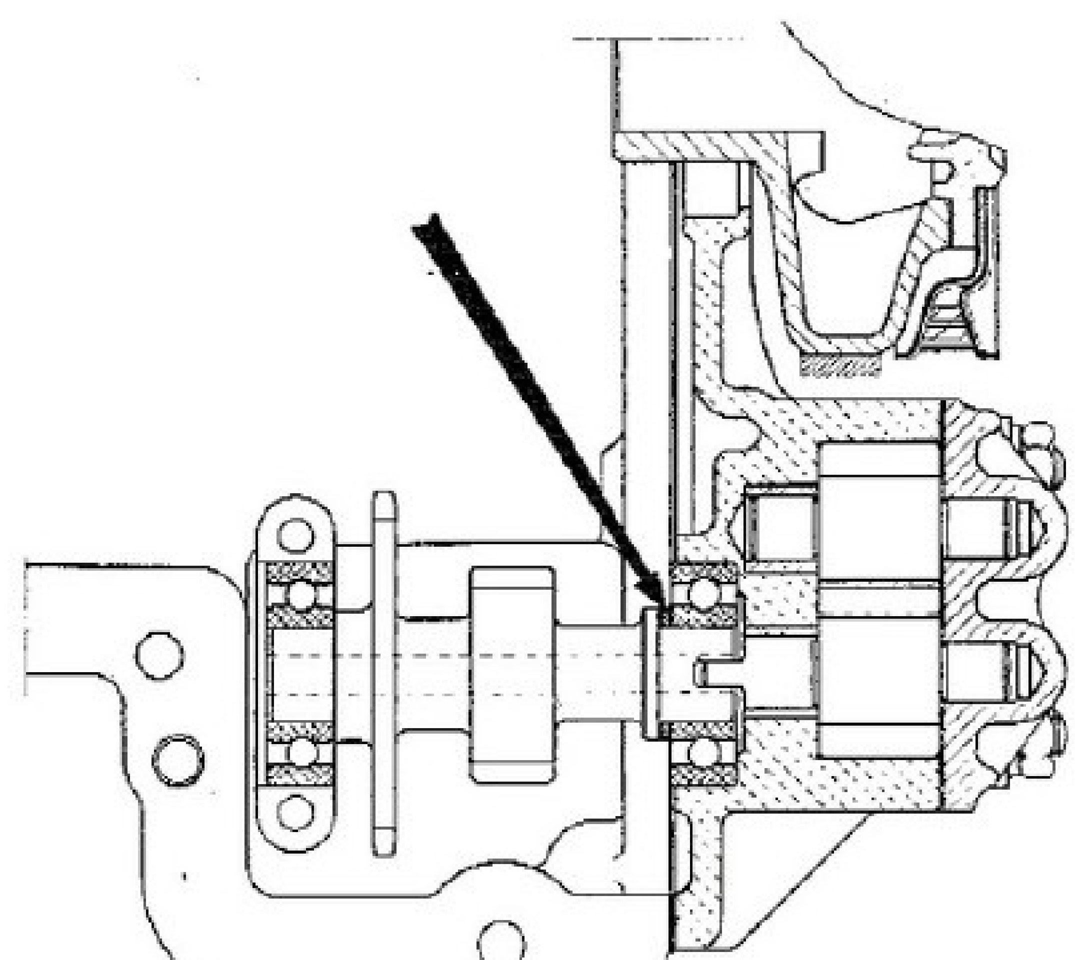


Fig. 23. - Section of oil pump.

Arrow points to the thrust washer supplied in different thicknesses.

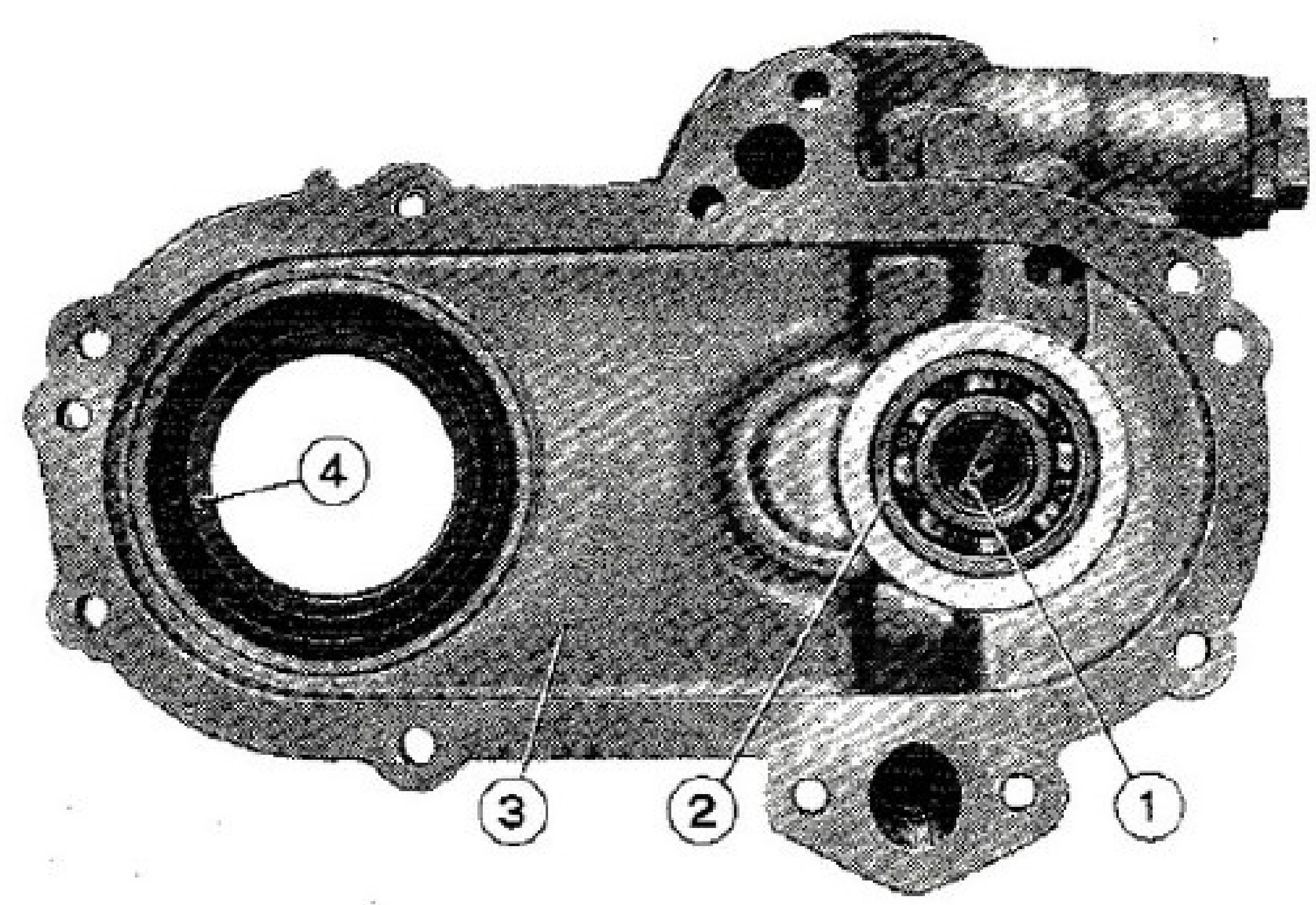


Fig. 24. - Oil pump - Inner side view.

1. Pump shaft drive tang - 2. Ball bearing - 3. Pump body - 4. Crankshaft seal.

VALVE GEAR DATA

	mm	in.
Camshaft journal diameters:		
Front	27,993 to 27,980	1.1021 to 1.1016
Central	28,393 to 28,380	1.1179 to 1.1174
Rear	28,793 to 28,780	1.1336 to 1.1331
Camshaft seat diameters:		
Front	28,000 to 28,021	1.1024 to 1.1032
Central	28,400 to 28,421	1.1181 to 1.1189
Rear	28,800 to 28,821	1.1339 to 1.1347
Standard tappet seat diameters	35,000 to 35,025	1.3780 to 1.3790
Standard tappet O.D.	34,984 to 34,995	1.3773 to 1.3778
Tappet oversizes	0,05-0,10	.0020-.0040
Valve guide seat diameters	13,000 to 13,018	.5118 to .5125
Valve guide outer diameters	13,052 to 13,062	.5138 to .5142
Valve guide inner diameters (after press-fitting)	8,000 to 8,015	.3150 to .3156
Valve stem diameters	7,975 to 7,990	.3139 to .3146
Intake valve head diameters	40,250 to 40,500	1.5846 to 1.5945
Exhaust valve head diameters	36,250 to 36,500	1.4271 to 1.4370
Valve face angle (intake and exhaust)	$55° 30'^{-0}_{+15'}$	
Valve seat angle (intake and exhaust)	$55° \pm 5'$	

CAMSHAFTS-TO-SUPPORTS FIT DATA

SUPPORTS		Support diameters (seat and cap)	Camshaft journal diameters	Fit clearance
FRONT	mm	28,000 to 28,021	27,993 to 27,980	0,007 to 0,041
	ins	1.1024 to 1.1032	1.1021 to 1.1016	.00003 to .00161
CENTRAL	mm	28,400 to 28,421	28,393 to 28,380	0,007 to 0,041
	ins	1.1181 to 1.1190	1.1179 to 1.1174	.00003 to .00161
REAR	mm	28,800 to 28,821	28,793 to 28,780	0,007 to 0,041
	ins	1.1339 to 1.1347	1.1336 to 1.1331	.00003 to .00161

VALVE GUIDES-TO-SEATS FIT DATA

Valve guide seat I.D.	Valve guide O.D.	Pinch fit
13,000 to 13,018	13,052 to 13,062	0,034 to 0,062
(.5118" to .5125")	(.5138" to .5142")	(.0013" to .0024")

VALVES-TO-VALVE GUIDES FIT CLEARANCE

Valve guide I.D.	Valve stem dia.	Fit clearance
8,000 to 8,015	7,975 to 7,990	0,010 to 0,040
(.3150" to .3156")	(.3139" to .3146")	(.0004" to .0016")

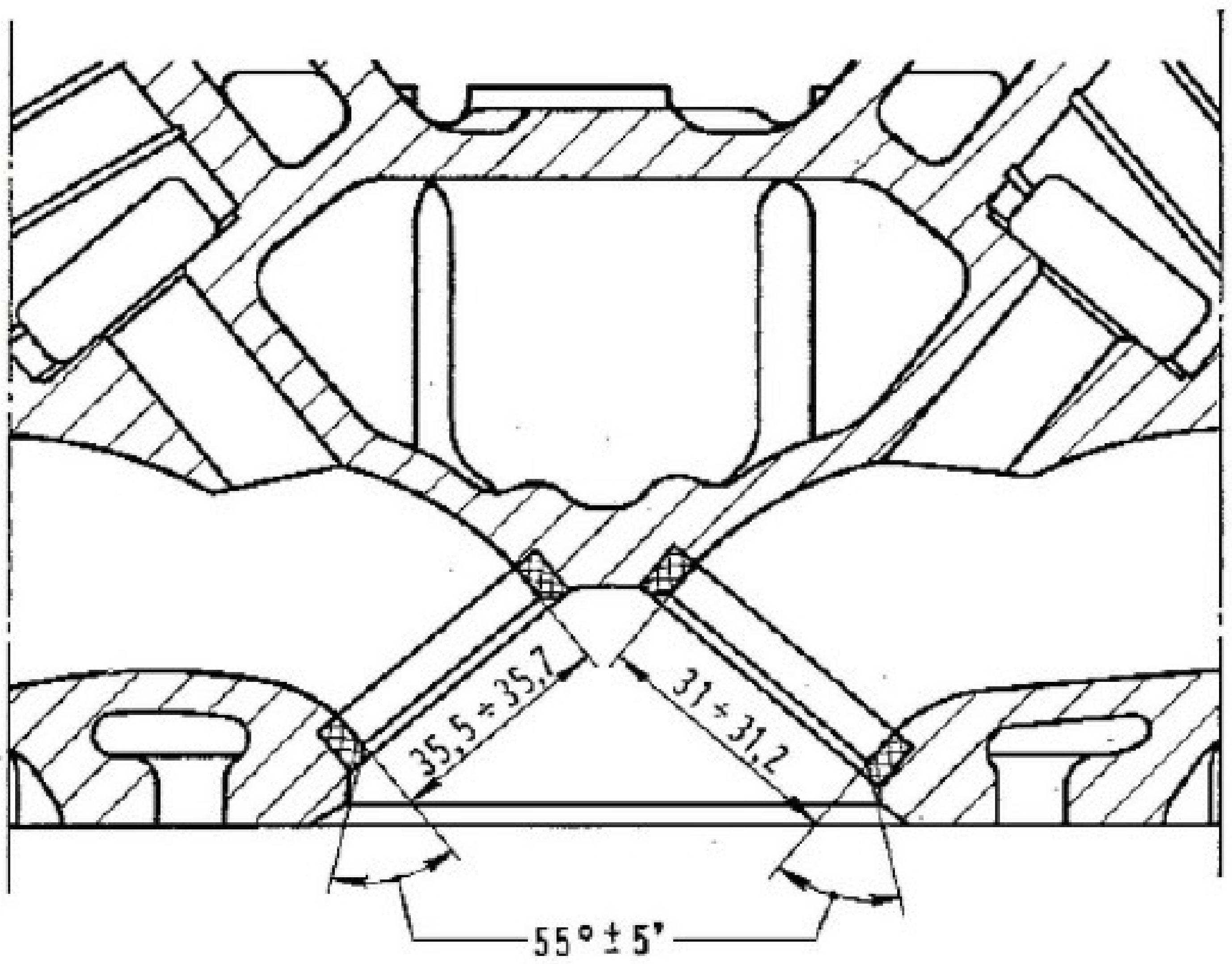


Fig. 25. - Cylinder head section on valve seats of one cylinder.

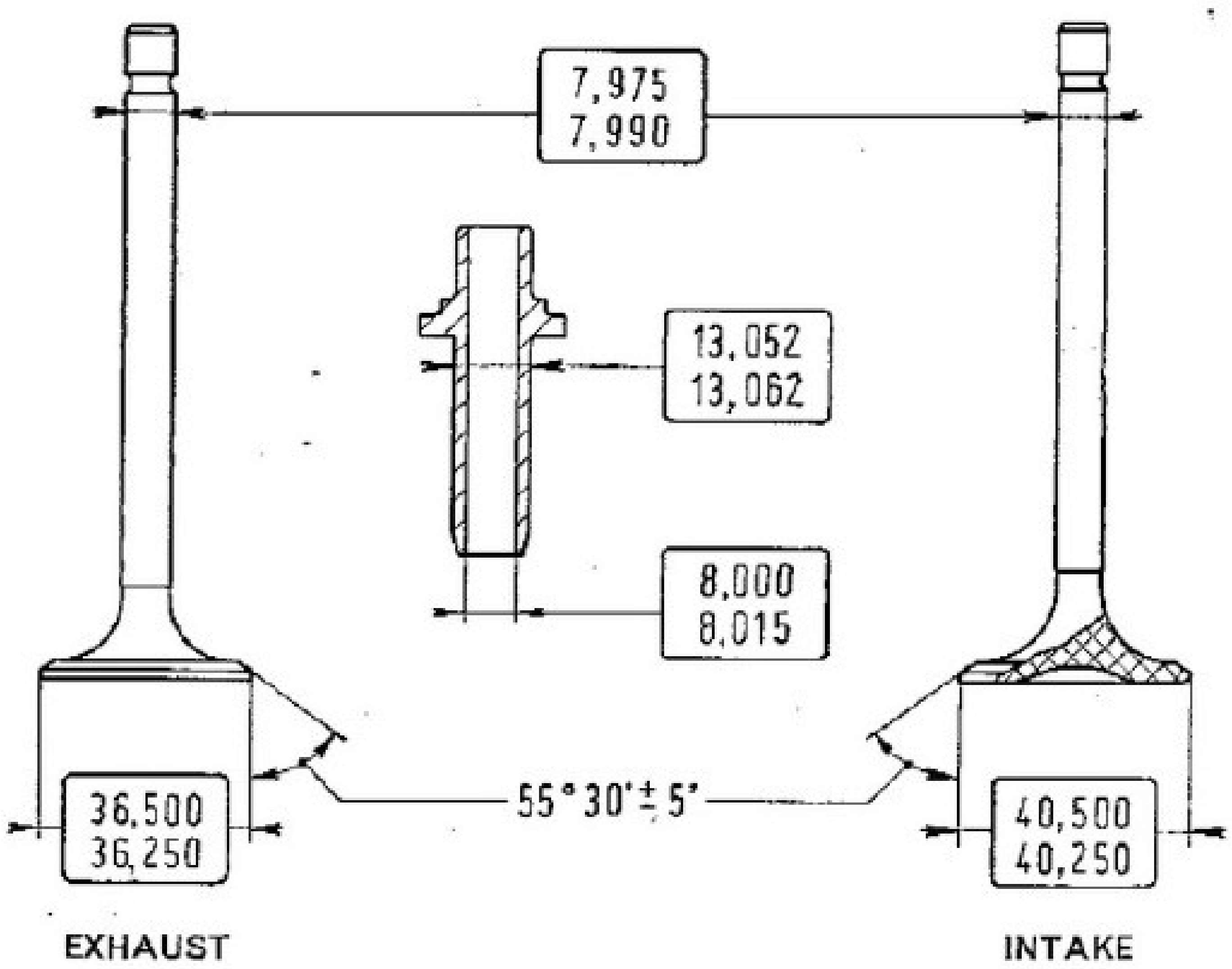


Fig. 26. - Main data - Valves and valve guides.

VALVE SPRING DATA

	No. of active coils	Total No. of coils	Inner Diam.	Wire diameter	A	B		C	
Outer spring . . .	4 1/4	5 3/4	24 mm .94"	3,50 mm .1378"	43,5 mm 1.71"	36 mm 1.42"	15 kg 33 lbs	27 mm 1.07"	33 kg 72.8 lbs
Inner spring . . .	5 1/2	7	17 mm .67"	2,75 mm .1083"	36,5 mm 1.43"	31 mm 1.22"	8,45 kg 18.6 lbs	22 mm .87"	22,3 kg 49.17 lbs

A = Free height B = Spring seated height C = Operation load min. height.

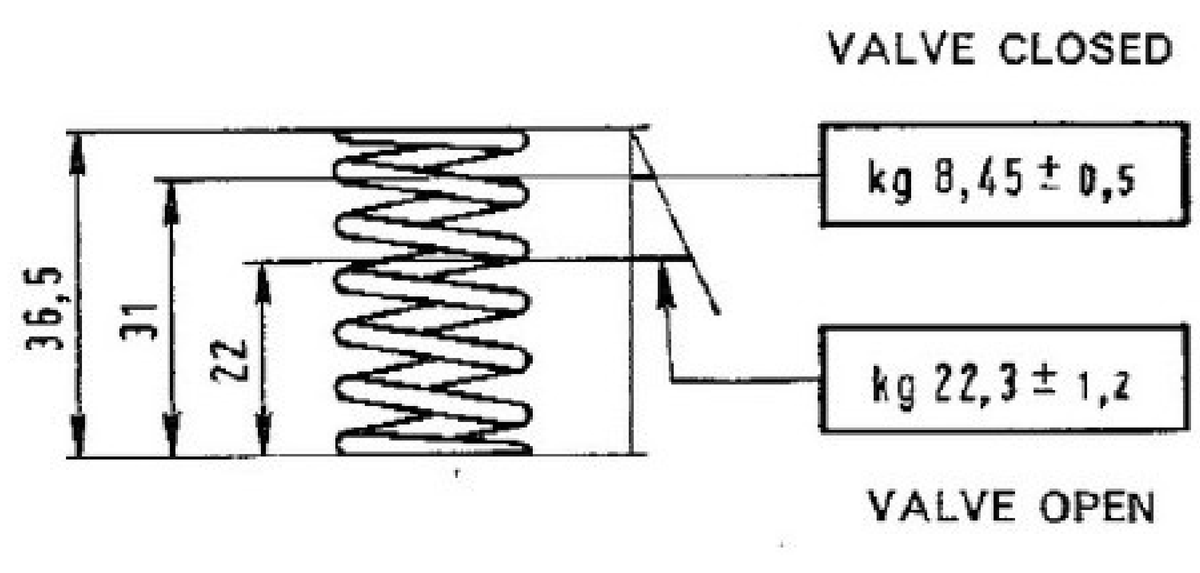


Fig. 27. - Valve inner spring data.

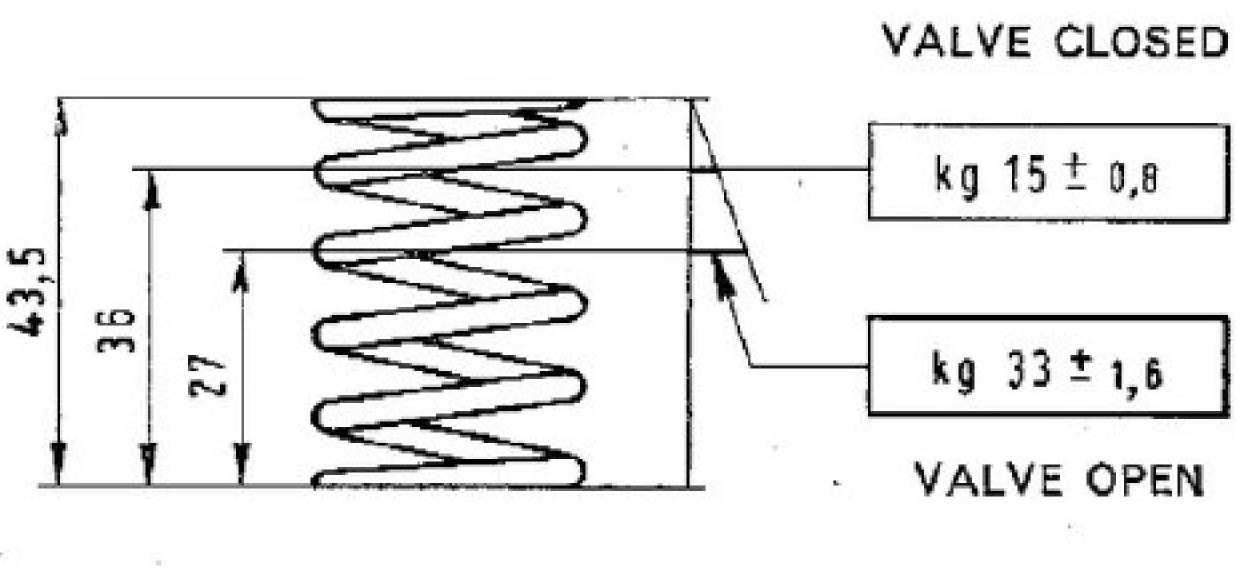


Fig. 28. - Valve outer spring data.

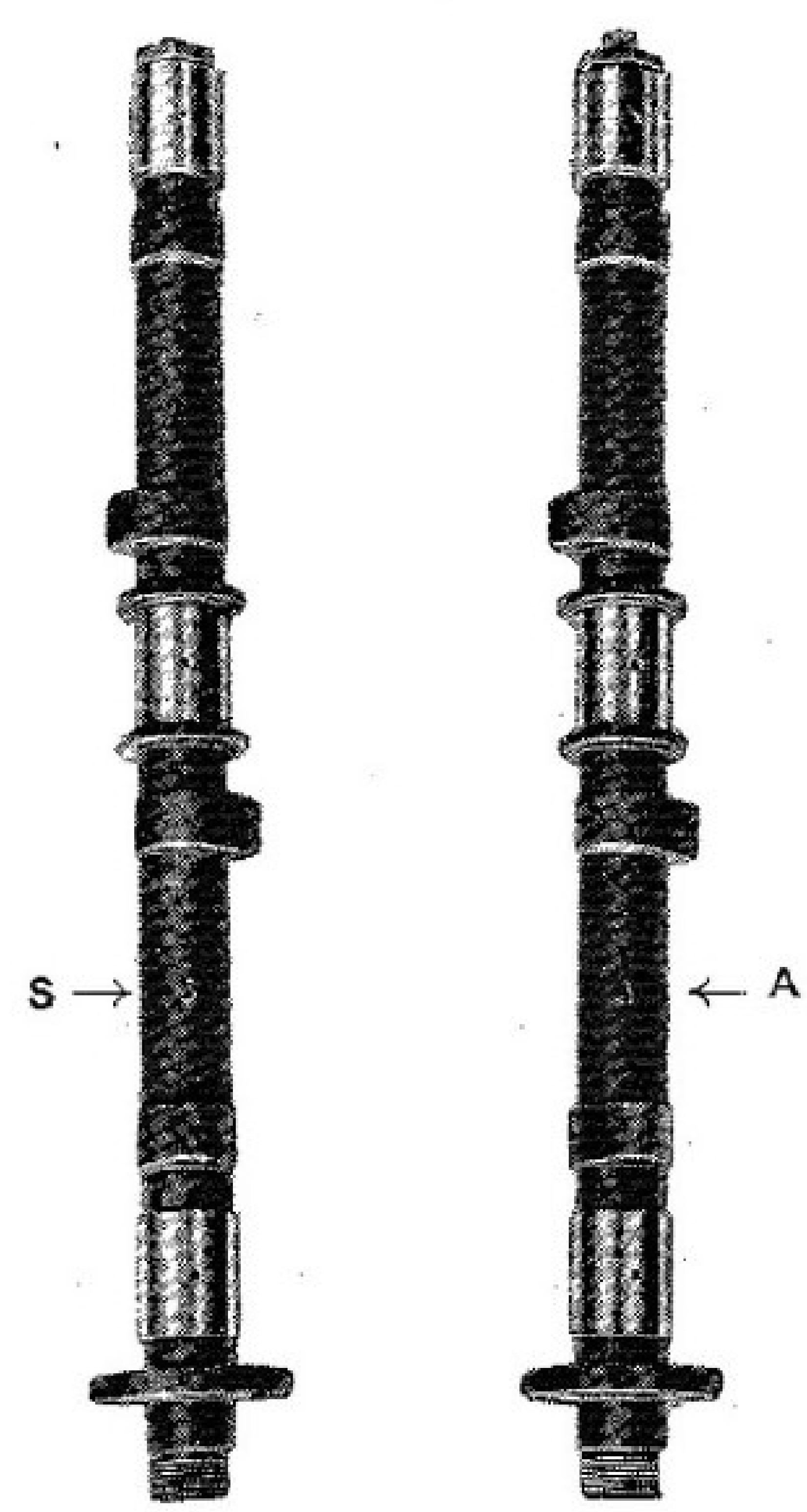


Fig. 29. - Camshafts: exhaust valve camshaft is marked S (left) and intake valve camshaft is marked A (right).

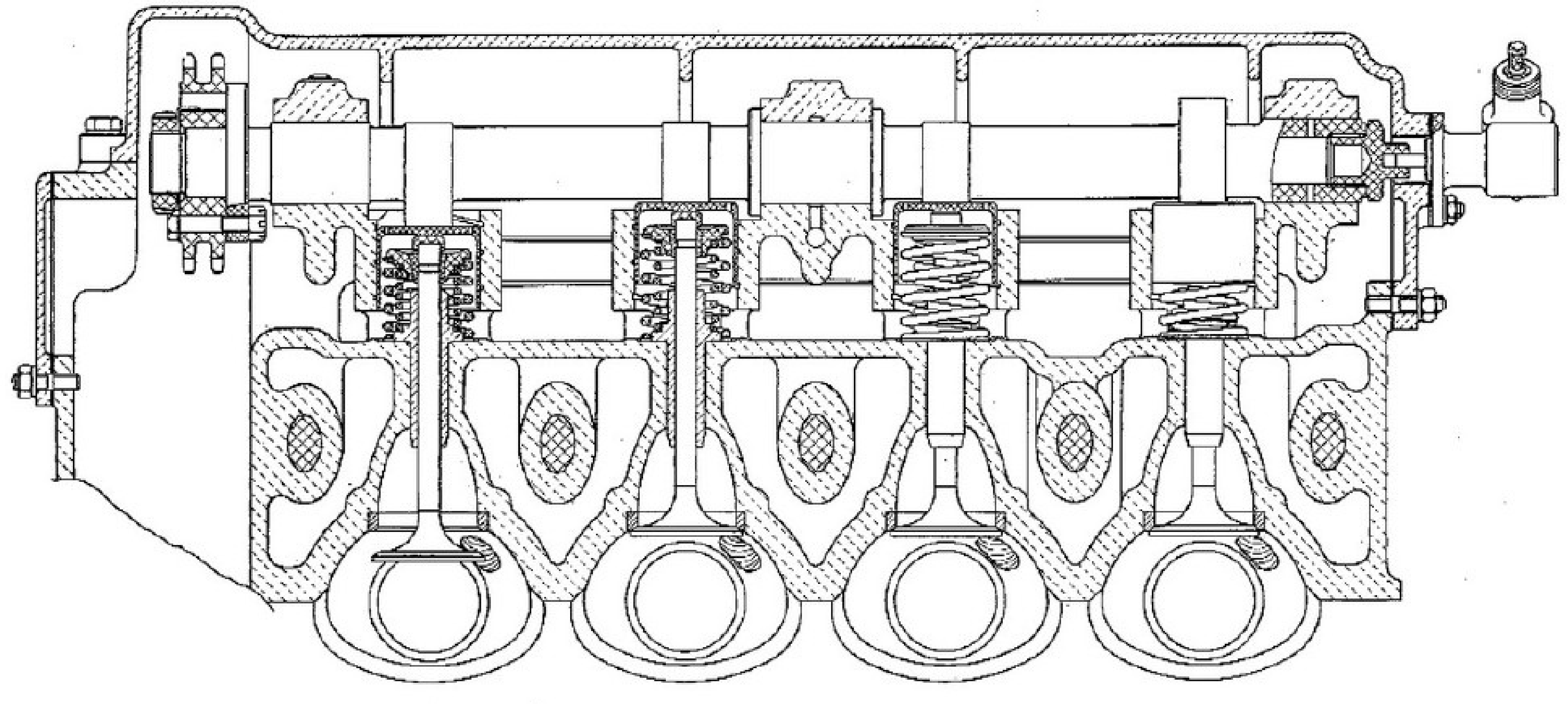


Fig. 30. - Cylinder head section through one of the camshafts and its valves.

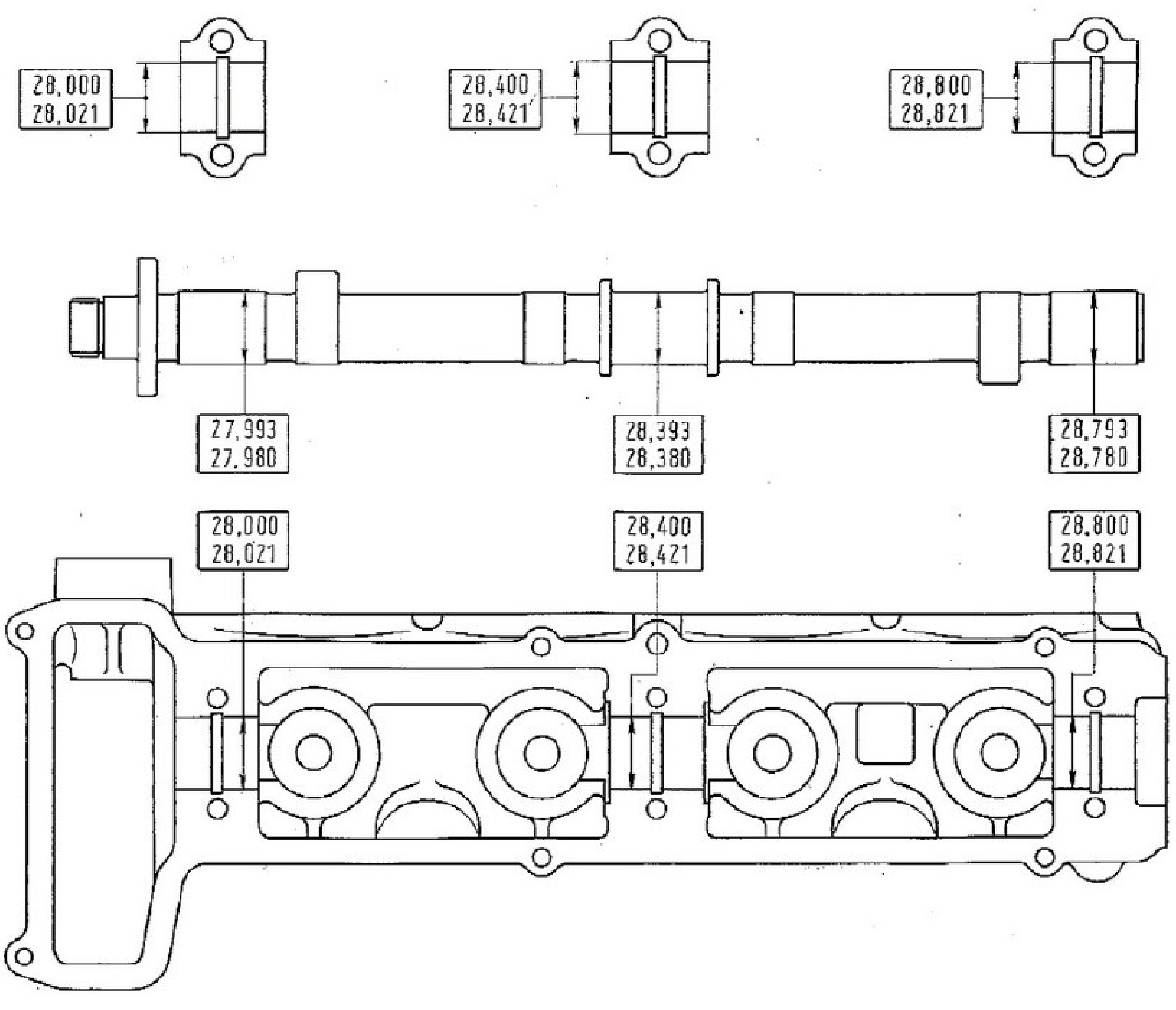


Fig. 31. - Diameters of camshaft journals, seats and caps.

CHECKING AND ADJUSTING VALVE CLEARANCE (cold engine)

The clearance setting between camshafts and valves of:

— 0,30 mm (.012") intake valves;

— 0,35 mm (.014") exhaust valves;

should be kept as much as possible constant in order not to alter the specified timing and obtain optimum engine operation. In fact, if clearance is excessive, noises will develop, while if it is much less than specified, valves will keep on staying a bit open with consequent lack of compression, reduced life of valves and seats.

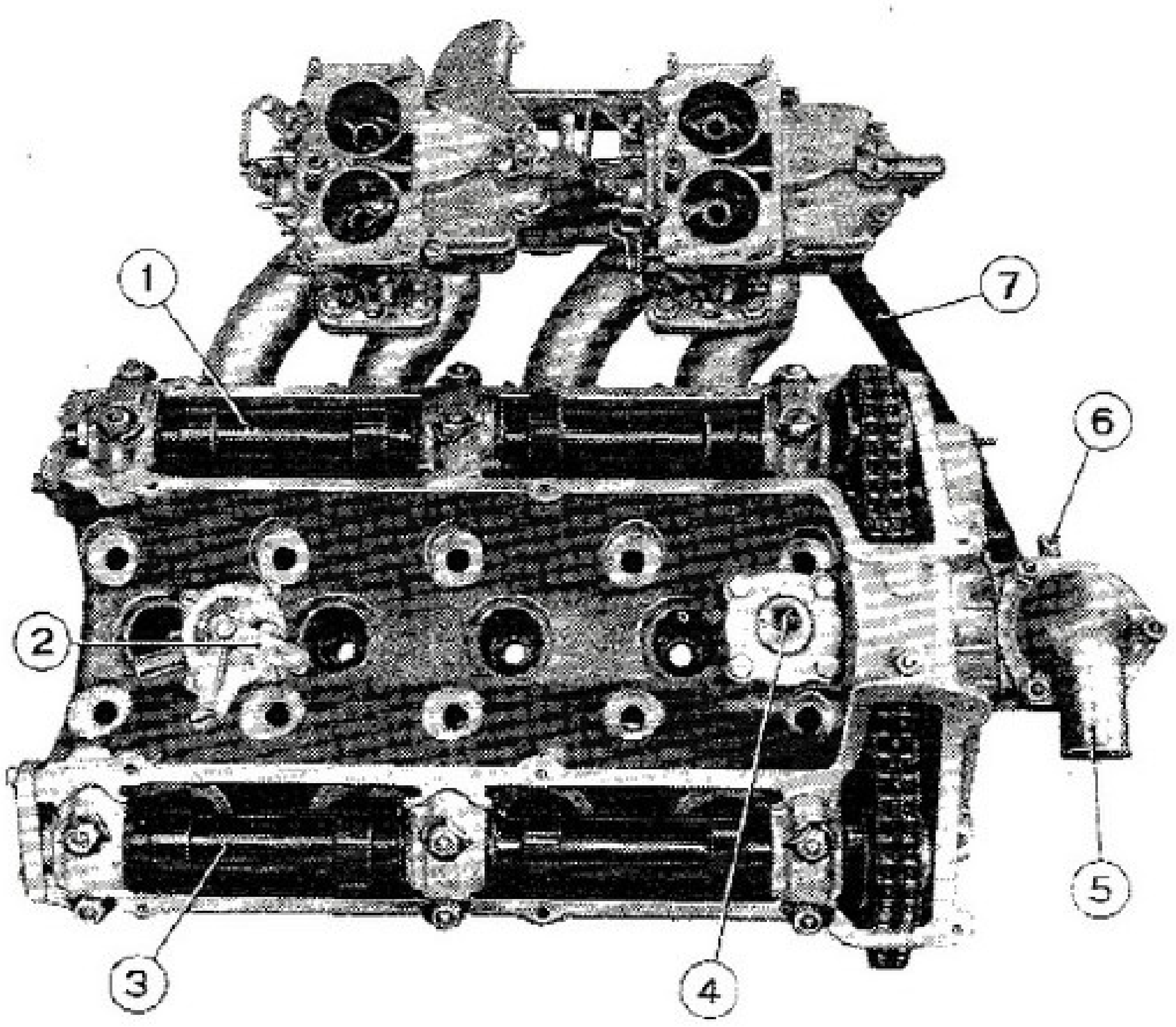


Fig. 32. - Detail of engine with valve gear covers removed.

1. Intake valves camshaft - 2. Cock, water to car heater - 3. Exhaust valves camshaft - 4. Heat indicator sending unit - 5. Cylinder head water outlet - 6. Water return line from heater - 7. Water delivery line to intake manifold.

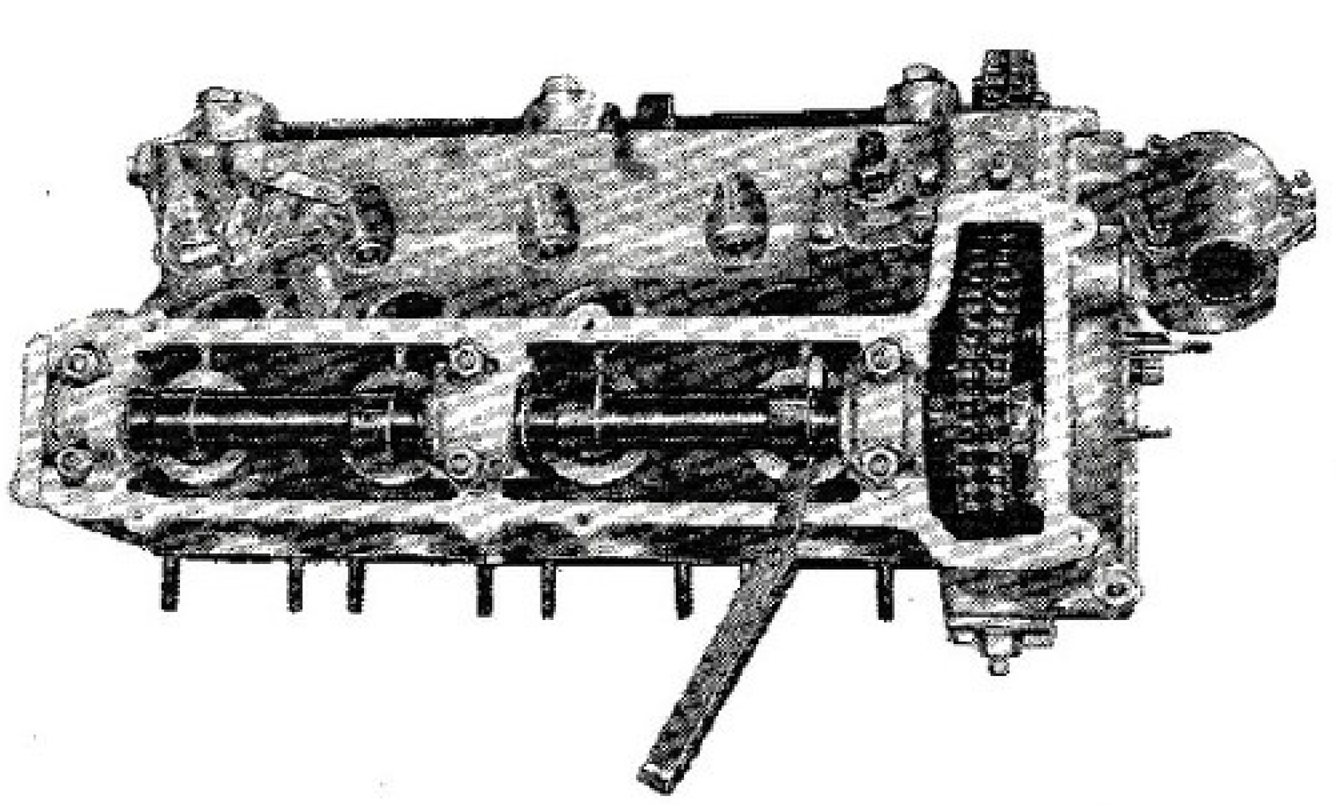


Fig. 33. - Checking valve clearance with feeler gauge C 315.

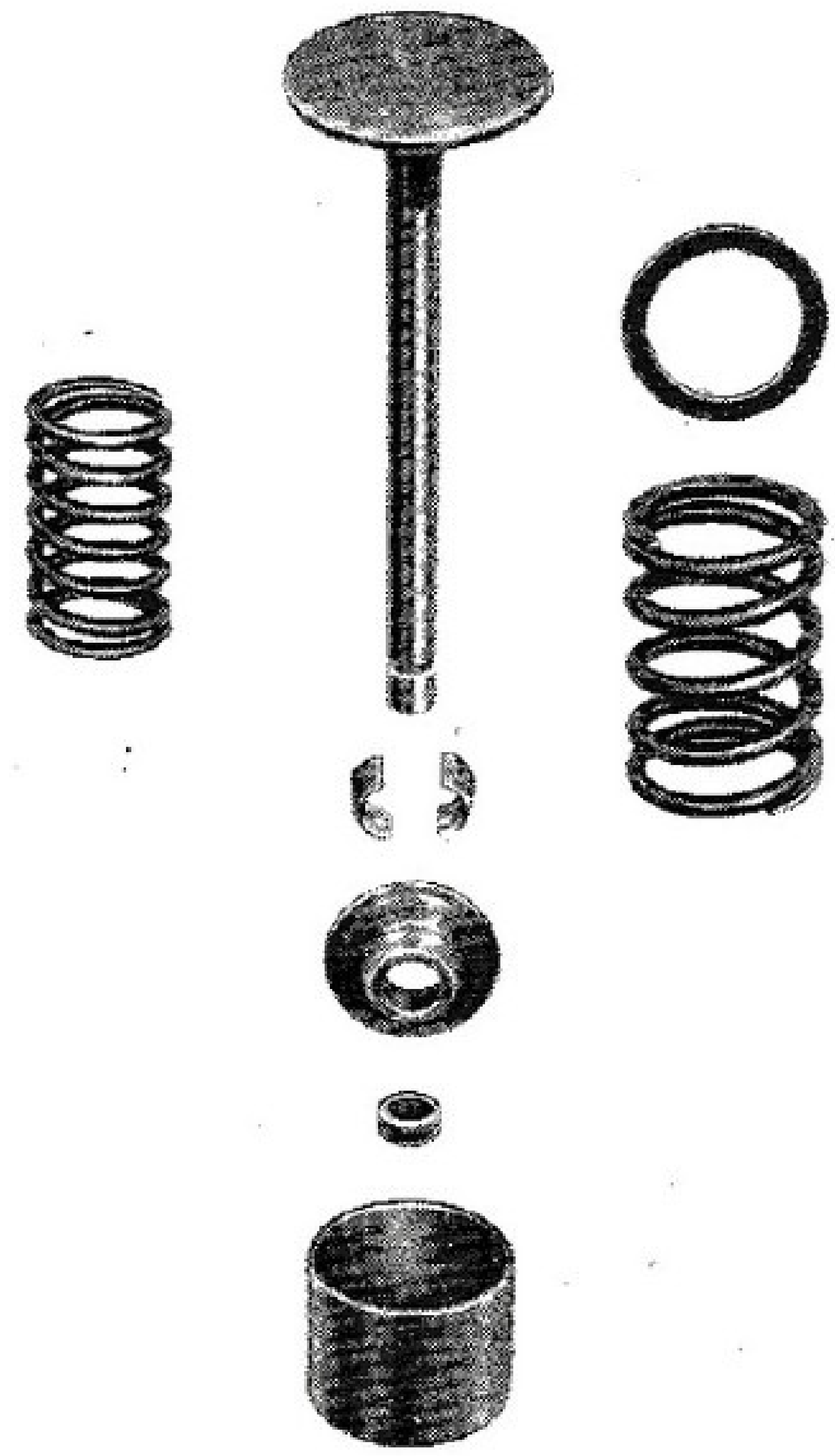


Fig. 34. - Detail of valve and its component parts.

Before any re-adjustment is undertaken, check with feeler gauge **C. 315** (fig. 33) the clearance between valves and camshaft and record each reading.

This procedure makes it possible to know beforehand the thickness of each valve end cup (fig. 35) for end cups are supplied in thicknesses ranging from 2 mm (.0787") to 3,20 mm (.1260") in progressive 0,05 mm (.0020") oversize increments.

Once the valves needing a clearance re-adjustment are singled out, proceed as follows:

— Turn flywheel until its « 1/4 » reference mark lines up with the mark on crankcase (fig. 36) and the reference marks on camshafts line up with the marks on camshaft caps (fig. 40).

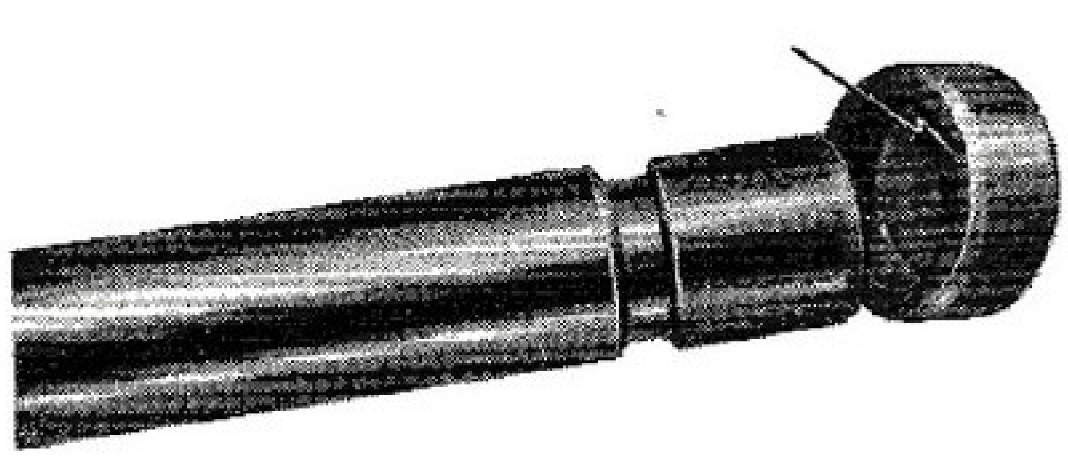


Fig. 35. - Detail of a valve stem and different thickness cups for clearance adjustment.

— See if the timing chain removable link is in a visible and accessible position (fig. 37), if not, turn flywheel until the alignment of reference marks and the correct location of chain removable link are coincident.

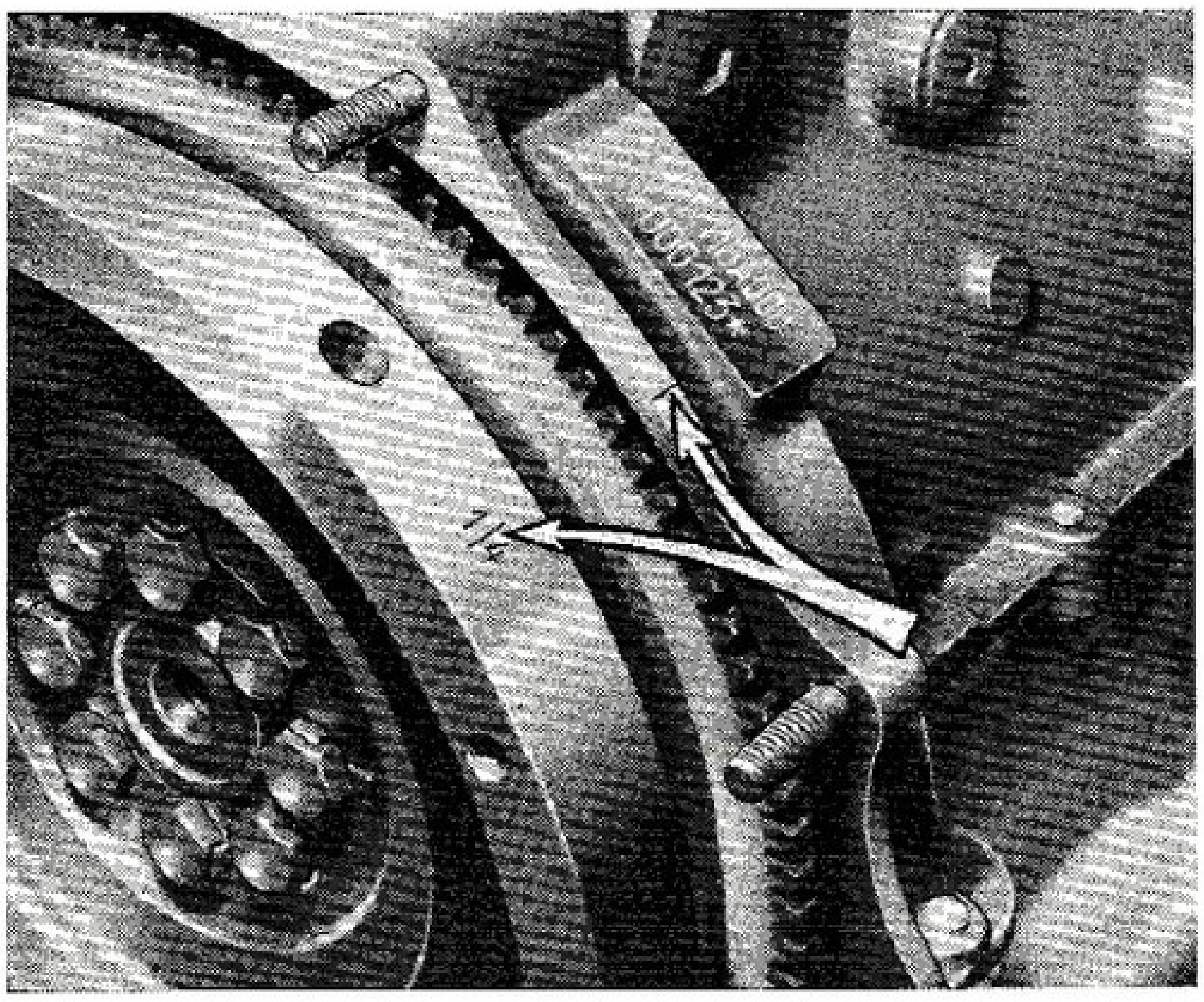


Fig. 36. - Reference marks on flywheel and crankcase for valve gear and ignition timing.

— Take off the link retainer, remove the link and secure chain free ends with two pieces of wire (fig. 38) so that it cannot fall into the timing gear case.

Remove camshafts and proceed with the replacement of the end cups between valves and tappets (fig. 35) in accordance with the previously recorded clearances.

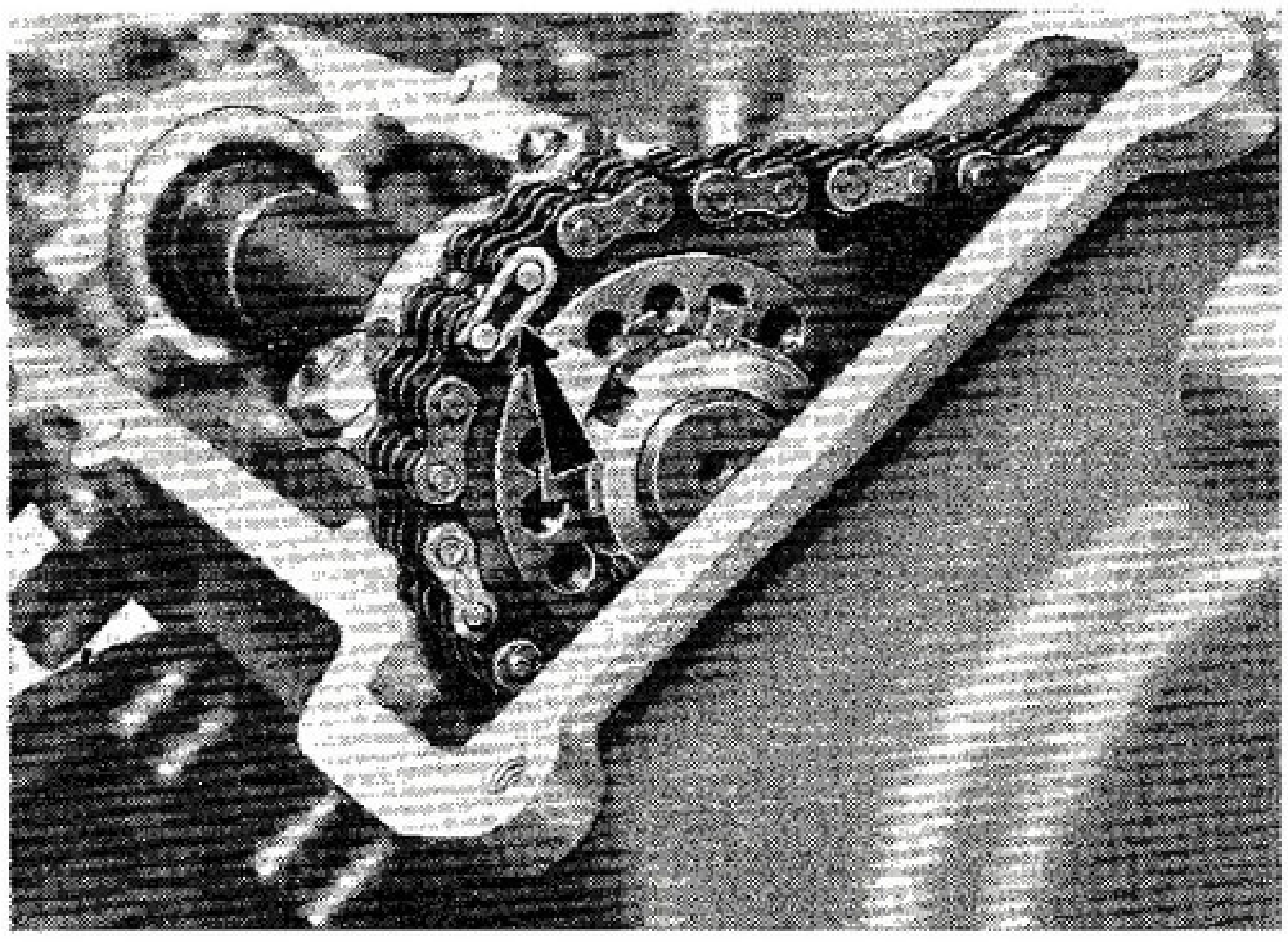


Fig. 37. - Upper timing chain link retainer.
Arrow points to retainer.

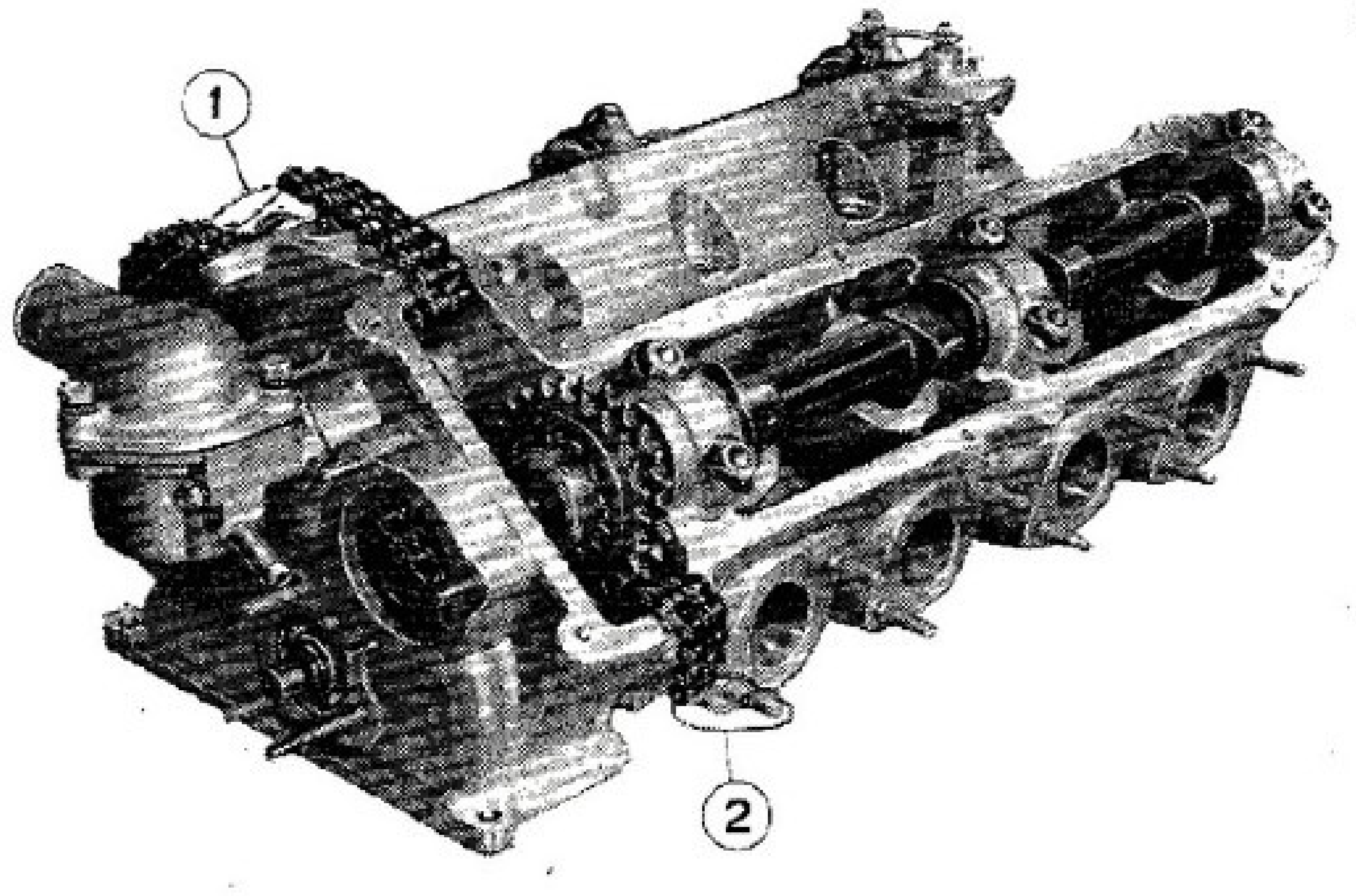


Fig. 38. - Camshaft drive chain opened.
1 and 2. Chain ends secured by wire.

NOTE - With chain open, do not vary the position of crankshaft.

After these preliminary operations, remove camshaft caps taking care to slacken central support screws first, followed by the front and rear caps, as uniformly as possible to prevent distortion of camshafts by the upward push of valve springs.

After re-adjustment, re-install all parts by reversing the removal operations, making sure that reference marks coincide.

Carry out a final check to ensure that clearances are all as specified.

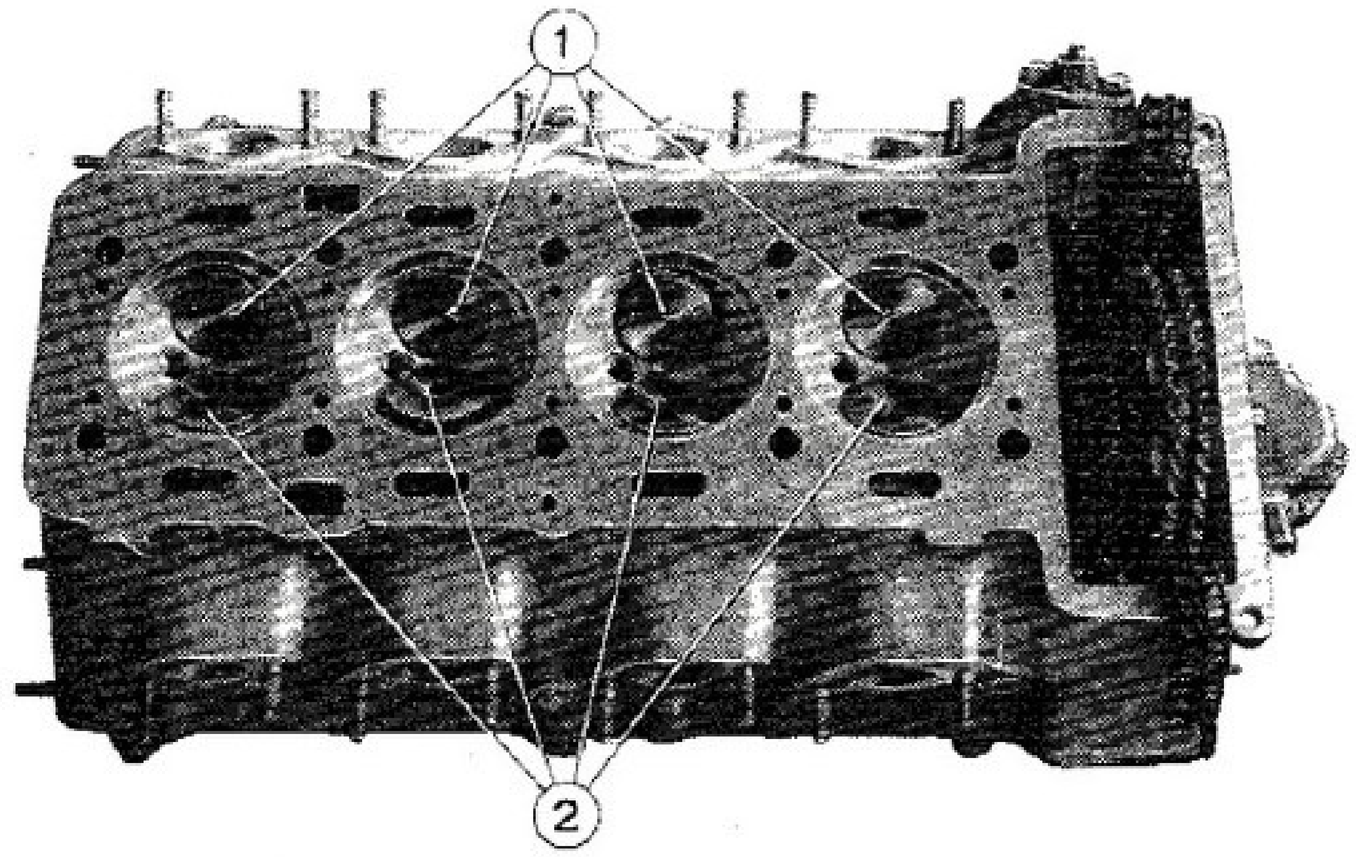


Fig. 39. - Cylinder head bottom view.
1. Intake valves - 2. Exhaust valves.

VALVE GEAR TIMING

Proceed as follows:

— Turn flywheel until its « 1/4 » reference mark lines up with the mark on crankcase (fig. 36) and see to it that the reference marks on camshafts line up with the marks on camshaft caps (fig. 40).

— Install the upper chain, locating the removable link retainer in the position shown in fig. 37, and stretch the chain as instructed on next page. Using a graduated sector, and turning the flywheel, check that the advance and retard angles, respectively at opening and closing of intake and exhaust, correspond to the ones specified on the timing diagram in reference to the 0,30 mm (.012") and 0,35 mm (.014") clearances, respectively for the intake and exhaust valves.

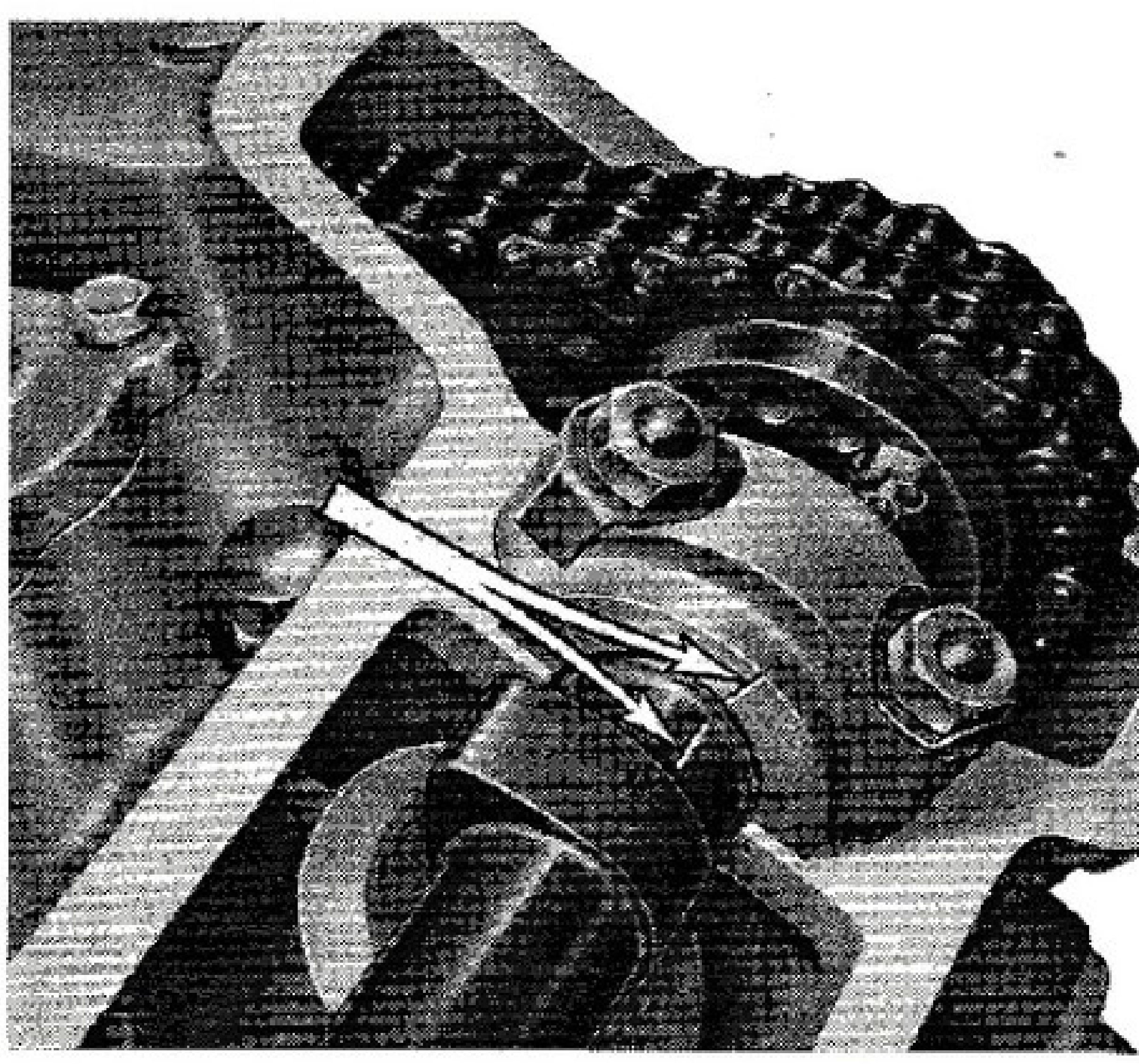


Fig. 40. - Timing reference marks on camshaft and cap.

In case a re-adjustment is required, timing may be corrected to the specified values by relocating the holes (14 in all) in the flange of camshafts relative to the holes (15 in all) in sprocket (see fig. 42).

The difference in the number of holes allows a correction of 1° 42′ 51″, plus or minus as required, by shifting the location screw to the hole immediately following or preceding, whichever is the case.

For this operation, proceed as follows: open lockplate tabs, back out the adjuster rings, remove sprocket-to-camshaft location screws; while holding fast the sprocket, relocate the camshaft as required to obtain the correct setting, re-install the location screws in the newly aligned holes, fully tighten adjuster rings and secure by lock plate tabs.

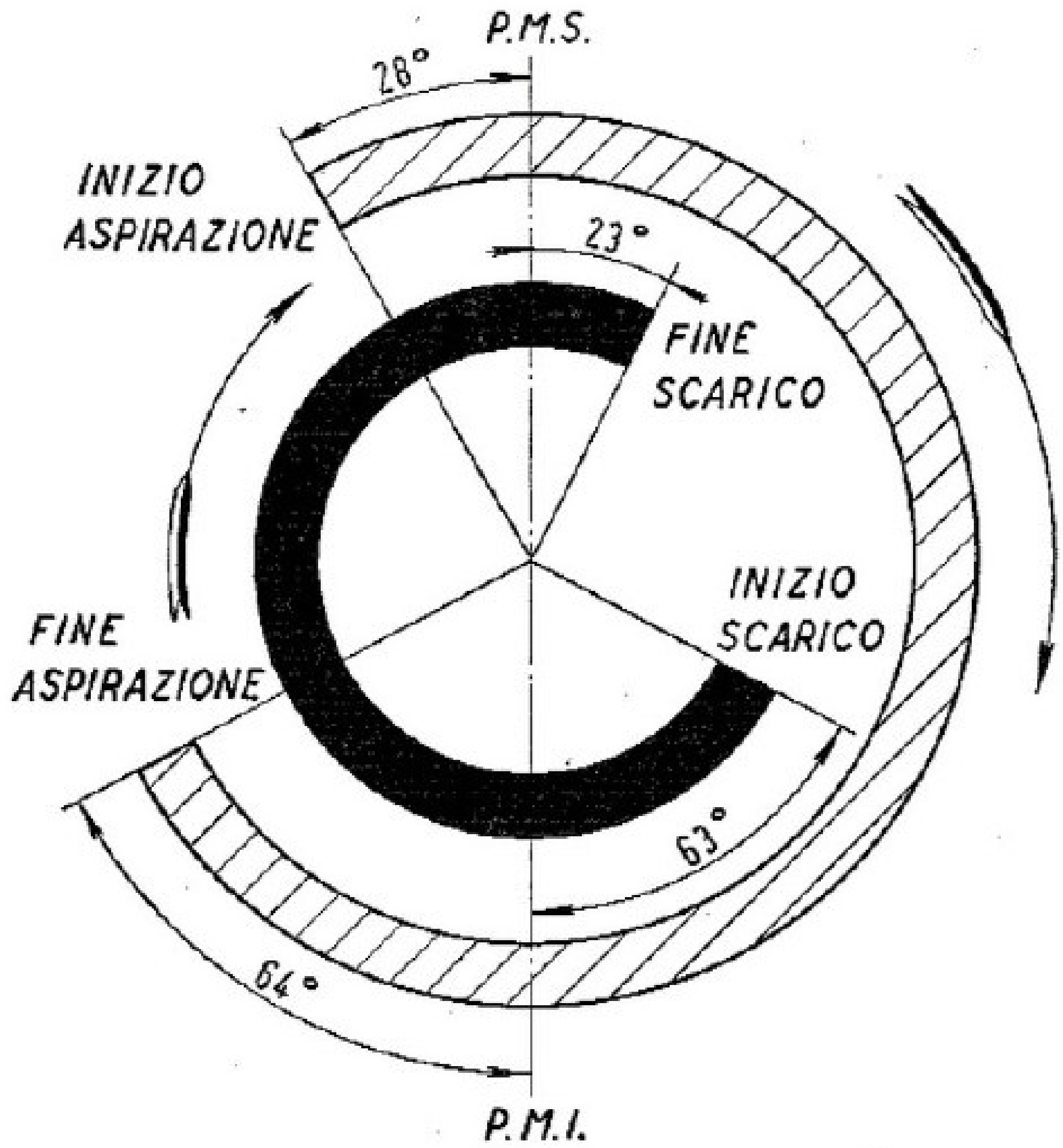


Fig. 41. - Timing diagram of engine type 118 A.000.

Inizio aspirazione = *Intake begins*
Fine aspirazione = *Intake ends*
Inizio scarico = *Exhaust begins*
Fine scarico = *Exhaust ends*
PMS = *TDC*
PMI = *BDC*

SPECIFIED TIMING DATA

Intake (with valve-to-camshaft clearance of 0,30 mm - .012"):

— **opens: before T.D.C.** . . . . **28°**

— **closes: after B.D.C.** . . . . **64°**

Exhaust (with valve-to-camshaft clearance of 0,35 mm - .014"):

— **opens: before B.D.C.** . . . . **63°**

— **closes: after T.D.C.** . . . . **23°**

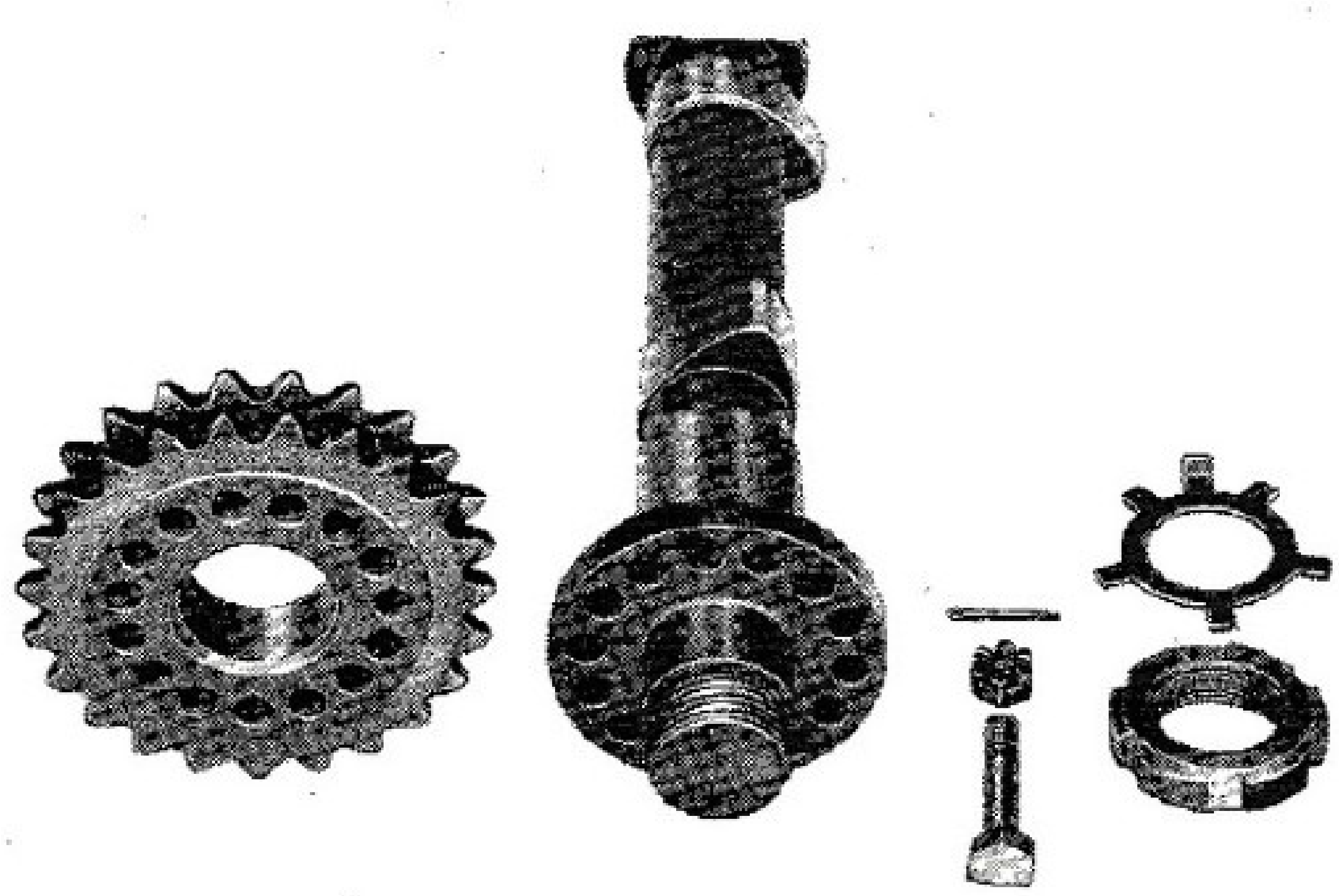


Fig. 42. - Flanged camshaft with sprocket, location screw, adjuster ring and lockplate.

The sprocket has 15 drilled holes, the camshaft flange 14. By varying the mounting position of sprocket on camshaft of 1 hole, an angular displacement of 1° 42′ 51″ — plus or minus depending on the direction of rotation — is obtained, to reset engine timing in conformity with the specified data (see timing diagram, above).

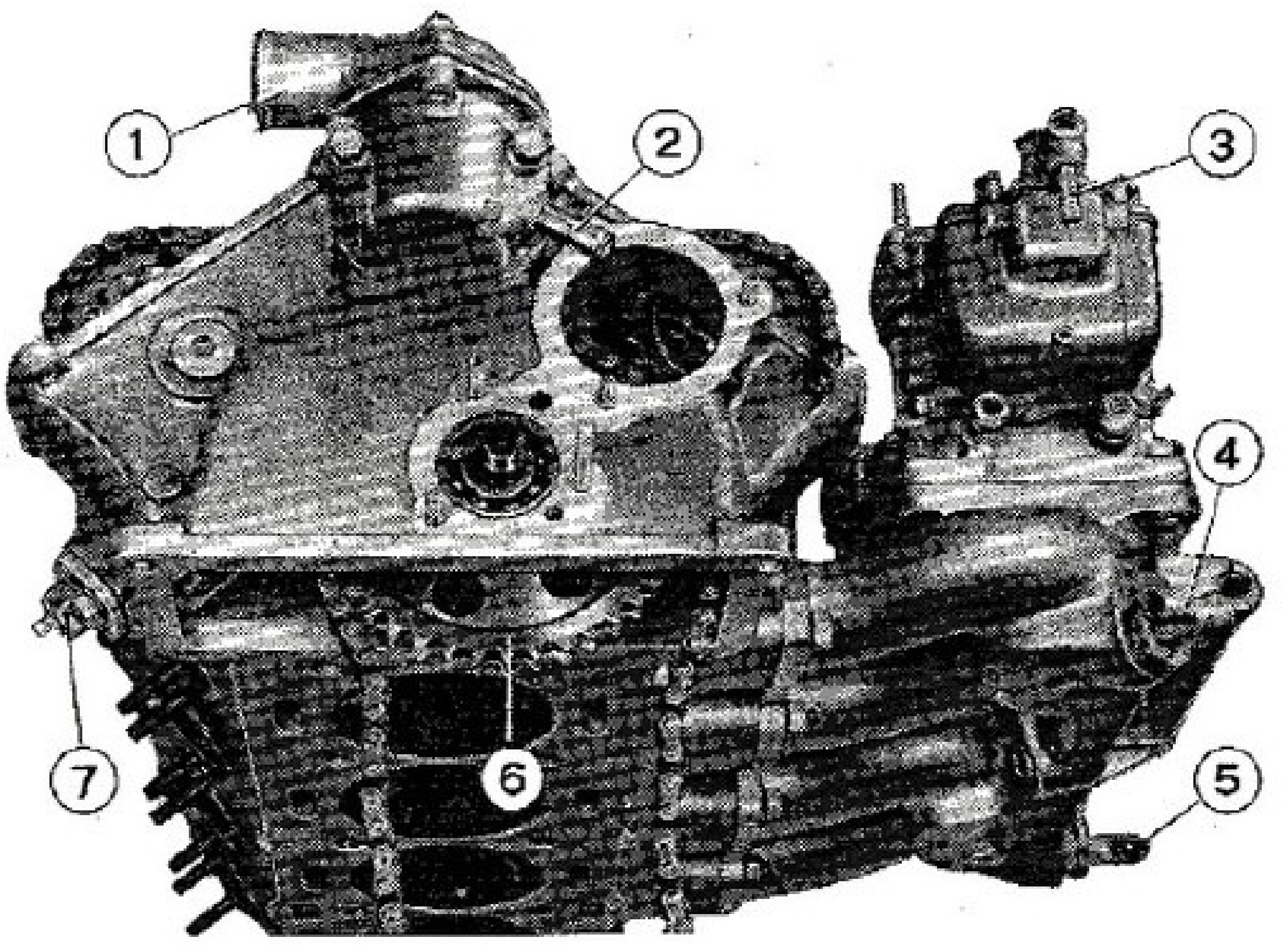


Fig. 43. - Cylinder head assembly, front bottom end view.

1. Water outlet elbow - 2. Water delivery line to intake manifold (to be connected to item 4) - 3. Fuel line to carburetor - 4. Intake manifold water inlet connection - 5. Intake manifold water outlet connection - 6. Idler sprocket.

Timing chains tension adjustment.

Timing chains tension is adjusted by the stretcher shown in figs. 43-44-45 and 48.

Chains must not be excessively stretched (sag under hand pressure: 1 to 2 mm - .04″ to .08″).

Turn stretcher square shank counterclockwise to increase and clockwise to reduce chain tension. Care must be taken that the nuts and bolts fixing the stretcher flanges to cylinder head and crankcase are well taut.

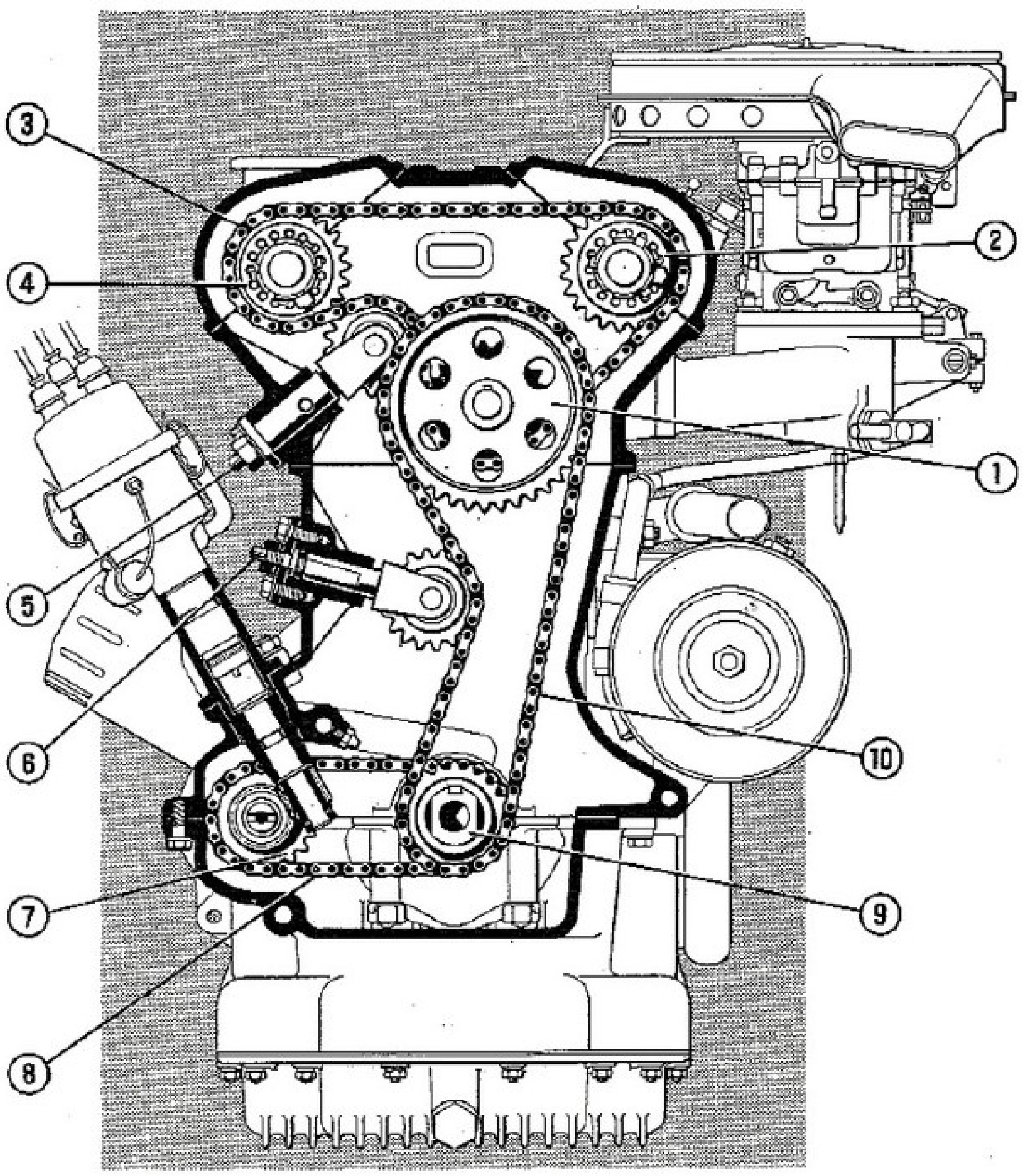


Fig. 44. - Valve gear drive.

1. Idler sprocket - 2. Intake valves camshaft sprocket - 3. Chain, double row, camshaft drive - 4. Exhaust valves camshaft sprocket - 5. Stretcher, chain (3) - 6. Stretcher, chain (10) - 7. Sprocket, ignition distributor and oil pump drive - 8. Chain, single, sprocket (7) drive - 9. Crankshaft - 10. Chain, double row, idler sprocket drive.

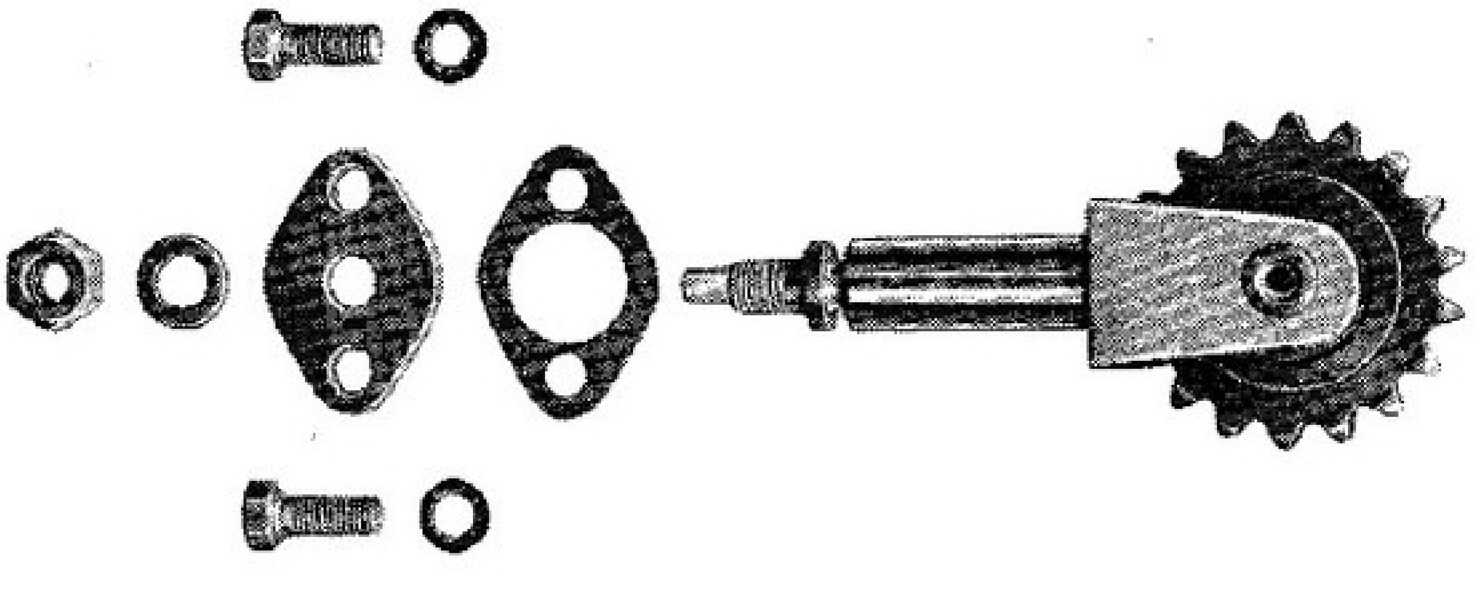


Fig. 45. - Timing chain stretcher components.

ADJUSTING IGNITION DISTRIBUTOR-AND-OIL PUMP DRIVE SHAFT END PLAY

Oil pump and ignition distributor are driven off the crankshaft via a chain and a helical gear set (fig. 47).

To take up end play, a thrust washer is fitted between the abutment face of ignition distributor/oil pump drive shaft and the oil pump ball bearing in pump body (see figs. 23, 47).

Thrust washers are available as spares in 0,10 mm (.0039") oversize thickness increments, from 1,70 mm (.0669") to 3,00 mm (.1181").

Adjustment procedure is as follows:

Make sure the shaft ball bearings are tightly press-fitted, at both crankcase and pump body ends, and insert the drive shaft into the crankcase bearing.

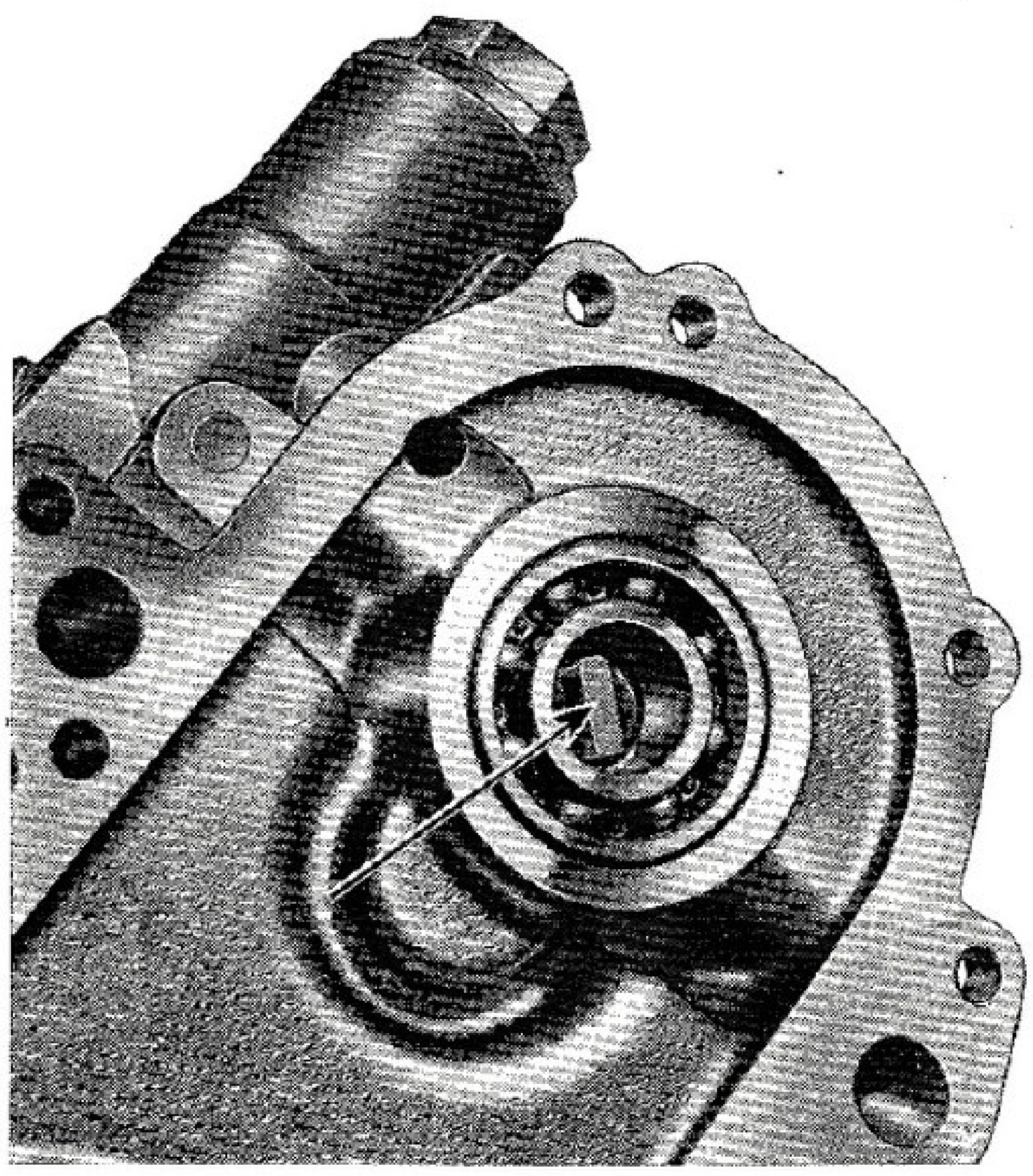


Fig. 46. - Detail of the oil pump body with bearing. Arrow points to the shaft drive joint.

Holding a straight edge on crankcase machined surface, find a thrust washer having a thickness equivalent to the gap between shaft abutment face and straight edge; make sure that the mounting plane of the ball bearing in pump body is flush with pump body mounting flange: differences, if any, must be kept in due account to increase or decrease the washer thickness.

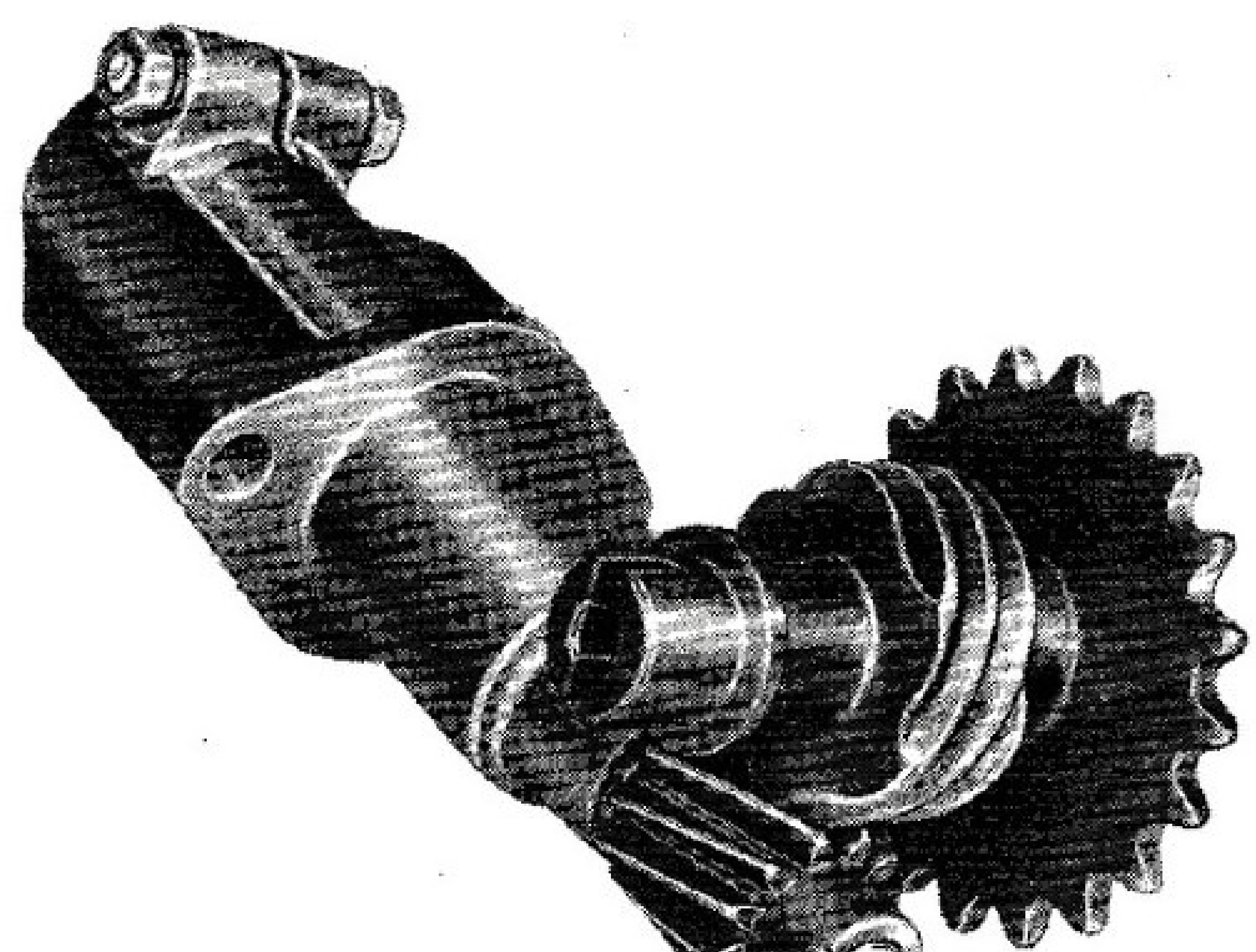


Fig. 47. - Ignition distributor-oil pump drive gear set and shaft, with thrust washer.

Thrust washers are supplied in different 0,10 mm (.0039") oversize thickness increments, from 1,70 mm (.0669") to 3,00 mm (.1181") to allow for end play adjustment between shaft abutment flange and pump ball bearing.

On shaft, insert the washer of the required thickness and fit the oil pump after interposing a paper gasket. The drive shaft end play is determined by the thickness of this paper gasket.

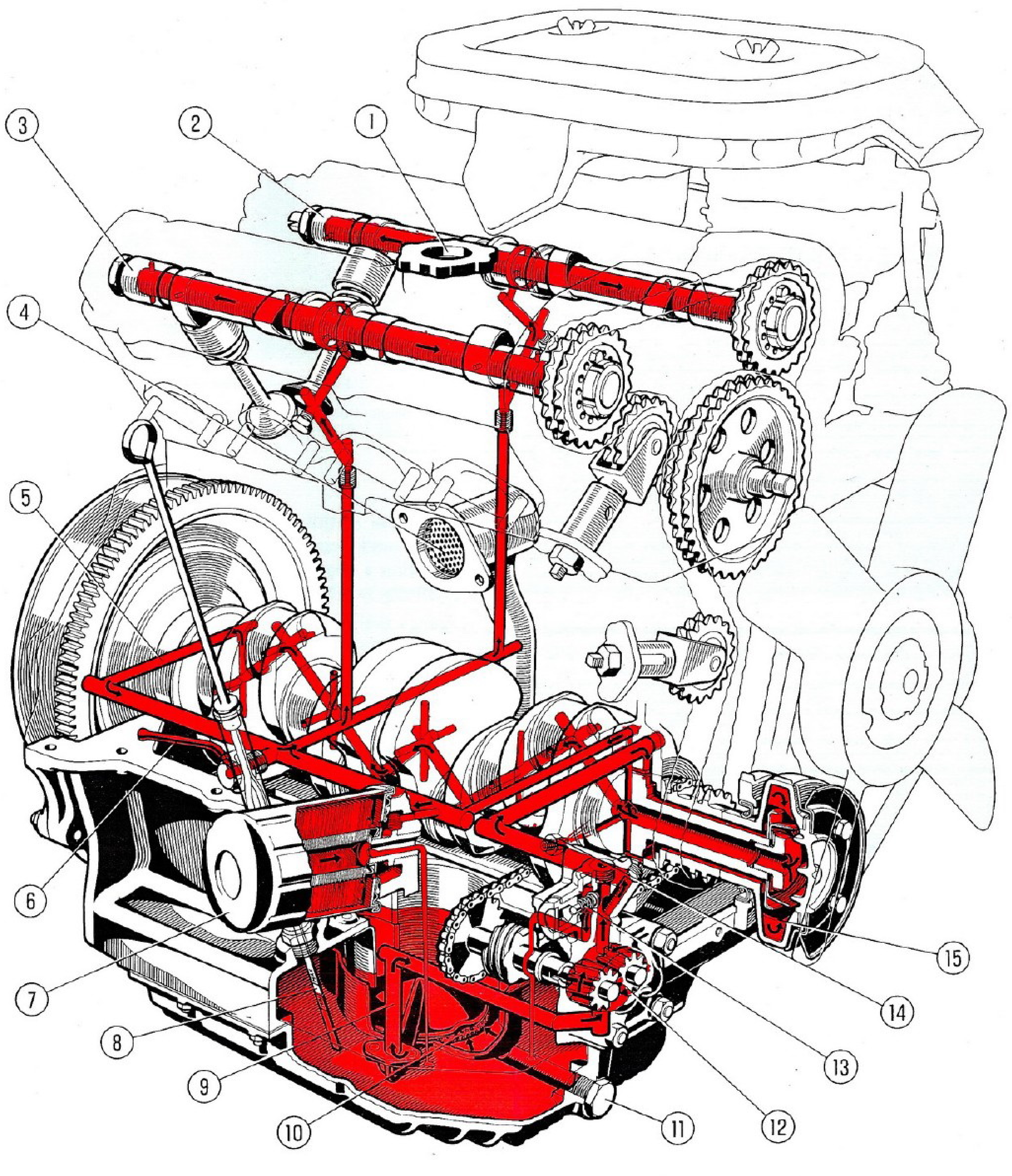


Fig. 48. - Engine **lubrication** diagram.

1. Oil filler - **2. Intake valves camshaft** - **3. Exhaust valves camshaft** - **4.** Crankcase **oil** vent line, **with filter** - **5. Duct, oil to pressure gauge, camshafts and** by-pass **filter** - **6. Line,** oil **to** pressure **gauge** - **7. By-pass oil filter** - **8. Oil level indicator** rod - **9. Oil suction** line **in sump** - **10. Oil** intake filter - **11. Drain** plug - **12. Oil** gear **pump** - **13. Oil pressure relief** valve - **14. Connection, ignition** distributor **and** oil **pump drive chain** lubrication - **15. Centrifugal oil filter.**

IGNITION TIMING

Proceed as follows:

— Turn flywheel until the «1/4» mark lines up with the T.D.C. index on flywheel housing.
— Check if the cylinder at the end of the compression stroke is No. 1 or No. 4.
— Move the rotor until it points to the contact for firing in cylinders No. 1 or 4, whichever is the case.

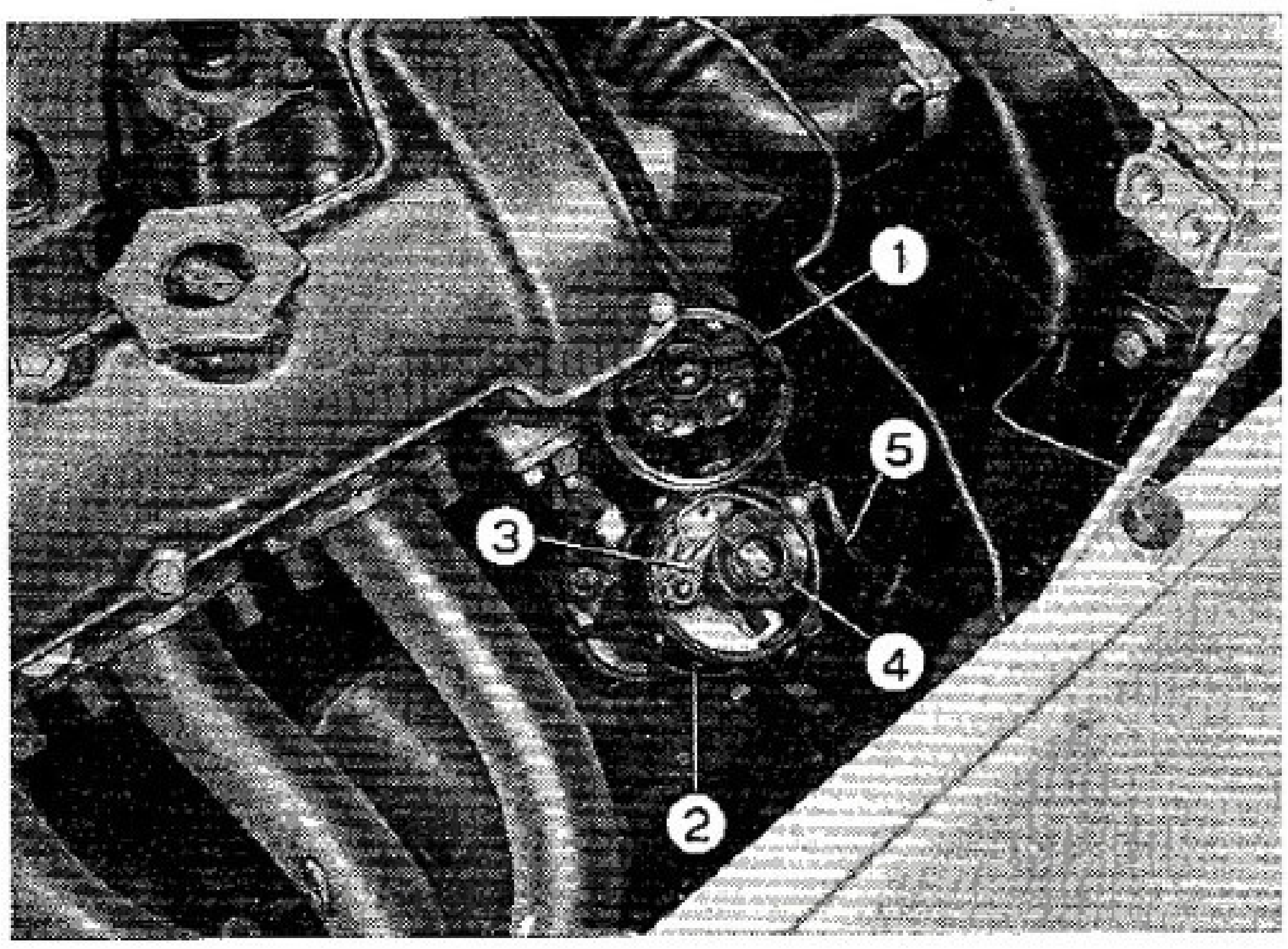


Fig. 49. - Ignition distributor on engine (cap removed).
1. Cap - 2. Body - 3. Breaker arm - 4. Rotor - 5. LT cable.

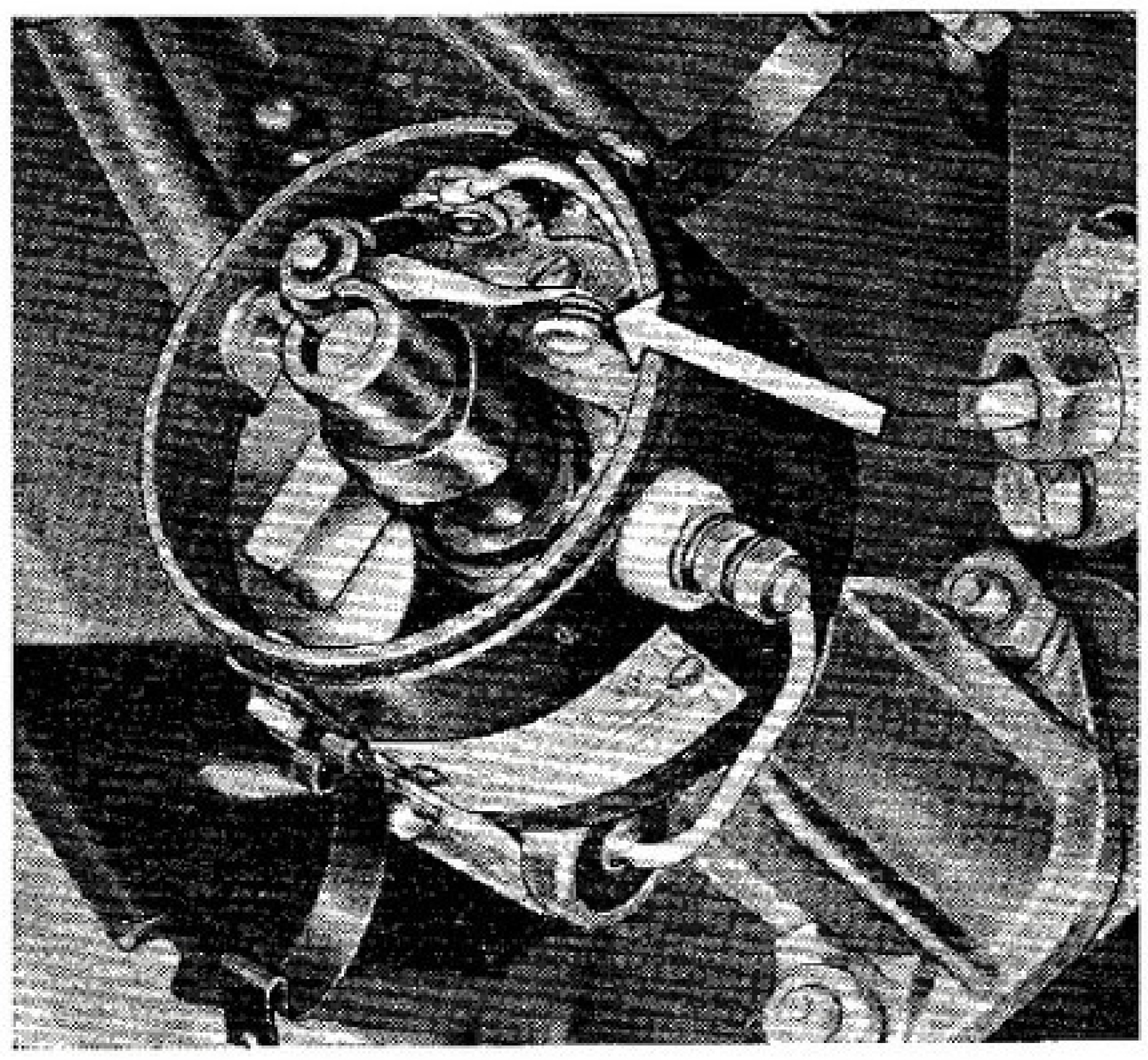


Fig. 50. - Ignition distributor.

The arrow points to the breaker gap which must be 0,45 ± 0,03 mm (.018" ± .0012") as specified.

— Place the distributor in its seat and turn distributor body until breaker contacts begin to open, while applying a slight pressure on the rotor in a direction contrary to shaft rotation.
— Check that when contacts are open to the specified gap (0,42-0,43; .017"-.019") the rotor registers with

ENGINE TIGHTENING REFERENCE

ITEM	Drwg. or Std. part No.	Thread	Material	Tightening torque	
				kgm	ft. lbs
Screw — flywheel to crankshaft	4063299	9 MB (x 1)	R 100	4700	34
Self-locking nut — connecting rod cap screw .	4045971	9 MB (x 1)	R 80	4000	28.9
Blind nut — cyl. head to crankcase stud . . .	4046070	12 MB (x 1,5)	R 80 Cdt (Stud R 100)	7000	50.6
Screw — crankshaft support cap	4046065	11 MA (x 1,5)	R 100	7300	52.8
Nut — camshaft support cap stud	1/61008/21	8 MA (x 1,25)	R 80 Cdt (stud R 100)	2500	18

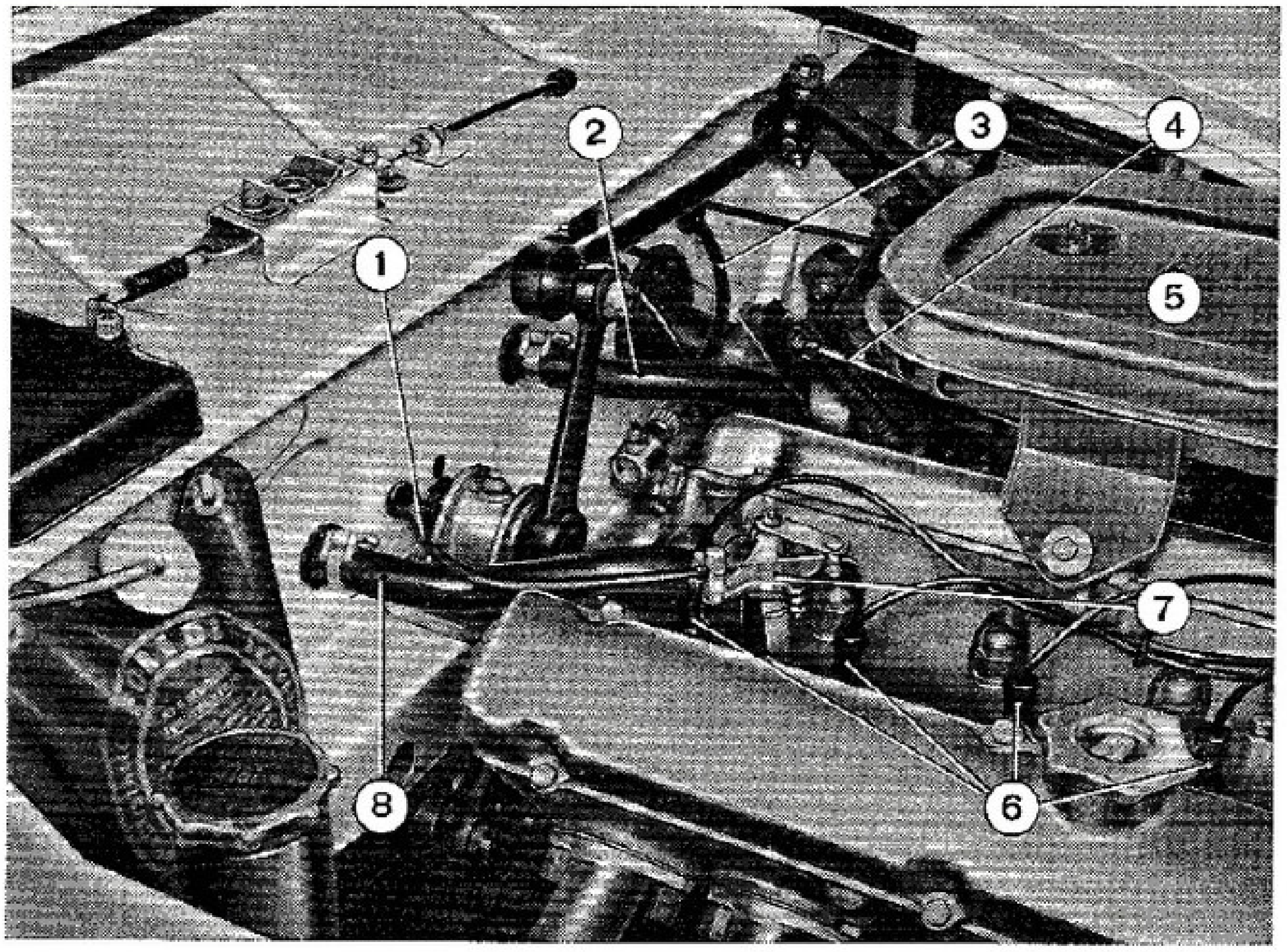


Fig. 51. - **Engine controls on car.**

1. Hot water cock control - 2. Heater water return line - 3. Revolution counter flexible shaft - 4. Throttle control tie rod - 5. Air cleaner - 6. Spark plugs - 7. Heater cock - 8. Water delivery line to heater.

the contact for firing in cylinder 1 or 4, depending on which one was at the end of compression.

— Lock the distributor support collar and fit the cap.

— See that cables are correctly connected to spark plugs.

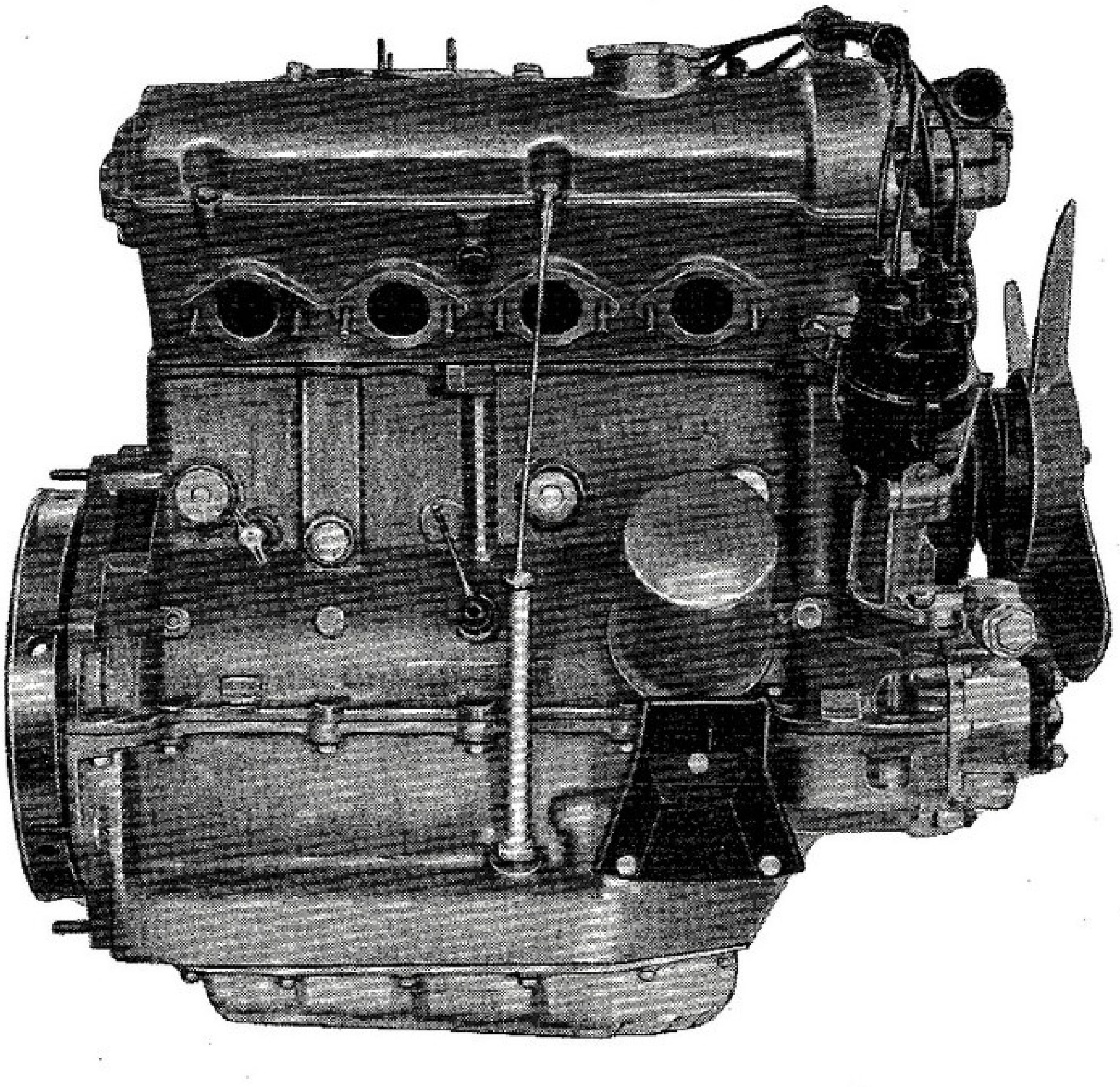


Fig. 52.

Type 118 A.000 engine assembly seen from exhaust side, with ignition distributor and by-pass oil filter installed, and exhaust manifolds removed.

COOLING SYSTEM

A centrifugal pump promotes circulation of water in the engine cooling system which consists of the following:

— a water pump, mounted on crankcase;

— a monoblock, vertical-tube core radiator, located in front of engine;

— a thermostat, located in the cylinder head water outlet connection.

Thermostat setting data:

— opens partly at . 82° to 87° C (180° to 189° F)

— fully open at . . . 92° to 97° C (198° to 208° F)

— **an electromagnetic fan, automatically controlled,** through a thermostatic-switch located in lower end of radiator in contact with the cooling system water;

— a water temperature sending unit connected to a gauge in instrument cluster.

ELECTROMAGNETIC FAN

The electromagnetic fan engages and disengages automatically and consists mainly of two units, namely:

1) **Pulley unit,** made up of the pulley proper (3, fig. 55) complete with hub (2) for mounting on water pump

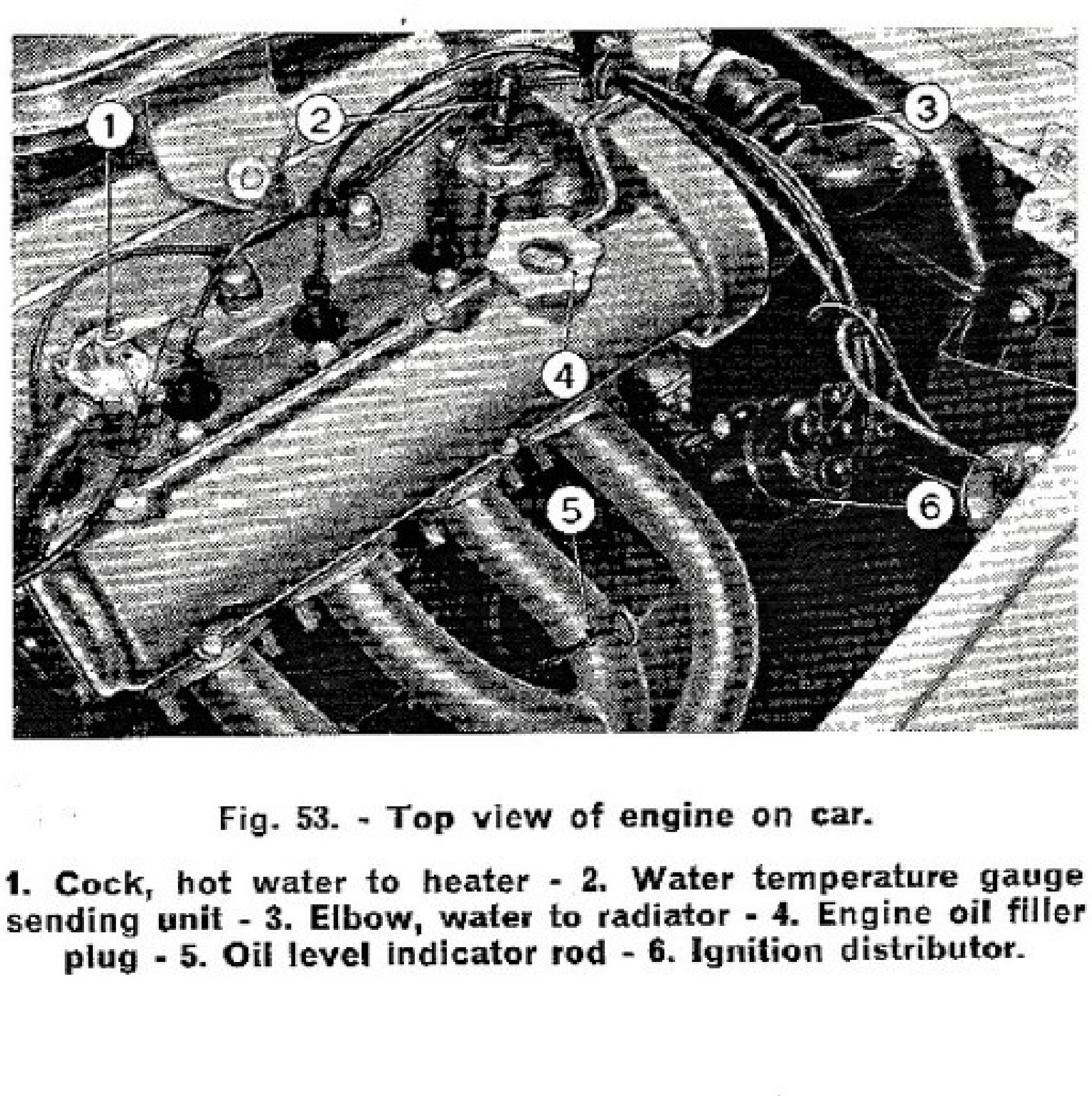


Fig. 53. - Top view of engine on car.

1. Cock, hot water to heater - 2. Water temperature gauge sending unit - 3. Elbow, water to radiator - 4. Engine oil filler plug - 5. Oil level indicator rod - 6. Ignition distributor.

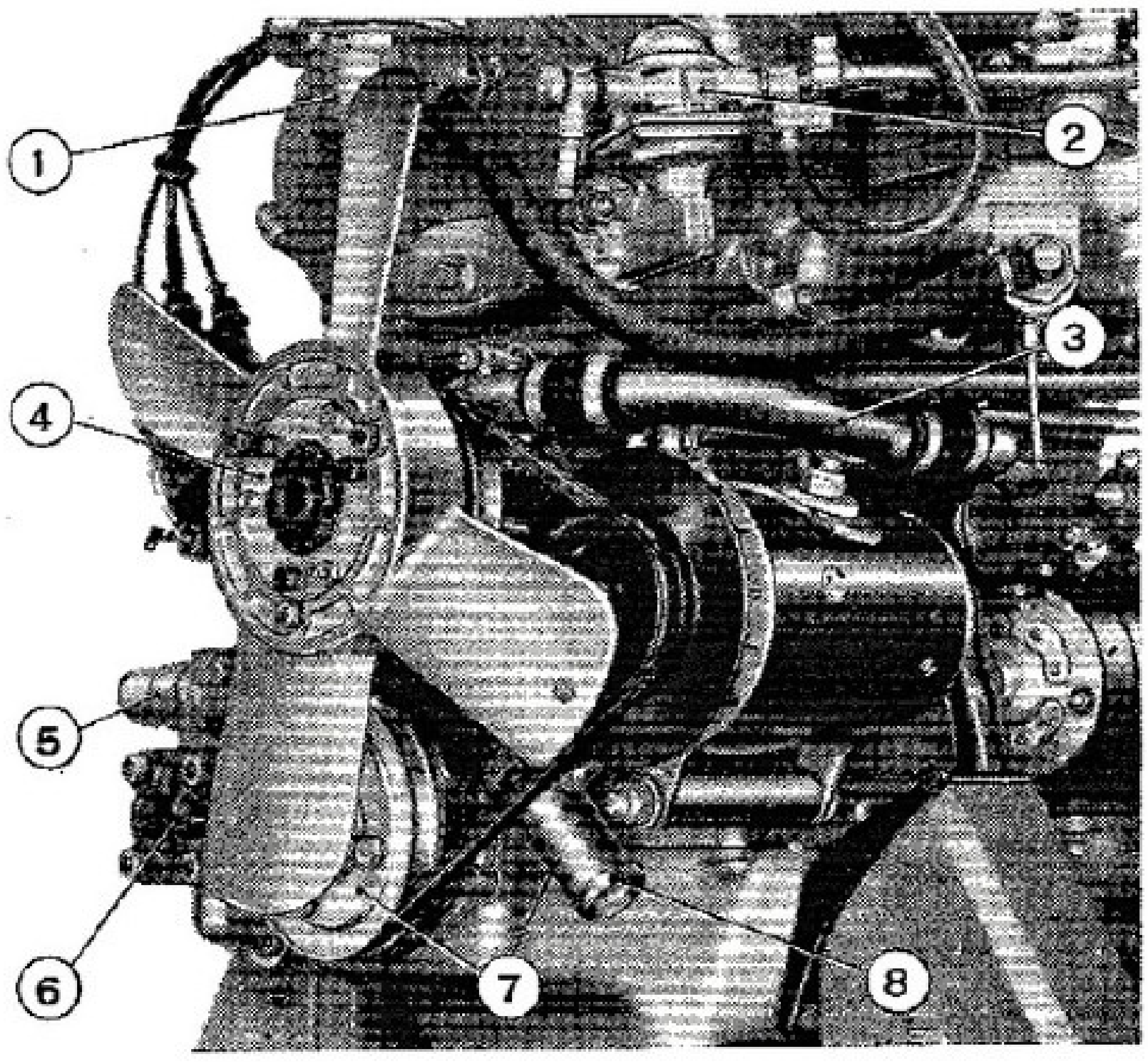


Fig. 54. - Engine front end detail.

1. Thermostat body - 2. Mechanical fuel pump - 3. Line, hot water from pump to cylinder block - 4. Fan hub - 5. Oil pressure regulating valve - 6. Oil pump - 7. Pulley-centrifugal filter unit - 8. Water pump inlet connection.

shaft and with the seats designed to receive the electromagnet yoke (3, fig. 57) and slip ring (6).
The electromagnet yoke (3) is made of magnetic

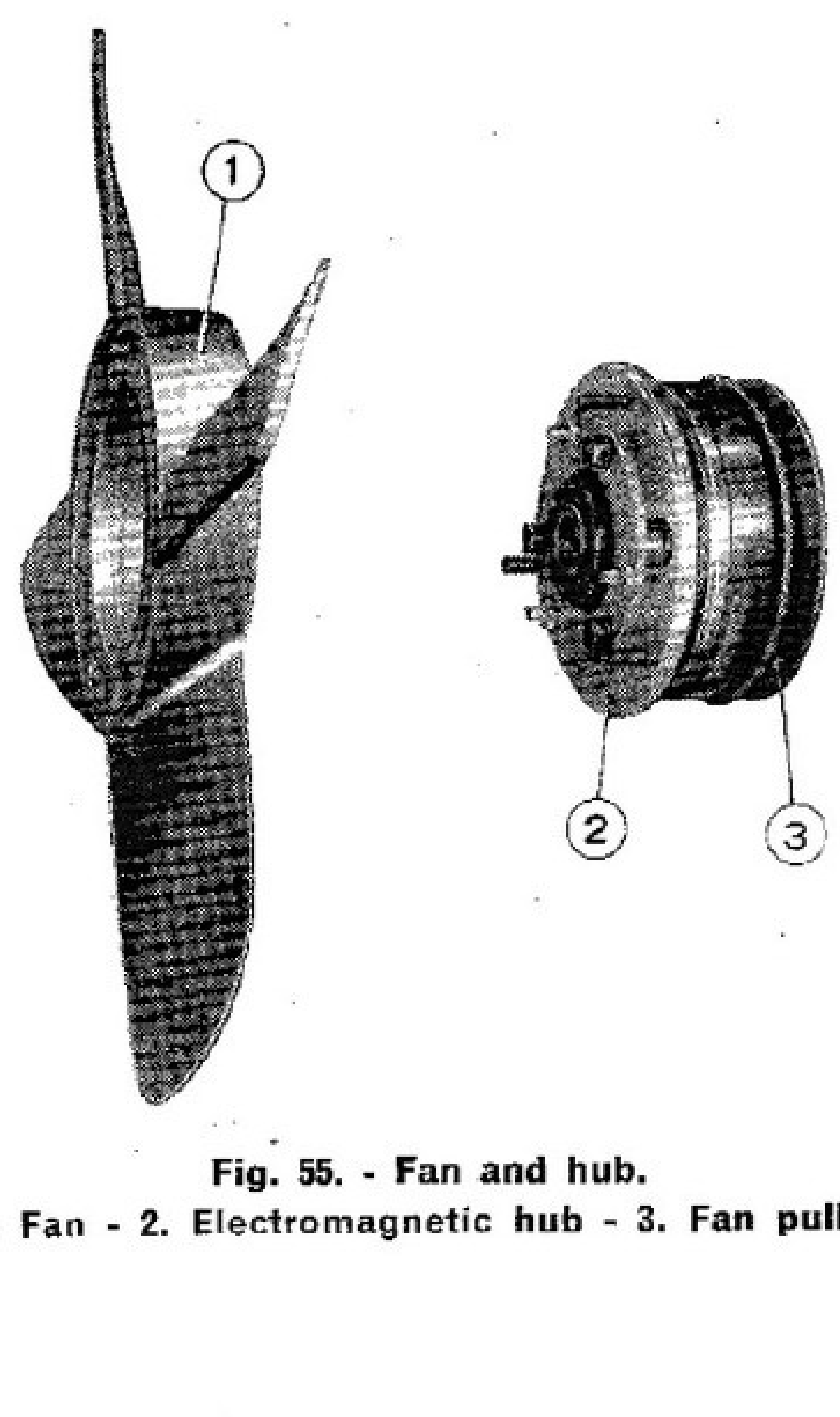


Fig. 55. - Fan and hub.

1. Fan - 2. Electromagnetic hub - 3. Fan pulley.

iron of high permeability and low hysteresis; it carries an annular groove housing the coil (5) which is sunk in a special insulating compound.

The brass slip ring (6), insulated with respect to pulley, is centered on its seat by a bakelite-impregnated fabric ring to which it is secured by the same insulating compound used for the coil.

Electric contact between slip ring and coil is ensured by an insulated lead (7) passing in a hole drilled through pulley and electromagnet yoke.

During engine operation the pulley unit is held in continuous rotation by the crankshaft-driven V-belt.

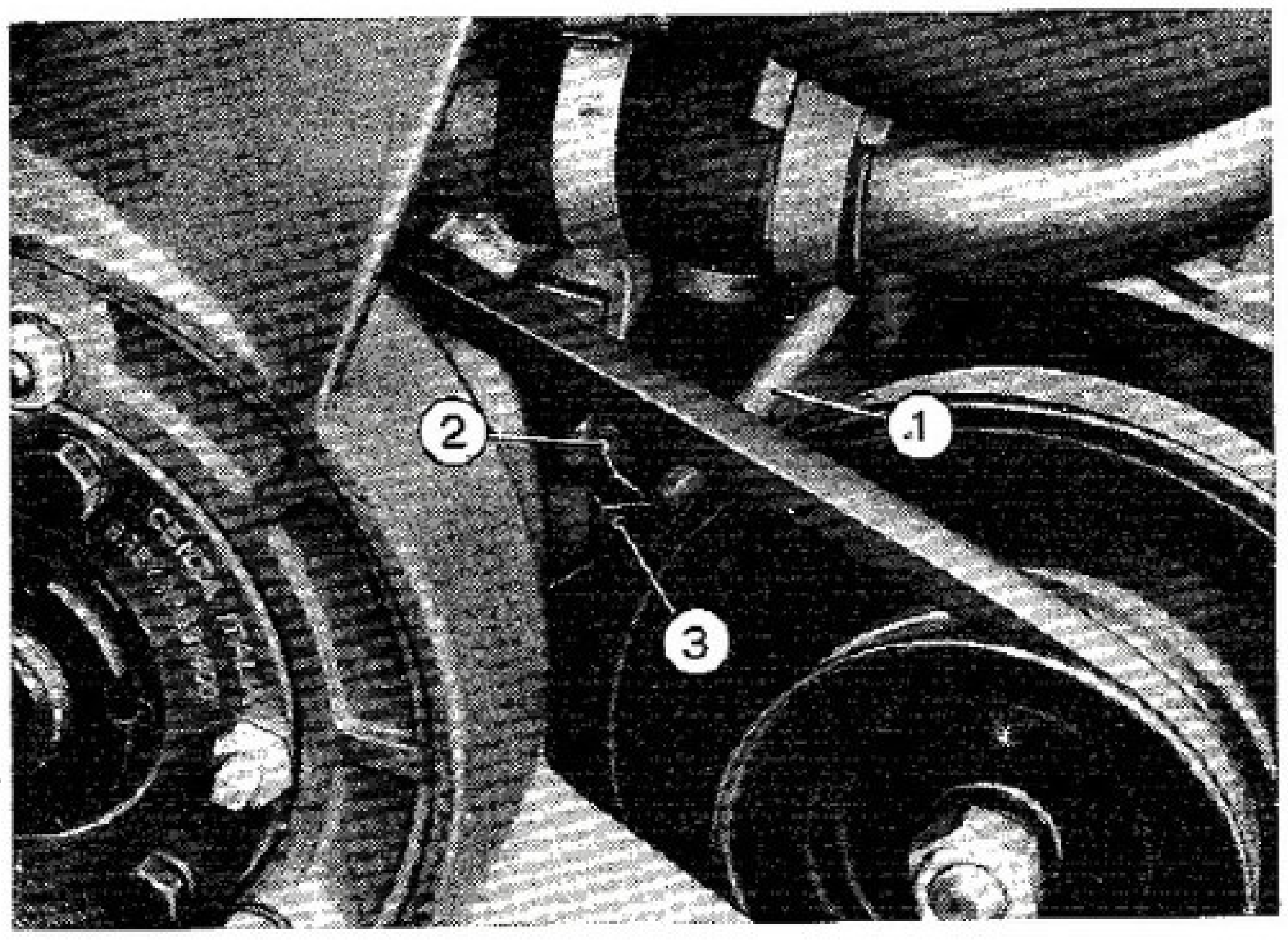


Fig. 56. - Detail of electrical connection between thermostatic switch, carbon contact and slip ring.

1. External insulated wire - 2. Spring fastener - 3. Carbon contact on slip ring.

2) **Fan-hub unit,** including the hub (2, fig. 57) on which the fan (16) and the electromagnet armature (9) are fixed.

Through the intermediary of a ball bearing (10) between the two units, the hub unit is free to rotate with respect to the pulley unit.

During engine operation when the electromagnet is not energized, the pulley unit is rotated by the belt whereas the hub unit is free and subjected only to a very small rotation moment due to the bearing friction and force of air on fan blades.

When electromagnet is energized, armature (9) is pulled against yoke (3) and friction between the two is sufficient to create a « motoring over » effect greater than the resisting moment of the fan: thus, the fan-hub unit turns in one with the pulley unit. Armature (9), built of magnetic iron like the electromagnet yoke, is elastically linked to the hub by three flexible arms (11) — arranged as shown in fig. 59 — having the purpose of throwing out the armature (away from yoke) when the coil is de-energized.

To ensure proper operation of electromagnet, the air gap between armature (9) and yoke (3) must be 0,25 to 0,45 mm (.0098" to .0177") as specified. Any correction, if required, must be done by the three screws (12) with nuts (13).

The pulley fan-hub assembly is secured in mounting position by a slotted lock ring (14) provided with lockwasher (15).

Electric contact between slip ring (6) and the external circuit is obtained by a carbon brush (17); fan engagement and disengagement are both controlled by a thermostatic switch, located in contact with the water in radiator bottom end (fig. 60).

When water temperature rises to 82° ± 2° C (180° ± 4° F) the thermostatic switch closes the electric circuit and hence energizes the electromagnet that engages the fan.

When water temperature drops to 68° ± 2° C (155 ± 4° F) the thermostatic switch breaks the circuit and disengagement of fan takes place. Once disengaged the fan keeps spinning, but at reduced speed, as it is driven by the friction of the ball bearing and the stream of air flowing against fan blades.

Checks and adjustments.

After the first 1500 to 2000 km (900 to 1200 miles), check if air gap between electromagnet yoke and armature is **0,25 to 0,45 mm** (.010" to .018") as specified, otherwise adjust as follows:

— slacken the locknuts (13, fig. 57) of adjustment screws (12);

— turn in or out screws (12), as required, measuring each time the air gap with a feeler gauge near the screw used for the correction;

— after adjustment, tighten nuts (13) of screws (12).

Every 20.000 km (12,000 miles): carry out the following operations:

— wipe accurately slip ring (6, fig. 57) with a clean cloth;

— unhook spring fastener (2, fig. 56), pull out brush holder (18, fig. 59) and check wear and contact conditions of carbon (17) and of its pressure spring; make sure the carbon contact slides freely in its seat. Replace worn parts as required;

— upon reassembly, make sure spring fastener (2, fig. 56) exerts sufficient pressure.

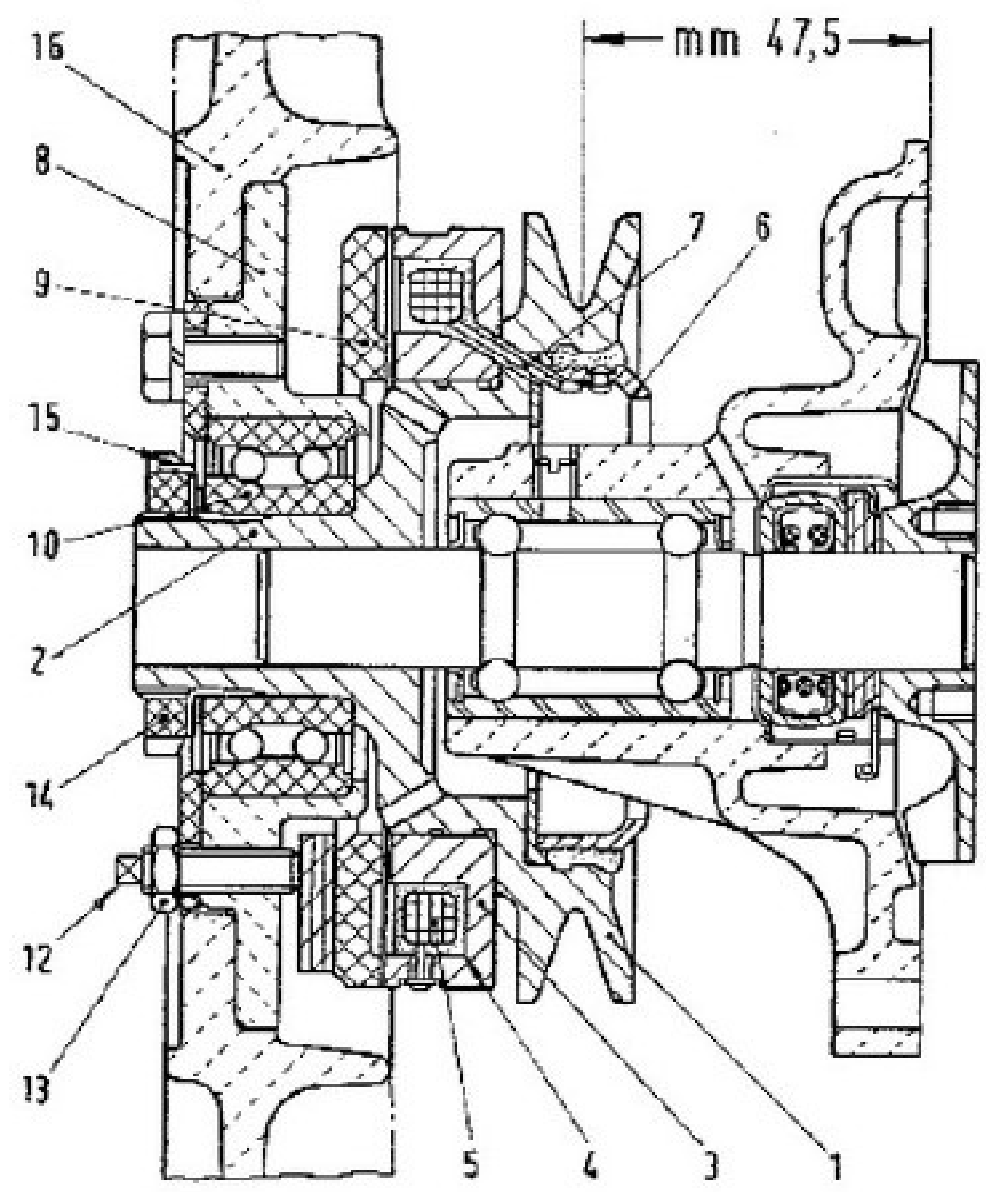


Fig. 57.

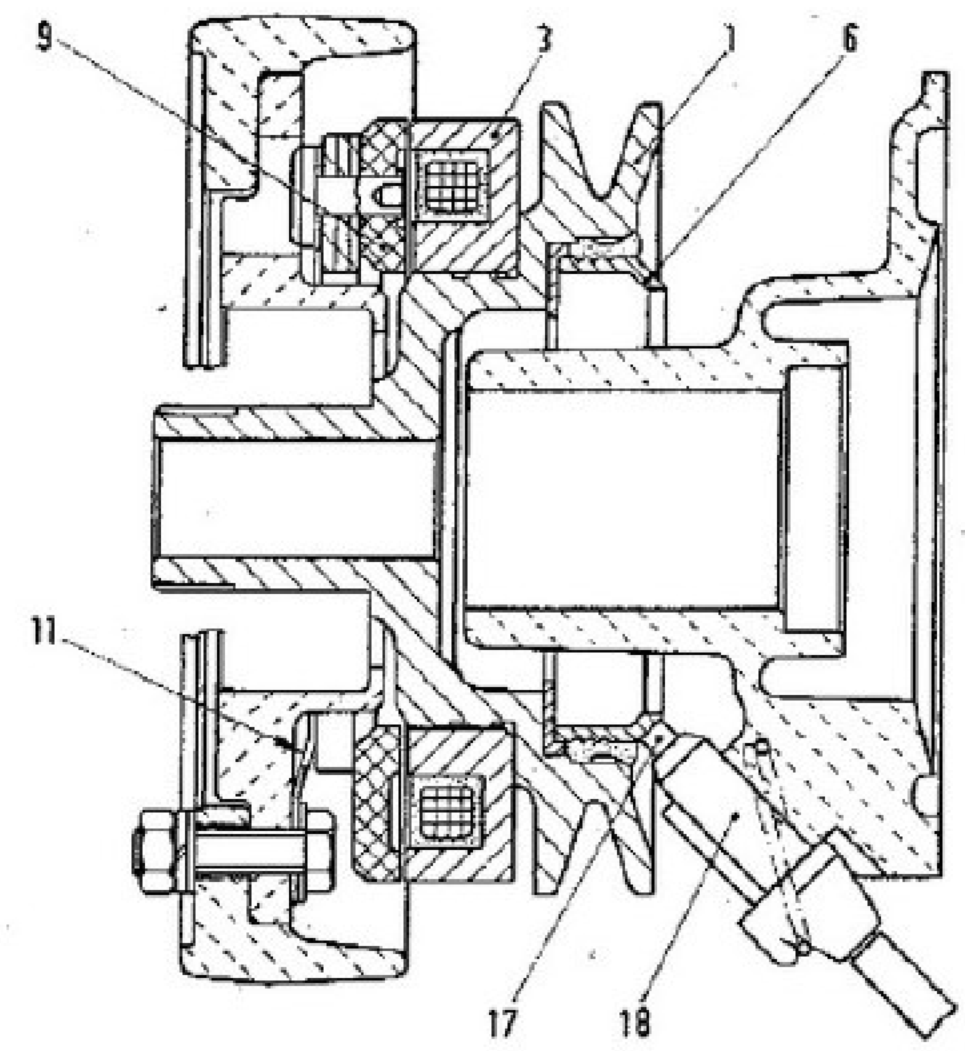


Fig. 59.

Figs. 57-58-59. - Sections through water pump and electromagnetic fan assembly.

1. Pulley - 2. Pulley hub - 3. Electromagnet yoke - 4. Electromagnet seat - 5. Electromagnet coil - 6. Slip ring - 7. Lead, slip ring to coil - 8. Fan hub - 9. Armature - 10. Fan bearing - 11. Flexible arms, armature return - 12. Air gap adjustment screws - 13. Locknut - 14. Slotted lock ring, fan mounting - 15. Lock plate for lock ring - 16. Fan - 17. Carbon contact brush - 18. Brush holder.

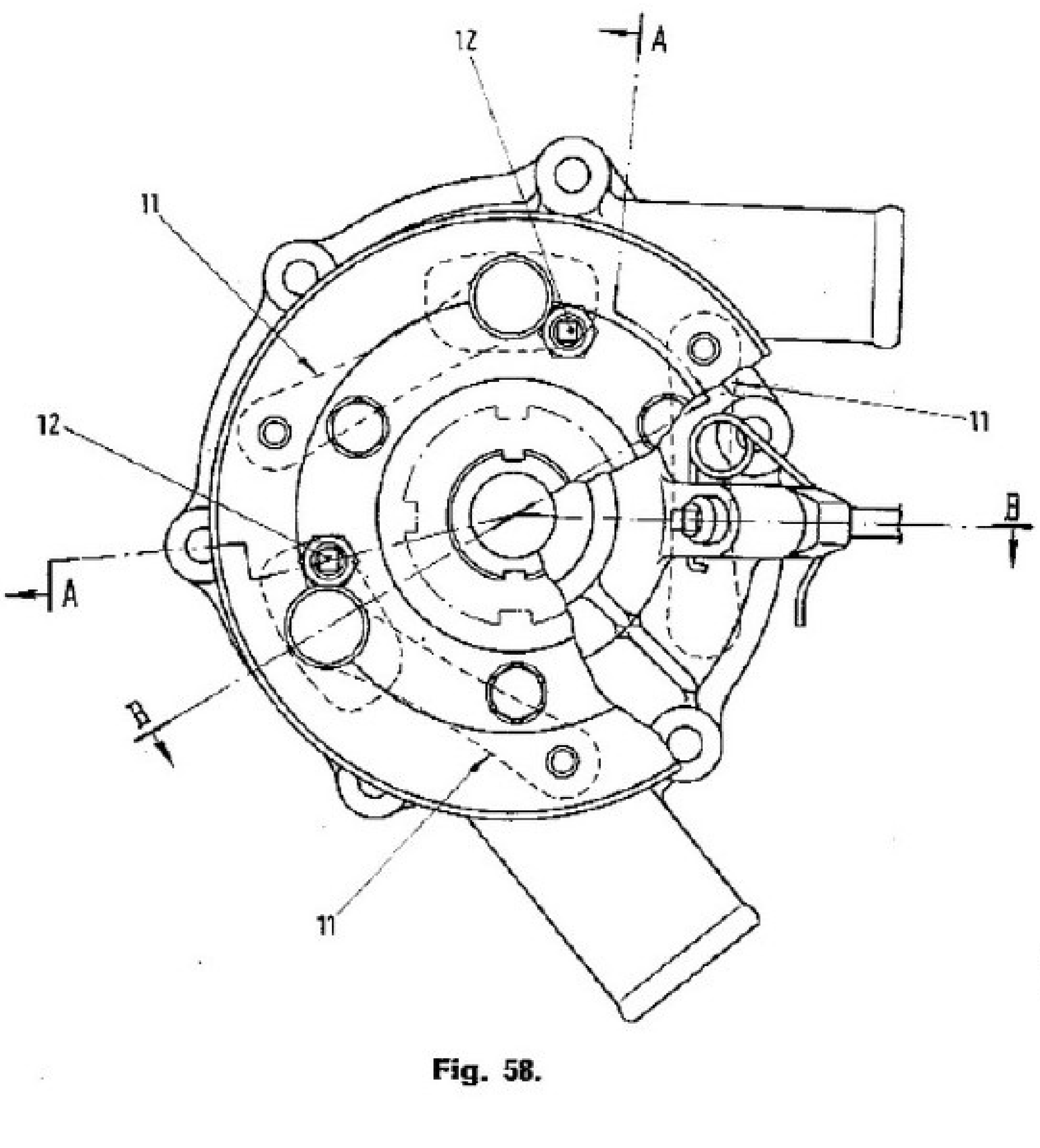


Fig. 58.

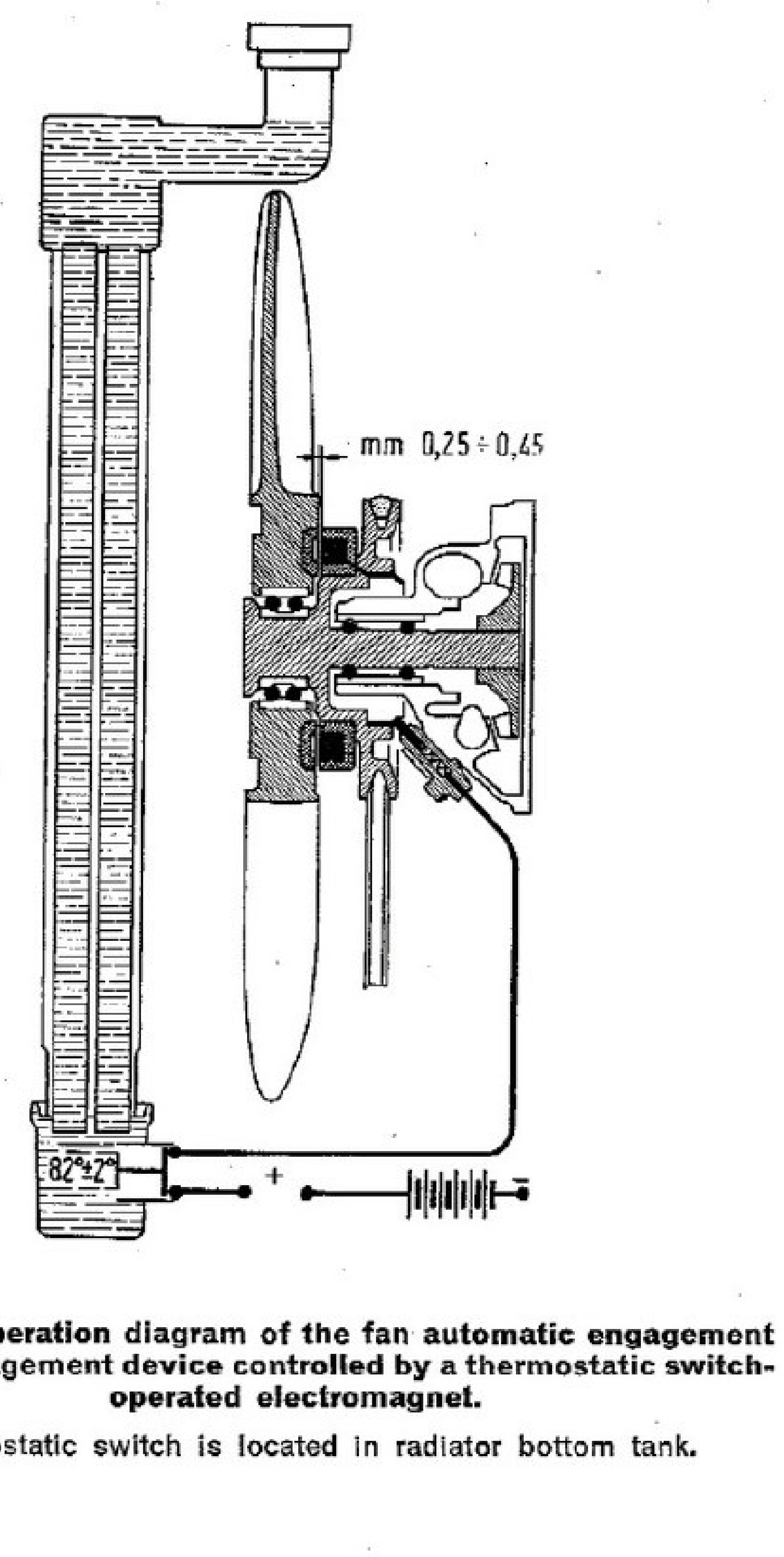


Fig. 60. - Operation diagram of the fan automatic engagement and disengagement device controlled by a thermostatic switch-operated electromagnet.

Thermostatic switch is located in radiator bottom tank.

Operation faults and remedies.

1) **Faulty thermostatic switch.**

If water temperature reading on gauge in panel indicates more than 85° C (185° F) and fan does not engage, the operation of thermostatic switch might be faulty. In this case, as **a temporary measure**, simply join the wires on the same terminal and the fan will operate continuously.

Then, replace switch at the first opportunity.

Later, to eliminate the trouble, replace the fan pulley complete with electromagnet.

3) **Slip ring-to-coil lead broken.**

If after joining the wires, the fan does not engage, the trouble may be due to failure of the lead (7, fig. 57) connecting the slip ring to the coil; also in this case, continuous operation of fan may be ensured — **temporarily** — by proceeding as described under para. 2).

As soon as possible, eliminate the trouble by replacing fan pulley complete with electromagnet and slip ring.

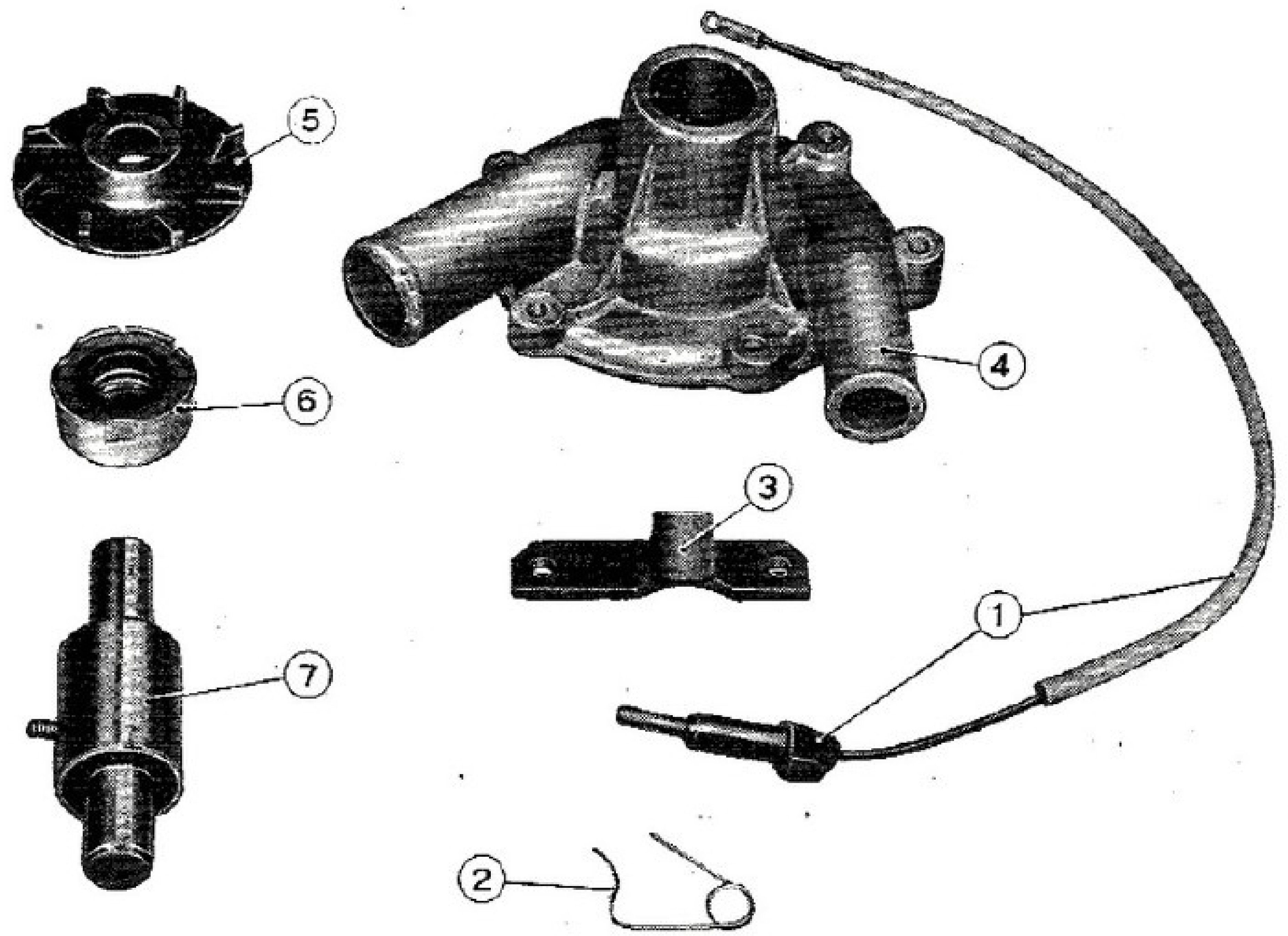


Fig. 61. - Components of water pump and fan wiring.

1. Wire, slip ring to switch - 2. Brush holder spring fastener - 3. Brush holder - 4. Water pump body - 5. Impeller - 6. Bearing seal - 7. Shaft with bearing and retainment screw.

2) **Discontinuity in electromagnet coil** (exceptional fault).

If even after joining the two wires the fan does not engage, a fault ascribable to a discontinuity of electromagnet coil, it will be possible to ensure continuous operation of fan — still as a **temporary measure** — by proceeding as follows:

— slacken the three lock nuts of air gap adjustment screws (12, fig. 58);

— tighten **slightly** the three screws (12, fig. 58) in order to move electromagnet armature against the yoke;

— tighten the three locknuts of said screws; this way, the fan will keep operating.

Replacement of pulley-and-electromagnet as a unit.

To replace pulley (1, fig. 57) and electromagnet (5), proceed as follows:

— Drain water from cooling system.

— Slacken and take off the fan drive belt.

— Slacken collars and remove pump water delivery and return hoses.

— Free the spring fastener of brush holder (18) and take off the holder.

— Remove the mounting screws and take out the water pump and fan assembly.

With water pump on bench, proceed as follows:

— Straighten the lock plate (15, fig. 57) and using wrench **A. 50090**, remove the slotted ring (14) locking the fan support bearing (10).

— Pull out fan assembly (16) with hub (2), electromagnet armature (9) and bearing (10).

— With the proper puller, extract the electromagnet-pulley assembly (1 and 3, fig. 57) from water pump bearing shaft.

pump cover seating plane is **47,5** mm (1.87") (fig. 57).

— Temporarily fit the brush holder (18, fig. 57) into its seat and check, by turning the pulley, that brush (17) seats evenly all around slip ring (6).

Note. - Any runners of insulating material liable to impair the contact between brush and slip ring must be scraped off.

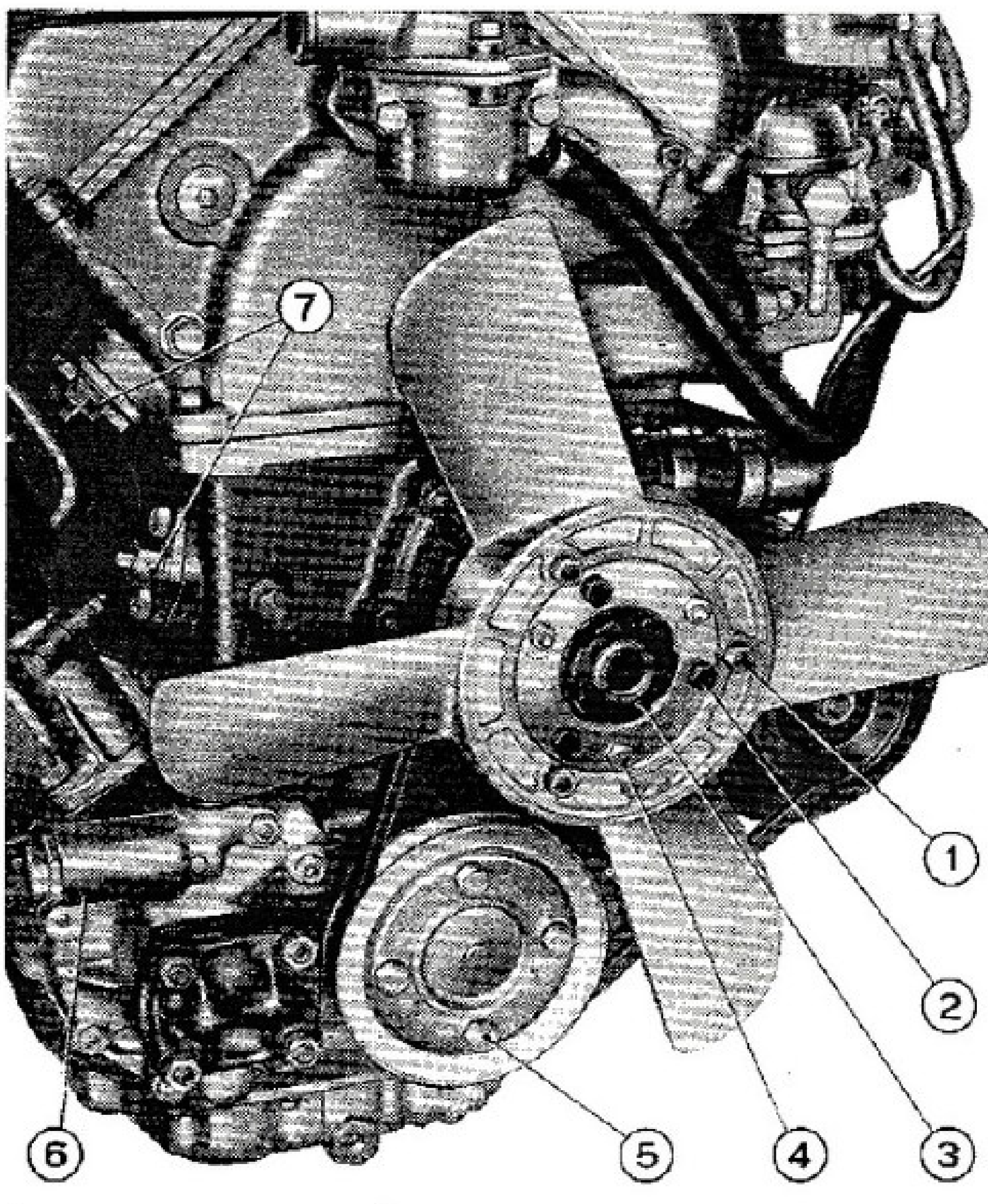


Fig. 62. - Engine front end detail view.

1. Fan mounting nuts - 2. Screw, thrust ring to hub - 3. Ball bearing slotted lock ring - 4. Electromagnet air gap adjustment screw - 5. Driving pulley mounting screws - 6. Oil pressure regulating valve body - 7. Timing chain stretchers locking nuts.

To reassemble the above parts, proceed as follows:

— Remove the water pump cover so as to gain access to the other end of bearing shaft in order to use it as an abutment for the subsequent press-fitting of pulley.

— With a press, drive the pulley (1, fig. 57), complete with electromagnet, onto the pump bearing shaft. The two parts must be perfectly co-axial and the specified pinch fit for a correct assembly is **0,012** to 0,06 mm (.0005" to .0024").
The parts must be so assembled that the **distance between pulley groove centerline and water**

— On pulley hub (2, fig. 57) fit fan (16) complete with its hub (8), electromagnet armature (9), bearing (10) and lock plate (15); using wrench **A. 50090** lock the bearing by slotted ring (14) and secure in place by suitably bending the lock plate.

— Finally, adjust air gap, as instructed on page 31, to 0,25-0,45 mm (.010"-.018").

Install the water pump-and-fan assembly on cylinder block, thread on pump drive belt and adjust tension to the correct value.

Next, insert brush holder (18, fig. 57) in its seat and secure in place with the spring fastener (2, figs. 56 and 61).

WEBER CARBURETORS

Type 28/36 DCD 12 (front) and Type 28/36 DCD 13 (rear)

Operation.

NORMAL OPERATION (fig. 66)

The fuel, through needle valve (2) passes to bowl (7) where float (6), articulated on trunnion (5), regulates the opening of needle (3) in order to keep the level of the liquid constant. Needle (3) is connected to the tab of float (6) by means of return hook (4).

From bowl (7), through main jets (8) and ducts (9), the fuel reaches wells (11).

Mixed with the air from the orifices of emulsioning tubes (12) and coming from air corrector jets (1), through

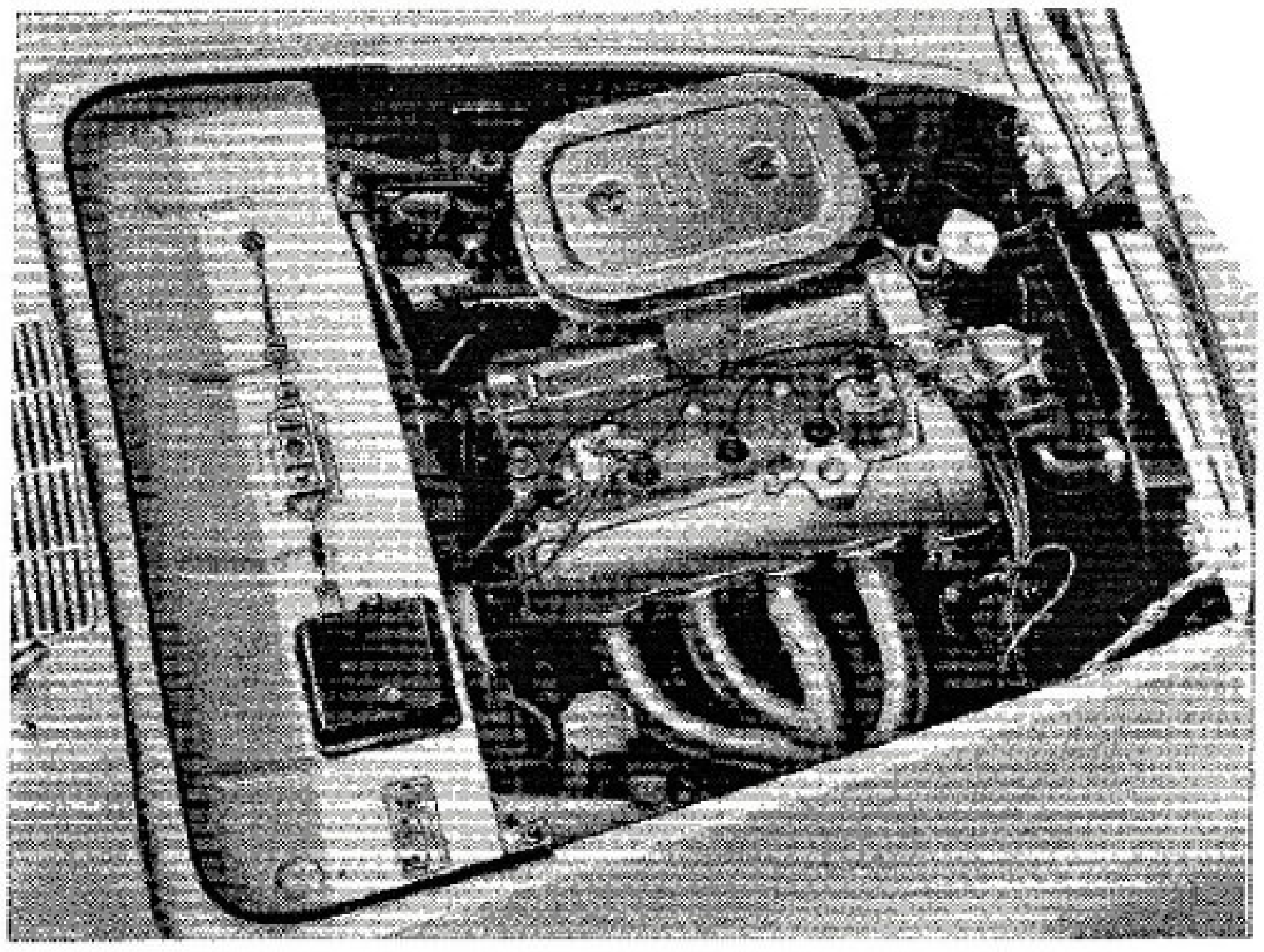


Fig. 63. - Engine top view.

nozzles (17), it reaches the carburetion area, consisting of auxiliary venturis (16) and primary venturis (15).

In fig. 66 is also shown the device for differential opening of the throttles. Acting on the throttles control lever (14), the tab (22) of sector (18) fixed to spindle (10), runs first along the slot (21) of toothed sector (23) and primary throttle (13) fixed to spindle (10), is opened of a corresponding angle, while the secondary throttle, mounted on spindle (25) remains closed.

Next, tab (22), dragging sector (23) and lever (24), turns secondary spindle (25) up to the simultaneous and complete opening of both throttles.

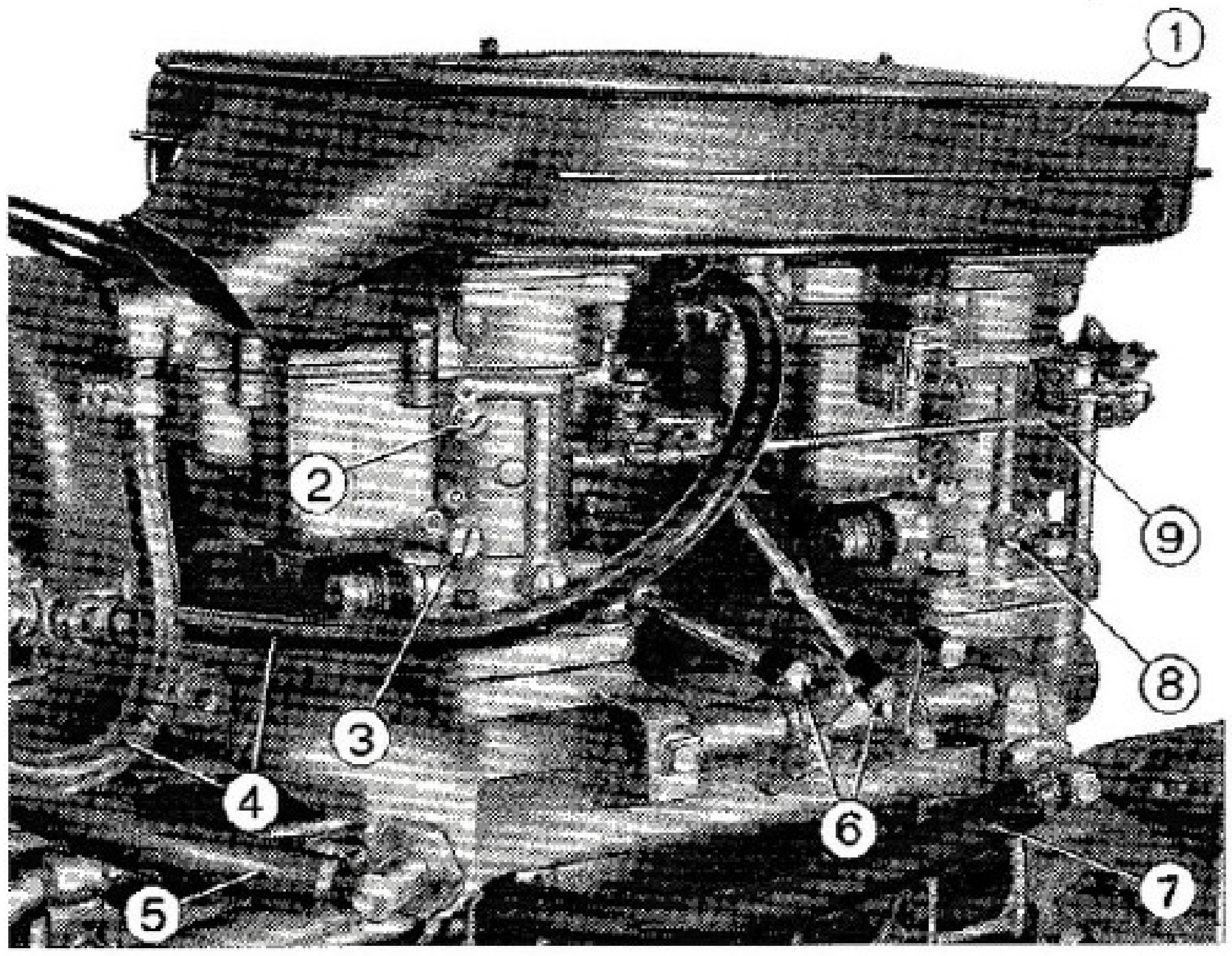


Fig. 64. - Front view of carburetors.

1. Air cleaner - 2. Idle speed jet - 3. Main jet - 4. Fuel arrival lines - 5. Hose, intake manifold to thermostat - 6. Throttle control tie rods - 7. Hose, cylinder head to intake manifold - 8. Progression orifice inspection screw - 9. Starting devices link rod.

In the primary duct is located the primary throttle idle speed adjustment screw (19) and the idle mixture adjustment screw (20).

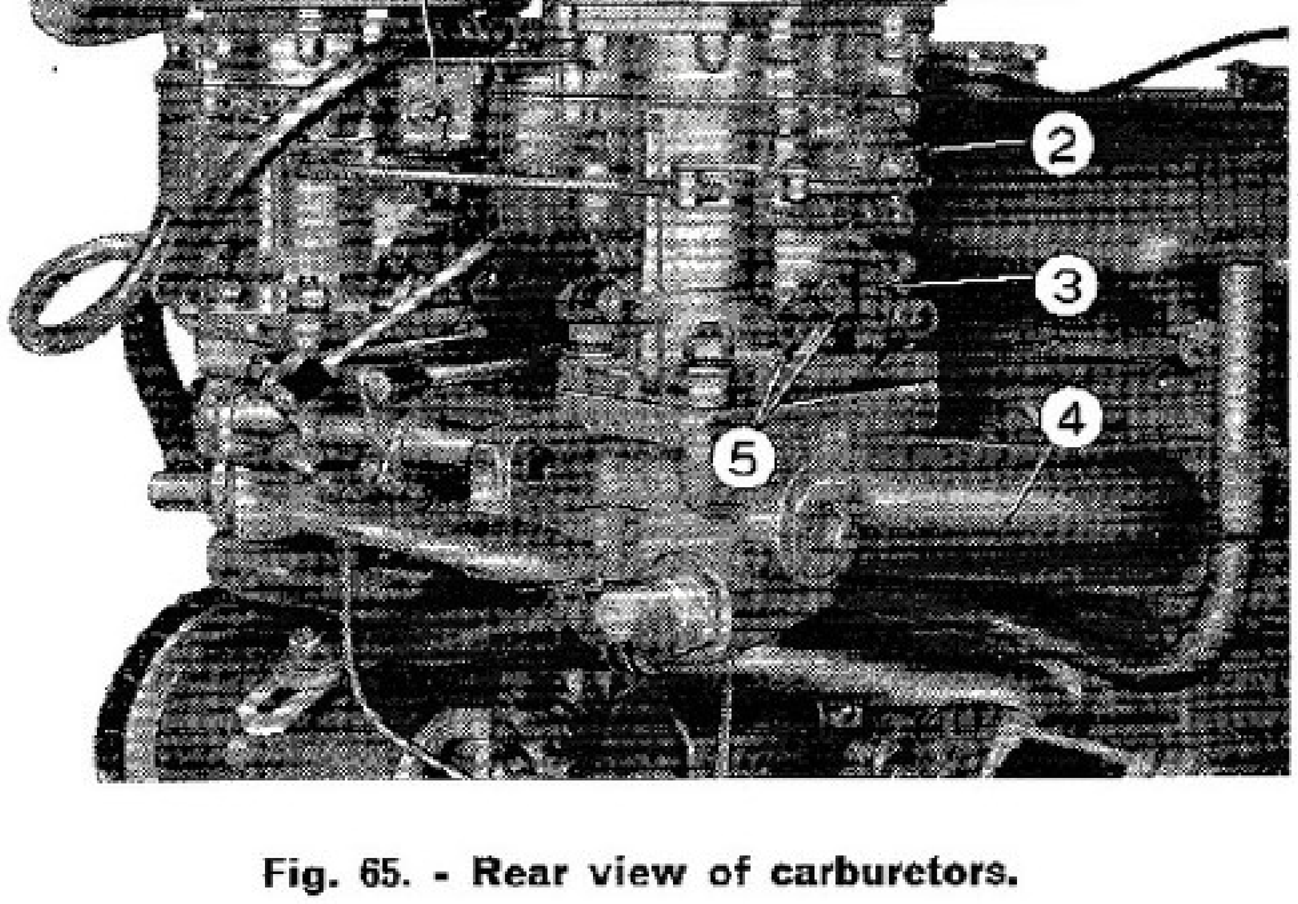


Fig. 65. - Rear view of carburetors.

1. Air cleaner - 2. Starting device - 3. Idler sector return spring - 4. Intake manifold - 5. Idler sector - 6. Bracket, bowden mounting.

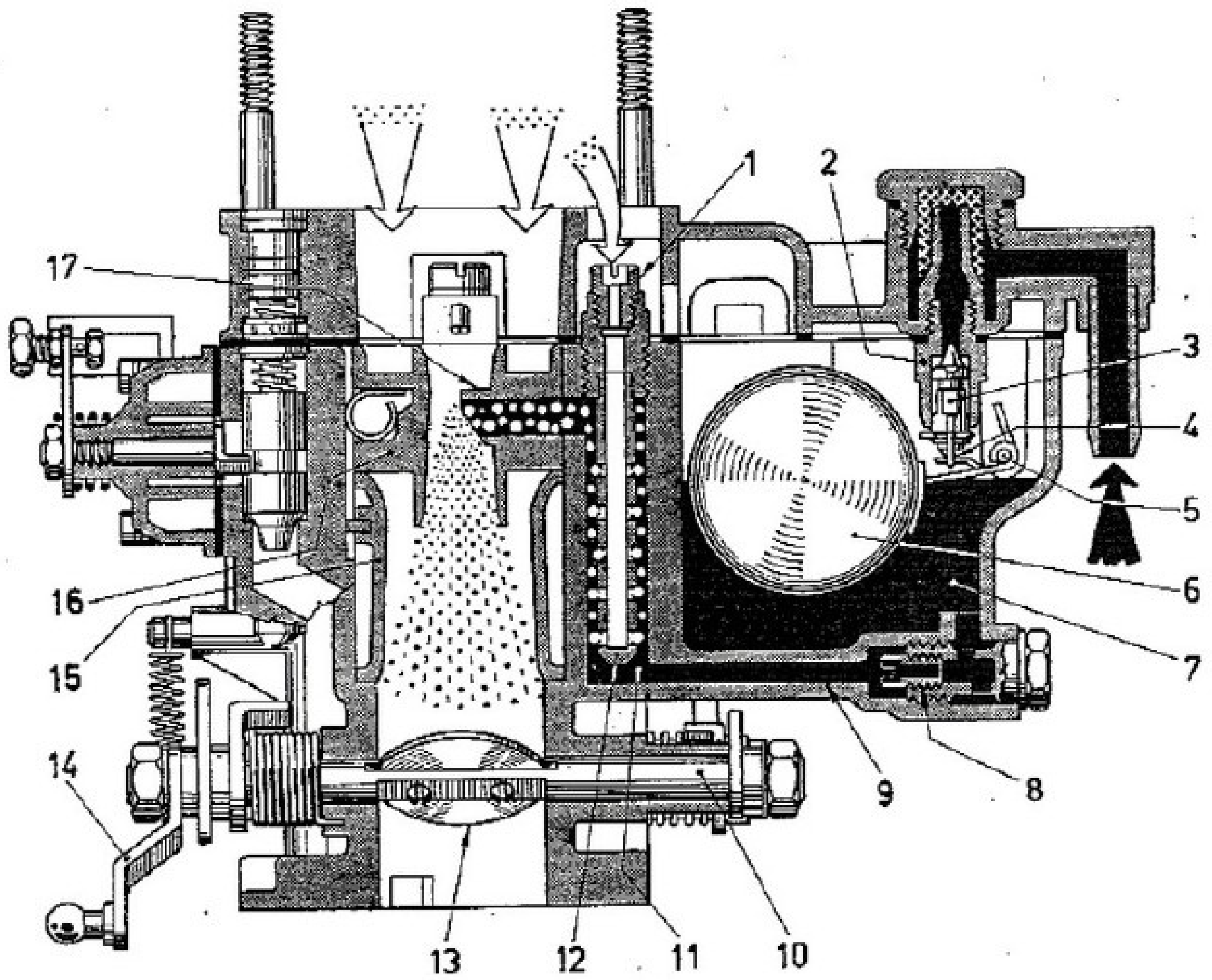
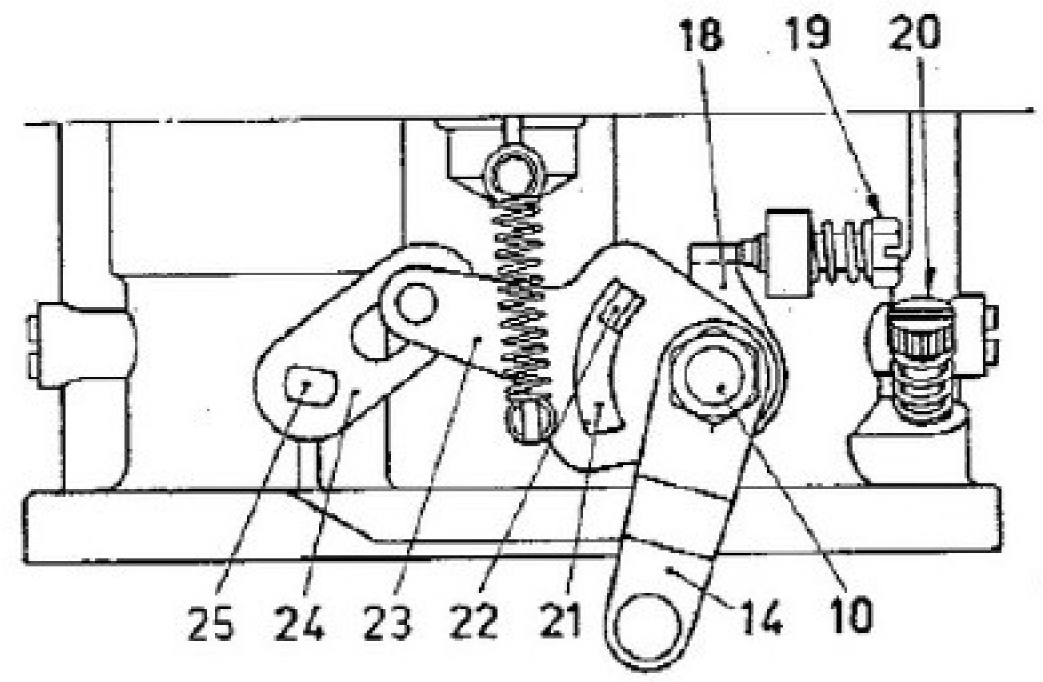


Fig. 66. - Weber type 28/36 DCD carburetors
Normal operation diagram.



IDLE SPEED AND PROGRESSION (fig. 67)

From the primary emulsioning tube well (12) fuel passes to idle jet (34) from which, emulsioned with the air coming from calibrated bush (35), via duct (32) and idle feed orifice (31), the latter being adjustable by a screw (20), it reaches the primary duct (30), downstream of throttle (13).

The mixture reaches the primary duct also through progression orifice (36) placed at the same height of primary throttle, thus allowing a regular increase in speed of the engine, starting from idle speed.

When secondary throttle (37) is opened, the fuel from the secondary emulsioning tube well (28) passes to idle jet (27). Emulsioned with air from the calibrated bush (26), through duct (29), it reaches the secondary duct by means of the progression orifice (38).

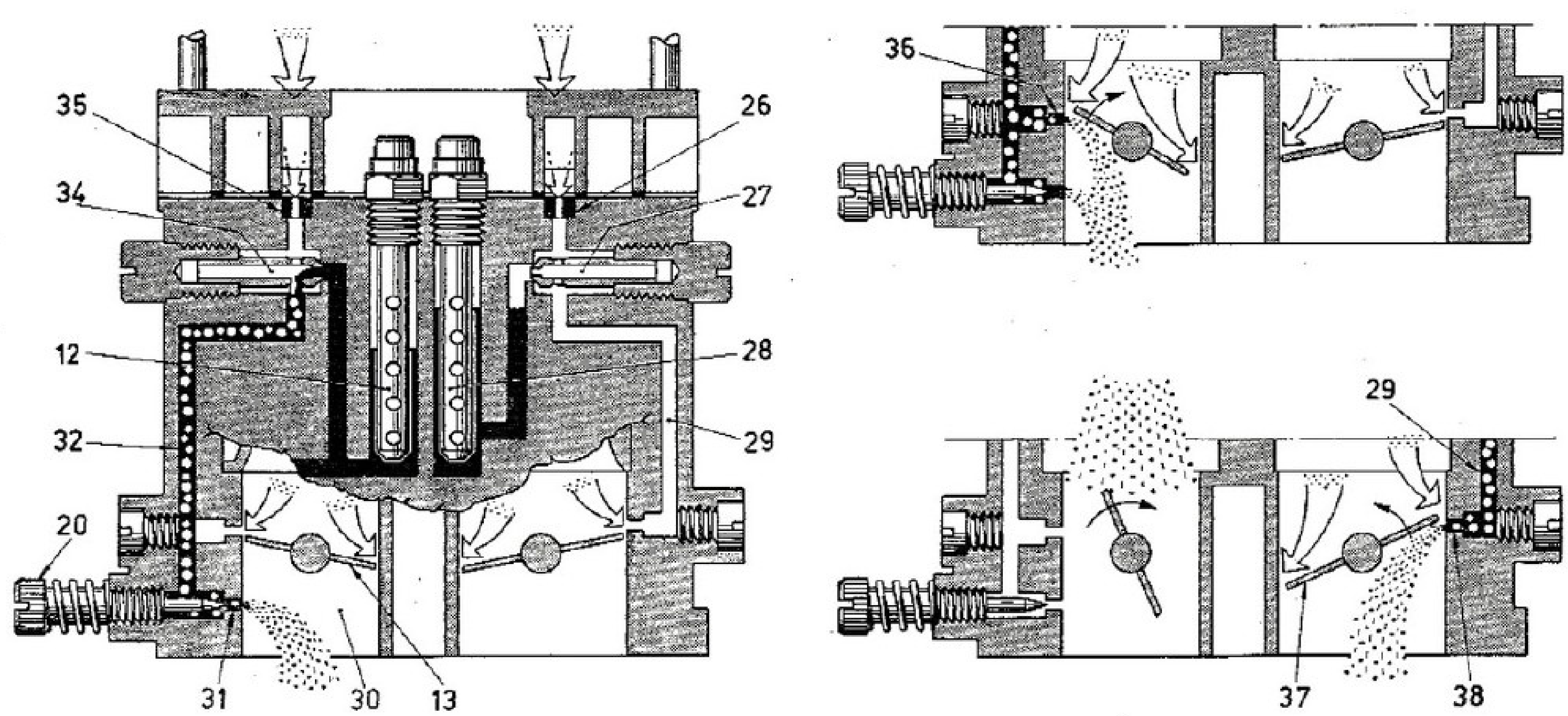


Fig. 67. - Idle speed and progression operation diagram.

ACCELERATION OPERATION (fig. 70)

When throttles are closed, lever (45) raises rod (44) and plunger (42). The fuel is drawn from bowl (7) into the cylinder of pump through intake ball valve (47).

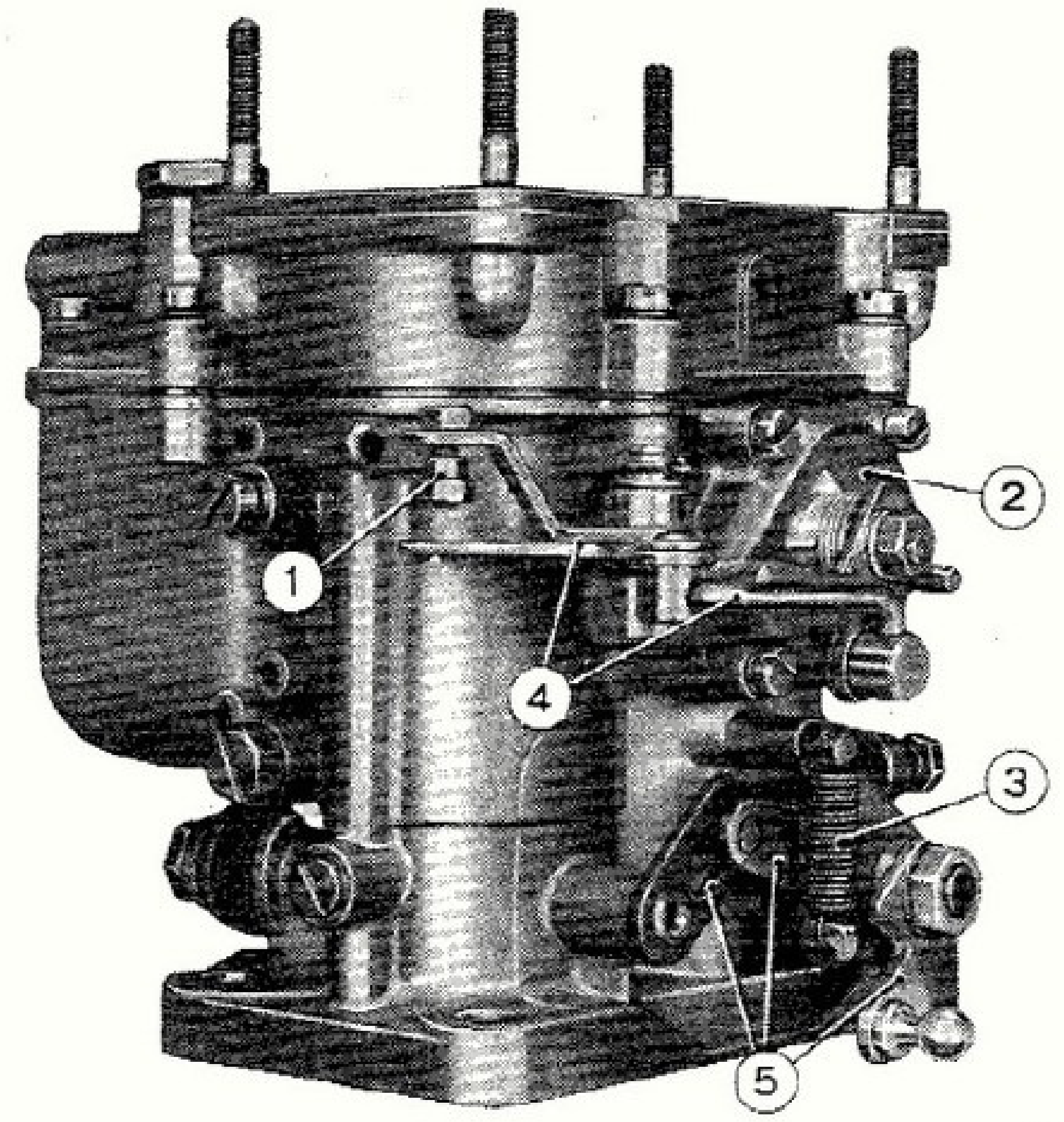


Fig. 68. - Weber 28/36 DCD 12 carburetor.

1. Starting device bowden retainer - 2. Starting device - 3. Idler sector return spring - 4. Starting device control rod and lever - 5. Throttles control lever and sectors.

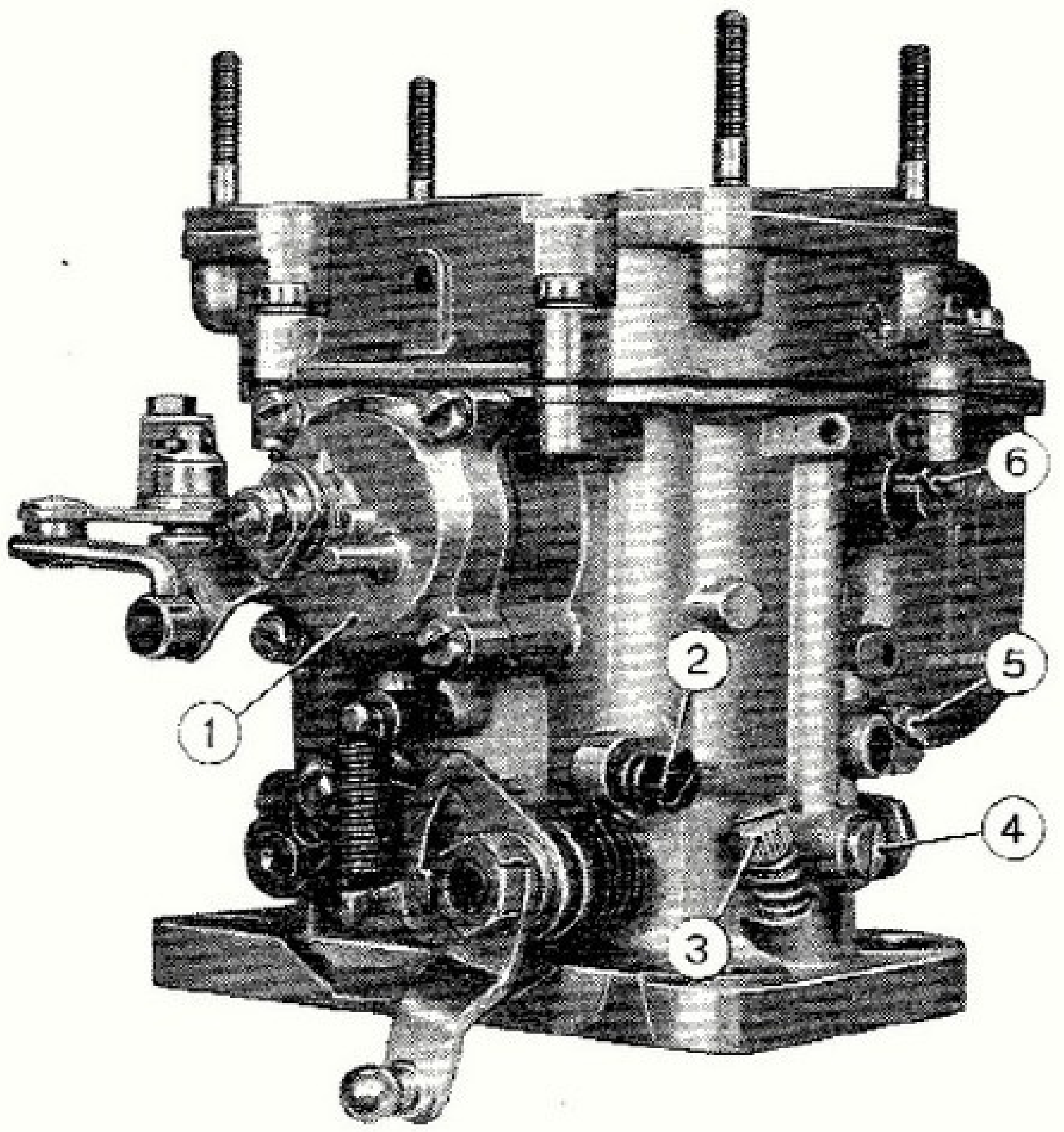


Fig. 69. - Starting device side view.

1. Starting device - 2. Throttle adjustment screw - 3. Idle speed mixture adjusting screw - 4. Progression orifices inspection screw - 5. Main jet holder - 6. Idle speed jet holder.

When throttles are opened, the primary spindle (10) turns first, lowering idle lever (45), mounted on spindle (25) which has remained in the closed position, by means of lever (46). Rod (44) and plunger (42) travel a given stroke under the action of spring (41): by means

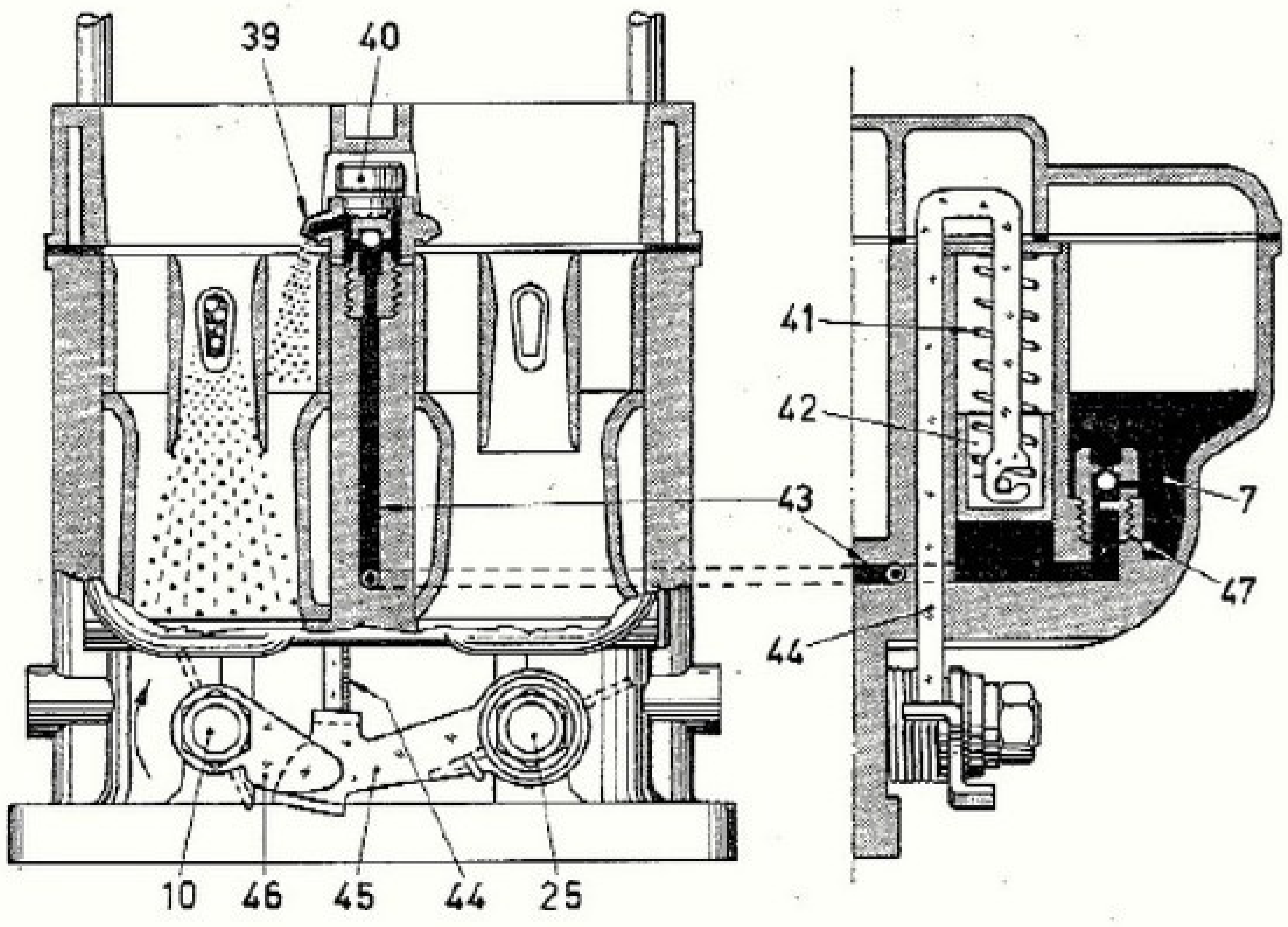


Fig. 70. - Operation diagram during acceleration.

of duct (43) a corresponding quantity of fuel is injected through valve (40) and pump jet (39) into the primary duct.

Next, also the secondary spindle (25) turns: the plunger moves further and the pump then delivers a certain quantity of fuel also during the opening of secondary throttle.

The inlet valve (47) may be of the type with a drilled calibrated lateral orifice which passes any excess fuel into the bowl.

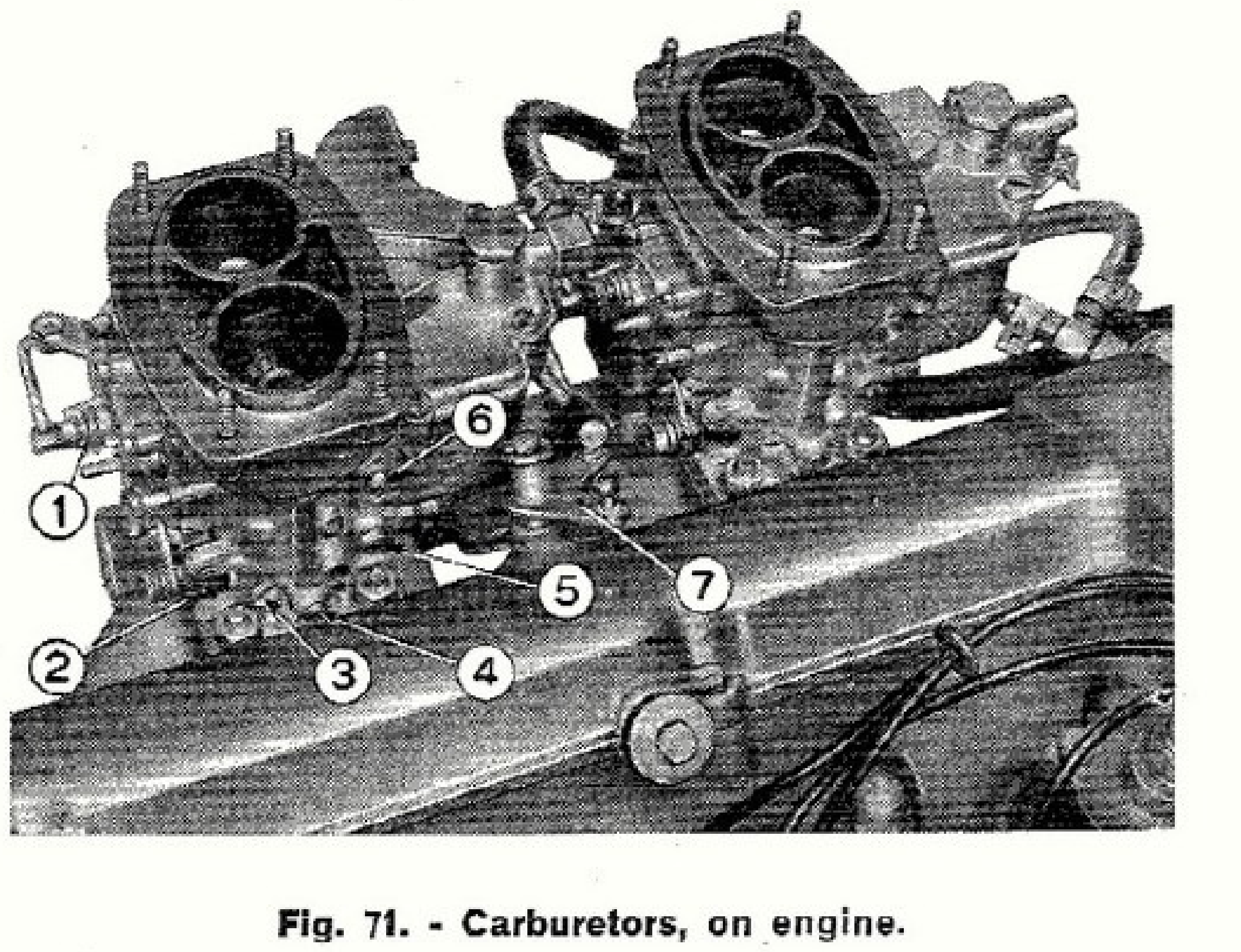
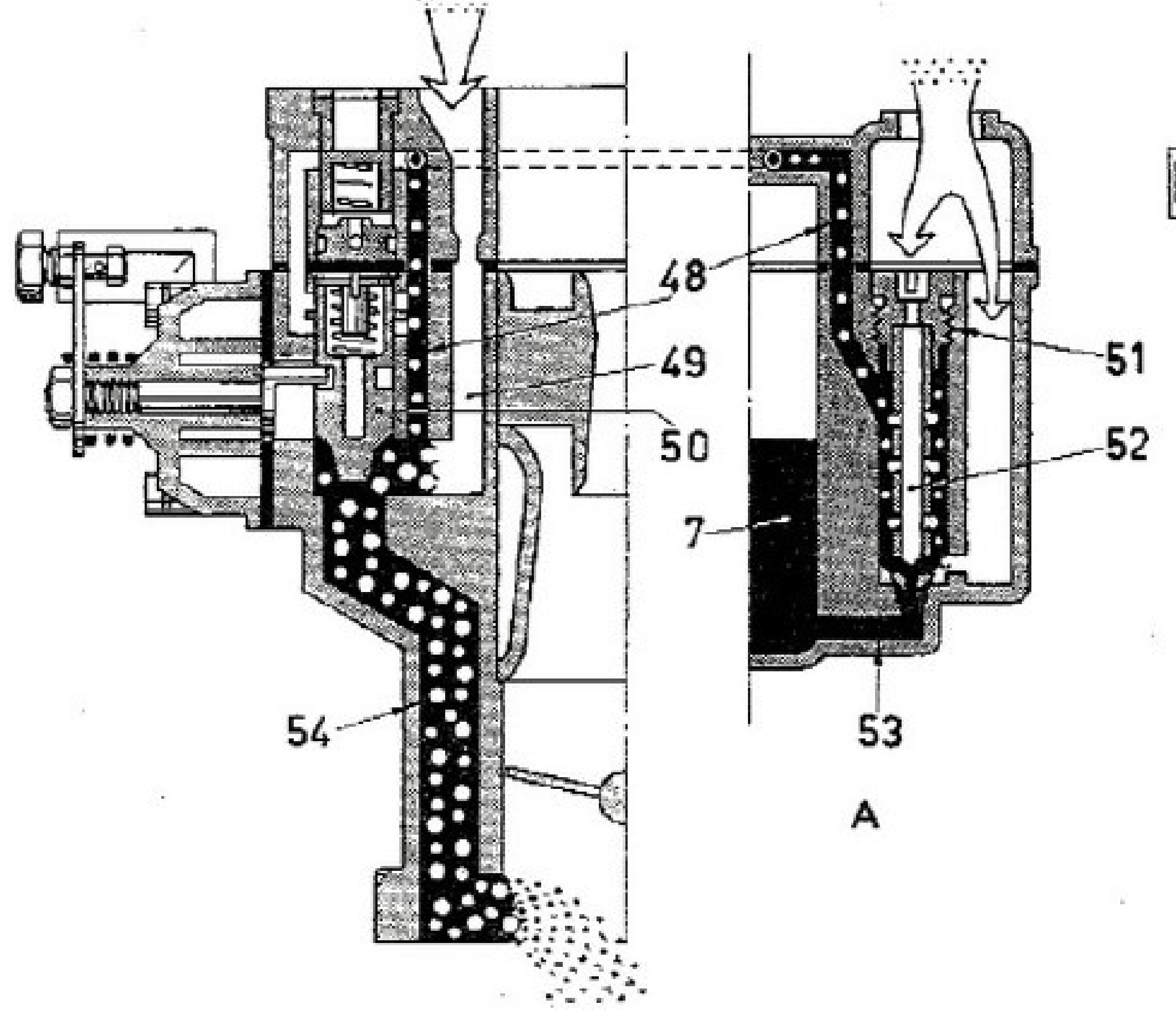


Fig. 71. - Carburetors, on engine.

1. Starting device - 2. Throttles adjustment screw - 3. Idle speed mixture adjusting screw - 4. Progression orifices inspection screw - 5. Main jet holder - 6. Idle speed jet holder - 7. Accelerator control relay lever.



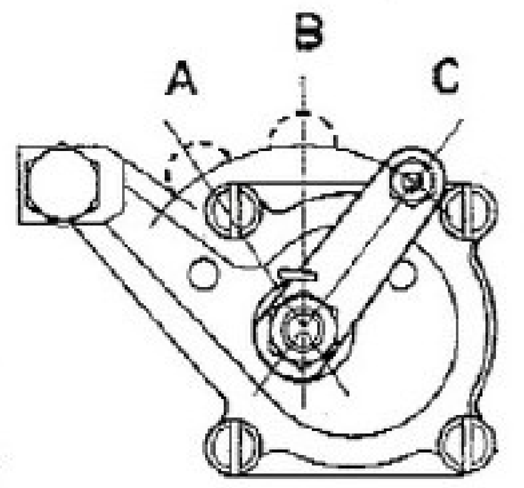
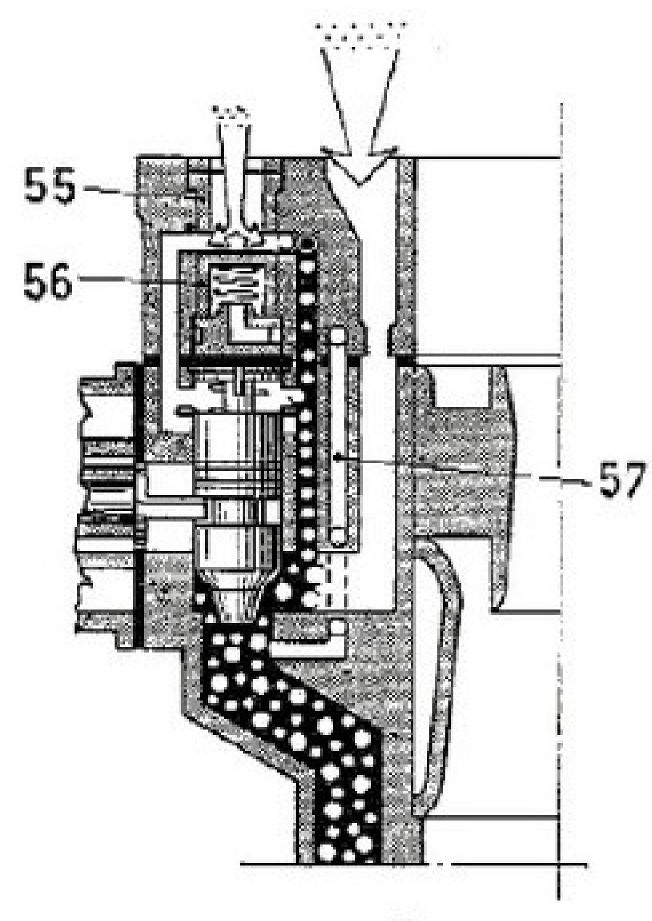
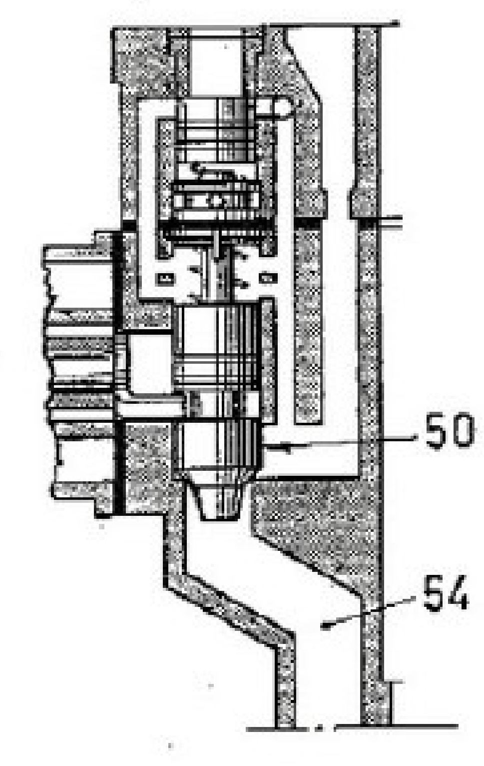


Fig. 72.
Starting device (choke) operation.





STARTING DEVICE (Choke) (fig. 72-A, B, C)

From bowl (7) fuel passes to the starting device through duct (53) and starting jet (52). Emulsioned with the air coming from the carburetor air intake and calibrated by the air corrector jet (51), it reaches the chamber of plunger (50) — through duct (48) — where it is mixed with air from duct (49): this mixture is then aspirated through duct (54) so permitting ready starting of the engine - Diagram A, fig. 72.

As soon as the engine is started, the rpm rate increases rapidly and, consequently, also the vacuum downstream of the throttles increases; through duct (57, fig. 72) this vacuum causes the opening of valve (56). The air sucked in through bush orifice (55) then leans the mixture in duct (48) coming from starting jet (52).

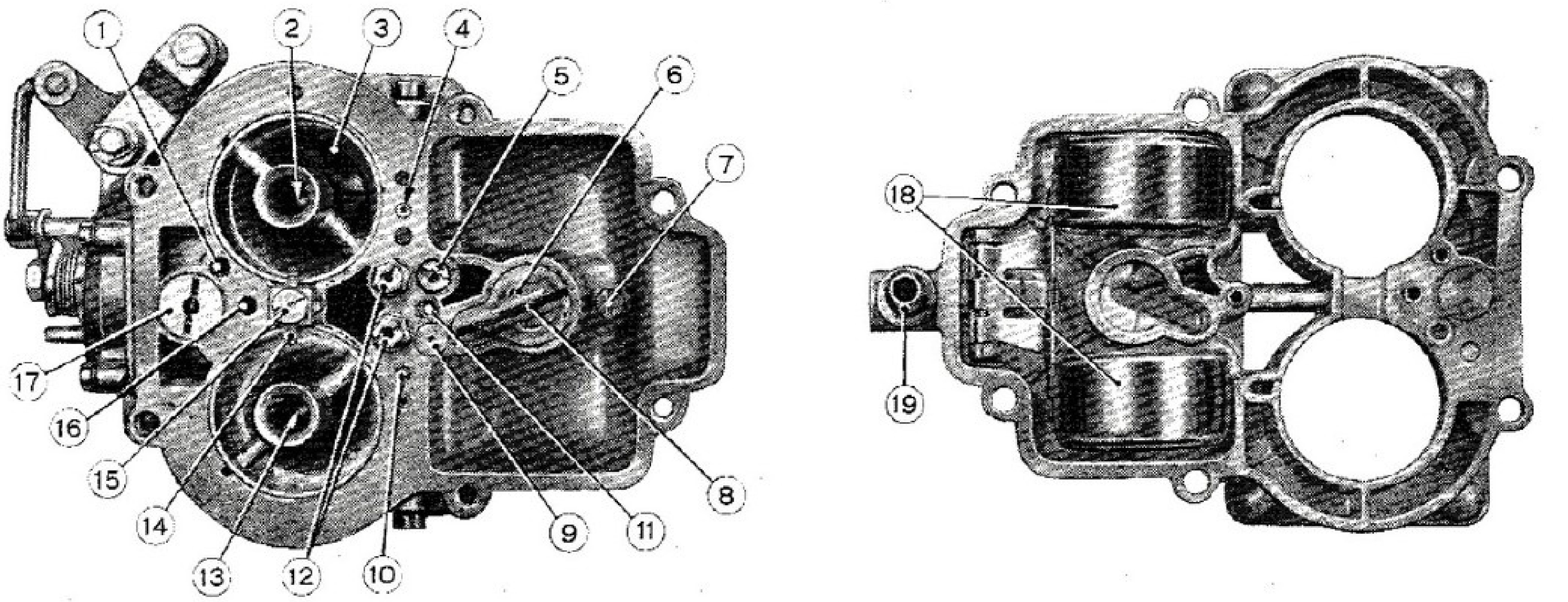
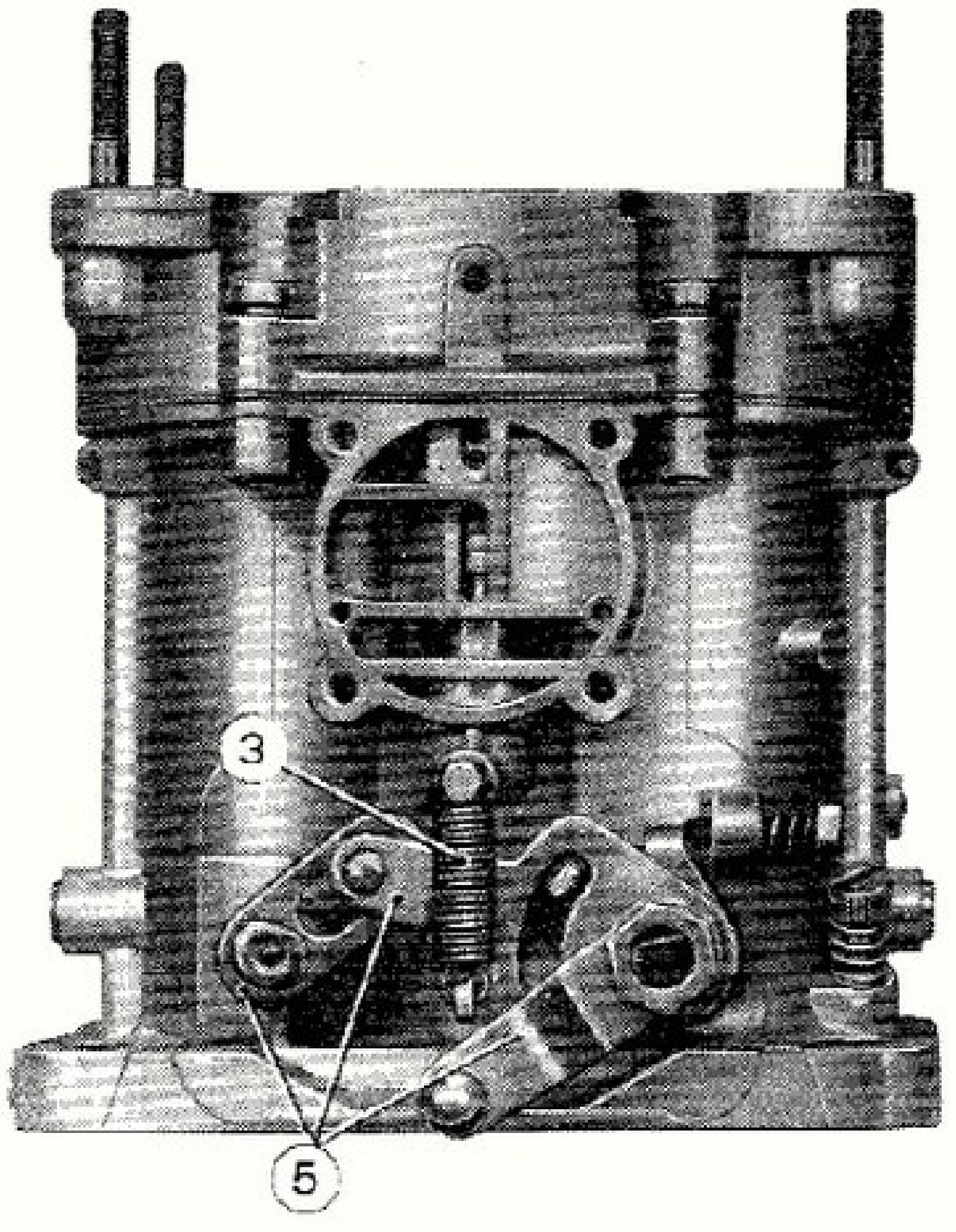


Fig. 73. - Carburetor top view (left) and cover with floats (right).

1. Vacuum duct - 2. Primary and secondary auxiliary Venturis - 3. Primary and secondary Venturis 4. Air corrector bush - 5. Starting jet - 6. Accelerating pump spring retainment plate - 7. Pump intake valve with discharge hole - 8. Pump control rod - 9. Starting reserve well - 10. Air corrector bush - 11. Starting mixture duct - 12. Emulsion tubes, complete with air corrector jets - 13. Spray nozzles - 14. Pump jet - 15. Pump delivery valve - 16. Starting mixture duct - 17. Starting valve spring stop - 18. Floats - 19. Fuel arrival connection.

On starting, the device distributes a slightly rich mixture in sufficient quantity to provide normal cold engine running - Diagram B, fig. 72.

As the engine warms up, however, this mixture is too rich and in excessive supply, so the starting device must be progressively cut out as the temperature of the engine rises.



With the starting device disconnected, plunger (50) blanks duct (54) thus stopping the flow of mixture - Diagram C, fig. 72.

Starting device operating instructions.

To obtain the best possible results, proceed as described below.

— **Starting the engine.**

Cold starts: insert the device fully (position A, fig. 72): once engine is running properly, set progressively back to rest position.

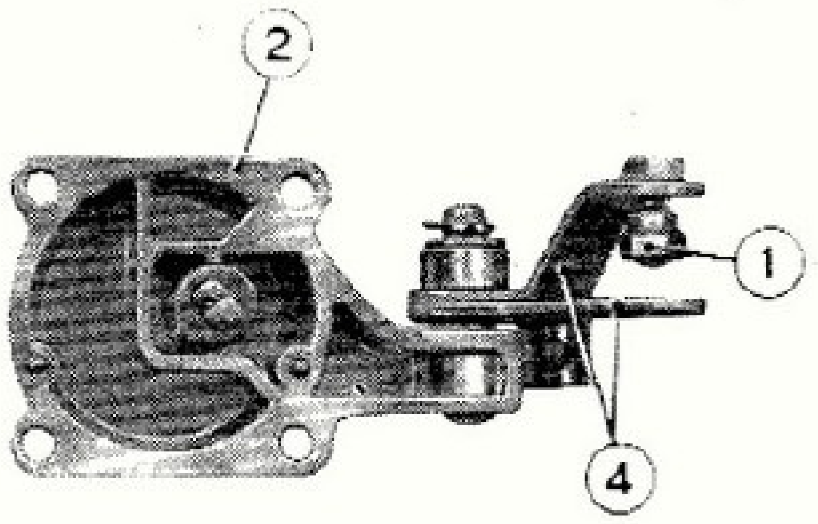


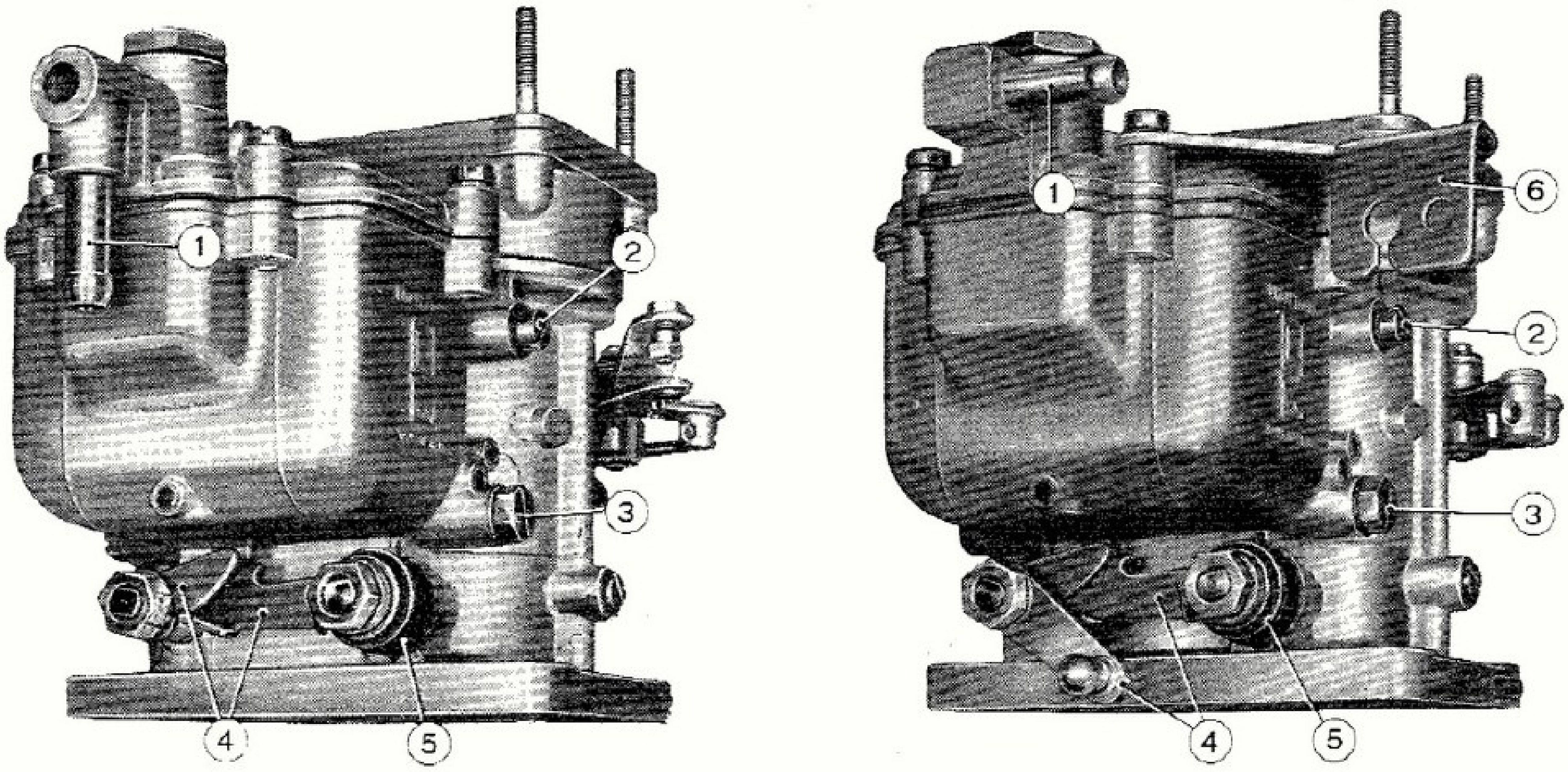
Fig. 74.

Partially disassembled carburetors.

1. Starting device bowden retainer - 2. Starting device - 3. Idler sector return spring - 4. Starting device control lever - 5. Throttles control lever and sectors.

Half-warm starts. A partial insertion of the device will suffice (position B, fig. 72).

Engine warm up. During this period, also when car is underway, the device should be gradually disinserted thus progressively leaning out the mix-



Figs. 75 and 76. - Front and rear carburetors - Float side.

1. Fuel arrival connection - 2. Idle speed jet holder - 3. Main jet holder - 4. Pump control levers - 5. Lever return spring - 6. Carburetor bowden mounting bracket.

ture to ensure smooth engine operation (position B, fig. 72).

— **Normal operation.** As soon as the engine reaches a temperature sufficient for normal operation, cut out the starting device (position C, fig. 72).

FLOAT LEVEL SETTING INSTRUCTIONS

For this setting, proceed as follows:

— Make sure that the weight of float (8, fig. 77) is the correct one (18 grams), that float is free on its hinge pin and is neither leaky nor dented.

— Make sure that needle valve (2) is tightly screwed in its housing and that ball (9) of the dashpot, incorporated in needle (4), is not jammed.

— Hold the carburetor cover (1) vertically as shown, otherwise the weight of float (8) might lower the ball (9) fitted on needle (4).

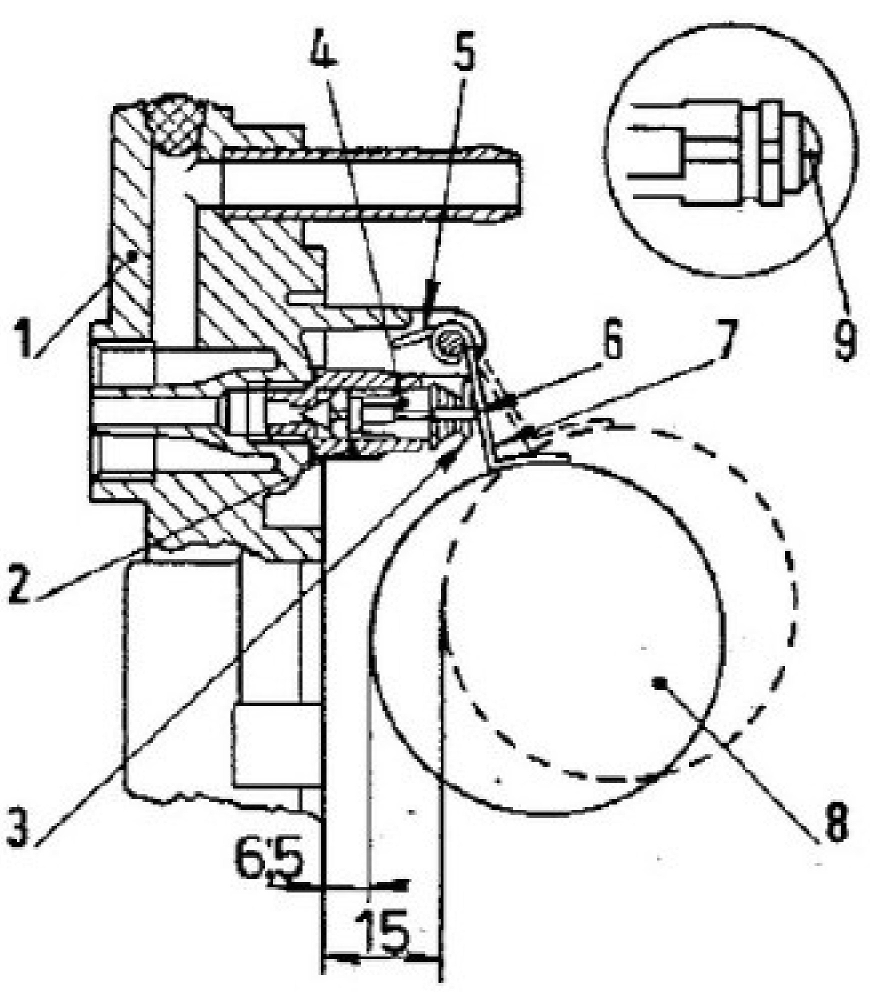


Fig. 77. - Float level setting diagram.

1. Cover - 2. Needle valve - 3. Lug - 4. Needle - 5. Lug - 6. Return hook - 7. Float arm - 8. Float - 9. Ball.

— With carburetor cover (1) vertical and lug (3) in light contact with the ball (9) of needle (4), the distance of both half-floats (8) from upper surface of carburetor cover (1), without gasket, must measure **6,5 mm (.26")**.

— After setting the level, check that travel of float (8) is **8,5 mm (.335")**. If necessary adjust the position of lug (5). Check that return hook (6) allows needle free movement in its seat.

— Sould the float (8) not be correctly placed, modify the position of float arms (7) until the required setting is reached, taking care that lug (3) is perpendicular to the axis of needle (4) and that it does not have any indentations on the contact face which might affect the free movement of the needle itself.

— Fit the carburetor cover making sure that float can move freely without undue friction.

NOTE - Float setting must be checked whenever replacing the float and/or the needle valve; in the latter case it is advisable to replace also the sealing gasket, making sure that the new needle valve is tightly screwed in its housing.

CARBURETOR SETTING DATA

DESCRIPTION	Calibration mm
Primary throat	28
Secondary throat	36
Primary Venturi.	19
Secondary Venturi	24
Primary auxiliary Venturi	4,50
Secondary auxiliary Venturi	4,50
Primary main jet	0,90
Secondary main jet	1,20
Primary idling jet	0,40
Secondary idling jet	0,80
Pump jet	0,40
Starting jet	0,80/F1
Primary emulsioning tube	F 33
Secondary emulsioning tube	F 25
Primary air corrector jet.	2,30
Secondary air corrector jet	1,85
Primary starting air jet	1,50
Secondary air starting jet	0,70
Needle valve	1,75
Intake valve with discharge orifice .	0,45
Float level setting	6,50

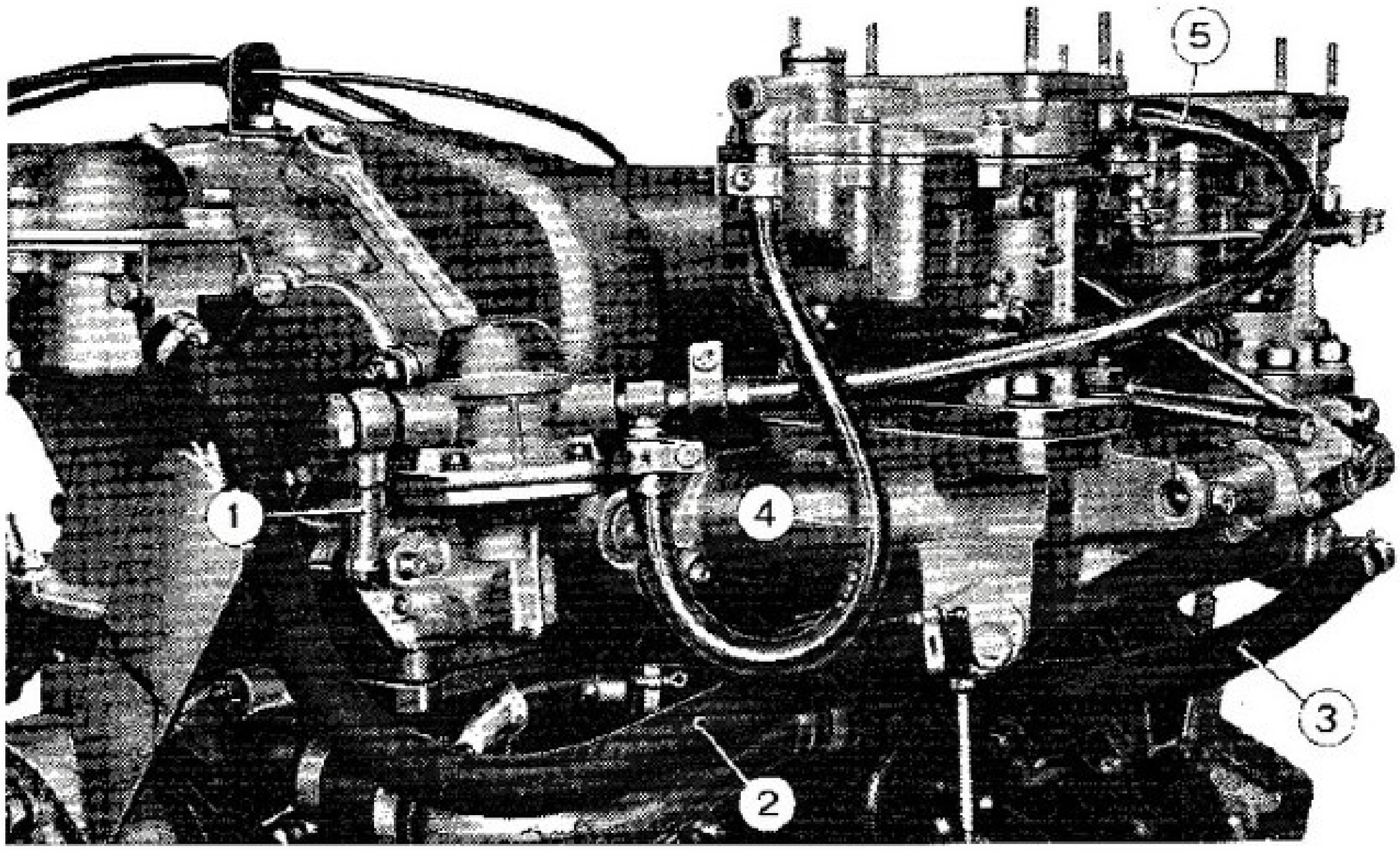


Fig. 78.

Mechanical fuel pump and relevant lines to carburetors.

1. Inlet connection, fuel from electric pump - 2. Water line from intake manifold to thermostat - 3. Water line from cylinder - 4. Front carburetor feed line - 5. Rear carburetor feed line.

MECHANICAL FUEL PUMP

The fuel pump (fig. 78) is mounted in series with the electric pump (see next page) from which it receives the fuel. The mechanical pump is located on cylinder head and is actuated by a cam, at the forward end of the shaft carrying the timing idler sprockets, through a pushrod acting on the diaphragm control rocker. At its top half the pump carries the fuel bowl, which serves also for priming, the strainer, the inlet and outlet valves. The diaphragm and its control mechanism are arranged in the pump lower half.

The fuel pump requires no particular care; periodical checks, however, are recommended. The impurities settled in bowl or on strainer can be washed out after removing the cover.

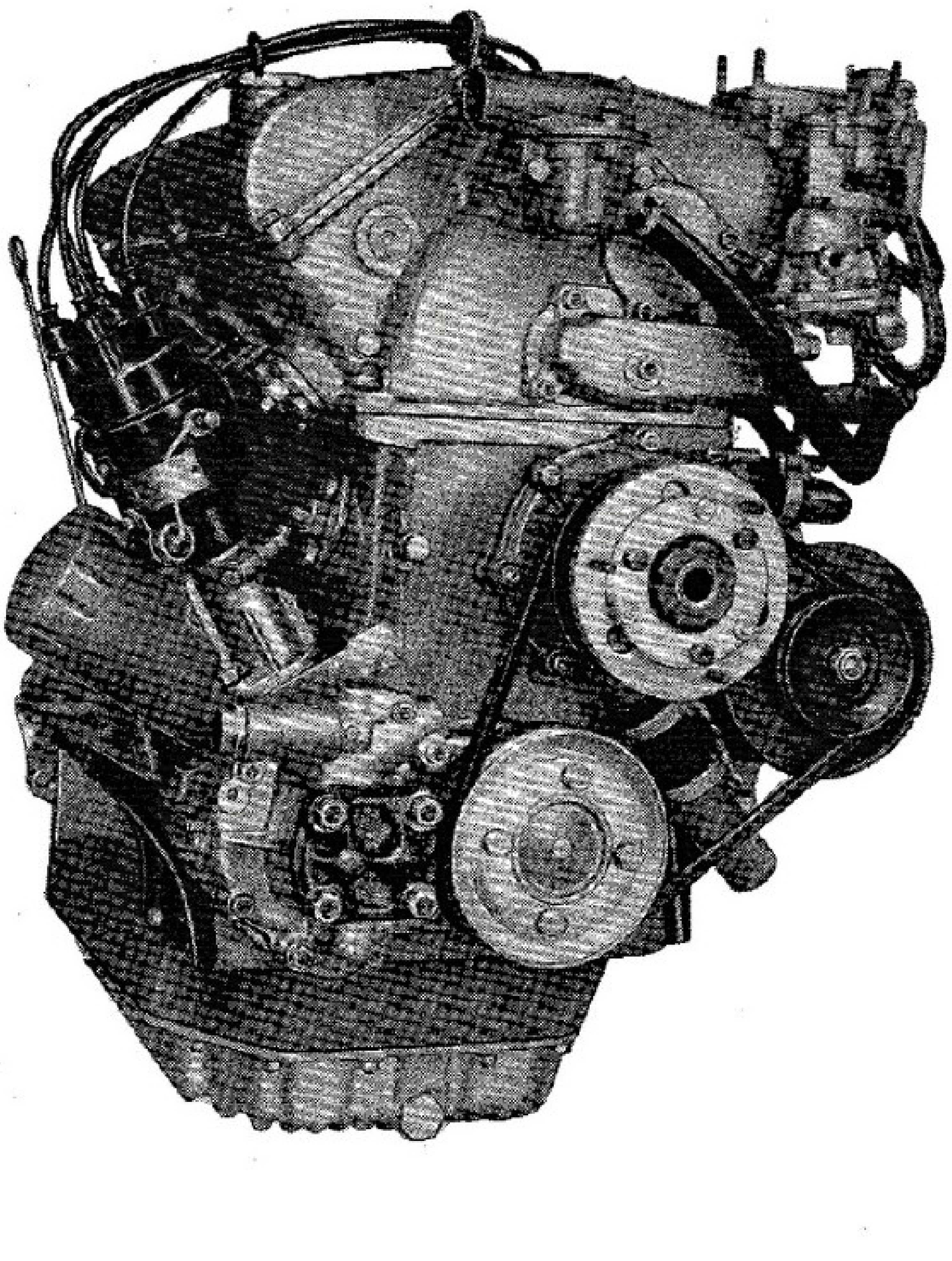


Fig. 79.

Front threequarter view of engine without fan.

ELECTRIC FUEL PUMP

Advantages.

The electric fuel pump is mounted underneath car floor (fig. 80) outside the battery housing. This pump needs no mechanical coupling with engine and therefore it can be installed far away from engine heat.

Pump capacity is independent of engine R.P.M. rate, and the pump is automatically started as ignition is turned on, so as to fill the carburetor before engine is started, with a saving in battery current.

Description.

The pump consists of a **body, a mechanical section** and an **electric section.**

The cylindrical body top end is closed by a dished cover clenched onto the body.

A corrugated diaphragm, called « **air chamber diaphragm** » is mounted below the top cover.

On its underside the body is closed by a bayonet-type cover sealed by a gasket and provided with a small magnet having the purpose of attracting and holding any ferrous impurities possibly present in the gasoline.

The pump body carries three welded connections: one at bottom for gasoline inlet, one at top for gasoline outlet and one central for electrical connection of the pump.

Inside the body, centrally located, is mounted a brass tube (whose bottom end is fixed to a base while the top end is soldered to the body through a flange) in which the pumping plunger slides.

The **mechanical section** consists of a valve carrier casing and a plunger with relevant load spring.

The valve casing is fixed by three screws to the central tube base and can be removed for service, if necessary. At bottom it carries the plastic inlet valve with cup and spring. The casing is provided with gauze strainer.

The **plunger** consists of a stainless steel hollow cylinder in the bottom end of which is press-fitted the plastic **lift valve.** A **damper spring** is mounted in plunger top portion.

The spring, seated in the valve holder casing, holds the plunger pushed upwards in the rest position whereby the damper spring rests against the tube cover.

The **electrical section** consists of the **coil, resistor** and **magnetic breaker.**

The ends of the enamelled copper wire coil, wound on a plastic material bobbin, are connected respectively to the current terminal and to the breaker contact spring.

The **resistor,** which is of cotton-insulated thin wire, is wound around the coil and acts as a bridge on coil, across the current terminal and ground.

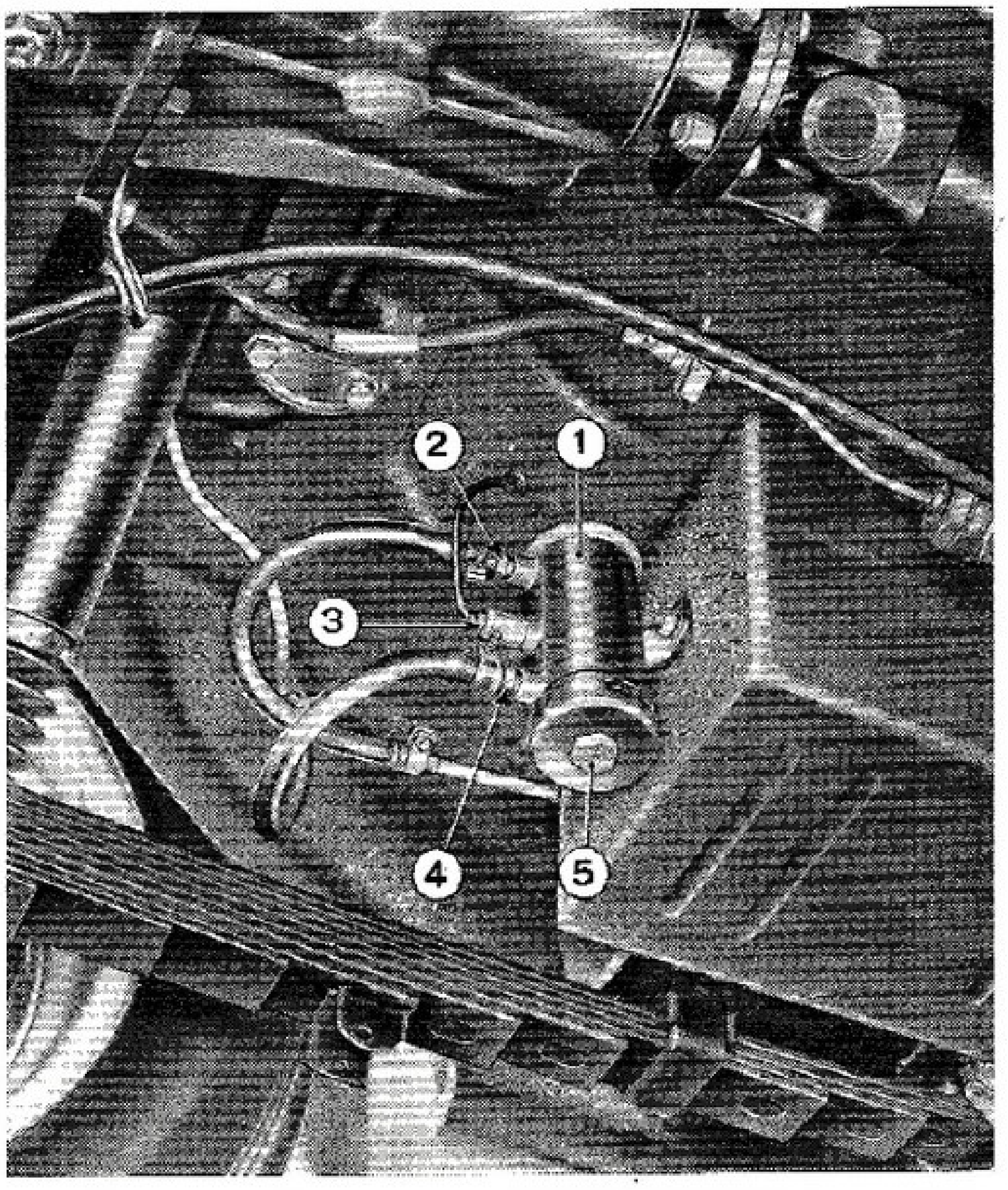


Fig. 80. - Electric fuel pump.

1. Pump assembly - 2. Fuel delivery connection - 3. Electric connection - 4. Fuel inlet connection - 5. Bottom cover nut.

The **magnetic breaker** is screwed onto its **base** fixed above the coil and consists of the **permanent magnet** (movable contact) and the breaker (stationary contact). The permanent magnet is movable inasmuch as it is soldered to the **breaker arm** which carries the ground contact on a proper spring. The breaker stationary contact is also carried by a spring, properly insulated, to which is soldered the coil winding end.

For a more positive grounding of breaker, a copper wire jumper is soldered between movable contact spring and breaker base.

The pump chamber in which the electrical section is housed is emptied of air and then filled with helium to sensibly reduce contacts deterioration.

OPERATION

The plunger is magnetically and electrically driven up and down the tube at a very high speed. When the plunger is pushed up by the spring load its upper end enters the field of the permanent magnet (movable contact). The pulling force between magnet and plunger causes the magnet (with pole bent at 90°) to come in contact with the brass tube in which the plunger slides. Because of the movement of breaker arm, whose articulation is pivoted on its fulcrum, the ground contact is pressed against the stationary contact thus closing the electric circuit. At this instant the current from battery (or from generator) flows through the coil winding inducing a strong magnetic field around it which attracts and pulls down the plunger.

When, following the downward movement the plunger leaves the permanent magnet field, the attraction force decreases and the permanent magnet returns to rest position under the magnetic pull of the opposite pole. As a consequence, breaker contacts part and cut off the current to the coil whose magnetic field collapses.

At this point the load of the spring takes over, pushes the plunger upwards and the cycle is repeated.

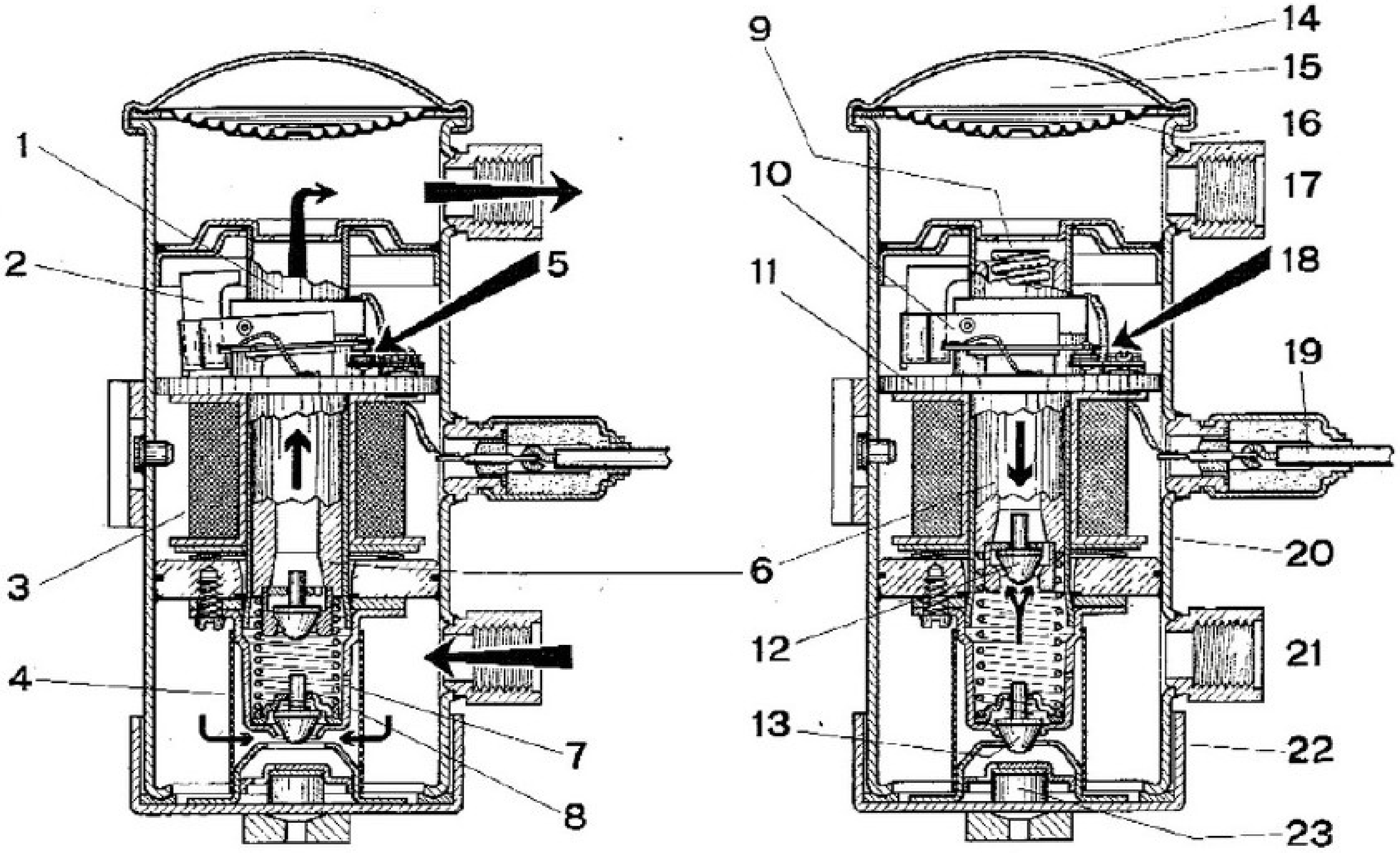


Fig. 81. - Electric fuel pump diagram.

1. Tube - 2. Magnet - 3. Coil - 4. Strainer - 5. Contacts (open) - 6. Plunger - 7. Plunger spring - 8. Valve carrier casing - 9. Damper spring - 10. Breaker arm - 11. Breaker base - 12. Fuel lift valve - 13. Fuel inlet valve - 14. Cover - 15. Air chamber - 16. Diaphragm - 17. Delivery connection - 18. Contacts (closed) - 19. Current lead - 20. Pump body - 21. Inlet connection - 22. Cover - 23. Magnet.

The reciprocating stroke of the plunger as described above causes a pumping action on fuel as follows:

When plunger is pushed upwards by the spring it exerts both a compression and a suction action. In the upstroke the **lift valve** in plunger is closed while, instead, the inlet valve in the casing is open so that the fuel above the lift valve is forced up and sent to carburetor through the pump pressure chamber. At the same time fuel is sucked into the chamber below plunger through the inlet valve.

In its downstroke the plunger compresses the fuel below it but being the inlet valve closed the fluid passes into the chamber above plunger through the lift valve.

In other words:

— in the upward stroke of plunger the pump draws and lifts fuel (fig. 81 - left illustration);

— in the downward stroke, the plunger just displaces fuel inside the cylinder (fig. 81 - right illustration).

During its flow through the pump the fuel is filtered twice since it passes first through a plastic gauze strainer, arranged in the suction space between valve carrier casing and magnet seat and then in a gapped passage between magnet seat and inlet valve where the magnet field traps any ferrous particles still present in fuel.

The «air chamber» diaphragm located in pump upper space forms, with the air contained in the space, a kind of air cushion which contributes to regularity and steadiness of fuel delivery.

Should the generator current rise to dangerous levels, the coil winding is protected by the jumper resistor connected across terminal and ground.

Pump installation on car.

The pump must be mounted vertically with fixed cover uppermost, and must be securely grounded.

The pump is provided with a welded bracket with holes for the mounting screws, as visible in fig. 80.

Maintenance.

Maintenance is limited to the mechanical parts of the pump.

For this purpose, the pump bottom can be removed using a 17 mm opening wrench. During this operation care must be taken not to damage the seal gasket between bottom and body. The gauze strainer is accessible after removal of pump bottom. The latter and the strainer must be washed in gasoline. Also the magnet support must be cleaned to remove any metal particles stuck thereon.

To disassemble the mechanical components undo the three valve carrier casing mounting screws and remove the casing, the inlet valve with cup, the plunger spring and the plunger.

The plunger components (lift valve and damper spring) cannot be disassembled.

The parts that can be disassembled are supplied as individual spares; the plunger only as an assembly.

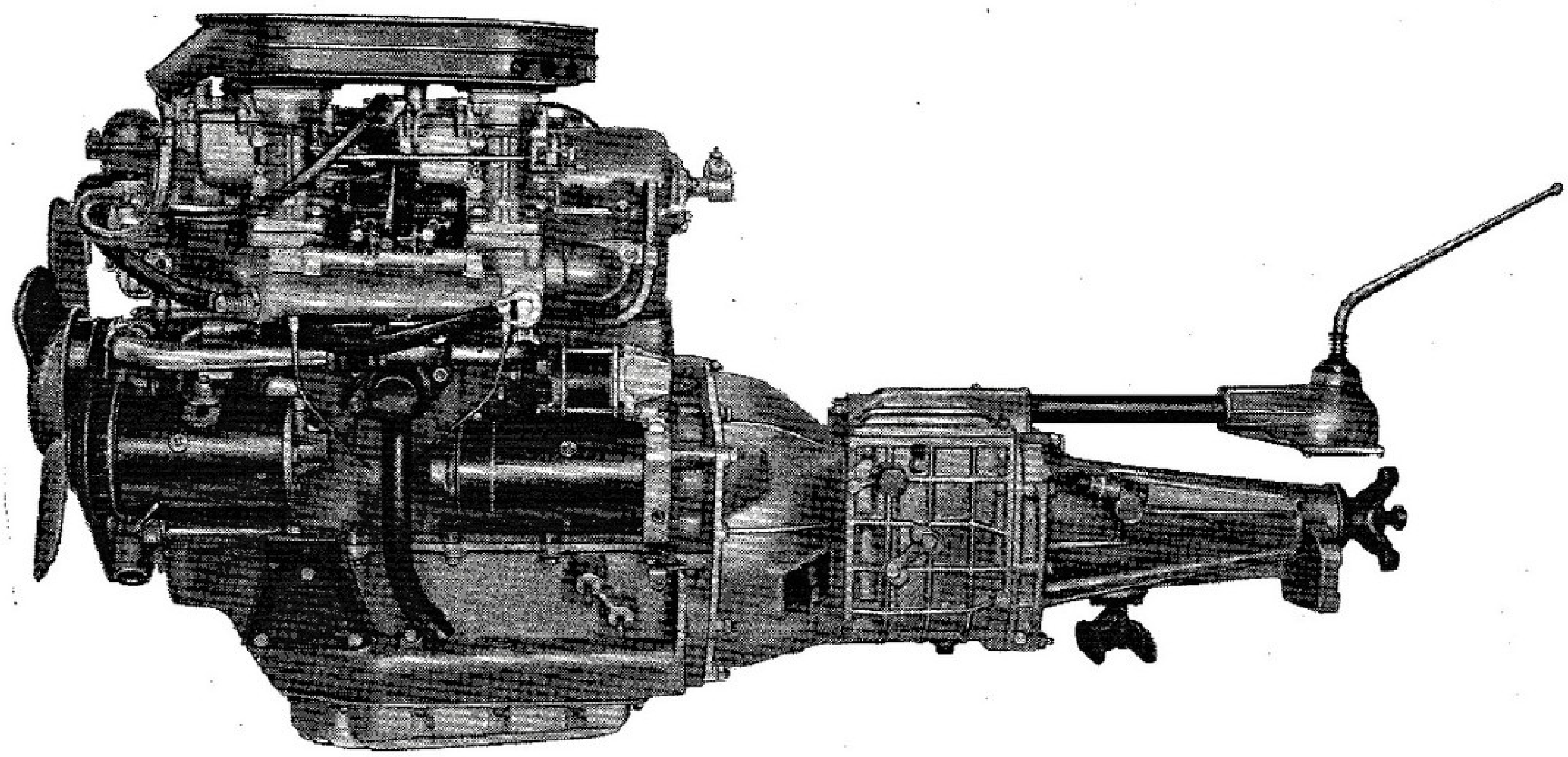


Fig. 82. - Left view of power plant (intake side).

118A.000 ENGINE BREAK-IN CYCLE

118A.000 ENGINE BREAK-IN "1600 S CABRIOLET"

RPM	Time in minutes	Load
500	15′	no load
2000	15′	half load
3000	10′	half load
3000	5′	full load
	Total 45′	

Note. - When bench testing a rebuilt engine never run it at its maximum RPM rate and do not try to obtain the output figures shown on the power diagram.

Break-in shall be completed by the User, keeping the engine RPM rates below the limits specified for the run-in period of the 1600 S Cabriolet, as follows:

- first 1000 km (600 miles): not over 3500 r.p.m.;
- from 1000 to 2000 km (600 to 1200 miles): not over 2500 r.p.m.;
- from 2000 to 4000 km (1200 to 2400 miles): r.p.m. may increase gradually but the max. specified rates must be reached only **after** 4000 km (2400 miles).

ENGINE PERFORMANCE CURVES

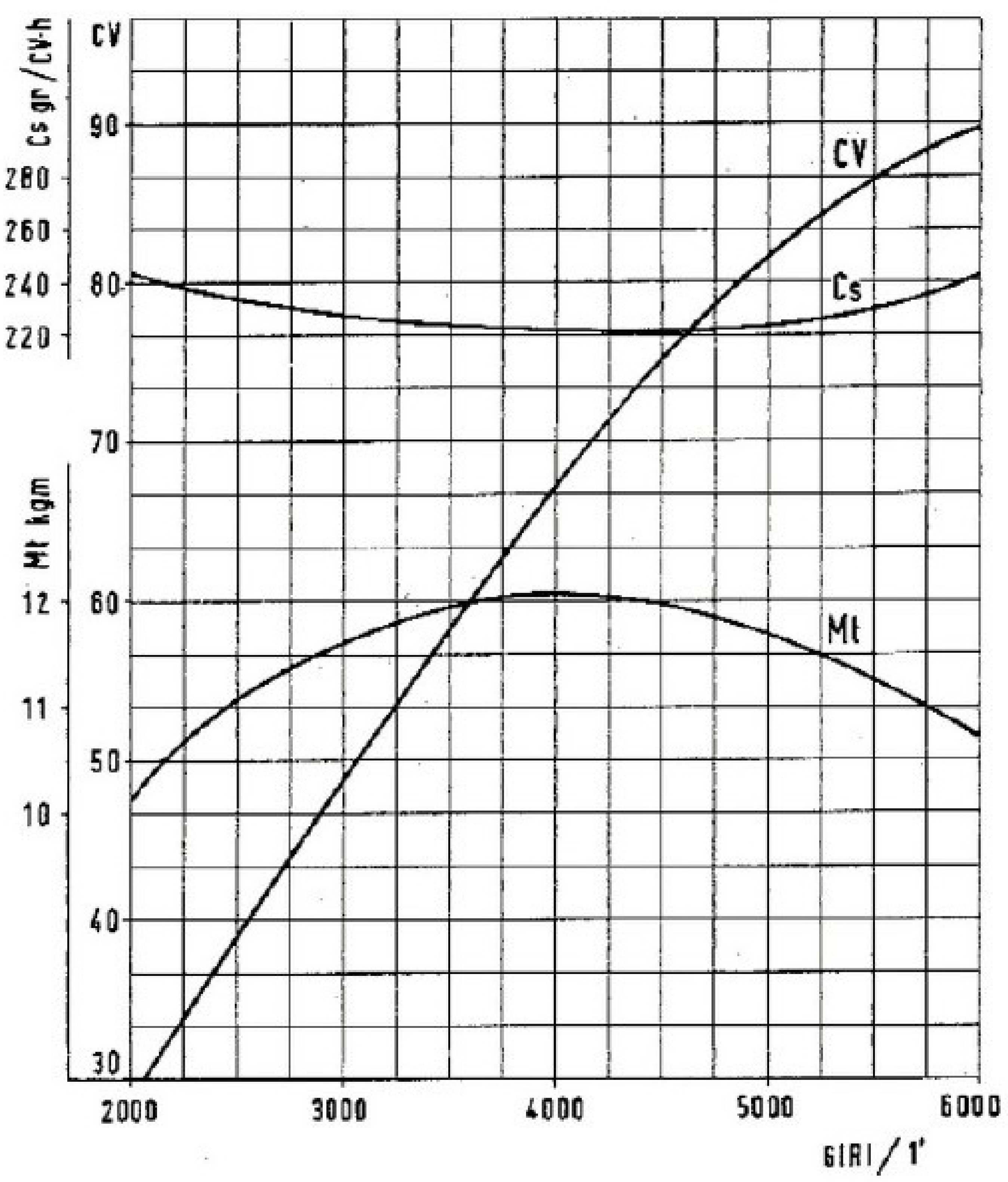


Fig. 83. - Type 118 A.000 engine - Performance curves.

gr/Cvh = *grHPhour*; Cv = *HP*; giri/1′ = *RPM*; Cs = *Consumption*; Mt = *Torque*;

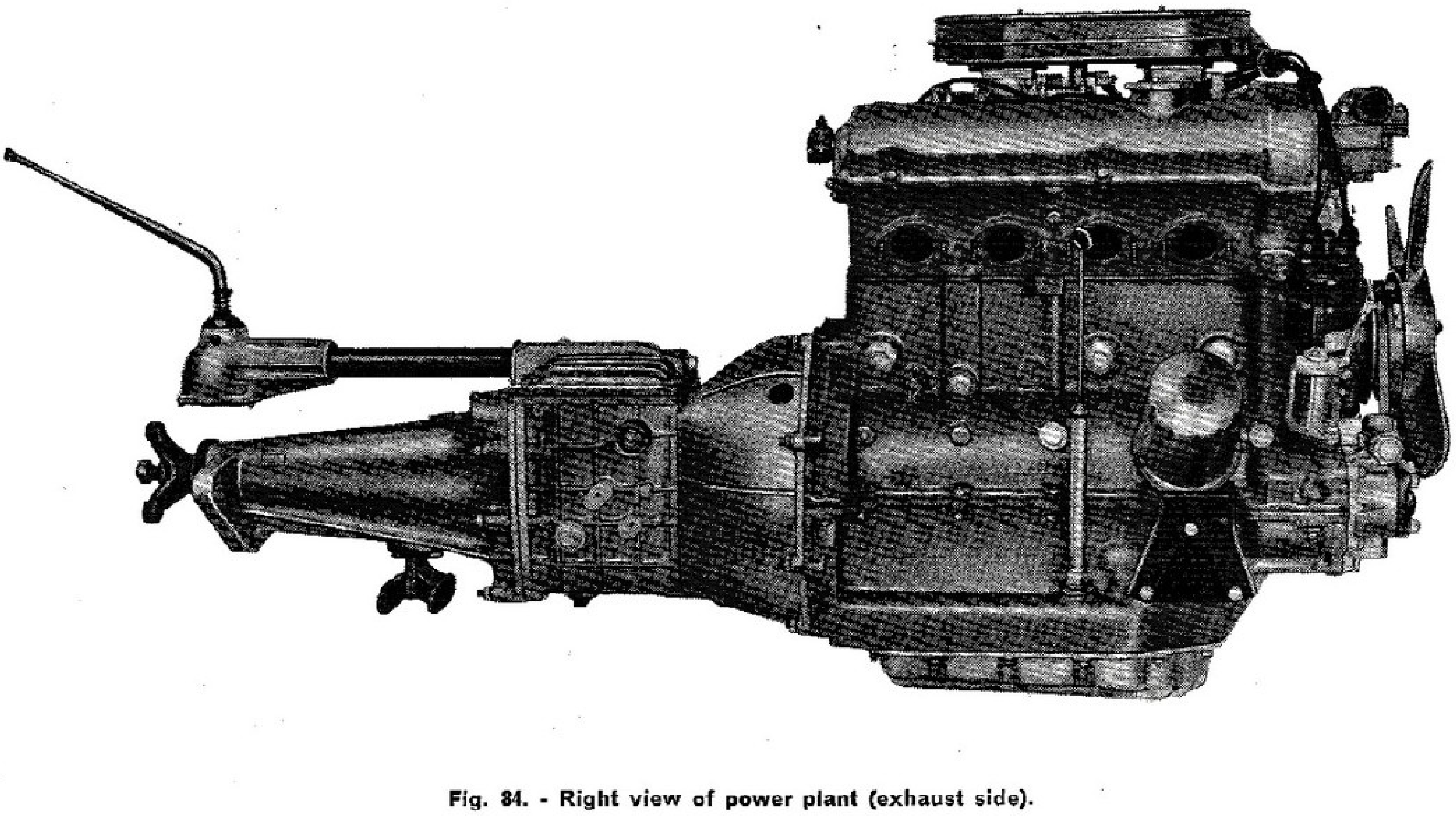


Fig. 84. - Right view of power plant (exhaust side).

Clutch

DESCRIPTION OF HYDRAULIC CONTROL

The clutch hydraulic control consists of a pedal-controlled master cylinder (connected to a reservoir in engine compartment) which forces fluid to an operating cylinder on crankcase lower end.

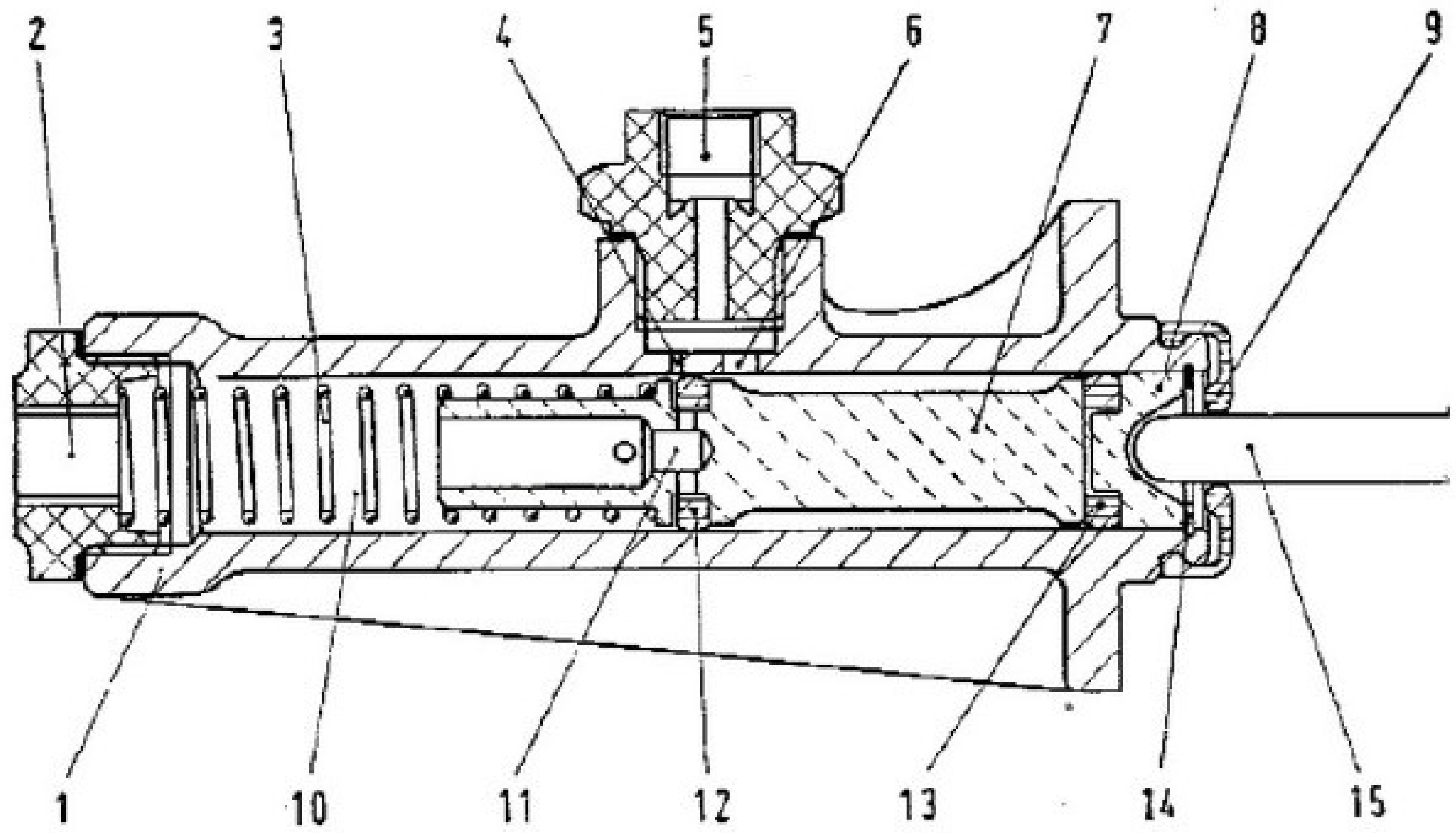


Fig. 85. - Clutch master cylinder.

1. Body - 2. Fluid outlet connection operating cylinder - 3. Plunger return spring - 4. Compensating hole - 5. Fluid inlet connection - 6. Fluid inlet hole - 7. Valve carrier - 8. Plunger - 9. Boot - 10. Fluid compression chamber - 11. Passage holes in valve carrier - 12. Valve ring 13. Valve ring - 14. Lockring - 15. Push rod.

The operating cylinder push rod is connected directly to the clutch release forked lever. The push rod is threaded at one end and carries a nut and a lock nut screwed on, the rotation of which enables adjustment of pedal free travel.

The hydraulic clutch circuit is entirely independent of brake circuit.

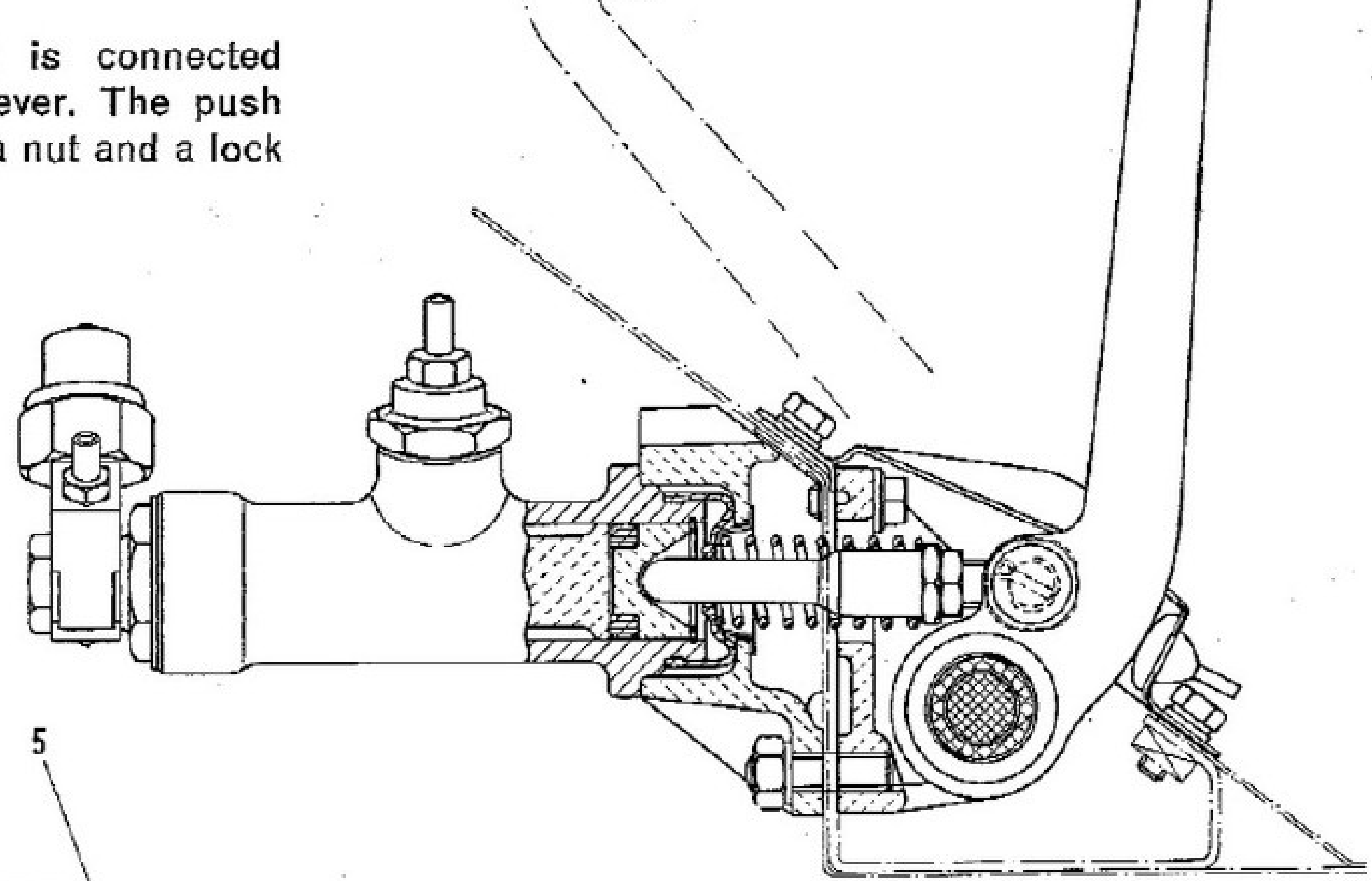


Fig. 85a.
Clutch pedal and master cylinder assembly.

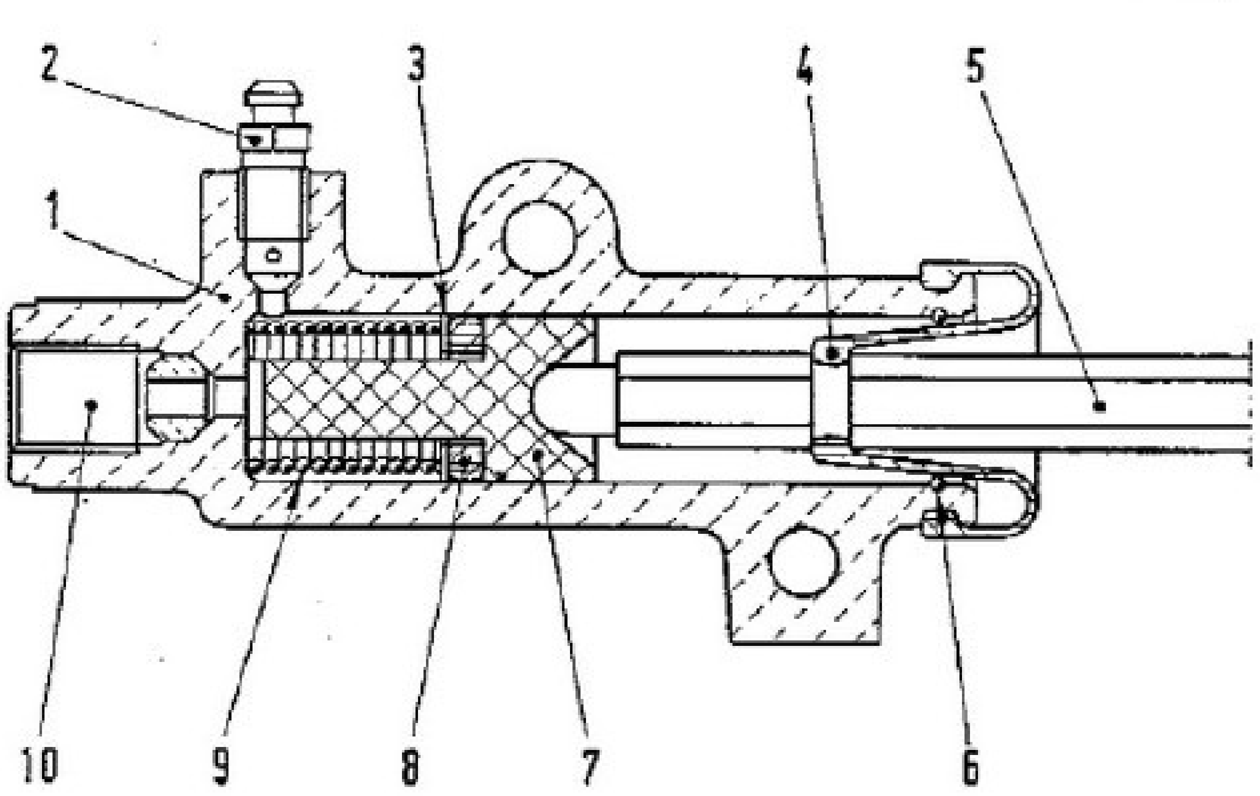


Fig. 86. - Clutch operating cylinder.

1. Cylinder body - 2. Air bleed screw - 3. Retainer - 4. Push rod and cylinder boot - 5. Threaded rod operating clutch control forked lever - 6. Snap ring - 7. Piston - 8. Seal ring - 9. Spring - 10. Fluid inlet hose connection seat.

OPERATION OF HYDRAULIC CONTROL

The hydraulic clutch circuit contains a « special FIAT brake fluid (Blue Label) » (.23 Imp. pts - .28 U.S. pts - 0.130 lt); fluid level in tank should never be above the « MAX » nor below the « MIN » marks.

Access to the master cylinder reservoir can be gained from engine compartment.

Fluid flows from reservoir to master cylinder through hole (6, fig. 85) and seeps past the gap between carrier of valve (12) and body; then it flows through holes (11) of valve carrier and fills the whole circuit.

When clutch pedal is operated, the push rod (15, fig. 85) presses pistons (8) forward and, consequently, valve carrier (7); as a result, valve ring (12) exerts its pressure against the front face of valve carrier, shutting off the passage to the annular chamber of valve carrier. Continuing in its forward movement, valve ring (12) passes over compensating hole (4), and cuts off any communication with the fluid reservoir.

and axial action of hydraulic pressure so that sealing ability is improved as pressure increases.

After releasing the pedal, the combined action of clutch release forked lever spring and of master cylinder spring (3, fig. 85), sends the fluid back to master cylinder and all parts resume their original position. Free intercommunication between system and reservoir is thus restored.

WARNING - At assembly, make sure that a clearance of 0 to 0,10 mm (.39") exists between master cylinder plunger and pushrod.

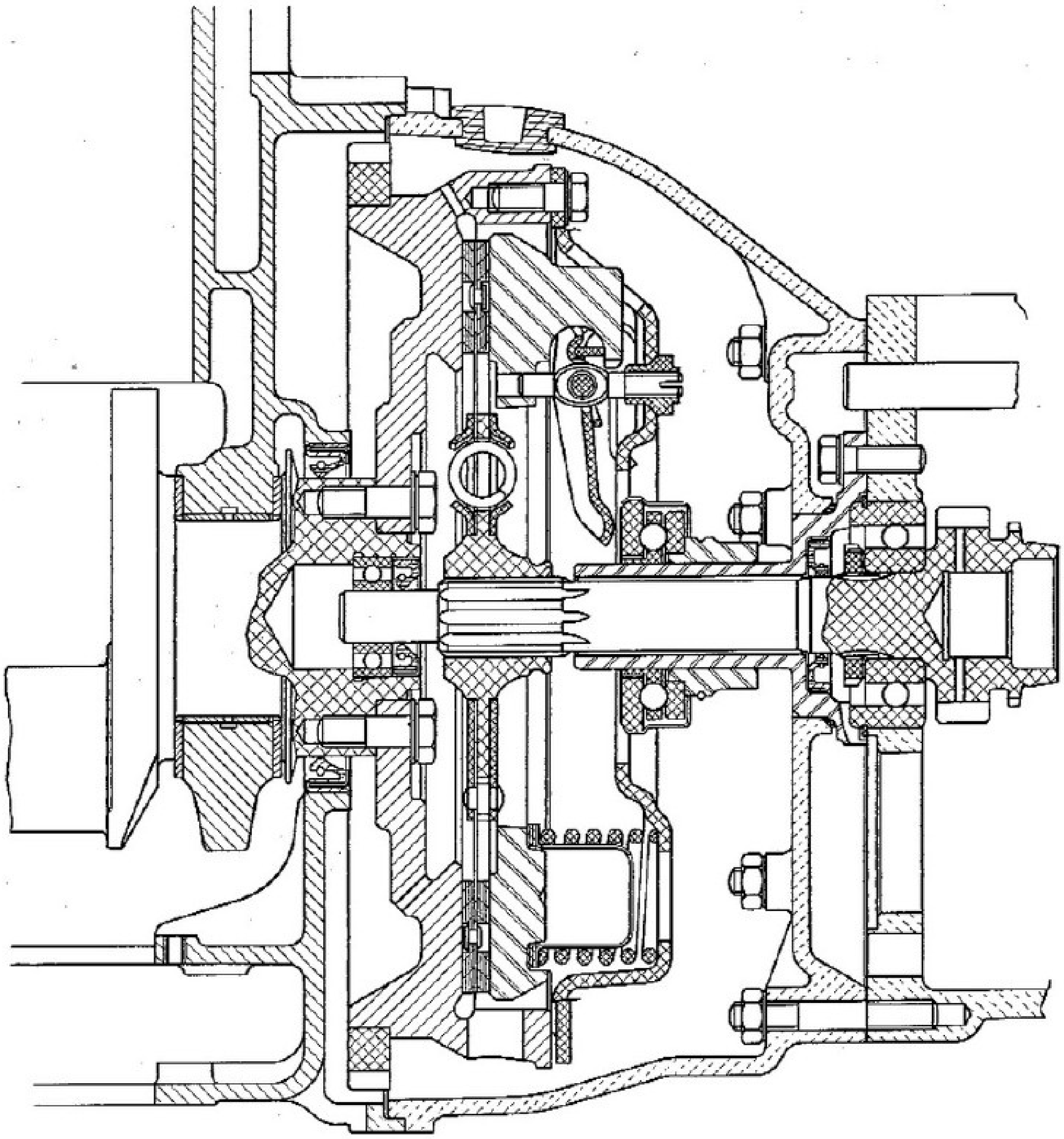


Fig. 87.
Clutch assembly.
Longitudinal section.

Compression of fluid begins from this instant. By acting on front and inner faces of valve, compression warrants perfect valve sealing even under high operation pressures.

When pressure reaches the fluid in operating cylinder (1, fig. 86) it pushes plunger (7) and displaces rod (5) thus actuating the clutch release forked lever.

In operating cylinder (1, fig. 86) seal ring (8), also when at rest, is axially compressed by cup (3) under the action of spring (9). The seal ring is under the radial

CLUTCH PEDAL FREE TRAVEL ADJUSTMENT

Clutch pedal total travel must be 147 mm (5.78") and free travel 18-22 mm (.71" to .87"). The latter corresponds to a clearance of 2 mm (.079") between release lever tips and pilot bearing.

Pedal free travel is adjusted by turning in or out the nut and locknut on rod (5, fig. 86) operating the clutch release forks.

ADJUSTING
CLUTCH RELEASE LEVERS

If the clutch unit has been disassembled and the overhaul of all parts has been made, including pressure spring test according to the data tabulated below, the release lever height should be adjusted, on assembly, as follows.

Secure the clutch cover to a rest face and place a dummy disk 7,70 to 7,73 mm (.3032" to .3044") thick between the pressure plate and the rest face.

Adjust the three release levers until the tips are 44 ± 0,5 mm (1.73" ± .020") apart from the rest face. For this operation use fixture **A. 70015.**

The tips of the three release levers should be level within 0,1 mm (.0039") after they have been set.

On assembling the clutch, lubricate the following parts with FIAT Jota 3 grease:

— pressure plate: outer faces of release lever mounts;

— release lever fulcrum; contact face:

— release lever pins: whole length;

— clutch cover: eyebolt nut seats;

— release lever eyebolts: stem flats.

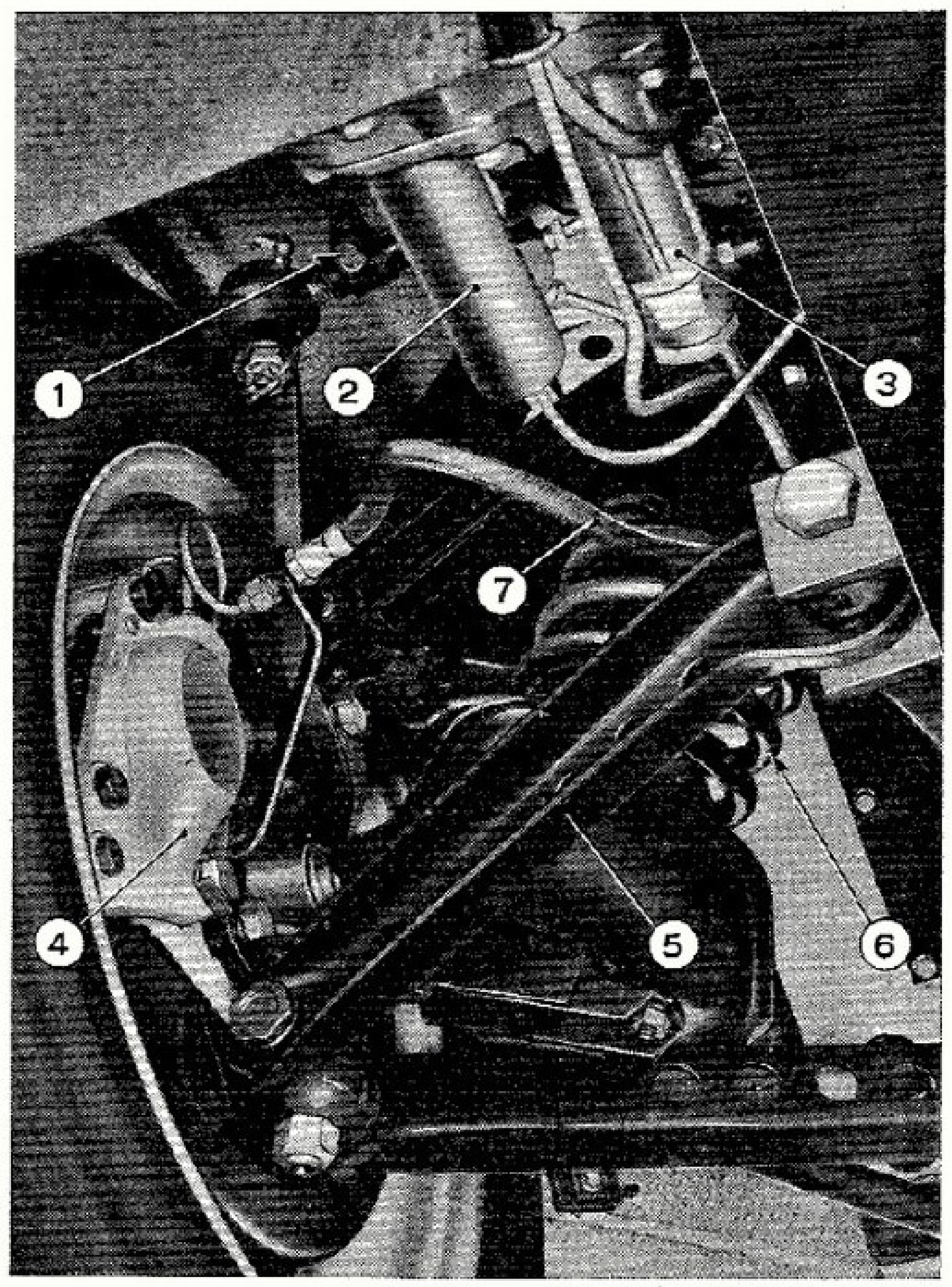


Fig. 88. - Detail of car bottom view at left front wheel.

1. Adjustable track rod - 2. Brake master cylinder - 3. Clutch master cylinder - 4. Disc brake caliper - 5. Lower swinging arm - 6. Coil spring - 7. Hydraulic brake line.

CLUTCH SPECIFICATIONS AND DATA

Type		Dry, single plate
Drive plate hub		cushioned type, with damper plates
Driven plate facings		friction linings
Facing O.D.		216 mm (8 ½")
Facing I.D.		152 mm (6")
Clutch pressure springs:	Part number	4097853
	Wire diameter	4,8 mm (.1899")
	Outside diameter	40,2 mm (1.583")
	Free spring height	58,7 mm (2.311")
	Seated spring height	34.5 mm (1.358")
	Corresponding load	75 ± 3,75 kg (165 ± 8.3 lbs)
Pedal free travel		18 to 22 mm (.71" to .87")
Release lever inner tip height from driven plate flywheel face		44 ± 0,5 mm (1.75" ± .020")
Clutch control		hydraulic
Master cylinder I.D.		3/4"
Operating cylinder I.D.		3/4"
Hydraulic circuit capacity		0,130 kg (.14 U.S. Qts. - .12 G.B. Qts.)
Fluid grade		Special FIAT brake fluid (blue label)

DIAGNOSIS AND REMEDIES FOR CLUTCH RELEASE HYDRAULIC CONTROL SYSTEM TROUBLES

TROUBLES	CAUSES	REMEDIES
Slipping clutch.	Master cylinder overloaded because compensating hole is clogged.	Overhaul master cylinder, replace seal if swollen or deteriorated, unclog compensating hole; bleed the system.
Grabbing clutch.	Air is present in system because of imperfect bleeding.	Bleed correctly.
	Introduction of chips, filings or other undesirable materials on the sealing surfaces of the ring-valve.	Clean, replace ring-valve if deteriorated, and bleed the system.
	Introduction of air in master cylinder because of inadequate piston seal ring tightness.	Fit a new seal ring and check that the piston land is lower than the seal ring. Bleed the system.
	Deteriorated ring-valve.	Replace the ring-valve checking master cylinder interior for absence of burrs, roughness, etc.; bleed the system.
	Fluid leaks from connections or lines.	Tighten the connections, replace deteriorated or otherwise faulty parts and bleed the system.
	Fluid leaks from operating cylinder.	Replace the seal and the deteriorated packing; bleed the system.
	Fluid in reservoir is insufficient.	Top up with recommended fluid and, if necessary, bleed the system.
	Misadjusted operating rod.	Adjust clearance between rod and piston to 0-0,10 mm (.039").
	Clogged vent hole in reservoir cap that promotes a vacuum in master cylinder, thus allowing air infiltrations through the seal.	Clean reservoir cap and unclog the vent hole; bleed the system.
Hard clutch pedal and engagement delayed with respect to pedal return.	Inadequate grade of fluid.	Drain the system, flush clean, refill with the recommended fluid; bleed the system.
	Deteriorated hose or kinked metal pipe.	Replace parts as required; bleed the system.

TRANSMISSION

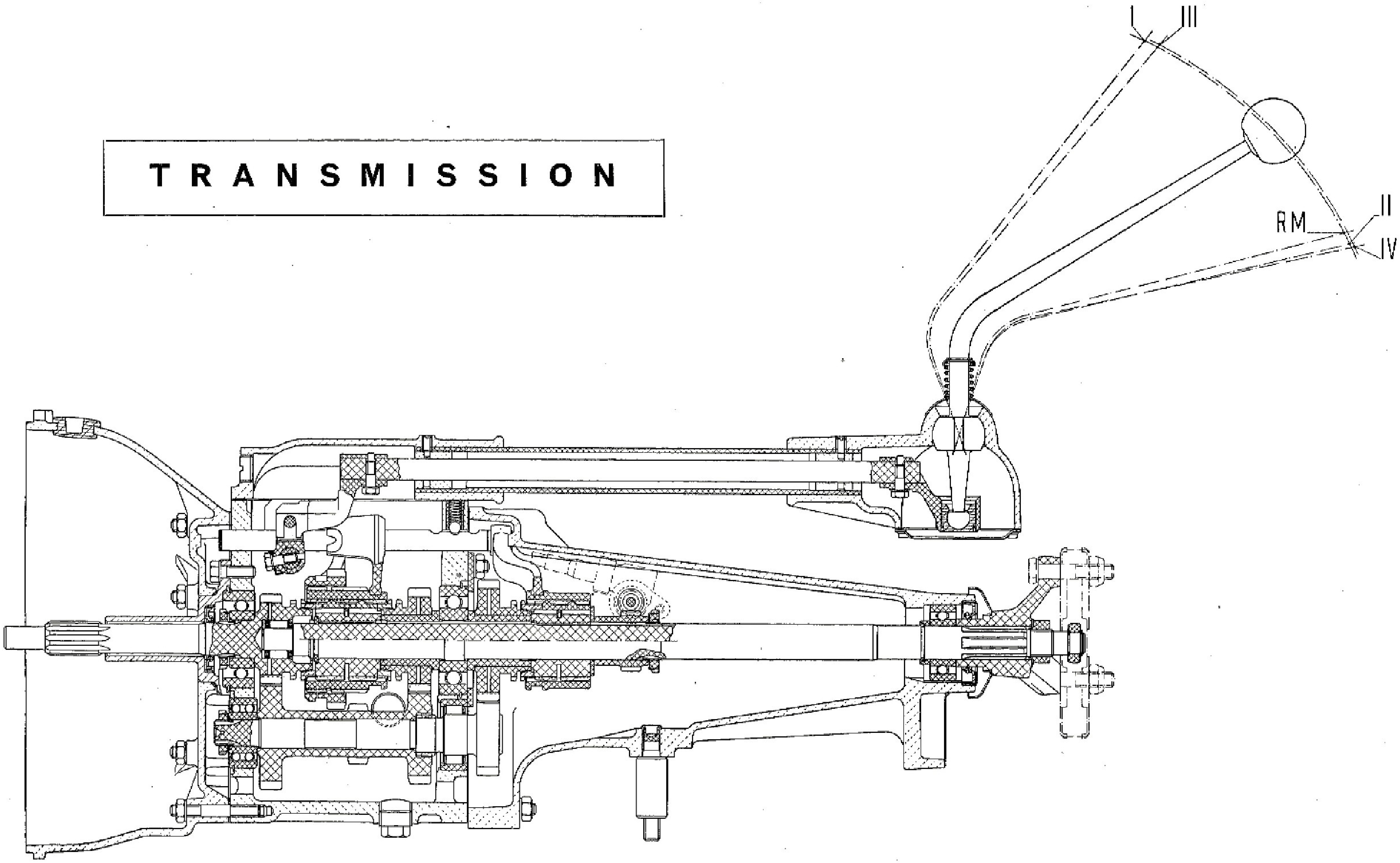


Fig. 89. - Longitudinal section.

PROPELLER SHAFTS AND JOINTS

Power drive is transmitted to rear wheels through a propeller shaft in two lengths (divided) with central pillow block (fig. 91).

The front propeller shaft is connected to transmission by a flexible joint (fig. 91) fixed to the studs of sleeve on transmission primary shaft (fig. 90), and is elastically supported by a pillow block near the rear propeller shaft slip yoke.

The rear propeller shaft is connected to the front propeller shaft and rear axle through universal joints. Splined front end allows for sliding motion of universal joint slip yoke.

Checks and service.

Run-out checks must be carried out separately on both front and rear propeller shaft sections: any straightening, if required, must be performed on an arbor press.

Balance must be checked by rotating the shaft: if weight distribution is not uniform, stick some putty as required to correct unbalance.

Next, weigh the putty and, on the same spots where it was applied, solder an equal amount of tin.

Check the front shaft bearing in pillow block for no shaft-to-bearing play and minimum end play.

The flexible joint should prove to be in good condition and so the pillow block housing rubber pads.

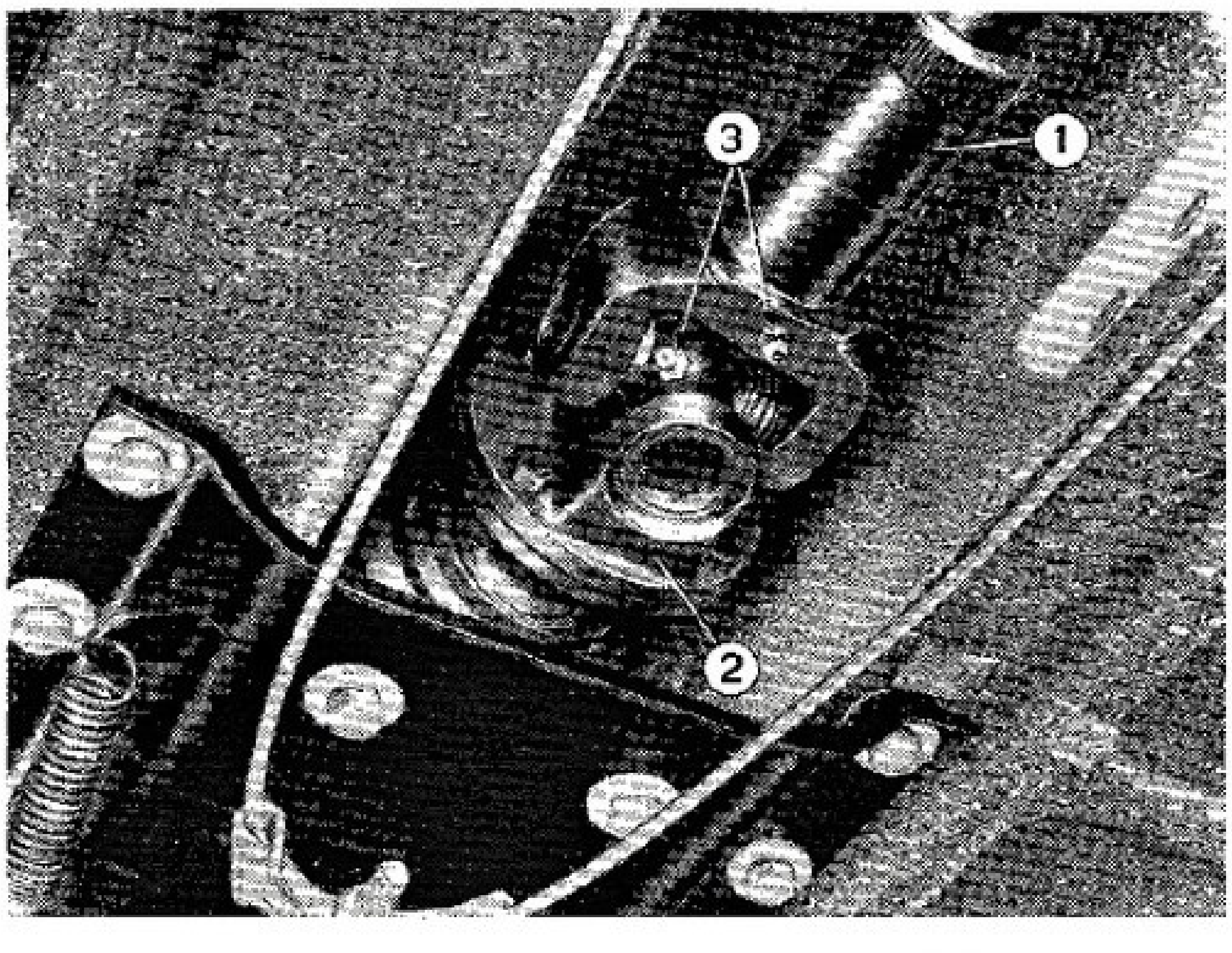


Fig. 90. - Detail of propeller shaft central universal joint.

1. Sliding sleeve with yoke - 2. Universal joint with sleeve - 3. Lubricators for spider and sleeve.

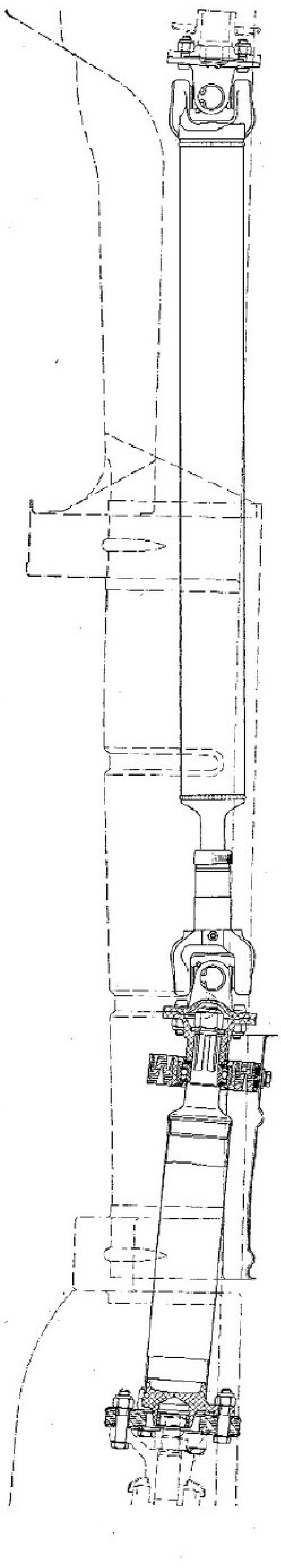


Fig. 91. - Divided propeller shaft with central pillow block.

Rear Axle and Suspension

Rear suspension is by semi-elliptic springs and oleo-pneumatic telescopic shock absorbers.
Stabilizer bar.

Axle casing is of pressed sheet steel, with cast-iron carrier.
Hypoid final drive gear set.

REAR SUSPENSION SPECIFICATIONS

Leaf springs	2
Composition	1 main leaf and 10 other leaves
Set spring opening	72 ± 3 mm (2.38″ ± .12″) under a load of 100 kg (220 lbs)
Anchor bushes	resilient
Resilient bushes orientation:	
— in spring rear eye	42° (to the line through the eyes of free spring)
— in rear support	36° (to the vertical)
Lubrication: leaves and elastic pad pockets at leaf ends	Gamma 1 G grease
Rear stabilizer bar	elastically fixed to body bottom and anchored to axle casing by rubber bushes.
Oleo-pneumatic shock absorbers	2
Length (measured from lower mounting eye center to outer casing top plane):	
— telescoped in	317 mm (12.5″)
— telescoped out	504 mm (19.9″)
Stroke	187 mm (7.4″)

REAR AXLE SPECIFICATIONS

Type	semi-floating
Final drive gear set	hypoid
Final drive ratio	10 to 43
Pinion bearings	2
Type	taper roller
Pinion bearing pre-load setting	collapsible spacer and nut tightening with torque wrench
Pinion bearing pre-load (pinion nut tightening torque)	8,000 to 16,000 kgmm (58 to 116 ft-lbs)
Pinion rolling torque	140 to 180 kgmm (1 to 1.3 ft-lbs)
Differential case bearings	2
Type	taper roller
Adjustment	threaded adjusters
Bearing pre-load: differential bearing cap divergence	0,20 to 0,25 mm (.0078″ to .0098″)
Pinion and bevel gear	paired
Pinion-to-bevel gear backlash	0,07 to 0,12 mm (.0028″ to .00047″)
Play in rear axle complete with axle shafts and brake discs	4 to 6 mm (.157″ to .236″)
Axle shaft bearing type	ball
Rear track	1215 mm (47.8″)
Rear axle lubricant: grade	FIAT W 90 oil (SAE 90 EP)
amount	0,635 lt (.67 U.S. qts - .55 G.B. qts)

Front Suspension and Wheels

By independent wheels, with coil springs and oleo-pneumatic, telescopic, double-acting shock absorbers. Stabilizer bar connected to lower swinging arms.

The suspension check data are tabulated on page 55.

COIL SPRINGS

The front suspension coil springs are selected and subdivided into two classes:

— springs identified by a yellow stripe on central coils: height under a load of 440 kg (970 lbs) more than 182 mm (7.17");

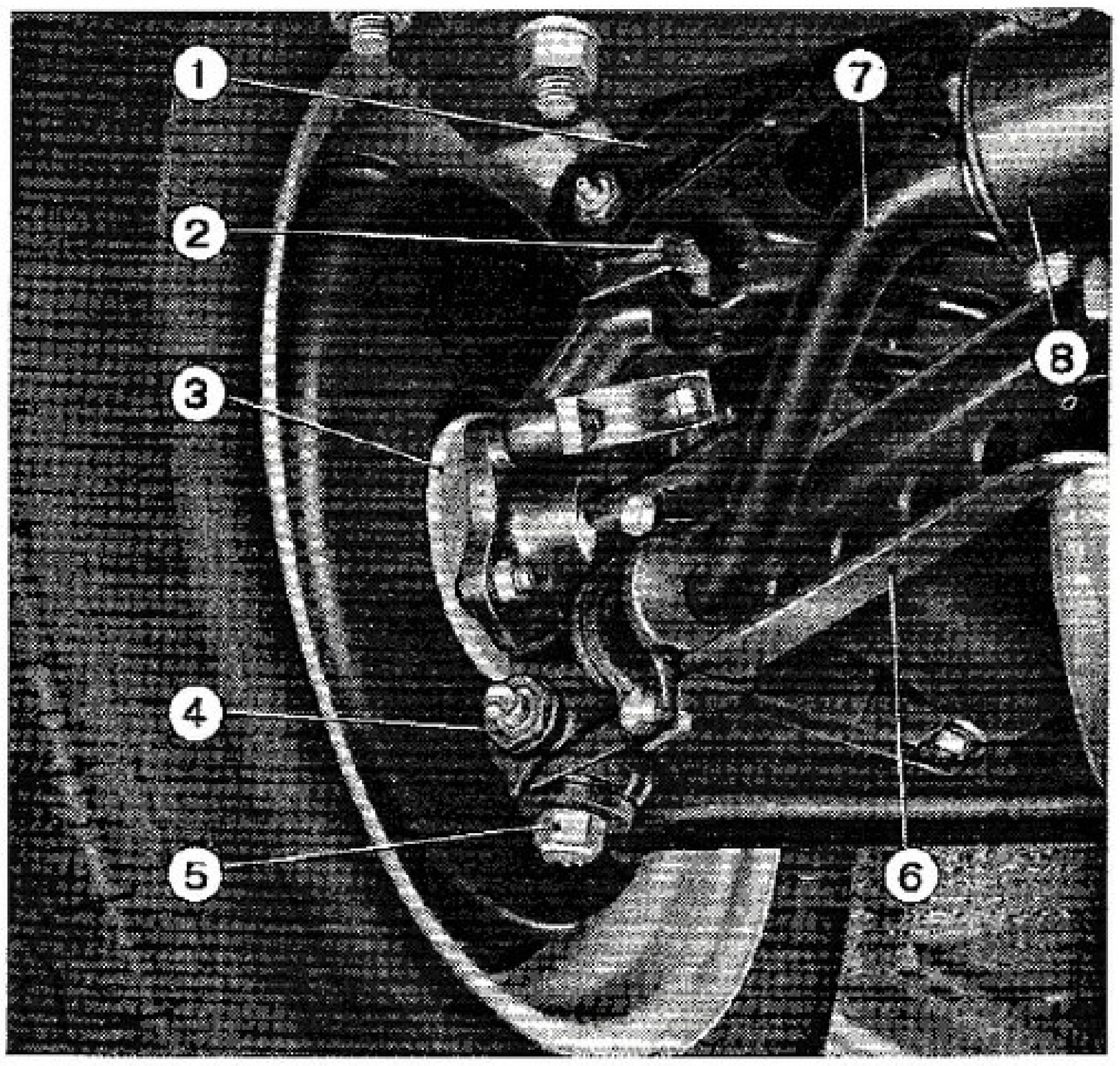


Fig. 92. - Front right suspension detail.

1. Upper swinging arm - 2. King pin - 3. Wheel hub - 4. Lower swinging arm pin - 5. King pin nut - 6. Lower swinging arm - 7. Stabilizer bar end - 8. Stabilizer bar support.

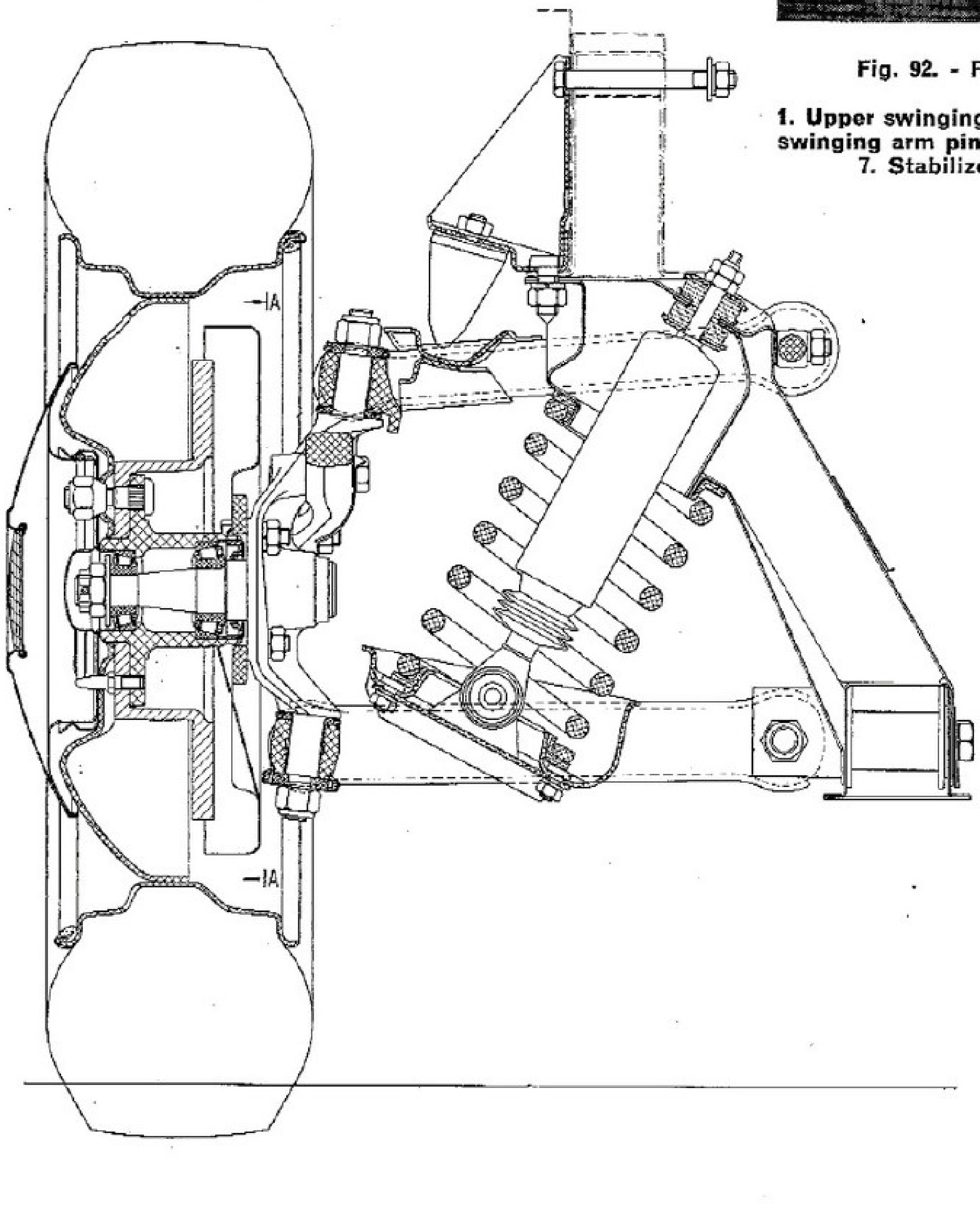


Fig. 93.

Section through right front wheel and suspension.

Section on wheel hub, brake disc, knuckle pillar, coil spring and shock absorber mounting.

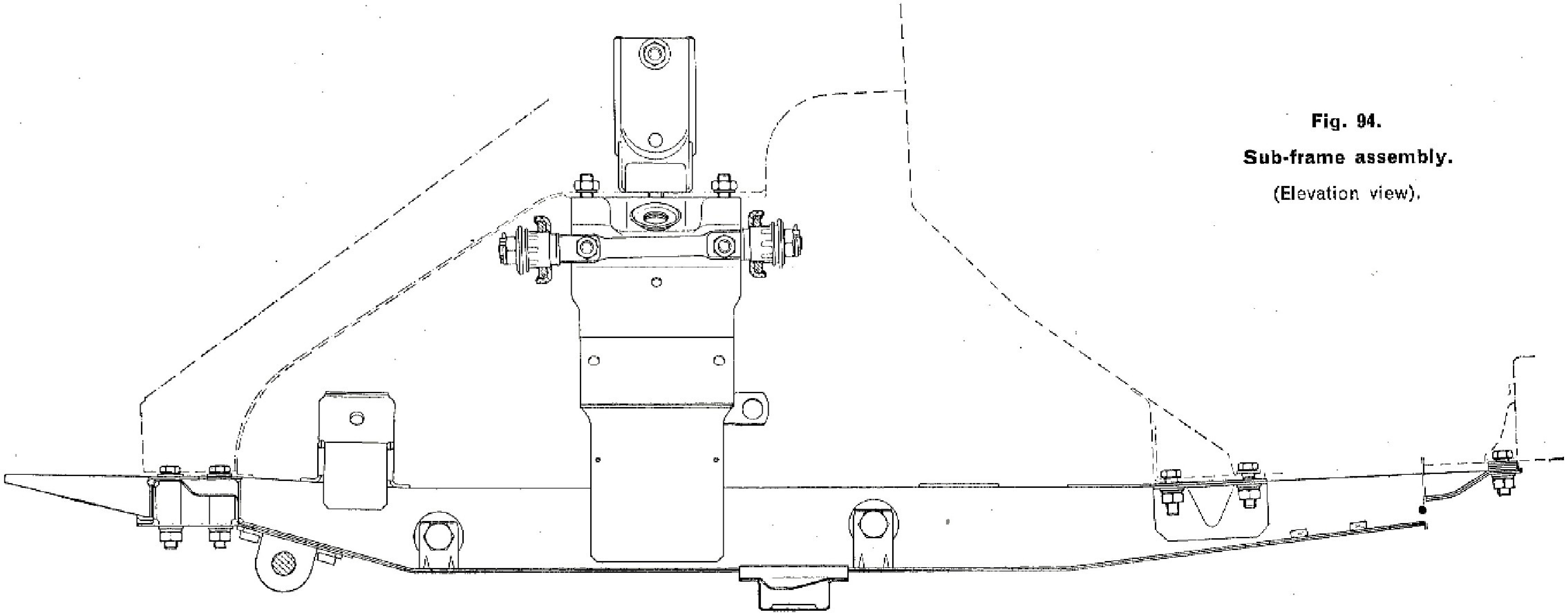


Fig. 94.

Sub-frame assembly.

(Elevation view).

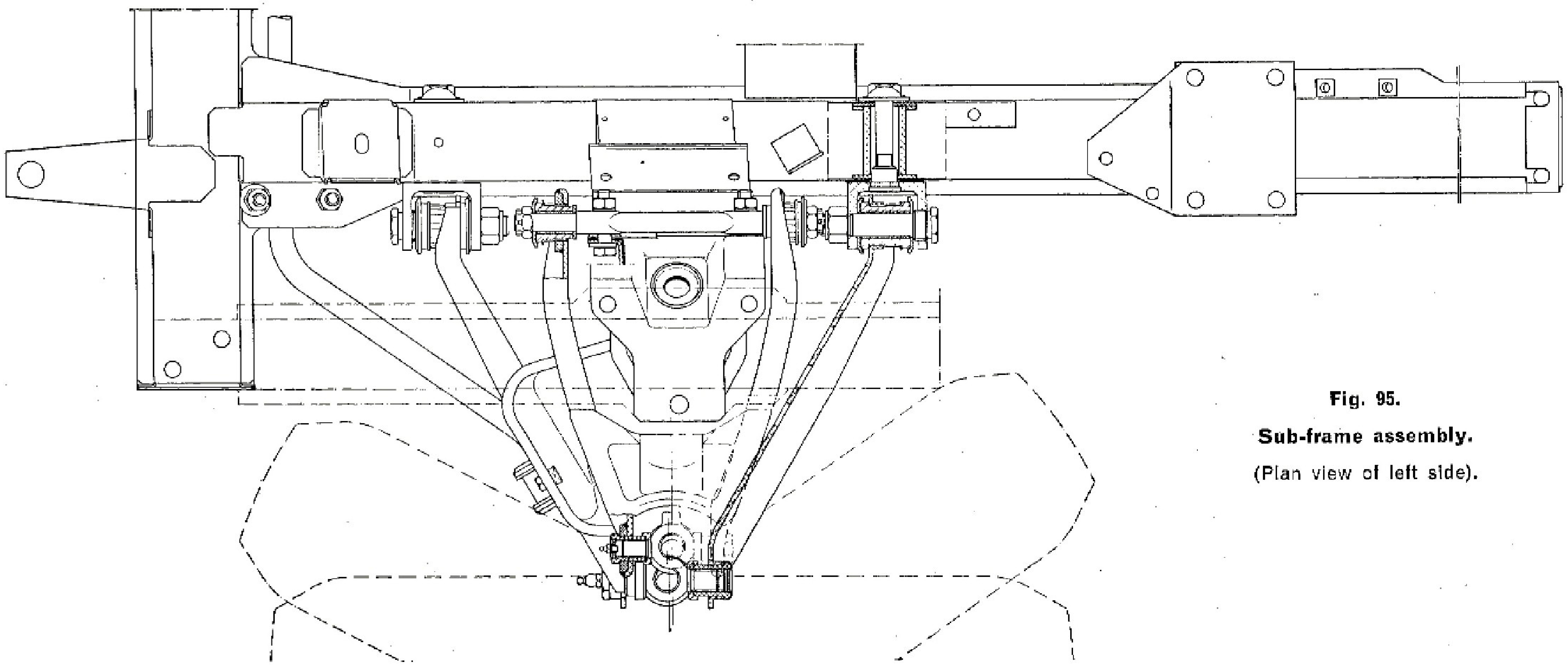


Fig. 95.

Sub-frame assembly.

(Plan view of left side).

— springs identified by a grinding mark on top coil and by a green stripe on central coils: height under a load of 440 kg (970 lbs) of not more than 182 mm (7.17").

Check that paired coil springs installed are of the same class.

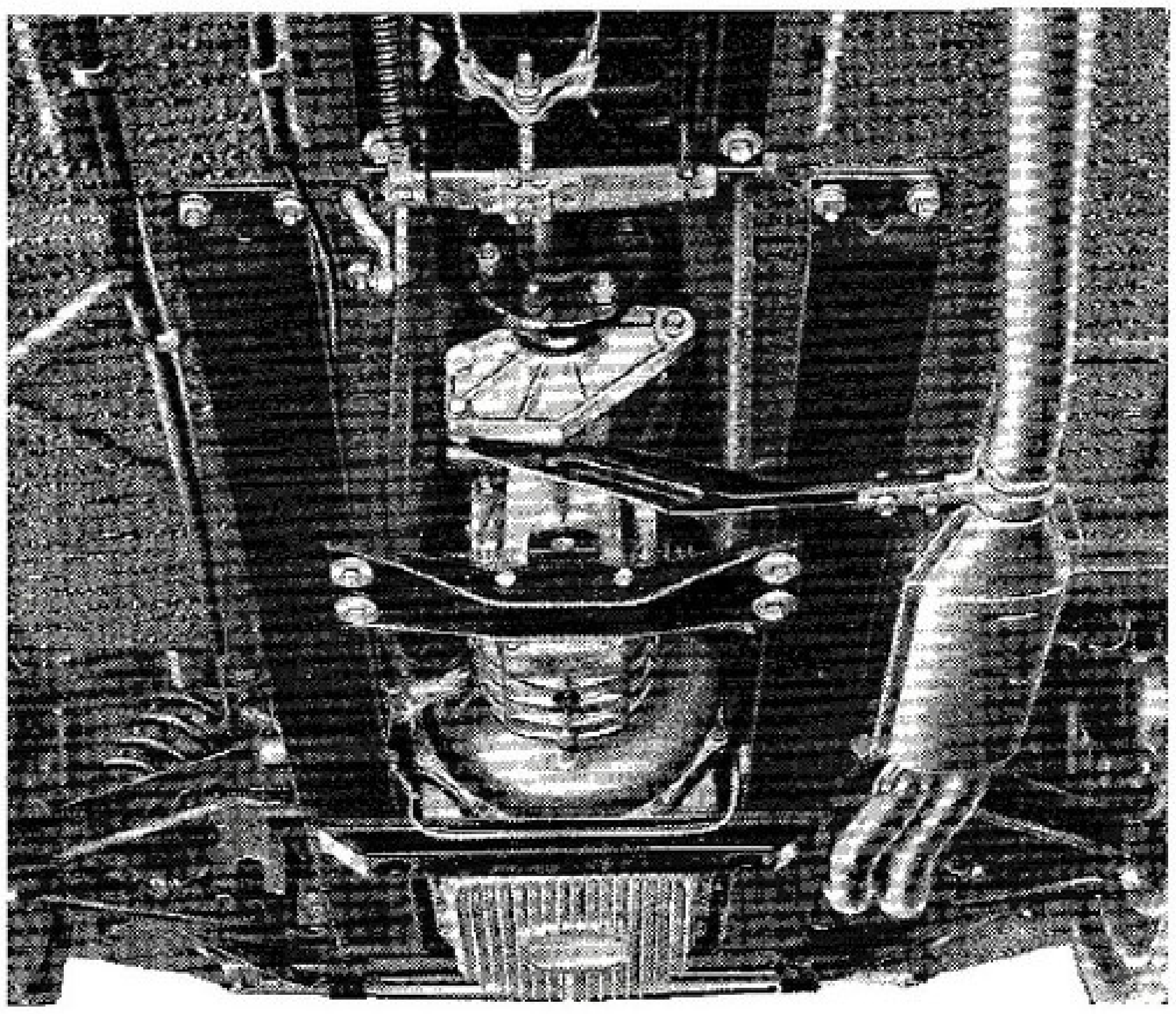


Fig. 96. - Detail of bottom central view.

COIL SPRINGS

DATA

Wire diameter	13,5 ± 0,05 mm (.5315" ± .0019")
Inside diameter	90 mm (3.5433")
Free height	abt. 263,5 mm (10.373")
Height under a 440 ± 22 kg (970 ± 48.5 lbs) load	182 mm (7.17")
Flexibility, load between 440 to 660 kg (970 to 1455 lbs)	18,5 ± 0,6 mm/100 kg (.331" ± .0107" in/100 lbs)

OLEO-PNEUMATIC SHOCK ABSORBERS

DATA

Length (measured from lower mounting eye center to outer casing top plane):

— telescoped in	216 mm (8.5")
— telescoped out	304 mm (12")
Stroke	88 mm (3.5")

FRONT SUSPENSION SPECIFICATIONS

Type	Independent wheels, with oleo-pneumatic shock absorbers and coil springs	
Stabilizer bar	Transversal, mounted on rubber bushes	
Camber	0° 27' ± 10'	To be measured under full load (two persons plus 110 lbs - 50 kg)
Caster	1° ± 10'	
King pin angle	7°	
Toe-in	2 ± 1 mm (.079" ± .039")	
Front track (on ground)	1,242 mm (49.6")	
Wheelbase	2,340 mm (92.13")	

Steering Gear

STEERING GEAR DATA

Type	worm and roller
Ratio	16,4 to 1
Worm screw bearings	roller
Roller shaft bushes	two, bronze
Bearing adjustment	by upper and lower shims
Worm screw-to-roller lash adjustment	by screw with plate, on roller shaft
Roller shaft bush I.D.	28,698 to 28,720 mm (1.1298" to 1.1307")
Roller shaft diameter	28,690 to 28,669 mm (1.1296" to 1.1287")
Roller shaft-to-bush fit clearance	0,008 to 0,051 mm (.00031" to .0020") (wear limit 0,10 mm - .0039")
Turning circle diameter	10,5 m (34 1/2 ft)
Steering rods	symmetric and independent track rods to each wheel; central link rod and relay lever
Track rods	with adjustable ball-and-socket heads (outer ends)
Link rod	non-adjustable ball-and-socket end heads
Steering angles — inner wheel	35°
Steering angles — outer wheel	about 27°
Front wheel toe-in — fully laden	1 to 3 mm (.04" to .12")
Front wheel toe-in — unladen	7 to 9 mm (.28" to .36")
Lube oil — grade	FIAT W 90 (SAE 90 EP oil)
Lube oil — steering box capacity	0,165 lt (.17 U.S. qts - .15 G.B. qts)

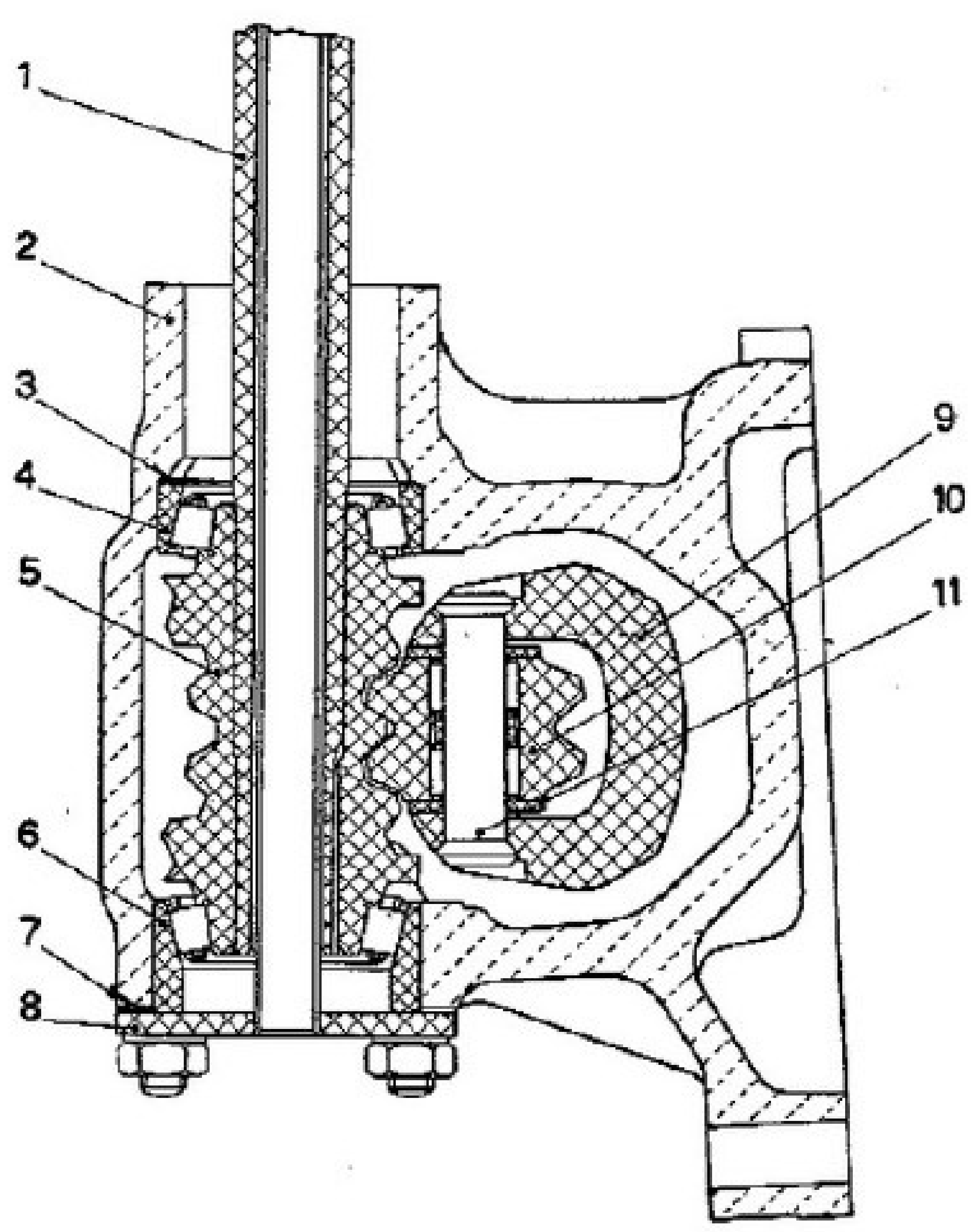


Fig. 97. - Steering gear section through worm screw shaft.

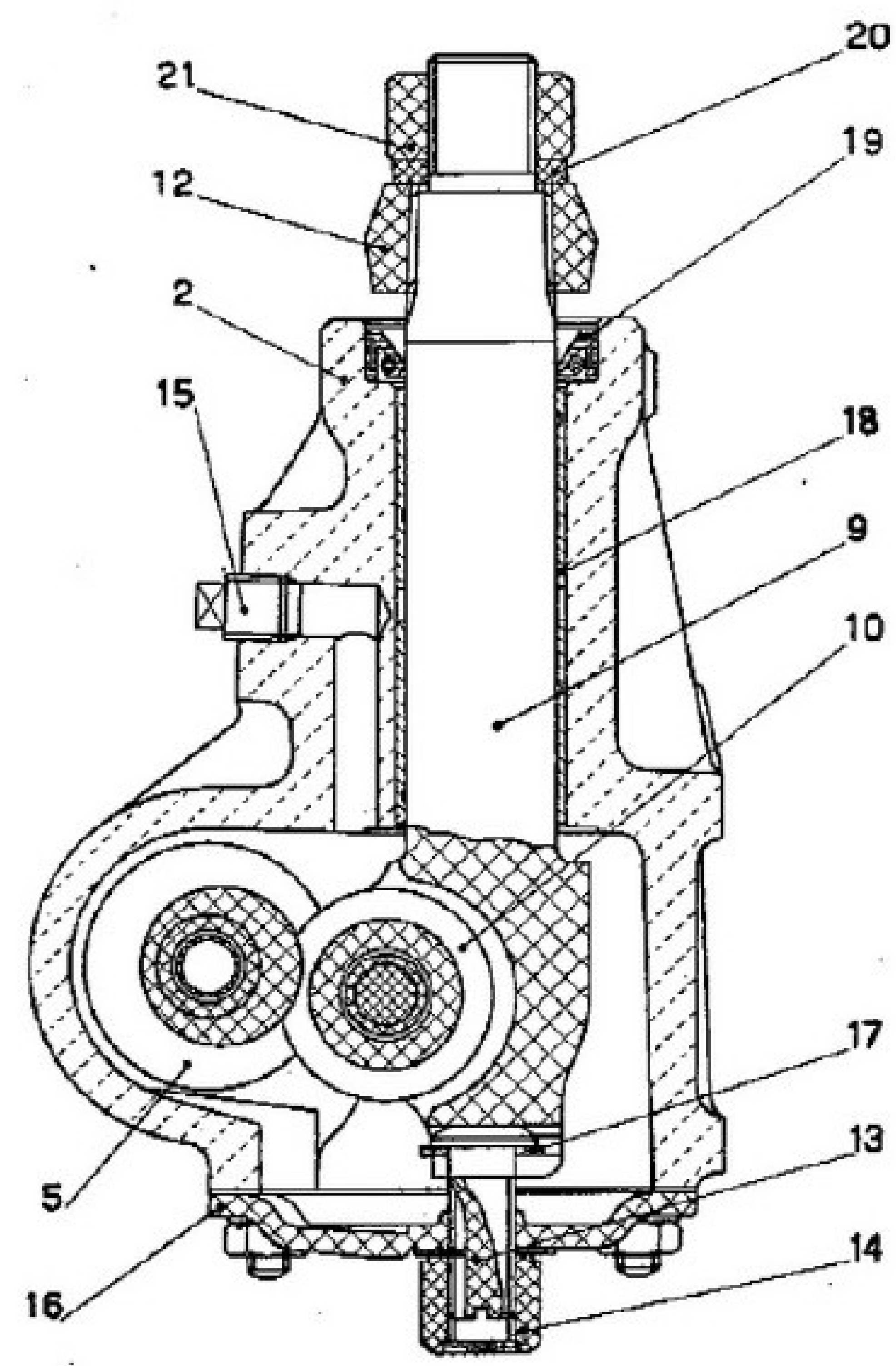


Fig. 98. - Steering gear section through roller shaft.

1. Steering column - 2. Steering box - 3. Steering worm rear bearing shim - 4. Rear roller bearing - 5. Worm screw - 6. Front roller bearing - 7. Steering worm front bearing shims - 8. Steering worm thrust cover - 9. Roller shaft - 10. Steering worm roller - 11. Roller pin - 12. Pitman arm - 13. Roller shaft adjusting screw - 14. Adjusting screw nut - 15. Steering box plug - 16. Steering box cover - 17. Roller shaft adjusting screw plate - 18. Roller shaft bushes - 19. Roller shaft seal - 20. Pitman arm lock washer - 21. Pitman arm-to-roller shaft nut.

Disc Brakes

CONSTRUCTION

The disc brake is of simple construction, consisting basically of a disc made from high-quality cast-iron and a cast-iron caliper mounted on a support bracket.

The disc (fig. 100), which is attached to and rotates with the hub, is straddled by the caliper (see figs. 100 and 101) secured by hex. head screws to steering knuckle pillar (front) or axle casing (rear).

One hydraulic cylinder is mounted in the caliper inboard half while two cylinders are located in the outboard half: the braking power, however, is the same on either side (see figs. 100 and 101).

The brake fluid line from master cylinder is connected to the caliper inner half and communicates with

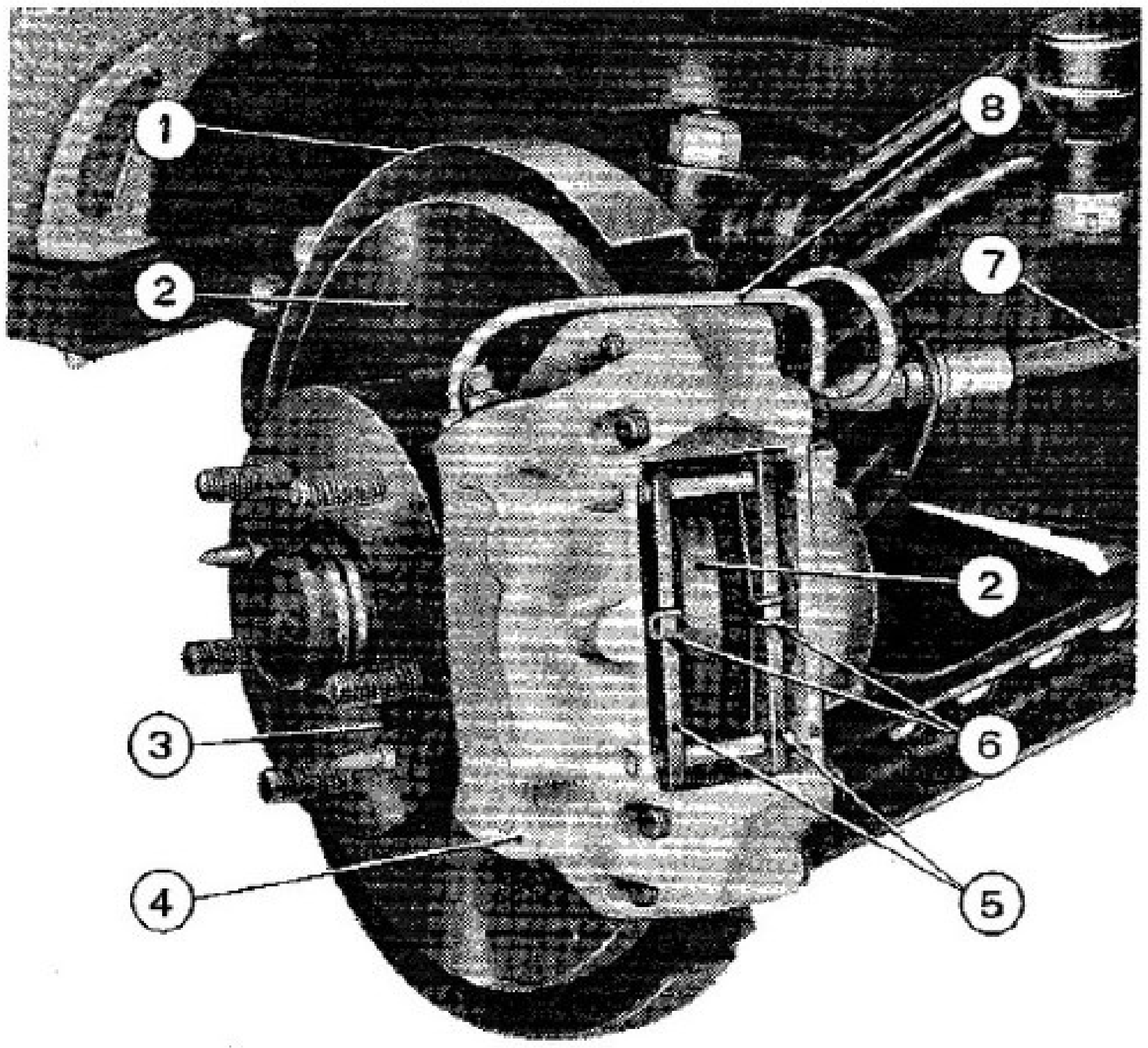


Fig. 100. - Front wheel disc brake.

1. Shield - 2. Disc - 3. Wheel hub - 4. Caliper - 5. Pads - 6. Pad spring retainers - 7. Brake fluid line to caliper inboard half - 8. Caliper bridge pipe.

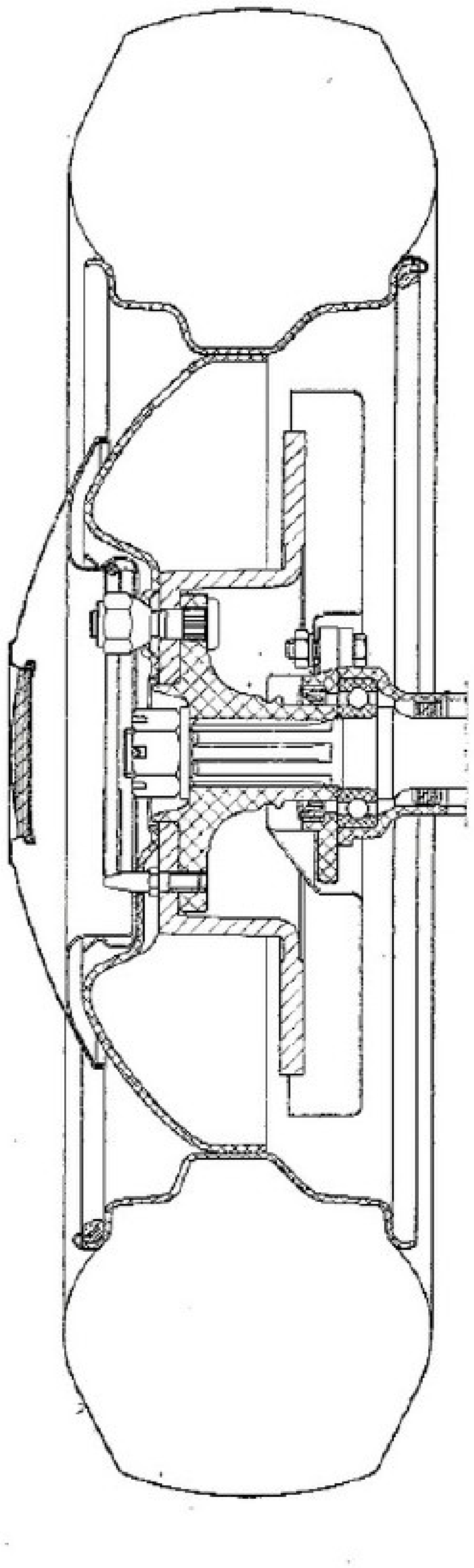


Fig. 99.

Section through rear wheel assembly and articulations.

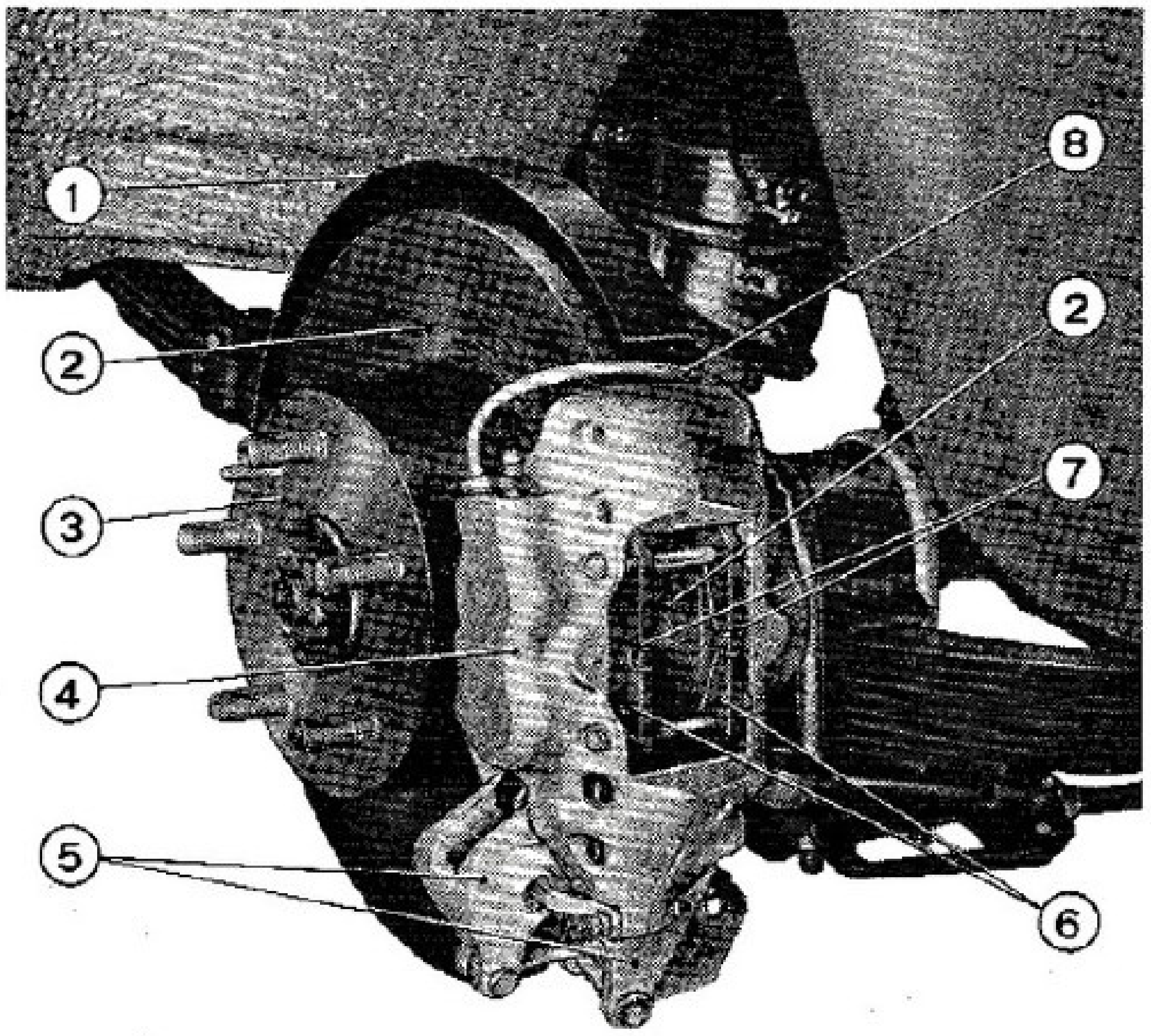


Fig. 101. - Rear wheel disc brake.

1. Shield - 2. Disc - 3. Wheel hub - 4. Caliper - 5. Hand brake mechanism - 6. Pads - 7. Pad spring retainers - 8. Caliper bridge pipe.

the respective cylinder. The two cylinders of the caliper outer half are connected to the inner half cylinder through a bridge pipe (see fig. 100). Hydraulic pressure is hence perfectly balanced on all three cylinders.

Each cylinder is provided with a rubber sealing ring positioned in a groove in caliper body. The piston, in turn, is protected by a rubber dust cover.

Inserted between the pistons and the disc, on both sides, is a pad consisting of a steel backing plate with cast-on brake lining; the plate is held in the body by retaining pins.

As clearly illustrated on these pages, each caliper is made up of two bolted halves.

The rear brake calipers are fitted with a hand brake mechanism which acts on brake disc through special lining pads.

OPERATION

Upon application of the brake pedal the hydraulic pressure generated in the system causes the pistons to apply equal and opposite pressure, by the friction pads, on the rotating disc, in direct proportion to the foot effort applied to the pedal.

When the pressure is released and the compression on the disc relieved, the pads barely touch the disc and are ready for the next application. In this manner, adjustment for lining wear is automatic and no manual adjustment is required.

SECTION A - A

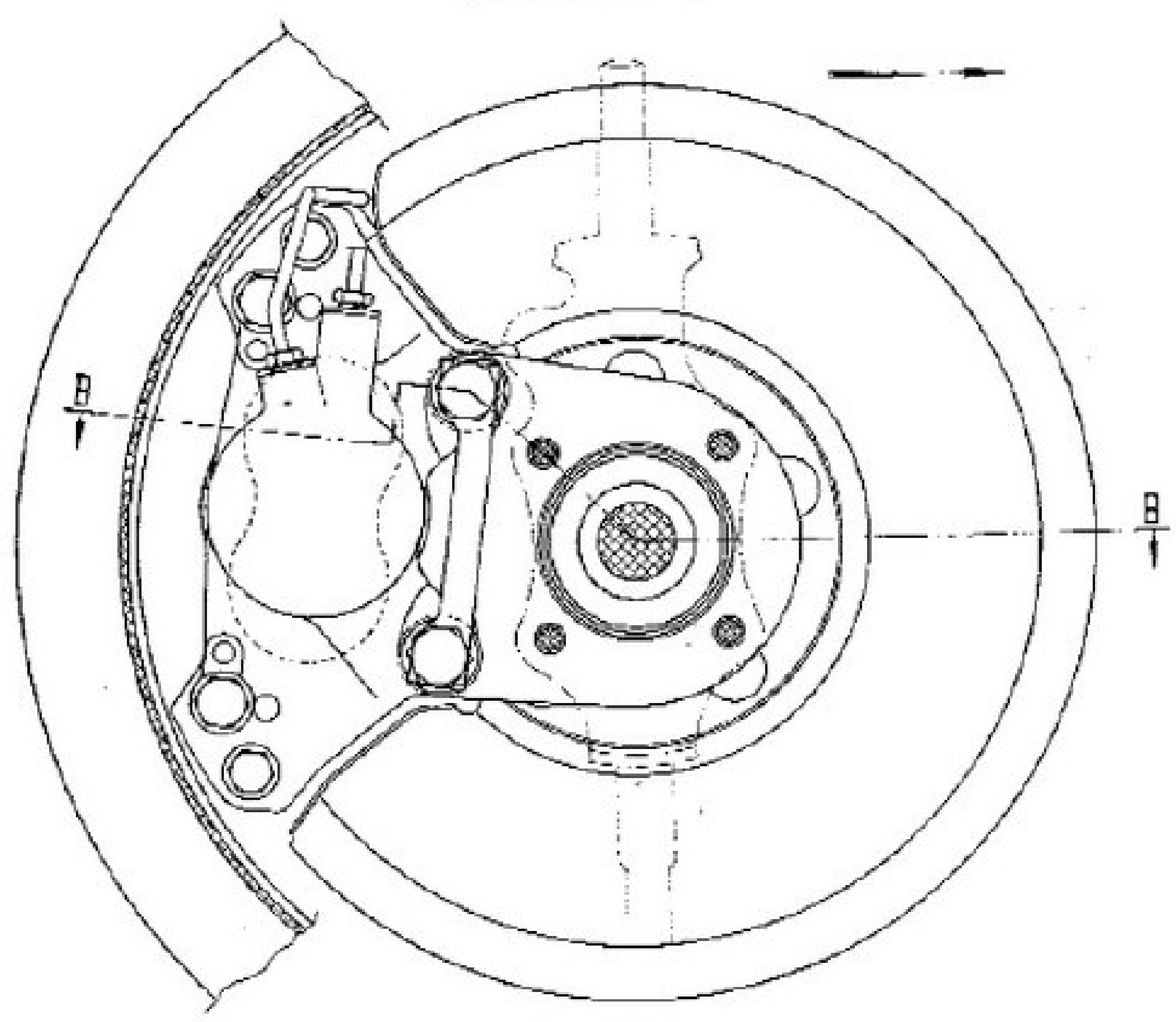


Fig. 103.

SECTION B - B

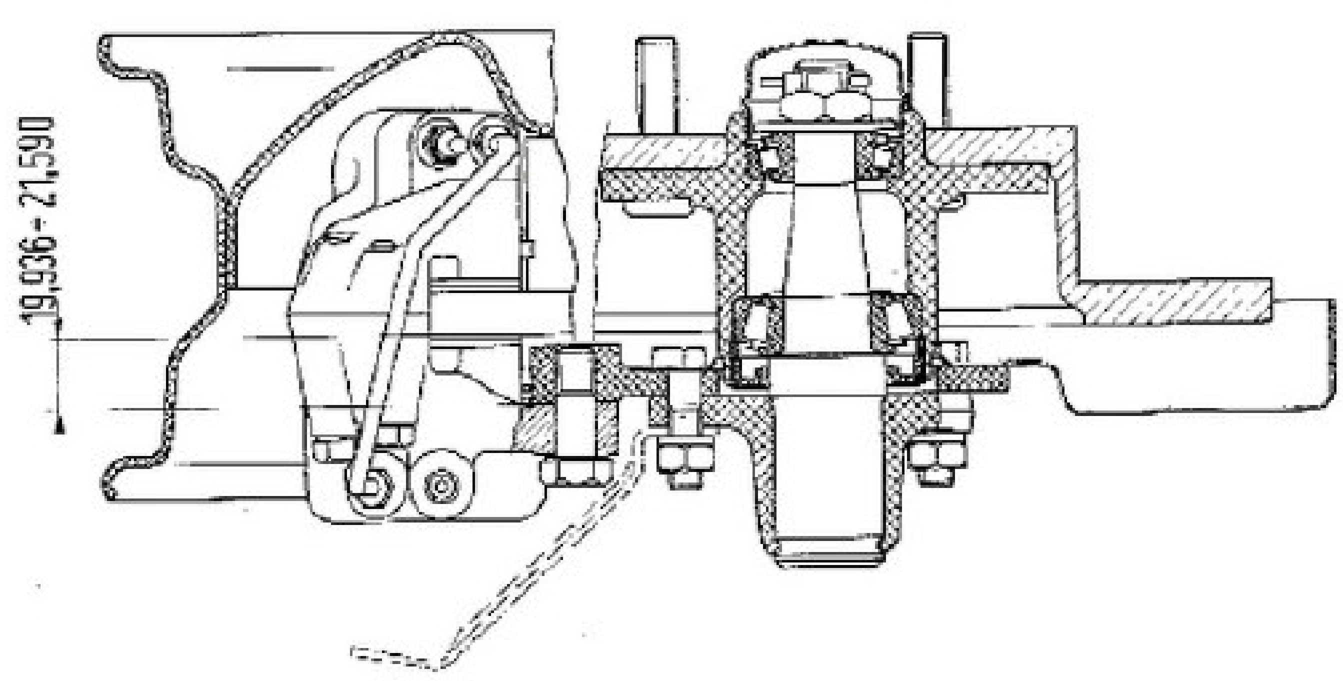


Fig. 104.

Figs. 103 and 104. - Detail of brake disc and of caliper installation on its mounting plate on steering knuckle.

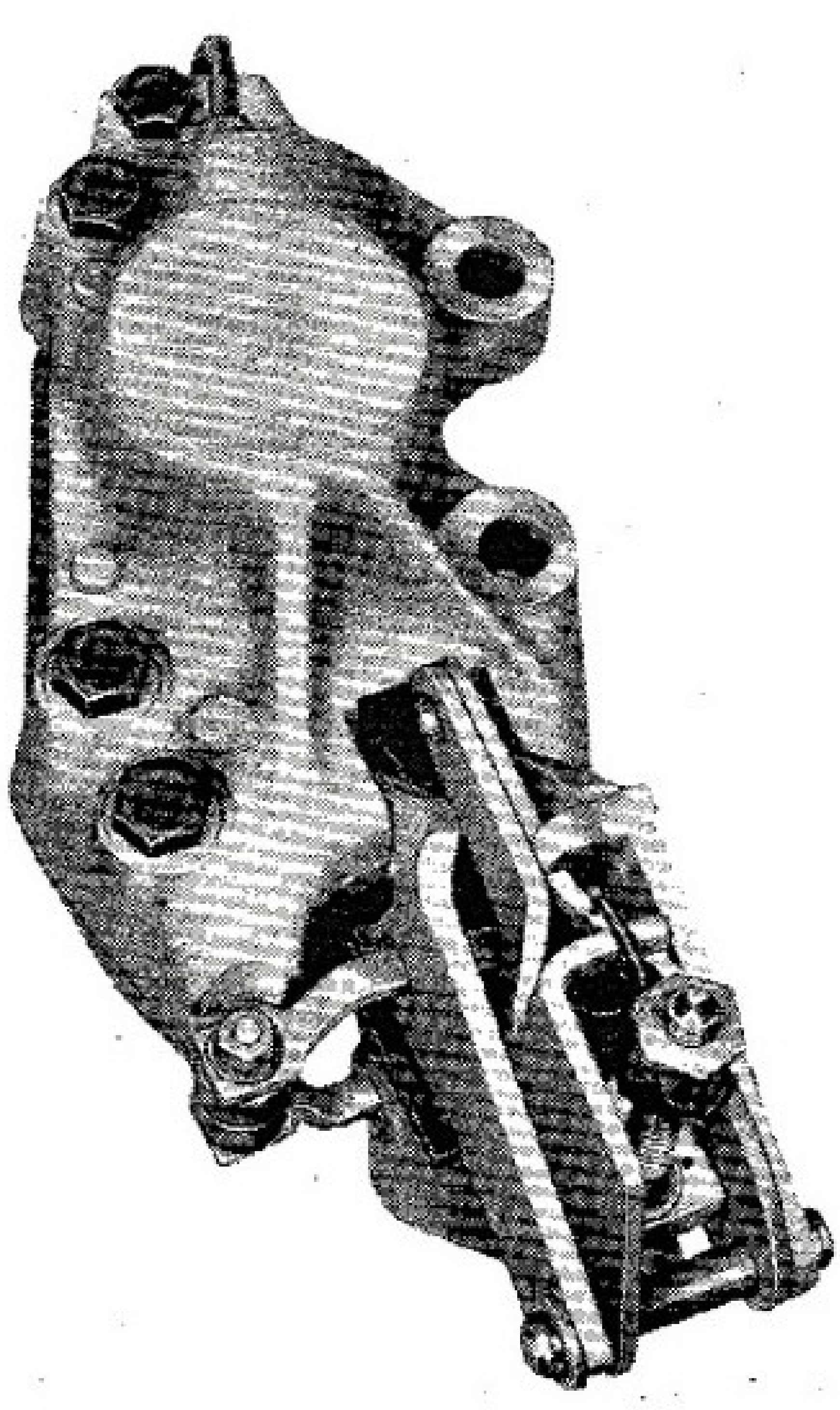


Fig. 102. - Rear caliper assembly with hand brake mechanism.

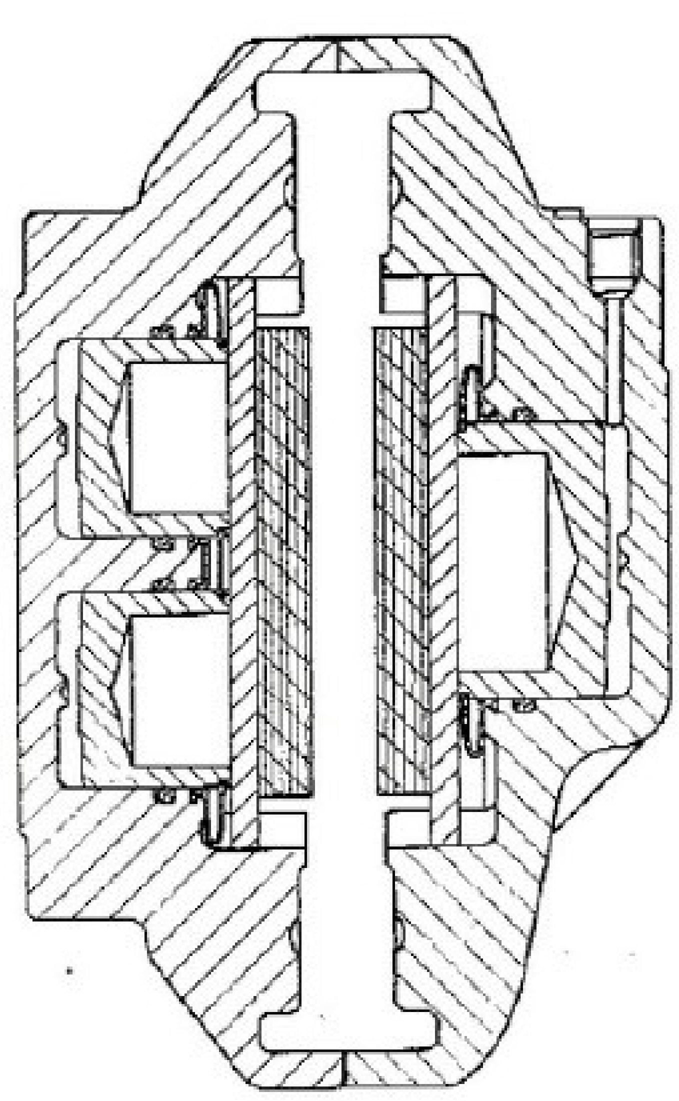


Fig. 105. - Front caliper - Section through pistons, lining pads and backing plates.

Piston seal rings and dust covers are also shown.

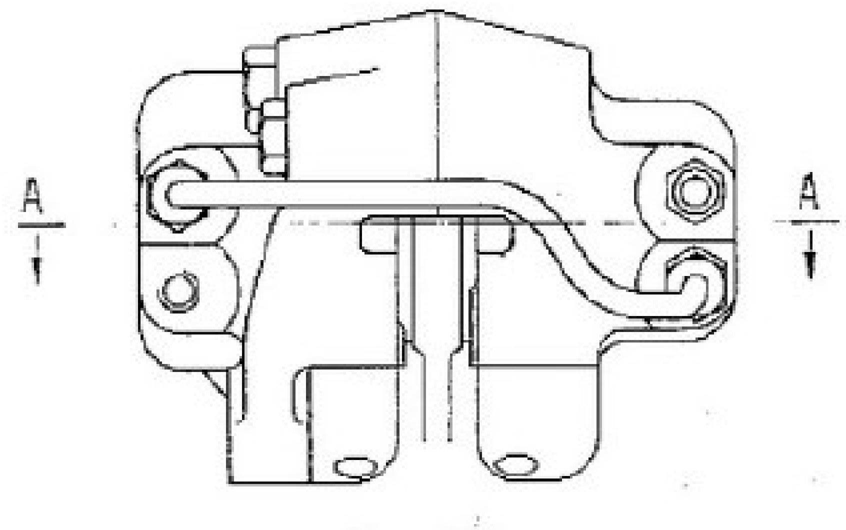


Fig. 106.
Bridge pipe connecting the cylinders of the two caliper halves.

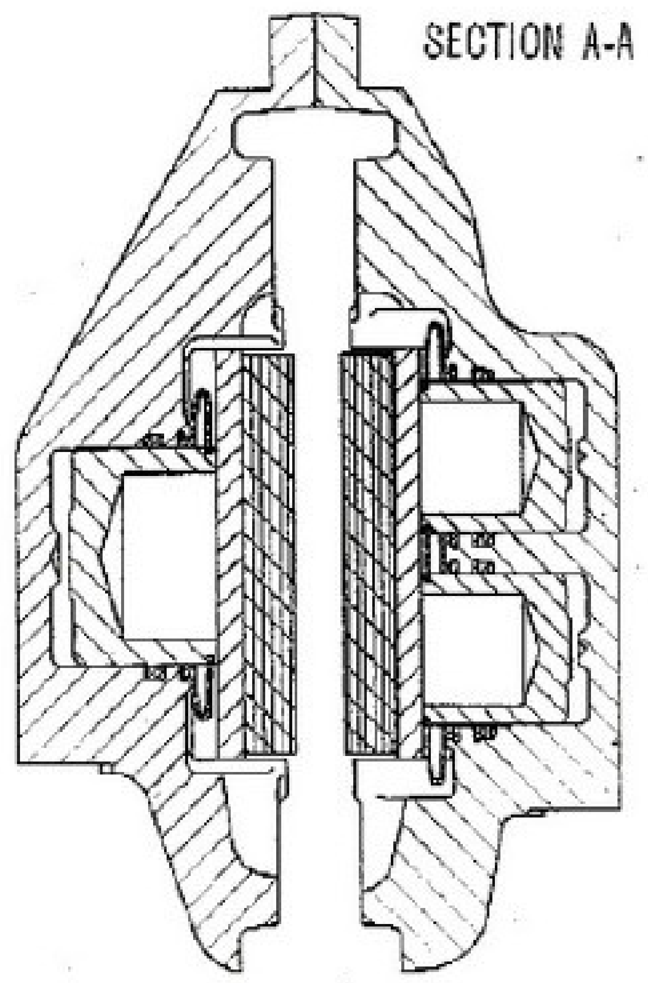


Fig. 107.

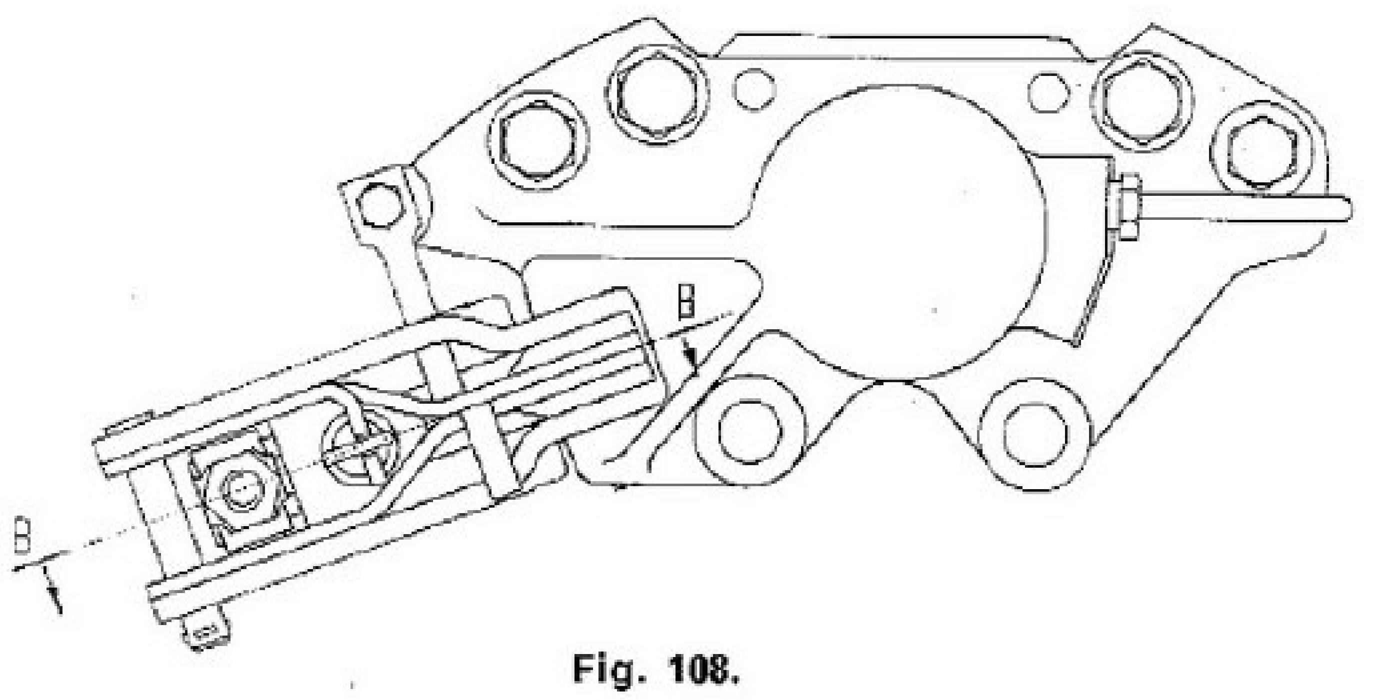


Fig. 108.

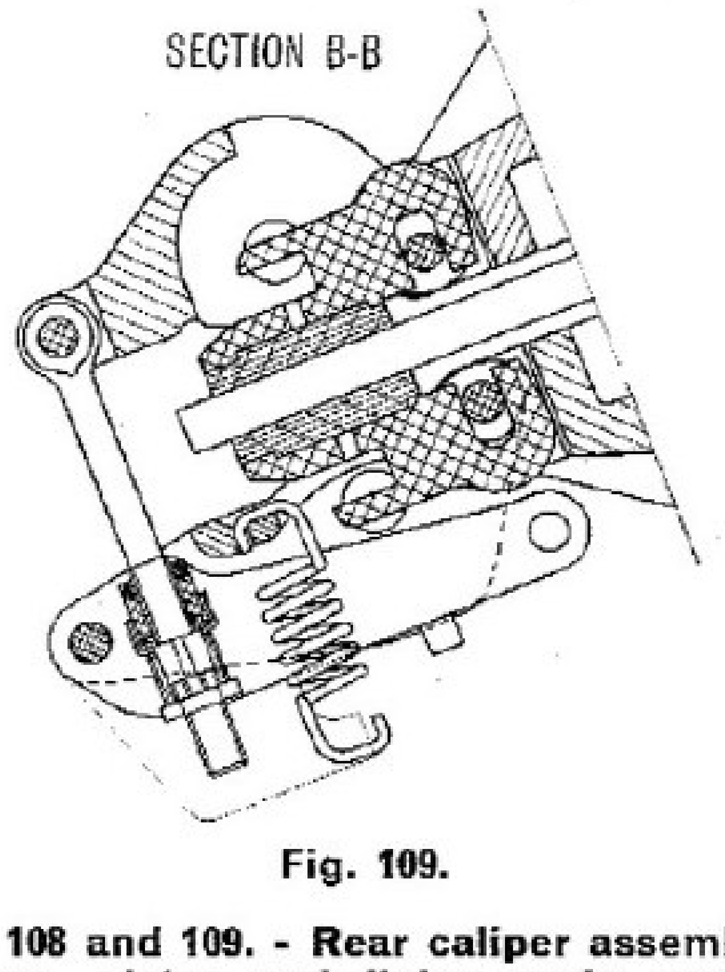


Fig. 109.

Figs. 106, 107, 108 and 109. - Rear caliper assembly - Sections through pistons, plates and lining pads, and hand brake mechanism.

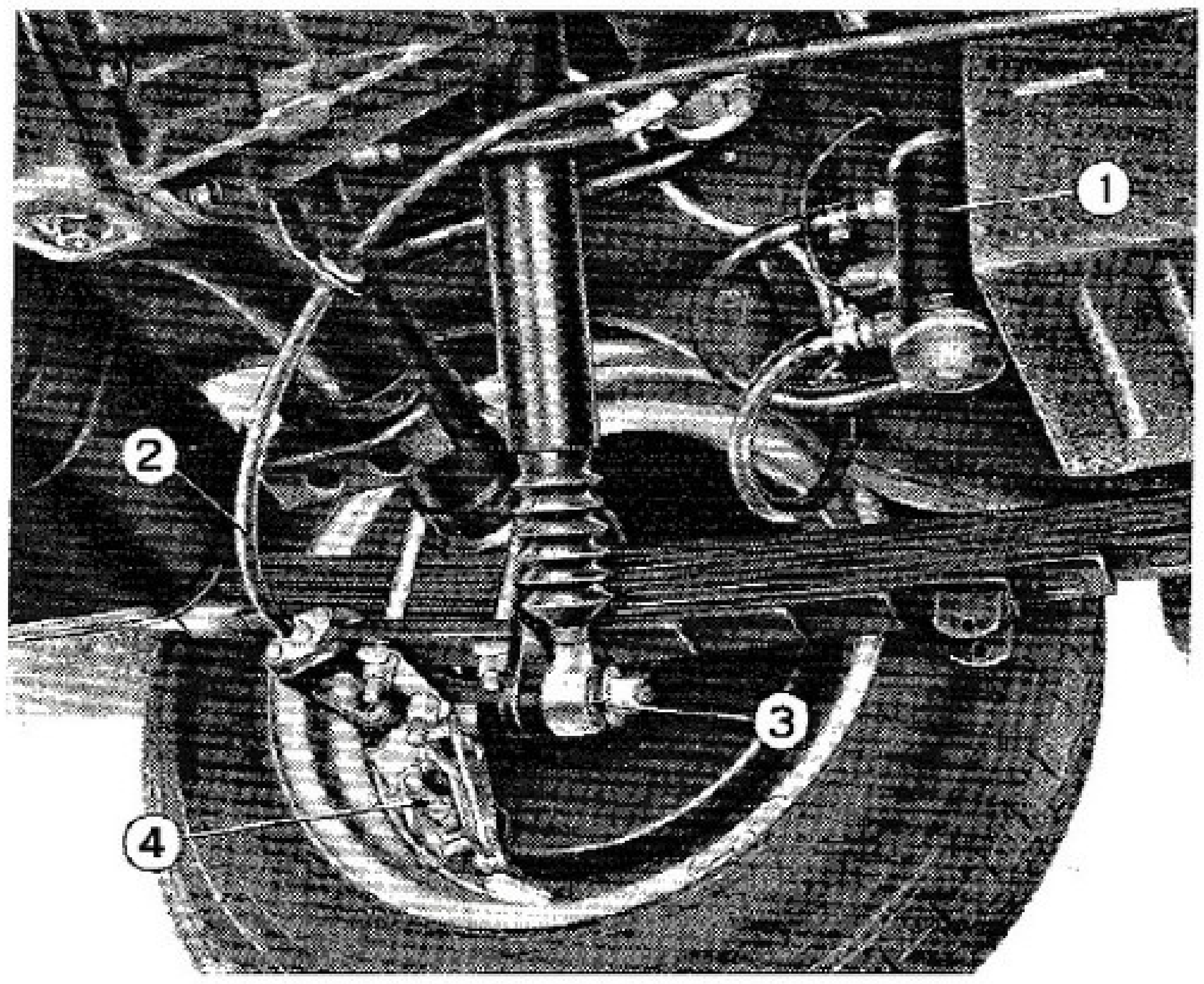


Fig. 110. - Detail of rear left suspension.

1. Electric fuel pump - 2. Rope, hand brake control - 3. Shock absorber - 4. Hand brake mechanism.

The disc brake has friction segments which operate on a small area of the braking surface leaving a large portion of the disc exposed to the atmosphere, thus allowing maximum dissipation of heat. This means the disc brake cools rapidly and provides consistent performance even on frequent stops from high speeds with virtually no change in pedal effort thus maintaining its smooth progressive characteristics throughout.

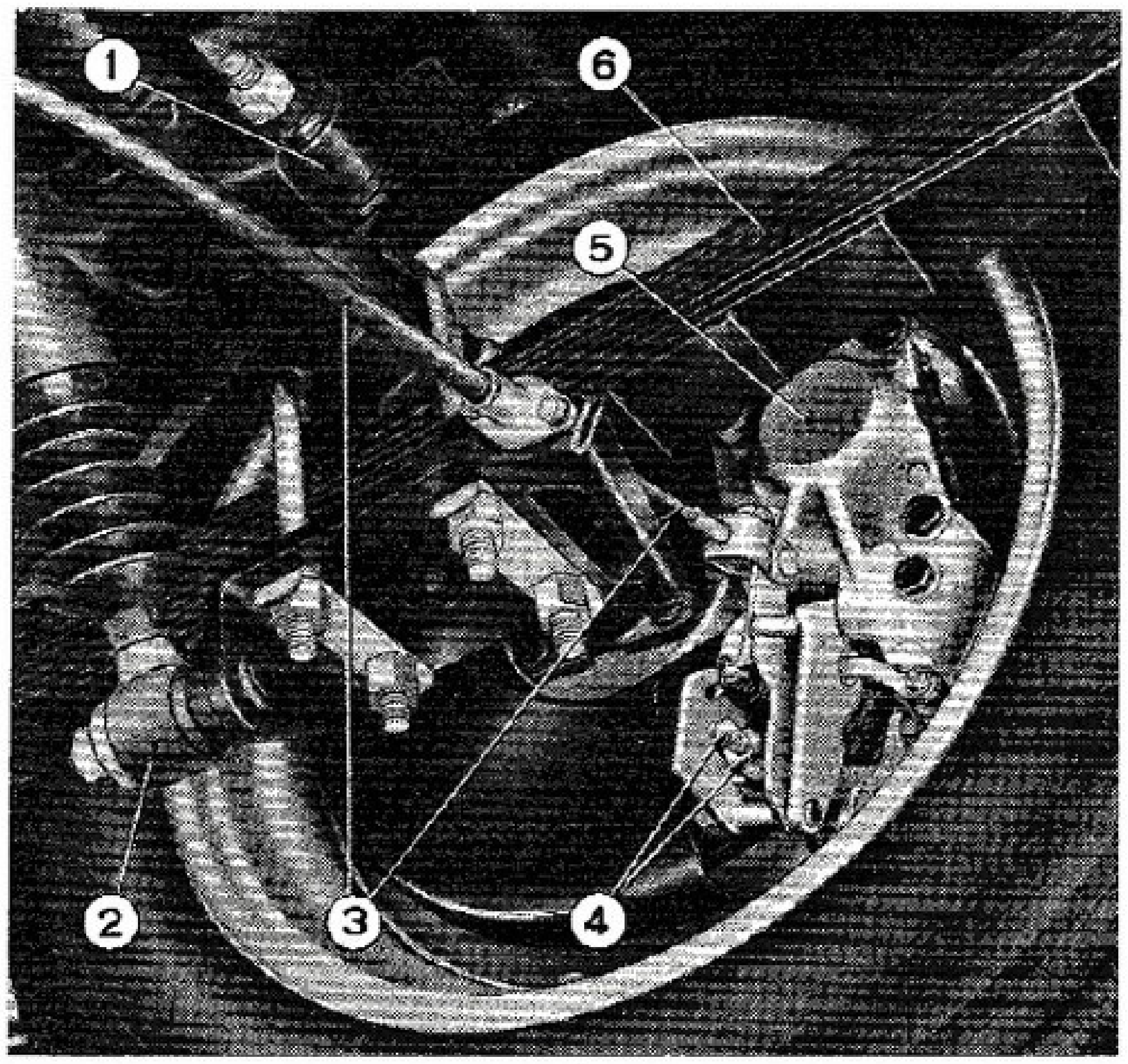


Fig. 111. - Detail of rear wheel brake.

1. - Stabilizer bar - 2. Shock absorber - 3. Rope, hand brake control - 4. Adjuster nut, hand brake pads - 5. Caliper.

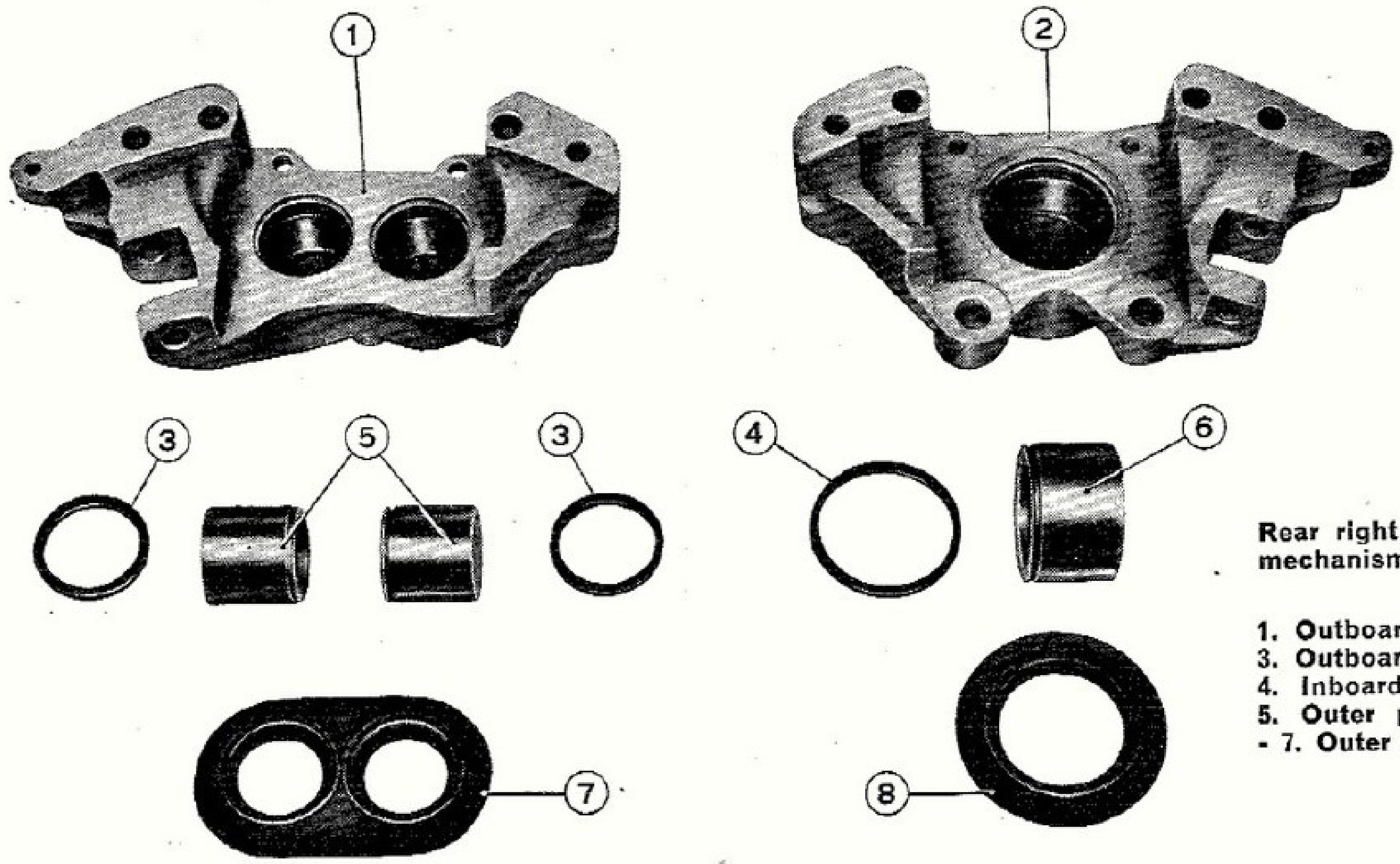


Fig. 112.

Rear right caliper (less hand brake mechanism) disassembled to show components.

1. Outboard half - 2. Inboard half - 3. Outboard half piston seal rings - 4. Inboard half piston seal ring - 5. Outer pistons - 6. Inner piston - 7. Outer dust cover - 8. Inner dust cover.

Hand brake mechanism on rear discs.

When hand lever (fig. 119) is pulled, it displaces the adjustment tie rod and metal rope at whose ends are fixed the forked pull rods that operate the hand brake mechanism; the hand brake is quite efficient and capable of immobilizing the vehicle even if parked on a steep incline.

REPLACEMENT OF LINING PADS

Linings should be replaced when their thickness is reduced to abt. 4 mm (.16"). Under no circumstances should the linings be allowed to wear below 2 mm (.08") in thickness.

Proceed as follows:

- Jack up the front or rear of car and remove the wheel.
- Remove the hairpin clips, the spring retainers, and slide out the pad retaining pins.
- Lift the worn pads out of the caliper.
- With an even pressure, push in the pistons to the bottom of the cylinder bores.
- Slip in the new pads.
- Re-install the pad retaining pins, the spring retainers and secure with the hairpin clips.

Before driving away the car after lining pad replacements, the foot pedal should be pumped until a solid resistance is felt: this will re-set the pistons in operation position.

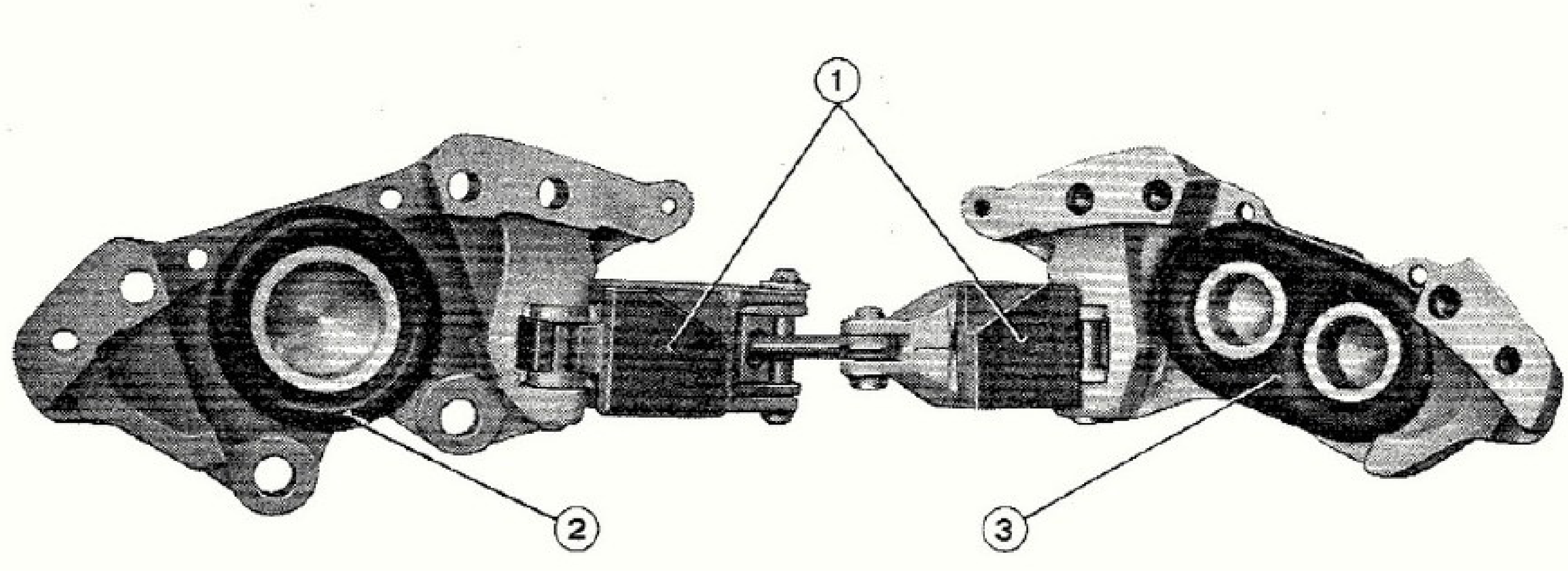


Fig. 113.

Rear left caliper assembly with hand brake mechanism - Viewed with open caliper.

1. Hand brake lining pads - 2. Inner dust cover - 3. Outer dust cover.

SERVICE HINTS

CALIPER HALVES

Caliper halves should be separated only in very exceptional cases. If calipers have been opened, when halves are again joined together it is essential to first align the retaining pin holes using two 6,527 mm (.2570") diameter pegs and then apply the mounting bolts.

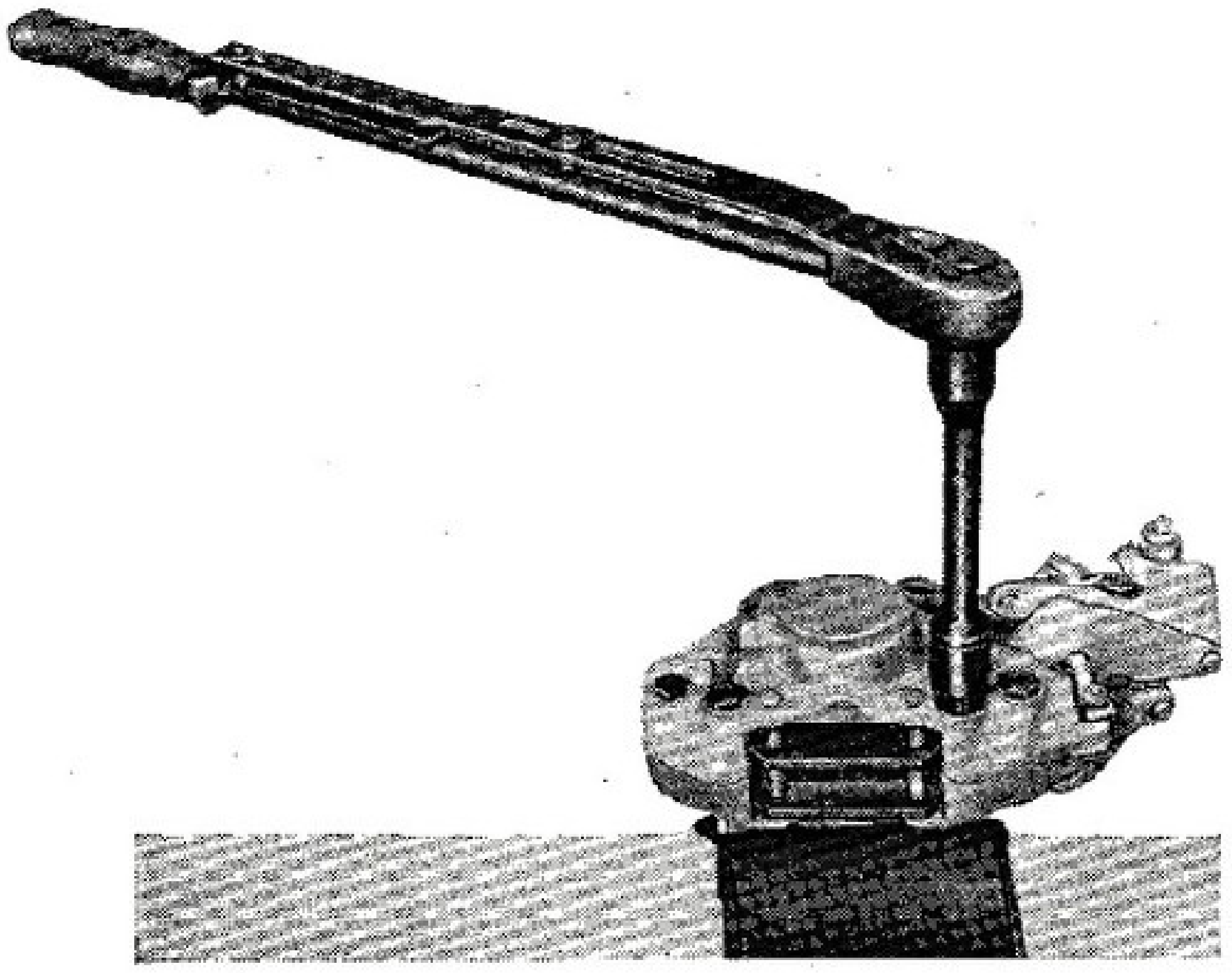


Fig. 114. - Tightening of the caliper halves joining bolts using a torque wrench.

Lubricate bolts with FIAT special brake fluid (Blue Label) or equivalent, before insertion in their holes. Specified tightening torques are as follows:

— **Front calipers** (fig. 115):

Inner pair of bolts (2) . . . . 9200 to 9700 kgmm (67 to 70 ft.lbs)

Outer pair of bolts (1) . . . . 7200 to 7600 kgmm (52 to 55 ft.lbs)

— **Rear calipers** (fig. 116):

Topmost bolt (side opposite hand brake) (1) . . . . 3900 to 4100 kgmm (28 to 30 ft.lbs)

The other three bolts (2) . . . 7200 to 7600 kgmm (52 to 55 ft.lbs)

The two caliper-to-mounting plate screws, both front and rear, must be tightened to a 10.000 kgmm (72 ft.lbs) torque.

PISTONS, SEAL RINGS AND DUST COVERS

To disassemble the pistons and seal rings it is necessary to remove the caliper assembly from the vehicle. Then, after sliding out the lining pads, remove the rubber dust covers (see figs. 112 and 113).

Pistons and their seal rings are removed by withdrawing them from the caliper body without unbolting the caliper halves.

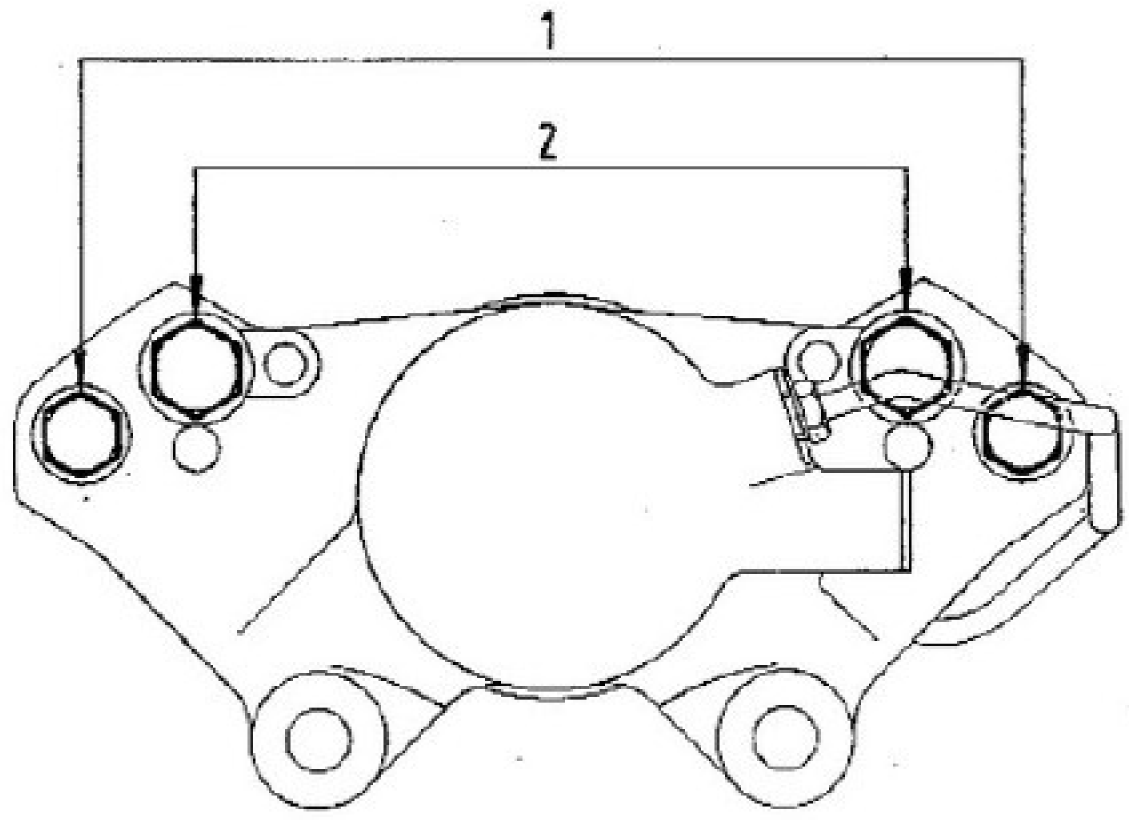


Fig. 115. - Front caliper halves tightening torques.
1. 7200-7600 kgmm (52-55 ft.lbs) - 2. 9200-9700 kgmm (67-70 ft.lbs).

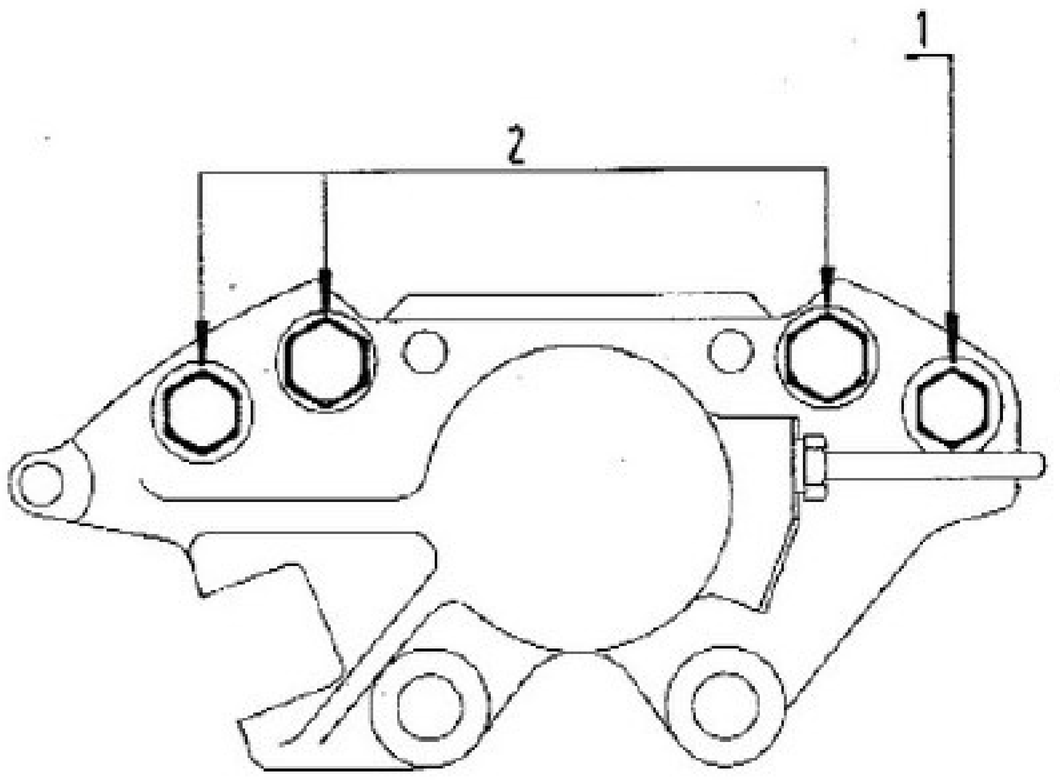


Fig. 116. - Rear caliper halves tightening torques.
1. 3900-4100 kgmm (28-30 ft.lbs) - 2. 7200-7600 kgmm (52-55 ft.lbs).

The sealing rings may then be removed by inserting a blunt tool under the seals and prying out, taking care not to damage the locating grooves.

Clean the different parts after disassembly.

It is important that in cleaning the cylinders, pistons, seals and dust covers, no gasoline, paraffin, trichloroethylene or mineral solvents of any kind should be used. Clean with hot water and FIAT LDC detergent, blowing dry with compressed air.

Examine the pistons and bores carefully for any signs of abrasion or scuffing.

If necessary, replace any damaged component as required.

In case caliper halves have been replaced, during re-installation follow the instructions given on page 61.

NOTE - Whenever pistons are removed for servicing, always replace the seal rings in caliper body as this is an essential condition for good operation of the system.

The re-assembly of seal rings and pistons must be done with great care making sure parts are perfectly clean.

After installation of the pistons, fit the dust covers.

The rubber dust covers must be located with the projecting lip in the groove provided in pistons and the other lip in the cylinder bore.

BRAKE DISC

In case of replacement, check that discs of both front and rear brakes, on car, run perfectly true between the pads (fig. 117). The maximum run-out permissible on the disc is 0,15 mm (.0059").

If disc run-out is greater than 0,15 mm (.0059") check accurately the location on steering knuckle (front discs)

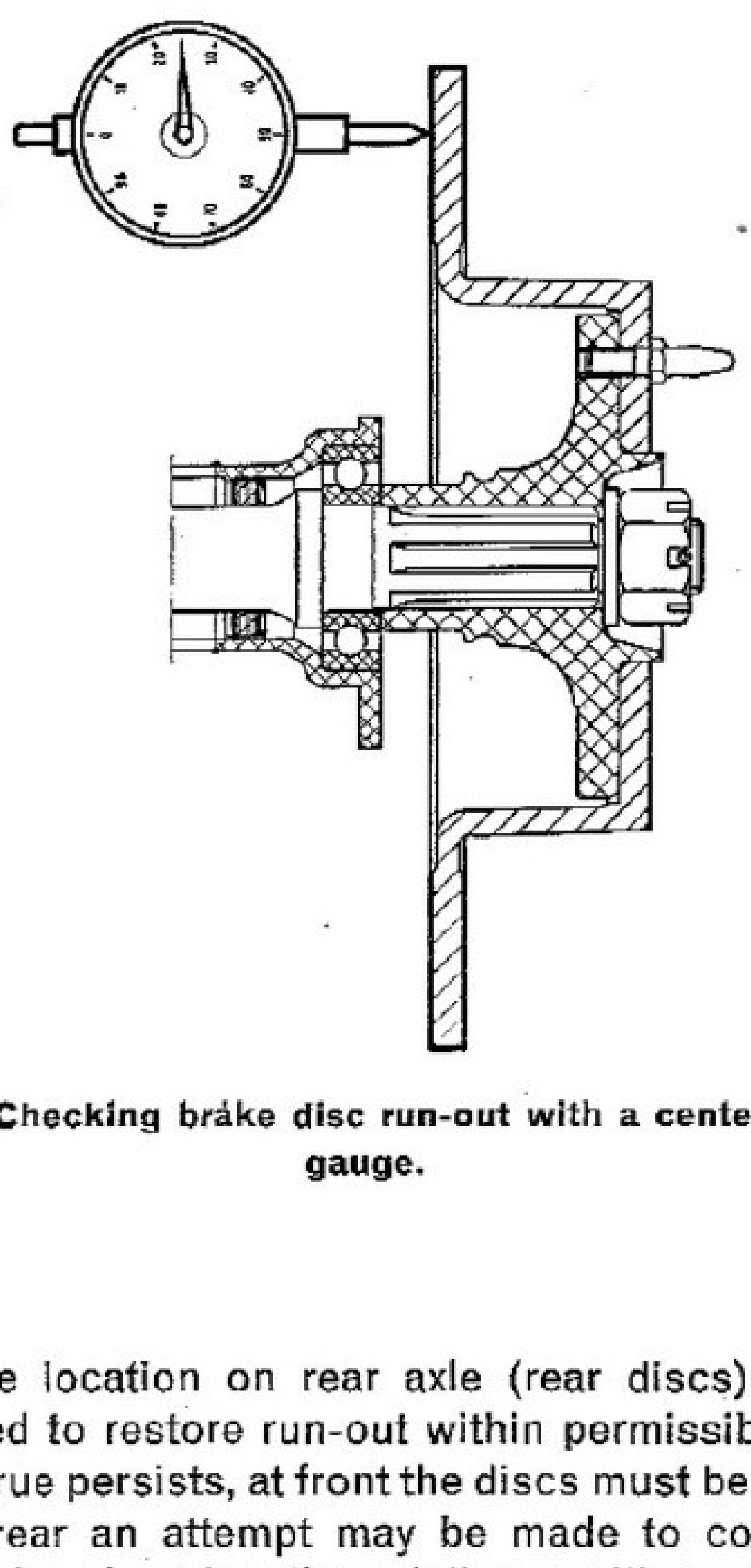


Fig. 117. - Checking brake disc run-out with a centesimal dial gauge.

and/or the location on rear axle (rear discs); correct as required to restore run-out within permissible limits. If out-of-true persists, at front the discs must be replaced while at rear an attempt may be made to correct the condition by changing the relative position of hub on axle shaft: to do this, re-locate the disc-and-hub of one or two splines.

In case of deep scoring marks or other signs of deterioration a few tenths of millimeter deep, the brake disc may be re-ground: the stock metal ground off on either face shall not exceed 0,7 mm (.0276") for front discs and 0,5 mm (.0197") for rear discs.

When front brake calipers have for some reason been replaced or when front suspension damages are repaired, it is necessary to check the distance between the caliper resting plane and the brake disc inner face This distance must always range between 19,550 and 21,150 mm (.3759" to .8327"). Any corrections, if required, may be done at assembly by placing a special 0,8 mm (.0315") thick shim between caliper and its mounting plate.

MASTER CYLINDER

The pedal operates the master cylinder (fig. 118) which transmits the pressure to the wheel cylinders in wheel calipers. The master cylinder is of the floating valve type.

A pressure regulator (fig. 120) is fitted in the rear brake hydraulic circuit to reduce the pressure to rear wheel cylinders.

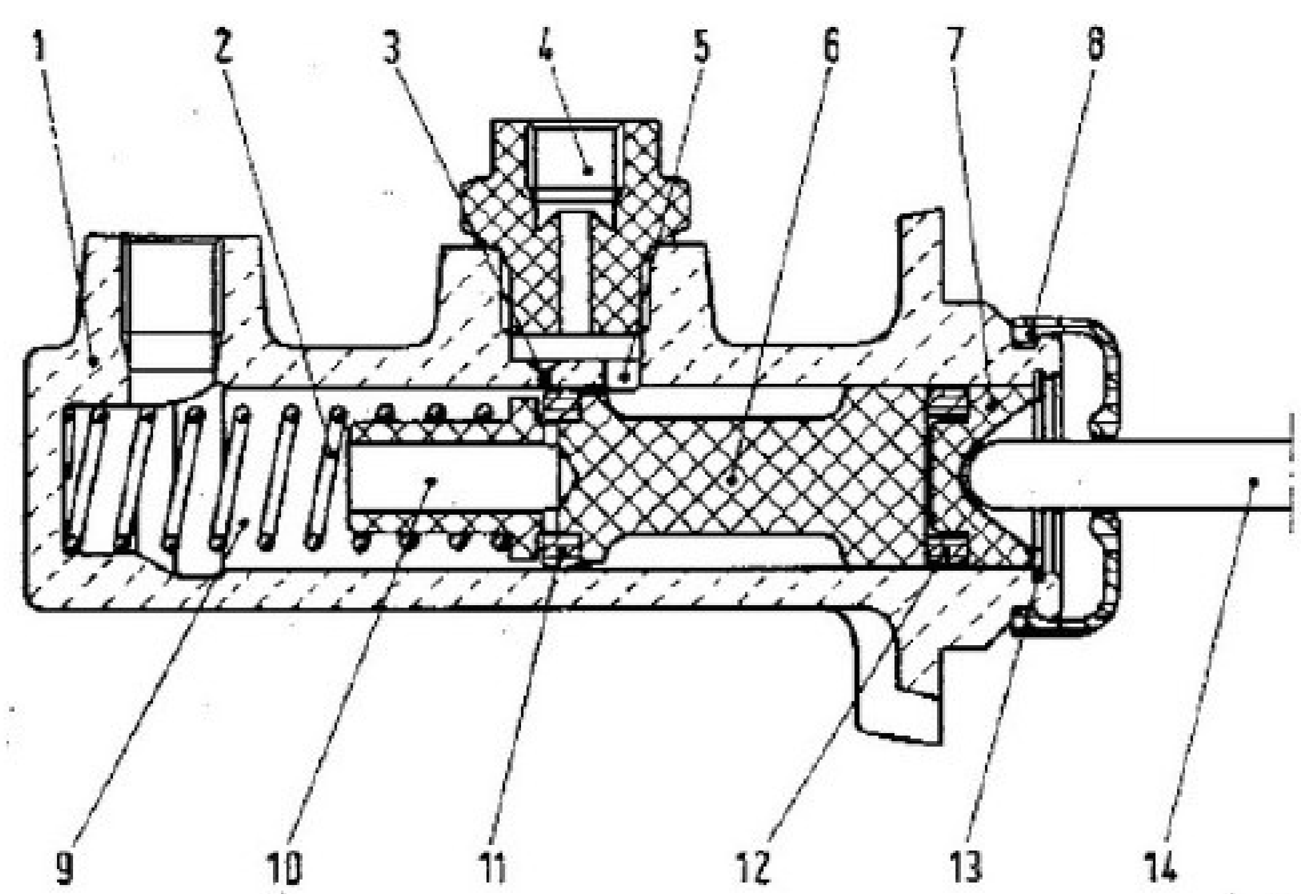


Fig. 118. - Master cylinder.

1. Body - 2. Plunger return spring - 3. Compensating hole - 4. Inlet connection - 5. Fluid inlet port - 6. Floating valve carrier - 7. Plunger - 8. Boot - 9. Compression chamber - 10. Chamber with holes for floating valve compression - 11. Floating valve - 12. Seal ring - 13. Snap ring - 14. Pushrod.

WARNING - At assembly check that clearance between plunger and control push rod is 0,10 to 0,30 mm (.004" to .012").

AIR BLEEDING

Whenever the hydraulic brake fluid circuit has been interrupted following the disconnection of calipers or lines, the system must be air bled.

Remove the wheels, back out bleeder screws about one turn after removing their protection caps. Pump pedal repeatedly (same as for normal service brakes) and when bleeding is over, re-tighten the screws and re-fit the protection caps.

AUXILIARY (HAND) BRAKE ON REAR WHEELS

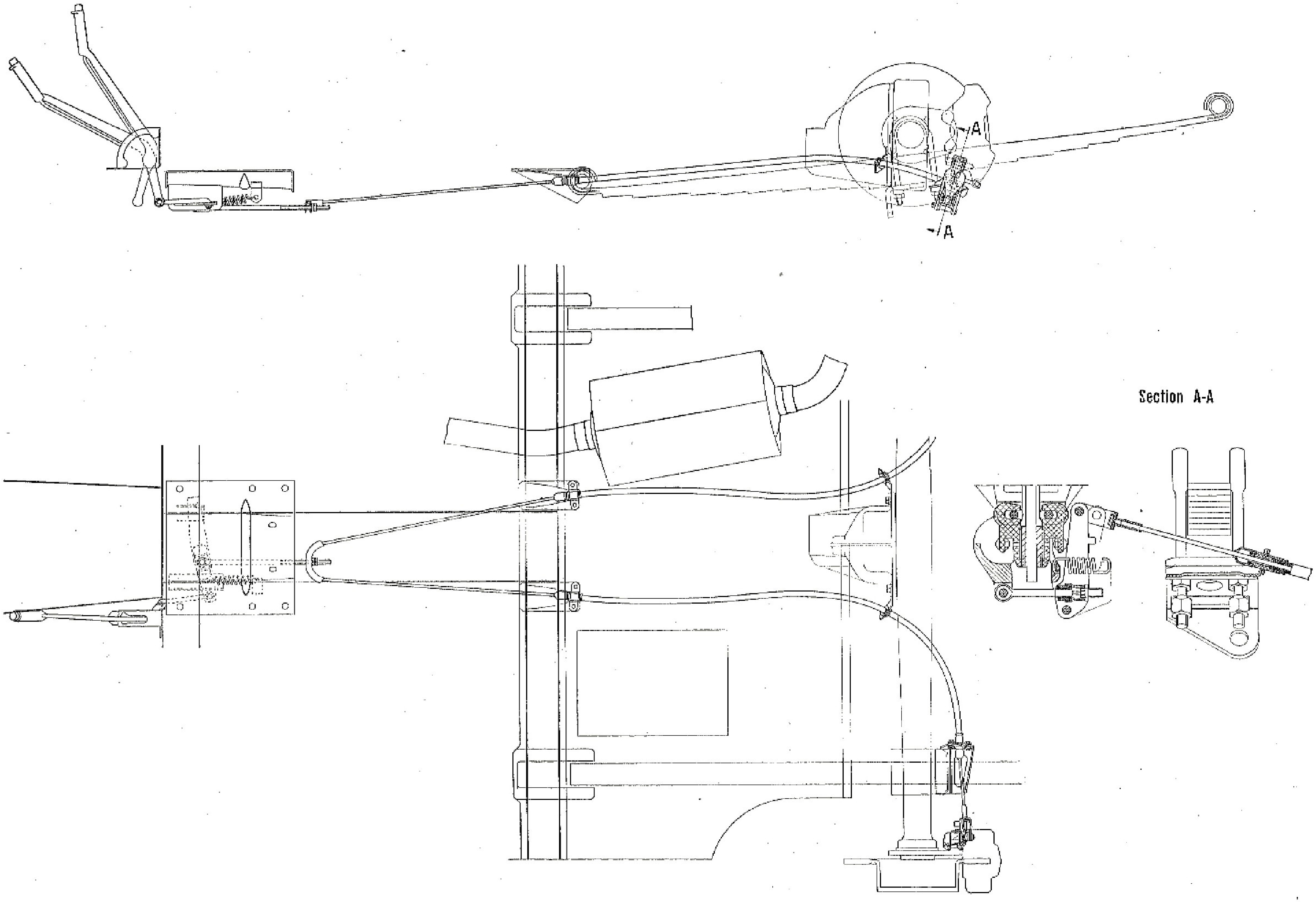


Fig. 119. - Auxiliary (hand) brake layout, with detail of the control mechanism on a rear disc.

Pressure regulator.

The device (2, fig. 5) consists mainly of a body in which a two-diameter piston slides. The smaller diameter end of body forms a high-pressure chamber (A, fig. 120), while the larger diameter end forms a low-pressure chamber (B).

Chamber (A) communicates with master cylinder primary circuit, while chamber (B) communicates with the secondary circuit to rear wheel cylinders.

The two chambers (A) and (B) may intercommunicate only through a check valve (14) incorporated in differential diameter piston (5).

The reduction between the pressures in chamber (B) and chamber (A) is accomplished by the difference in the areas of the two working surfaces of piston (5).

In high pressure chamber (A) is housed a calibrated spring (17) which exerts its pressure on the smaller diameter face of the piston which, in its rest position, is thus kept pressed against cylinder end plug (10).

When in position of rest, therefore, valve (14) is kept open by grooved pushrod (4) which overcomes the resistance of reaction spring (15) thus allowing intercommunication between chambers (A) and (B).

When brake pedal is depressed, the fluid flows from chamber (A) to chamber (B) through valve (14).

As pressure increases the difference in pressure on the larger and smaller diameter faces of piston (5) moves piston towards chamber (A), overcomes the resistance of spring (17) and frees valve (14) from pushrod (4); valve (14) is then pushed towards its seat under the action of spring (15) determining its complete closing when the pressure reaches the specified figure of 25 kg/cm² (356 psi).

As a result, under this condition the communication between chambers (A) and (B) is intercepted, delivery pressure acts on the smaller-diameter face of the differential piston and pressure in chamber (B) is thus lower than in chamber (A). Consequently, also the pressure in the rear wheel brake cylinders is proportionally lower than the pressure at master cylinder outlet.

When the pressure in chamber (A) further increases, piston (5) is again shifted towards chamber (B) thus opening valve (14) and allowing an additional amount of fluid to pass from chamber (A) into chamber (B). As this involves an increased pressure in the rear wheel brake circuit, it causes valve (14) to close again, thus re-instating the pressure differential between the rear wheel brake circuit and the master cylinder.

From the above description it is inferred that to close the passage between chambers (A) and (B) the differential piston (5) must move — after overcoming the resistance of spring (17) — of an amount sufficient to free valve (14) completely, and this is obtained starting from a delivery pressure of 25 kg/cm² (356 psi).

When brake pedal is released, pressure in chamber (A) decreases, differential piston — under the action of spring (17) — is pushed against plug (10), valve (14) is opened by pushrod (4) and the fluid in the rear wheel brake circuit is sent back to master cylinder circuit.

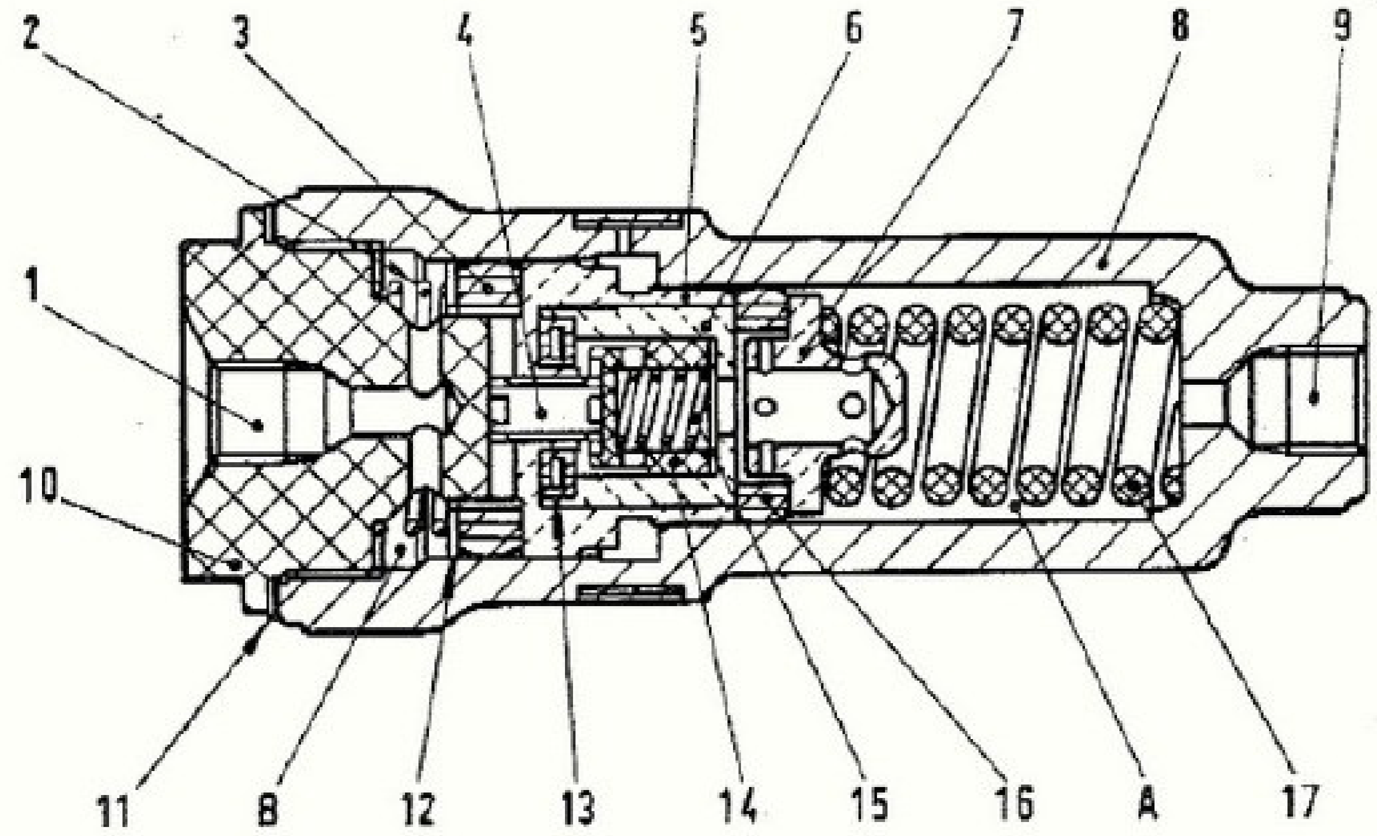


Fig. 120. - Longitudinal section of pressure regulating cylinder.

1. Connection, fluid delivery line to rear wheel brake cylinders - 2. Spring, flexible seal ring - 3. Seal ring, low-pressure chamber - 4. Pushrod, valve - 5. Two-diameter (differential) piston - 6. Valve holder - 7. Seal ring carrier - 8. Body, pressure regulating cylinder - 9. Connection, line from master cylinder - 10. Plug, low-pressure chamber - 11. Gasket, plug - 12. Washer, spring seat - 13. Seal, valve - 14. Valve - 15. Spring, valve - 16. Seal ring, high-pressure chamber - 17. Spring, reaction - A. High-pressure chamber - B. Low-pressure chamber.

AUXILIARY (Hand) BRAKE

Observe that brake linings do not protrude beyond disc braking area periphery.

The hand brake centering plates must not be locked before adjustments.

After assembly, adjust as described in the following paragraphs.

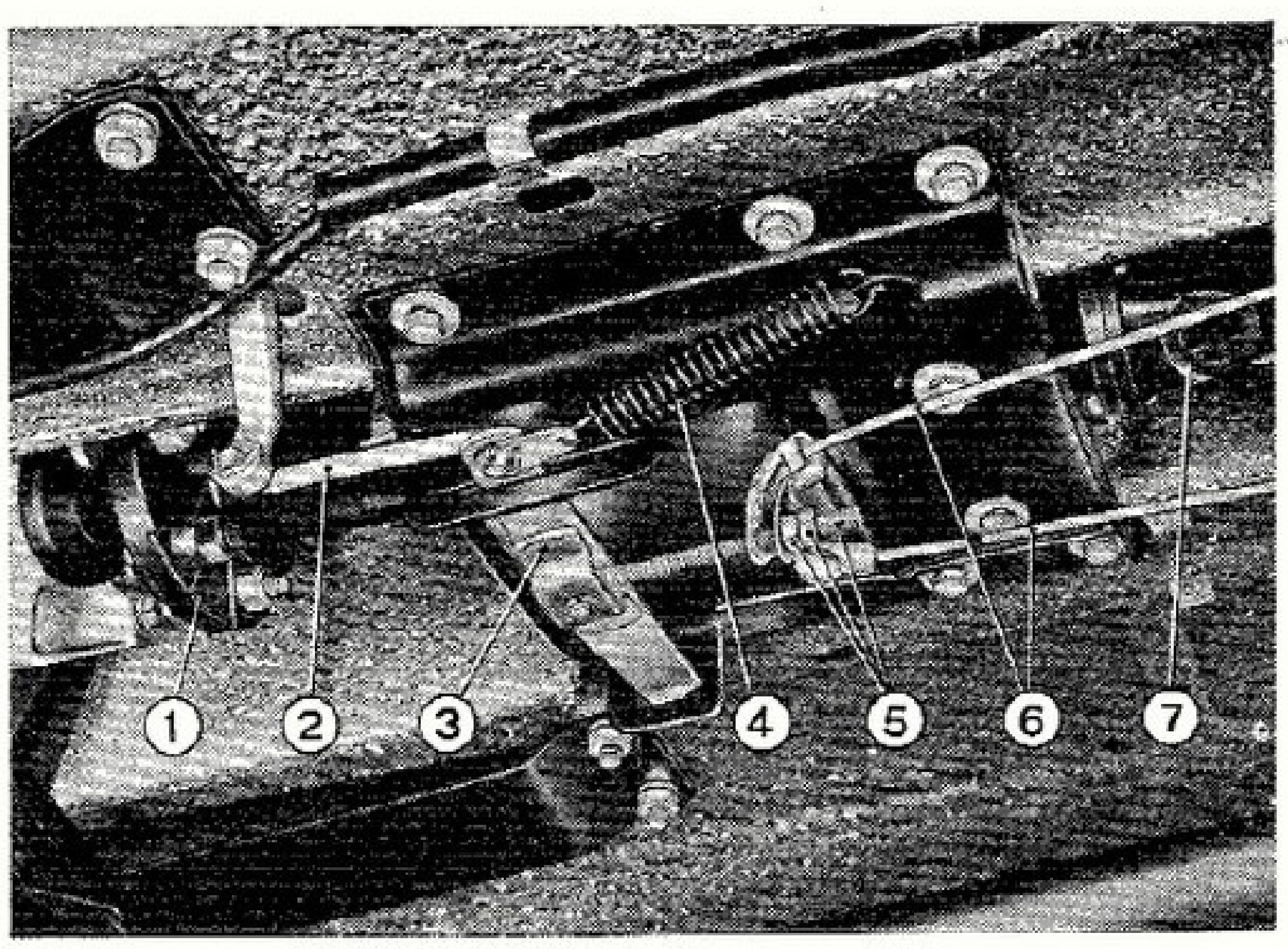


Fig. 121. - Bottom view of car mid section.

1. Flexible joint - 2. Hand brake tie rod - 3. Hand brake lever - 4. Hand brake return spring - 5. Nuts and threaded rod for hand brake rope - 6. Tension adjustment - 7. Universal joint.

ADJUSTMENT PROCEDURE

- Set the hand lever in fully released brake position.
- Insert a 0,25 mm (.0010") thick block between disc faces and hand brake pads.
- Tighten fully the adjustment nut.
- Stretch the rope by applying the hand brake lever and, if necessary, adjust lever play until rope is well taut.
- Lock the centering plate mounting nut.
- Re-set hand lever back into rest position.
- Slacken the adjustment nut of the amount required to slide out the thickness blocks.
- After repeatedly actuating the hand lever, make sure the mechanism is centered with respect to the disc; to ensure this condition it must be possible to insert, without forcing, a 0,1 mm (.0040") thick probe between disc and pads on both sides. If the mechanism is not properly centered, remove the centering plates, bend them suitably as required, and repeat the adjustment operation.

Hand lever stroke is set by adjustment tie rod (5, fig. 121).

MAINTENANCE

Disc brakes require no particular maintenance. During car general cleaning and before carrying out any maintenance on the brake system, clean carefully each brake **using exclusively warm water with FIAT LDC detergent** then drying immediately with a compressed air blast.

Never use gasoline, diesel fuel, trichloroethylene or other mineral solvents of any kind which are detrimental to the hydraulic cylinders seal rings and dust covers.

During rear leaf spring oilspray operations, shield the brakes as much as possible.

Every 5.000 km (3,000 miles): check the condition of **all** brake linings pads and replace if required.

Make sure piston dust covers are sound.

Check brake pedal and hand lever plays and, if necessary, adjust as described.

BRAKE SPECIFICATIONS

Front and rear service brakes	disc type with friction linings operated by three hydraulic cylinders
Disc diameter	270 mm (10.63")
Total working area { front / rear	188 cm² (29.1 sq.in) 186 cm² (18.8 sq.in)
Master cylinder diameter	7/8"
Pressure regulator cylinder diameter	22,225 x 28,575 mm (.8750" x .8888")
Max. allowable wear and reconditioning limits for brake disc side faces { front / rear	0,7 mm (.0276") on each side 0,5 mm (.0197") on each side
Minimum allowable brake pad lining thickness	4 mm (.157")
Emergency and parking hand brake	Operating mechanically by separate pads on rear brake discs.

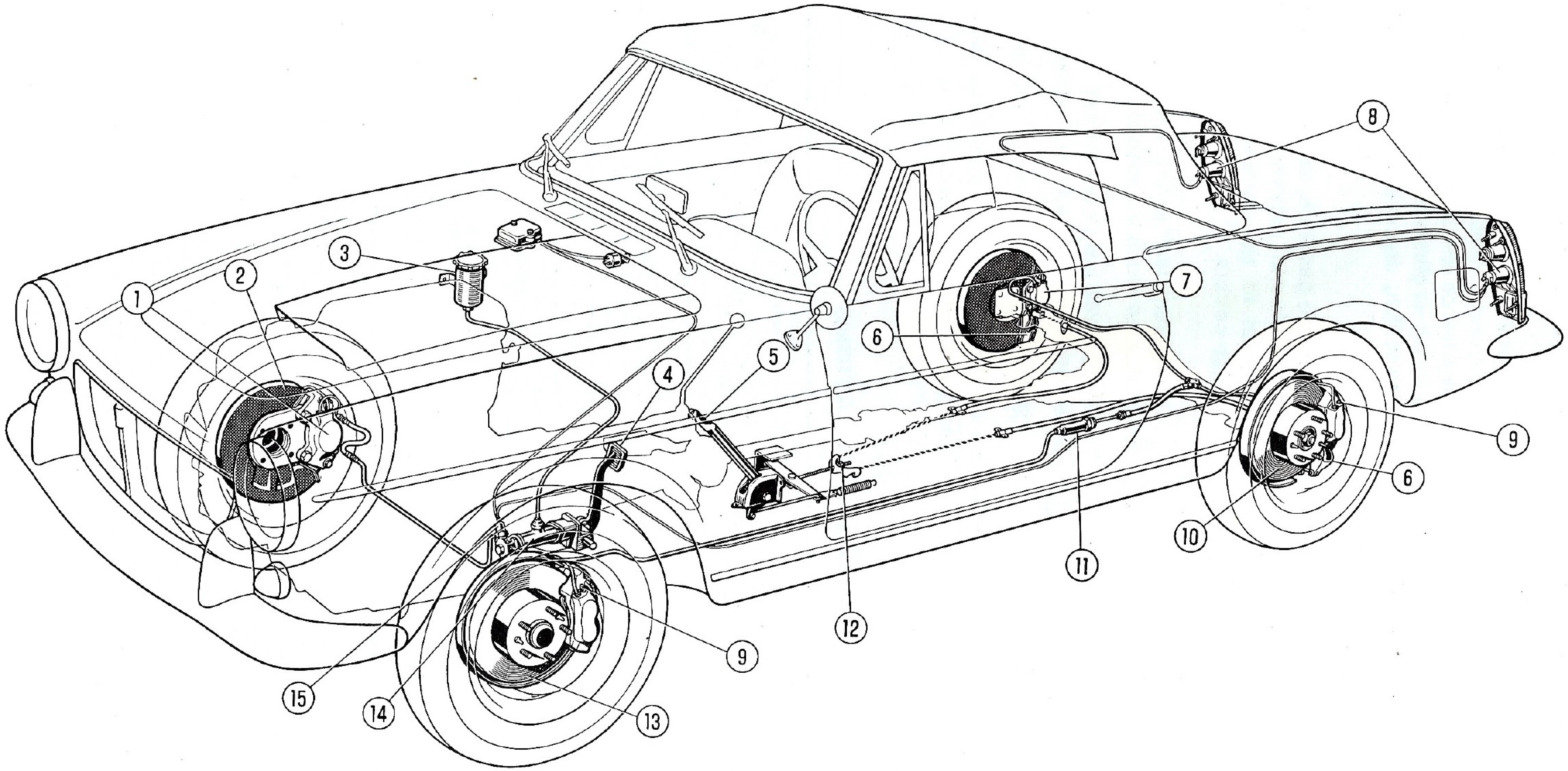


Fig. 122. - Hydraulic service and mechanical hand brake system diagram.

1. Front disc brake calipers - 2. Brake disc shield - 3. Brake fluid reservoir - 4. Brake pedal - 5. Hand brake lever - 6. Hand brake controlled by lever (5) - 7. Rear disc brake calipers - 8. Stop lights - 9. Brake circuit bleeder connection - 10. Rear brake disc - 11. Rear brake circuit pressure regulator - 12. Hand brake lever stroke adjuster - 13. Front brake disc - 14. Master cylinder - 15. Stop lights pressure-operated switch.

CHASSIS TIGHTENING REFERENCE

ITEM	Drwg. or Std. Part No.	Thread	Material	Tightening torque	
				kgmm	ft/lbs
Self-locking nut — kingpin-to-swinging arms	1/25748/11	14 MB (x 1,5)	R 50 Cdt (king pin 38 NCD 4 Bon)	12,000	87
Nut — brake disc-to-knuckle arm and king pin bolt . .	1/21647/11	10 x 1,25 M	R 50 Cdt (Bolt R 80 Cdt)	5.200	38
Screw — steering knuckle arm-to-kingpin	855961	12 MB (x 1,5)	R 80 Cdt	9.700	70
Nut — steering wheel-to-shaft	1/07914/11	16 MB (x 1,5)	R 50 Cdt (shaft C 12 pipe)	5.000	36
Nut — pitman arm-to-roller shaft	1/21643/21	20 MB (x 1,5)	R 80 Cdt (Shaft 30 CD 4)	20.000 to 24.000	145 to 174
Screw — steering box-to-body	1/21647/11	10 x 1,25 M	R 50 Cdt (Screw R 80 Cdt)	3.000 to 3.500	22 to 25
Nut — relay lever support	1/21647/11	10 x 1,25 M	R 50 Cdt (Screw R 50 Cdt)	3.500 to 4.000	25 to 29
Nut — steering rod ball stud	1/07933/11	12 MB (x 1,5)	R 50 Cdt (stud 15 CND 3 R Cmt 1)	3.000	22
Self-locking nut — flexible joint stud	1/25745/11	10 x 1,25 M	R 50 Cdt (Stud R 80 Cdt)	5.200	38
Self-locking nut — bevel drive pinion	1/25749/11	16 MB (x 1,5)	R 50 Cdt (Pinion 14 CN 5 Cmt 7)	8.000 to 16.000	58 to 116
Screw — bevel ring gear-to-case	4073970	10 x 1,25 M	R 100	7.000	51
Screw — cap-to-carrier	1/09242/20	10 x 1,25 M	R 80	5.400	39
Screw — carrier-to-axle casing	1/60433/21	8 MA (x 1,25)	R 80 Cdt	2.100	15
Nut — brake disc-to-axle casing bolt	1/61008/21	8 MA (x 1,25)	R 50 Cdt (Bolt R 80 Cdt)	2.300	17
Nut — hub-to-axle shaft	875611	20 MB (x 1,5)	R 50 Cdt (Shaft C 33 Tmp-Induction hard.)	22.000	159
Nut — leaf spring-to-axle casing U-bolt	735802	10 x 1,25 M	R 50 Cdt (U-Bolt C 30 Bon Cdt)	3.100	22
Self-locking nut — spring front mounting screw. . . .	1/25748/11	14 MB (x 1,5)	R 50 Cdt (Screw R 50 Cdt)	8.200	59
Nut — spring rear shackle bush pin	1/61008/11	8 MA (x 1,25)	R 50 Cdt (Pin C 20 Bon)	1.400	10
Self-locking nut — rear shock absorbers mounting . .	1/25747/11	12 MB (x 1,5)	R 50 Cdt (Stud 12 NC 3)	8.700	63
Self-locking nut — wheel-to-hub studs	4009008	12 MB (x 1,5)	R 50 Cdt (Stud C 35 R Bon Cdt)	7.500 to 8.500	54 to 62
Screw — rear caliper halves assembly	4071558	5/16″	R 120	3.900 to 4.100	28 to 30
Screw — front and rear caliper halves assembly . . .	4071545	3/8″	R 120	7.200 to 7.600	52 to 55
Screw — front caliper halves assembly	4071545	7/16″	R 120	9.200 to 9.700	67 to 70
Screw — caliper mounting on plate	4084893	12 x 1,25 M	R 100	10.000	72

Electric system

BATTERY

The model 1600 S Cabriolet battery is located behind left seat and is secured by two spring retainers.

A plastic cover protects the battery.

Cell connectors are sunk in sealing compound. This arrangement improves battery insulation and cuts down intercell and ground current leakage. Moreover, cell connector and terminal post corrosion is noticeably reduced.

BATTERY SPECIFICATIONS

Tension	12 V
Capacity (20 h discharge rate)	48 Amp/h
Length	260^{+0}_{-2} mm (10.2″ $^{+0''}_{-.08''}$)
Width	172 ± 1 mm (6.8″ ± .04″)
Height	225^{+0}_{-4} mm(.93″ $^{+0''}_{-.16''}$)
Weight, with electrolyte abt.	20,5 kg (45.2 lbs)
Weight, without electrolyte	16,4 kg (36 lbs)
Electrolyte level (above separators):	
Battery at rest and cold (20° C) during operation	3 mm (.12″)
Fully charged battery	5 mm (.20″)

GENERATOR

The 1600 S Cabriolet is equipped with the type FIAT D 90/12/16/3 B generator which, as will appear from the specifications on next page, is capable of supplying a temporary peak current of 22 Amp.

The generator is connected to a regulating unit FIAT GN 2/12/16 whose current regulator is « temperature-compensated ». Owing to this particular design feature, the regulated current of the cold unit (i.e., when operation begins after a sufficiently long period of inactivity) is higher than the maximum continuous current of generator. As a result, the generator may operate even under overload if the users in the system so require.

However, the generator can withstand this overload without damage because it too is in the initial operation stage, same as the regulator, and hence is not yet « thermally stabilized », that is, its windings are at the same temperature as the surrounding ambient. As the generator and regulator warm up following the dissipation of heat by their windings, the current regulator (within 20-30 minutes) reduces the limiting current to a level the generator can withstand without damage on continuous operation; this current value is variable and is reached when the interior of regulator is at rated temperature (i.e., it is « thermally stabilized »).

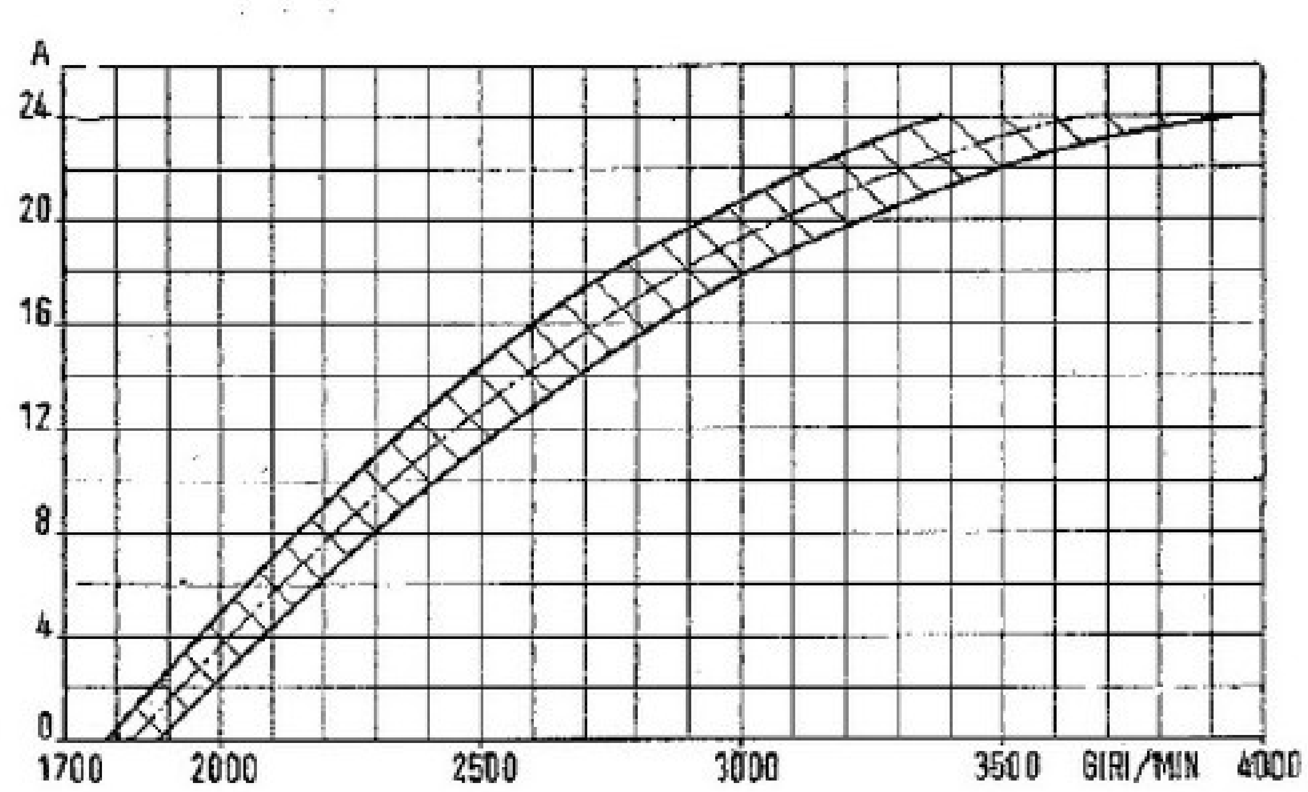


Fig. 123. - Current output curve (warm) of generator D90/12/16/3B.

At a steady 12 V tension.

Giri/min. = R.P.M.

FIAT D 90/12/16/3 B GENERATOR DATA

Nominal tension	12 V
Maximum continuous current	16 Amps.
Maximum temporary peak current	22 Amps.
Maximum continuous output	230 W
Maximum temporary peak output	320 W
Pole shoes	2
Field winding	Shunted
Regulator	GN 2/12/16
Cut-in speed (12 V at 20° C)	1710 to 1790 RPM
Speed for maximum continuous current output, at nominal tension (16 Amps at 20° C)	2550 to 2700 RPM
Speed for peak current output (22 Amps at 20° C)	3050 to 3200 RPM
Maximum speed — Continuous	9000 RPM
Maximum speed — Temporary peak (for 15 minutes)	10000 RPM
Rotation direction (drive end)	clockwise
Engine-to-generator drive ratio (with new belt)	1 to 1,83
Pole shoe inner diameter	58,3 to 58,4 mm (2.295" to 2.299")
Armature outer diameter	$57{,}6^{+0}_{-0.05}$ mm ($2.268''^{+0''}_{-0.002''}$)
Brush Part No.	4033762
Minimum car speed, in 4th gear, for battery charge (lights out)	31 km/h (19.3 m.p.h.)
Bench testing data	
— Testing generator as a motor (at 68° F - 20° C):	
Feed voltage	12 V
Current draw	5 ± 0,5 Amps
Speed	1500 ± 100 r.p.m.
— Output test (at 68° F - 20° C):	
Steady voltage	12 V
Speed — for abt. 45 min.	4500 RPM
Speed — for abt. 30 min.	9000 RPM
Current delivery to resistor	16 ± 0,5 Amps
After bringing generator to operation temperature by running generator at the above specified speed and time rates, at a steady 12 V tension, read the values of the current output at every generator speed increment.	
Caution - Before running output tests, check that the brush seating face has formed properly on commutator.	
— Ohmic resistance test (at 68° F - 20° C):	
Armature resistance	0,145 ± 0,01 ohm
Field winding resistance	$8^{+0.1}_{-0.3}$ ohm
— Mechanical characteristics test:	
Load of springs on new brushes	0,600 to 0,720 kg (1.3 to 1.6 lbs)
Commutator maximum out-of-round	0,01 mm (.0004")
Mica undercut depth	1 mm (.04")
Lubrication.	
Drive end ball bearing	FIAT Jota 3 Grease
Commutator end head bush pocket	FIAT Jota 3 Grease
Commutator end head oiler	FIAT VS 40 oil

This temporary initial operation peak load of generator makes possible a quicker battery recharge just when the battery may be in a low-charge condition like, for instance, after a difficult cold-start of engine or during town drives with frequent stops and starts and limited recharging times.

The generator is articulated on cylinder block by a pivot.

To adjust drive belt: move generator away from engine, and lock in new position on slotted bracket by the nut provided.

GENERATOR

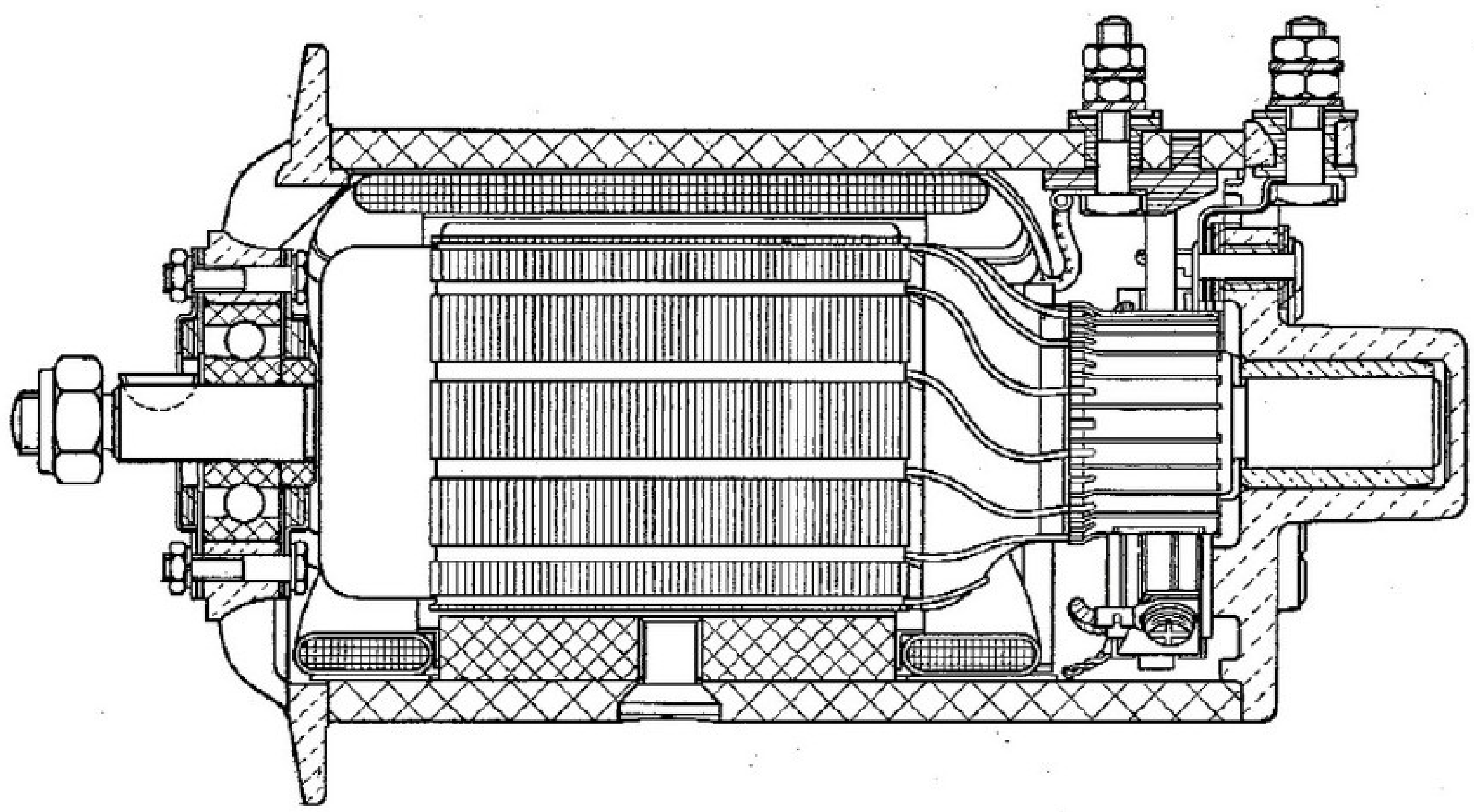


Fig. 124. - Generator FIAT D 90/12/16/3 B - Longitudinal section.

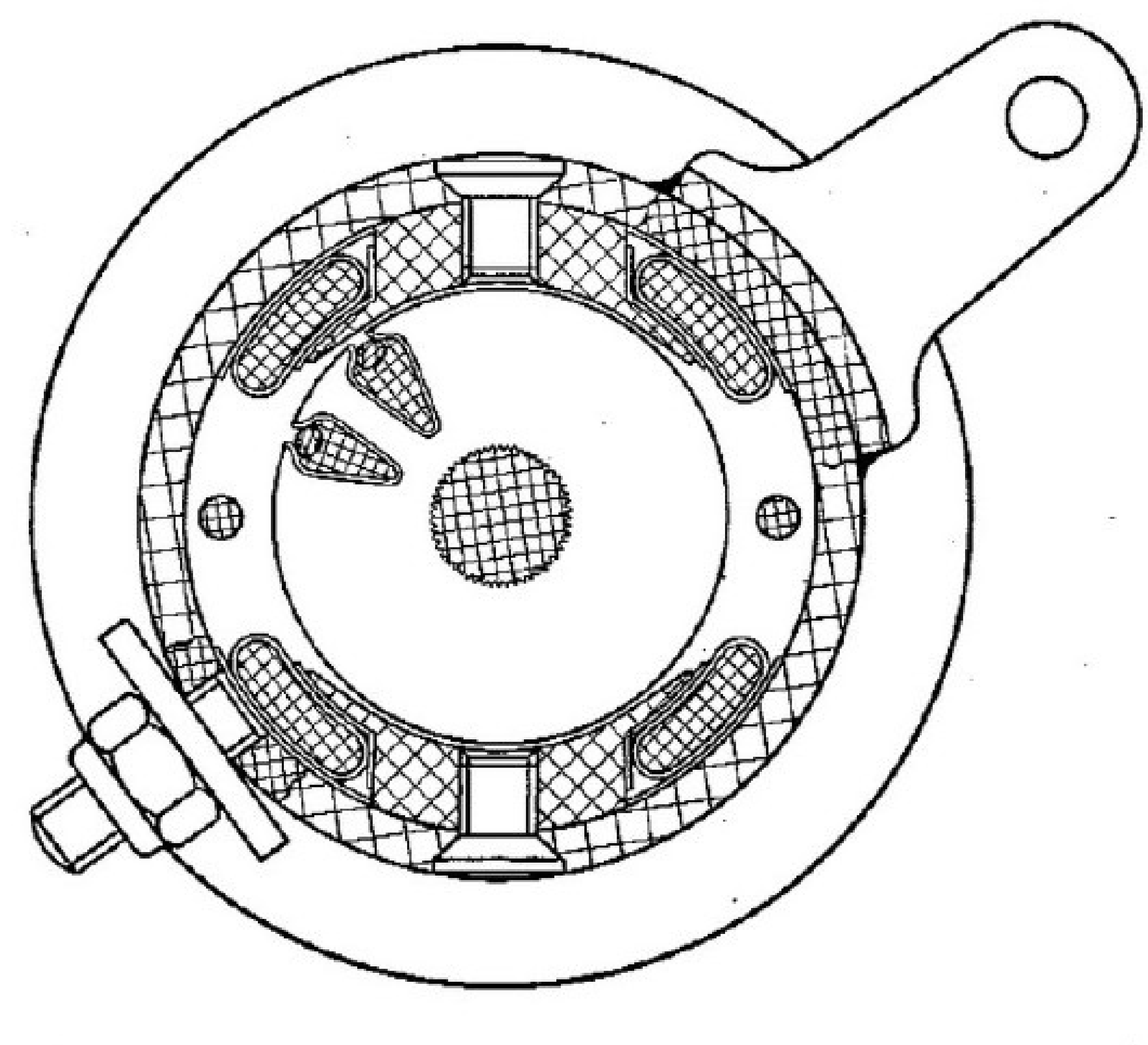


Fig. 125. - Generator, sectioned through the frame, pole shoes and windings.

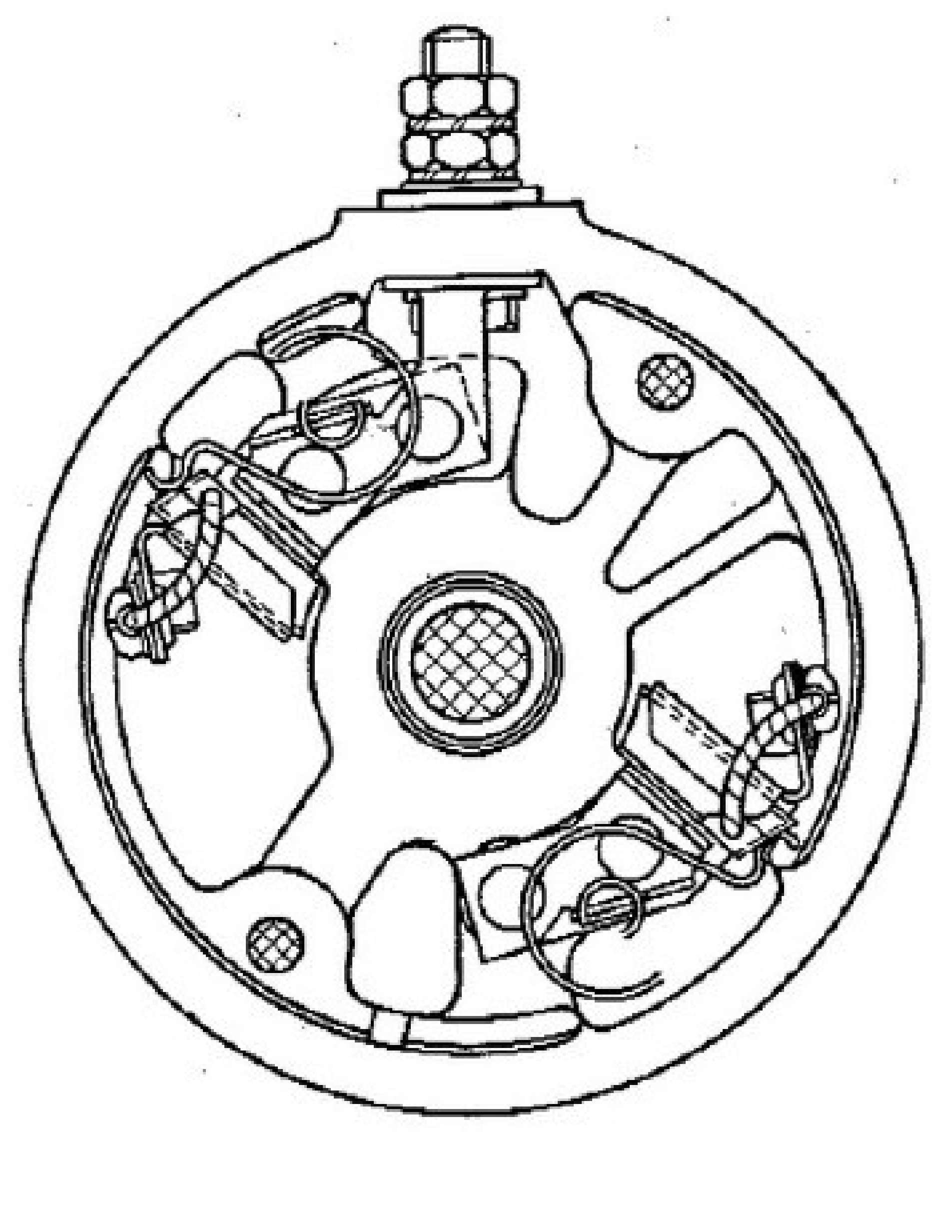


Fig. 126. - Section of generator through armature shaft and view of commutator end head.

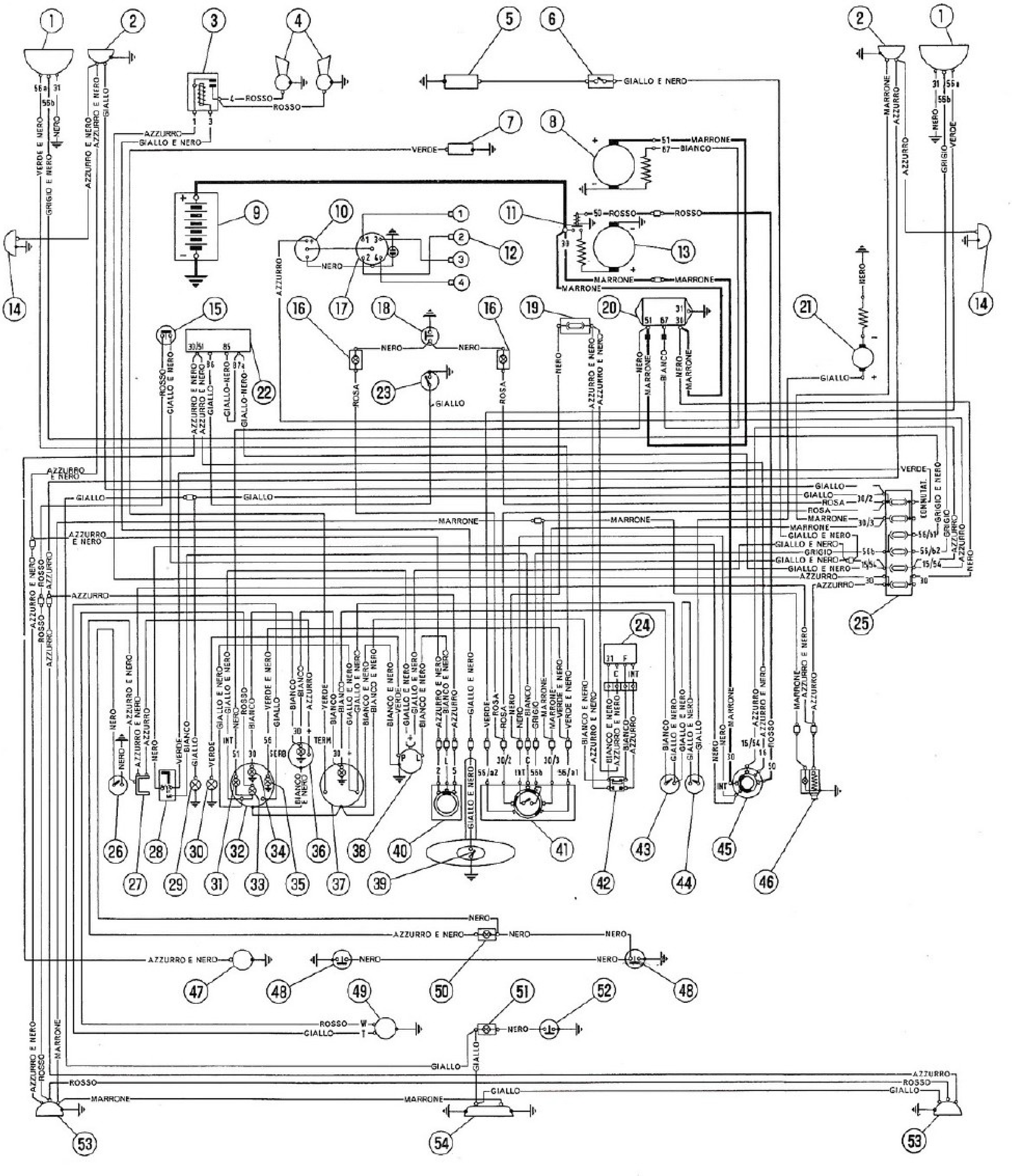


Fig. 127 - **Wiring diagram with color coded cables.**

1. Headlamps (high and low beams) - 2. Front direction indicator and parking lamps - 3. Horn relay switch - 4. Horns - 5. Engine water radiator electromagnetic fan - 6. Thermostatic switch for fan 5 - 7. Engine cooling water heat gauge sending unit - 8. Generator - 9. Battery - 10. Ignition coil - 11. Starter relay switch - 12. Spark plugs - 13. Starter - 14. Direction indicator side repeaters - 15. Hydraulic, pressure-operated stop lights switch - 16. Engine compartment lights - 17. Ignition distributor - 18. Engine compartment lights jam switch - 19. Fuse, 8-Amps, windshield wiper motor - 20. Generator regulator - 21. Air conditioning unit electrofan - 22. Relay switch for pump 47 - 23. Low oil pressure switch for relay switch 22 - 24. Windshield wiper motor - 25. Fuse box - 26. Dash light switch - 27. Inspection lamp receptacle - 28. Outer lighting switch - 29. Parking lamps indicator (green) - 30. Direction indicators pilot light (green) - 31. Generator charge indicator (red) - 32. Speedometer-mileage recorder with various indications - 33. Fuel reserve indicator (red) - 34. Speedometer light bulb - 35. Headlamp high beam indicator (blue) - 36. Electric clock, with light - 37. Engine revolution counter and heat gauge, with light - 38. Flasher, direction indicators - 39. Horn button - 40. Direction indicators switch - 41. Front outer lighting change-over switch - 42. Windshield wiper switch - 43. Panel light switch - 44. Electrofan switch - 45. Lock switch - 46. Cigarette lighter, with indicator - 47. Electric fuel pump - 48. Jam switches between door and pillar, for lamp 50 - 49. Fuel level gauge - 50. Dash light - 51. Luggage compartment lamp - 52. Jam switch for lamp 51 - 53. Rear parking, stop and direction indicator lamps - 54. Number plate lamps.

Note: Mark ▬ means that the cable is provided with numbered strip or ferrule.

CABLE COLOR CODE

Azzurro = **Blue**	Giallo = **Yellow**	Marrone = **Brown**	Rosso = **Red**	Rosa = **Pink**	INT. = **Switch**
Bianco = **White**	Grigio = **Grey**	Nero = **Black**	Verde = **Green**		SERB. = **Tank**

REGULATOR

The FIAT GN 2/12/16 Regulator is of the three-element type: voltage regulator, current regulator and cutout.

Said elements consists of separate relays.

The current regulator is of the « temperature-compensated » type.

The reason for this feature is explained on page 68 under « Generator ».

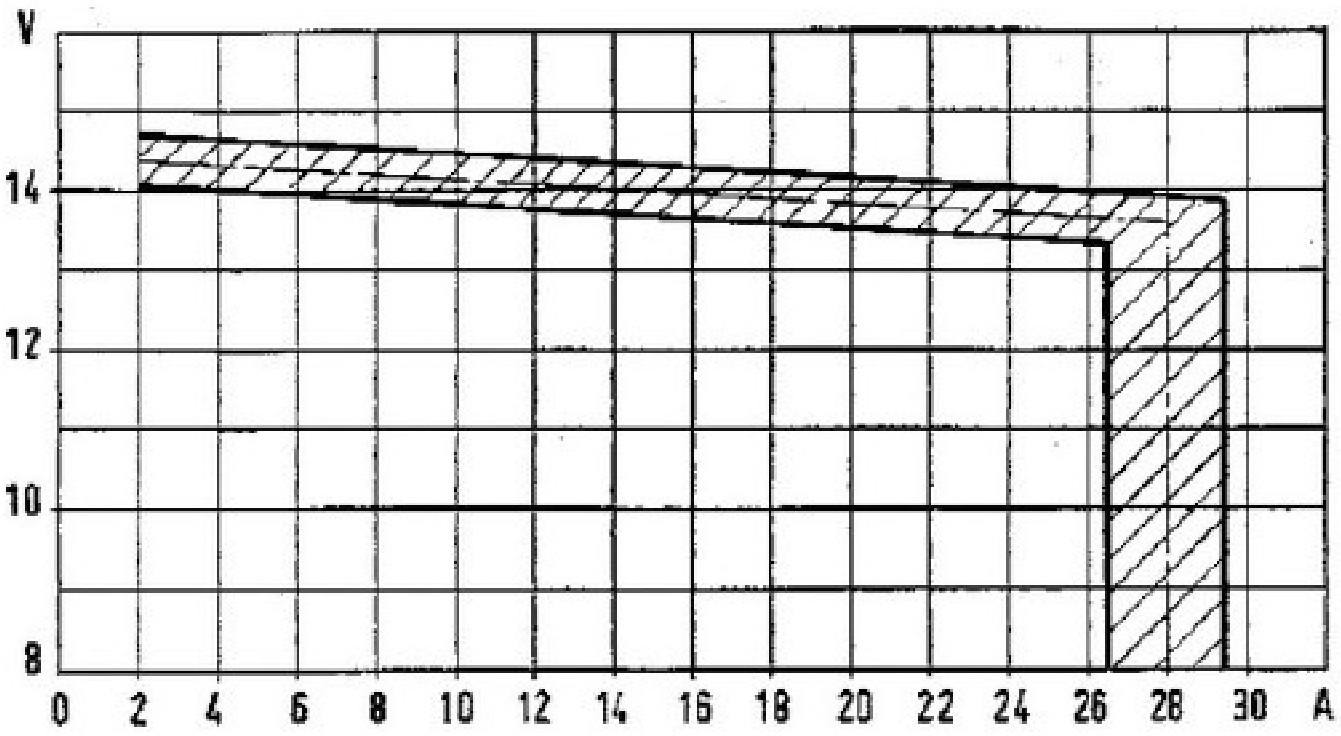


Fig. 128. - Characteristic regulation Volt/Amp. curve on battery.

Temperature: 50° ± 3° C = 122° ± 6° F.

(Generator speed rate: 4500 rpm).

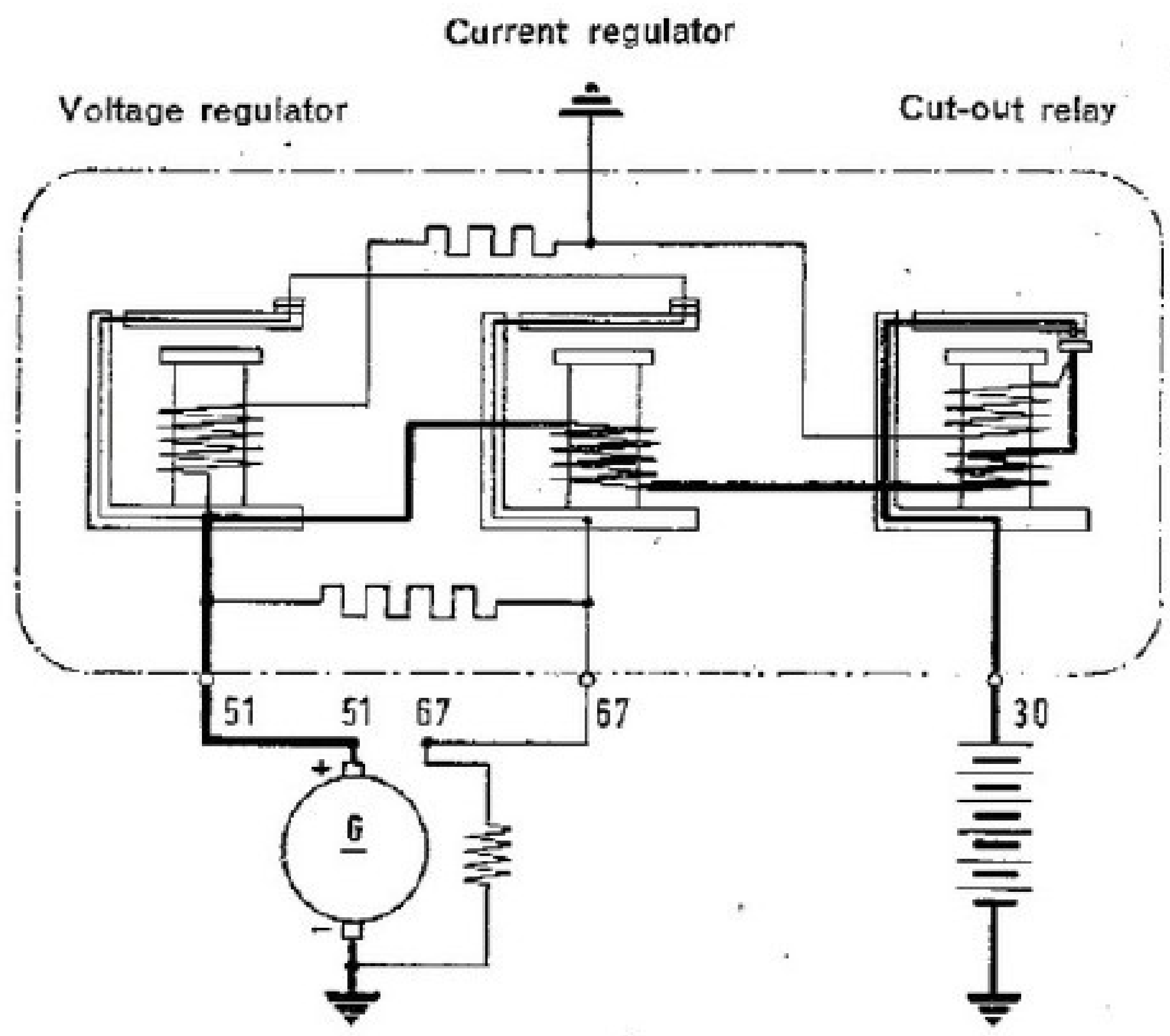


Fig. 129. - Wiring diagram of GN2/12/16 regulator assembly.

GN 2/12/16 REGULATOR CHECKING AND SETTING DATA

Generator speed for setting checks	4500 RPM
Cutout.	
Feed voltage for thermal stabilization:	
— regulator initial operating temperature 15°-20° C (59°-68° F)	16,5 V
— regulator initial operating temperature 20°-35° C (68°-95° F)	15 V
Closing voltage	12,6 ± 0,2 V
Voltage-contact stroke variation: less than	1 V/mm
Reverse current: up to and not greater than	16 Amps
Air gap (closed contacts)	0,35 mm (.0138")
Contact gap	0,45 ± 0,06 mm (.0177" ± .0023")
Voltage regulator.	
Battery (of test bench)	50 A/h
Half-load current	8 ± 0,5 Amps
Setting voltage after thermal stabilization at ambient temperature of 50° ± 3° C (122° ± 5,4° F) for 30 minutes, at half-load on battery	14,2 ± 0,3 V
Feed voltage for thermal stabilization	15 V
Air gap	0,99 to 1,11 mm (.0391" to .0437")
Current regulator.	
Regulator current on battery, checked with stabilized current and after 30 minutes operation at ambient temperature of 50° ± 3° C (122° ± 5,4° F)	16 ± 1 Amps
Voltage for regulated current check	13 V
Air gap	0,99 to 1,11 mm (.0391" to .0437")
Regulating resistor	85 ± 5 Ω

Setting adjustment instructions.

The adjustment of regulator setting must be carried out placing the unit upright on bench, with terminals lowermost and cover removed.

IMPORTANT - If the unit has remained for some time at temperatures below 15° C (59° F) or above 35° C (95° F) it shall be kept for at least 1 hour at 25° ± 10° C (77° ± 18° F) before proceeding with the adjustment operations outlined below.

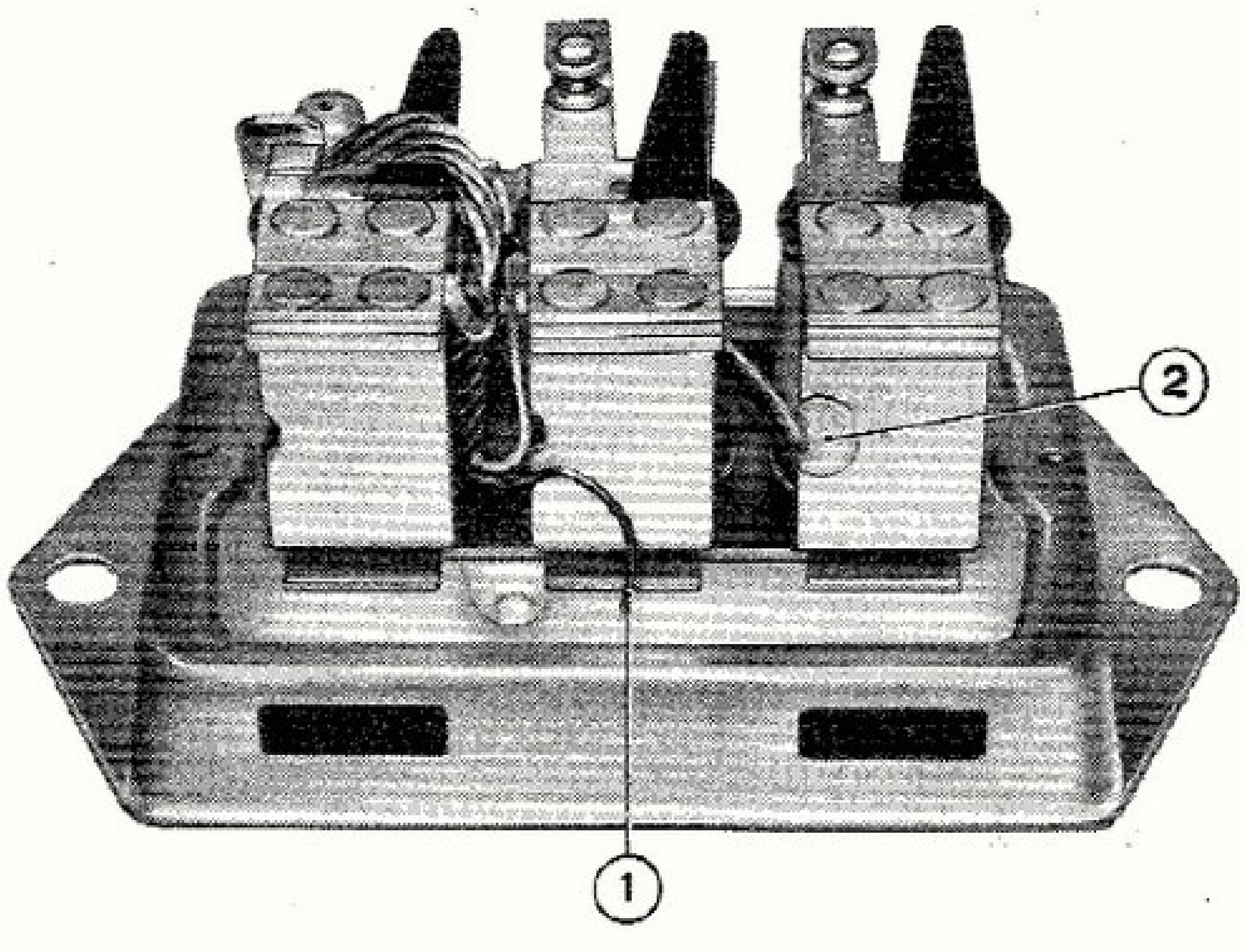


Fig. 130. - **GN2/12/16 regulator assembly. Rear end view.**

1. Cut-out relay winding end soldered to base - 2. Current regulator winding end soldered to voltage regulator body.

CAUTION - Whenever the regulator has been opened and kept open for repair or overhaul, it must be operated for a while, without cover, to allow the regulator to warm up. Fit the cover and tighten it on warm assembly, and make sure that the rubber gasket between cover and base is properly seated and provides adequate sealing. This eliminates the possibility of moisture building up inside a cold regulator, particularly on windings, when surroundings are moist. If any humidity is trapped in, when the regulator warms up in operation moisture will evaporate and deposit on armature, thus causing highly detrimental oxidation of contacts.

NOTE - It is dangerous to insert radio interference suppression condensers of any capacity between:

- **terminal 67 and ground;**
- **terminal 67 and 51, both on generator and regulator.**

STARTER MOTOR

The 1600 S Model Cabriolet is equipped with starter motor type FIAT E 100-1,5/12 Var. 1 with electromagnetic engagement control.

The electromagnet is in a single unit with the starter and is controlled by the lock switch.

The drive is by overrunning clutch.

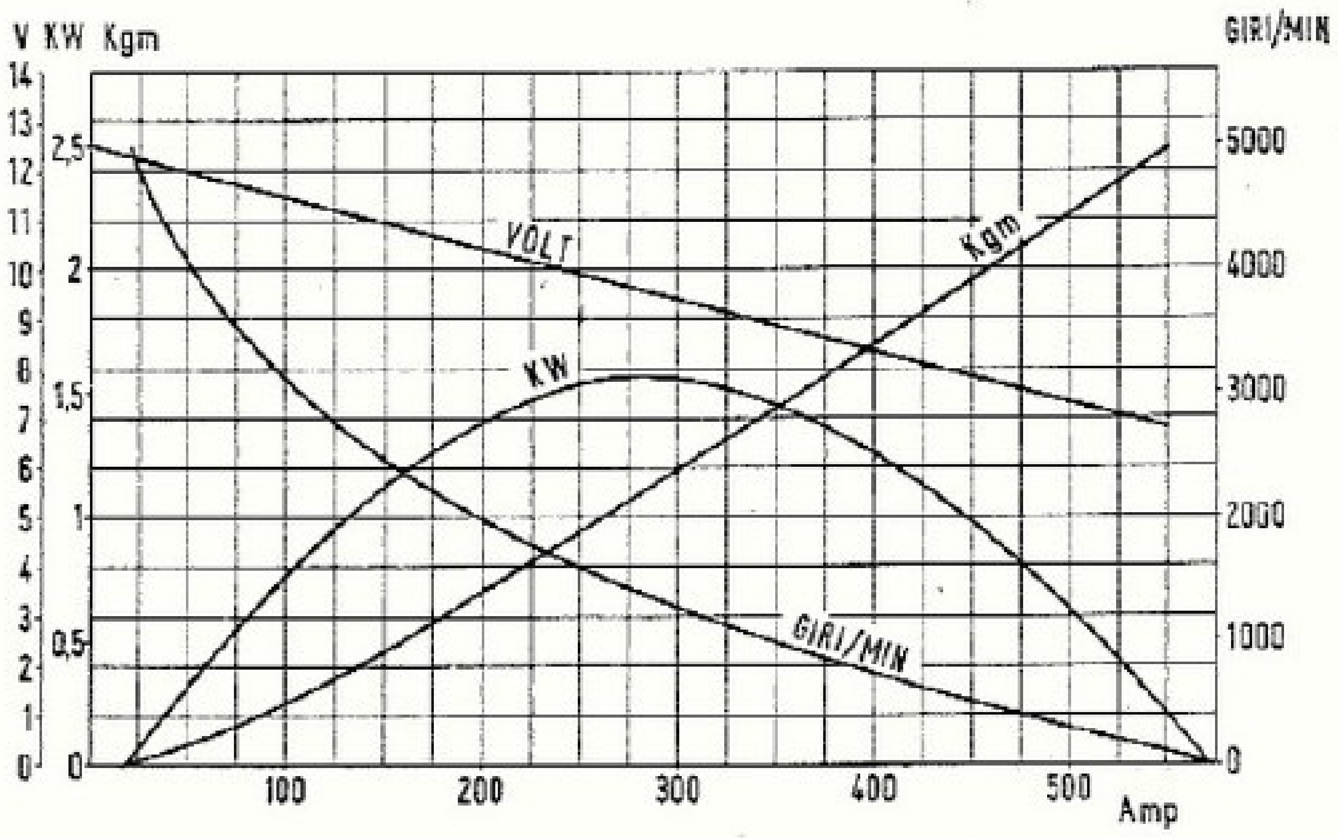


Fig. 131. - Characteristic curves of FIAT E 100-1,5/12 Var. 1 starter.

Conditions: Electrolyte temperature 20° C (68° F) - Battery, 48 Amp/hr (at 20 hrs discharge rate), fully charged - No-load speed: 9000 RPM.

GIRI/MIN = R.P.M.

NOTE - After installing the field winding — which must be heated to about 50° C (122° F) to render it more flexible and facilitate its seating — fully tighten the pole shoe screws.

This will ensure correct resetting of the specified air gap between armature and pole shoes.

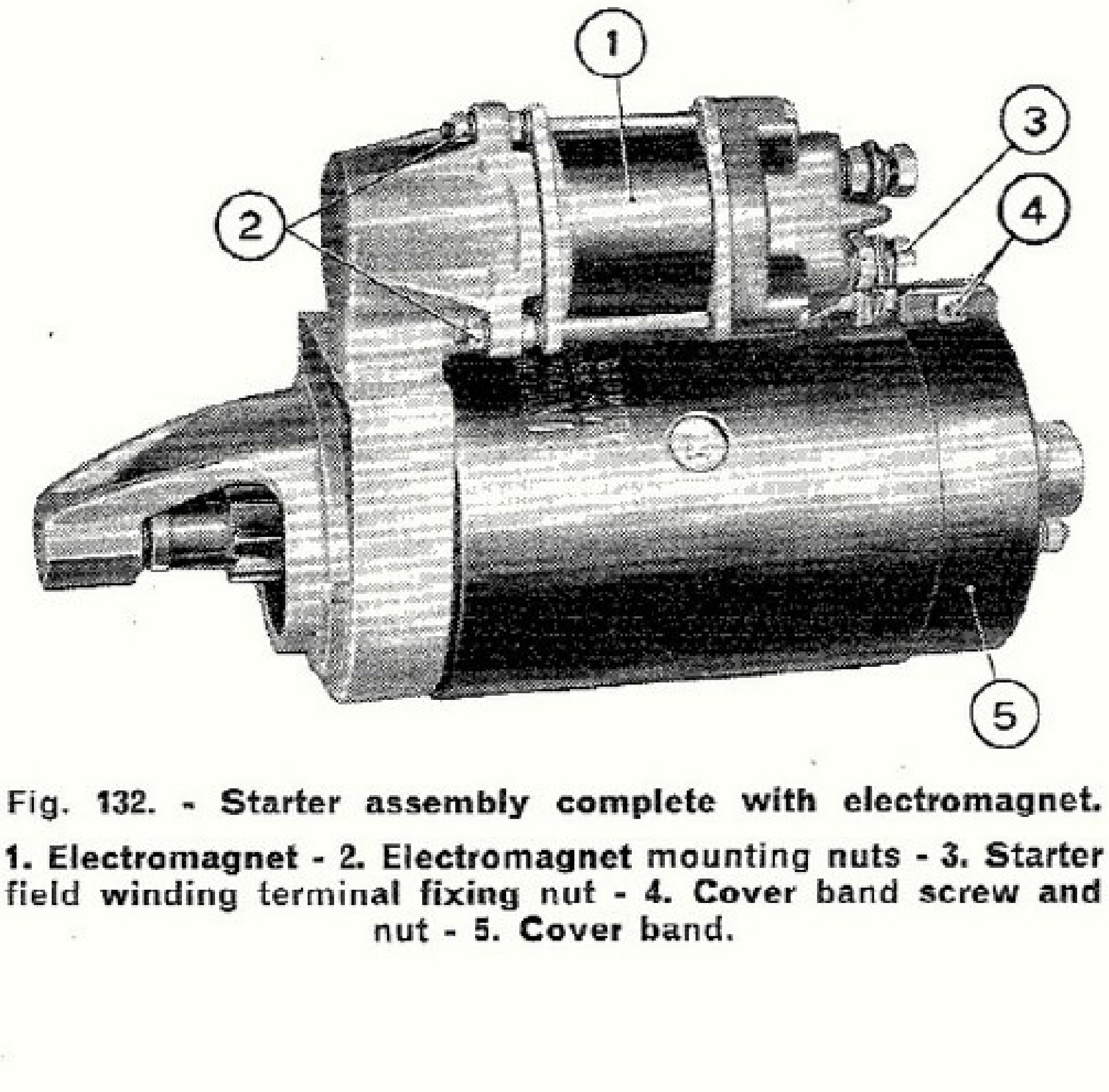


Fig. 132. - **Starter assembly complete with electromagnet.**

1. Electromagnet - 2. Electromagnet mounting nuts - 3. Starter field winding terminal fixing nut - 4. Cover band screw and nut - 5. Cover band.

STARTER MOTOR DATA

Type	FIAT E 100-1,5/12 Var. 1
Voltage	12 V
Nominal power	1,5 kW
Rotation (pinion end)	clockwise
Pole shoes	4
Field winding	series/parallel
Engagement	by free wheel
Engagement control	by electromagnet
Mechanical data.	
— Pole shoes I. D.	67,80 to 67,97 mm (2.6693″ to 2.6760″)
— Armature diameter	66,95 to 67,00 mm (2.6358″ to 2,6378″)
— Part No. of brushes	FIAT 4045771
— Ring gear-to-pinion ratio	12 : 1
Bench test data.	
— Operation test at 20° C (68° F):	
Current	300 Amp
Torque developed	1,2 ± 0,05 kgm (8.7 ± .36 ft.lbs)
Speed	1200 ± 50 r.p.m.
Tension	9,5 Volt
— Stall torque at 20° C (68° F):	
Current	610 Amp
Tension	6,05 ± 0,3 Volts
Torque developed	2,8 ± 0,1 kgm (20.3 ± .7 ft.lbs)
— No-load test at 20° C (68° F):	
Current	≤ 20 Amp
Tension	12 Volts
Speed	6000 ± 300 r.p.m.
— Electromagnet coil resistance, at 68° F (20° C)	0.399 to 0.409 Ohms
— Inner resistance, on starting, at 68° F (20° C)	0.009 to 0.01 Ohms
— Shunt field winding resistance, at 68° F (20° C)	1.96 to 2.04 Ohms
— Series field winding resistance	0.0039 to 0.0041 Ohms
Mechanical Specifications Test.	
— Spring pressure on brushes (not worn)	1 ± 0,1 kg (2.2 ± .22 lbs)
— Armature shaft end play	0,1 to 0,7 mm (.0039″ to .0276″)
— Mica undercut	1 mm (.0394″)
— Overrunning clutch efficiency: static load to draw pinion into slow rotation, not greater than	0,9 kgcm (.78 in.lbs)
— Electromagnet core stroke	12,8 to 15,8 mm (.5039″ to .6221″)
— Electromagnet contact stroke	10,72 to 14,03 mm (.4220″ to .5513″)
Lubrication.	
— Drive unit inner splines	Jota 2/M grease

STARTER

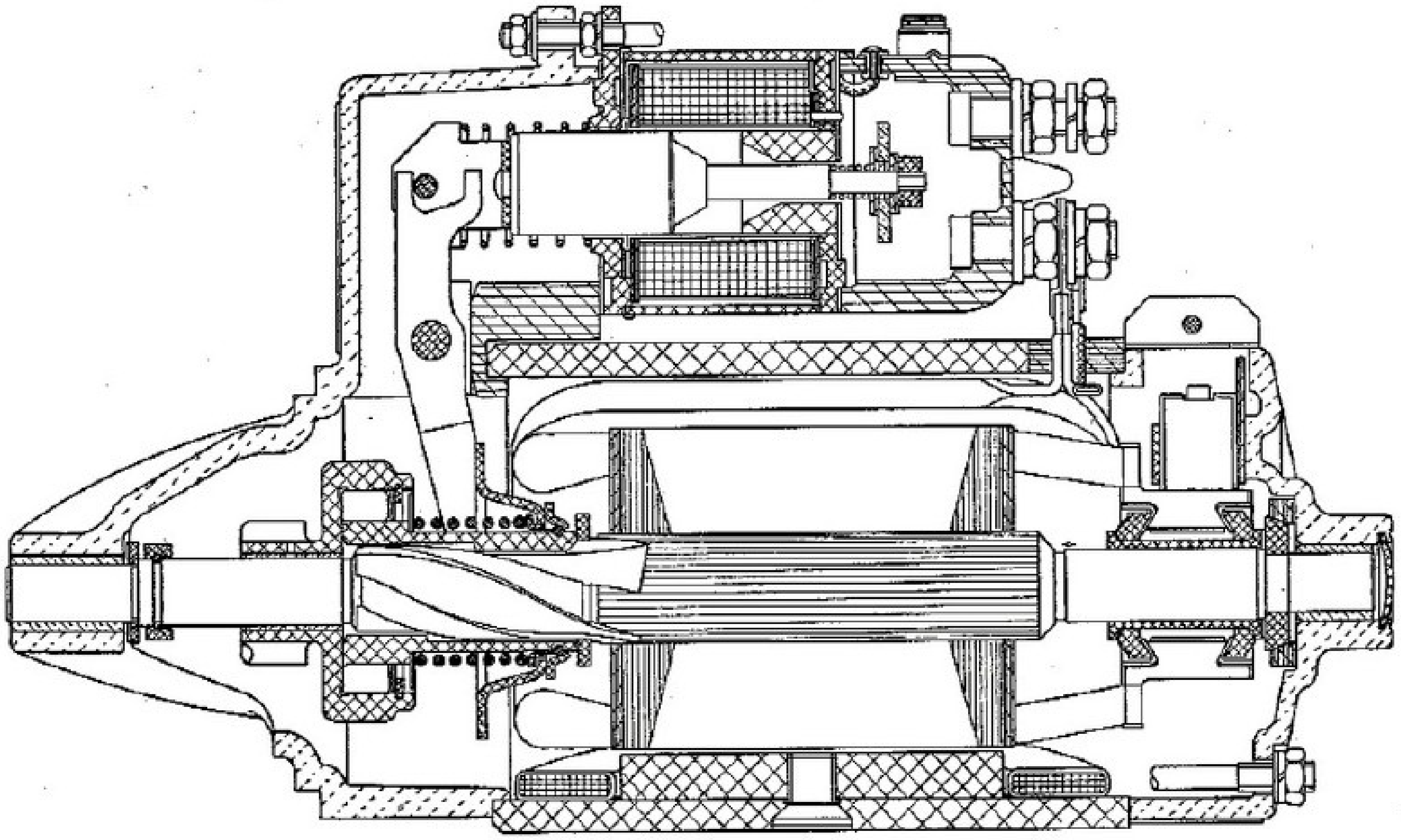


Fig. 133. - Longitudinal section of starter FIAT E 100-1,5/12 Var. 1.

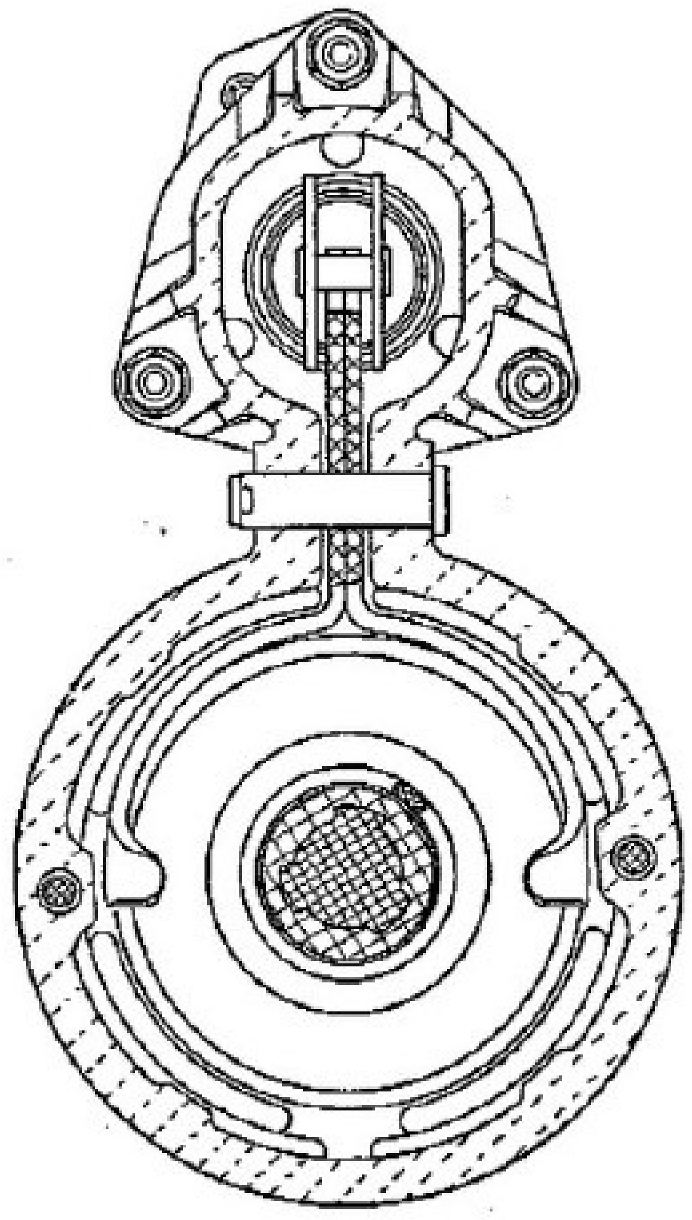


Fig. 134. - Cross section through pinion engagement control.

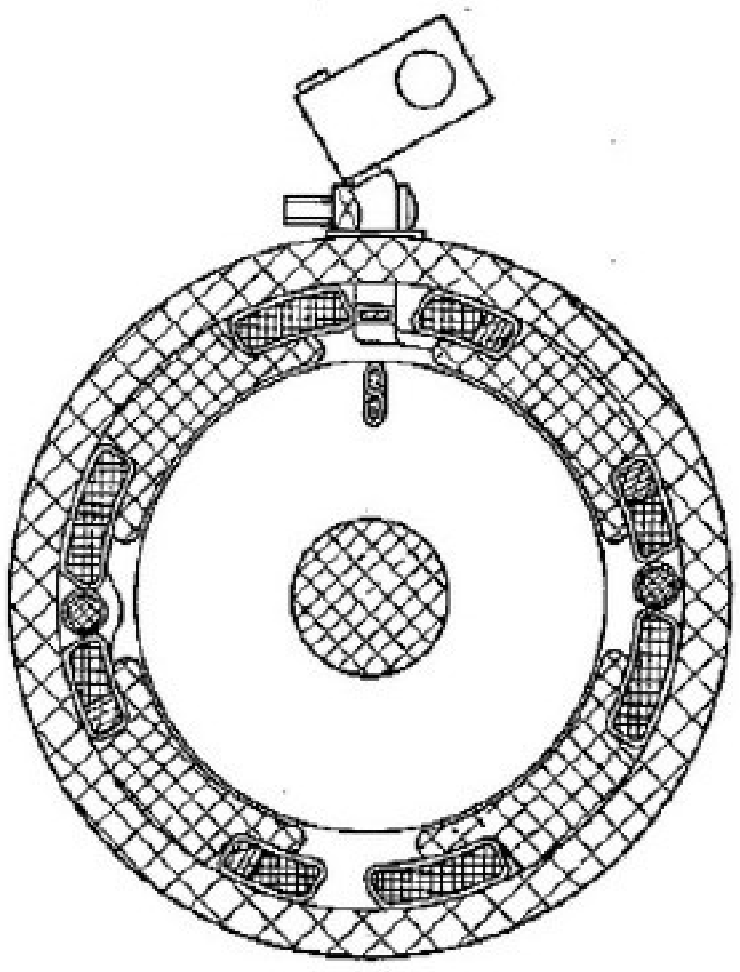


Fig. 135. - Cross section through pole shoes and field winding.

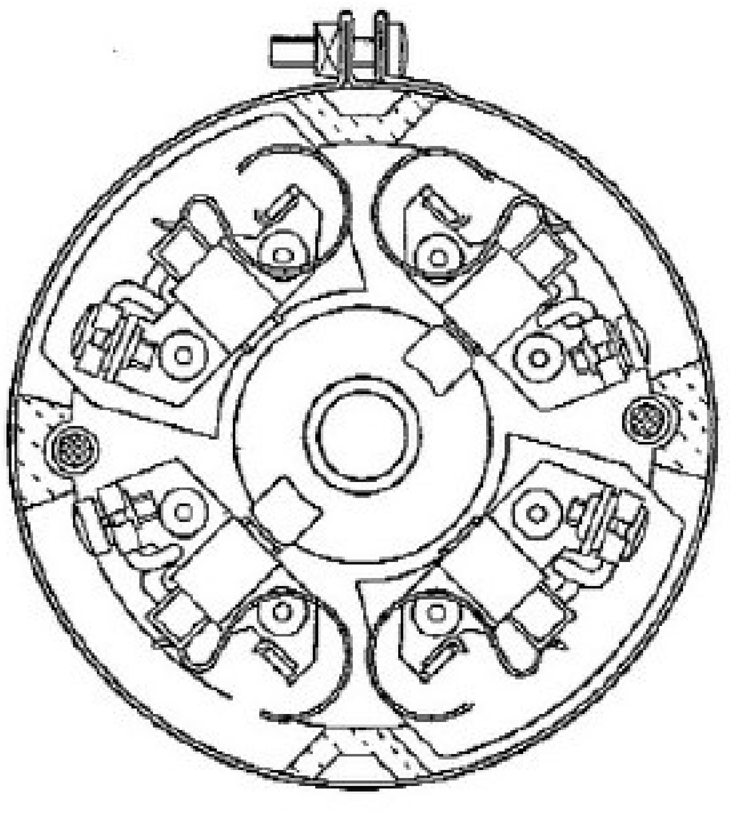


Fig. 136. - Section through commutator head with brushes in view.

LIGHTING

BULBS

LOCATION		TYPE	Wattage (12 Volts)
Headlamps	high beam	spherical, double filament, special for asymmetric low-beam headlamps (*)	45
	low beam		40
Front lamps	direction	spherical, double filament	20
	parking		5
Tail lamps	stop		20
	parking		5
Tail lamps: direction indicators		spherical	20
Number plate lights		spherical	5
Engine compartment lighting		cylindrical	5
Luggage compartment lighting			
Dash light		cylindrical	3
Direction indicator side repeaters		tubular	3
Instrument cluster lights			
Direction indicators pilot light			
Generator charge indicator			
Fuel reserve indicator			
Parking and number plate lamps indicator			
High beam indicator			
Cigarette lighter housing indicator			

(*) Standard bayonet-type for symmetric low beam headlamps (L. H. Traffic).

Aiming the asymmetric low beam headlamps (*).

Place the car (unladen) on level ground at 10 m (33 ft.) in front of a white screen in the shade, which could also be the white wall of a building. Switch on the low beams: the light pool horizontal demarcation line must fall on line **b-b**. Furthermore, the separation lines inclined upwards must start from the intersection points of vertical lines **a-a** (headlamp axes) with horizontal line **b-b**. The aiming adjustment is carried out by the proper screws.

(*) Identified by symbol E 3 on lens.

Aiming the symmetric low beam headlamps.

Place the unladen car in the position shown in the illustration.

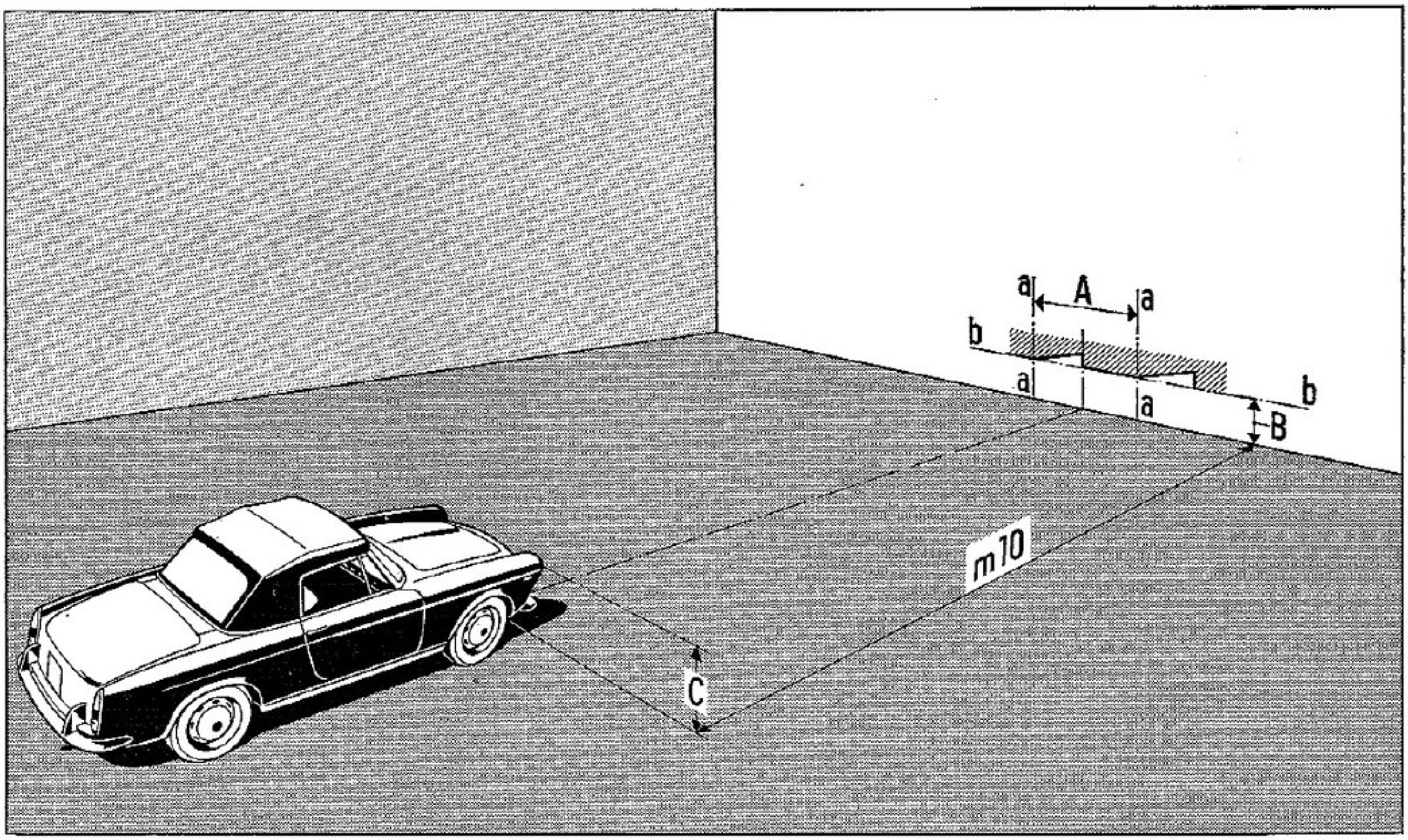
Horizontal aim checks with the high beams:

— The center of the light pool of each headlamp must lie on the vertical reference **a-a**.

Vertical aim checks with the low beams:

The separation line between lit and unlit areas must be horizontal and lie on the horizontal reference **b-b**.

For beam orientation, use the adjustment screws provided on the headlamp unit.



Fiat. 137 - Headlamp aiming chart.

A = Distance between headlamp centers - B = C minus 7 cm ($2^3/_4$") - C = Height of headlamp centers above ground.

Note - In case headlamps are aimed with car at 5 mt ($16^1/_2$ ft) from screen, B = C minus 3,5 cm $1^3/_8$").

Fuses.

(See table on next page).

Five, 8-Amp fuses, one 16-Amp fuse (green) in a box located on bulkhead in engine compartment, and one 8-Amp fuse (G, fig. 138) arranged next to said box in a special fuseholder.

Before replacing a burnt fuse trace the cause of blowing, and remedy accordingly.

Unprotected circuits: battery charge, ignition and starting.

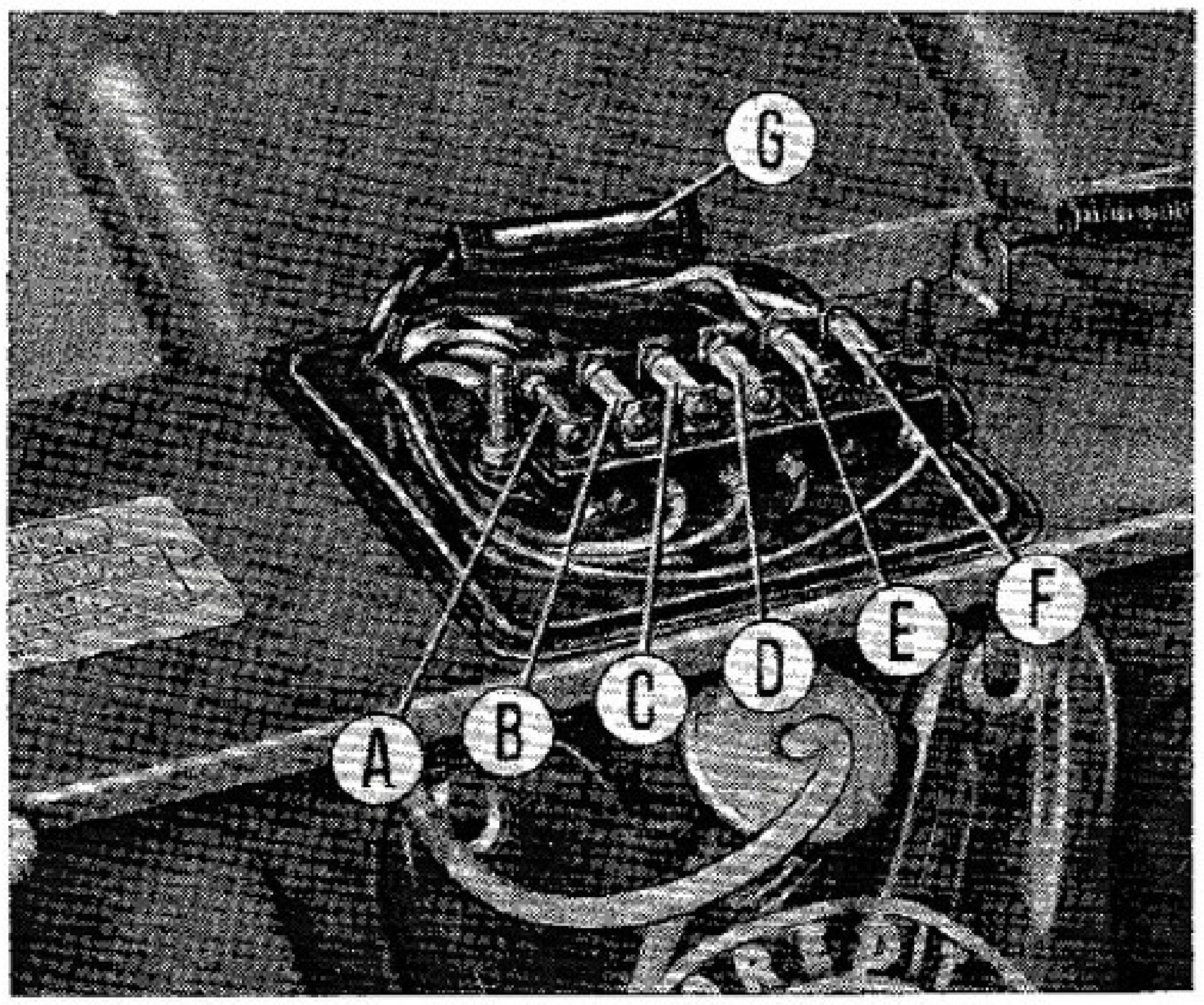


Fig. 138.

Fuses (see next page for protected circuits).

FUSE	PROTECTED CIRCUITS
A - Fuse No. 30 16 Amps	Dash light. Horns. Inspection lamp receptacle. Cigarette lighter. Electric clock.
B - Fuse No. 15/54 (with circuit energized) 8 Amps	Electrofan. Rear stop lights. Direction indicators, side repeaters and pilot light. Instrument cluster lights. Fuel level gauge and reserve indicator. Generator charge indicator. Heat gauge. Electric fuel pump. Electromagnetic fan.
C - Fuse No. 56/b2 (with circuit energized) 8 Amps	Right headlamp low beam.
D - Fuse No. 56/b1 (with circuit energized) 8 Amps	Left headlamp low beam.
E - Fuse No. 30/3 (with circuit energized) 8 Amps	Left headlamp high beam. High beam indicator. Front right parking light. Rear left parking light. Number plate light (right bulb). Cigarette lighter housing indicator.
F - Fuse No. 30/2 (with circuit energized) 8 Amps	Right headlamp high beam. Front left parking light. Rear right parking light. Parking lights indicator. Number plate light (left bulb). Engine compartment lights. Luggage compartment light.
G - Separate fuse (with circuit energized) 8 Amps	Windshield wiper.

Bodywork

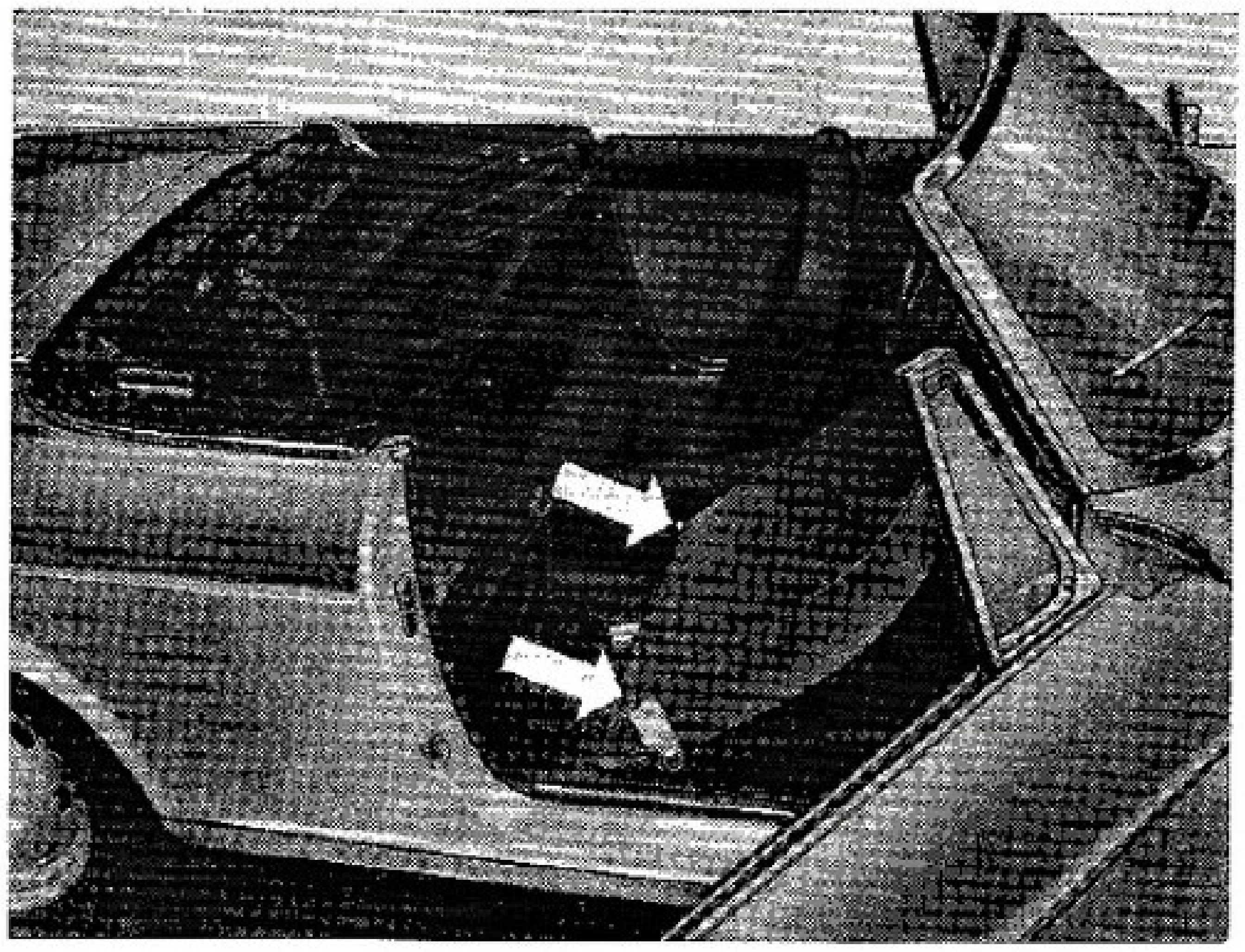


Fig. 139. - Car with top removed and seat squabs tilted forward.

Arrows point to the screws with rubber pads for squab inclination adjustment.

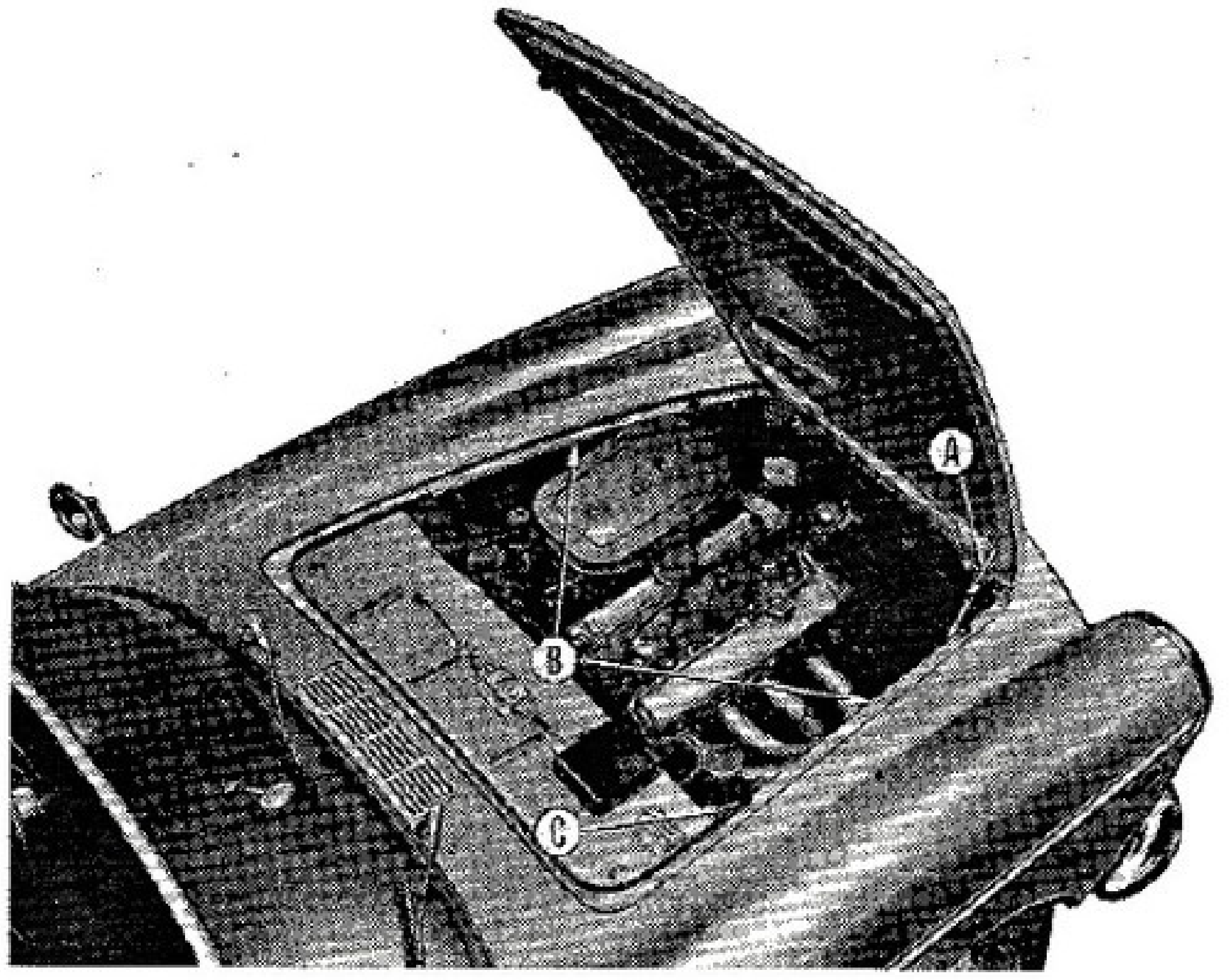


Fig. 140. - Hood in open position.

A. Prop, holding the hood open - B. Engine compartment lamps (automatically turned ON when hood is raised and outer lighting switch is ON) - C. Jam switch for lamp B.

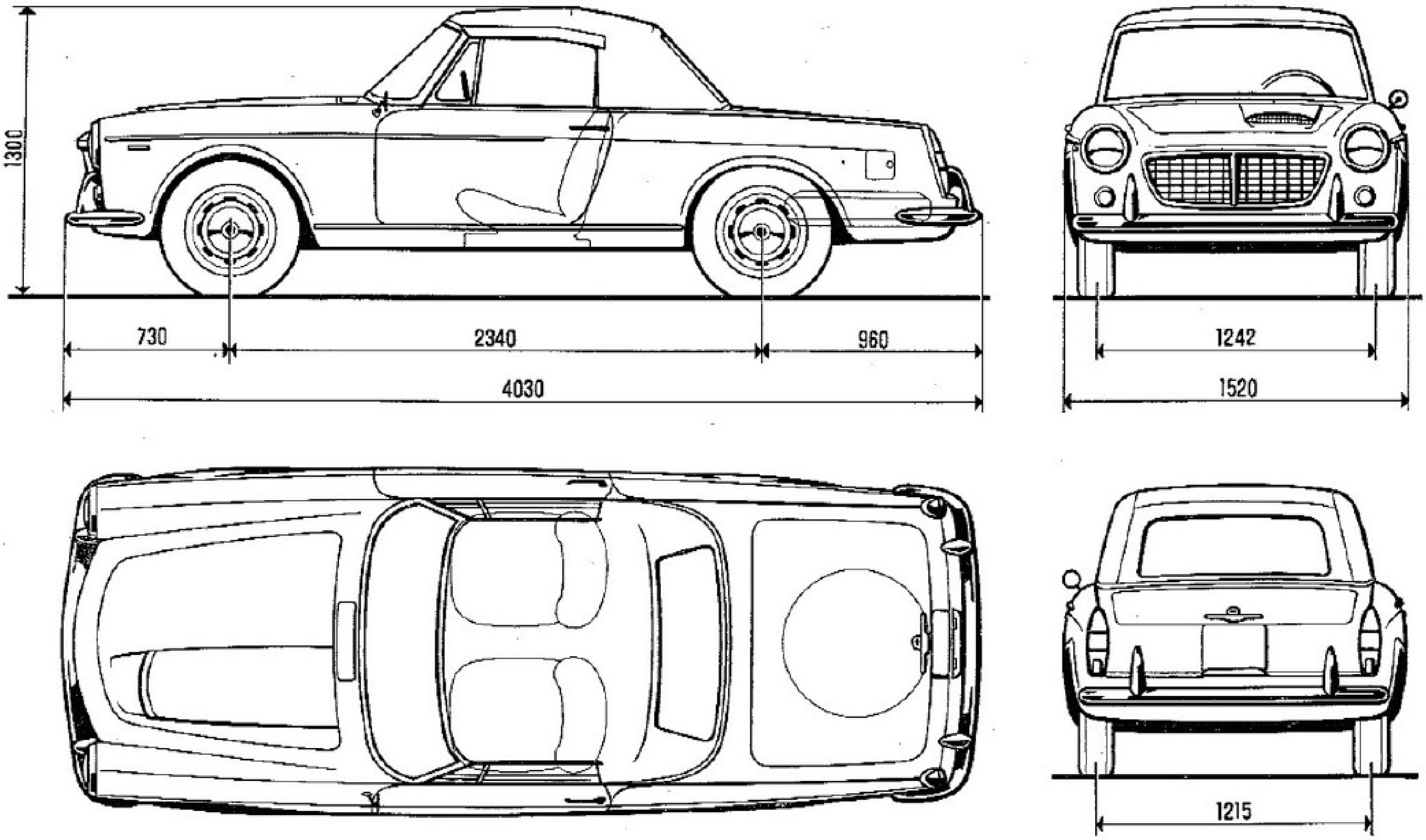


Fig. 141. - Car main dimensions.

730 mm = 28.7″
2340 » = 92.1″

960 mm = 37.8″
4030 » = 158.7″

1300 mm = 51.2″
1242 » = 49.6″

1520 mm = 59.8″
1215 » = 47.8″

Maximum height is intended with unladen car.

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