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rec 4/2/74

WORKSHOP MANUAL

GILERA { **125 5V ARCORE**
150 5V ARCORE



AZIENDA GILERA



FOREWORD

In order to undertake repairs quickly and efficiently, it is essential that the mechanic is properly acquainted with the machine to be repaired, in addition to having that technical knowledge which qualifies him as a mechanic.

This Manual has been prepared as a guide for mechanics dealing with the repair of "125 5V Arcore - 150 5V Arcore" motorcycles, by describing their features in detail, by indicating the most efficient methods to be adopted for the various operations as well as permissible wear limits.

The Manual has been divided into nine sections for easy reference purposes.

SHOULD MODIFICATIONS BE INTRODUCED TO THE MOTORCYCLES IN THE FUTURE, WHICH WOULD NECESSITATE THE USE OF NEW EQUIPMENT NOT SHOWN IN THIS MANUAL, AMENDMENTS WILL BE CIRCULATED.

Robert 8449375



Fig. 1 - Motorcycle "150" "Incore" (left side)

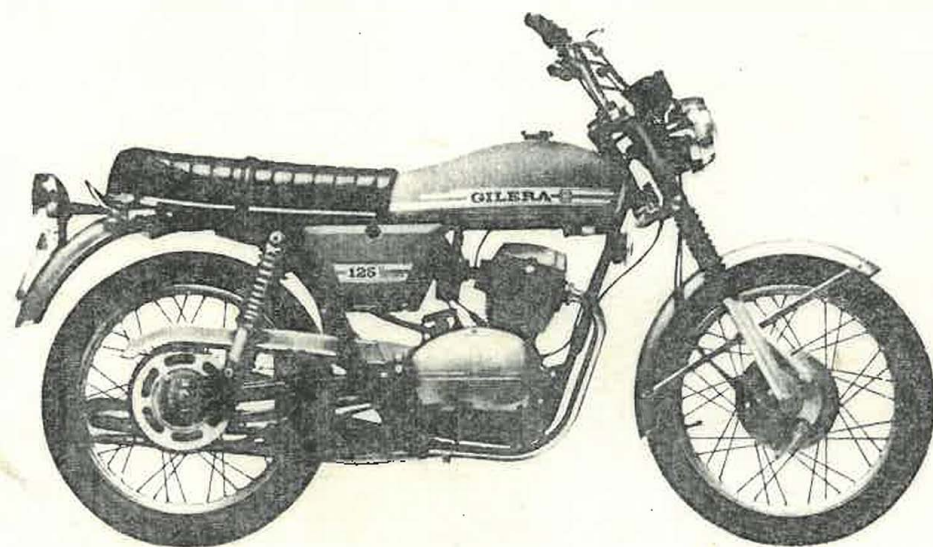


Fig. 2 - Motorcycle "125 5V Arcore" (right side)

PREPARATION OF BATTERY

- 1) Remove tape and cell caps, fill battery with 1.260 (30° Be) S.G. sulphuric acid with a minimum temperature of 15°C. The level of acid in each cell should be 5 - 10 m.m. above the separators.
- 2) Allow to stand for two hours.
- 3) Charge battery at 1/10 of its capacity until the voltage of each cell reaches 2.7V (3 cell battery 8V 6 Cell Battery 16V respectively) and the S.G. is 1.270 (31° Be) which should remain constant for a minimum of 3 hours.
- 4) If necessary, re-establish acid level, replace filler pump and clean exterior of battery.

SECTION 1 - Specific data
General Instructions for maintenance and lubrication

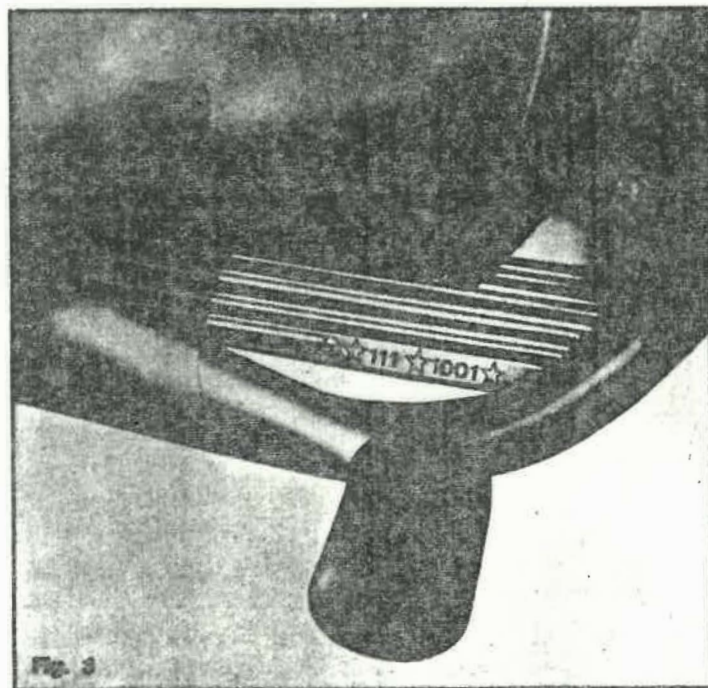
Identification data	1- 2
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Instructions for maintenance and lubrication . . .	1-11

IDENTIFICATION DATA

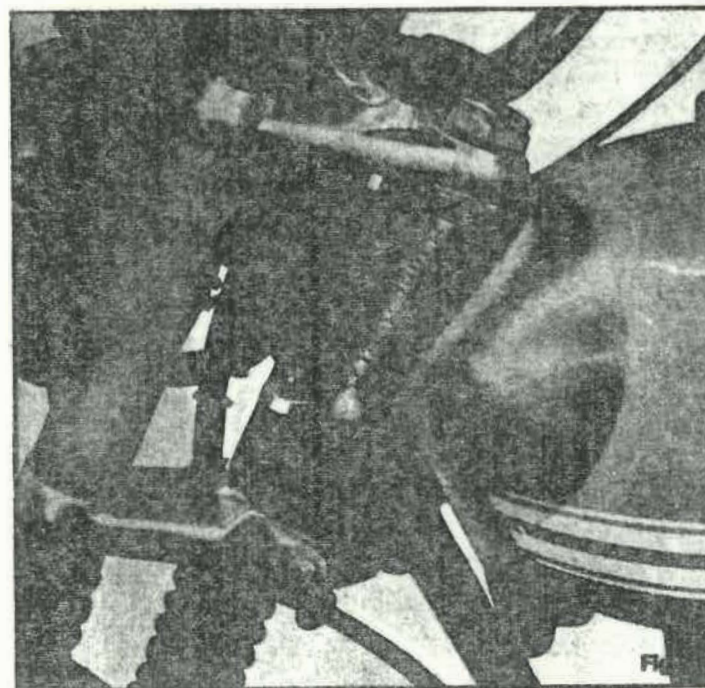
(see fig. 3 and 4)

Every machine has an identification number stamped on both frame and engine.

For the engine on the rear right side of crank case.



For the frame on the left side of steering Head-Stock.

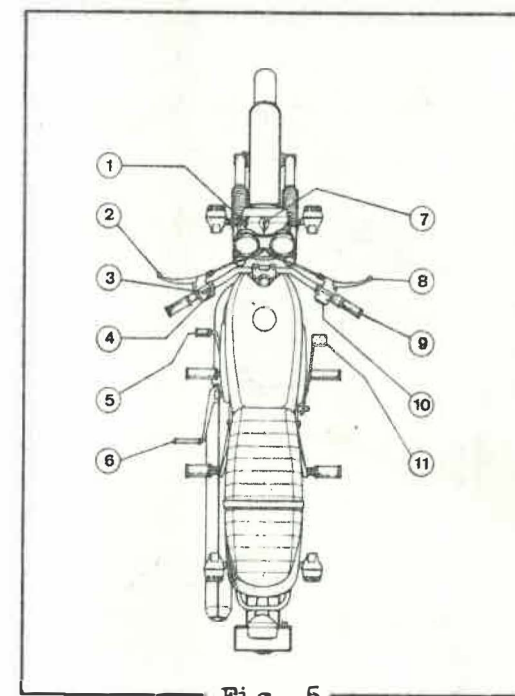


The frame number is required for legal identification of the machine and it is recorded on the registration card.

POSITION OF CONTROLS
(see Fig. 5)

The controls of the models "125/150 5V
Arcore", are as shown on fig. 5, that is:

- 1 - Ignition key
- 2 - Clutch control
- 3 - Dip Switch
- 4 - Horn button
- 5 - Gear change pedal
- 6 - Kickstarter
- 7 - Light switch
- 8 - Front brake lever
- 9 - Throttle control
- 10 - Direction indicator switch
- 11 - Rear brake pedal



SPECIFIC DATA OF
MODELS GILERA
125/150 5V ARCORE

ENGINE

Internal combustion, four stroke engine, O.H.V.
operated by push rods, single cylinder.
The camshaft operates the rods by tappets.

Cylinder, in light alloy with liner in cast iron.

Cylinder head, in light alloy.

Flywheel magneto ignition with contact-breaker and
ignition automatic advance incorporated.

Pressure fed lubrication

Air cooled

Gearbox in unit with engine; 5 speeds with foot gear-
change.

Multi plate type clutch in oil bath

Primary transmission by gear

Secondary transmission by chain

VEHICLE

Double cradle type frame

Front suspension: telescopic fork with shock absorbers.

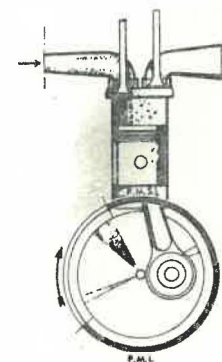
Rear swinging arm with shock absorbers.

Tangent spoke wheel with expanding type brakes.

Lighting system complete with 3 lights headlamp, tail
lamp with parking light, rear, plate and stop light,
electric horn.

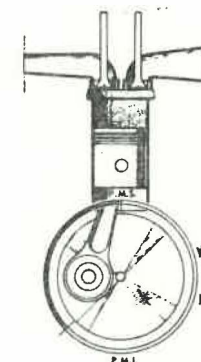
SPECIFIC DATA OF MODELS GILERA 125 - 150 5V ARCORE

Description	125 5V Arcore	150 5V Arcore
Frame and engine (prefix)	111	112
Bore mm.	60	60
Stroke mm.	44	54
Displacement cc.	124,4	149
Compression ratio	1 : 10	1 : 10
Max. power HP-DIN	12,42	14,87
Maximum power at	8500 r.p.m.	8300 r.p.m.
Maximum torque at	6700 r.p.m.	6500 r.p.m.
Valves diameter:		
external mm.		29,1
inlet		
useful mm.		25,5
external mm.		25,1
exhaust		
useful mm.		22
Timing system (see fig. 6)		
inlet: opens	54° before T.D.C.	
closes	70° after B.D.C.	
exhaust: opens	80° before B.D.C.	
closes	60° after T.D.C.	
	<p>The above data must be determined with a clearance of mm. 0,33 between valves and tappets. The normal clearance between valves and tappets with cold engine is: inlet mm. 0,10 exhaust mm. 0,15</p>	



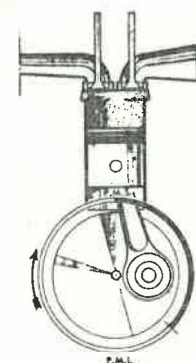
INLET

Opens
54° before T.D.C.
Closes
70° after B.D.C.



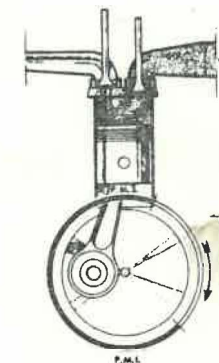
COMPRESSION

The valves
are closed.



POWER

The valves
are closed



EXHAUST

opens
80° before B.D.C./
Closes
60° after T.D.C.

SPECIFIC DATA OF MODELS GILERA 125- 150 5V ARCORE

Description	125 5V Arcore	150 5V Arcore
Carburettor Dell'Orto (central float chamber)	VHB 22 BS	VHB 23 BS
Advance: fixed automatic total		24° 15° 39°
Spark plug	Bosch W 260 T2 or equivalent	
Lubrication (see fig. 7)	Pressure fed by gear pump to crank pin, camshaft and tappets	
Primary transmission ratio	1 : 3.9047 (Z = 21/82)	
Gear ratio (see fig. 8)		
1st	1 : 2.062 (Z = 16/33)	
2nd	1 : 1.381 (Z = 21/29)	
3rd	1 : 1.041 (Z = 24/25)	
4th	1 : 0.815 (Z = 27/22)	
5th	1 : 0.666 (Z = 30/20)	

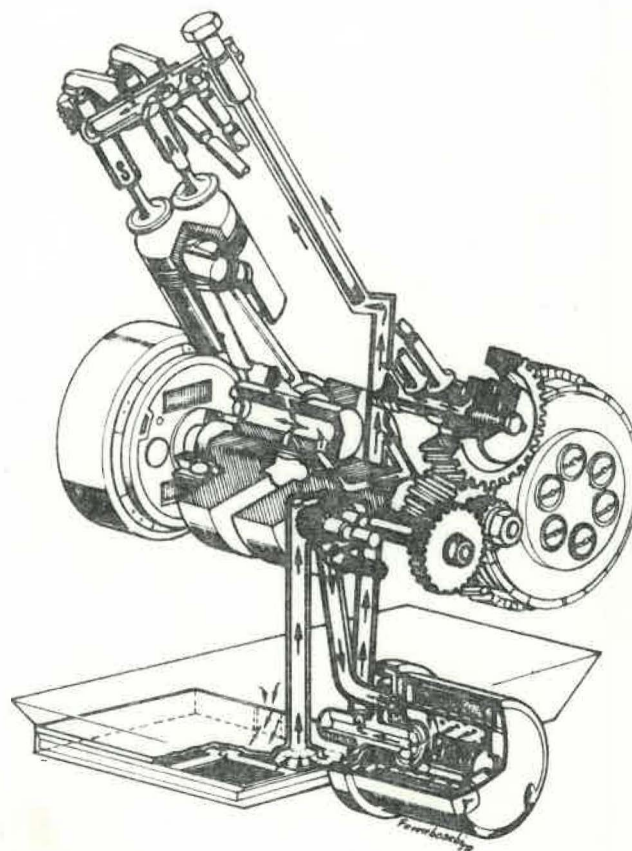


Fig. 7

SPECIFIC DATA OF MODELS GILERA 125-150 5V ARCORE

Description	125 5V Arcore	150 5V Arcore	Description	125 5V Arcore	150 5V Arcore
Secondary transmission ratio	1 : 3.733 (Z = 15/56)	1 : 3.466 (Z = 15/52)	Max speed m.p.h. (apprx)	70	75
Overall engine: wheel ratios			Fuel consumption (CUNA standards)	105 m.p.g.	100 m.p.g.
1st gear	1 : 30.056	1 : 27.906	Max gradient	35%	40%
2nd gear	1 : 20.129	1 : 18.690	Fuel tank range	258 miles	245 miles
3rd gear	1 : 15.173	1 : 14.088			
4th gear	1 : 11.879	1 : 11.030	Wheelbase m.	1,280	
5th gear	1 : 9.707	1 : 9.013	Max. length m.	1,940	
Brakes: front mm. rear mm.	160 x 30 140 x 25		Max. width m.	0,750	
Wheels: front rear	18" type WM 1/16 18" type WM 1/16		Max. height m.	1,060	
Tyres: front rear	2.75-18" ribbed 3.00-18" universal		Ground clearance m.	0,170	
Tyre pressures: solo: front rear	1.75 kg/cm ² (25 psi) 2.25 kg/cm ² (32 psi)		Weight (dry) Kg Petrol	117 use super fuel	
pillion: front rear	2.00 kg/cm ² (28 psi) 2.75 kg/cm ² (39 psi)		Petrol tank capacity Oil in the crankcase	2 1/4 Imp gal. 52 fl. oz.	

view of gearbox

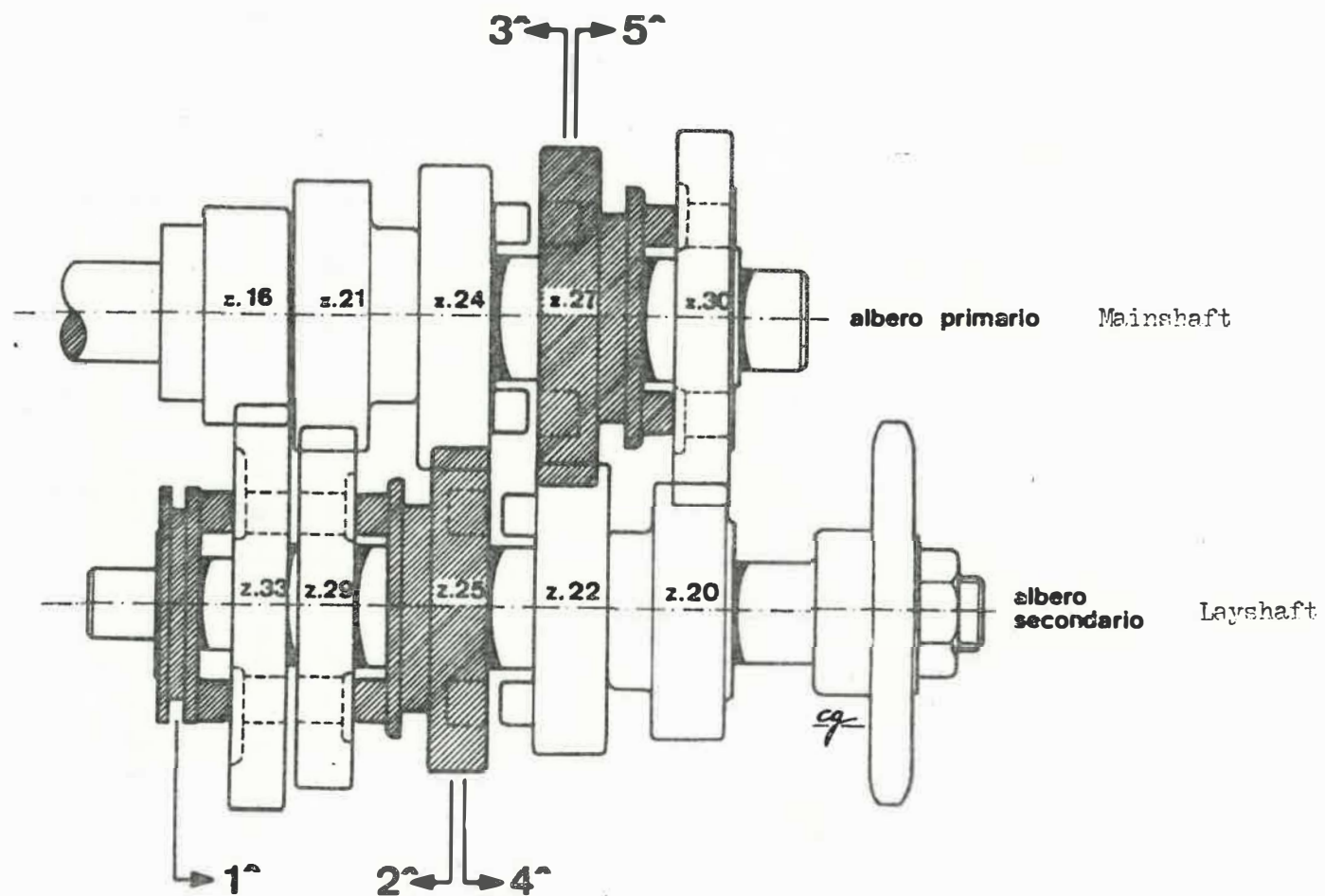
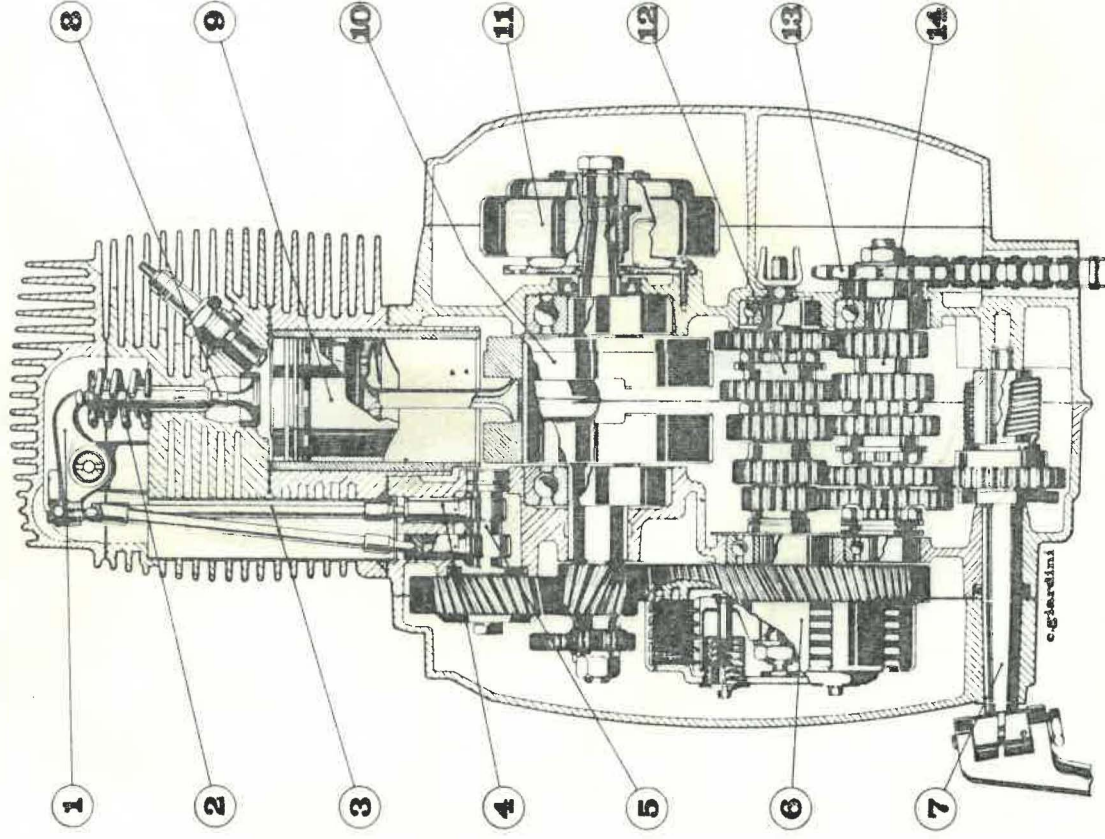


Fig. 2

ENGINE DIAGRAM

GILERA 125 - 150 5V ARCORE



- 1) Rockers
- 2) Valve springs - 3) Push rods - 4) Tappets
- 5) Camshaft - 6) Clutch unit - 7) Kickstart shaft - 8) Valve - 9) Piston - 10) Crankshaft - 11) Flywheel magneto - 12) Gearbox mainshaft complete with gears - 13) Chain Sprocket - 14) Gearbox layshaft complete with gears.

Fig. 9

GENERAL INSTRUCTIONS FOR MAINTENANCE AND LUBRIFICATION

G R O U P	O P E R A T I O N S T O B E C A R R I E D O U T						L U B R I C A N T S	N O T E S
	After the initial 1000 Km (625 mls)	Every 1000 Km (625 mls)	Every 3000 Km (1875 mls)	Every 5000 Km (3125 mls)	Every 9000 Km (5625 mls)	In case of overhaul		
ENGINE	Change oil (A)	Check and top up oil level (it must be up to the lower edge of thread of filler hole)	Change oil (A)	-	Change oil filter (Full flow)(A1)	Change oil (A2)	AGIP F.1 WOOL MOTOR OIL HD SAE 30 As per Operation & Maintenance Handbook	(A) This operation must be performed when the engine is warm. Quantity of fresh oil 3 pints (approx.)
TAPPETS	Adjust the clearance between valves and rockers with cold en- gine: Inlet (0.004") 0.10mm Exhaust 0.15mm (0.006")	-	-	Check and adjust the clearance between valves and rockers	-	Adjust the clearance between valves and rockers	As per Operation & Maintenance handbook	(A1) Change oil. Run engine at tick over for a few minutes. Restore the oil level. (A2) After complete over- haul and careful clean- ing, fill with fresh oil. 3 pints (approx.)
MAIN BOLTS AND NUTS OF VEHICLE	Check the tightening of cyl. head nuts	-	Check for security with torque wrench	-	-	Check for security with torque wrench	As per Operation & Maintenance Handbook	
AIR FILTER	-	-	Clean by petrol and blow by low pressure air	-	Replace	Clean or replace	As per Operation & Maintenance Handbook	
SPARK PLUG	Check and adjust gap (0.020" - 0.028")	-	-	Clean and ad- just plug gap	-	Fit new spark plug	As per Operation & Maintenance Handbook	
FLYWHEEL MAGNETO	Clean the C.B. Points	-	-	Clean points adjust gap	-	Change the contact breaker points (if necessary)	As per Operation & Maintenance Handbook	
TELESCOPIC FORK	-	-	-	Check level (B)	Change oil (C)	Change oil after cleaning (C)	AGIP F.1 ATF DEXRON	(B) When fork is fully extended, it must be 43 cm. from handlebar support.
FRONT AND REAR WHEEL BEARINGS, REAR FORK PIVOTS, STEERING HEAD RACES	-	-	-	-	Grease	Grease	AGIP F.1 GREASE 30	(C) Quantity of oil for legs: 90 cm ³
CONTROL CABLES FOR: CLUTCH, THROTTLE, FRONT BRAKE, BRAKE FULCRUM, PINS, BRAKE PEDAL, PROP STAND PINS, SPEEDOMETER CABLES	-	-	Grease or lubricate.	-	-	Grease or lubricate	AGIP F.1 GREASE 30 AGIP F.1 WOOL MOTOR OIL HD SAE 10W/20	
CHAIN	Lubricate (D) periodically						AGIP F.1 ROTRA SAE 140	(D) Clean chain in the fol- lowing manner: Remove and wash in pe- trol, then carefully dry. Immerse chain for half an hour in heavy oil-bath, in order to allow lubricant to pe- netrate between pins and rollers. Allow ex- cessive oil to drain off.
BATTERY	Periodically add distilled water to maintain correct level						-	

If motorcycle is to be stored, proceed as follows: 1) Clean the motorcycle - 2) Drain fuel tank - 3) Pour 10 to 15 cm³ of AGIP F.1 WOOL MOTOR OIL HD SAE 30, oil into stationary engine through spark plug hole (piston at B.D.C.), then actuate kickstart lever 3 to 4 times - 4) Grease unpainted areas with anti-rust grease - 5) Store motorcycle on blocks so as to keep wheels off ground.

SECTION 2 - Adjustment

Engine	2-3
Machine.....	2-5

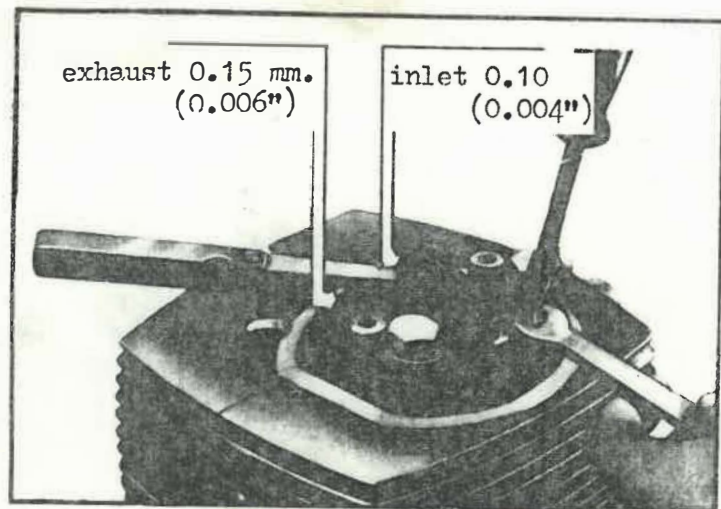


Fig. 10

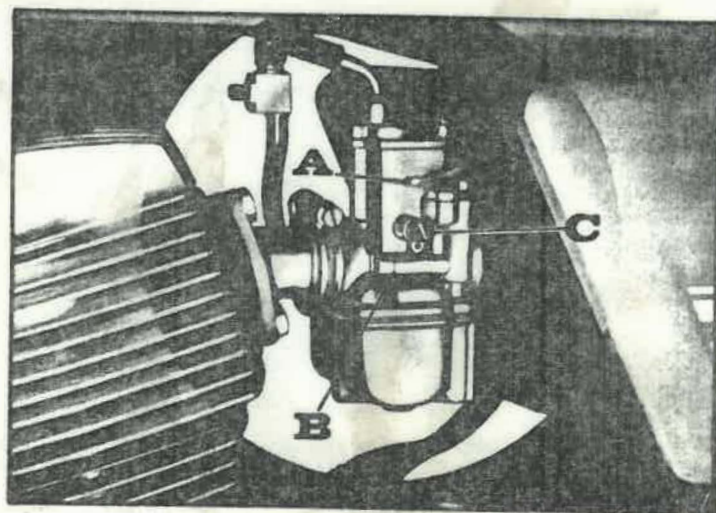


Fig. 11

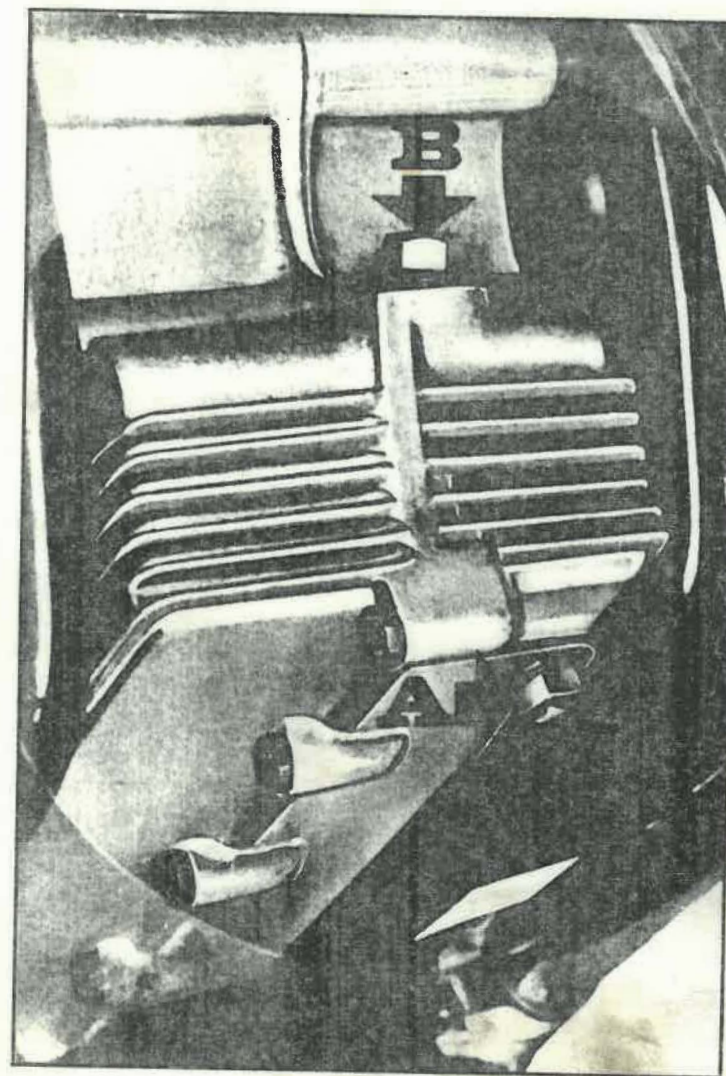


Fig. 12

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Operation	Operations to be performed	Note
<p>Adjust- ment of main run- ning</p>	<p>At this stage, when slowly opening the throttle, the engine should not misfire or stop. Should this occur tighten the volume control screw until the 'flat spot' disappears.</p> <p>If the jets, valves and needle are as prescribed, and are not unduly worn, the adjustment should be correct. If the adjustment is not in order because of variations in the density of the fuel being used, or sudden changes in air temperature, change the main jet or the position of the needle.</p>	

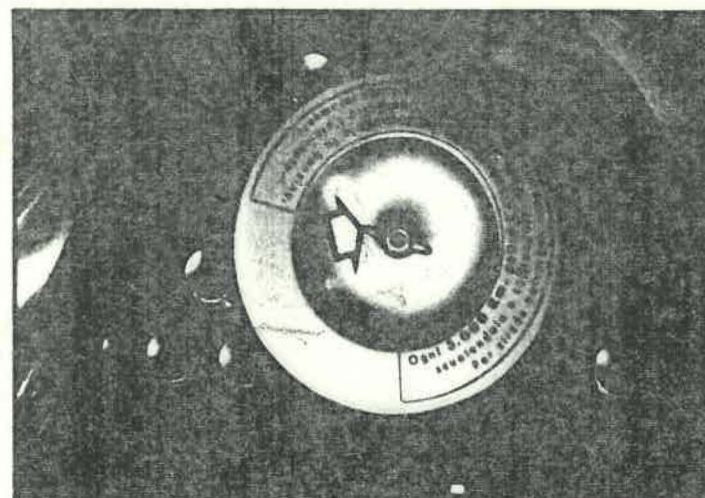
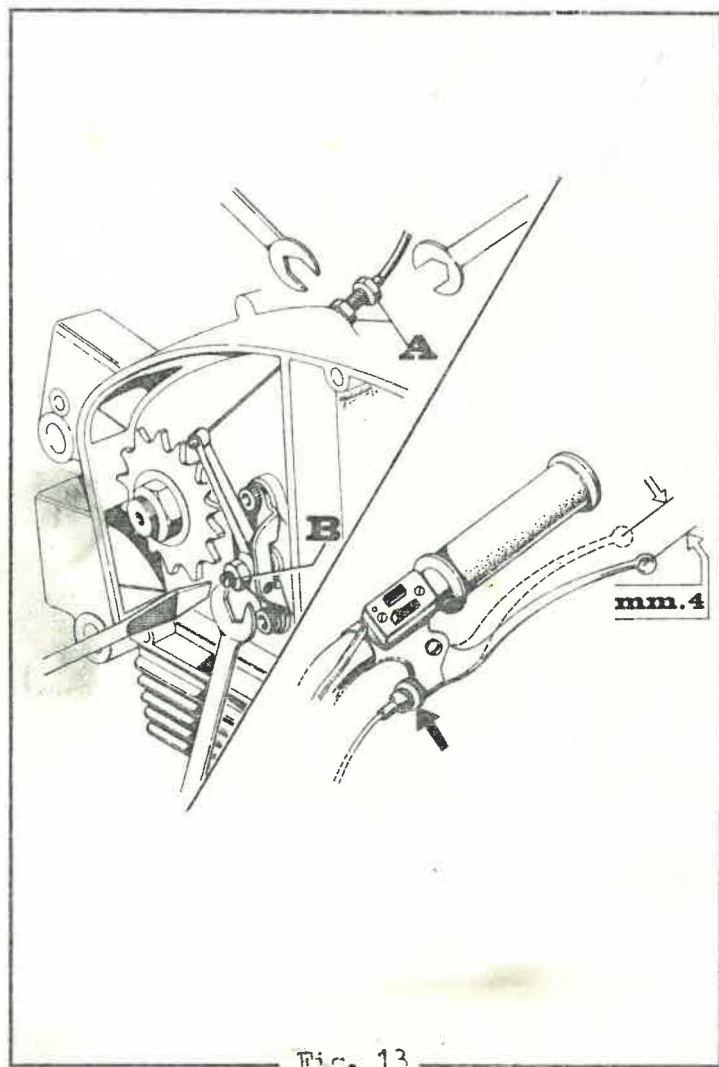
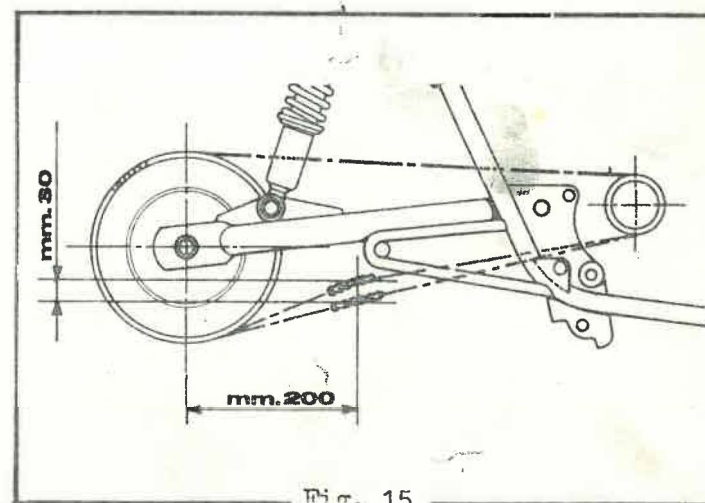


Fig. 14



ADJUSTMENT

Operation	Operations to be performed	Note
Removal of air filter for cleaning	Remove air filter from his housing every 2000 miles Shake and blow it from inside with low pressure compressed air to clean.	(see fig. 14)
Clutch adjustment	Replace air filter with a new one every 6000 miles Operate on the cable adjuster "A" (fig. 13). If it is fully extended, screw fully inwards. Then adjust both screw "B" and nut "A" until a clearance of $5/32$ " at the tip of the lever on the handlebar is obtained.	When motorcycle is used in dusty conditions carry out these operations more frequently.
Contact breaker maintenance	Check condition of contact points "a" every 3000 miles (fig. 16). If dirty, clean with a cloth dipped in petrol and dry well. Lubricate felt "b" with a few drops of oil.	To adjust the clutch when the motorcycle is being ridden use the adjuster on the handlebar.
Checking of ignition timing	Turn flywheel until the reference mark TDC, marked on it, is in line with the reference mark on the crankcase. In this position the contact breaker points gap should be $.014$ "-- $.016$ " (see fig. 16). If not, reset the points gap by operating on screw "e" and cam "f" until the above mentioned gap is obtained. After this check, turn flywheel clockwise for about 360° , until the reference mark "d" on the flywheel is lined up with the reference mark "c" on the crankcase. In this position the contact breaker points must start to open. If not, slacken the screws "g" which secures the stator plate and rotate clockwise or anti clockwise so that contact breaker points start to open with the reference marks "d" and "c" marked respectively on the flywheel and on the crankcase corresponding.	

ADJUSTMENT

Operation	Operations to be performed	Note
Checking spark plug	Remove with the proper spanner. If dirty clean with a wire brush. The distance between the electrodes must be .020"/.027".	
FRAME		Screw spark plug home by hand Use the spanner only for tightening.
Chain adjustment	Place the machine on its centre stand. Loosen the nuts fixing rear wheel spindle. Operate chain tensioners uniformly in order to obtain a verticle movement (lift) of 30 m.m. measure in the lower portion of chain at a distance of 200 m.m. from wheel axis.	

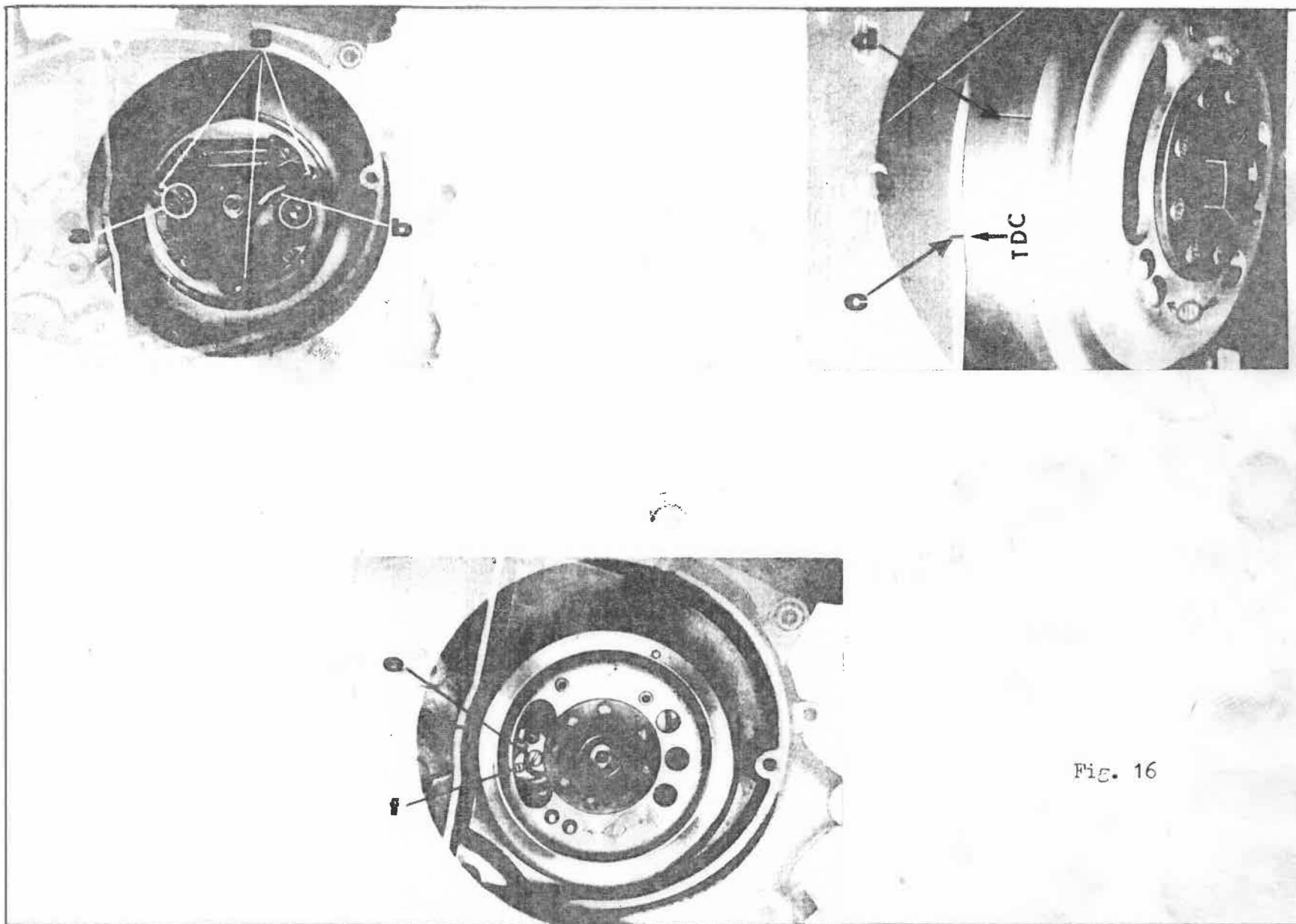


FIG. 16

ADJUSTMENT

Operation	Operations to be performed	Note
Brakes adjustment	<p>When the operation is completed, tighten the rear spindle nuts.</p> <p>The adjustment of the front brake is carried out by operating on the cable adjuster, positioned on the brake drum. It is necessary to leave 4 mm play at the tip of the brake lever on the handlebar. (fig.17) The rear brake is adjusted by operating on the knob, screwed on the control rod. Adjust, to leave play of 10 - 15 mm at the tip of the pedal.</p>	When the machine is being ridden adjust brake with cable adjuster on the handlebar.
Oil replacement on front fork	<p>The telescopic fork does not require special maintenance.</p> <p>The oil content is fl. oz. 3.2 for each leg. Check oil every 3000 miles. If oil is in good condition add only the quantity of oil necessary to maintain fl. oz. 3.2 in each leg.</p> <ul style="list-style-type: none"> - to drain the oil, remove the lower plug 2 (see fig. 18) located near the wheel spindle on the fork leg. - fill through the upper plug 1 located on the fork top. 	
Rear Suspension	Except for occasionally lubricating the fork pivot, no other maintenance is required.	
Battery	<p>Is the component of the electrical system that needs the most regular maintenance. Periodically check that the level of the liquid covers the plates. If not, restore the level with the distilled water (do not use tap water) and check at the same time the specific gravity of the liquid (see section "Overhaul")</p> <p>If the motorcycle is laid up for any length of time (1 month and over) recharge the battery at intervals. In the course of 3 months the battery discharges automatically and completely. When fitting the battery take care to connect properly. Remember that the earth wire is connected to the positive terminal.</p>	

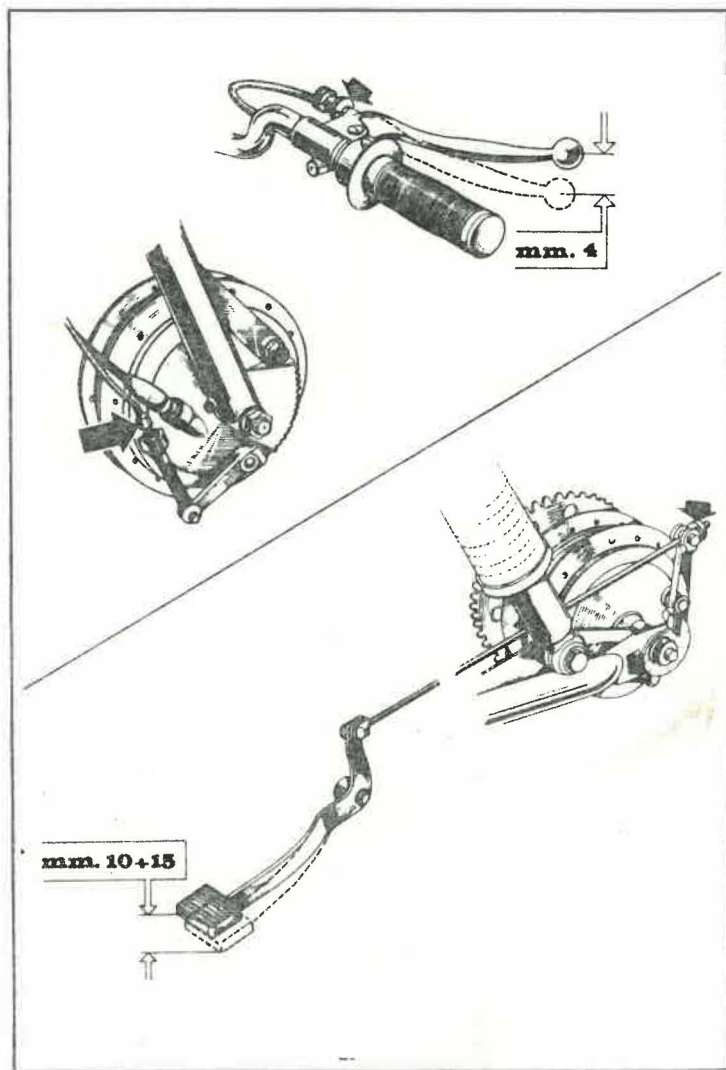


Fig. 17

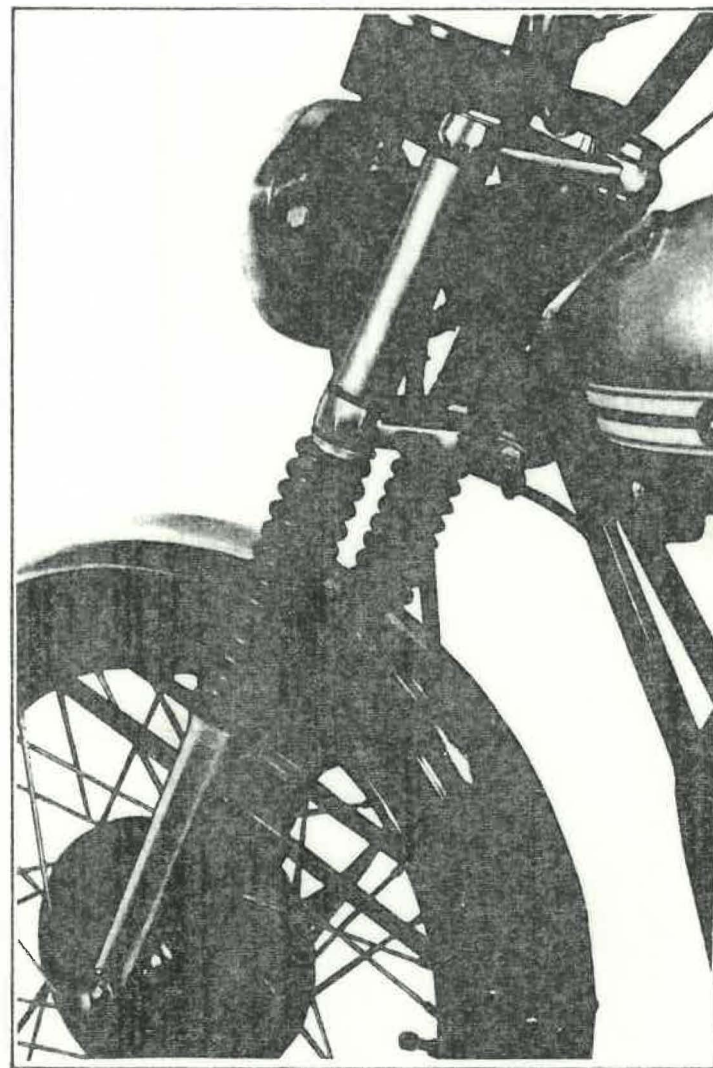


Fig.18

SECTION 3 - Electrical equipment

ELECTRICAL EQUIPMENT

It comprises of the following parts: (see fig. 22)

+ Flywheel alternator 6V-31.6W Clockwise rotation.
The contact breaker and the automatic advance are incorporated into stator plate which is fixed to crankcase by 3 screws.

+ Electric horn cc. 6V.

+ Headlamp 130 mm diameter with parking light incorporated complete with:

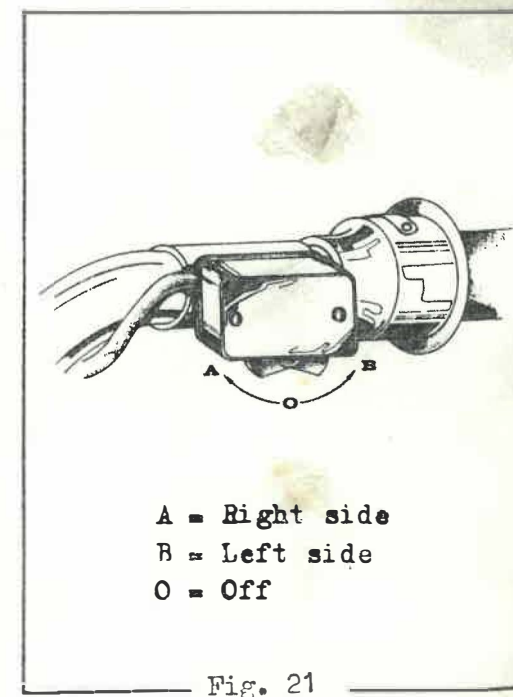
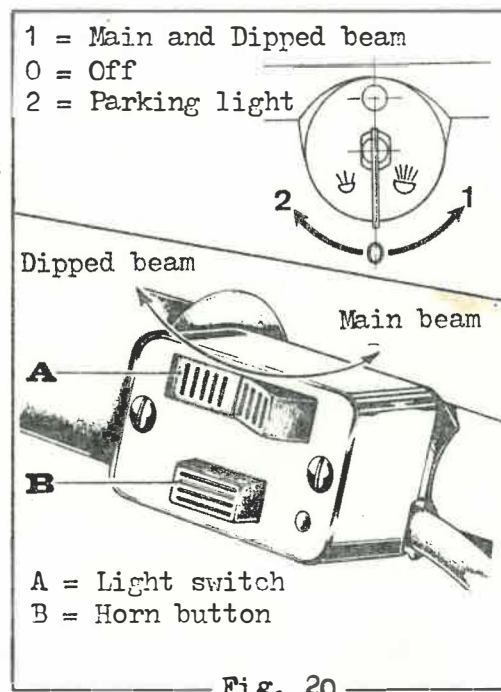
- n. 1 - 6V 25/25W Double Filament bulb
- n. 1 - 6V 3W parking light bulb
- n. 1 light switch on the handlebar (see fig. 20).
- n. 1 6V - 1.5W speedometer light
- n. 1 - 6V-1.5W rev. counter light
- n. 1 - 6V-1.5W oil warning light

+ Tail lamp with reflector complete with:

- n. 1 - 6V-3/15W bulb for stop light, rear plate and parking light.

+ Battery: capacity 6V-11/Ah

6-Direction indicators (see Fig.22)



WIRING DIAGRAM

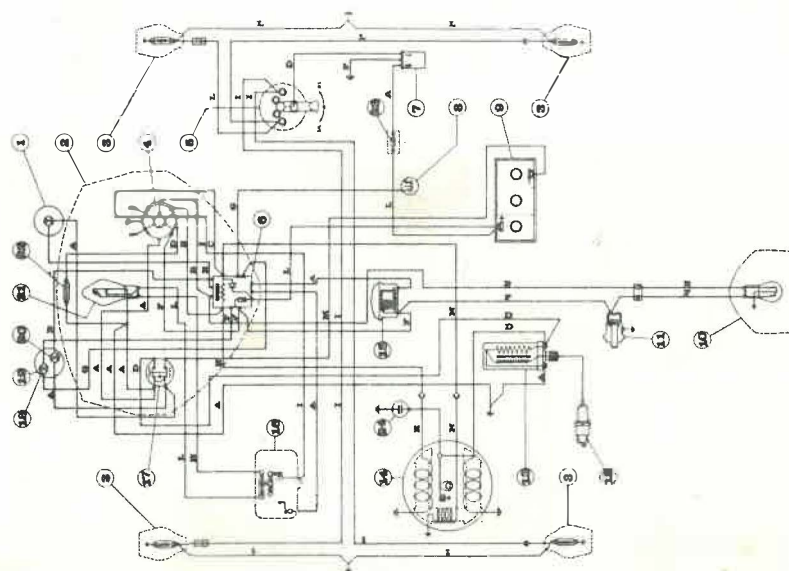


Fig. 22

A - Black
 B - Yellow
 C - Orange
 D - Grey
 E - Red
 F - Green

G - Violet
 H - White
 I - Maroon
 L - Blue
 M - Blue/Black
 N - Yellow/Black

- 1) Speedometer with 6V - 1.5W bulb
- 2) Headlight
- 3) Direction Indicator lamps with 6V-18W bulbs
- 4) Dipswitch
- 5) Direction Indicator switch
- 6) Impedance and rectifier box
- 7) Cutout
- 8) Oil pressure switch
- 9) 6V - 11A/h battery
- 10) Tail light with 6V 3/15W bulb
- 11) Stop switch
- 12) Spark plug
- 13) H.T. Coil
- 14) 6V - 31.6W Flywheel magneto
- 15) Electric horn
- 16) Headlamp switch with horn button
- 17) Ignition switch
- 18) Oil pressure warning light (6V. 1.5W)
- 19) Tachometer
- 20) 6V - 1.5W tachometer bulb
- 21) 6V - 25/25W main bulb
- 22) 6V - 3W pilot bulb
- 23) 8A fuse
- 24) Condenser

SECTION 4 - Fault finding

Engine	4-3
Electric system.	4-3
Braking system	4-4
Steering-gear and suspension, controls.	4-4

FAULT FINDING AND REMEDY

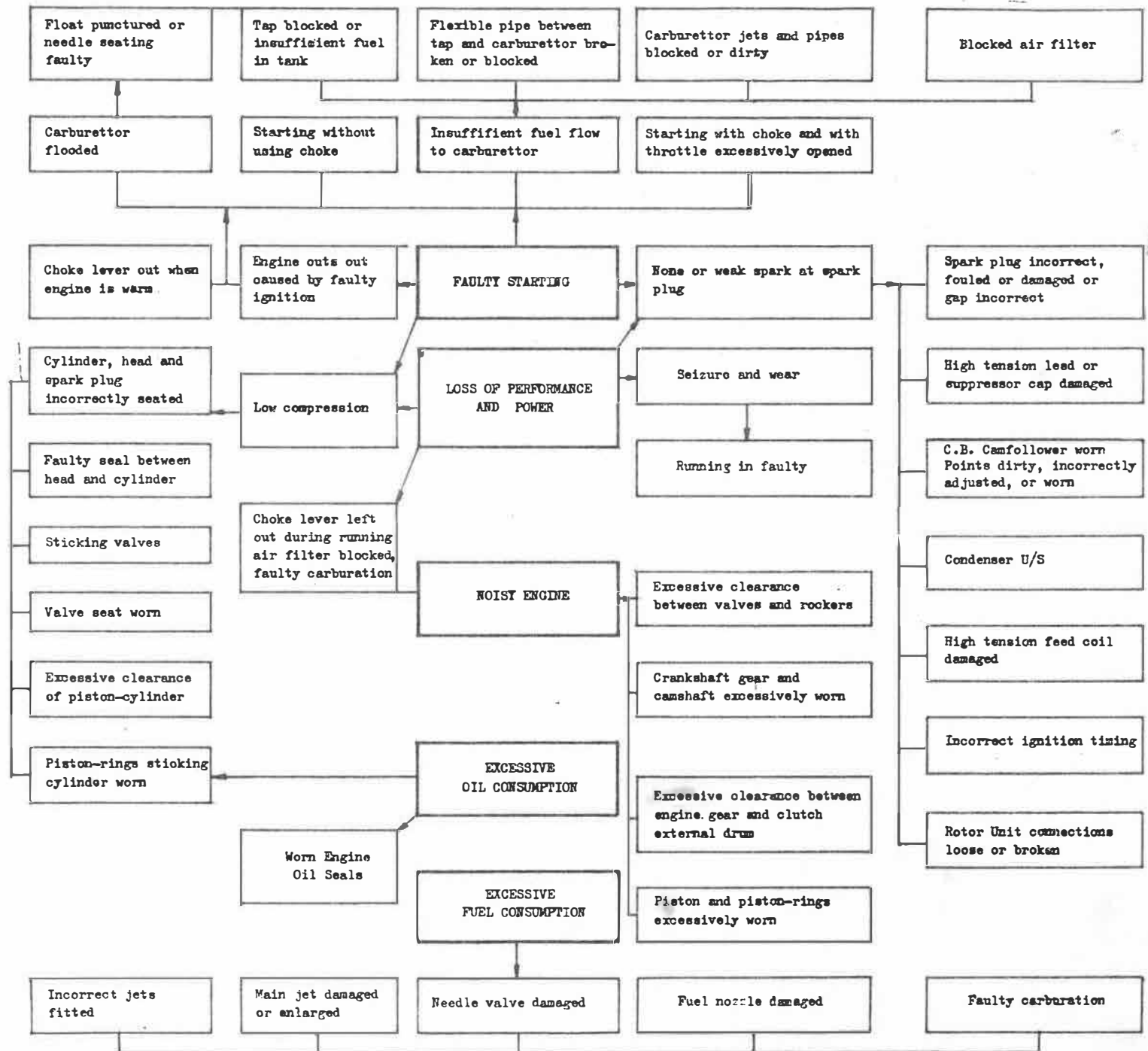
Unit	Fault and Remedy
<p>ENGINE (see chart on page 4-5)</p>	<ul style="list-style-type: none"> - In case of poor performance, low compression or petrol leaks, check the security of screws, nuts etc. of engine parts concerned (carburettor, cylinder head, silencer joint). - To replace spark plug, use types recommended on chart page 1-6. REMEMBER THAT MANY ENGINE FAULTS ARE CAUSED BY USING AN INCORRECT SPARK PLUG. - For general maintenance instructions see chart on page 1-11 - The normal gap of the C.B. points must be 0.35-0.40 mm. Ignition timing must correspond to that shown on chart page 1-6 (see heading "overhaul" for timing and instructions). - Clutch unit, it is important to check free play at clutch lever (see fig. 13) and the cable adjustment. If slipping or fierce action, check springs, linings and oil level in gearbox. - If dismantling parts for overhaul or replacement purposes, always use new gaskets and split pins when reassembling. - Should faults occur, which are not listed in chart on page 4-5 (e.g.: abnormal noise, failure or excessive wear of mechanical parts etc.) one must locate the fault and if necessary replace or repair the parts concerned. Ensure that operating tolerances of main components (piston to cylinder, piston ring, a.s.o.) are according to clearances specified on charts page 7-2 and following.

FAULT FINDING AND REMEDY

Unit	Fault and Remedy
Electrical equipment	<ul style="list-style-type: none">- For checking the ignition, the magneto flywheel (for timing see page 2-5) and the ignition coils.- Should lights, warning lights, or horn fail to operate, check wiring for breaks etc.- Check that terminals are not loose.- Check the bulbs and sockets.- Check all connections, and switch contacts.- In order to check magneto flywheel and coil efficiency, proceed as follows:<ul style="list-style-type: none">- disconnect C.B. lead from H.T. coil (below tank) and position

FAULT FINDING AND REMEDY

Unit	Fault and Remedy
Braking system	<p>it near a head fin (earth), at about 3 cm. Depress kickstart pedal. If there is a spark between terminal and head fin, the flywheel magneto is efficient.</p> <ul style="list-style-type: none"> - Reconnect the C.B. lead to the coil, disconnect the spark-plug lead and position it near a head fin at about 3 mm. distance, again depress the kickstart lever. If there is no spark between the H.T. lead and earth, the coil is faulty. - If normal adjustment of brake cables do not have desired effect check shoes and drums for wear. If wear or scoring is found, replace as necessary. - If rear brake pedal is stiff to operate, dismantle and lubricate. - Should lever travel be excessive, adjust at control end. Remember that in order to obtain good braking performance, the brakes should begin to take effect immediately the relevant controls begin to move. - Should the front brake cable become corroded, lubricate or replace as necessary. - After repair, or adjustment of the braking system, road test.
Steering gear and suspension controls	<ul style="list-style-type: none"> - To prevent the cables from becoming harsh or corroded, carry out the lubrication prescribed on chart, page 1-11 - If steering becomes stiff or has excessive play, check the tightness of the upper cone. Should fault still be evident check the head races for pitting. Replace if worn. - The telescopic forks require no particular maintenance, except for lubrication as prescribed on chart page 1-11. - The rear shock absorbers require neither maintenance nor lubrication.



SECTION 5 - Tools

Standard tools 5-3

Special tools 5-4

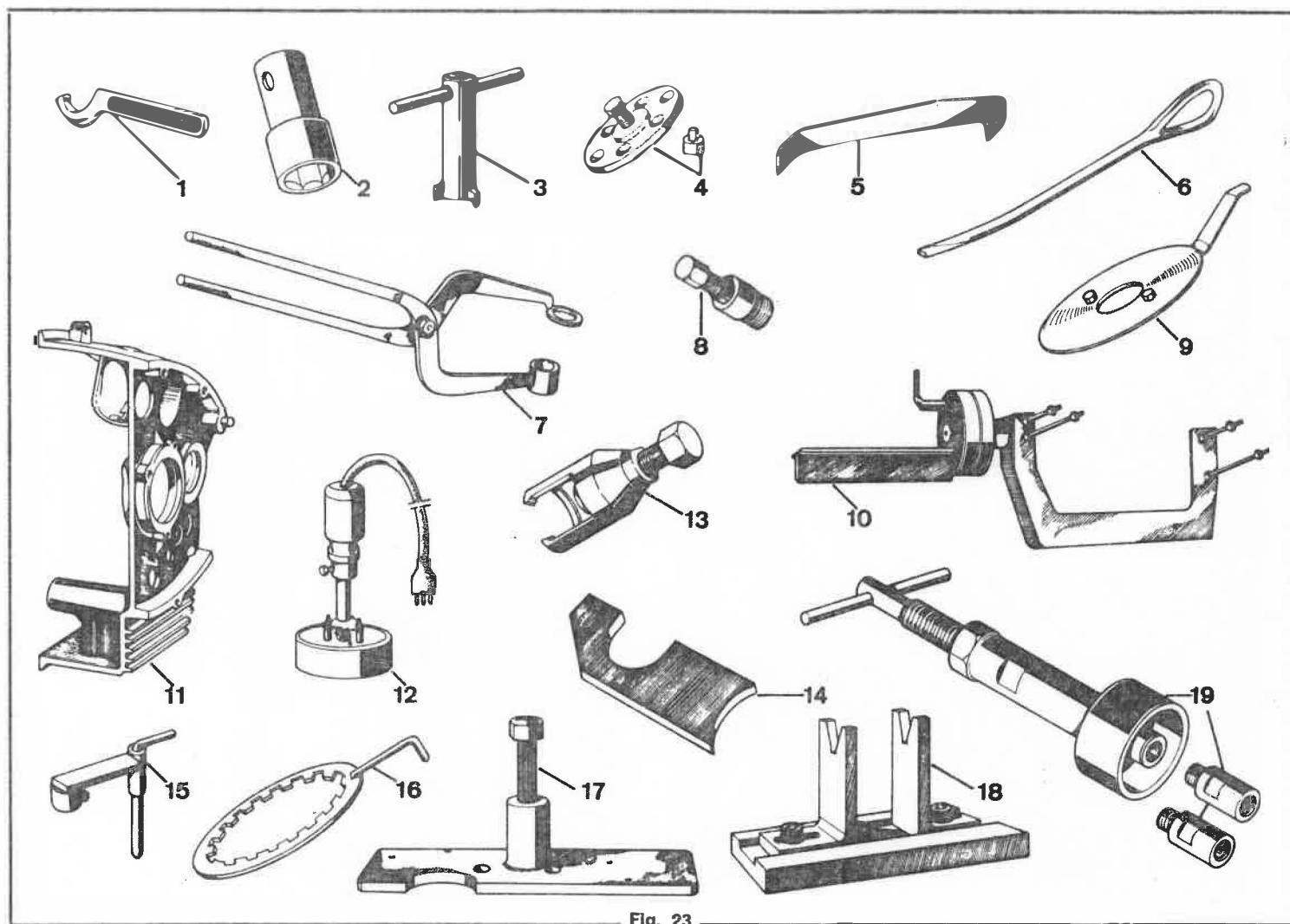
STANDARD TOOLS

The following list includes common tools for the operations described in this manual.

Description	Use shown on page
- Mechanically operated dial gauge with stand	9-6
- Hydrometer	8-9
- Thickness gauge	2-3/9-20
- Torque Wrench	-
- Stroboscope	8-8
- Extractor separator complete with integral device with max. opening 75 mm. for crankshaft bearings (30 x 72 mm.)	6-21
- Extractor for bearing 25 x 52 mm. (Mainshaft, left half crankcase)	6-20
- Extractor for bearing 17 x 40 mm. (Mainshaft, right half crankcase)	6-20
- Extractor for bearing 12 x 37 mm. (Layshaft, left half crankcase)	6-20
- Extractor for bearing 17 x 47 mm. (Layshaft, right half crankcase)	6-20
- Extractor for bearing 15 x 35 mm. (Rear brake drum)	6-20
- Extractor for bearing 12 x 32 mm. (Front brake drum)	6-20

The following list includes the special tools, specifically made for dismantling, repair and reassembly.

Chart Ref	Drawing No.	Tool	Use shown on page
1	G 27828/30	"C" spanner for exhaust pipe threaded ring	6-5
2	G 13875/30	Conic nut spanner for handlebar connection	6-3
3	G 13959/30	Wrench for steering head races	6-4
4	G 16398/30	Clutch extractor	6-15
5	G 18037/30	Clamp for rings assembling	9-18
6	G 18219/30	Lever for prop-stand spring	6-7
7	G 19869/30	Pliers for valve springs	6-9
8	G 22127/30	Flywheel extractor	6-10
9	G 23499/30	Flywheel holding plate	6-10
10	G 26939/30	Engine stand	6-8
11	G 27015/30	Jig for gearbox control	9-13
12	G 27535/30	Heater	9-5
13	G 27841/30	Extractor for engine gear	6-13
14	G 27910/30	Chain sprocket dismantling and reassembly tool	6-11
15	G 27911/30	Tool for pre-tensioning kickstart shaft for half crankcase reassembly	9-14
16	G 27912/30	Clutch dismantling and reassembly tool	6-14/15
17	G 27913/30	Tool for dismantling crankshaft from crankcases	6-17/19
18	G 28019/30	Crankshaft alignment checking fixture	9-6
19	T. 0018112/1-2-3-10	Tool "Piaggio" for crankshaft assembly in the half crankcases complete with parts G 27908/30 Flywheel side and G 27909/30 Clutch side	9-7/14



SECTION 6 - Dismantling

Handlebar connection	6- 3	Crankshaft Gear	6-13
Steering upper cone	6- 4	Clutch drum	6-14
Exhaust pipe	6- 5	Internal clutch drum	6-15
Engine from frame	6- 6	Stop ball of selector	6-16
Motorcycle support	6- 7	Left half crankcase, clutch side	6-17
Engine oil drain	6- 8	Gearshaft, kickstart shaft and selector	6-18
Valves	6- 9		
Magneto flywheel	6-10	Crankshaft from right half	6-19
Sprocket	6-11	crankcase	6-20
Oil Pump Gear	6-12	Bearings extraction	6-21
		Crankshaft bearings	

Foreword to dismantling

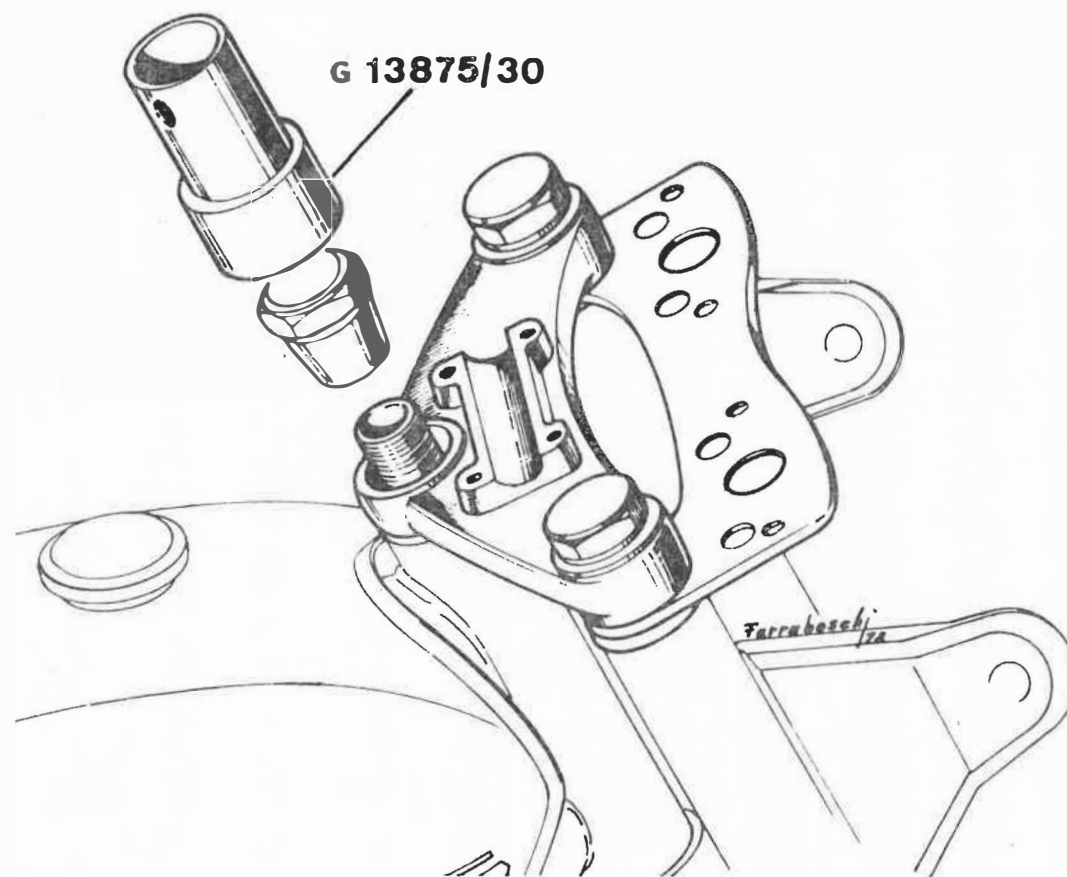
The principal dismantling operations are shown in this section. These require specific tooling or particular skill. Easy operations are not described, such as tasks which can be performed with standard screwdrivers, spanners, pliers etc.

It is advisable not to dismantle parts not requiring repair or check, with special mention of gaskets, joints etc., pin and bronze bearings, locating studs, etc.

Each tool is shown with drawing number.

DISMANTLING

Handlebar connection



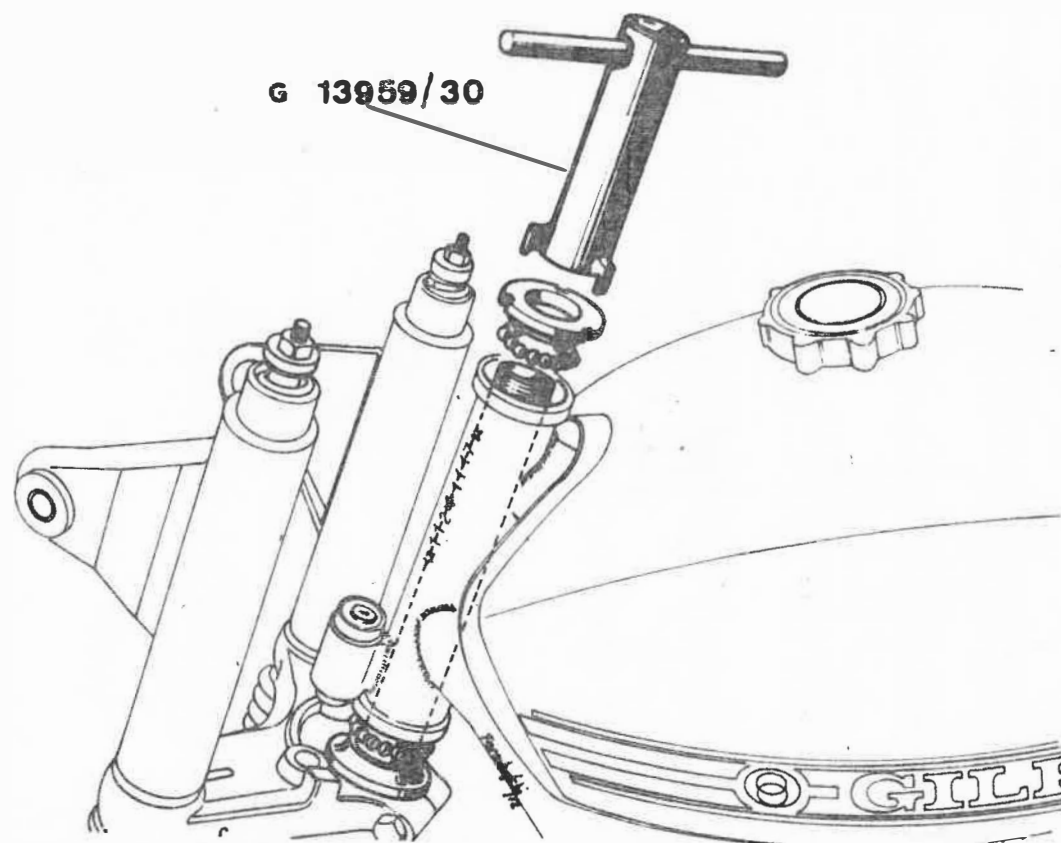
Procedure

- Remove the conic nut with the tool G 13875/30 and the two upper fixing nuts.
- Remove the plate of handlebar connection, using a mallet.

Fig. 24

DISMANTLING

Steering upper cone



Procedure

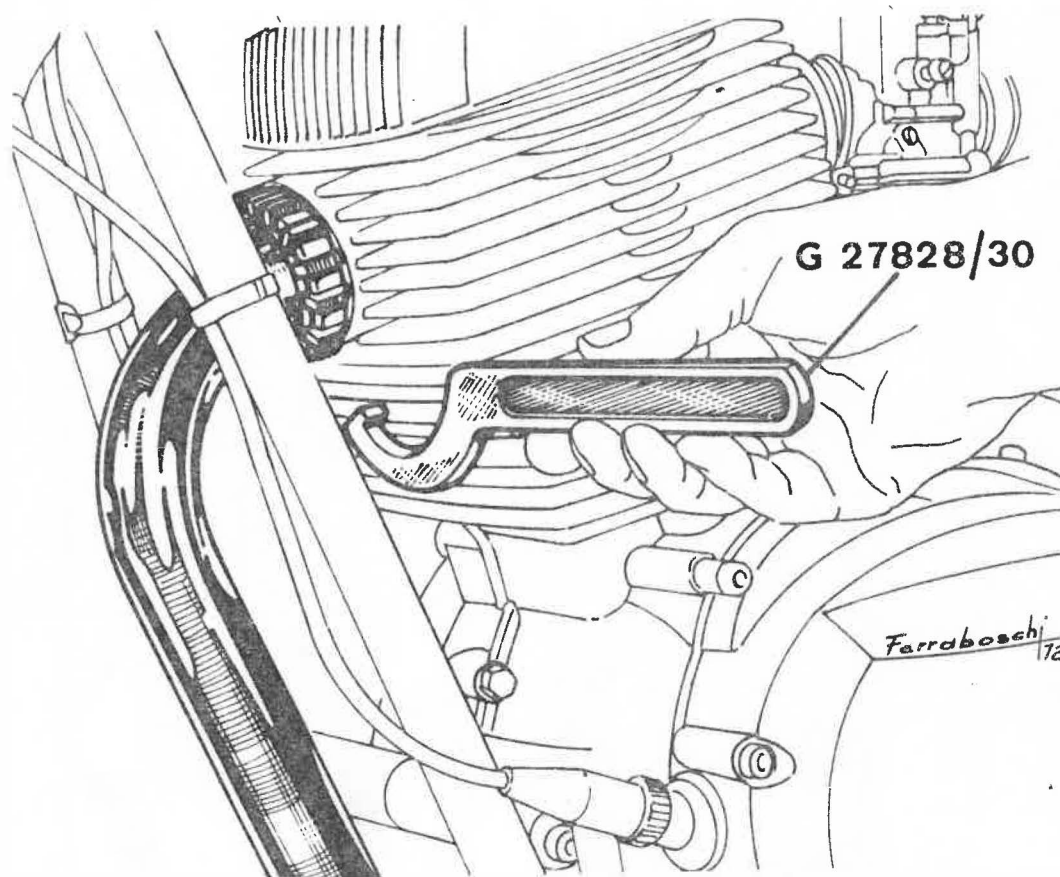
- Unscrew the upper cone on the steering tube, using wrench G 13959/30
- Remove the complete fork, taking care not to loose the steel balls.

N.B. - Stand the forks upright to avoid loss of oil.

Fig. 25

DISMANTLING

Exhaust pipe



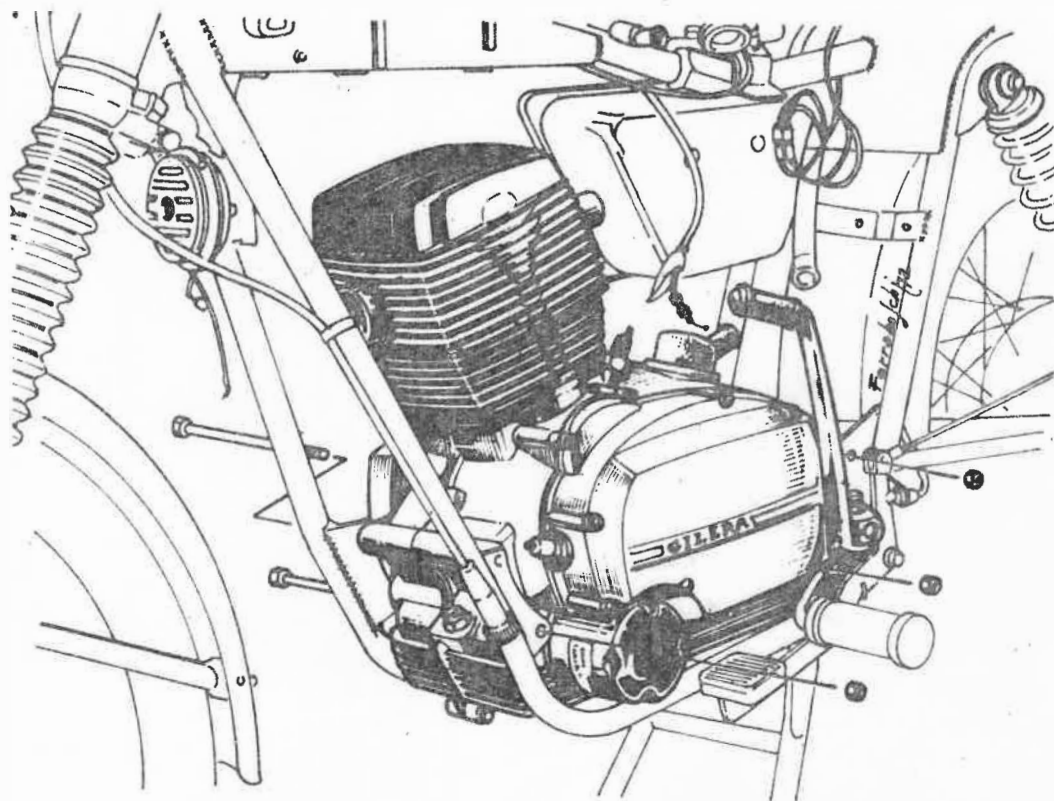
Procedure

- Unscrew exhaust pipe threaded ring from engine using "C" spanner G 27828/30

Fig. 26

DISMANTLING

Engine from frame



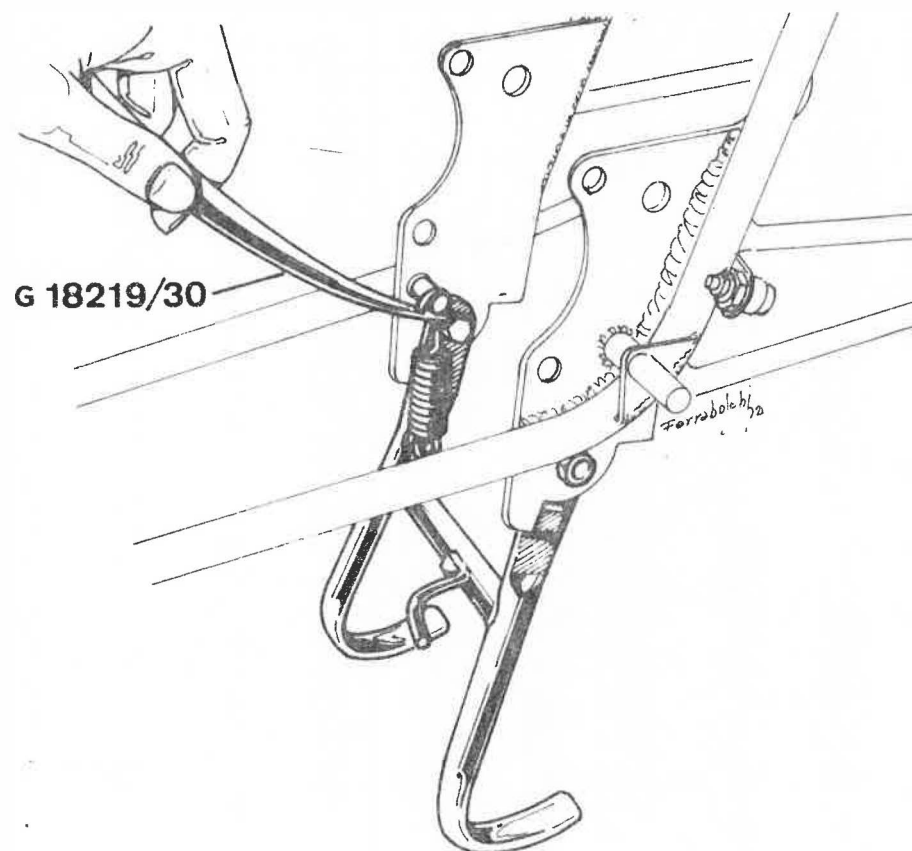
Procedure

- Remove coil, carburettor and left side, tool box
- Loosen the nut from the bolt securing to fork.
- Remove the nuts from the front and rear engine securing bolts.
- Remove the bolts.
- Remove engine by lifting and inclining towards operator.

Fig. 27

DISMANTLING

Motorcycle support



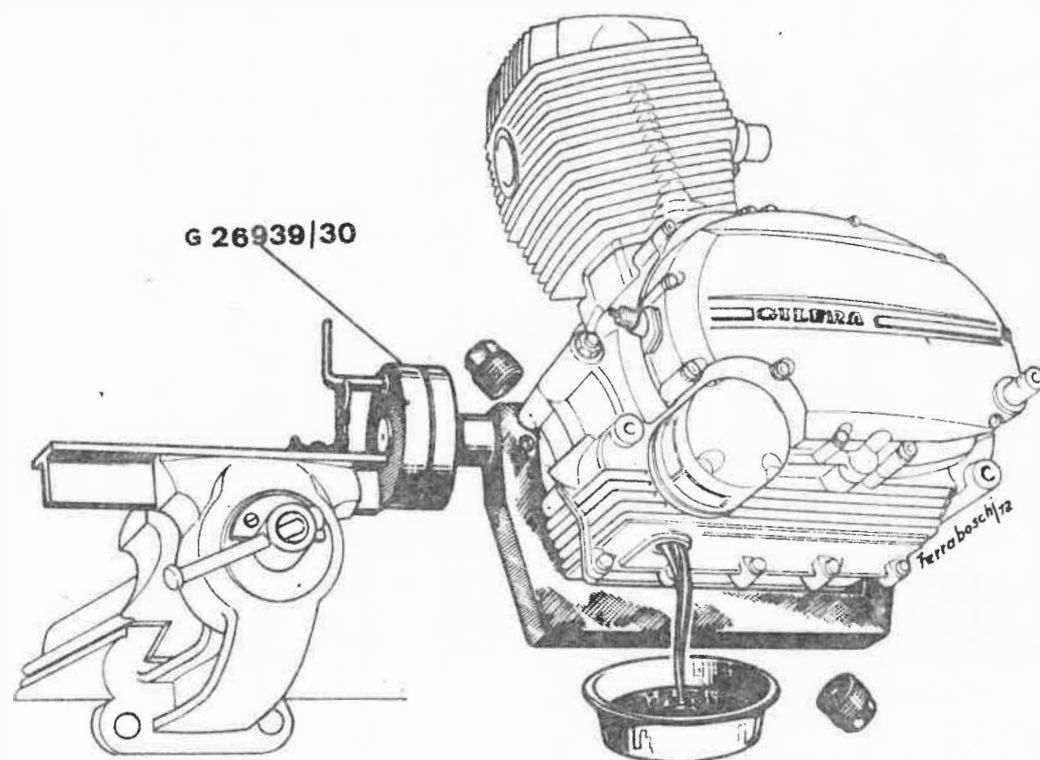
Procedure

- Remove the spring using the special lever G 18219/30

Fig. 28

DISMANTLING

Engine oil drain



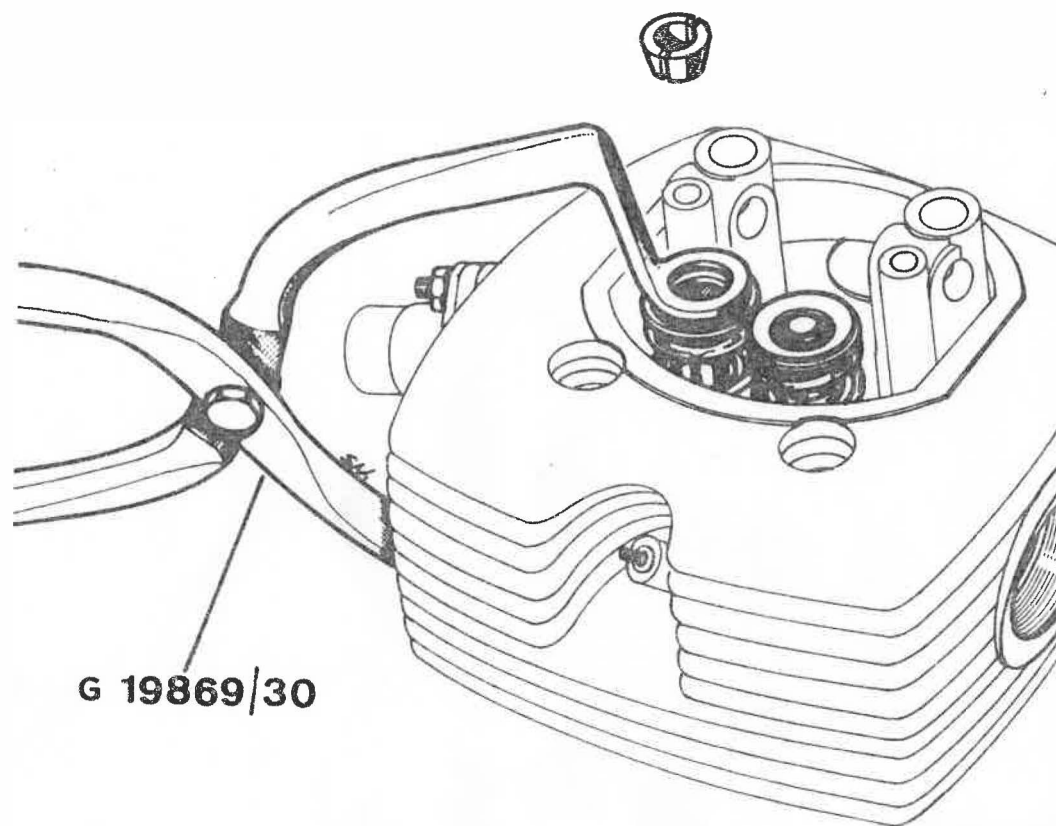
Procedure

- Clamp engine to bench using engine stand G 26939/30
- Remove plug and allow oil to drain into tray.

Fig. 29

DISMANTLING

Valves



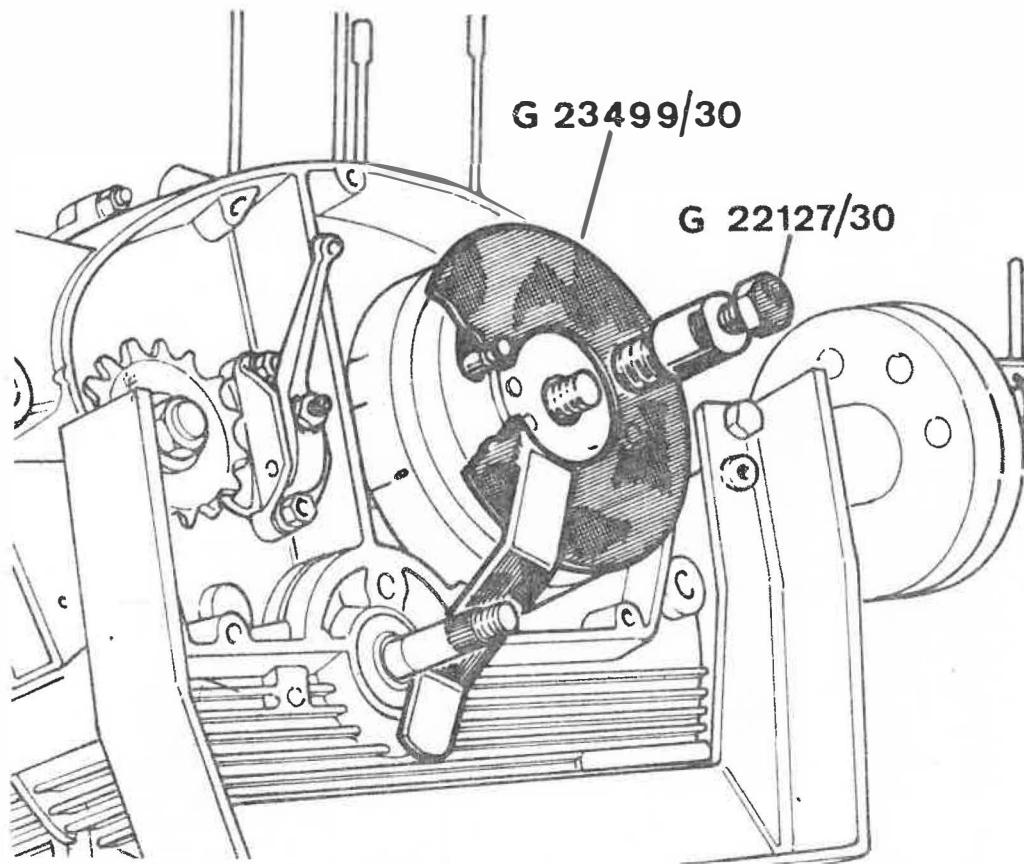
Procedure

- Dismantle the valve springs using the tool G 19869/30
- Remove the valves.

Fig. 30

DISMANTLING

Magneto flywheel



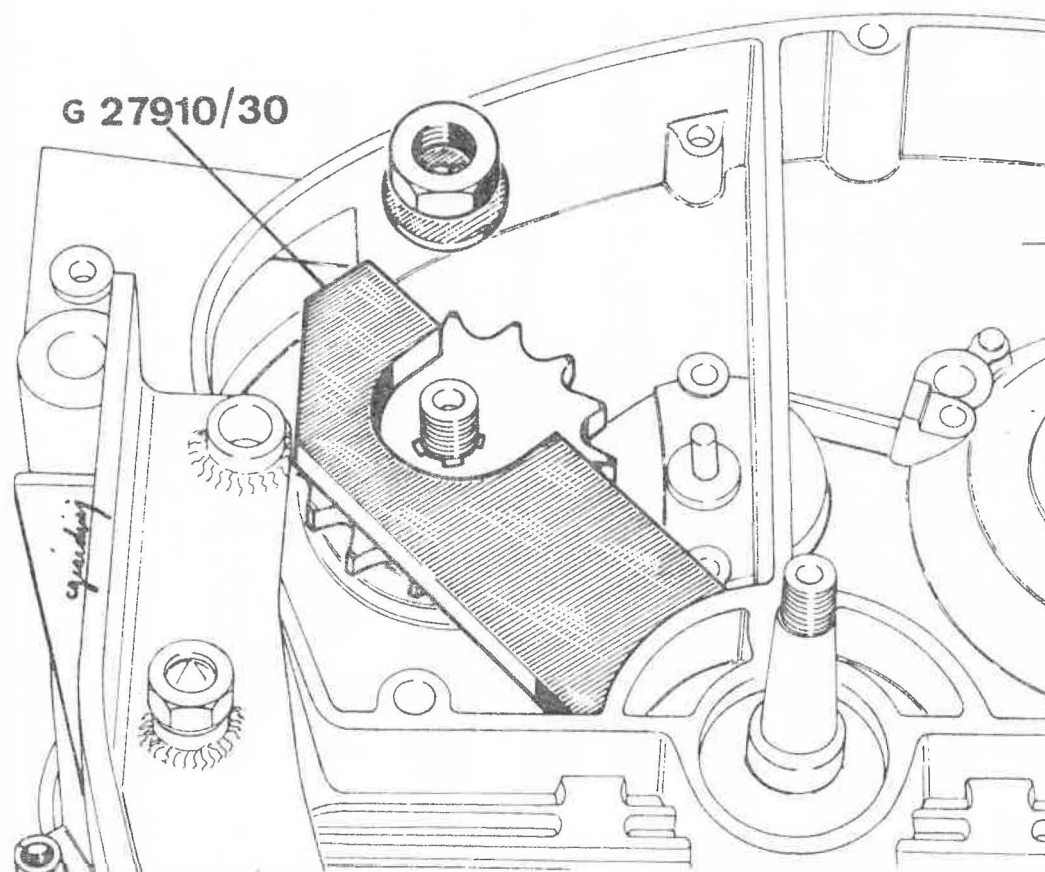
Procedure

- Clamp flywheel rotor with holding plate G 23499/30
- Unscrew rotor retaining nut with normal box spanner
- Remove rotor using tool G 22127/30
- Mark coil baseplate and housing with reference marks for reassembling
- Remove coil baseplate after loosening the 3 securing screws

Fig. 31

DISMANTLING

Chain sprocket



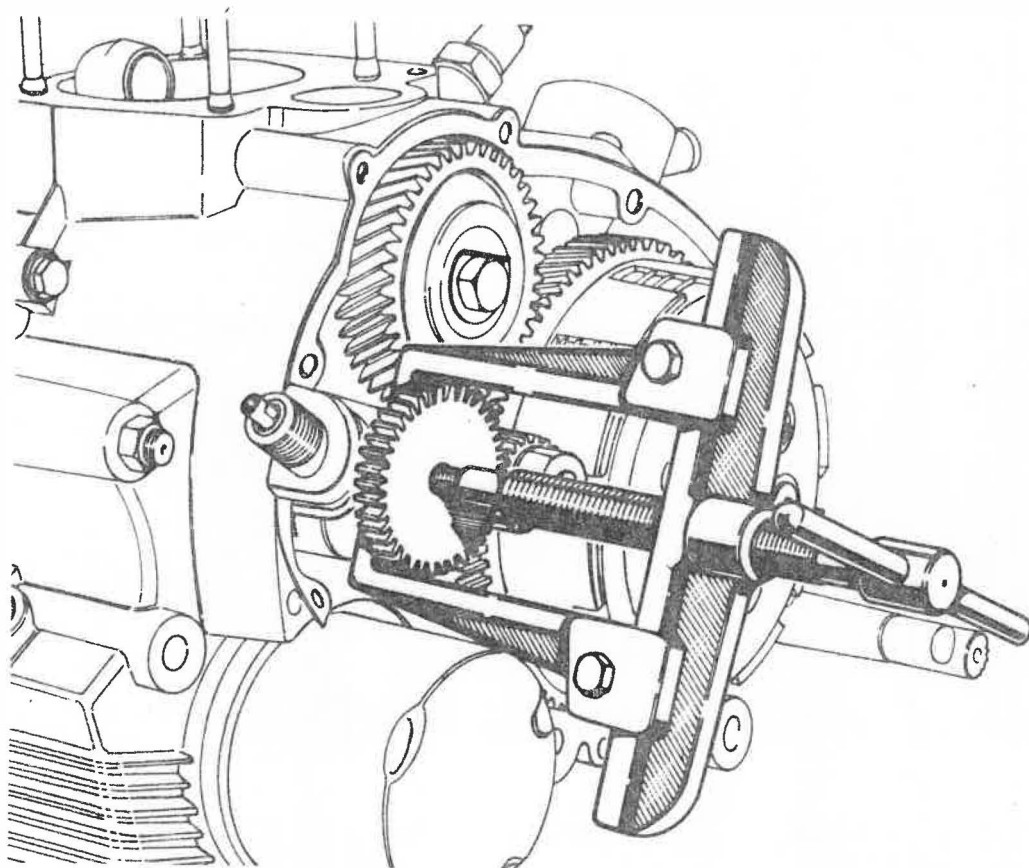
Procedure

- Flatten tab washer.
- Clamp sprocket with tool G 27910/30
- Loosen nut and remove sprocket.

Fig. 32

DISMANTLING

Oil pump gear



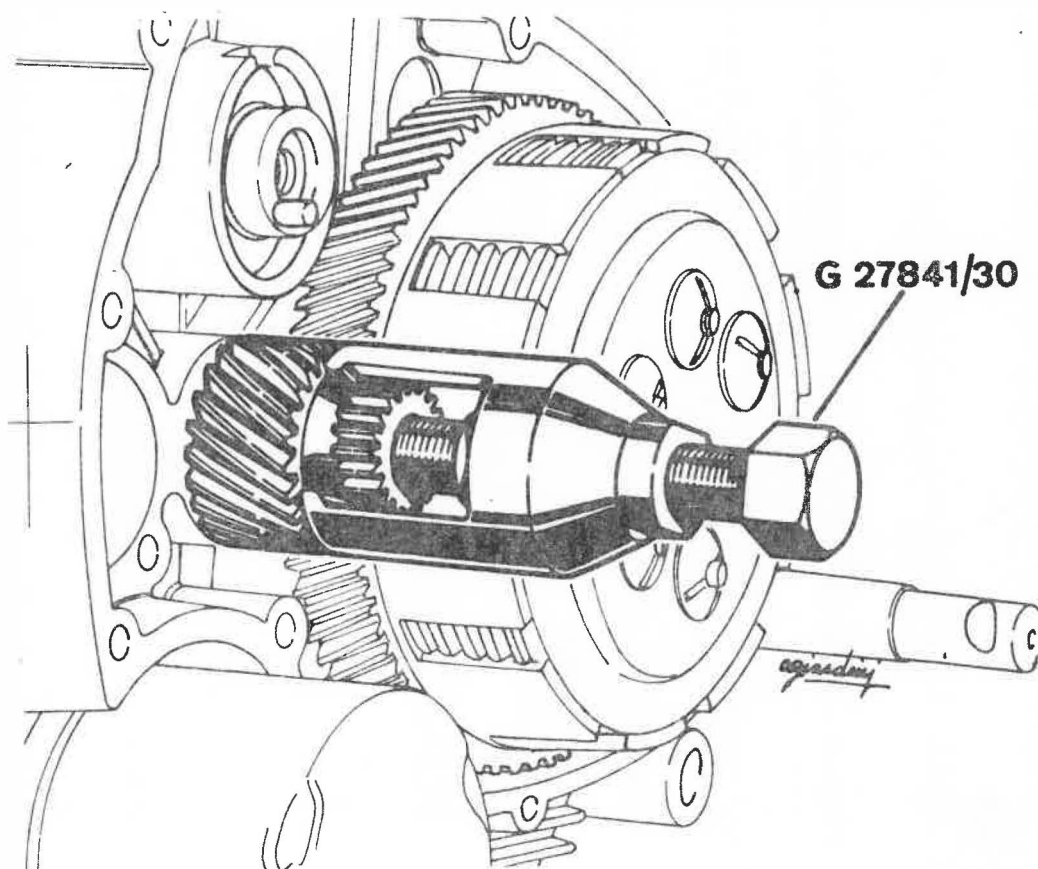
Procedure

- Remove the nut and the washer.
- Remove the gear using usual extractor.

FIG. 33

DISMANTLING

Crankshaft gear



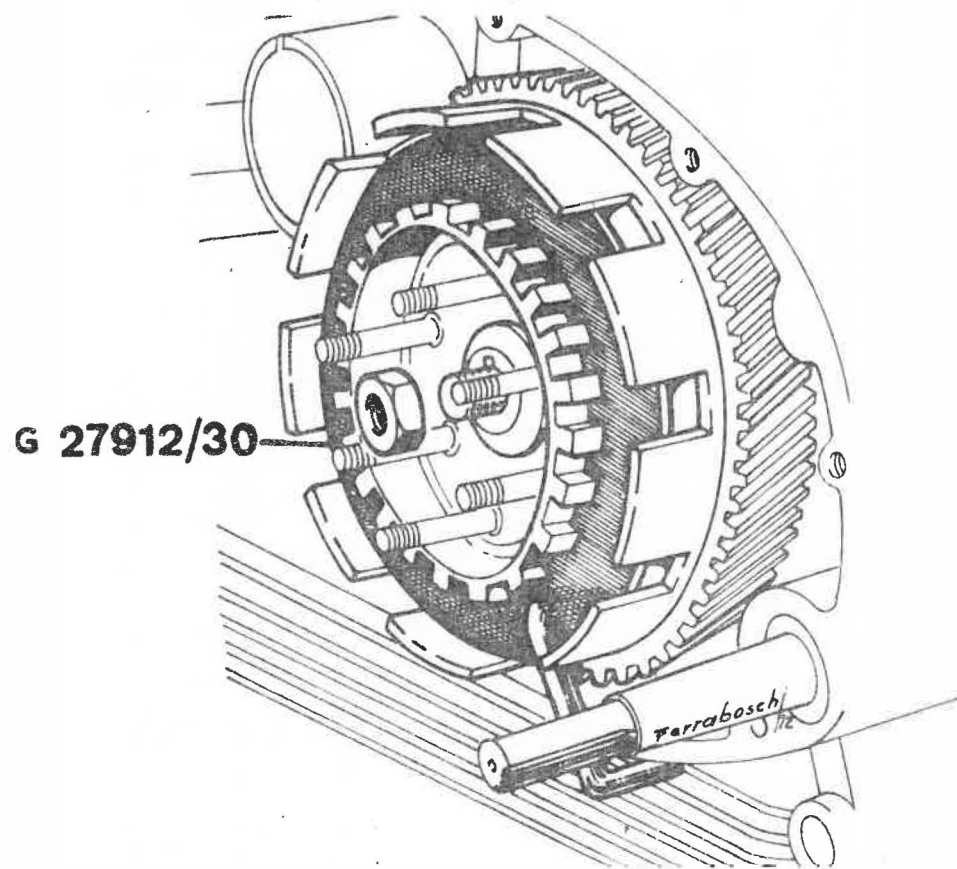
Procedure

- Remove the nut and the washer
- Remove the gear using the tool G 27841/30

Fig. 34

DISMANTLING

Clutch drum



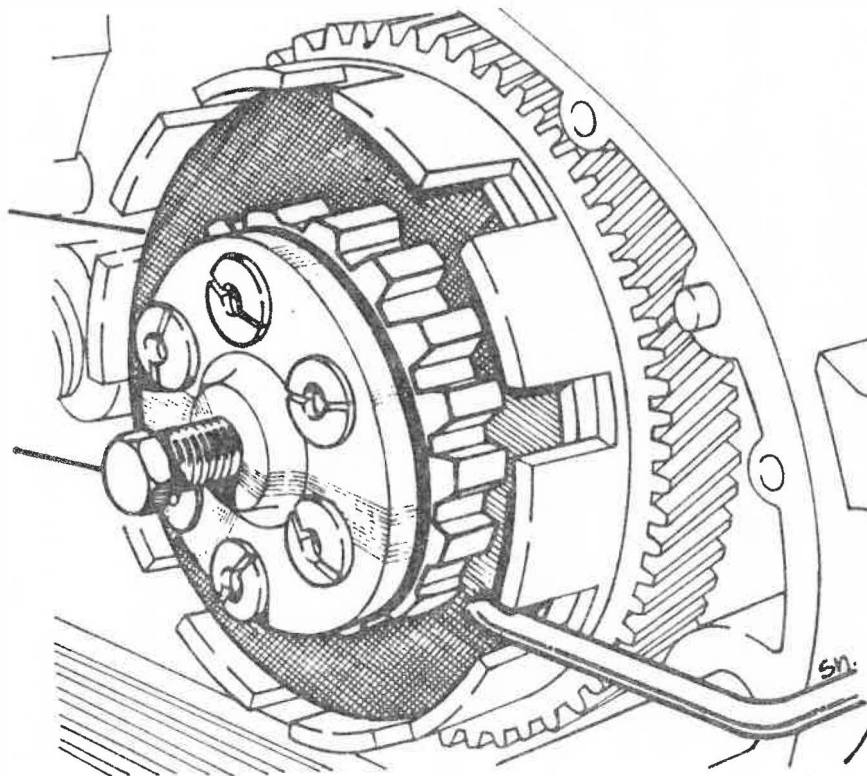
Procedure

- Remove the nut fixing internal drum using the tool G 27912/30.

Fig. 35

DISMANTLING

Internal clutch drum

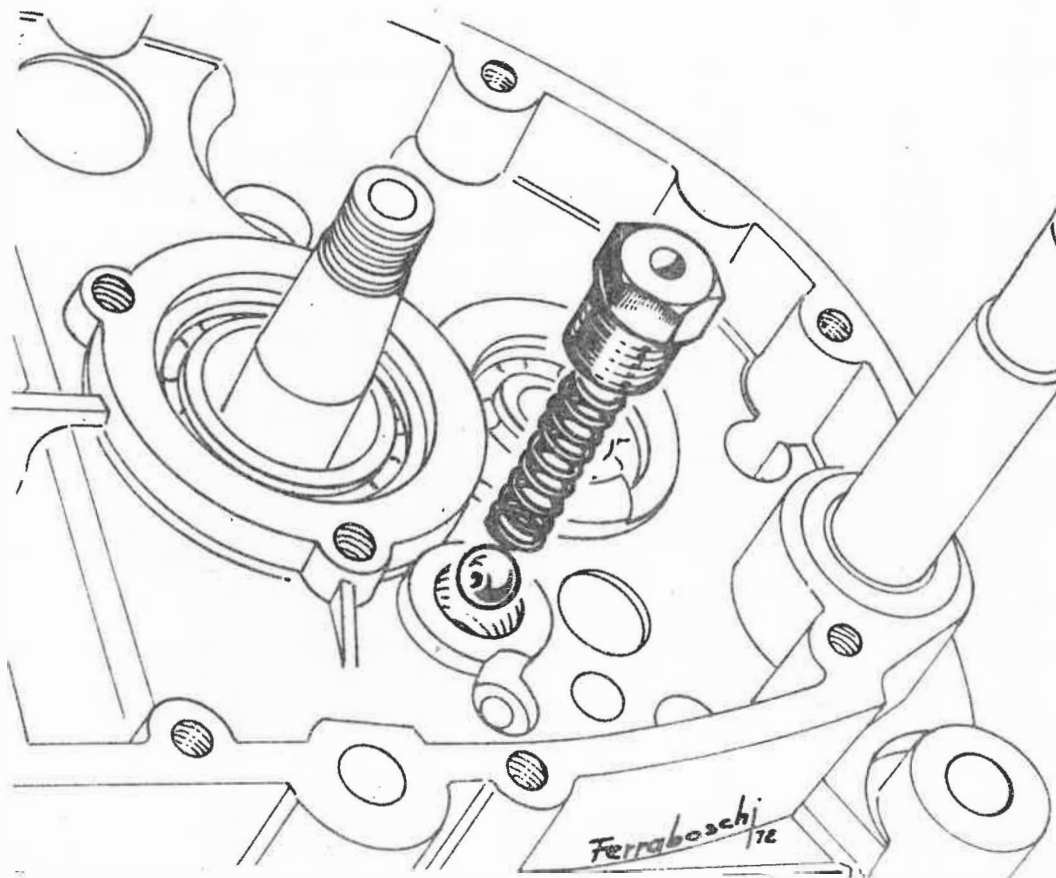


Procedure
<ul style="list-style-type: none">- Remove the internal drum using extractor G 16398/30
<p>N.B. - To avoid damage to mainshaft, remember the spacer.</p>

Fig. 36

DISMANTLING

Stop ball of selector

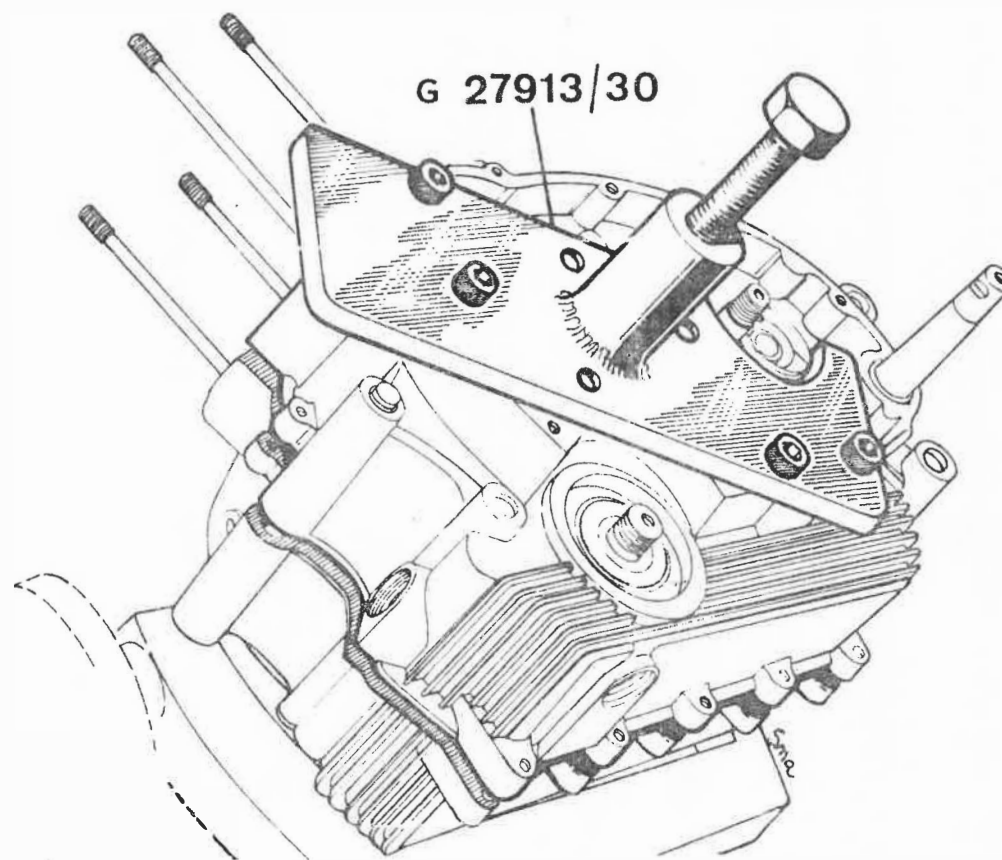


Procedure
- Unscrew the screw plug.
- Remove the spring, taking care not to lose the ball.

Fig. 37

DISMANTLING

Left half crankcase, clutch side



Procedure

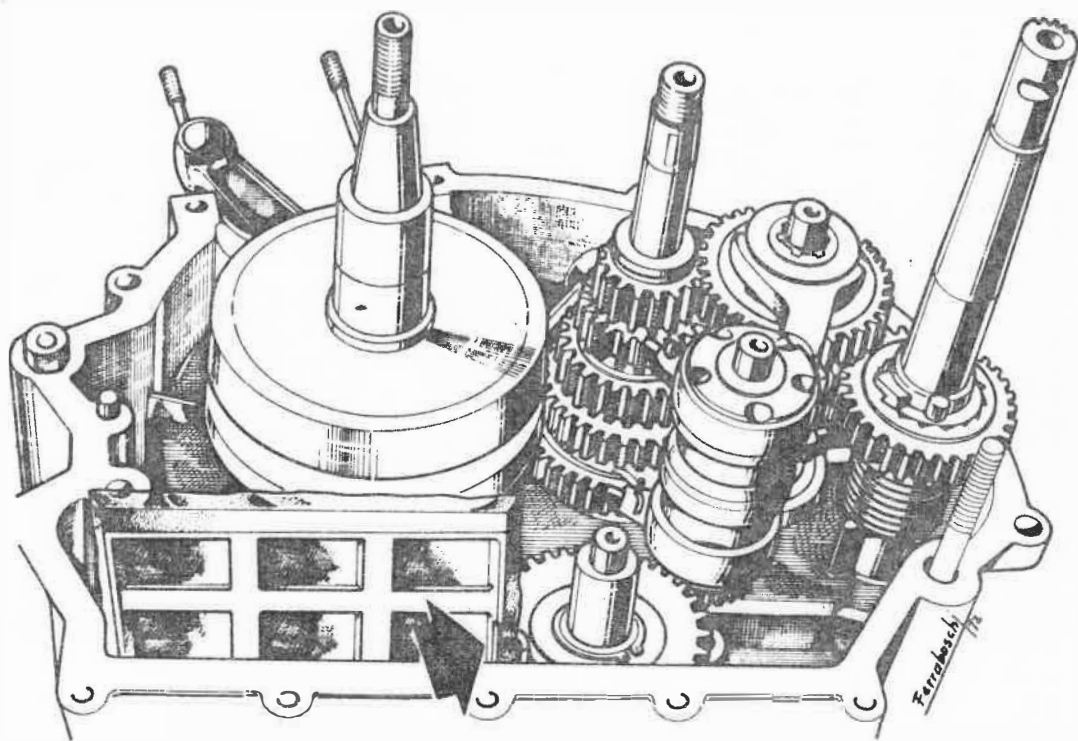
- Remove the crankcase bolts.
- Apply the tool G 27913/30 on left half crankcase.
- Screw the bolt till complete removal of left half crankcase, leaving all internal engine parts on right half crankcase.

N.B. - Opening the crankcase, note position, size and quantity of washer for a correct reassembly.

Fig. 38

DISMANTLING

Gearshaft, kickstart shaft and selector



Procedure

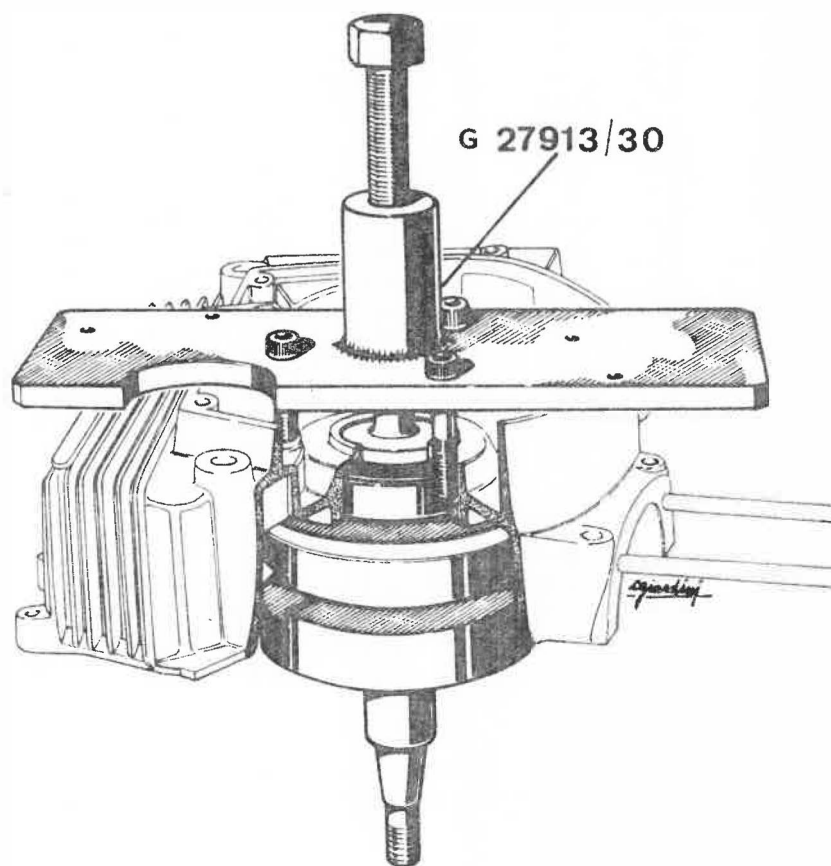
- Remove by hand the gearshaft, the kickstart shaft and selector.
- If necessary, dismantle the gearshift forks, removing the stop cotter-pin of small pin.

N.B. Reassembling the oil filter, take care that it is as shown on figure.

Fig. 39

DISMANTLING

Crankshaft from right half crankcase

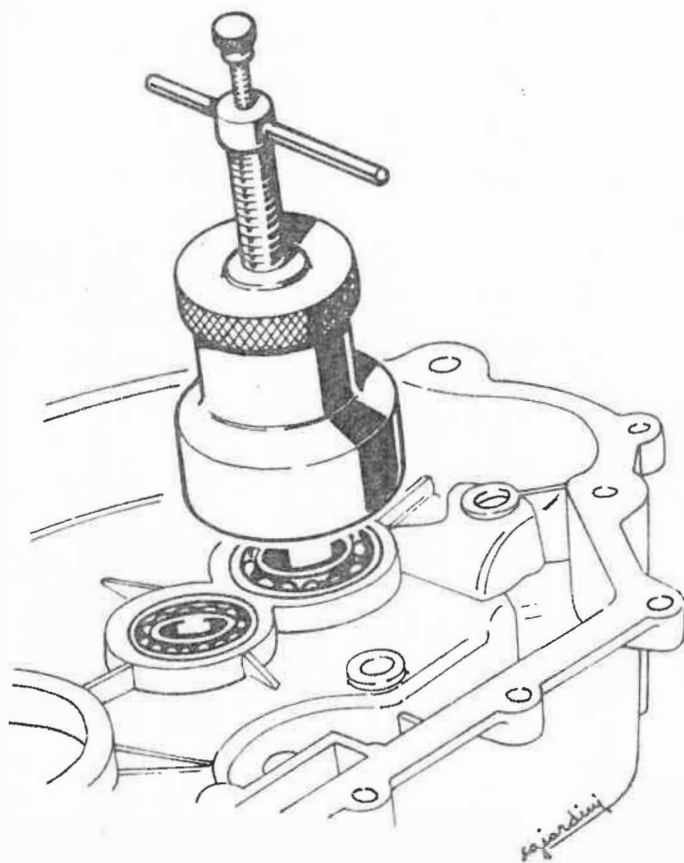


Procedure
<ul style="list-style-type: none">- Apply the tool G 27913/30 on right half crankcase- Screw the bolt till complete removal of crankshaft from its seating.

Fig. 40

DISMANTLING

Bearing extraction



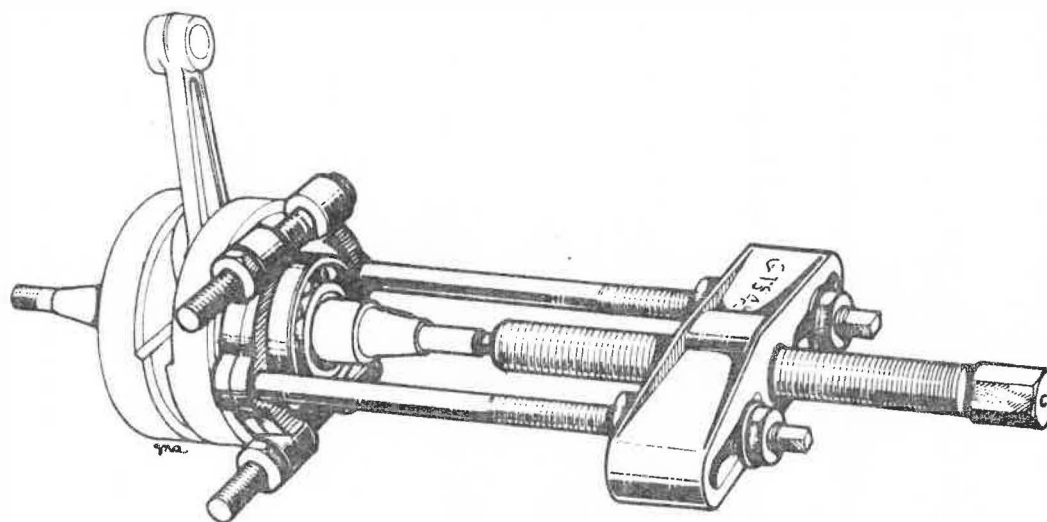
Procedure

- To remove the bearings use the standard extractors. (see standard tools list).

Fig. 41

DISMANTLING

Crankshaft bearings



Procedure

- Remove the bearings using a standard extractor.

Fig. 42

SECTION 7 - Assembly clearances

Piston cylinder 125 5V Arcore	7- 2	Tappets	7-14
Piston cylinder 150 5V Arcore	7- 3	Layshaft neutral gears	7-15
Gudgeon-pin and piston	7- 4	Layshaft and mainshaft neutral gears	7-16
Compression rings	7- 5	Mainshaft neutral gear	7-17
Ring Gaps	7- 6	Kickstart gear	7-18
Connecting rod, Gudgeon-pin and small end	7- 7	Fork and link-drum	7-19
Crankshaft and connecting rod	7- 8	Fork and 1st gear sleeve	7-20
Valves and valve-guides	7- 9	Fork and sliding gear	7-21
Valve springs	7-10	Oil pump	7-22
Journal bearing pin and rocker	7-11	Bearing pipe and sliding part	7-23
Clutch drum and gear mainshaft	7-12	Rear fork brass bushes	7-24
Camshaft contours	7-13		

ASSEMBLY TOLERANCES BETWEEN PISTONS AND CYLINDERS OF MOTORCYCLES "125/150 5V ARCORE"

Class	Normal		1st Oversize		2nd Oversize		3rd Oversize	
	Piston ϕ P	Cylinder ϕ C	Piston ϕ P	Cylinder ϕ C	Piston ϕ P	Cylinder ϕ C	Piston ϕ P	Cylinder ϕ C
A	59.950	60.000	60.150	60.200	60.350	60.400	60.550	60.600
B	59.955	60.005	60.155	60.205	60.355	60.405	60.555	60.605
C	59.960	60.010	60.160	60.210	60.360	60.410	60.560	60.610
D	59.965	60.015	60.165	60.215	60.365	60.415	60.565	60.615
E	59.970	60.020	60.170	60.220	60.370	60.420	60.570	60.620

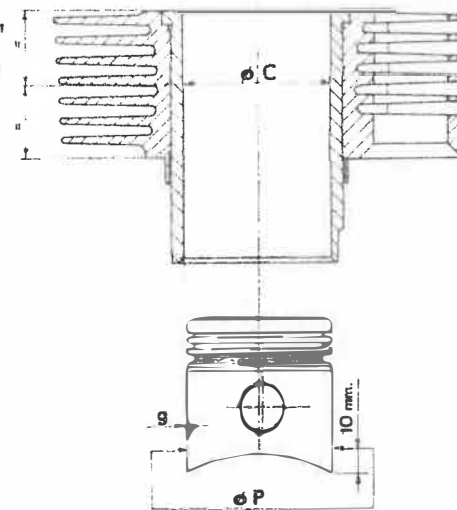


Fig. 43,

MATCHINGS

The pistons and cylinders are matched with a clearance of 0.05 mm. i.e. in accordance with corresponding values "P" and "C" as above.

WEAR LIMITS

The max. clearance "g" permissible at wear limit is 0.10 mm.

The sizes of the diameter "P" and "C" shown in illustrations, are stamped respectively on piston head and on the face of cylinder. The above sizes are in accordance with one of the values as shown in the table with an approximation ± 0.002 . The pistons and the cylinders oversize have the stamping of the grade together with the symbols M2, M4 or M6 according to whether the oversize is 0.2 mm, 0.4 mm or 0.6 mm.

ASSEMBLY CLEARANCES AND WEAR LIMITS BETWEEN GUDGEON-PIN AND PISTON

Piston ϕA	17 + 0.006 - 0.005
Gudgeon-pin ϕB	17 + 0 - 0.008
Interference and assembly clearance C	Interf. 0.005 Cleara. 0.014
Max clearance acceptable after use C max.	0.05

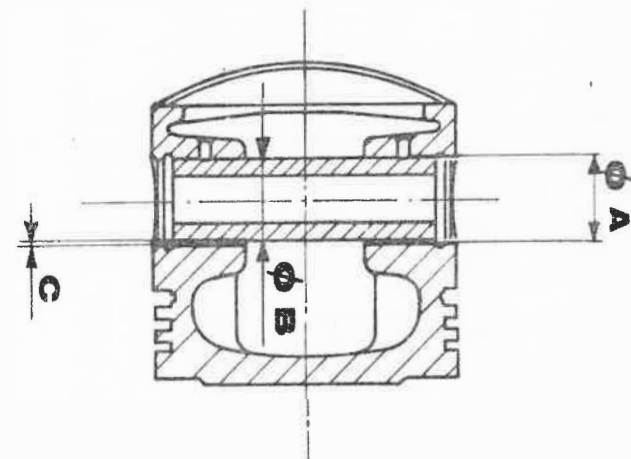


Fig. 44

END FLOAT AND WEAR LIMIT OF COMPRESSION RINGS

	1st piston ring	2nd piston ring
Piston D	$+ 0.04$ 1.5 $+ 0.06$	$+ 0.04$ 2 $+ 0.02$
Piston rings E	$- 0.010$ 1.5 $-$	$- 0.010$ 2 $- 0.022$
Assembly end float F	Max. 0.082 Min. 0.050	Max. 0.062 Min. 0.030
Max. clearance acceptable after use F max.	0.16	0.12

END FLOAT AND WEAR LIMIT OF PISTON RINGS

Piston D	$+ 0.04$ 3.5 $+ 0.02$
Piston rings E	$- 0.010$ 3.5 $- 0.022$
Assembly end Float F	Max. 0.062 Min. 0.030
Max. clearance acceptable after use	0.12

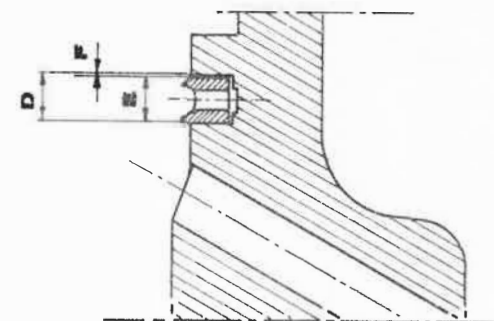
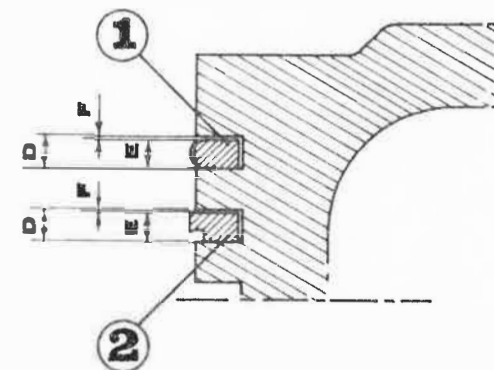


Fig. 45

PISTON RING GAPS

Operation	External diameter of rings ϕ L I25 - 150 5V
Standard size	60
1st Oversize	60.2
2nd Oversize	60.4
3rd Oversize	60.6
Gap between ring ends when assembled. G	$0.25 + 0.4$
Max. clearance acceptable after use. G max.	2 mm

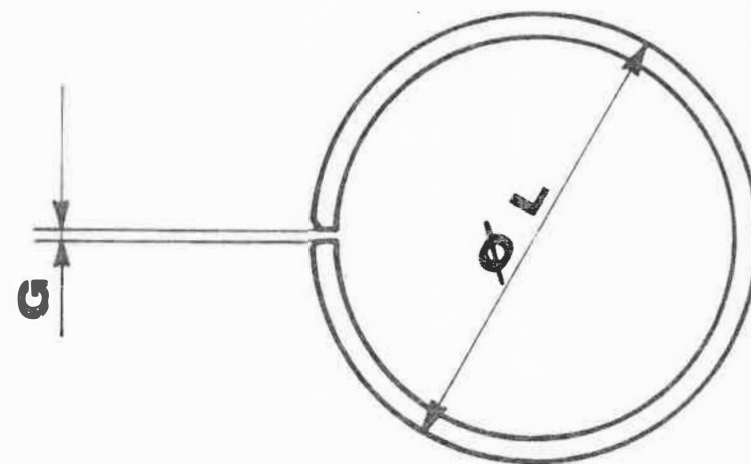
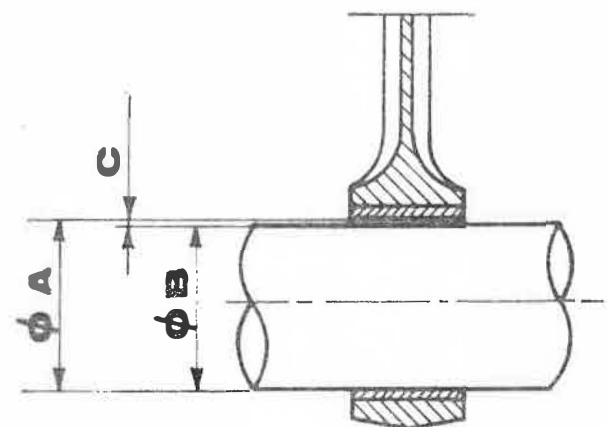
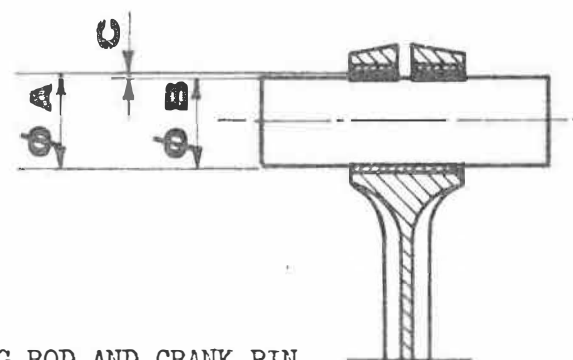


Fig. 46

ASSEMBLY CLEARANCES AND WEAR LIMITS BETWEEN CONNECTING ROD SMALL END AND GUDGEON-PIN

Connecting rod small end ϕA	17 + 0.012 + 0.023
Piston-pin ϕB	17 + 0 - 0.008
Assembly clearance C	Max. 0.031 Min. 0.012
Max. clearance acceptable after use C max.	0.08



ASSEMBLY CLEARANCES AND WEAR LIMITS BETWEEN BIG END OF THE CONNECTING ROD AND CRANK PIN

	White metal	Pink metal
Big end of the connecting rod ϕA	+ 0.051 30 + 0.035	+ 0.066 30 + 0.050
Crank Pin ϕB	+ 0 30 - 0.011	+ 0 30 - 0.011
Assembly clearance C	0.062 0.035	0.077 0.050
Max. clearance acceptable after use C max.	0.14	0.15

Fig. 47

ASSEMBLY CLEARANCES BETWEEN CRANK WEBS AND CONNECTING ROD

Crank pin Width A	$+ 0.2$ 20 $+ 0.3$
Big end of the connecting rod Thickness B	$+ 0$ 20 $- 0.05$
Side clearance of assembly C	$0.2 + 0.35$

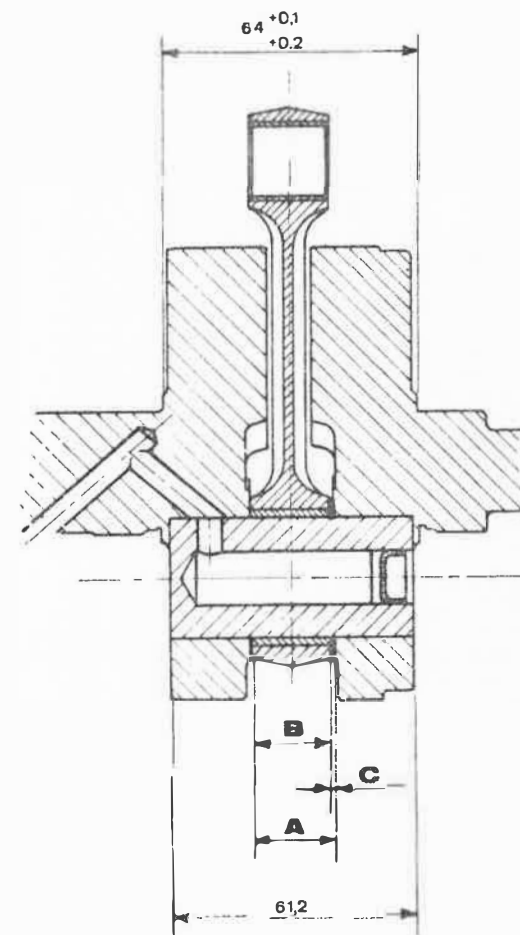


Fig. 48

ASSEMBLY CLEARANCES AND WEAR LIMITS BETWEEN VALVES AND VALVE-GUIDES

	Inlet	Exhaust
Valve-guide ϕA	$7 + 0.030$ $+ 0.045$	$7 + 0.040$ $+ 0.055$
Valve ϕB	$7 + 0$ $- 0.015$	
Assembly clearance C	Inlet max. 0.060 min. 0.030	Exhaust 0.070 0.040
Max. clearance acceptable after use C max.	Inlet 0.12	Exhaust 0.14

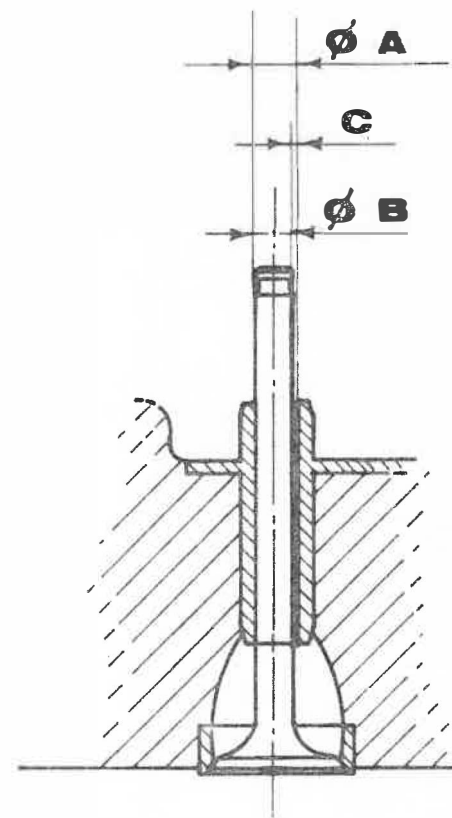


Fig. 49

LENGTH, LOAD AND LIMITS OF VALVES SPRINGS

EXTERNAL SPRING

Settled new spring L	Length in seating L = 30.67 Load Kg. 24 ± 1
Max. limit acceptable after use L	Length in seating L = 30.67 Load Kg. 21 ± 1

INTERNAL SPRING

Settled new spring L	Length in seating L = 26.67 Load Kg. 8 ± 0.3
Max. limit acceptable after use L	Length in seating L = 26.67 Load Kg. 7 ± 0.3

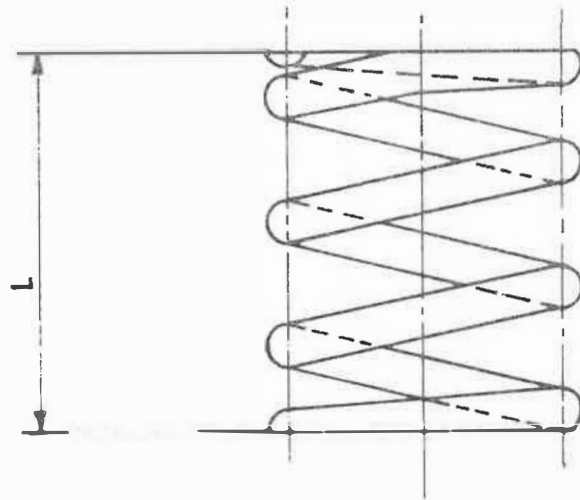


Fig. 50

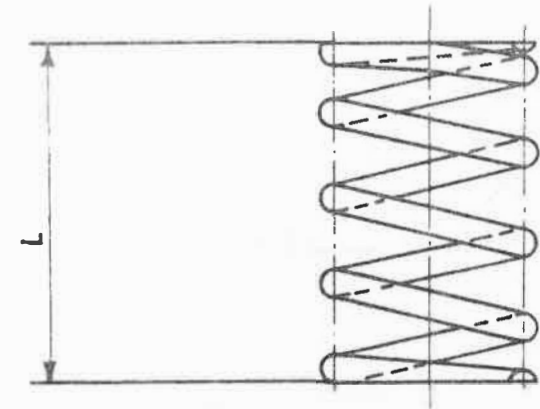


Fig. 51

ASSEMBLY CLEARANCES AND WEAR LIMITS. ROCKER GEAR

Rocker bearing ϕ A	15 $\begin{matrix} + 0.021 \\ - 0 \end{matrix}$
Rocker ϕ B	15 $\begin{matrix} + 0.016 \\ + 0.011 \end{matrix}$
Shaft ϕ C	15 $\begin{matrix} + 0 \\ - 0.011 \end{matrix}$
Assembly clearance	
D	E
Interference 0.010	Max. 0.045
Clearance 0.014	min. 0.046
Max. clearance acceptable after use	
D max.	E max.
0.10	0.13

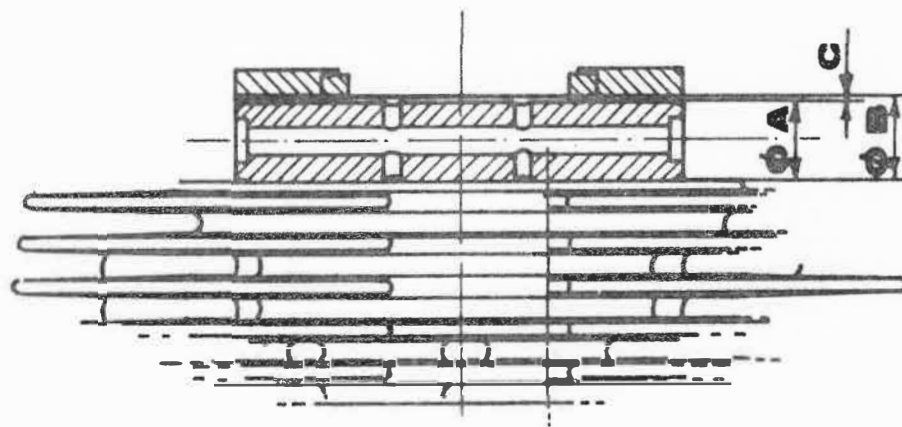


Fig. 52

ASSEMBLY CLEARANCES AND WEAR LIMITS BETWEEN EXTERNAL CLUTCH DRUM
AND GEAR MAINSHAFT

Clutch drum ϕ A	17 + 0.028 + 0.010	
Mainshaft ϕ B	17 - 0.006 - 0.017	
Assembly clearance C	max. 0.045	min. 0.016
Max clearance acceptable after use C max.	0.10	

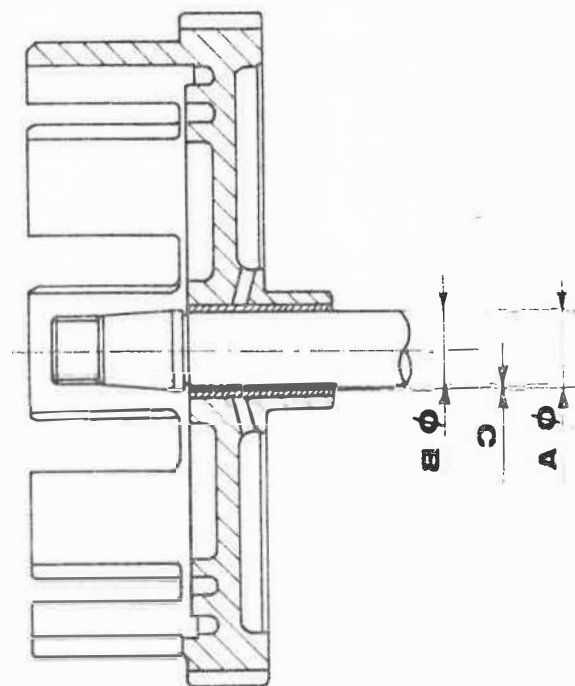


Fig. 53

ASSEMBLY CLEARANCES AND WEAR LIMITS OF CAMSHAFT

New cam profile A	20.74
Max wear limit acceptable after use B	20.24

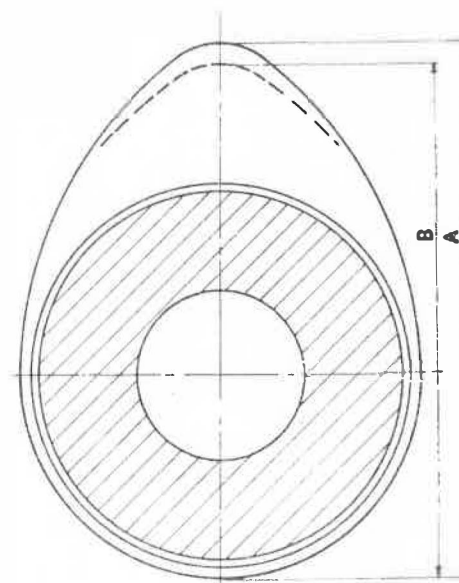


Fig. 54

ASSEMBLY CLEARANCES AND WEAR LIMITS OF TAPPETS

Tappet new A	31 ± 0.1
Max wear limit acceptable after use B	0.5

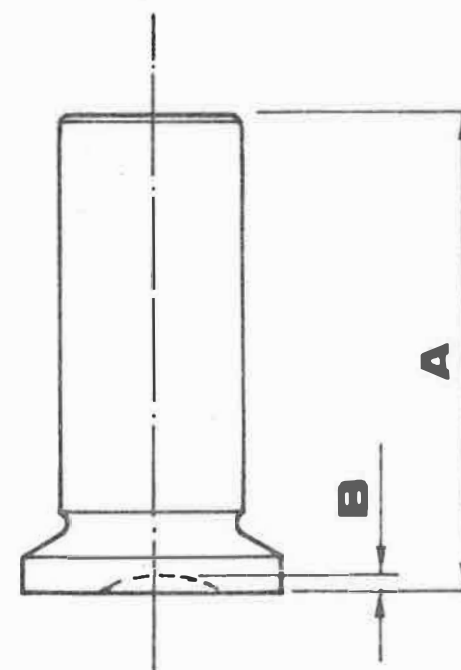


Fig. 55

ASSEMBLY CLEARANCES AND WEAR LIMITS OF GEAR BUSH, NEUTRAL OF FIRST AND
SECOND LAYSHAFT GEARS

Internal diameter of Bush ϕ A	18.520 $\begin{matrix} + 0.033 \\ - 0 \end{matrix}$
Gearshaft diameter ϕ B	18.500 $\begin{matrix} + 0 \\ - 0.013 \end{matrix}$
Assembly clearance C	max. 0.066 min. 0.020
Max. clearance accept- able after use C max.	0.18
Internal diameter of gear ϕ D	21.000 $\begin{matrix} + 0.021 \\ - 0 \end{matrix}$
External diameter of bush ϕ E	20.980 $\begin{matrix} + 0 \\ - 0.021 \end{matrix}$
Assembly clearance F	Max. 0.062 min. 0.020
Max. clearance accept- able after use F max.	0.15

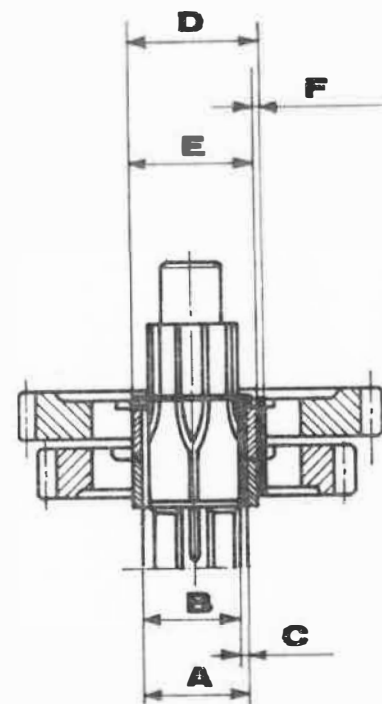


Fig. 56

ASSEMBLY CLEARANCES AND WEAR LIMITS OF GEAR BUSH, NEUTRAL OF THIRD GEAR ON
MAINSHAFT AND FOURTH GEAR OF LAYSHAFT

Internal diameter of ϕA	$20.020 \begin{smallmatrix} + 0.021 \\ - 0 \end{smallmatrix}$
Gearshaft diameter ϕB	$20.000 \begin{smallmatrix} - 0.021 \\ + 0 \end{smallmatrix}$
Assembly clearance C	$\begin{smallmatrix} \text{max. } 0.062 \\ \text{min. } 0.020 \end{smallmatrix}$
Max. clearance accept- able after use C max.	0.15
Internal diameter of the gear ϕD	$22.500 \begin{smallmatrix} + 0.021 \\ - 0 \end{smallmatrix}$
External diameter of Bush ϕE	$22.493 \begin{smallmatrix} - 0.013 \\ + 0 \end{smallmatrix}$
Assembly clearance F	$\begin{smallmatrix} \text{Max. } 0.041 \\ \text{min. } 0.007 \end{smallmatrix}$
Max. clearance accept- able after use F max.	0.13

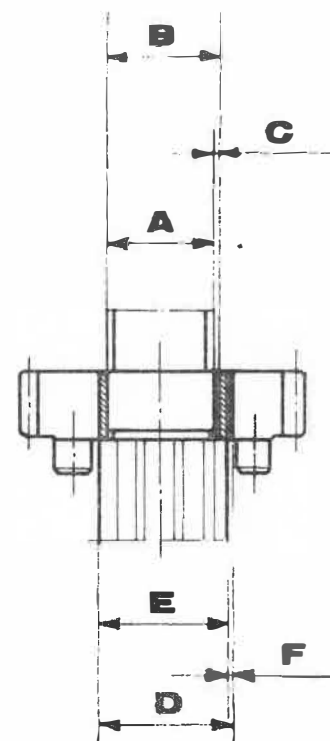


Fig. 57

ASSEMBLY CLEARANCES AND WEAR LIMITS OF GEAR BUSH IN NEUTRAL OF FIFTH GEAR
ON MAINSHAFT

Internal diameter of Bush ϕA	$17.016 \begin{matrix} + 0.018 \\ - 0 \end{matrix}$
Gearshaft diameter ϕB	$17.000 \begin{matrix} - 0.011 \\ + 0 \end{matrix}$
Assembly clearance C	$\begin{matrix} \text{max. } 0.045 \\ \text{min. } 0.016 \end{matrix}$
Max. clearance accept- able after use C max.	0.13
Internal diameter of gear ϕD	$20.000 \begin{matrix} + 0.021 \\ - 0 \end{matrix}$
External diameter of Bush ϕE	$19.993 \begin{matrix} - 0.013 \\ + 0 \end{matrix}$
Assembly clearance F	$\begin{matrix} \text{Max. } 0.041 \\ \text{Min. } 0.007 \end{matrix}$
Max. clearance accept- able after use F max.	0.12

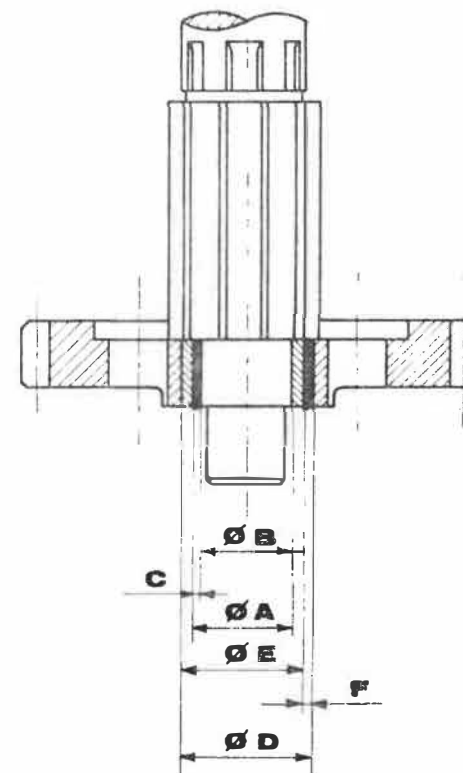


Fig. 58

ASSEMBLY CLEARANCES AND WEAR LIMITS OF THE KICKSTART GEAR BUSH

Internal diameter of the gear ϕA	$38.044 \begin{matrix} - 0 \\ + 0.006 \end{matrix}$
External diameter of the Bush ϕB	$37.991 \begin{matrix} - 0.016 \\ + 0 \end{matrix}$
Assembly clearance C	$\begin{matrix} 0.075 \\ 0.053 \end{matrix}$
Max. clearance acceptable after use C max.	0.2

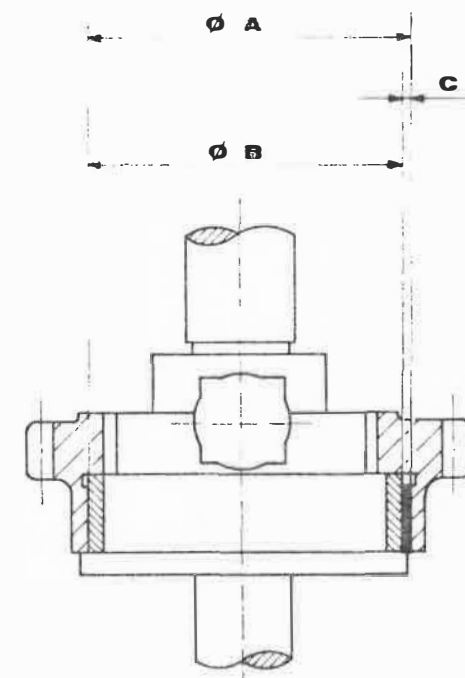


Fig. 59

ASSEMBLY CLEARANCES AND WEAR LIMITS BETWEEN GEARBOX LINK-DRUM
AND FORK

Link-drum diameter ϕ A	$37.966 \begin{smallmatrix} + 0.025 \\ - 0 \end{smallmatrix}$
Internal diameter of fork ϕ B	$38.000 \begin{smallmatrix} + 0.025 \\ - 0 \end{smallmatrix}$
Assembly clearance C	$\begin{smallmatrix} \text{max. } 0.059 \\ \text{min. } 0.009 \end{smallmatrix}$
Max clearance acceptable after use C max.	0.15

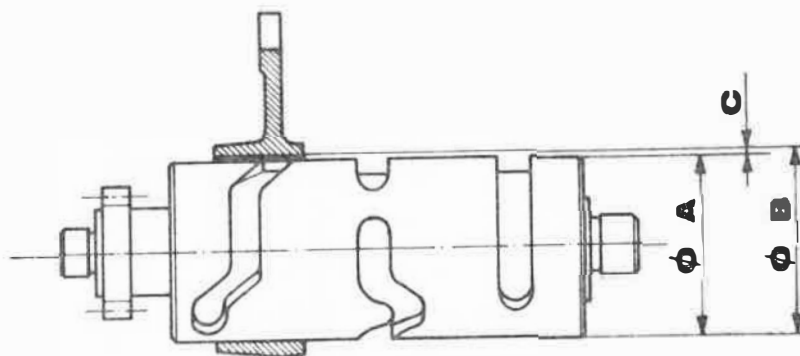


Fig. 60

ASSEMBLY CLEARANCES AND WEAR LIMITS BETWEEN FORK AND FIRST GEAR SLIDING SLEEVE

Fork thickness A	$2.500 \begin{smallmatrix} + 0 \\ - 0.060 \end{smallmatrix}$
Seating width B	$2.600 \begin{smallmatrix} + 0.100 \\ - 0 \end{smallmatrix}$
Assembly clearance C	$\begin{smallmatrix} \text{max. } 0.260 \\ \text{min. } 0.100 \end{smallmatrix}$
Max. clearance acceptable after use C max.	0.6

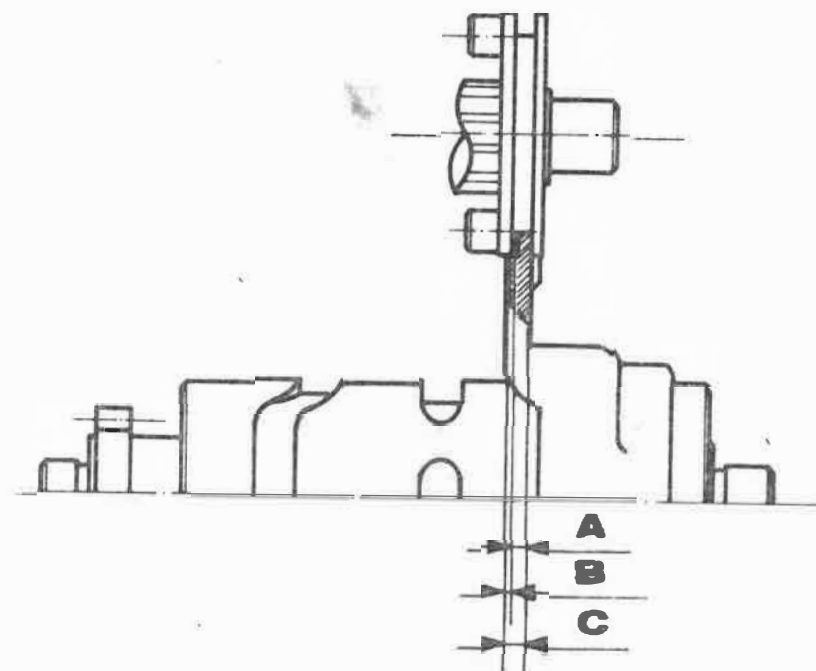


Fig. 61

ASSEMBLY CLEARANCES AND WEAR LIMITS BETWEEN FORK AND SLIDING GEAR

Fork thickness A	$+ 0$ $4.860 - 0.075$
Seating width B	$+ 0.100$ $5.100 - 0$
Assembly clearance C	0.415 0.240
Max. clearance acceptable after use C max.	0.8

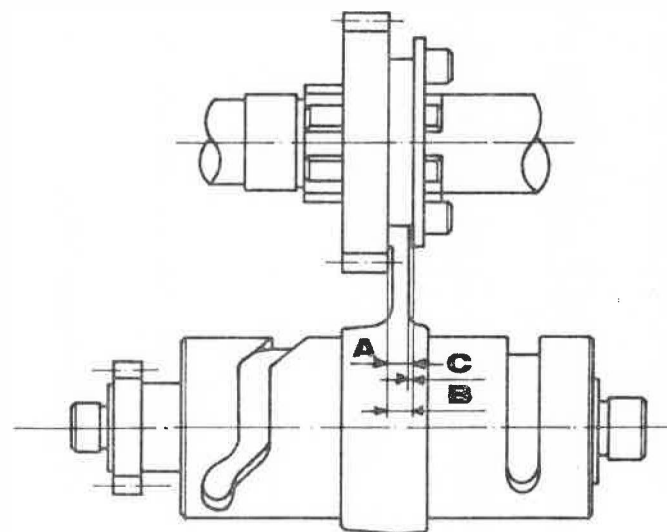


Fig. 62

ASSEMBLY CLEARANCES AND WEAR LIMITS OF OIL PUMP

Depth of gear seating A	+ 0.050 13.5 + 0.032
Gear height B	- 0.016 13.5 - 0.027
Assembly clearance C	max. 0.77 min. 0.48
Max. clearance acceptable after use C max.	0.10

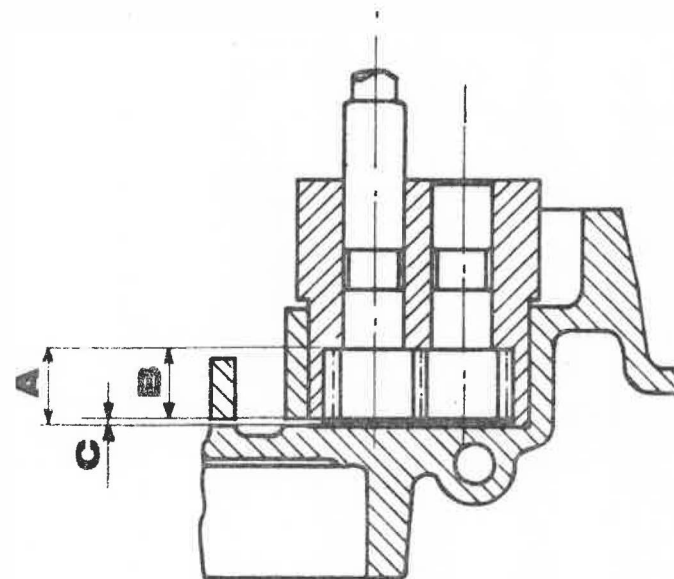


Fig. 63

ASSEMBLY CLEARANCES AND WEAR LIMITS BETWEEN BEARING TUBE AND SLIDING PART

External diameter of bearing tube ϕA	$30.000 \begin{smallmatrix} + 0 \\ - 0.033 \end{smallmatrix}$
Internal diameter of sliding part ϕB	$30.000 \begin{smallmatrix} + 0.020 \\ - 0.053 \end{smallmatrix}$
Assembly clearance C	$\begin{smallmatrix} 0.086 \\ 0.020 \end{smallmatrix}$
Max. clearance acceptable after use $C \text{ max.}$	0.15

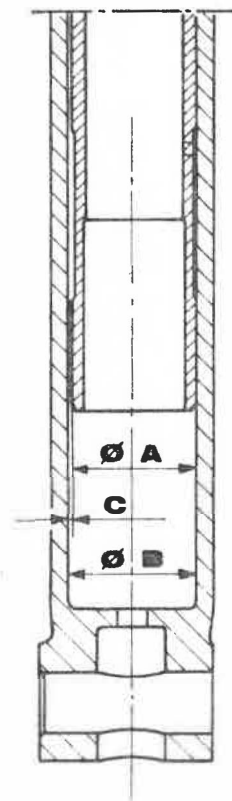


Fig. 64

ASSEMBLY CLEARANCES AND WEAR LIMITS OF THE REAR FORK BUSHES

Internal diameter of Bush ϕA	$20.000 \begin{smallmatrix} + 0.021 \\ - 0 \end{smallmatrix}$
External diameter of the spacer ϕB	$19.980 \begin{smallmatrix} - 0.021 \\ + 0 \end{smallmatrix}$
Assembly clearance C	$\begin{smallmatrix} \text{max. } 0.062 \\ \text{min. } 0.020 \end{smallmatrix}$
Max. clearance acceptable after use	0.18
C max.	
Cross assembly clearance D	$\begin{smallmatrix} \text{max. } 0.9 \\ \text{min. } 0.3 \end{smallmatrix}$
Max. clearance acceptable after use	1.5
D max.	

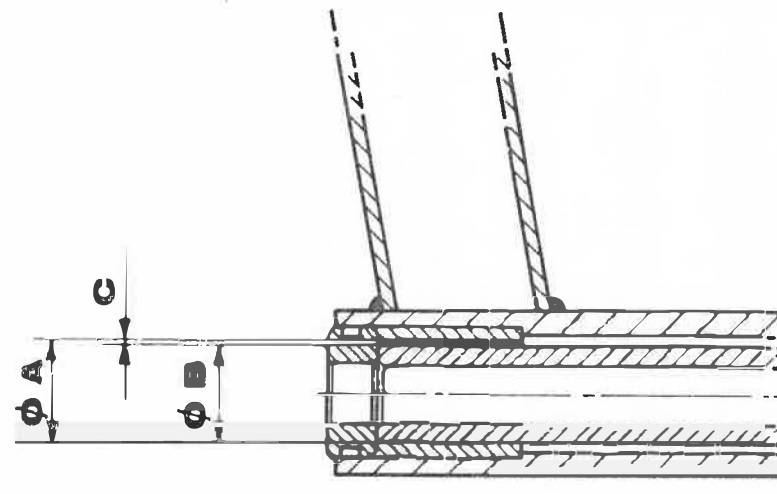


Fig. 65

SECTION 8 - Overhaul

Engine.....	8-3
Carburettor.....	8-4
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ENGINE OVERHAUL

CYLINDER HEAD

Remove carefully the carbon deposits using petrol and brush, without damaging the metal, as this will encourage a new formation of carbon deposits.

Examine the valve seats: they must not show any indentations or grooves but must have a uniform surface so that the valves seal is perfect. As a check pour a little petrol into the ducts of inlet and exhaust. The seal is perfect when there are no leaks of petrol between the valve and its seat.

VALVES

Examine the valve seats as above, and inspect for wear together with their guides, as shown on the table of page 7-9. If the seat is excessively worn, or if the tolerance with its guide exceeds the fixed limit, the valve must be changed.

VALVE-SPRINGS

Check the tension as shown in the tables on pages 7-10 and 7-11.

CYLINDER-PISTON

Check that the surfaces have not been subject to seizure, or damaged in any other way. Check the dimensions, as shown on tables on pages 7-2 and 7-3. If the wear limits are exceeded or if there are seizure marks, it is necessary to rebore the cylinder and fit an oversize piston. Complete with rings.

The piston wear must be checked as shown in the tables on pages 7-2 and 7-3.

CONNECTING ROD. SMALL END

Check as shown on page 7-7; if the bush have exceeded the prescribed wear limit, replace.

CRANKSHAFT B/E ASSY.

Check as shown in the tab. on page 7-7
If the connecting rod seizes between the webs, it is necessary to change the webs together with the crankpin.

OIL PUMP

Check as shown in tab. on pag. 7-22
Change the gears if excessively worn.

TIMING SYSTEM

Check the surface of cams and the tappets.
If there are signs of excessive wear, replace parts (see pag. 7-13 and 7-14). Check the camshaft gear and change if excessively worn.

KICKSTART

Check the gear kickstart bush as shown on pag. 7-18. Ensure that the pawl slides in its seating and that the dog clutch is intact.

GEARBOX SELECTOR AND FORKS

If the pedal has lost movement when in neutral i.e. (without spring resistance) replace the spring.

Check that the internal contours of the selector plate has not worn especially on the corners. If so, replace. Check the tolerances on page 7-19. Check that the pawls have no excessive wear and examine the springs.

CLUTCH

Check for wear on the plates, for excessive clearances on the plates, also the drum teeth. If there is wear, replace parts.

GEARS

Check that the gears have not become broken, chipped or excessively worn. If so, replace.

BEARINGS

Bearing wear is revealed by noise; and the excessive clearance between the internal and the external bearing track.

N.B. - Never clean the bearings by compressed air.

REAR DRIVE

Check for wear of pinion and rim teeth. Replace if wear is excessive. We recommend to replace pinion, rim and chain at the same time.

CARBURETTOR

Dismantle the carburettor completely, wash carefully with petrol, and clean all drillings and ducts with a jet of air. Make sure all ducts are perfectly clean. Carefully check each part, and particularly the following:

- 1) Throttle valve: ensure it slides freely in the mixing chamber, and in case of excessive clearance due to wear, replace it with a new one. If mixing chamber shows signs of wear, which would prevent a good seal or free travel of the valve (even though new) replace carburettor.
- 2) Needle valve: ascertain whether needle valve is worn on the tapered section. If necessary replace with one of the same type.
- 3) Main jet: never modify the jet to change the calibration and never clean by using wire. If there is any doubt regarding their original calibration, or any evidence of damage, replace them with the correct type (see tab. page 8-5)
- 4) Pilot jet: as above.
- 5) Float chamber: it is absolutely necessary that this part of the carburettor functions correctly for good carburation. To obtain this, check that weight of float is not excessive with possible infiltration of petrol (exact weight is embossed on float top) and that the needle valve is not excessively worn, thus preventing a good seal. If necessary replace float and/or needle valve.
- 6) Petrol filter: it is advisable to check and clean frequently.
- 7) Carburettor filter: every 3000 km. clean it by petrol and compressed air. Every 9000 km fit new.
When frequently driving across dusty country clean or replace more frequently.

CARBURETTOR : Features

Carburettor features	125 5V ARCORE	150 5V ARCORE
Type Dell'Orto	VHB 22 BS	VHB 23 BS
Choke diameter mm	22	23
Main jet	95	103
Pilot jet	40	50
Float	7450.2 gr. 14	7450.1 gr. 10
Throttle valve	7447.40	
Needle valve	E. 29 1st notch	E. 29 2nd notch
Fuel nozzle	260/Q	260/V
Starter jet	55/100	50/100

Description fig. 66

1. Starter - 2. Mixture Adjusting screw for pilot jet -
 3. Throttle valve adjusting screw - 4. Needle valve -
 5. Throttle valve - 6. Starter jet - 7. Float Needle -
 8. Pilot jet - 9. Petrol filter - 10. Float - 11. Fuel
 Nozzle - 12. Main jet

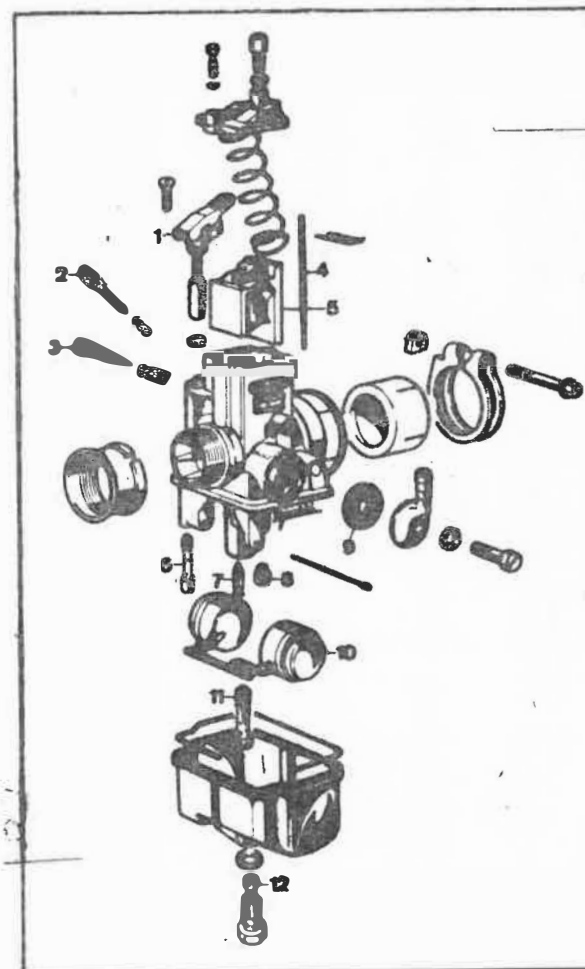


Fig. 66

FRAME OVERHAUL

TELESCOPIC FORK

Check the diameter of the bearing tube and the internal diameter of the sliding member. The internal and external surfaces must be without abrasions or score marks and the wear must be within the limits shown on table page 7-23. If the motorcycle is used frequently on muddy roads, it is advisable to frequently check the oil. If it shows signs of containing water or dirt, drain and refill with new oil after washing (assembled fork) with petrol.

REAR FORK

No special maintenance. If excessive wear of the bronze bearings occur affecting stability, replace the bronze bearings (see table page 7-24).

WHEEL ALIGNMENT

Mount the wheel on a suitable stand. Tighten loose nipples with a spoke key, until the wheel is centred axially and radially, using the stand as a gauge. Some practice is required to undertake this task. This operation may also be carried out with wheel mounted on motorcycle. Deflate the tyre when adjusting the wheel.

ELECTRICAL EQUIPMENT OVERHAUL

FLYWHEEL MAGNETO

Whenever the coils are replaced, position them towards the inside of the stator plate whilst tightening the relative screws. Then check the gap (space between coil ends and pole shoe) is 0.40 (+ 0.05 mm.).

Checking and setting of flywheel magneto

1) General setting of flywheel (change of rotor or coils), if a test bench is used, the opening of the contact breaker must begin when the centre of the polar expansion, immediately on the right of small key groove, overtakes the middle of H.T. coil by $8^{\circ} + 12^{\circ}$ advanced (open earth) and by $28^{\circ} - 32^{\circ}$ retarded (closed earth). The utility of this angle must be the following:

4 at 1500 rev.

Without windows 5 at 6000 rev.

The opening of contacts must be 0.35 - 0.40 mm. Automatical advance: $20^{\circ} + 1^{\circ}$

Advance beginning 2500 rev. -

Advance end 3500 rev. + 200 rev.

2) During partial overhauls and adjustments (change of contact breaker), if it is not possible to have a test bench and to control the utility, it is necessary to ensure that the contacts opening begins when the end of the H.T. coil is 21 - 23 mm retarded (see fig. 67) and 7 - 8 mm advanced from the polar expansion. The contacts opening must be 0.35 - 0.40 mm.

TENSION AT TERMINALS OF HEADLAMP BULB

If the flywheel has had at least 90 hours working on the machine, with good conditions of magnetization and with the wiring system in good order, the voltage at each terminal of the 6V-25/25W bulb must be:

6.5V - 7V at 6000 r.p.m.

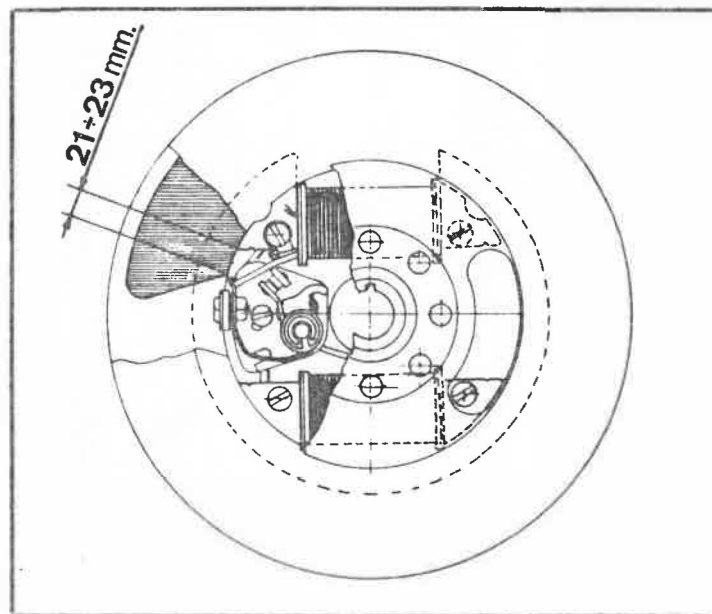


Fig. 67

CHECKING IGNITION TIMING BY STROBOSCOPIC LAMP

For this operation there are marks on the following engine parts:

- on the flywheel are 3 marks:
- one for T.D.C.
- one in the centre for fixed advance
- one for automatic advance
- on right half crankcase in the central rib, a fixed mark.

Connect the stroboscopic lamp to battery and spark plug, remove the right half crankcase cover, start the engine which must tick over (850 - 1000 r.p.m.;) check with a rev. counter and allow engine to reach normal working temperature.

Hold the stroboscopic lamp and point it on the marks pressing the button (see fig. 68)

The centre flywheel mark lighted by flashing-light at same frequency as ignition, appears fixed and it must exactly coincide with the fixed mark on crankcase if the ignition is correct.

If an error is noted in direction of engine rotation, the ignition is retarded.

If an error is noted in opposite direction, the ignition is advanced.

In both cases, it is necessary to turn the stator plate. Clockwise if it is advanced, anti-clockwise if it is retarded, until the centre mark on the flywheel coincides with the mark on the crankcase. The contact opening must be 0.35 - 0.40 mm (0.014" - 0.016")

Control of Automatic advance

Increase the engine revolutions, keeping the flashing-light of stroboscopic lamp on the marks, to peak r.p.m. (max. 5000 r.p.m.)

At a given moment during the increase of the engine revolutions, the centre mark moves in the apposite direction to engine rotation, and the movement is proportional to the engine speed up to a certain point, after which the movement stops, (this happens at 3000 rev. approx.) at this point the third mark on the rotor must exactly coincide with the

fixed mark ont the crankcase. Increase or decrease the engine revolutions from the minimum to 3000 r.p.m. there or four times to ceck the correct automatic advance operation.

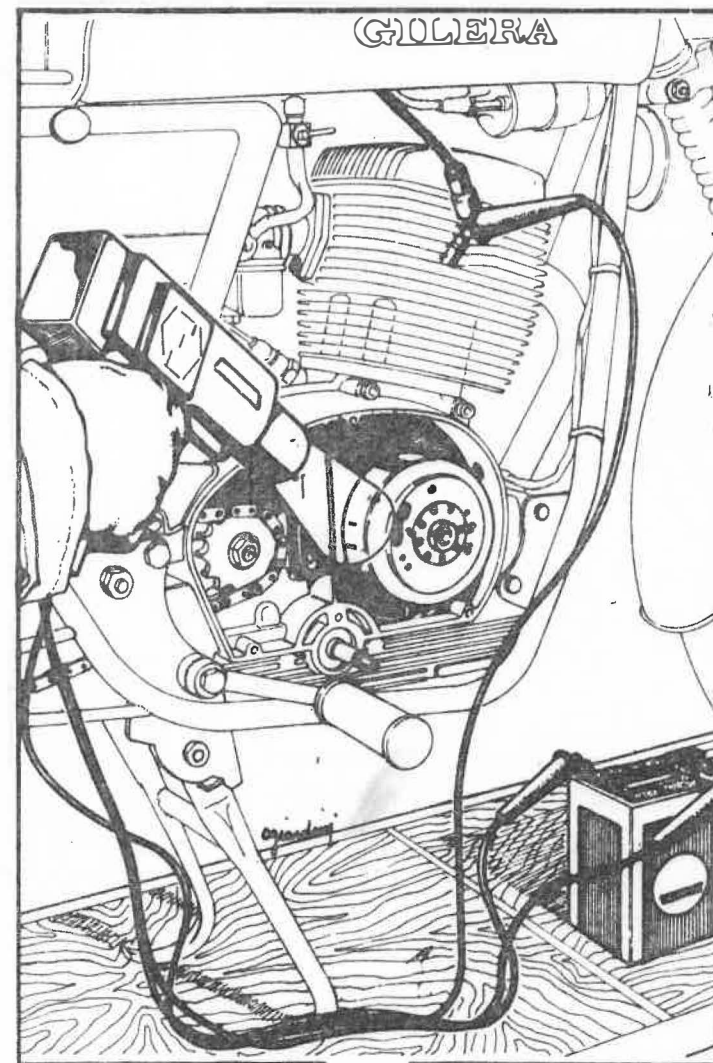


Fig. 68

ELECTRIC HORN

Normally requires no maintenance. If horn does not work, the trouble may be due to:

- a) faulty horn
- b) connections between horn and hornbutton broken
- c) hornbutton defective

To check if the trouble is due to horn, connect it to battery.

If horn does not work, replace.

If horn operates, look for defective connections or hornbutton. If the horn tone is defective, the trouble may be in the loosening of the horn support retaining screw.

Tighten if necessary.

BATTERY

It is the component of electrical system that needs most regular checking and the most careful maintenance. As follows:-

- 1) Checking of electrolyte level.
The electrolyte level, must be checked once a month at least and must exceed the top of the separators by 5-10 mm. To restore this level use distilled water only.
If it happens too frequently, check the electrical system for over charging.
- 2) Restore the electrolyte level and check the S.G. with an hydrometer (see fig. 69).
When the battery is charged, the density must be $30^{\circ} - 32^{\circ} \text{ Be}$, i.e. specific gravity $1.26^{\circ} - 1.28^{\circ}$ with temperature not lower to 15°C .

If the density is lower to 20° Be , the battery is completely discharged and it should be recharged.

When the battery is charged the voltage of each cell must be 2.6 - 2.8 V. The charge limit of each cell is 1.8V. The above voltage checks must be carried out with a headlamp bulb, connected separately.

Battery recharge

Normal recharge is a 1. 2 A current for 6 - 8 hours.

Ensure battery charger connections correspond to poles (+ with + and - with -). During the charge the battery plugs must be out.

Battery cleaning

The battery must be always clean and the terminals must be protected with vaseline.

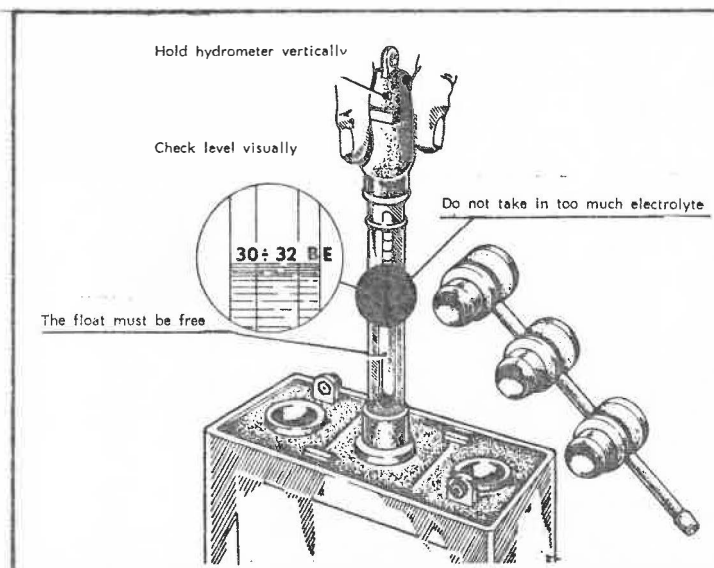


Fig. 69

SECTION 9 - Reassembly

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FOREWORD TO REASSEMBLY

This section describes the principal reassembling operations for which specific tooling or particular skill is necessary. We have not described tasks, which can be easily achieved with standard screw-drivers, spanners, pliers etc. In the same manner, the operations described in the section "Dismantling" are not repeated. For these, just reverse the process. For torque readings see page 2-4.

When reassembling carefully check and clean every single part.

Pay special attention to the following.

- THE HALF CRANKCASES must not be cracked or warped. The bearing seats must not be worn or scored.
- BALL BEARINGS. Check they are in good condition and that no excessive axial or radial play exists. It is good practice to check their smoothness by spinning them manually. Replace if they show traces of roughness after cleaning (washing in petrol). When reassembling lubricate the bearings with grease AGIP T. 1 Grease 30.
- SHAFTS AND AXLES Sliding and rolling surfaces must be free from indentation and roughness which will effect smooth operation, and they must be adequately lubricated.
- Always use new SEALS AND SPLIT PINS.

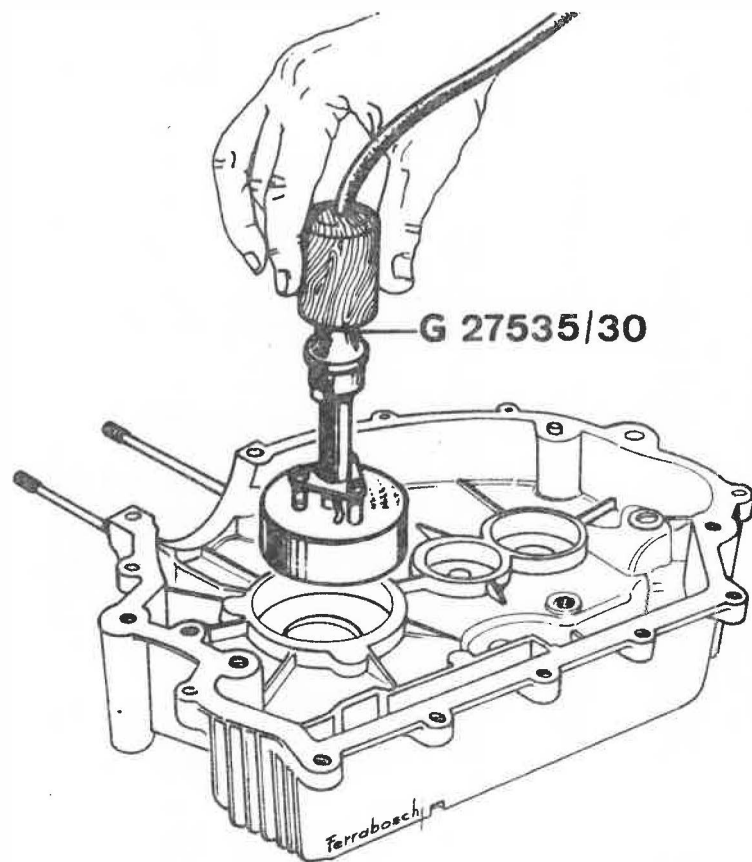
N.B. - For tightening screws and nuts, it is advisable to use a torque wrench.

BOLTS AND NUTS: Torque readings in kg/m

Part name	Torque in kg/m
Cylinder Head Nuts thread 8 x 1	2,3 - 2, 5
Spark-plug	2,5
Oil drain plug	3
Crankcase bolts	0.8
Bolts retaining crankcase at cylinder base	2.5
Chain Sprocket retaining nut	5
Flywheel magneto retaining nut	5
Clutch internal drum retaining nut	8
Oil pump control gear retaining nut	1.5 - 1.7
Oil pump retaining screws	0.6 - 0.8
Camshaft gear retaining screws	2.5 - 2.8
Timing gear nut	6

REASSEMBLY

Crankcase half heating



Procedure

-To facilitate correct assembly of bearings into the crankcase seatings it is necessary to adequately heat the relative housings using the heater G. 27535/30

Crankshaft alignment check

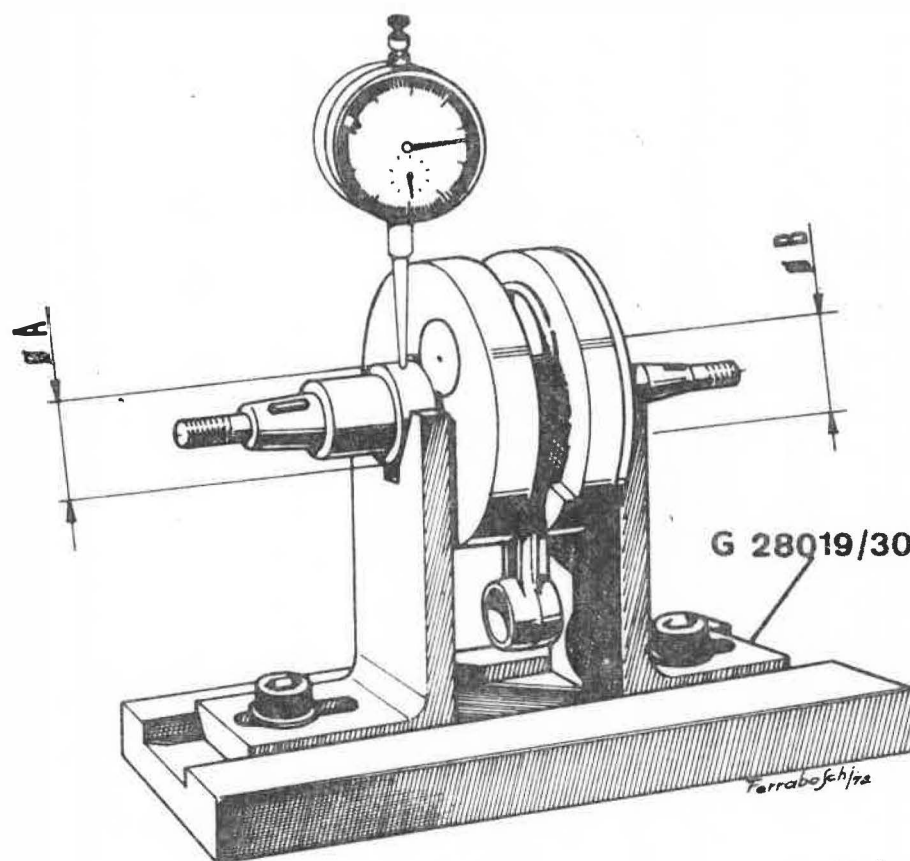


Fig. 71

Procedure

- Using the relevant fixture check that the degree of eccentricity on the surfaces of the outer diameters "A" and "B" are within 0.02 mm, which is the maximum limit.
- Slight mal-alignment can be corrected by actuating the crank webs with a wedge or by tightening them in a vice (using aluminium clamps) accordingly.

REASSEMBLY

Crankshaft on right half crankcase

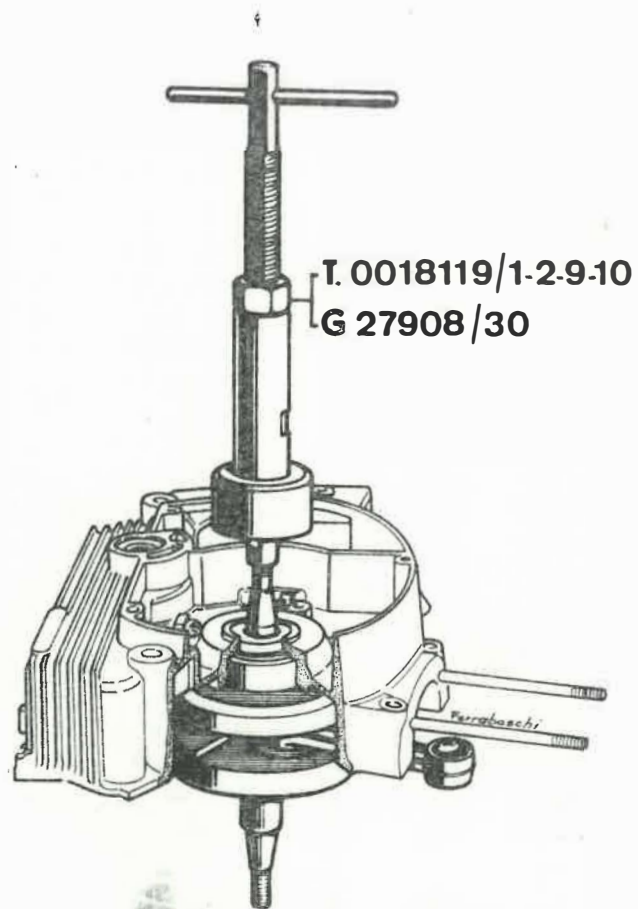
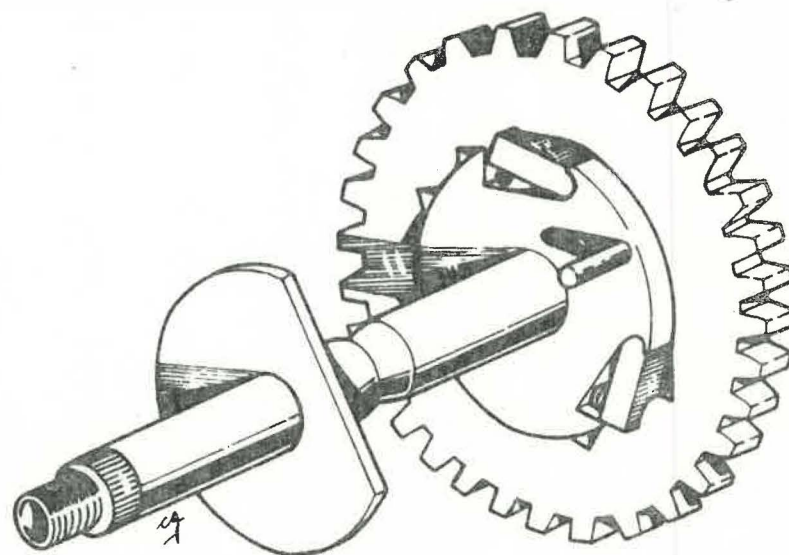


Fig.72

Procedure
<ul style="list-style-type: none">- Assemble the crankshaft, flywheel side, in the right half crankcase using tool T. 0018119/1-2-9-10 complete with part G 27908/30.

REASSEMBLY

Selector shaft



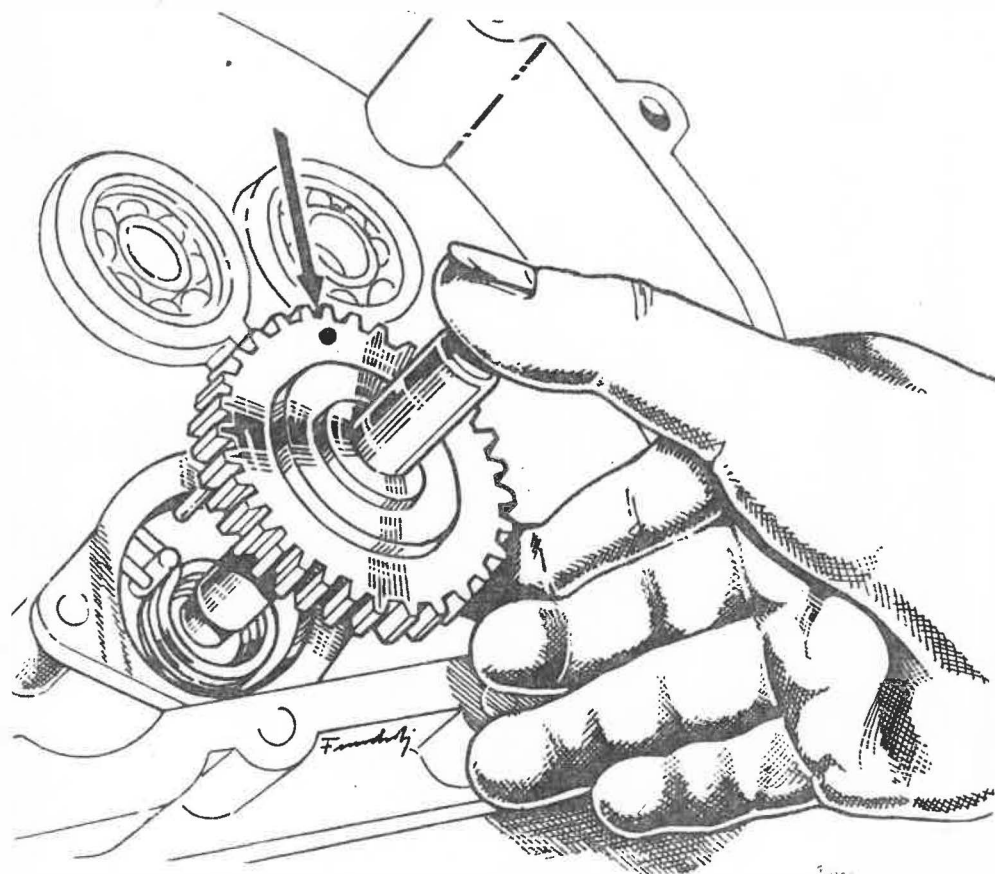
Procedure

- Assemble all parts of selector shaft, taking care that the part of gear marked with a burin point is towards the operator.
- The position of two pawls must be as shown in illustration.
- Insert the shaped washer retaining the pawls in the shaft.

Fig. 73

REASSEMBLY

Spring and selector shaft on crankcase



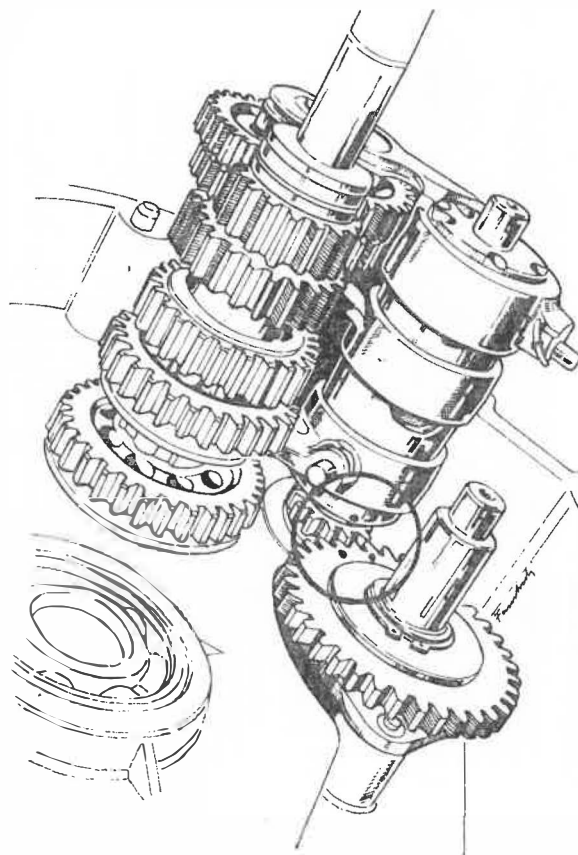
Procedure

- Assemble the lever return spring in its seating on right half crankcase using a screwdriver and cross the spring ends so that the spring is loaded.
- Insert the plate in the pins on crankcase.
- Insert the selector shaft in its seating, taking care that the pin goes into two ends of spring.

FIG. 7

REASSEMBLY

Gearbox timing



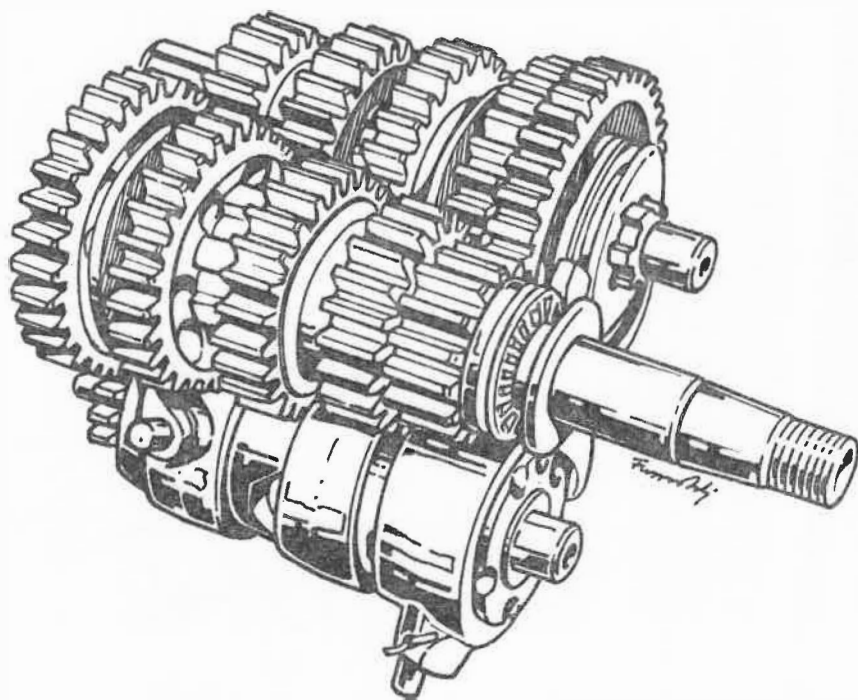
Procedure

- Assemble the gearbox unit, taking care that the timing points of selector gear and link drum gear are corresponding.

Fig. 75

REASSEMBLY

Gearbox reassembling



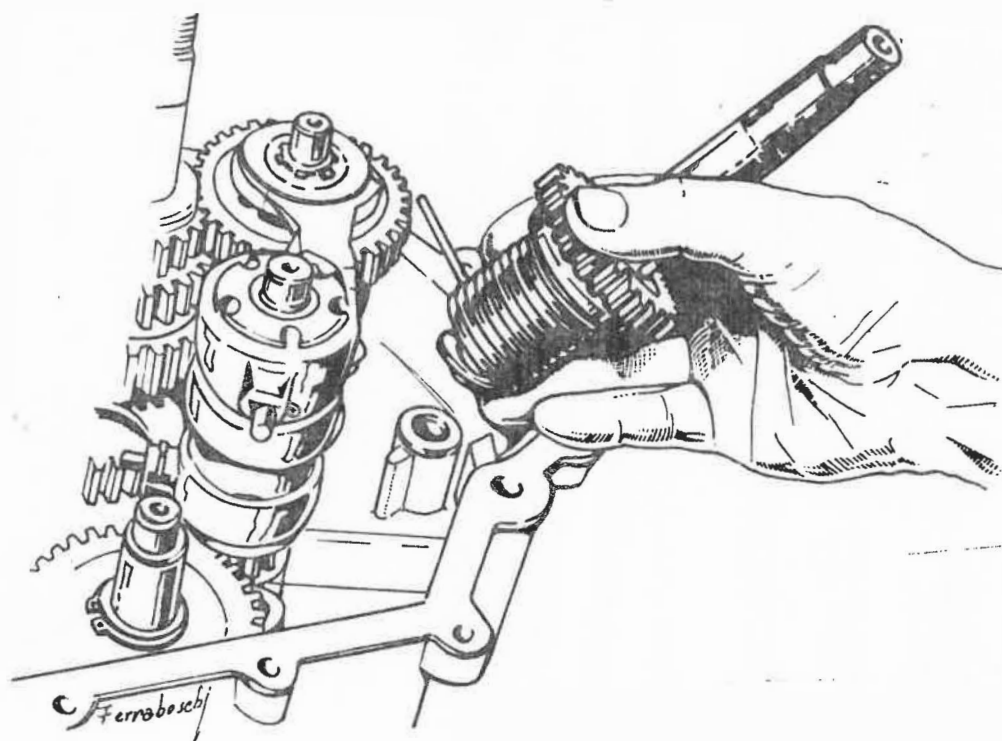
Procedure

- Assemble the mainshaft and the layshaft in accordance with the gearbox diagram.
- Assemble the link drum engaging the forks in the groove of the sliding gears and in the sleeve of 1st gear.

N.B. - Remember to assemble on mainshaft the washer and the thrust-block.

REASSEMBLY

Kickstart shaft



Procedure

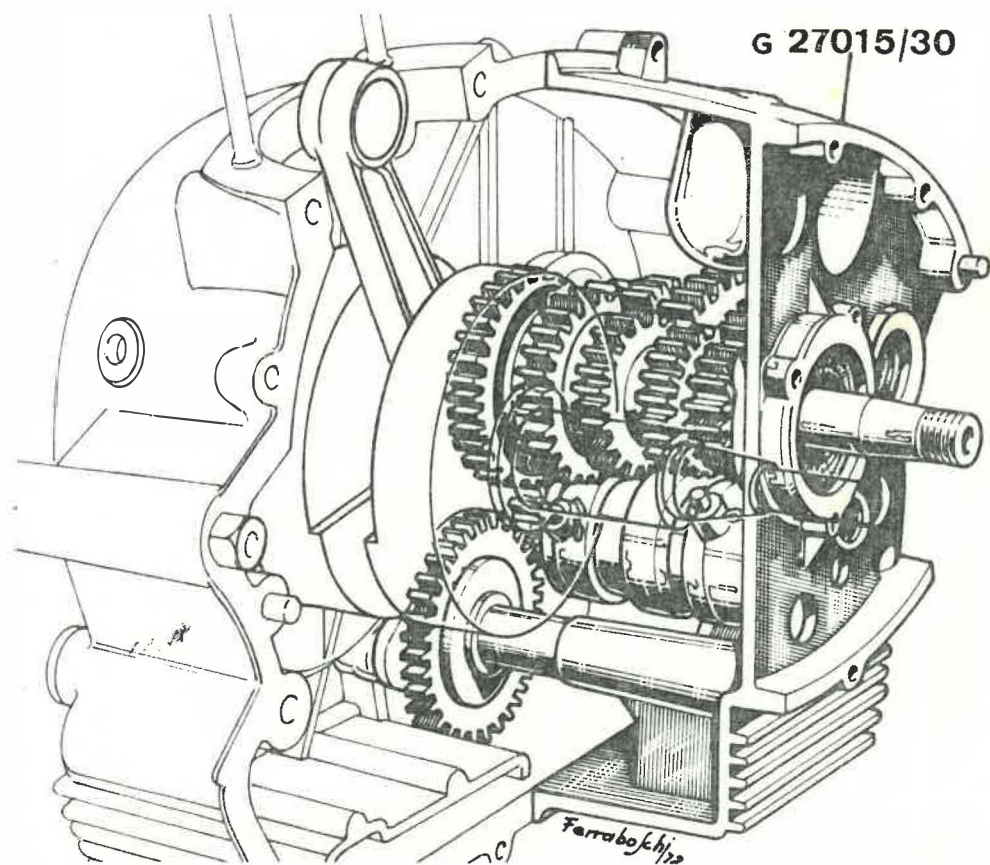
- To facilitate this operation, lift slightly the gear unit from its seating to permit the gears engagement.

NB.- Assemble the spring spacer on the shaft with the bevel towards the gear.

Fig. 77

REASSEMBLY

Gearbox unit control



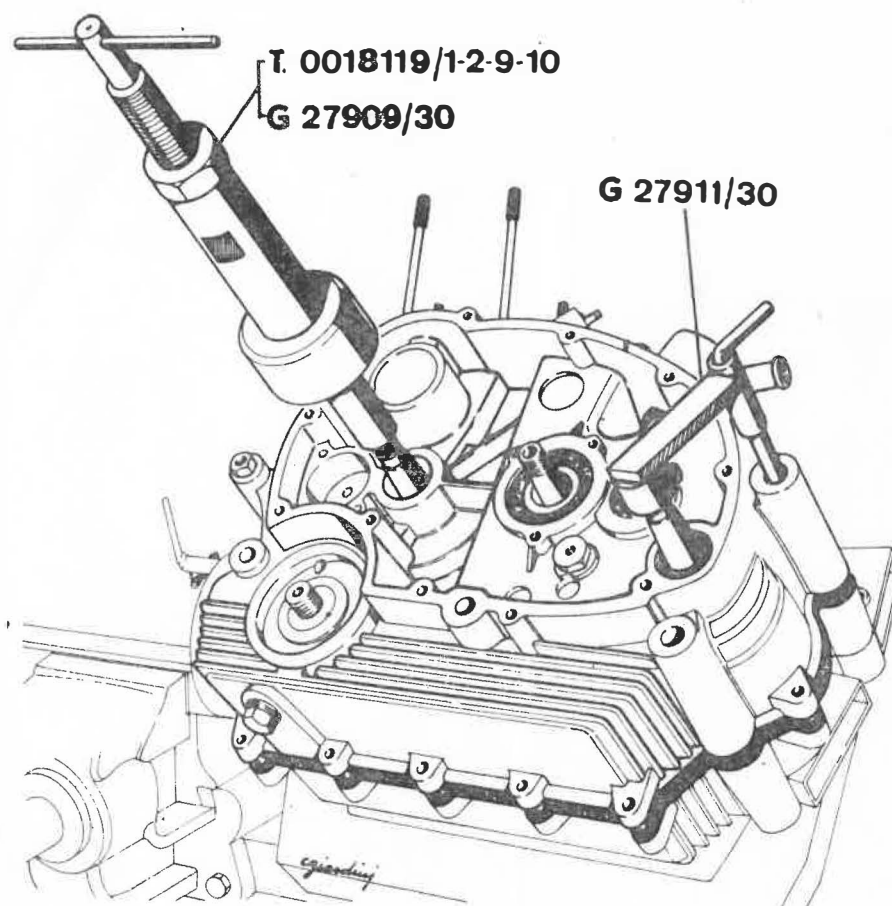
Procedure

- Assemble on right half crankcase the tool G 27015/30 and check the axial clearances of selector shaft and layshaft; if necessary use washers

Fig. 78

REASSEMBLY

Crankcase reassembling



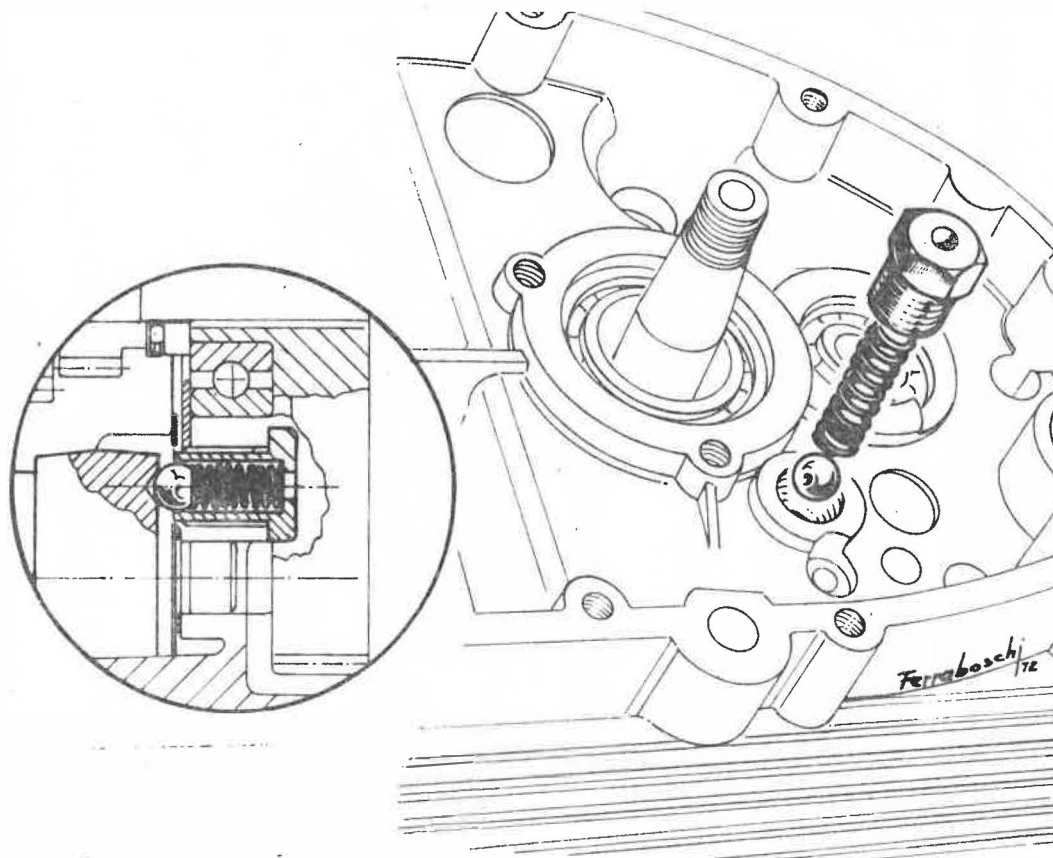
Procedure

- Fit a new gasket
- Offer the left half to right half crankcase and at the same time load the kickstart shaft spring using the tool G 27911/30 -
- Apply the tool T. 0018119/1-2-9-10 complete with the part G 27909/30 and tighten the two half crankcase guiding the selector shaft in its seating.
- Fit the crankcase retaining bolts.

Fig. 79°

REASSEMBLY

Selector stop ball



Procedure

- Insert the ball, taking care that it goes in the link drum groove.
- Insert the spring in the plug.
- Tighten the plug in its seating and check the gearbox operation.

Fig. 80

REASSEMBLY

Clutch unit

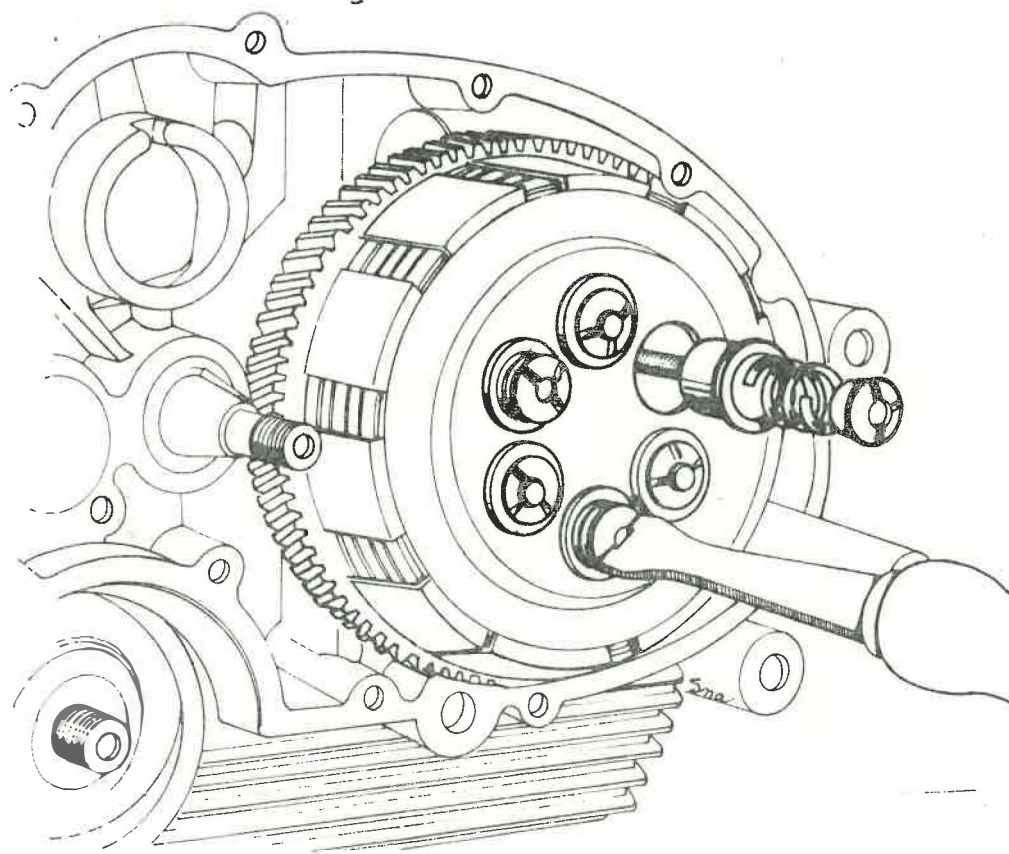


Fig. 81

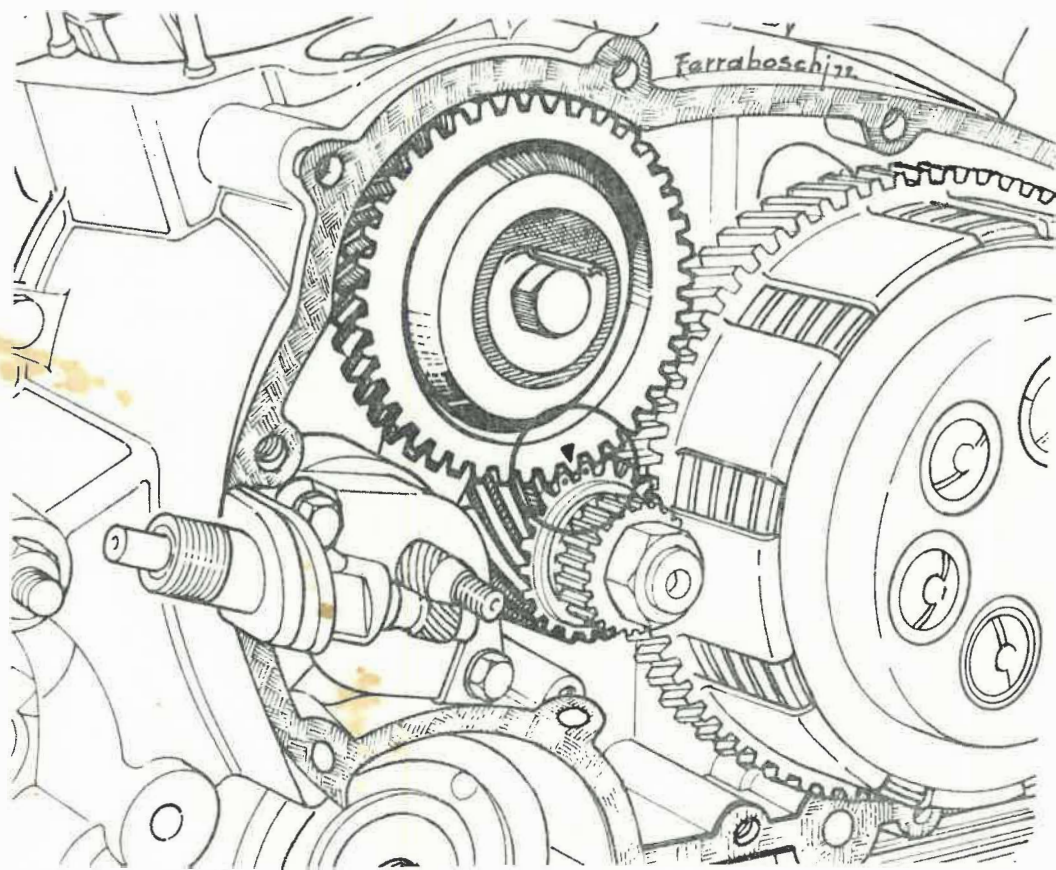
Procedure

After clutch unit assembly, ensure that the clutch plates open sufficiently and are parallel and that the pressure plate turns freely. For this operation press the control lever and use the kickstart lever.

- If necessary, use the screwdriver (concave end) and turn adjusting screws so that the springs load are evenly distributed.

REASSEMBLY

Camshaft timing



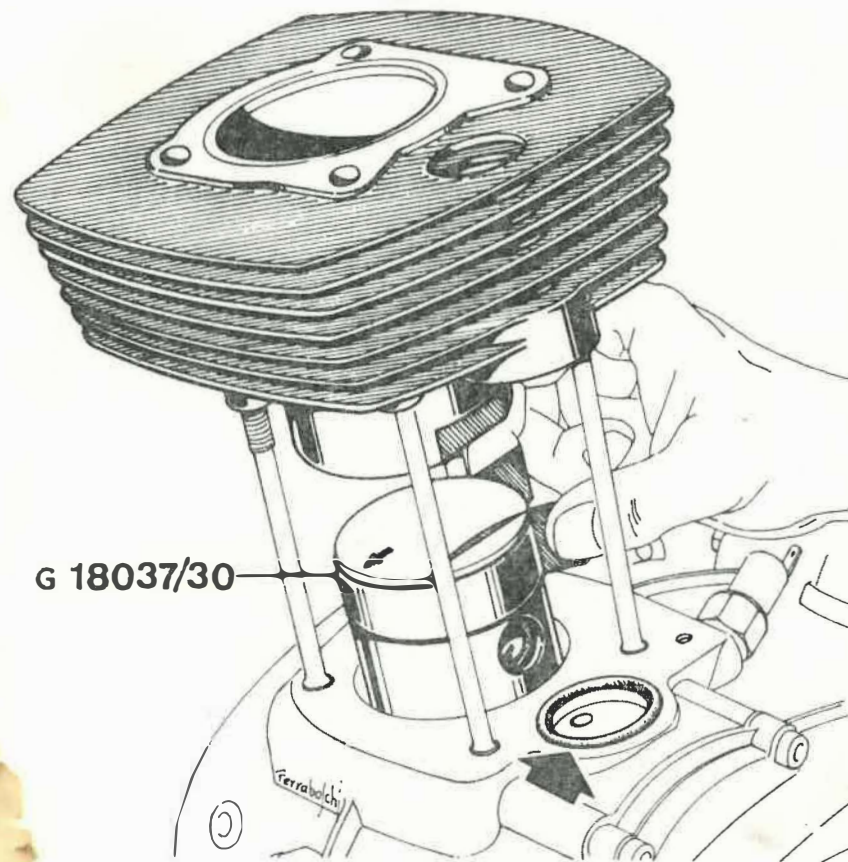
Procedure

- After assembly of tappets and camshaft in their correct seatings, assemble the timing gears taking care that the timing marks correspond.

Fig. 82

REASSEMBLY

Piston and cylinder



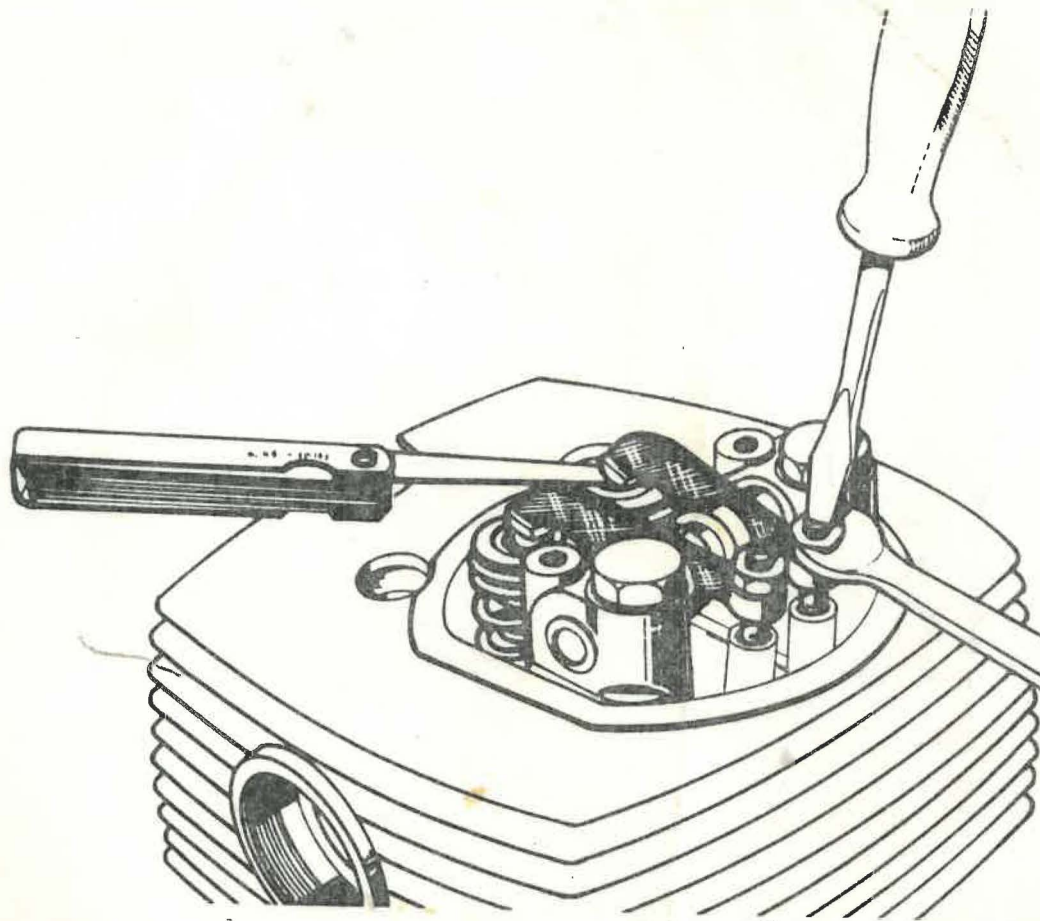
Procedure

- When reassembling the piston, remember that the arrow on the piston crown must point forwards. Towards exhaust.
- When reassembling the cylinder to piston use piston ring clamp G 18037/30

Fig. 83

REASSEMBLY

Valve-tappet adjustment



Procedure

- Adjust the tappets with piston at T.D.C.
- Turn the adjustment screw with a screwdriver after loosening of adjustment nut and check by feeler gauge the following clearances (cold engine)
 - inlet mm 0.10 (0.004")
 - Exhaust mm 0.15 (0.006")
- Tighten the adjustment screw

Fig. 85

PREPARING MACHINE FOR THE ROAD

When engine overhauling, or overhauling of other parts of the motorcycle is complete, carry out the following checks before handing machine back to customer, after bench testing of flywheel magneto and engine:

- 1 - Check security of all nuts and bolts.
- 2 - Oil level in gearbox: check with dip stick.
- 3 - No fuel or oil leak.
- 4 - Check pressure of tyres (see tab. pag. 1-7).
- 5 - Efficiency of electrical equipment.
- 6 - Carburation check.
- 7 - Brakes for efficiency.
- 8 - Clutch adjustment.
- 9 - Steering without hands on handlebars.
- 10 - Steering lock. This attachment must not be greased.
- 11 - Motorcycle cleanliness. Use petrol for engine exterior. Use water for painted parts and chamois for drying.

Note: Distributors and representatives should also carry out the above checks, on new motorcycles before handing them to the customer.

1st Edition