1000 SP

MOTO GUZZI

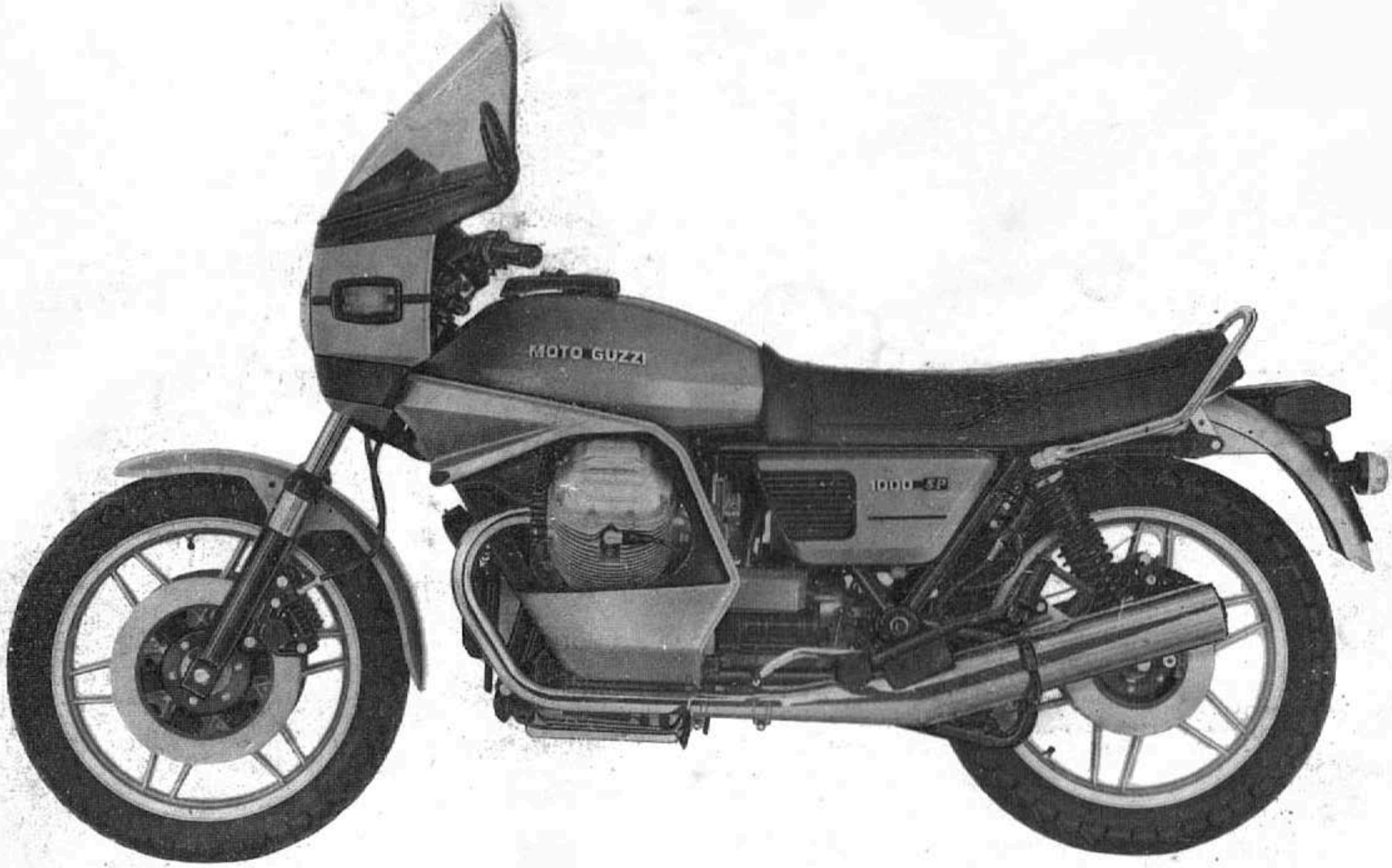
owner's manual

First of all we wish to thank you for choosing a Moto Guzzi motorcycle. By following the instructions contained in this booklet you will ensure a long and troublefree life to your machine.

Before riding, please read carefully these instructions in order that you may know your motorcycle features and how to operate it safely.

All major checking and overhauling jobs are best carried out by our dealers who have the necessary facilities and know how to competently repair your byke.

Repairs and/or adjustments made by others than Moto Guzzi dealers during the warranty period could invalidate the warranty right.


MOTO GUZZI
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4 MAIN FEATURES

Engine

Twin cylinder - 4-stroke	
Cylinder disposition	«V» 90°
Bore	88 mm
Stroke	78 mm
Displacement	948,8 cc
Compression ratio	9.2 to 1
Max torque	8.6 kgm at 5200 rpm

Valve gearing

O.H.V., push rod operated.

Carburation

N. 2 carburettors «Dell'Orto» type VHB 30 CD (right), VHB 30 CS (left).

Lubrication

Pressure, by gear pump.
Wire gauze and cartridge filters in oil sump.
Normal lubrication pressure 3.8-4.2 kg/sqcm (54-60 p.s.i.).
Controlled by pressure relief valve in the sump.

Generator/Alternator

Front, on the crankshaft (14 V - 20 A).

Ignition

Coil-battery ignition with double contact breaker and automatic advance.

Ignition data:

— Initial advance (fixed) 2°
— Automatic advance 31°
— Full advance (f. + a.) 33°
— Contact breaker gap:
0.37 ÷ 0.43 mm (.14″ ÷ .16″)
— Spark plugs: Marelli CW 7 LP
Bosch W 225 T2
Champion N 9 Y
AC 44 XL
Lodge HLNY
— Plug points gap: 0.6 mm (.023″).
— 2 ignition coils fitted on the frame on top of the engine.

Starting

Electric starter (12 V - 0,7 KW) with electromagnetic ratchet control. Ring gear bolted on the flywheel. Starter button (Start) on R/H of handlebar.

Transmission

Clutch

Dry type, multiplate, hand controlled by lever on left handlebar.

Primary drive

By gears. Ratio: 1.235 to 1 (Z = 17/21).

Gearbox

5 speeds, frontal engagement, constant mesh gears. Cush drive incorporated. Pedal operated on L/H of motorcycle.

Gear ratios:

Low gear = 1 to 2 (Z = 14/28)
2nd gear = 1 to 1.388 (Z = 18/25)
3rd gear = 1 to 1.047 (Z = 21/22)
4th gear = 1 to 0.869 (Z = 23/20)
High gear = 1 to 0.750 (Z = 28/21)

Secondary drive

By cardan shaft, bevel gear set.
Ratio: 1 to 1.714 (Z = 7/33).

Overall gear ratios (engine-wheel):

Low gear = 1 to 11.643
2nd gear = 1 to 8.080
3rd gear = 1 to 6.095
4th gear = 1 to 5.059
High gear = 1 to 4.366

Frame	Duplex cradle, tubular structure.
Suspensions	Front: telescopic fork incorporating sealed dampers. Rear: swinging fork and rear dampers with adjustable external springs.
Wheels	Light alloy castings with rims: WM 3/2.15 - 18″ (CP 2).
Tires	Front: 100/90 H 18″ (MT 18). Rear: 110/90 H 18″ (MT 18).
Brakes	Front: disc type with caliper having 2 cylinders, controlled by hand lever on the R/H side of the motorcycle. Hydraulic transmission independant from the rear brakes. Disc size: 300 mm (11.8″), braking cylinder 38 mm (1.49″), master cylinder 12.7 mm (.5″).

Rear: disc type with fixed caliper having 2 cylinders. Controlled by rocker pedal on the center R/H side of the byke. Disc size 242 mm (9.5″), braking cylinder size 48 mm (1.890″), master cylinder 15.875 mm (.624″).
Hydraulic transmission with pressure control valve (operating on the rear brake circuit).
The rear brake is connected by an hydraulic transmission to a twin front brake having the same features and size as the hand controlled right front brake.

Dimensions and weights

Wheelbase	1.480 mt (58″)
Length	2.180 mt (86″)
Width	0.750 mt (29.5″)
Height	1.040 mt (40″)
Height (with windshield)	1.380 mt (54″)
Min ground clearance	0.150 mt (6″)

Dry weight: abt 210 kg (460 lbs).

Performances

Top speed, solo riding: abt 200 km (129 mph).
Fuel consumption: lt 5,8 x 100 km.

Fuel and oil capacities

Group or part	Quantity	Recommendation
Fuel tank	24 l (6.6 gls)	Supergrade gasoline (98/100 NO-RM)
Reserve	4 l (1 gl)	
Oil sump	3 l (abt 3 qts)	Oil «Agip Sint 2000 SAE 10 W/50»
Gear box	0.750 l (abt 26 oz)	Oil «Agip F.1 Rotra MP SAE 90»
Rear drive box (bevel set)	0.250 l (abt 9 oz)	
	of which	
	0.230 (8 1/4 oz)	«Agip F.1 Rotra MP SAE 90»
	0.020 (3/4 oz)	«Agip Rocol ASO/R»
Front fork (each leg)	0.060 (2 oz)	Fluid «Agip F.1 ATF Dexron»
Braking circuits (front and rear)		Fluid «Agip F.1 Brake Fluid SAE J 1703B»

10 CONTROLS AND ACCESSORIES

(fig. 2)

1 Caliper, right front brake.

2 Speedometer.

3 Voltmeter.

4 Rearview mirror.

5 Right front brake control lever.

6 Throttle control grip.

7 Engine start and stop button.

8 Front fairing.

9 Left front brake and rear brake pedal.

10 Footrest.

11 Pillion footrest.

12 Rear turn signal lamp.

13 Caliper, left front brake.

14 Rev-counter.

15 Clock.

16 Windshield.

17 Clutch lever.

18 Buttons controlling: horns, flashers (flash), and turn signals.

19 Light switch.

20 Ignition key.

21 Lock set, fuel filler cap opening.

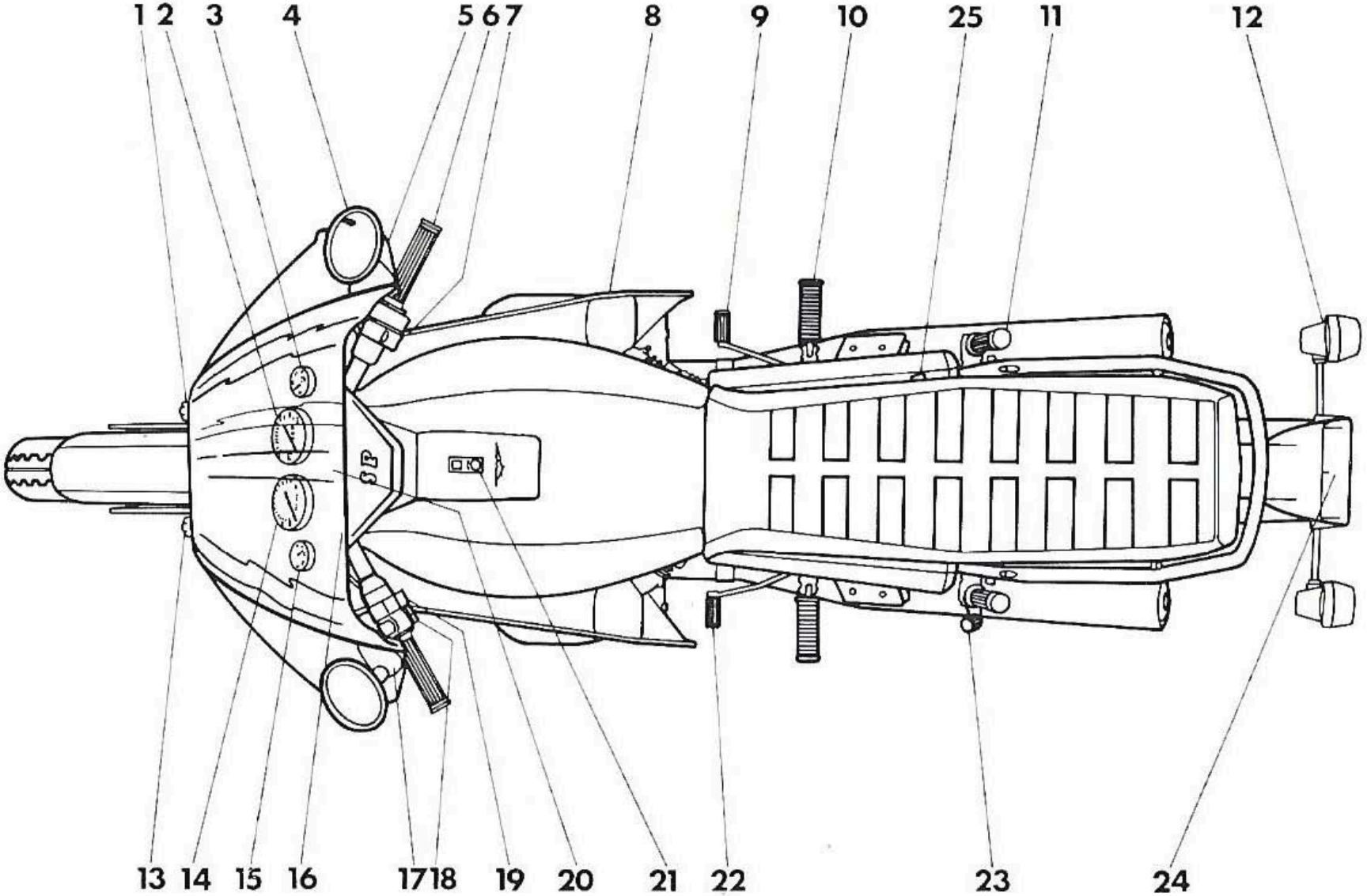
22 Gearshift pedal.

23 Center stand.

24 Tail light.

25 Saddle release lever.

«Right» or «left» in the text are intended as seen by the rider astride the motorcycle.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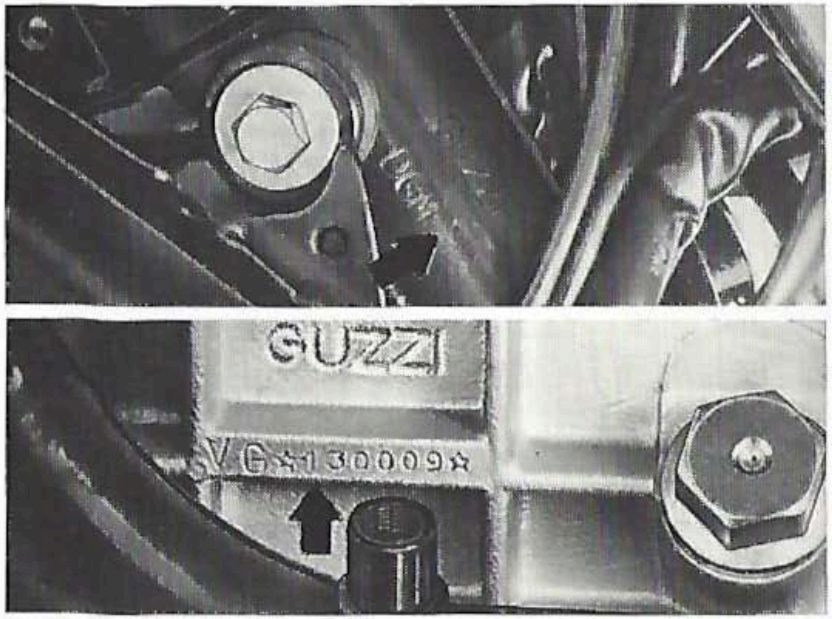
12 IDENTIFICATION DATA
(fig. 3)

Each motorcycle is identified by an identification number on the frame down tube and a number stamped on the engine crankcase.
The identification number on the frame is mentioned in the motorcycle log-book and identifies the vehicle to all legal effects.



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Spare parts

In case of part replacements, ensure that «**original Moto Guzzi spare parts**» only are used.
The use of non-genuine parts invalidates every warranty right.

Warranty

The warranty is valid for a period of 6 months with a limitation to 10.000 km (6000 miles) from the selling date and expires in case of modifications to the motorcycle or partecipation to racing competitions.
Tires, accessories, or parts not manufactured in the «Seimm Moto Guzzi» factories are excluded from this guarantee.
Each new motorcycle is supplied with a «coupon book» which has to be carefully kept with all other circulation papers as it is the only document entitling the owner to request warranty services from Seimm Moto Guzzi dealers, according to the general conditions of sale.

Instrument panel (fig. 4)

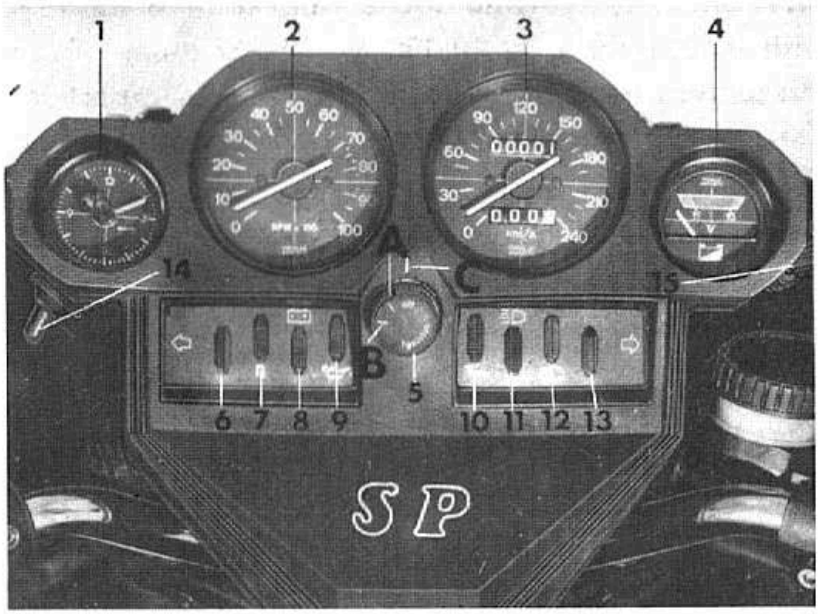
1 Clock.

2 Rev-counter.

3 Speedometer, km or miles counter.

4 Voltmeter.

5 Ignition key.



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«OFF» In line with the panel mark: machine at standstill, key removable.

«A» In line with panel mark (turned clockwise): machine ready to be started. All circuits on. Key not removable.

«B» In line with mark on panel (turned clockwise): machine at standstill. With switch «A» (fig. 5) in position «O» parking light on. Key removable.

6 Warning light (green), left turn signal.

7 Warning light (green), neutral indicat. Light up only when transmission is in neutral.

8 Warning light (red), indicating current delivery from generator. Should go out when the engine reaches a certain number of revs.

9 Warning light (red), oil pressure gauge. Goes out when oil pressure is sufficient for normal engine lubrication. If it does not, this means oil pressure is not correct and in such an event the engine should be immediately stopped and all circuits checked over.

10 Warning light (red) indicating low level of oil in the reservoir-master cylinder for front left and rear brakes. When this light comes on, top up the fluid reservoir, ensuring there are no leakages in the hydraulic circuit.

11 Warning light (blue) indicating high beam on.

12 Warning light (green) indicating parking lights on.

13 Warning light (green), right turn signal.

14 Switch for emergency flashers.

15 Odometer zero reset.

Light switches (on left hand side of handlebar) (fig. 5)

Switch «A»

«0» Parking lights.
«1» Low beam.
«2» Lights off.

Switch «B»

With switch «A» in position «1»:
«3» Low beam.
«4» High beam.

Horn, flashing lights and turn signal buttons (fig. 5)

Are fitted on L/H side of handlebar.

Button «C»

«5» (horn) Horn control.
«6» (flash) Flashing light control.

Switch «D»

«7» Right turn light.
«8» Left turn light.

Engine starting and stopping button (fig. 6)

It is located on the right handlebar.

With key of fig. 4 in position «A», the vehicle is ready to be started.

To start the engine, proceed as follows:

— ensure switch «B» is in position «1» (run);

— pull the clutch lever completely;

— on a cold engine, set the starter lever to position «B» (fig. 27);

— press start button «A».

To stop the engine in an emergency:

— move switch «B» to position «2» (OFF).

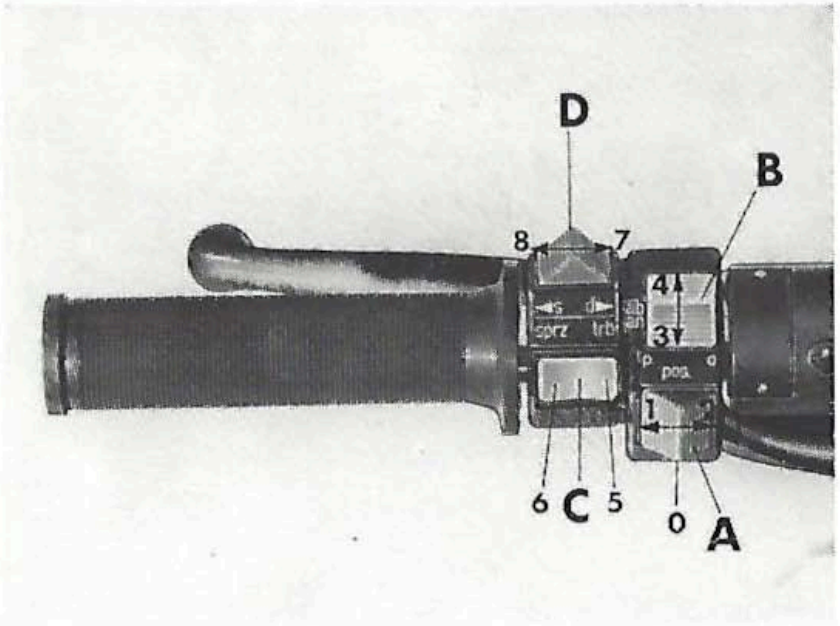
As soon as the engine stops, turn ignition key (fig. 4) counterclockwise till mark «OFF» is in line with the mark on the panel board, and take out the key from the lock set.

Starter lever (fig. 27)

This lever for cold startings is located on the left side of the vehicle:

«B» Start position.

«C» Riding position.



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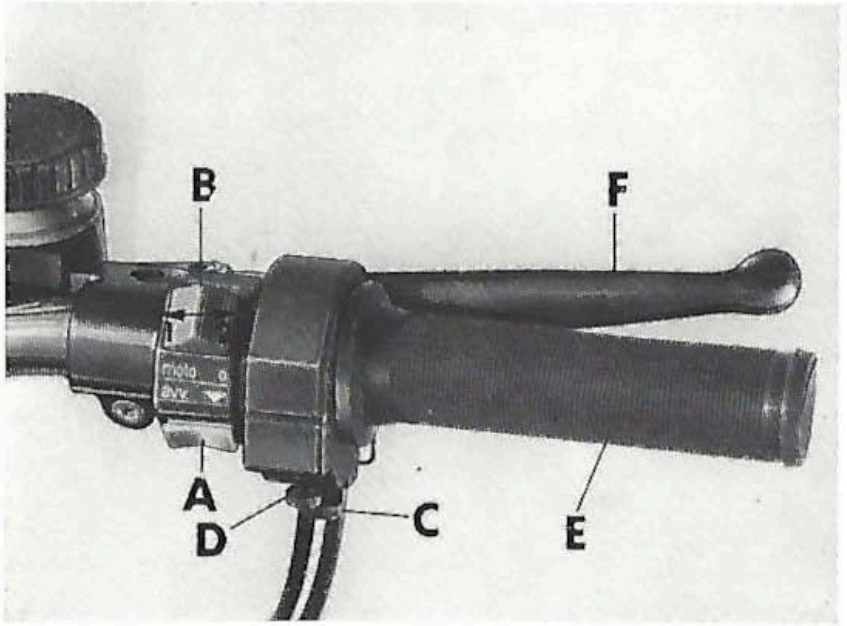

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16 Throttle twist grip control (fig. 6)

It is located on the R/H side of the handlebar; turning it inwards opens the gas and viceversa closes it.

Clutch control lever (fig. 5)

It is on the L/H side of the handlebar: should be pulled only for starting and gearshifting.

Control lever for the R/H front brake («F» in fig. 6)

on the R/H handlebar. It controls the master cylinder for the hydraulic front brake through a suitable circuit.

Left front and rear brake control pedal («F» in fig. 17)

It is centrally located on the R/H side of the vehicle and is link connected to the master cylinder.
It controls the left front brake and rear brake simultaneously.

Gearbox control pedal (fig. 7)

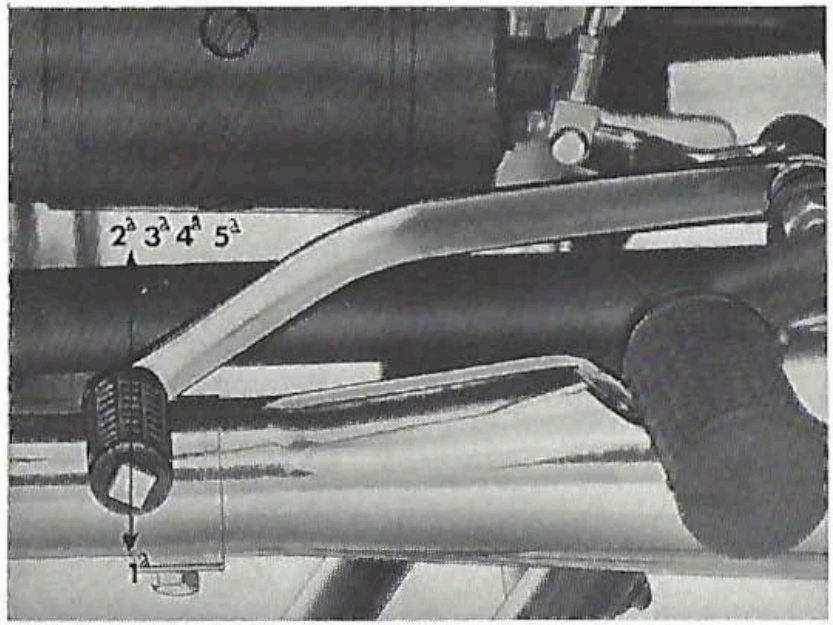
This rocking pedal is located at the left center of the motorcycle.
Positions:

— low gear, front lever end towards the ground;

— 2nd, 3rd, 4th, high gear, rear lever end towards the ground;

— neutral between low and 2nd gear.

Before actuating the pedal, pull the clutch lever completely.



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Fuel filler cap (fig. 8)

To acceed to the filler cap «B» it is necessary to turn clockwise key «A» on the protection cover «C» then the cover can be lifted.

Fuel taps (fig. 9)

Are fitted under the rear part of the tank.
The tap has 3 positions:

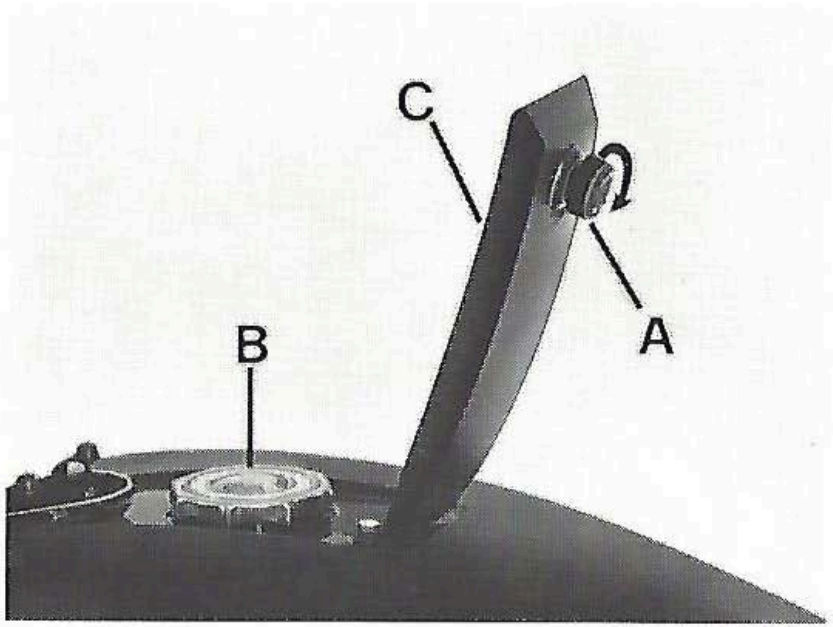
«ON» Open, arrow on lever upwards.

«RES» Reserve, arrow on lever downwards.

«OFF» Closed, arrow on lever horizontal.

Terminal block with fuses (fig. 10)

It is located on the right side of the motorcycle.
To acceed to it, remove the right side cover and then the box cover.
N. 6 fuses of 16 A are fitted.



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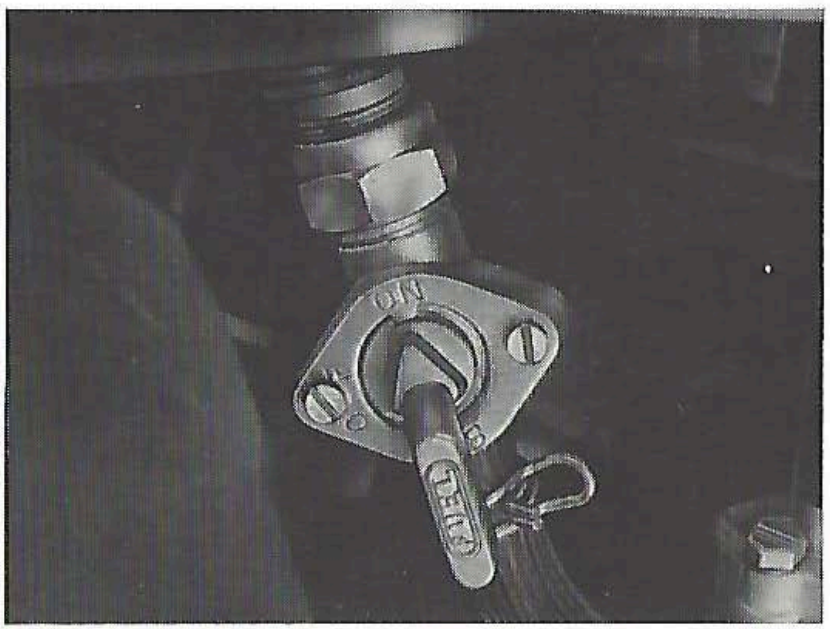

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Fuse n. 1

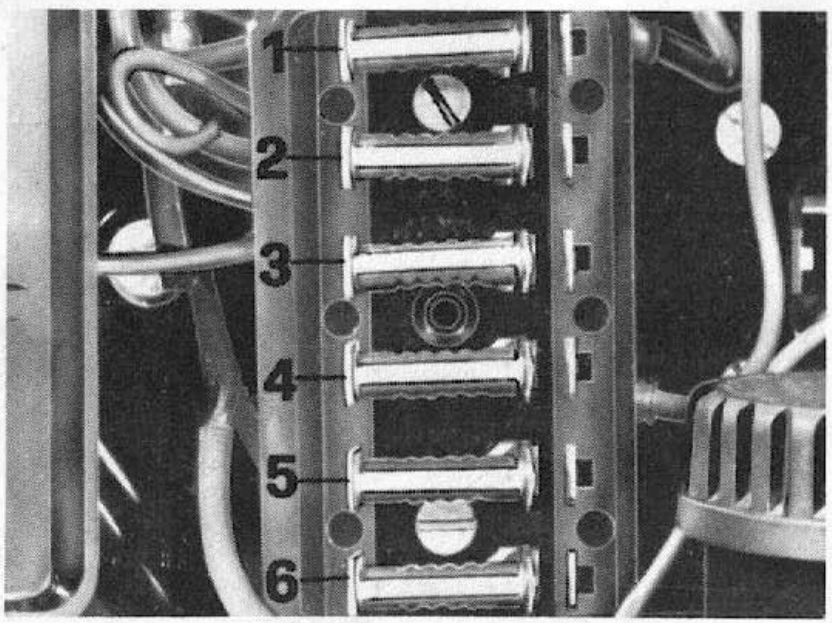
Starter relay - Rear stop switch.

Fuse n. 2

Flashing lights - Horns.

Fuse n. 3

Warning lights: neutral - gen - oil - brake fluid - parking - high and low beam - front stop switch - parking lights - panel lights - high beam.



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Fuse n. 4

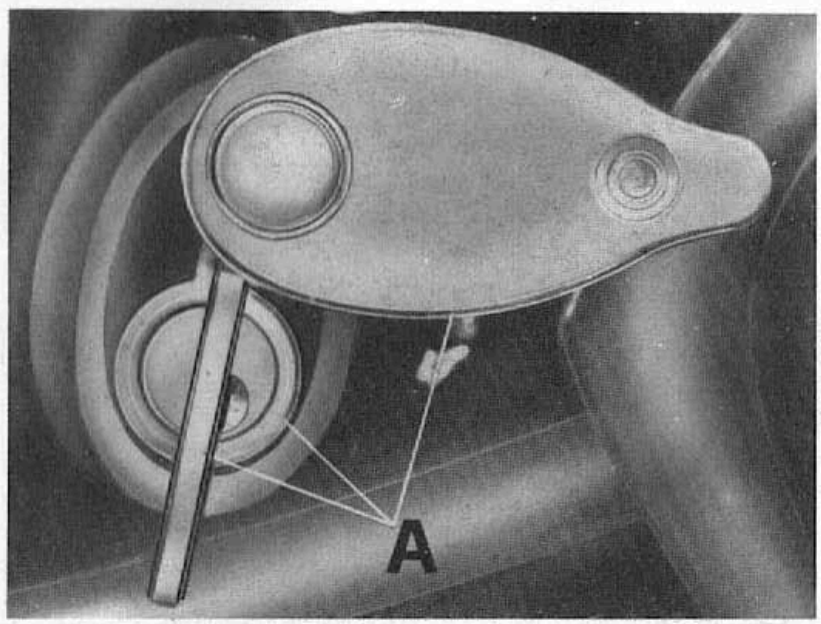
Parking light - Parking light indicator - Panel instrument lights.

Fuse n. 5

Turn signal lights and their warning lights.

Fuse n. 6

Clock +.



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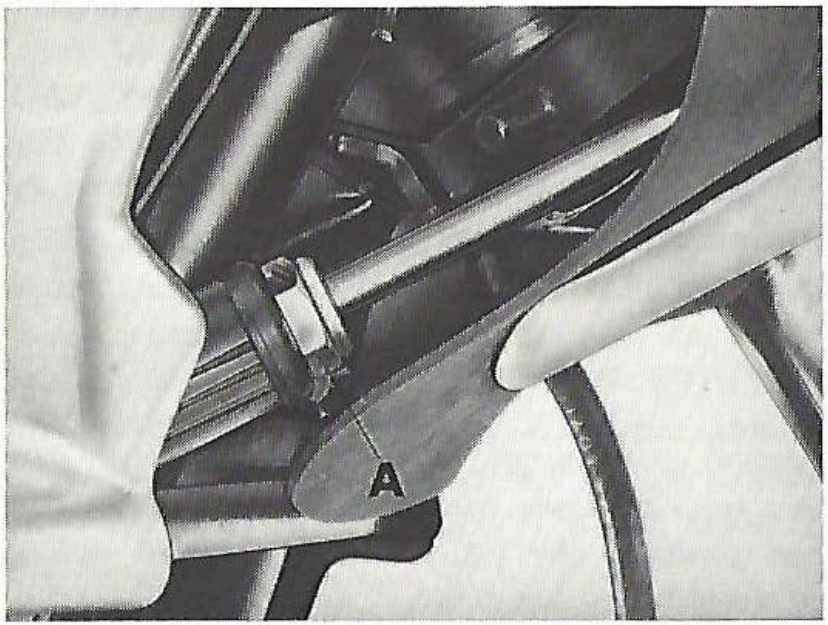
Steering lock
(fig. 11)

To lock or unlock the steering, proceed as follows:

Locking

- turn the handlebar fully to the right;
- insert the key in the lock set, turn it anticlockwise, push in right in release it, and withdraw it.



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Unlocking

- insert the key in the lock set, turn it anticlockwise, release it and withdraw it.

Side stand

This stand is used only for brief stops. Since it is automatically retractible, for long stops it is advisable to use always the centre stand which garantees better stability.

Steering damper (fig. 12)

It is fitted on the R/H side of the motorcycle, between frame and bottom yoke.
To harden or slacken the damper, screw in or out nut «A».

Controls before starting

Ensure that:

- ignition key is in the start position (mark «A» on key has to be in line with the mark on panel (fig. 4);
- there is sufficient oil in the tank;
- warning light «brake» (fuel level in braking circuits) is not lighted;
- the oil in the sump is at correct level;
- the following warning lights are lit: «oil» (red), «gen» (red), and for nightime riding, «1» (green);
- starter control lever for cold starting is in position «B», fig. 27).

Starting a cold engine

After checking the above, turn the twist grip 1/4 turn towards the rider, pull clutch lever fully, and press start button «A», moving eventually switch «B» in figure 6 to position «1» (run).
As soon as the engine has started and before returning starter lever to position «B», fig. 28, allow the engine to idle a few minutes in the cold seasons or a few seconds in the cold season.
If starter lever is left in starting position «A» fig. 27 whilst riding, there would be irregular carburation and increased fuel consumption and in the worst cases the cylinder may seize because of too much petrol going into it.

Caution - If the green light in the panel does not light up when the ignition is in position «A», fig. 4, this means a gear is engaged and the pedal has to be shifted to «neutral» as starting in such conditions may be dangerous.

Starting a hot engine

Proceed as for a cold engine, except that in this case «starter» lever has not to be adjusted to the start position «A» fig. 27 as this would richen the carburation too much.

On the way

To change up or down, pull the clutch lever completely and engage the next gear. Release the clutch lever slowly, accelerating at the same time. The pedal has to be actuated firmly and accompanied with the foot.
When shifting down to a lower gear, operate gradually on the brakes and the throttle grip to avoid overrevving the engine when the clutch lever is released.

Stopping the motorcycle

Close the throttle, actuate the brakes gently, and pull the clutch lever only when the byke is almost to a standstill. This operation has to be done with much coordination in order to keep the vehicle under control.
To reduce speed gradually using the gearbox properly, in order to utilise the engine braking power, do this paying attention not to cause the engine to over rev.
On wet or slippery roads, the brakes — especially the front one on the right — should be used with great caution.
To stop the engine, turn the ignition key to position «OFF» (fig. 4).
Do not forget to always close the fuel taps on an engine at standstill.

Parking

When parking at night on insufficiently lighted roads, switch on the parking lights by turning the key in fig. 4 till it is in line with mark «C» on the panel and light switch in fig. 5 to position «O». Then remove the key and lock the steering.

22 RUNNING IN

During the running in period, follow strictly these recommendations:

1 Before starting allow the engine to warm up at idling speed for a more or less period of time, according to the external temperature.

2 Avoid exceeding the maximum permissible speeds in each gear. Avoid running at the same number of revolutions for long periods but change gear frequently.

3 Before stopping, reduce the speed gradually to prevent the various engine groups from undergoing abrupt changes of temperature.

4 Ensure all the operations specified in the service voucher have been carried out at the stated mileages.

5 Dont forget that proper bedding down of all components will only occur after several thousands of miles have been covered.
This will allow you to obtain excellent performance from your motorcycle for a long period of time.

Maximum running in speeds

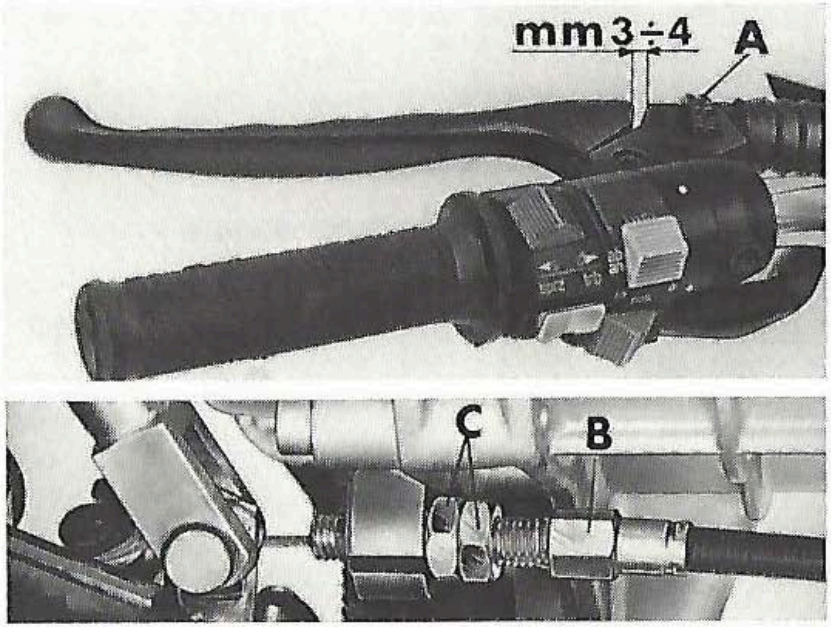
Distance covered	Maximum permissible speeds				
	Low gear	2nd gear	3rd gear	4th gear	High gear
Up to 1000 km (600 miles)	45 km (29 mph)	65 km (40 mph)	85 km (53 mph)	100 km (63 mph)	115 km (72 mph)
From 1000 km (600 miles) to 2000 km (1200 miles)	55 km (34 mph)	80 km (48 mph)	105 km (63 mph)	120 km (74 mph)	140 km (87 mph)
From 2000 km (1200 miles) to 4000 km (2500 miles)	Gradually increase the above limits up to the maximum admissible speed.				

After the first 500 km (300 miles) 1000 km (600 miles)

Change the crankcase oil. **Should the level fall under the minimum mark before the engine has reached 300-600 miles (500-1000 km), it will be necessary to change the oil instead of topping up.**
Recommended oil: «Agip Sint 2000 SAE 10W/50».
Check tightness off all nuts and bolts.
Adjust valve rocker clearance.
Check contact breaker gaps.

Adjusting the clutch control lever (fig. 13)

If the free play at the handlebar is more than 4 mm (.157″), act on adjuster «A» to restore the correct play.
This adjustment can also be carried out by slackening counternuts «C» on the right side of the gearbox and acting on adjuster «B».



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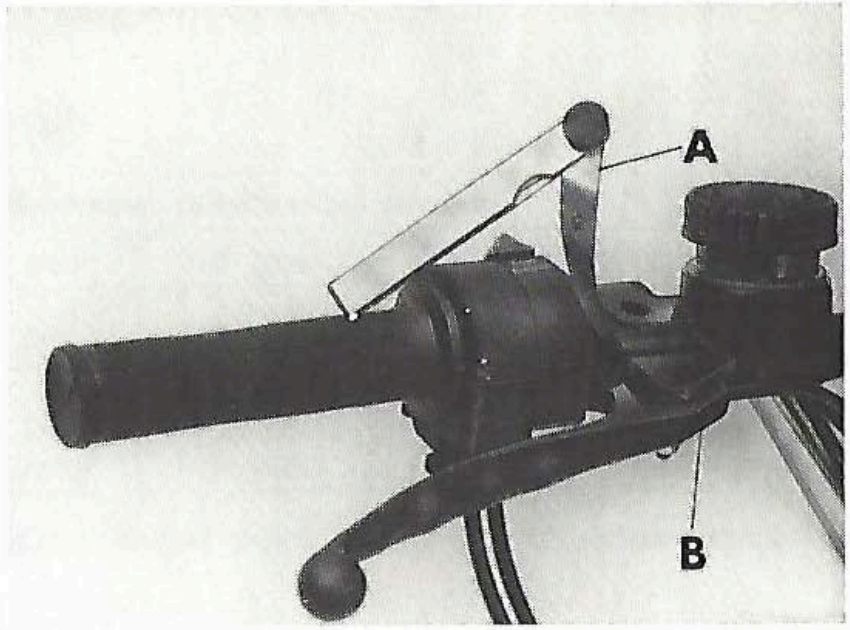
Adjusting the right front brake control lever (fig. 14)

Proceed as follows:

- insert feeler gauge «A» between the floater in master cylinder and the control lever end and turn thumb screw «B» to obtain the correct play which is 0.05-0.15 mm (.0019-.0059″).



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Checking wear of the brake pads

Every 5000 km (3000 miles), check thickness of the brake pads.

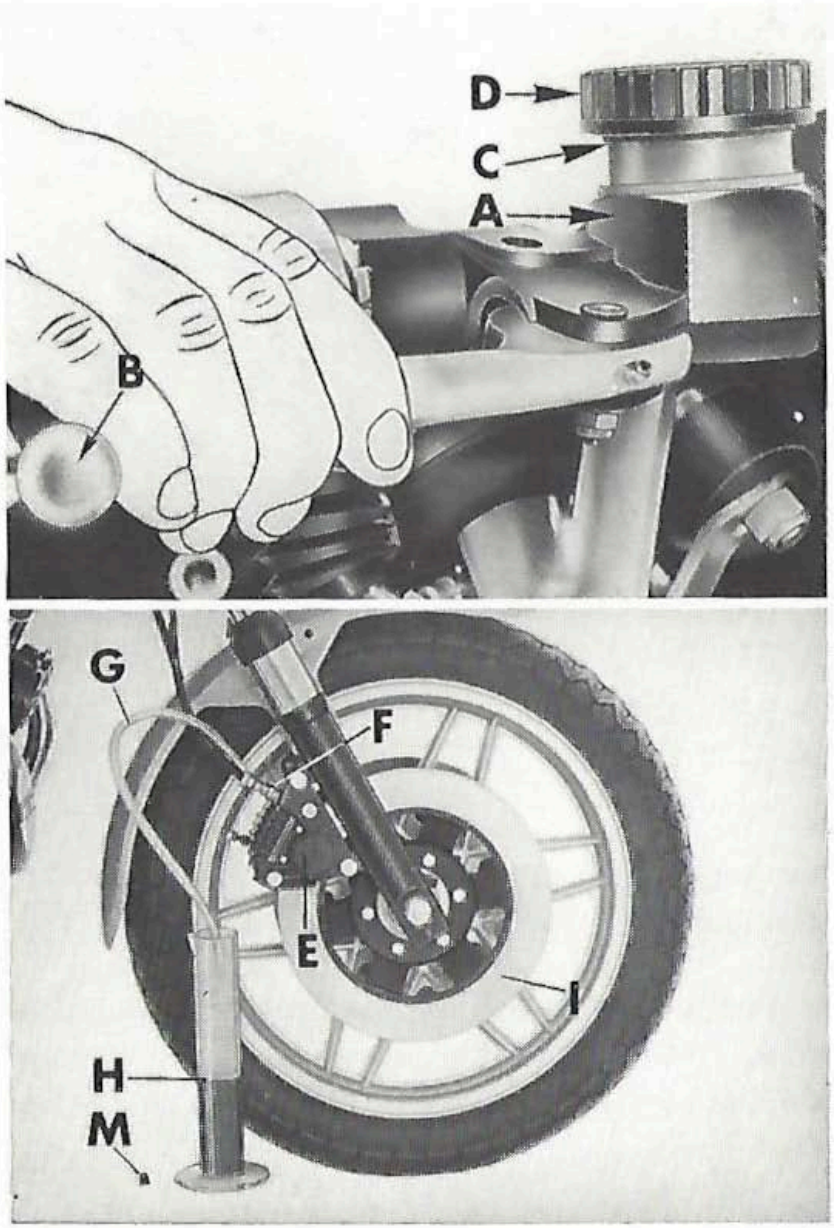
— New pad 9 mm (.3543″).

— Wear limit 6 mm (.2362″).

If the pad wear limit is below this limit, it is necessary to change the pads.
After this operation has been carried out, there is no need to bleed the air from the braking circuits; it is sufficient to operate the control lever on the handlebar («B» in fig. 15) several times until the caliper pistons reach their normal position.
When replacing the pads, check also the condition of the fluid ducts: if in any may damaged, replace them immediately.

Checking the braking discs
(fig. 15 and 16)

The discs «I» should be perfectly clean, without oil, grease or other impurity, also free from deep scoring.



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In the case of replacement or overhauling of the brake discs, it is necessary to check their fluttering. This control is done using a suitable gauge and the reading should never exceed 0.2 mm (.0079″).
If the «fluttering» is higher, have the discs checked in any one of our dealers shop.

Controlling the fluid level and replacing the brake fluid in the reservoirs (master cylinders)
(figg. 15-16)

For proper braking operation, these instructions should be strictly followed:

1 Periodically check the fluid level in the reservoirs. This level should always be over the transparent section «C» of the reservoir (master cylinder) «A».

2 Periodically check and if necessary top up the fluid in reservoir «A», after undoing nut «D» and removed the diaphragm (see fig. 15).
The fluid level in the reservoir for the left front and rear brakes is indicated by warning light «10» in fig. 4 on the instrument panel which is actuated by the indicator on cover «H» (fig. 17).
To top up, undo cap «H» on master cylinder «I» in fig. 17, after disconnecting the electric wires.

Use only fluid taken from original containers opened just before pouring in.

3 Change all the braking fluid every 15.000 km or at least once a year.
For good operation of the circuits, it is necessary for the ducts to be always full of airless fluid.
A long and elastic movement of control lever «B» indicates the presence of air bubbles in the ducts.
To wash the braking circuits, use only fresh fluid.

Never use alcohol for washing or compressed air for drying. For metal parts, the use of trichloroethylene is recommended.

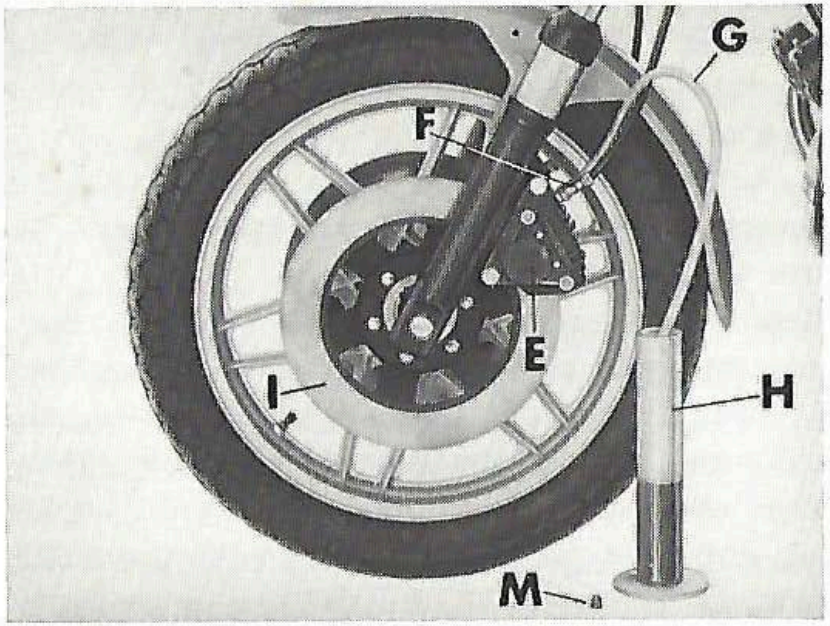
Fluid to be used: «Agip F.1 Brake Fluid SAE J 1703B».

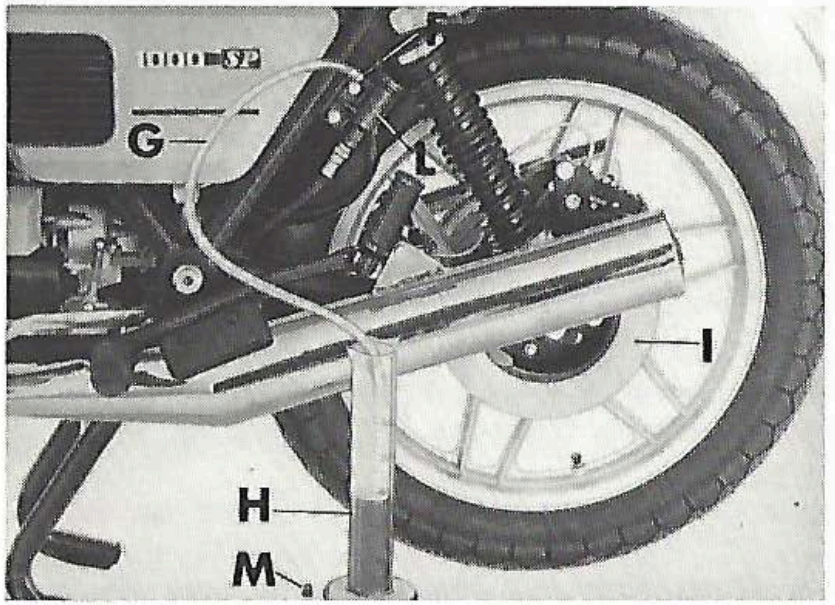
Bleeding the air from the braking circuits (fig. 15 and 16)

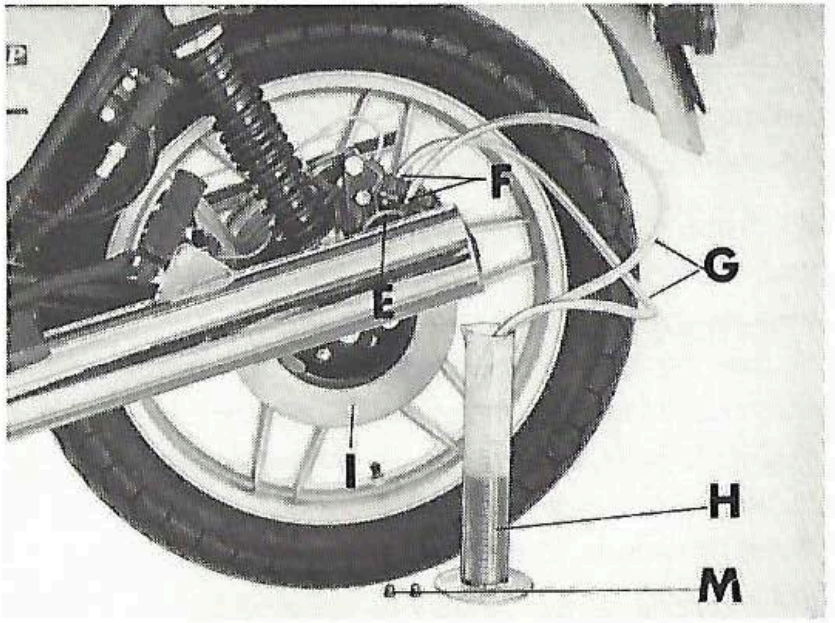
This operation is required when the movement of the control lever on the handlebar or the pedal is long and elastic, due to the presence of air in the braking circuits.
To bleed, proceed as follows:

Right front braking circuit (fig. 15)

- turn the handlebar till the reservoir is in horizontal position;







- if necessary, fill up reservoir «A» (ensuring that during the bleeding operation the fluid does not drop below the transparent section);
- bleed by acting on one caliper half «E» at the time as follows:

1 Remove the rubber cover «M» and fit flexible ducts «G» on drain plug «F» with the other end of the duct plunged into transparent container «H» partially filled up with liquid of the same type.

2 Loosen drain plug «F».

3 Completely pull brake control lever «B» several times, releasing it slowly and waiting a few minutes before pulling it again. Repeat the operation until the duct end plunged into the transparent container emits airless fluid.

4 Keep control lever «B» fully pulled and lock drain plug «F». Then take out plastic duct «G» and re-fit rubber cover «M» on the drain plug.
If the air bleeding operation has been carried out correctly, a direct and efficient working of the fluid will be perceived immediately after the initial idle movement of control lever «B».
If not, repeat the operation till the above is achieved.

Front left and rear brake circuit

Air bleeding from the circuit from master cylinder to the pressure relief valve (fig. 16)

Proceed as follows:

1 If necessary, top up reservoir «H» (fig. 17) (ensuring that during the bleeding operation, the fluid does not drop below the transparent section).

2 Bleed pressure relief valve «L» operating as follows:

— fit a transparent flexible duct «G» on drain plug «F» with its other end immerged into transparent container «H» partially filled up with fluid of same type;
— slacken plug «F».

3 Actuate fully control pedal «F» (fig. 17), releasing it slowly and waiting a few seconds before pushing it down again.
Repeat the operation until the duct end plunged into the transparent container emits airless fluid.

4 Keep control pedal («F» in fig. 17) fully pressed down and tighten drain plug «F» (fig. 16).
Then take out plastic duct «G» from the container and re-fit rubber cap «M» on the drain plug «F».

Bleeding air from the pressure relief valve and the caliper on the rear wheel disc (fig. 16)

Repeat the operations 1 - 3 - 4 in the previous chapter.

2 To drain plugs «F» of caliper «E» fitted on the L/H plate of the swing arm, after removing rubber caps «M», connect transparent lines «G» with the other ends plunged into transparent container «H» partially filled with fluid of same type.

Bleeding air from the pressure relief valve circuit to the caliper on the left fork cover (fig. 16)

Repeat the operations 1-3-4, as above specified.

2 On drain plug «F» of caliper «E» on the left fork cover and, after removing rubber cap «M», fit up transparent flexible duct «G» of which the other end is plunged into a transparent container «H» partially filled with fluid of same type.
If the bleeding of the left front and rear brakes circuits has been done correctly, a direct and efficient working of the fluid will be perceived immediately after the initial movement of control pedal «F» (fig. 17).
If this does not occur, it is necessary to repeat the above operation.

Adjusting the front left and rear brake pedal position (fig. 17)

Check clearance between floater and control lever «B», proceeding as follows:

- fit feeler gauge «G» between the master cylinder floater and the control lever end. Then operate on thumb screw «A» to obtain the correct play which is 0.05-0.15 (.0019-.0059″);
- take off the circlip, slip out the pin, slacken counternut «B» and screw in or out fork «C» until control pedal «F» comes to the desired position. Refit the rod retaininng pin and the split pin.

At the end of this operation, slacken counternut «D» and adjust screw «E» for lever return.

Adjusting the rear suspensions (fig. 18)

The external springs of the rear dampers can be adjusted to three different position by means of lever «A» in the kit.
Should and irregular operation of the hydraulic

dampers be noticed, it is advisable to have them checked in one of our dealers workshops.

Note - Do not forget that both suspensions have to be adjusted to the same position to ensure good stability to the motorcycle.

Adjusting the steering (fig. 19)

For safe riding, the steering has to be adjusted so as to allow free movement to the handlebar but without excessive play.

To correctly adjust:

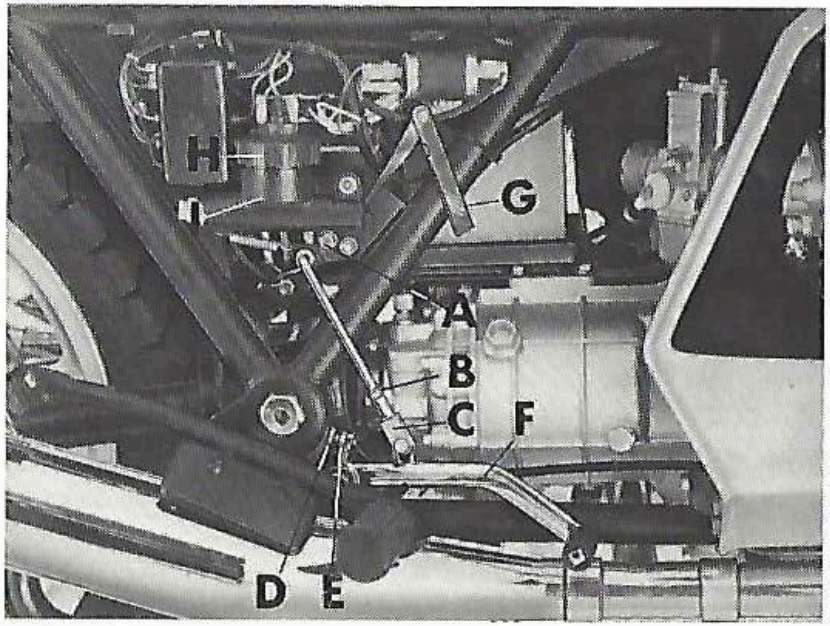
— Loosen steering head fixing bolt «A».

— Undo steering head nut «B».

— Screw in or out adjuster screw «C» to take up the excessive play.

This done, tighten nut «B» and steering head fixing bolt «A».

It is well for this operation to be carried out by one of our dealers.



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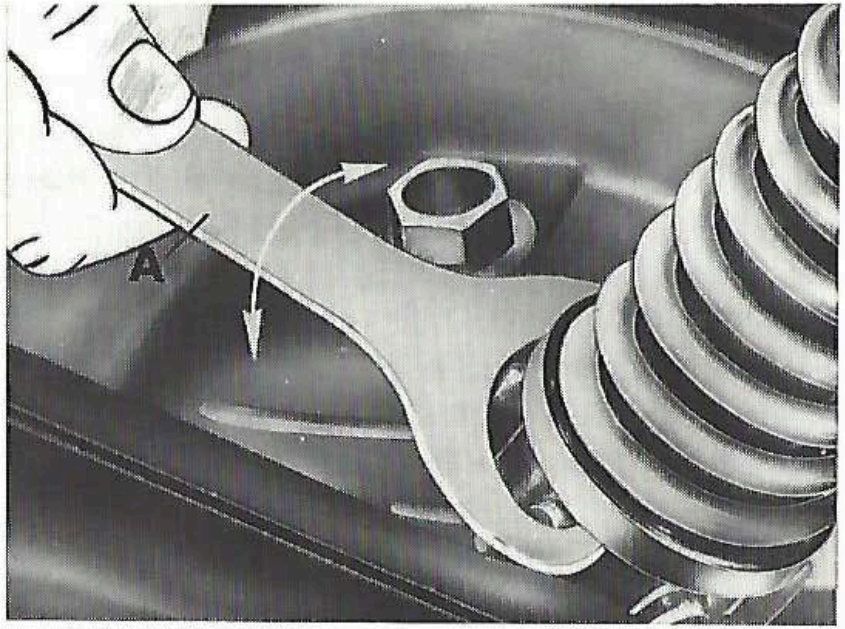
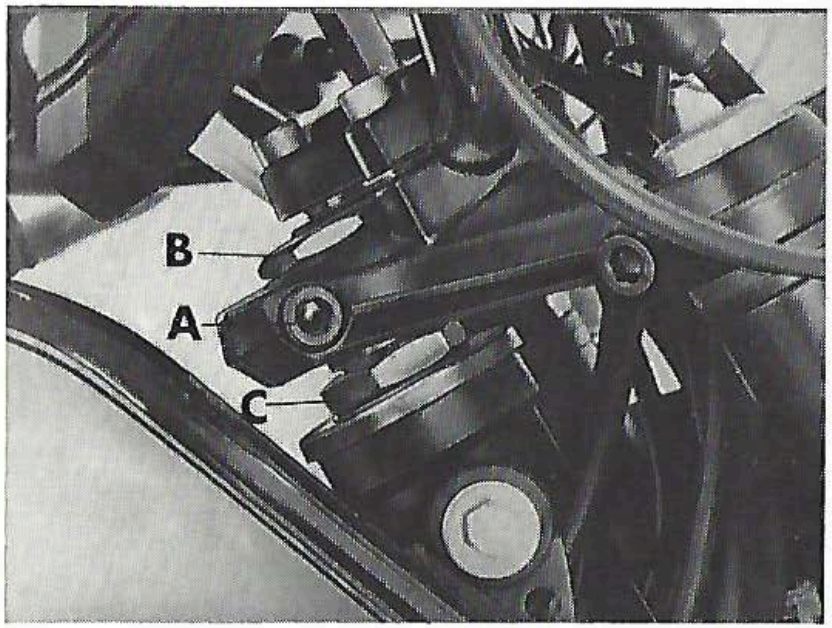


18

Adjusting the twist grip
(«D» and «C», fig. 6)

To adjust the travel of the twist grip, operate on screw «C» after loosening counternut «D».
To harden the return of the grip operate on screw «C».



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32 REMOVAL OF WHEELS

Front wheel (fig. 20)

To remove the front wheel, operate as follows:

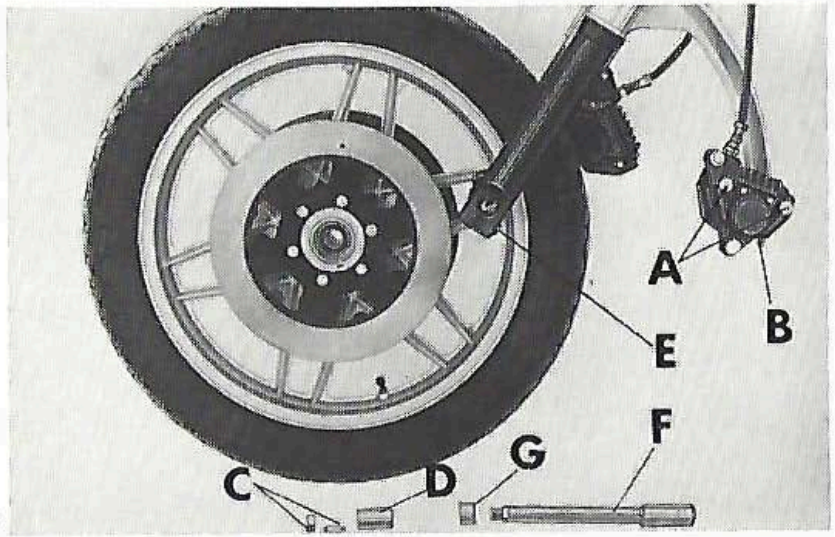
- set the vehicle up on the center stand and place a stand under the engine crankcase to keep the wheel up from the ground;
- undo the screws securing caliper «A» to the right fork cover and from this remove caliper «B» complete with its line;
- undo the spindle securing nut on the L/H side «C»;
- undo the screws securing the covers to wheel spindle «E»;
- withdraw spindle «F» paying attention to the mounting position of spacers «D» and «G»;
- take out the braking disc (on the right side of the wheel) from the caliper fitted on the R/H fork cover. Take off the wheel from the fork legs.

The re-assembly operation is a reversal of the dismantling one.

Rear wheel (fig. 21)

To remove the rear wheel from the swing arm and rear drive box, proceed as follows:

- set up the byke on the center stand;
- undo nut «A» with washer «B» on the spindle, rear drive box side;
- loosen spindle bolt «D» on fork arm;
- withdraw spindle «C» from the drive box, the hub, and the swing arm;



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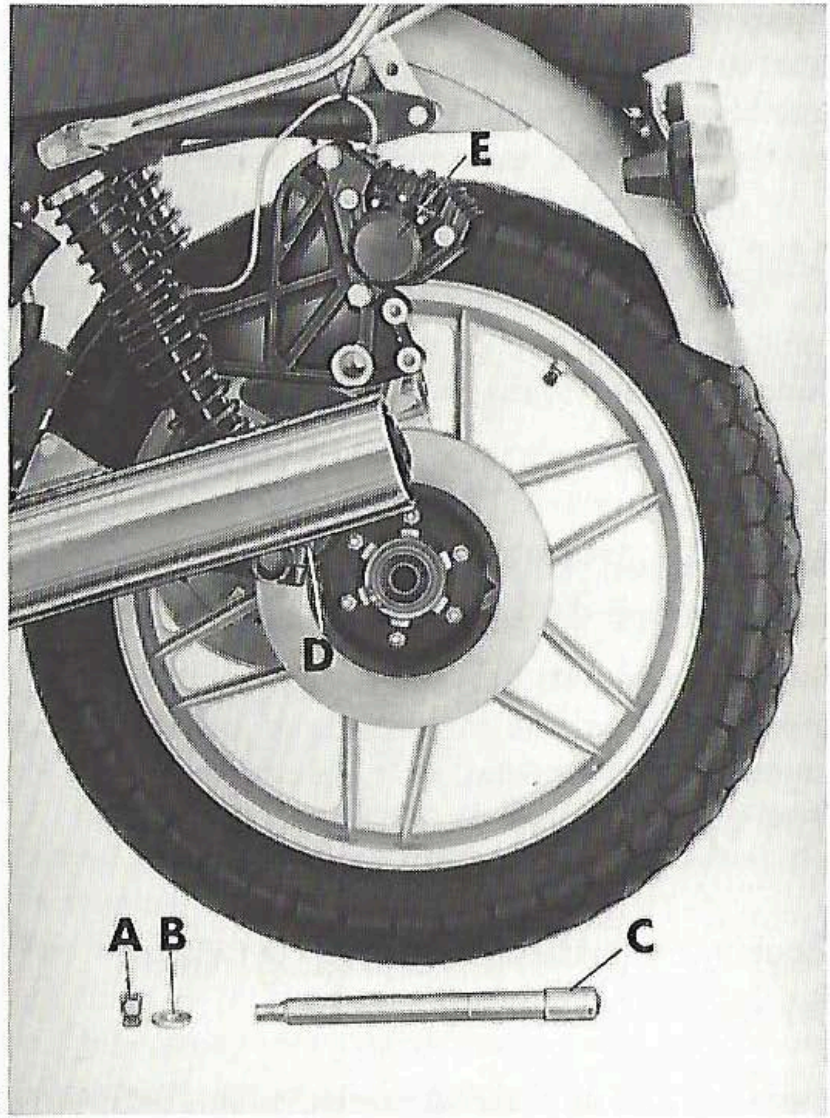
- take out braking disc from caliper «E»;
- remove the plate assembly fitting the caliper from the stop pin on the swing arm, securing this group to the frame;
- lean the vehicle to the right just sufficiently to withdraw the wheel from the rear fork arm and the rear drive box.

To re-assemble, reverse the dismantling sequence remembering to insert the plate complete with caliper on the rear left arm stop on the swinging fork.

Wheel balancing

To improve the vehicle stability and reduce vibrations at high speed, the wheel have to be kept in a perfectly balanced condition.
To balance a wheel, proceed as follows:

- remove the wheel and set it up on a fork;
- spin the wheel slowly several times and watch if it always stops in different positions, thus indicating a correct balance;
- if one point of the wheel stops always at the bottom, put a balance weight on the spoke opposite this point;
- repeat the operation till the wheel is correctly balanced.



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34 Tires

These are included in the components which must be very carefully checked as the vehicle stability, riding comfort, and sometimes even the rider's safety are dependant on them. Therefore it is unadvisable to use tires having less than 2 mm (1/16″) thickness tread.
An incorrect tire pressure may also affect the vehicle stability and cause rapid wear of the tire. Recommended pressure are:

— Front wheel with one or two persons: 2.1 kg/sqcm (29 p.s.i.).

— Rear wheel: solo riding 2.4 kg/sqcm (34 p.s.i.) with pillion 2.6 kg/sqcm (37 p.s.i.).

The above speeds are for normal riding (cruising speed). If using the motorcycle at constant high speed or on highways, it is recommended to increase the pressure by 0.2 kg/sqcm (3 p.s.i.).

Removing and re-fitting tires on the rims

These models fit light alloy rims which offer very high mechanical resistance but might suffer damage from a functional and aesthetic aspect if improper tooling is used for the removing and assembly operations.
Under the circumstances, never use tools that have ribbings or sharp edges on the sides contacting the rims.
The contacting surface of such tooling has to be very wide, smooth and with rounded edges.
The use of any of the lubricants available on the market for these purposes will greatly facilitate tire sliding and settling on the rim, preventing also overloads on the tools.
It is also very important for the tire beads to be properly entered into the center rim groove.
Tires that have an arrow on their side have to be fitted in the following way:

— Rear wheel, with arrow turned in the riding direction.

— Front wheel, with arrow turned against the riding direction.

Monthly (or about every 3000 km 2000 miles)

- Check the electrolyte level in the battery (see **Electrical equipment** «Battery»).

Periodically

- Check tire pressure (see **Removal of wheels** «Tires»).

Every 500 km (300 miles)

- Check the crankcase oil level (see **Lubrications** «Engine lubrication»).

After the first 500-1000 km (300-600 miles)

- Renew the oil in the crankcase (see **Lubrications** «Engine lubrication»).
- Replace the oil cartridge (see **Lubrication** «Replacing the oil cartridge»).
- Check tightness of all nuts and bolts.
- Check rocker clearance (see **Valve gearing** «Tappet clearance»).

Every 3000 km (2000 miles)

- Replace the crankcase oil (see **Lubrications** «Engine lubrication»).
- Check oil level in gearbox (see **Lubrications** «Lubrication of gearbox»).
- Check rocker clearance (see **Valve gearing** «Tappet clearance»).
- Check oil level in drive box (see **Lubrications** «Lubrication of rear drive box»).

Every 5000-6000 km (3000-3600 miles)

- Check the fluid level in the reservoir (master cylinder) for the right front brake. (Ensuring it is not below the transparent section).

For the left front and rear brakes, an incorrect oil level is warned by an optical indicator (red) on the panel (see **Maintenance and adjustments** «Checking and replacing the brake fluid»).

36 Every 10.000 km (6000 miles)

- Replace the air filter cartridge (see **Carburation** «Replacing the air filter cartridge»).
- Clean the fuel tank, fuel filters, and pipes (see **Carburation** «Cleaning the fuel tank, fuel taps, fuel filters, and pipes»).
- Replace the oil in the gearbox (see **Lubrications** «Replacing the oil in the gearbox»).
- Replace the oil in the rear drive box (see **Lubrications** «Replacing the oil in the rear drive box»).
- Clean and smear with jelly all battery connections (see **Electrical equipment** «Battery»).

Every 15.000 km (9000 miles)

- Replace the fluid in the braking circuits (see **Maintenance and adjustments** «Checking and replacing the fluid in the braking circuits»).
- Replace the oil filter cartridge (see **Lubrications** «Changing the cartridge and cleaning the wire gauze filter»).

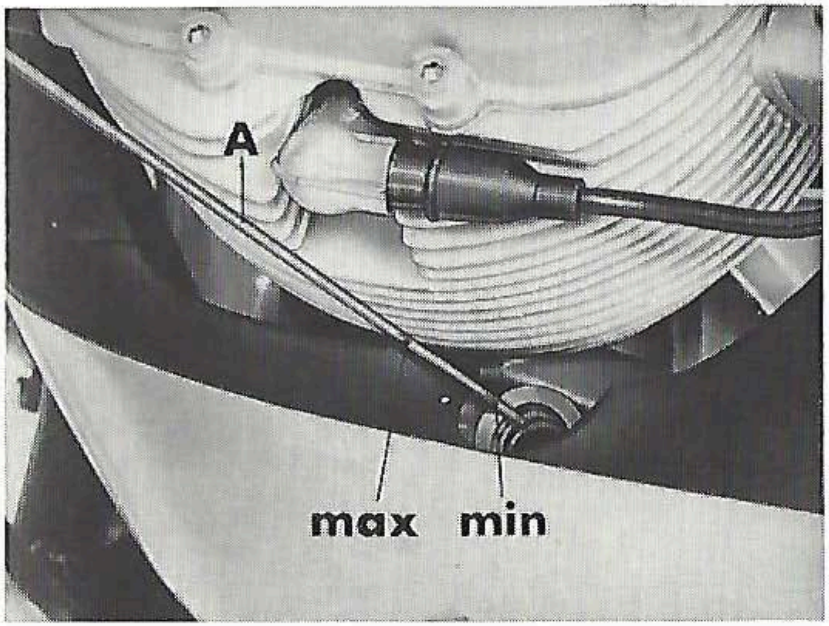
Every 20.000 km (12.000 miles)

- Check condition of wheel bearings.
- Check that all steering caps are sufficiently greased «Agip F.1 Grease 30».
- Replace the oil in the fork legs (see **Lubrications** «Fork lubrications»).
- Using a clean rag lightly moistened in petrol, clean the starter motor and generator commutators.

Engine lubrication

Checking the oil level

Every 500 km (300 miles) check level of the crankcase oil.
Correct level is in proximity of the top mark on dipstick «A».
If lower, top up with oil of same quality and density.



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This control has to be made after the engine has been run for a few minutes and with the cap-dipstick «A» fully screwed in.

Replacing the oil

After the first 500-1000 km (300-600 miles) and later on every 3000 km (2000 miles) or so, replace the oil in the crankcase. This operation is done on a warm engine, allowing all the old oil to drain completely before introducing fresh oil.

«A» Oil filler cap (fig. 22).
«B» Oil drain cap (fig. 23).

Quantity required: 3 l of «Agip Sint 2000 SAE 10 W/50».

Replacing the oil filter cartridge and cleaning the wire gauze filter (fig. 23)

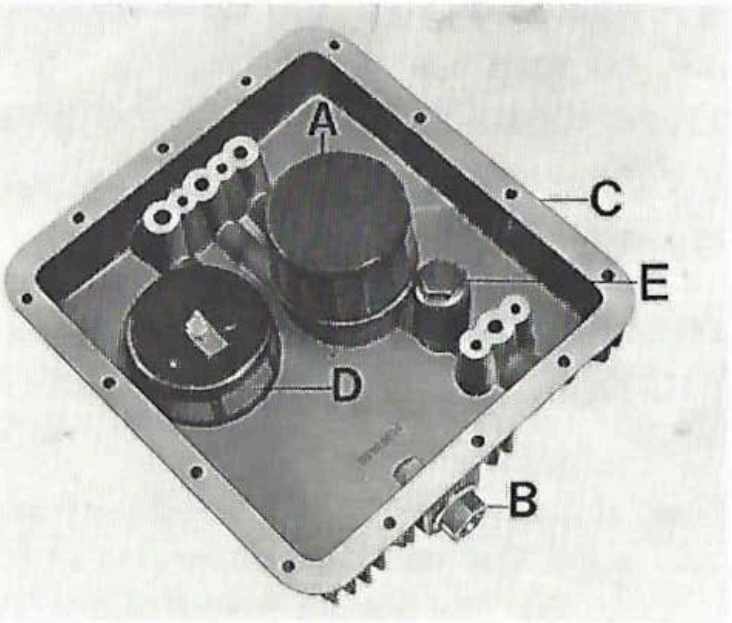
Every 15.000 km (9000 miles or 5 oil changes), replace the filter cartridge proceeding as follows:

- undo cap «B» and let the oil drain fully;

- undo the sump securing screws and remove the sump «C» from the crankcase complete with filter cartridge «A», wire gauze filter «D» and the oil pressure relief valve«E »;

- undo filter cartridge «A» and replace it with an original one.

When replacing filter cartridge «A», it is well to also remove wire gauze filter «D», washing it in a petrol bath and drying it with a compressed air jet. Before re-fitting it, blow through the oil-ways in the sump with compressed air.



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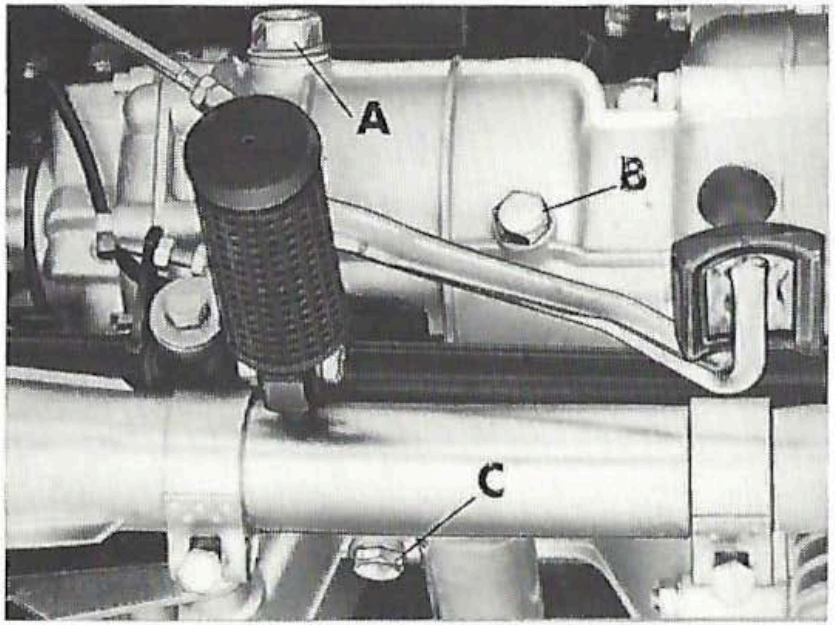
Finally, do not forget to replace always the oil sump gasket.
This servicing is best done by our dealers.

Lubrication of the gearbox (fig. 24)

Checking the oil level

Every 3000 km (2000 miles) check that the oil level is skimming the top of inspection plug «B». If lower, top up with oil of same quality and density.



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Replacing the oil

Every 10.000 km (6000 miles), replace the oil in the gearbox. This operation has to be done on a warm engine when the oil is more fluid and so easier to drain.
Do not forget to let all the old oil to drain completely, before adding fresh one.

«A» Filler cap.
«B» Level checking cap.
«C» Oil drain plug.

Quantity required: 0.750 l (abt 25 oz) of «Agip F.1 Rotra MP SAE 90».

Lubrication of the rear drive box
(fig. 25)

Checking the oil level

Every 3000 km (2000 miles), check that the oil level is nearly skimming the top of level cap «A». If lower, top up with oil of same quality and density.

Oil change

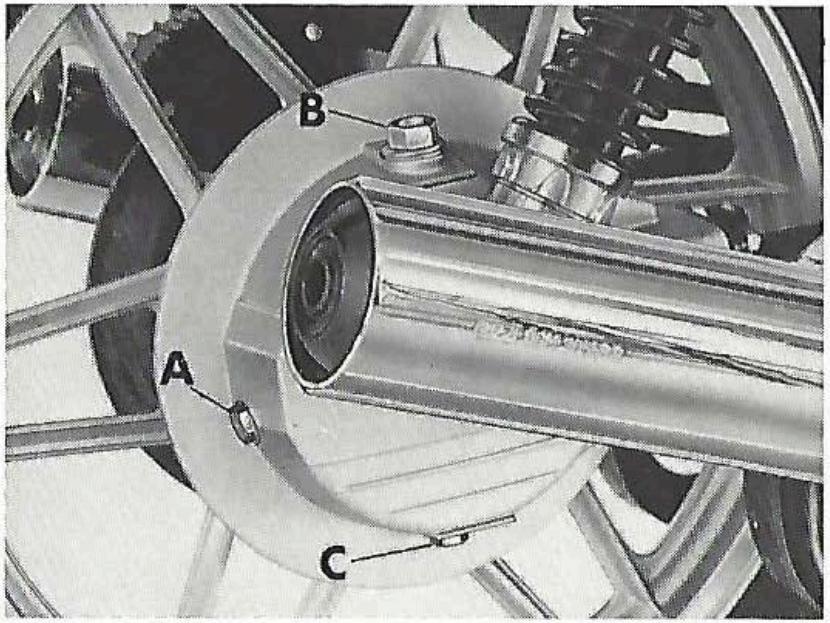
Every 10.000 km (6000 miles) or so, change the oil in the rear drive box.
Do this on a warm engine as the oil is more easily drained.
Let the old oil drain completely before introducing fresh oil.

«A» Level plug.

«B» Filler plug.

«C» Drain plug.

Quantity required: abt 0.250 l of which 0.230 l (3/4 pts) of «Agip F.1 Rotra MP SAE 90» and 0.020 l (approx 3/4 oz of «Agip Rocol ASO/R».



25

40 Fork lubrication (fig. 26)

To replace the oil in the fork legs, proceed as follows:

- undo drain plug with gasket «A»;
- undo allen screw «B».

Before introducing fresh oil let the fork legs oil drain completely.

«A» Fluid drain screw.
«B» Fluid filler screw.

Quantity required: 0,090 l for each leg (3 oz) of «Agip F.1 Dexron ATF».

Lubrication of steering and rear fork bearings

These operations are best carried out by our dealers.

26

Carburettors (fig. 27)

This model fits two «Dell'Orto» carburettors type VHB 30 CD (right) and VHB 30 CS (left).

Controls

- throttle control grip («E» in fig. 6) on the R/H side of the handlebar;
- starter lever for starting a cold engine, fitted on the L/H cylinder head cover.

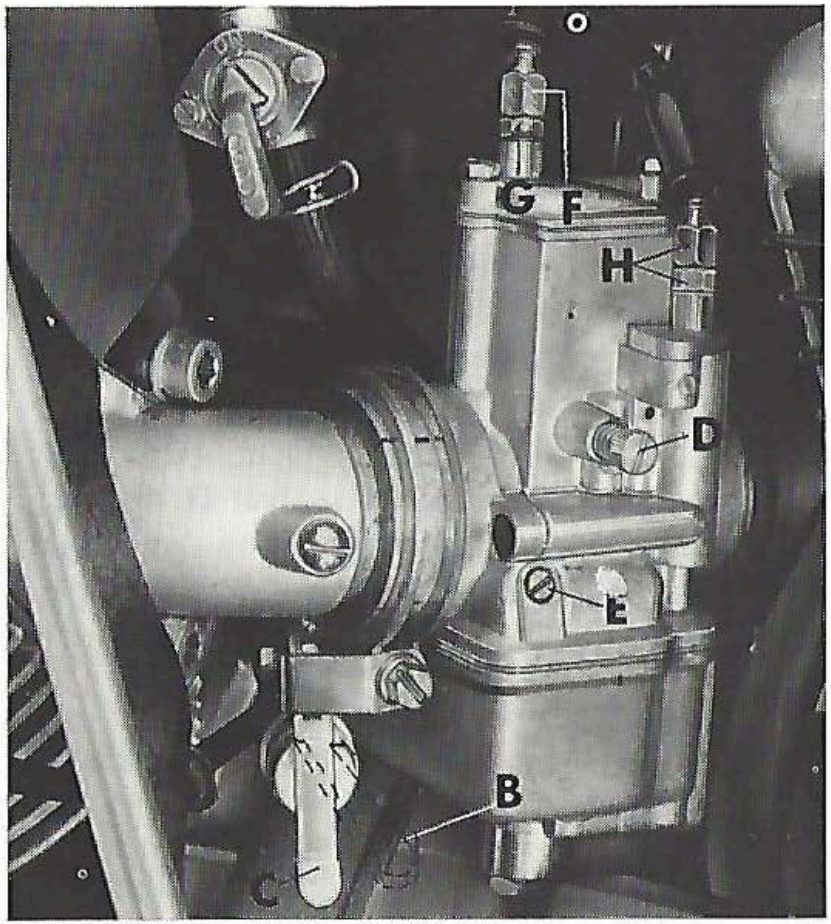
«B» Starting position.
«C» Riding position.

Note - With the starter lever in position «C» (riding), check that there is a clearance of 3 mm (.11") between cable ends and adjuster screw «H» of both carburettors.

Standard carburettor settings

Choke	Ø 30 mm
Throttle valve	40
Atomiser	265
Main jet	125
Idling jet	50
Starter jet	80
Needle	V 9 (2nd notch)
Floater	10 gr

Idling screw adjustment: open 1 and ½ turns.



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42 Adjustment of carburation and idling speed (hand adjustment) (fig. 27)

Proceed as follows:

1 Warm the engine up to its normal running temperature.

2 Screw in fully idling adjusters «E» and then screw them out 1½ turns.

3 Using both your hands, check if the exhaust pipes pressures are equal. If any difference is noted, operate on screw «D» of one carburettor until the exhaust pressure of both carburettors is the same (idling speed should be kept at no more than 900-1000 rpm and consequently it may be necessary to screw in the screw of the carburettor for the cylinder giving a lower exhaust pressure, or screw out the screw of the carburettor for the cylinder giving a higher exhaust pressure).

4 Acting on screws «E» get the best carburation for each cylinder (this is perceived by an increase of rpm) and then adjust idling speed according to point 3.

5 Disconnect one spark plug lead at the time and check that in both cases the engine stops after firing 5-6 strokes. If it does not, screw out screw «D» of the carburettor making the engine fire more than 5-6 strokes or screw it in for the carburettor making the engine fire less than 5-6 strokes.

6 Adjust idling speed at 900-1000 rpm by screwing in or out both screws «D» by **the same amount.**

7 With the throttle grip closed, ensure that there is a clearance of 1-1.5 mm (.039-.059″) between cable ends and cable adjuster screw «F» of both carburettors.

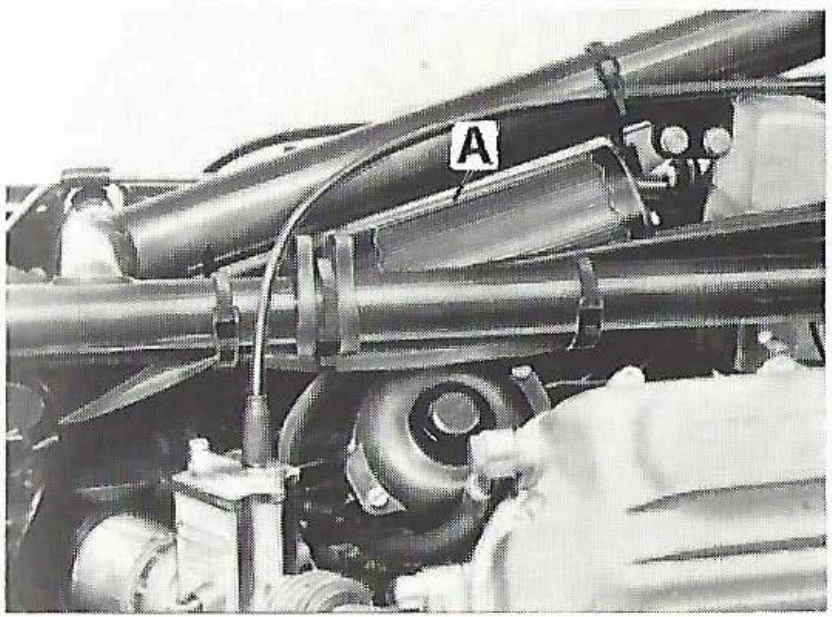
8 Ensure that the throttle valves open simultaneously by proceeding as follows: gradually turn the throttle control grip and check that the exhaust pipe pressure increases in synchronisation using both your hands (an assistant is necessary for this operation).
If pressure increase of one cylinder is advanced, act on its carburettor by gradually screwing in cable adjuster «F», after loosening counternut «G» until the synchronisation of both exhaust pipe pressures is reached.

Adjusting the carburation by means of a vacuometer

In order to obtain a correct adjustment of the carburation it is necessary to apply to our dealers who can carry out this operation by means of a vacuometer.

Air filter cartridge (fig. 28)

Every 10.000 km (6000 miles), air filter cartridge «A» should be changed. This is located in a suitable container together with the oil breather assembly, under the fuel tank.
For this replacement it is best to apply to one of our dealers.



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Cleaning the fuel tank, fuel taps, fuel filters, and pipes

Every 10.000 km (6000 miles) or in case of irregular fuel flow to the carburettors, it is necessary to clean the fuel tank, fuel taps, filters on carburettors, and the fuel pipes.
All these parts are best cleaned with petrol and dried off with compressed air.

44 VALVE GEARING

Tappet clearance (fig. 29)

After the first 500-1000 km and later after every 3000 km or so or any time valve operation is too noisy, check tappet clearance.
This adjustment is done on a cold engine with the piston at TDC, at the end of the compression stroke (valve fully closed).
After removing the rocker cover, proceed as follows:

- slacken nut «A»;

- screw in or out adjuster «B» till the following clearances are obtained:

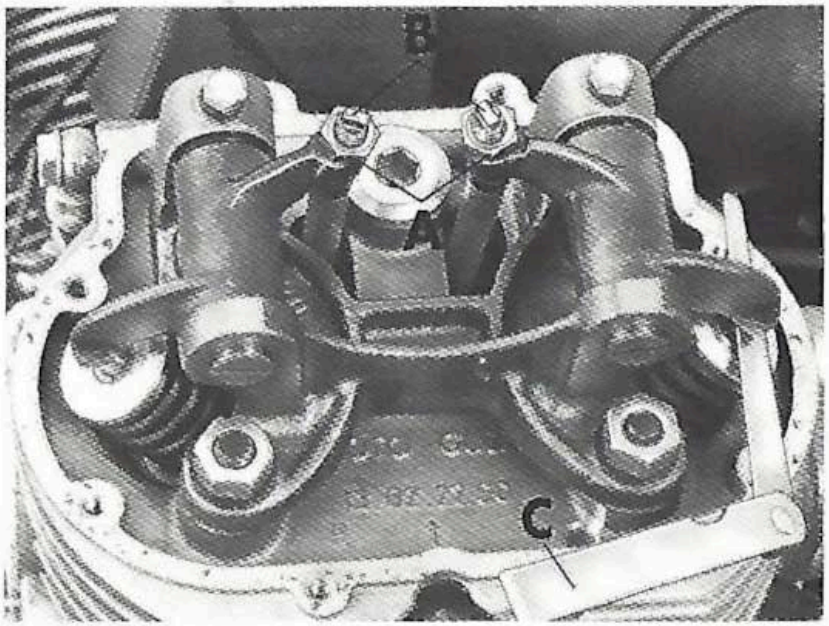
— 0.22 mm (.0086″) for both the inlet and exhaust valves.

This check is made using feeler gauge «C».
In case of higher clearance, there will be noisy valve operation while if the valves do not close fully there will be inconveniences such as:

— compression loss;

— overheating of the engine;

— burning of valves.



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Checking and adjusting the double contact breaker (fig. 30)

Maintenance

Every 3000 km (2000 miles) lightly moisten cam felt pad «R» with a few drops of engine oil.

Inspection

- remove the double contact breaker cover, after undoing its securing screws;
- if contacts «A» and «B» are dirty or greasy, clean them with a petrol soaked rag. If damaged or worn, replace them;
- check points gap of breaker «A» (right cylinder - red cable) and breaker «B» (left cylinder - green cable) which should be in between 0.37-0.43 mm (.014-.016″).

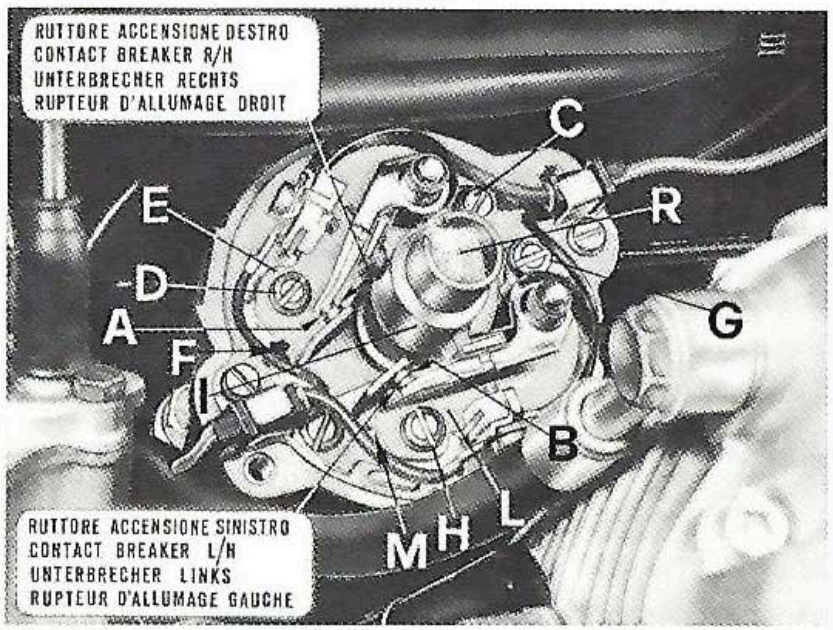
Adjusting the contact points

Contact «A» - right cylinder

Bring the cam «I» to its maximum lift, loosen screws «C» and «D» and move plate «E» by acting on notch «F».
After setting to the correct distance, lock screws «C» and «D».

Contact «B» - left cylinder

Bring the cam «I» to its maximum lift, loosen screws «G» and «H» and move plate «L» operating on notch «M».



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After setting to the correct distance, lock screws «G» and «H».
When adjusting the contact points, the ignition timing should also be checked (see following chapter).

Checking and adjusting the ignition timing «fixed advance»
(fig. 31)

Inspection

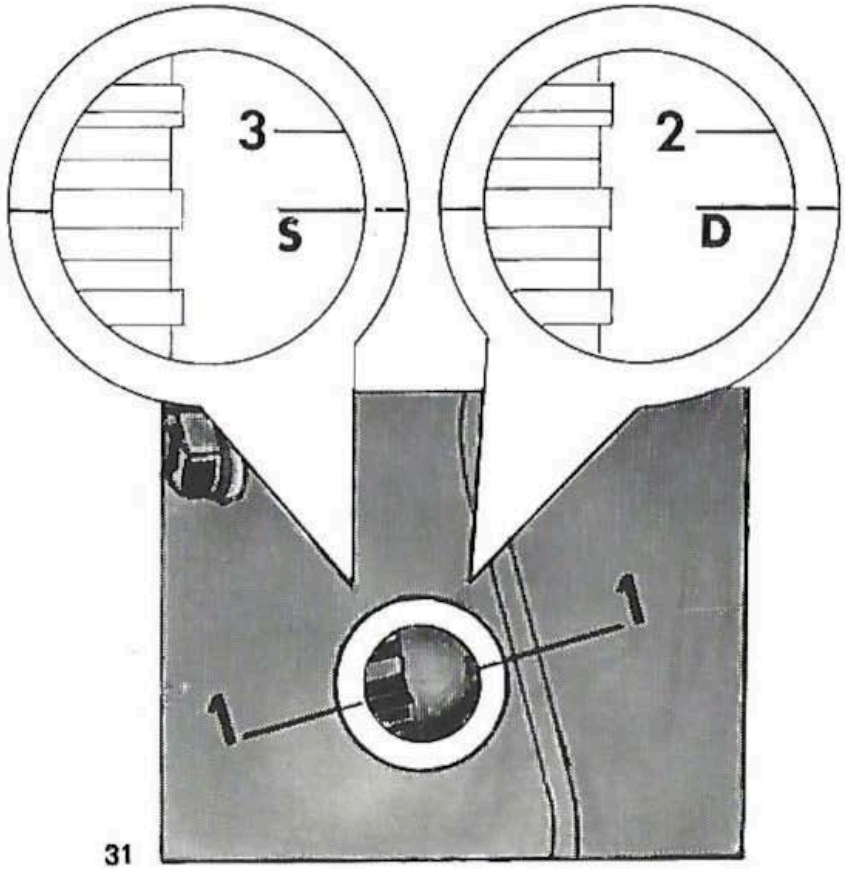
- remove the rubber cap which seals the inspection hole on the R/H side of the reducer box opposite the flywheel;
- to find the exact moment when points «A» and «B» (fig. 30) start opening, it is advisable to use an appropriate timing light to be set up between the breaker feeding clamp and the ground.

Timing of right cylinder

- turn the flywheel counterclockwise (engine rotation) until the piston is at the end of its compression stroke (both valves closed).

At this stage, mark «D» on the flywheel (TDC of right cylinder) should coincide with mark «1» on the inspection hole rim;

- turn the flywheel clockwise until mark «2» on the flywheel (fixed advance) coincides exactly with mark «1» on the inspection hole rim.



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At this point, breaker contacts «A» should start to open («A», fig. 30).

Timing the left cylinder

- turn the flywheel in the normal sense of rotation of the engine (anticlockwise until the piston is at the end of its compression stroke (valves fully closed).

At this point, mark «S» on the flywheel (TDC of left cylinder) should coincide with mark «1» on the inspection hole rim;

- now rotate the flywheel clockwise until mark «3» (fixed advance) coincides exactly with mark «1» on the inspection hole rim.

At this point, breaker «B» contacts («B», fig. 30) should start to open.
If the contacts points of breakers «A» and «B» do not start opening in the above positions, then ignition timing needs adjustment.

Ignition advance data

— Initial advance (fixed)	2°
— Automatic advance	31°
— Full advance (f. + a.)	33°
— Breaker contact points gaps: 0.37-0.43 mm (.014-.016″).	

This servicing is best done by any one of our dealers.

Spark plugs

The type of spark plug to be used is indicated at page 5.
Spark plug points gap: 0.6 mm (.023″).
The spark plug is best cleaned with petrol and a wire brush, using a needle for the inner part.
In re-fitting the spark plugs, ensure they are started by hand for a few turns, completing the operation with the wrench in the tool kit. If not properly started, the cylinder head thread may get stripped.
For all events, the plugs have to be replaced every 10.000 km (6000 miles) even if they appear to be still in good condition.

The electrical equipment consists of:

- Battery.
- Starter motor with electromagnetic ratchet control.
- Generator/Alternator, fitted on the front end of the crankshaft.
- Double contact breaker with automatic advance.
- Ignition coils.
- Rectifier.
- Regulator.
- Terminal block with fuses (6 fuses 16 A).
- Flashing light relay.
- Starter relay.
- Headlight.
- Tail light, parking light, and number plate.
- Turn signal indicators.
- Ignition switch.
- Light switch.
- Turn light switch, horn, and flashing light.
- Engine starting and stop button.
- Electric horns.

Battery

The battery is a 12 V type with a 32 A capacity. It is charged directly by the generator.
Access to the battery is obtained by:
— unhooking saddle lifting lever «A» (25 in fig. 2);
— raising the seat and keeping it up with its rod;
— removing the tool box complete;
— unhooking the rubber bands;
— disconnecting the electric cables (positive and negative)
— withdrawing the battery.

Putting a new dry battery in service

1 Remove sealing tape and the plugs and into the cells introduce pure sulphuric acid for batteries with a specific gravity of 1.25 kg/l at temperature not lower than 15° C till the level tops the plate separators or splashguard by 5-6 mm (.19-.23″).

2 Let the battery rest for about two hours.

3 Charge the battery at an intensity equal to about 1/10th of its capacity until the current in-

tensity rate of the acid is about 1.27 kg/l and such rate has remained constant for at least 3 consecutive hours of charging.
Normally, 6-8 hours charge are sufficient.
4 At the end of the charge, top up the acid, plug down and clean accurately.

Servicing the battery under service conditions

1 The electrolyte level should always cover the separators. To top up, use distilled water. Never add sulphuric acid.
2 If too frequent water additions are required, have the electrical system checked over as the battery works under overcharged conditions and will deteriorate quickly.
3 Check over the electric system also if the battery discharges quickly.
4 When a new battery filled with acid (or a second hand one) is left unused for long periods of time, it is a good rule to re-charge it every month.
5 Always keep the battery terminals spotlessly clean and smeared with neutral vaseline.
6 Always keep the top battery cover dry, avoiding overflows of electrolyte which will reduce insulation and corrode the battery bracket.
Note - If the battery is used in tropical climates (average temperature over 33° C = 92° F, it is recommended to reduce the acid gravity to 1.230 kg/l.

Replacement of light bulbs

Headlight (fig. 32)

Undo bottom screw «B», withdraw the beam unit, take out the bulb holders, and replace the bulbs.

Tail light (fig. 33)

Undo screws «A» securing reflector to tail light, push bulbs inwards turning them to the left, and slip them out.

Front turn signal bulbs (fig. 32)

Undo screws «C» securing the reflectors to the lamp, push the bulbs inwards turning them to the left, and slip them out.

Panel, tachometer, and rev-counter lights

Remove the bulbholders and replace the bulbs.

Rear turn signal bulbs (fig. 33)

Undo screws «B» securing the reflector to the rear lamp. Push the bulbs inwards turning them to the left and slip them out.
In refitting the reflectors do not overtighten to prevent breakages.

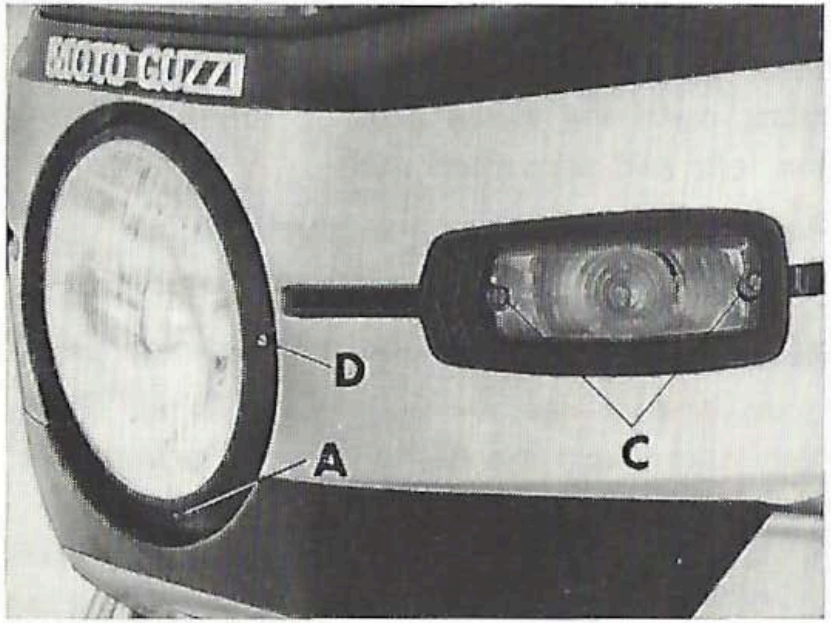
50 Bulbs (12 V)

Headlight

— High and low beam	45/40 W
— Parking light	4 W

Tail light

— Parking and stop	5/21 W
— Turn signals	21 W
— Panel indicators	1.2 W
— Speedo and rev-counter	3 W
— Voltmeter	3 W
— Clock	3 W



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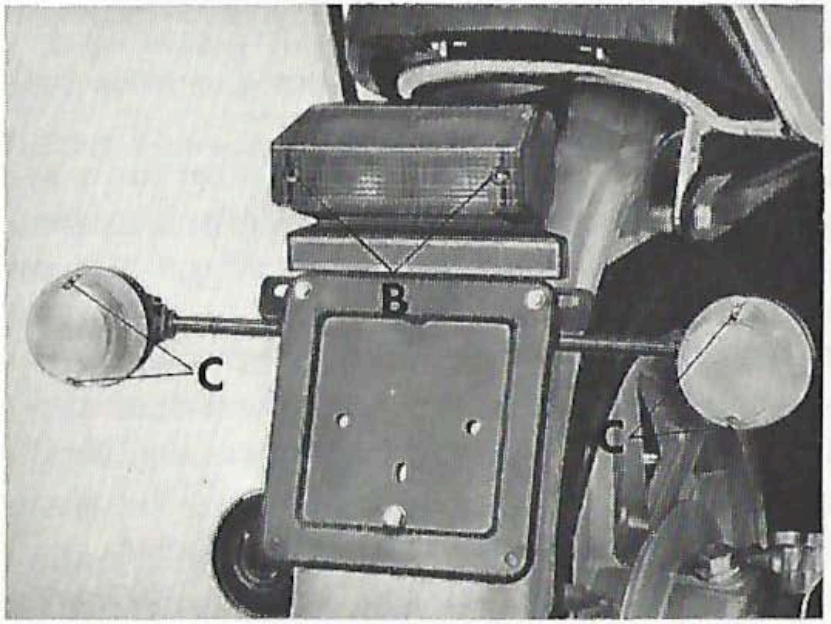
Headlight beam adjustment (fig. 32)

For safe riding and not to trouble crossing riders, the headlight has always to be kep at the same height.
Horizontal setting is adjusted by screw «A» while vertical setting is adjusted by undoing the two screws securing the headlight to the fork lugs by hand up or down until the correct height is reached.
The center of the high beam has not to be higher than 0.875 mts (34.50″) measured at 3 mts (abt 3.3 yards) distance with the motorcycle off the stand and the rider in the saddle.



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CLEANING THE WINDSHIELD

Any type of soap, cleansing agent, polish or polishing wax normally used to clean plastic or glass materials can be utilized.
However, the following precautions should be taken:

- **Never wash or clean the windshield when the external temperature is very high or after exposure to the sun.**
- Under no circumstances, solvents, lyes, or similar products should be used.
- Do not use liquids containing abrasive materials, pumice powder, emery paper, scrapers, or suchlike.
- Before polishing ensure all dust and impurities are removed.
- Light scratches can be smoothed out with light polish.
- Fresh paint or sealing compounds, when still wet, can easily be removed by lightly rubbing off with isopropylic alcohol, soluble mineral oil, butyl, or cellosolve. (Never use methylic alcohol).
- Use a soft sponge or cloth, chamois leather or cottonwool, rubbing lightly.
- Never use paper towels, synthetic fiber clothes which may scratch the windshield surface.

Vigorous rubbing or solvents will not remove deep scratches or nicks.

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