

BULTACO
OWNER'S MANUAL
instrucciones

 **Alpina**

250

350



This Owner's Manual



covers the following models:

ALPINA 250 (Serial 115)

ALPINA 350 (Serial 116)

Compañía Española de Motores, S. A. (CEMOTO)

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LUBRICATION AND MAINTENANCE

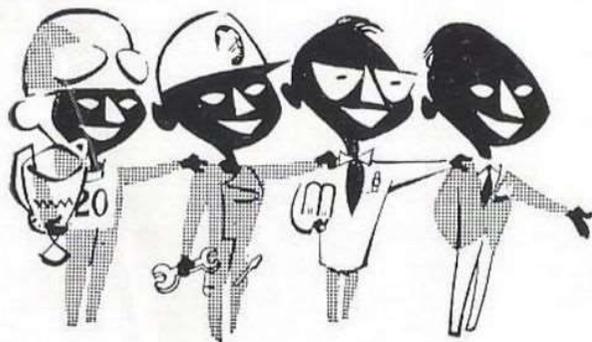
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I. YOUR ALPINA

Although the Sherpa «T» was principally created exclusively for observed trial competition, some customers have been using it for pleasure riding along mountain ways as well as the most severe «cross-countries».

Even though these usages are remote from the specialization of trials, the performance demanded from the motorcycle is enormous. The famous «T» conducted itself so brilliantly, that we even surprised ourselves; the manufacturer.

With this application in mind, we decided to introduce a new enduro model devoted exclusively to the enthusiast to ride on terrain for hours on end.

We have increased the gas tank capacity, designed a large and comfortable seat to smooth the journeys harshness, fitted proper internal gear-box ratios, but, without detracting from the basic qualities that made the world-renowned Sherpa «T» famous.

The «ALPINA»... This is the name of our new model. The very essence of «Dynamic Balance».

CEMOTO



II. THE LAYOUT

This chapter describes the location, use and minor adjustment of the Alpina's operating controls.

A. THE IDENTIFICATION NUMBERS

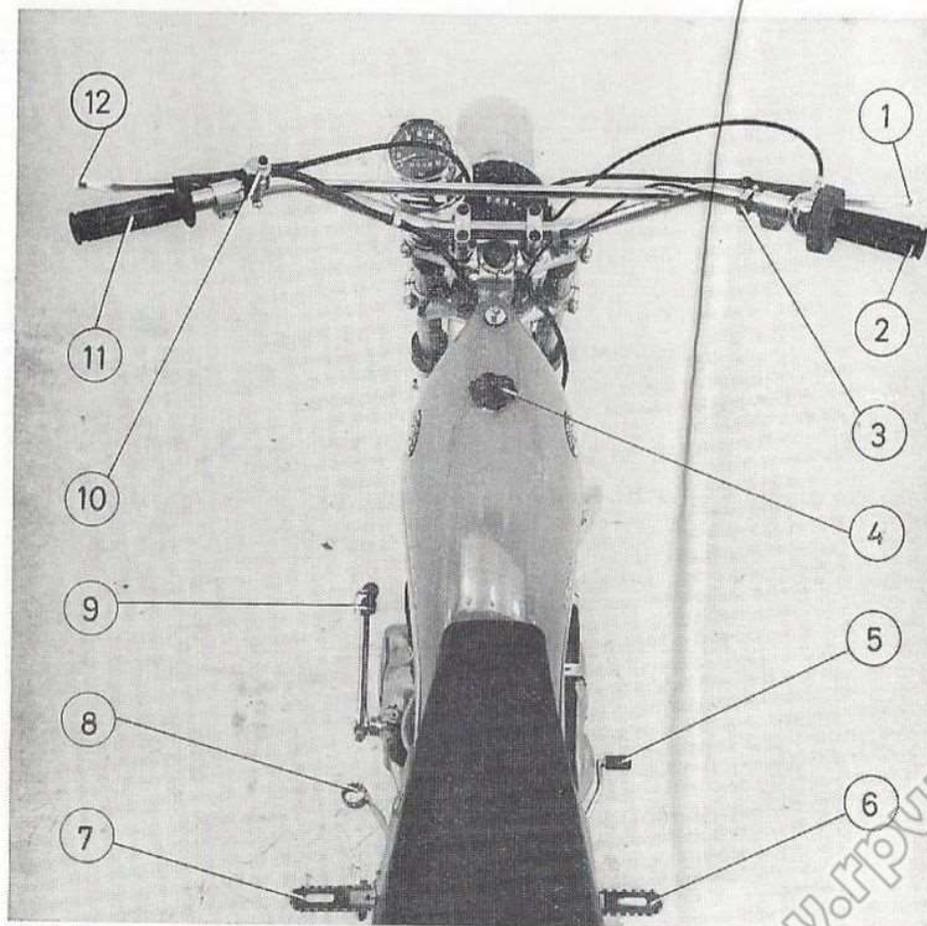
The engine serial-number is stamped on top of the engine-cases, near the rear engine-mount. The frame number is stamped on the steering tube of the frame, just in front of the petrol-tank.

B. OPERATING CONTROLS

When seated astride the machine in the normal riding position, please note the location of the (fig. 1):

1. Front brake lever.
2. Twistgrip.
3. Kill button.
4. Gas Tank Filler-Cap.
5. Gearshift Pedal.
6. Foot-rest right side.
7. Rear Brake Pedal.
8. Kickstarter.
9. Switchbox.
10. Handlebar grip.
11. Clutch lever.
12. Clutch lever.

Fig. 1



C. THE HANDLEBARS

The position of the handlebars is a very individual preference. Each rider should adjust the handlebars so that he may sit as comfortably as possible. More important yet, however, is to ensure that the handlebars are adjusted to permit comfortable and sure control of the motorcycle when standing on the foot pegs, as this is the best position for successfully negotiating the tough sections.

Fig. 2

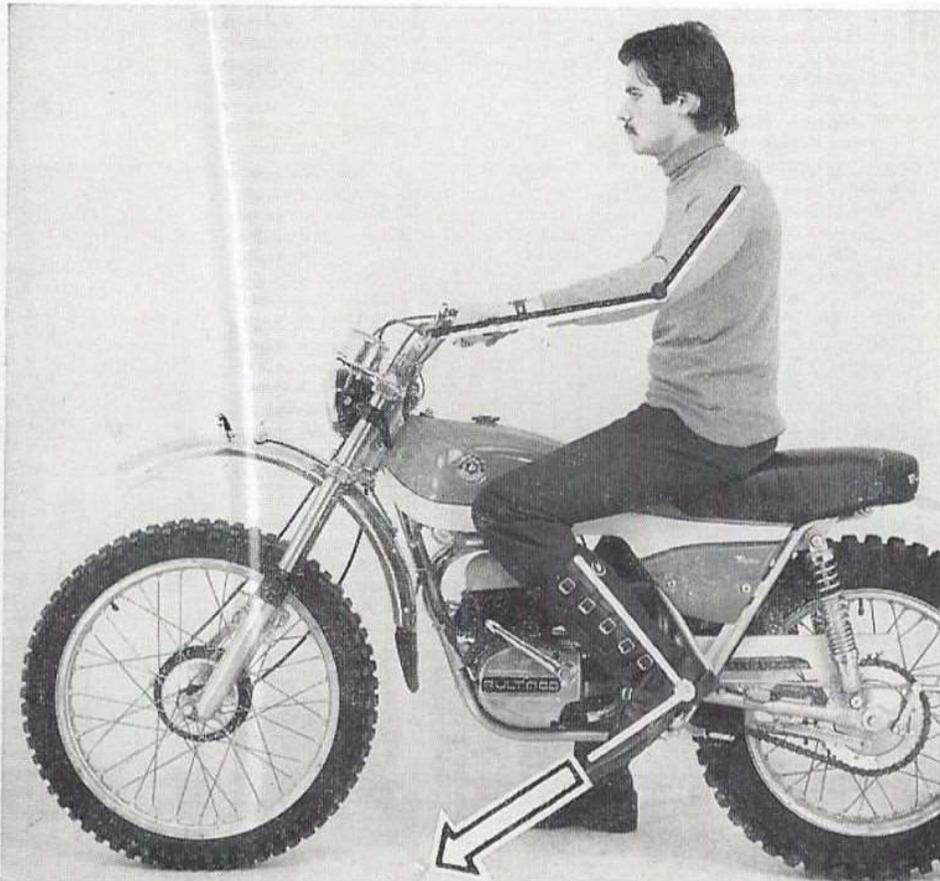


Fig. 2/1

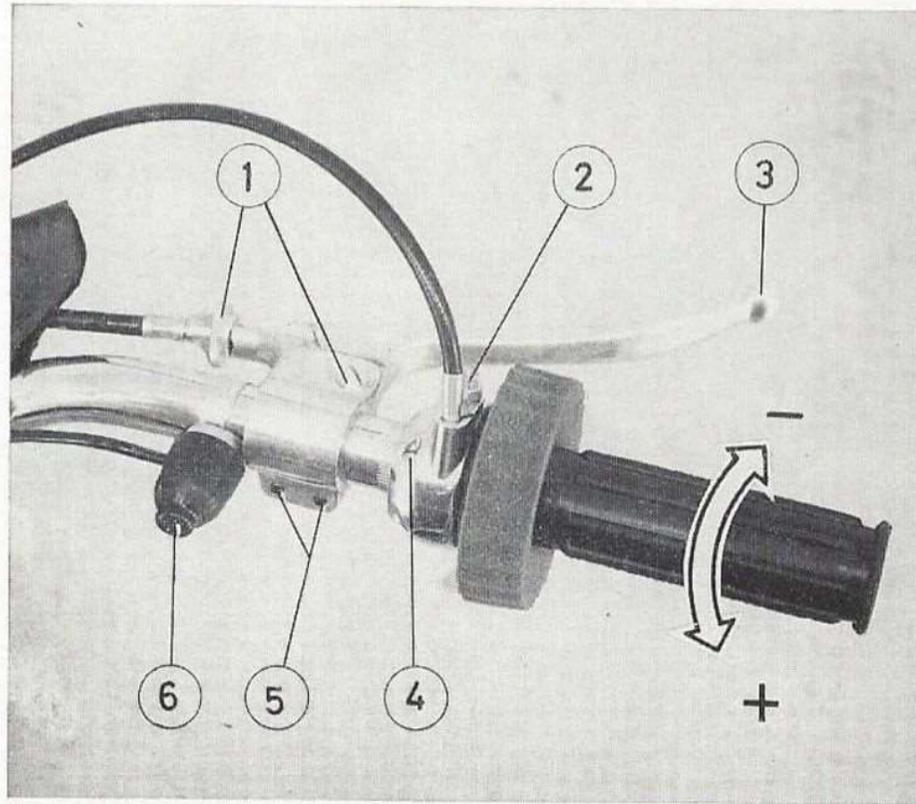


To adjust the handlebar position, loosen the four screws with 5 mm «Allen» wrench. Position the handlebars to your satisfaction, and tighten the nuts.

D. THE TWISTGRIP

The right handlebar grip is the throttle, or twistgrip. Two screws adjust the twistgrip to handlebars. It is possible to change the position and the suavity of the twistgrip.

Fig. 3



1. Grease. — 2. Hand pressure adjuster screw. — 3. Front brake lever. — 4. Throttle fixing screws. — 5. Brake lever fixing screws. — 6. Kill button.

E. THE FRONT BRAKE LEVER

The lever next to the twistgrip operates the front brake. You should position the front brake lever in the following manner. Sit on saddle and extend the fingers of your left hand. Curl your fingers over the clutch lever. Your hand and wrist should be in a straight line with your forearm. If they are not in a straight line, reposition the lever.

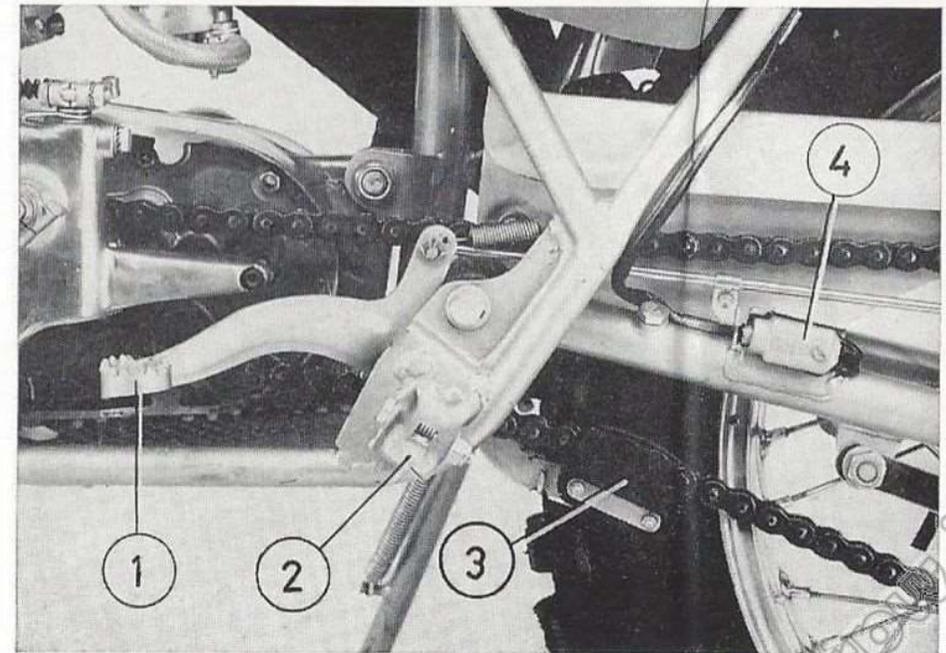
F. THE CLUTCH LEVER

The handlebar lever next to the left handlebar grip operates the clutch. Position the clutch lever as the front brake.

G. THE REAR BRAKE PEDAL

The rear brake pedal is located in front of the left footpeg. The position and the travel of the pedal are adjustable.

Fig. 4



1. Rear Brake Pedal. — 2. Foot-rest. — 3. Tensioner. — 4. Stoplight switch.

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H. THE GAS-TAP

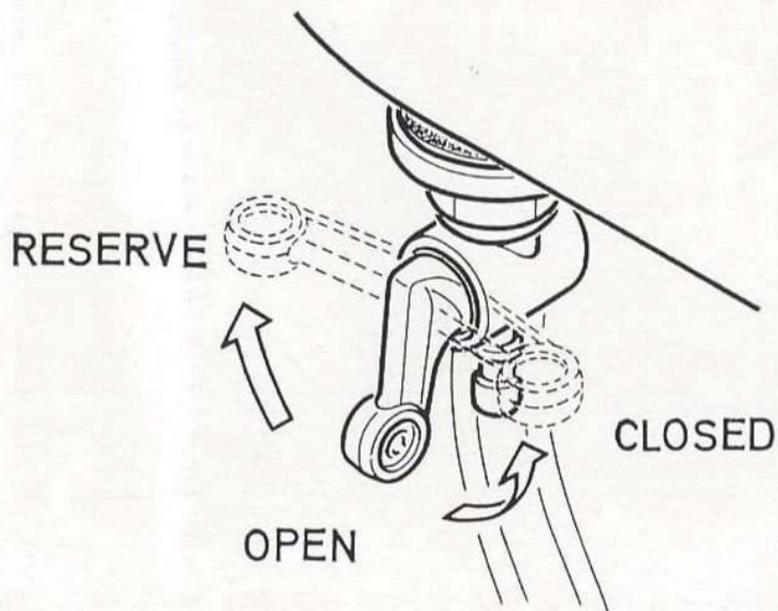
The gas-tap is located at the bottom of the petrol-tank on the left side of the motorcycle. It controls the flow of fuel to the carbureter.

When the gas-tap lever is pointing toward the rear of the motorcycle, and you can see lette «C», the fuel is turned off.

When the lever is pointing straight down, the gas is turned on, and you will be able to use all but 1/4 gallon of the fuel in the 1 1/2 gallon petrol-tank.

When the lever is pointing toward the front of the motorcycle, and you can see the letter «R», you will be able to use all of the fuel in the petrol-tank.

Fig. 5



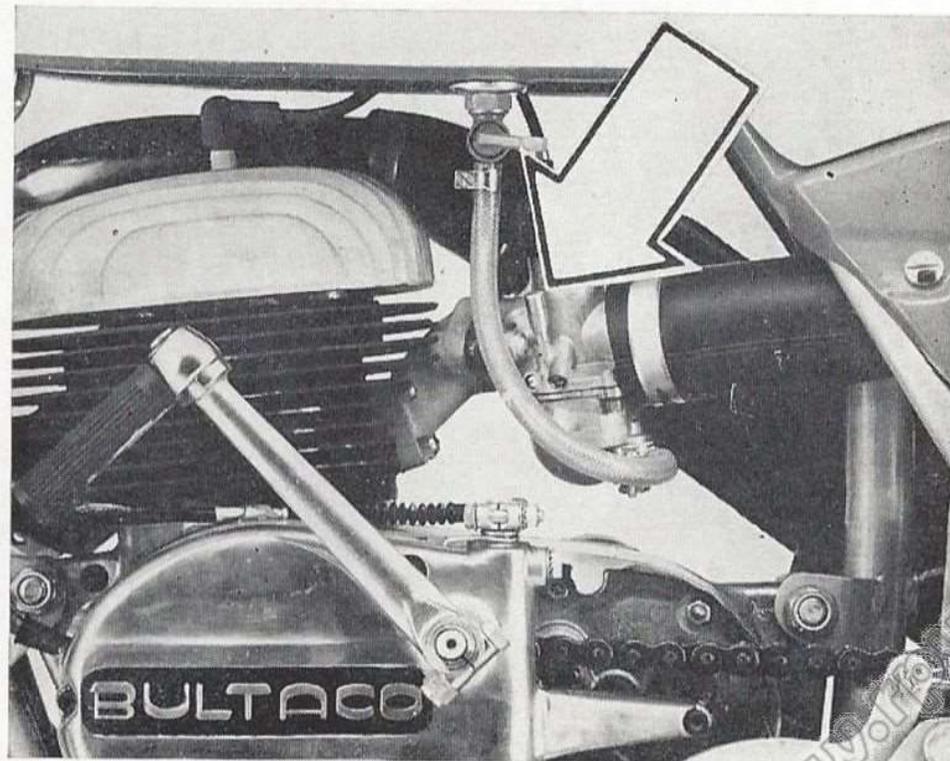
You should normally ride with the gas-tap lever pointing down. Then, should you run low on fuel, turn the gas-tap lever to «R», and stop at the next filling station for fuel.

Always turn the gas-tap lever to the «off» position whenever you stop the engine.

J. THE CARBURETER TICKLER

The tickler is a short vertical rod on the left side of the carbureter. After turning on the gas-tap, depress the tickler for several seconds, until the first few drops of fuel averflow the float bowl. This refills the float bowl so trat you can star the engine. You need not use the tickler if the engine is till warm from previous running.

Fig. 6



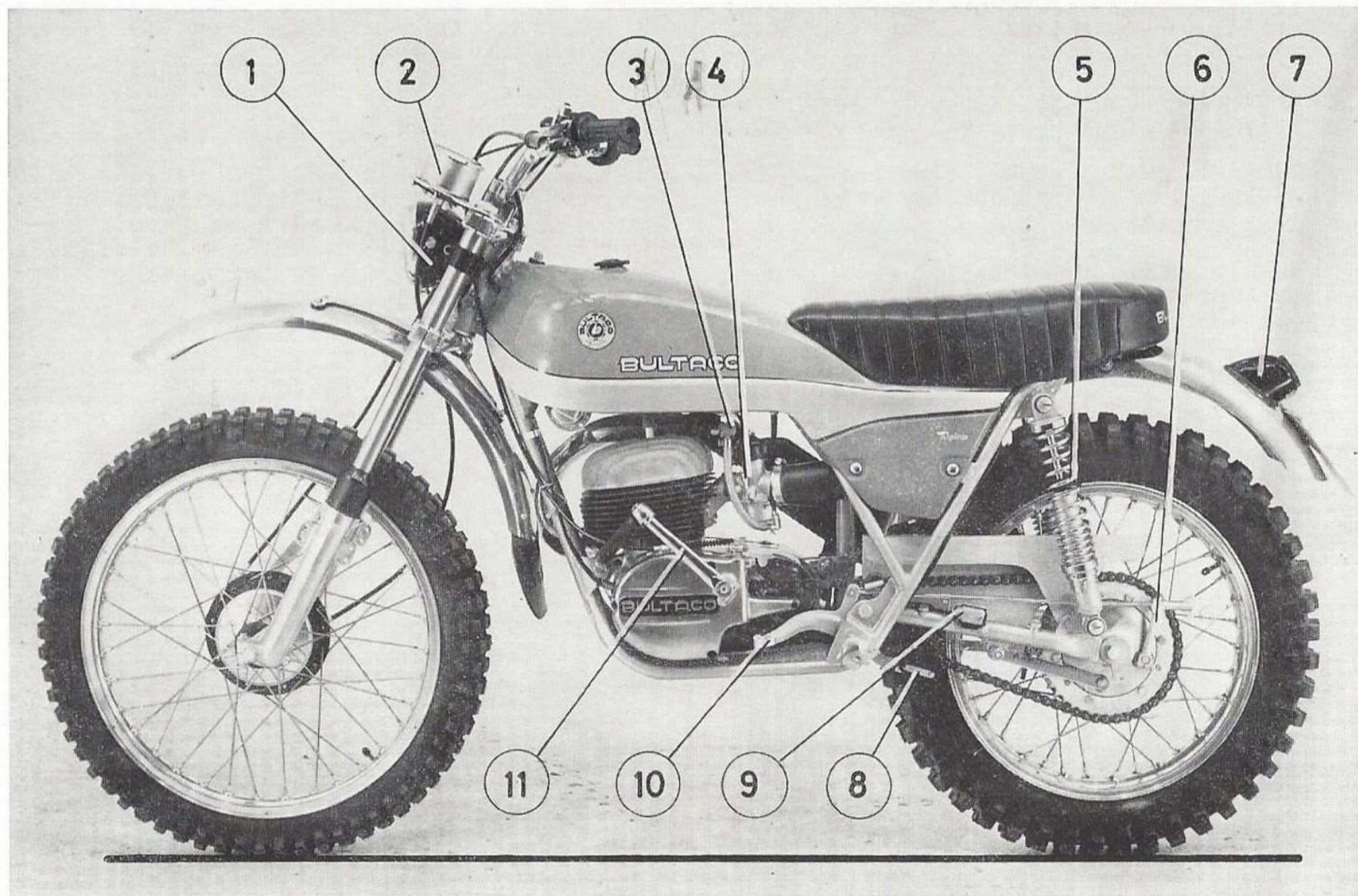


Fig. 7

1. Head-light (Only U.S. Market). — 2. Speedometer. — 3. Gas-Tap. — 4. Carburetor Tickler. — 5. Rear Shock Absorbers. — 6. Rear Brake. — 7. Tail-light (Only U.S. Market). — 8. Chain Tensioner. — 9. Stoplight. — 10. Rear Brake Pedal. — 11. Kickstarter.

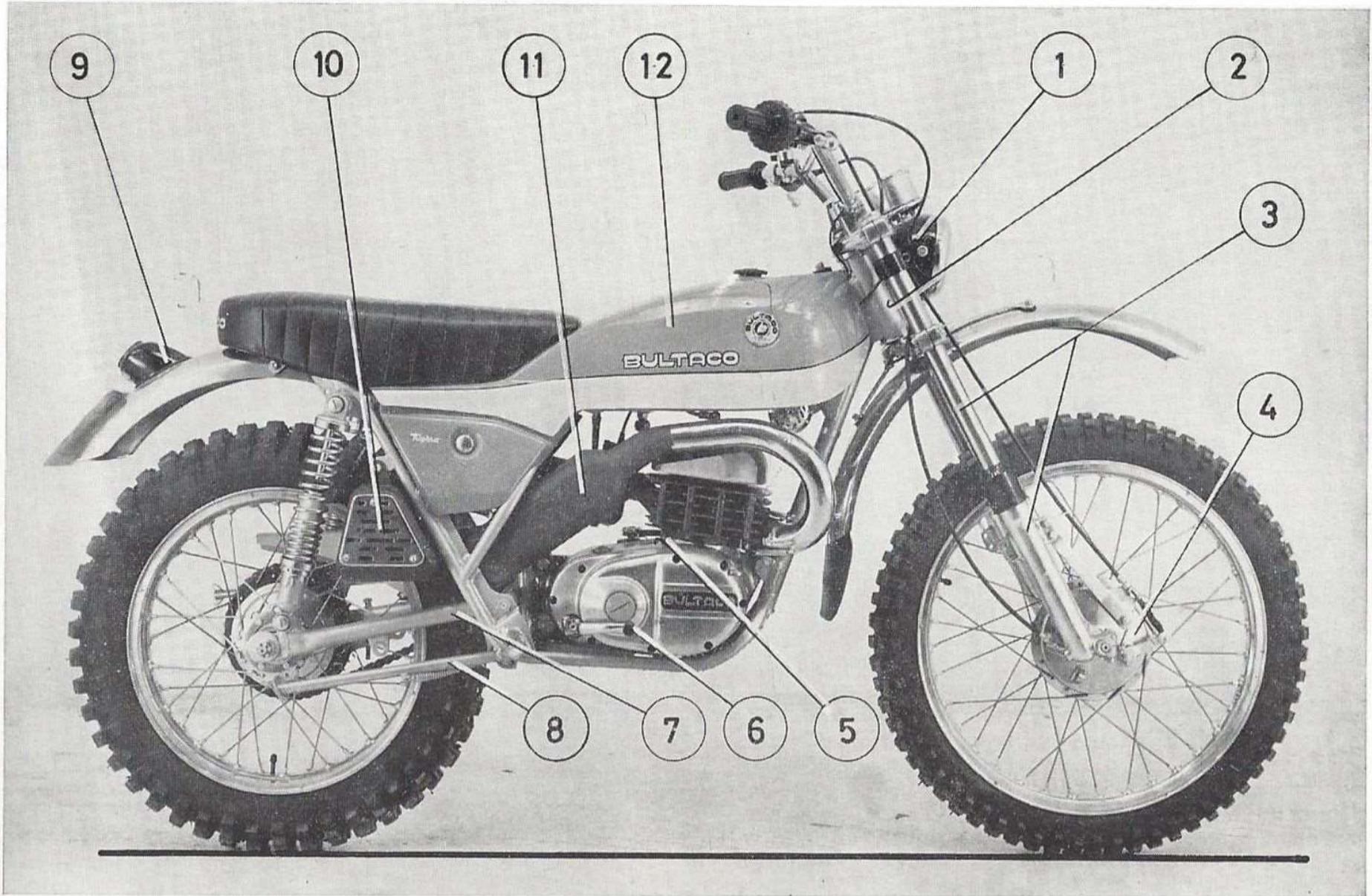


Fig. 2

1. Head-light. — 2. Frame Number. — 3. Front Forks. — 4. Front Brake. — 5. Engine Number. — 6. Gearshift Pedal. — 7. Swinging Arm.
8. Sidestand. — 9. Tail-light. — 10. Silencer Insert. — 11. Silencer.

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K. THE GEARSHIFT PEDAL

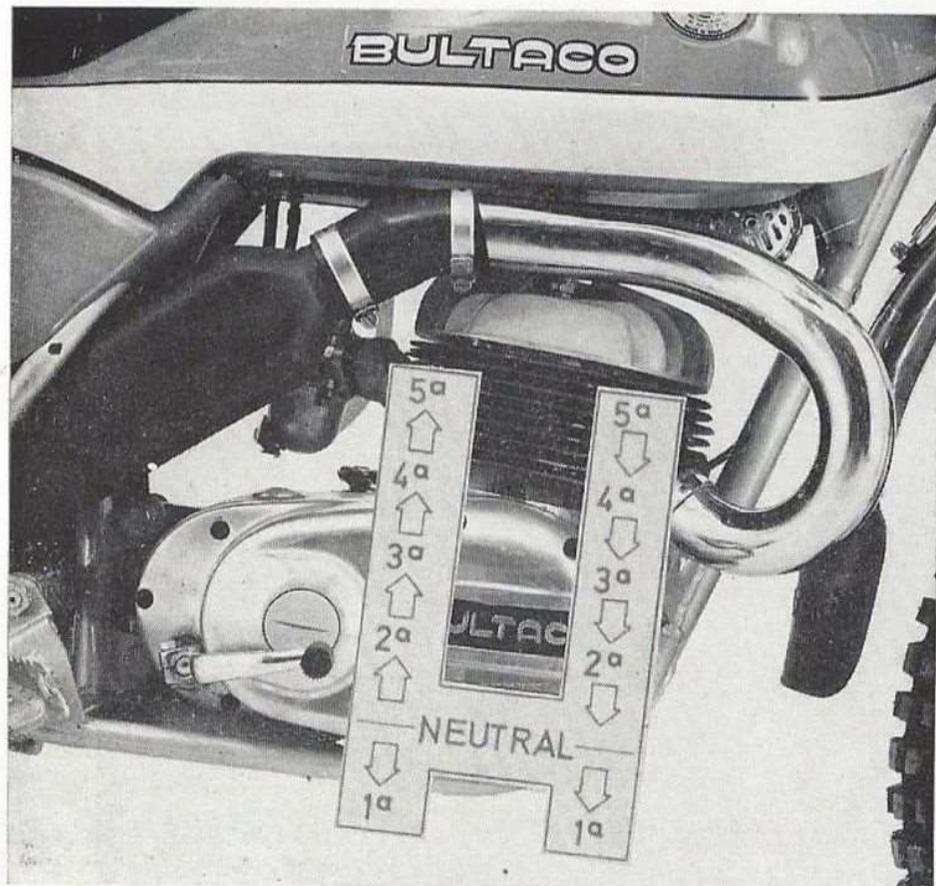


Fig. 9

The gearshift pedal is located in front of the right footpeg. The Alpina has five forward speeds, and neutral. The gearshift can change only to the next highest or next lowest gear at one time. To shift to the next highest gear, you push up on the gearshift pedal until it stops. To shift to the next lowest gear, you press down on the gearshift pedal until it stops. From first gear, you can only shift up. From fifth gear, you can only shift down to fourth. Neutral is located between first gear and second gear. Gearshifting will be described in more detail in a later chapter.

L. THE KICK-STARTER

The kick-starter is attached to the left side of the engine. It operates in a clockwise direction. To use the kick-starter, fold out the footbar that normally point toward the front of the engine.

Fig. 10

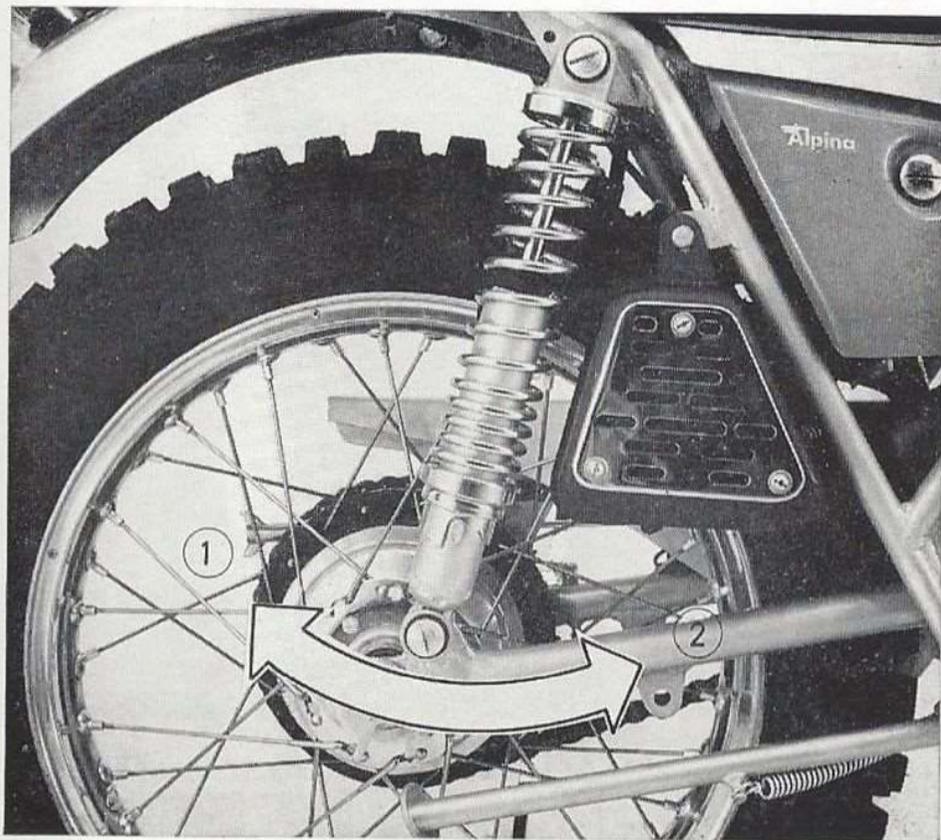


M. THE REAR SHOCK-ABSORBERS

The rear shock-absorbers are adjustable. At the bottom of the shock, a peg rides in one of three notches on a rotatable ring. The first, or highest notch should be used by a lightweight rider on good pavement. For heavier riders, or rough terrain, use lower notches on the ring.

You can vary the setting of the shock-absorber by lifting up on the coil spring with your left hand, and rotating the notched ring with your right hand. Always adjust both shocks to the same setting.

Fig. 11

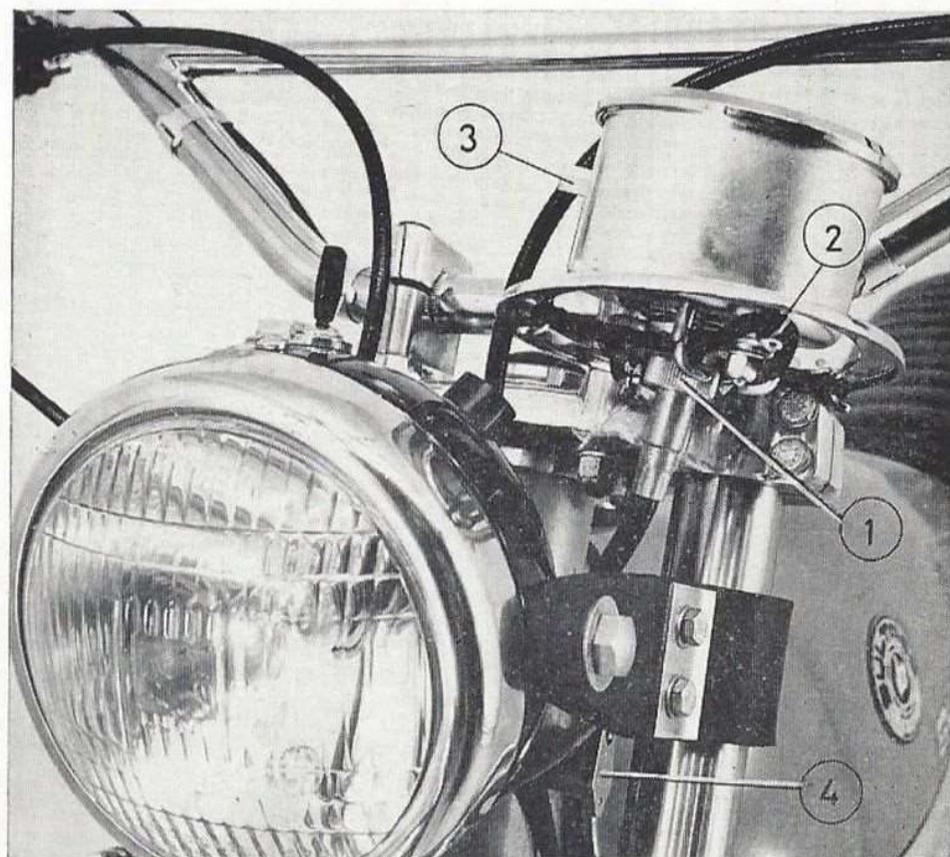


1. Firm. — 2. Soft.

N. THE SPEEDOMETER

The Alpina is equipped with a speedometer and odometer. Both are calibrated in miles.

Fig. 12



1. Outer cover upper nut. — 2. Rubber washer. — 3. Mielage Set screw at zero. — 4. Steering lock.

P. THE SIDESTAND

The sidestand is located on the lower right hand side of the rear frame tube.

Remember the sidestand is very light. It was made to support motorcycle only, **without** rider.

Q. THE TOOL KIT

The motorcycle is provided with a compact set of tools (9). The Tool Kit is stored in a waist bag which is supplied with the motorcycle.

The Kit consists of pliers (6), and adjustable wrench (3), a screwdriver (10), sparkplug wrench (2), a combination dipstick handle (8), a 22/32 mm wrench (7), a 4 mm wrench (11), a 5 mm Allen wrench (4), and a 6 mm wrench (5).

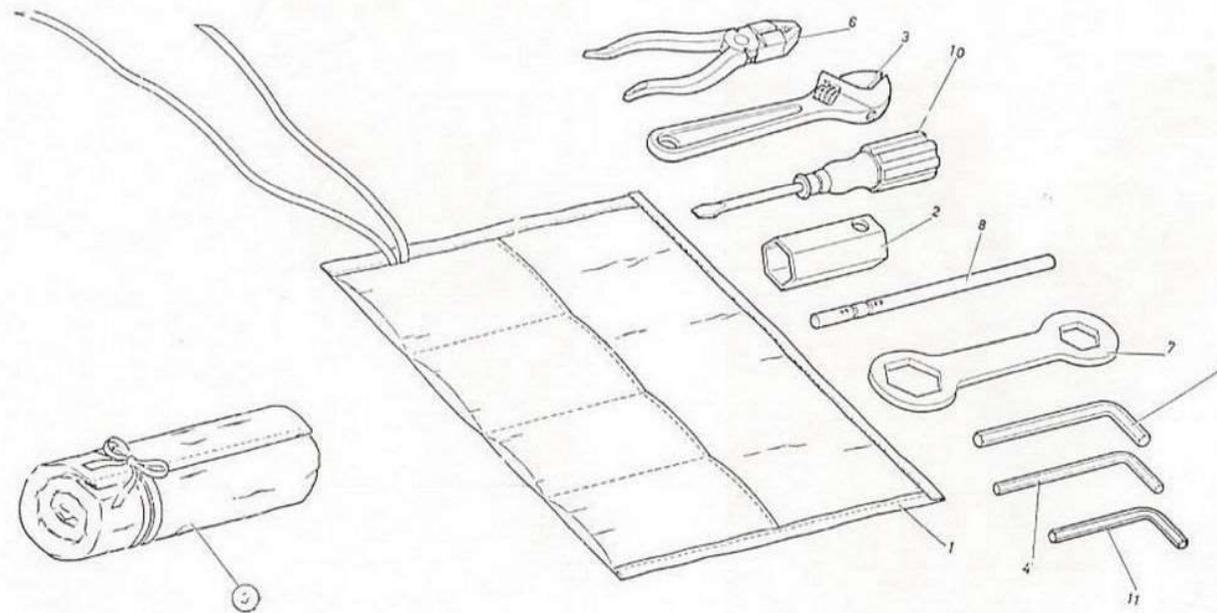


Fig. 12 bis

For performing the normal maintenance, we recommend that you buy open-end metric-wrenches in 6, 7, 8, 9, 10, 11, 12, 13, 14, 17, 18, 19 and 22 mm sizes. If you have a 3/8" drive socket-wrench, you may also wish to buy metric sockets in 10, 14 and 19 mm sizes. The 19 mm socket is specially handy for tightening engine-mount nuts and bolts.

If you wish to set the ignition timing, you will need the Bultaco timing light, vernier gauge, and metric feeler gauge.

If you are an experienced mechanic, and you wish to be able to perform any maintenance that your motorcycle might require through the years, your Bultaco dealer can obtain for you the complete range of Bultaco special tools, and the service manual.



III. PREPARATION

This chapter tells how to mix the fuel, and how to make a few simple checks before taking your first ride on the Alpina.

A. FUEL MIXTURES

The Alpina gets its engine lubrication from oil mixed with the gasoline. Never run the motorcycle on straight gasoline, even for short distances. Always use high-test gasoline, of at least 90 octane. Do not use additives such as nitro, benzene, acetone, etc.

They are two general types of oil that you can mix with the gasoline: regular motor oil and two-cycle oil. It is better not to switch around among the various types, you should select one brand of oil and continue to use it.

1. **Regular Motor Oil, SAE 40.** This is the standard type of oil used in automobiles. You can buy it at filling stations. Mix this oil with the gasoline at 5 %, or 20 parts of gasoline to 1 part of oil. It works out to 6 1/2 ounces, or 200 cc. of oil per gallon of gas.

Pour the oil and the gasoline into a clean five-gallon gas-can, and shake the can to slosh the liquids for several minutes, until they are mixed thoroughly.

If you are using a mixture of regular motor oil and gasoline in your petrol-tank, and you have not ridden the machine during the preceding week, wiggle the handlebars from side to side for a few minutes, to re-level the fuel, before starting the engine.

2. **Two-Cycle Oil.** Two-cycle oil is made for use in lawnmowers, outboard motors, etc. It is available at many filling stations, hardware stores, and sporting-goods stores. It works out to 5 ounces, or 150 cc. of oil per gallon of gas.

You should use a gas-can for mixing the two-cycle oil and the gasoline. Once mixed this type of oil is not likely to settle out in your petrol-tank.

DO NOT GUESS AT THE AMOUNT OF OIL TO USE. Do not make rough estimates, using soft-drink bottles to measure out the oil. Buy a graduated cylinder, or a measuring-cup, and use it to get the right amount of oil into the gasoline.

3. **Fuel Mixture Chart.** The Alpina holds 2.9 U.S. gallons of fuel 10.5 lts. Use the chart to determine how much oil to mix with the gasoline.

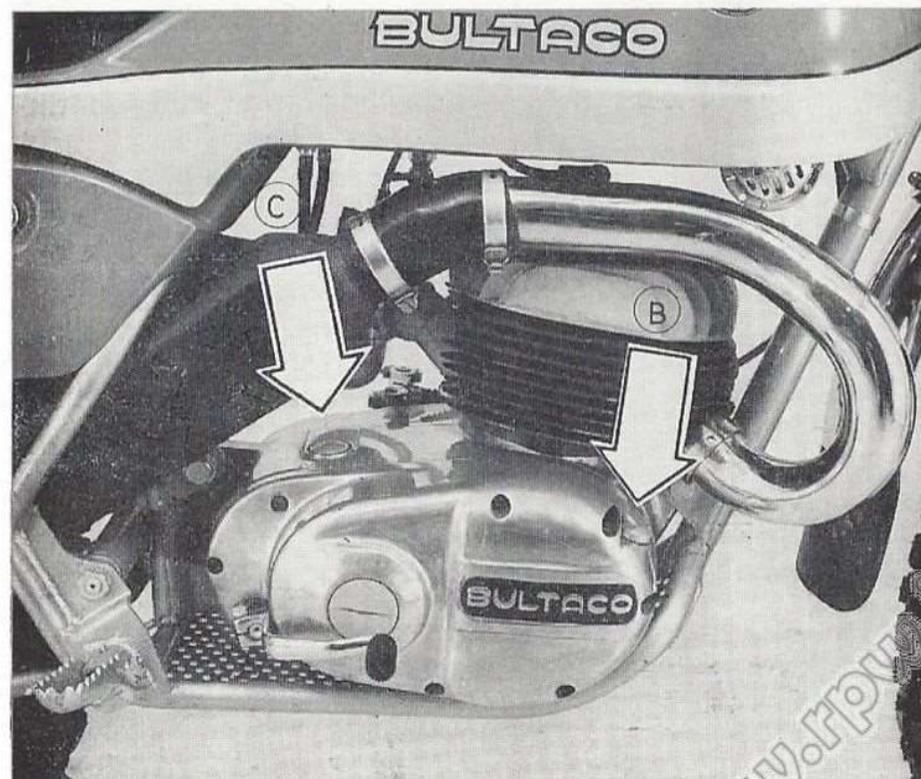
U.S. Gallons of Gasoline	Oil Regular Motor SAE 40 at 5 %		Regular Two - Cycle Oil at 4 %	
	Oz	cc	Oz	cc
.1	.6	18	.5	15
.2	1.3	39	1.1	33
.3	1.9	57	1.6	48
.4	2.6	78	2.1	63
.5	3.2	96	2.6	78
.6	3.9	117	3.2	96
.7	4.5	135	3.7	111
.8	5.2	156	4.2	126
.9	5.8	174	4.8	144
1.0	6.4	192	5.3	159
1.1	7.0	210	5.8	174
1.2	7.7	231	6.4	192
1.3	8.3	249	6.9	207
1.4	9.0	270	7.4	222
1.5	9.6	288	7.9	237
1.6	10.3	309	8.5	255
1.7	10.9	327	9.0	270
1.8	11.6	348	9.5	285
1.9	12.2	366	10.6	303
2.0	12.8	384	11.1	318
2.1	13.5	405		333
2.2	14.1	423	11.6	348
2.3	14.8	444	12.1	363
2.4	15.4	462	12.6	378
2.5	16.0	480	13.1	393
2.6	16.7	501	13.7	411
2.7	17.3	519	14.2	426
2.8	17.9	537	14.7	441

B. PRIMARY CASE

The primary case, on the right side of the engine houses the clutch and the primary-drive chain. You should drain the lubricant from the primary case and refill it.

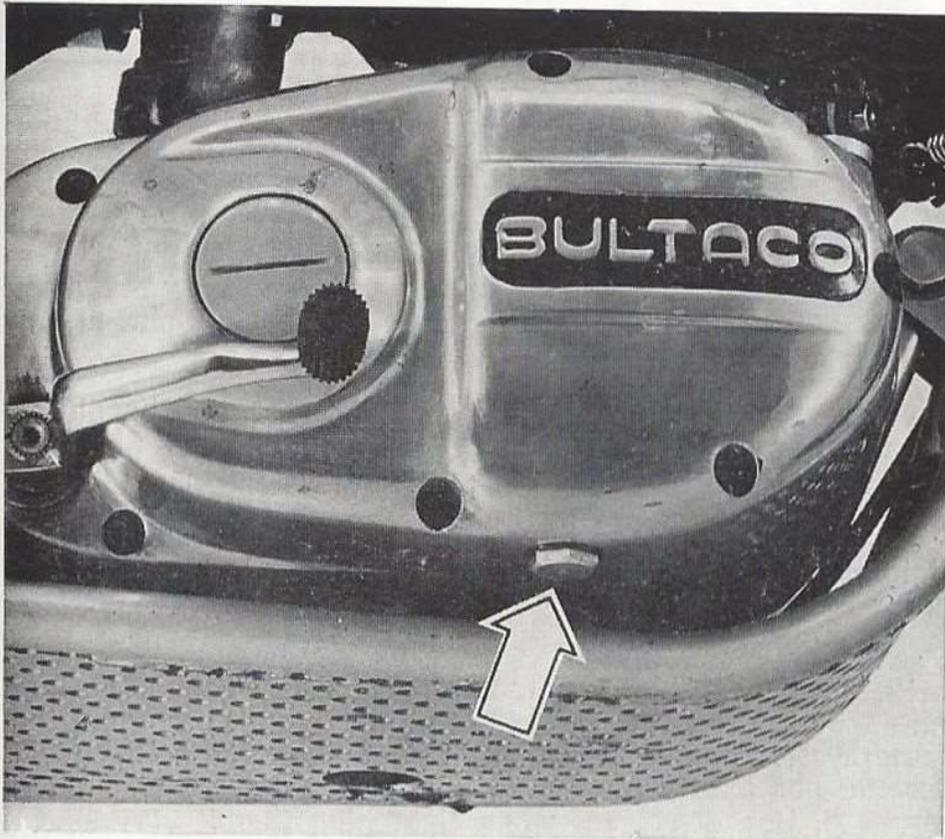
The primary-case drain-plug is located at the bottom of the primary case. With the motorcycle on its stand, position a pan beneath the drain plug. Remove the plug with a 10 mm wrench. Allow the lubricant to drain into the pan. When the primary case is empty, replace the drain plug and tighten it well.

Fig. 13



The primary-case filler-plug is located atop the primary case. Remove the filler plug with a screwdriver. Using a funnel or a graduated cylinder, pour in 250 cc. of SAE 30 motorcycle-primary-case oil. Replace the filler plug, and wipe away any spilled oil. Do not overtighten the filler plug, because its gasket is made of soft rubber.

Fig. 14

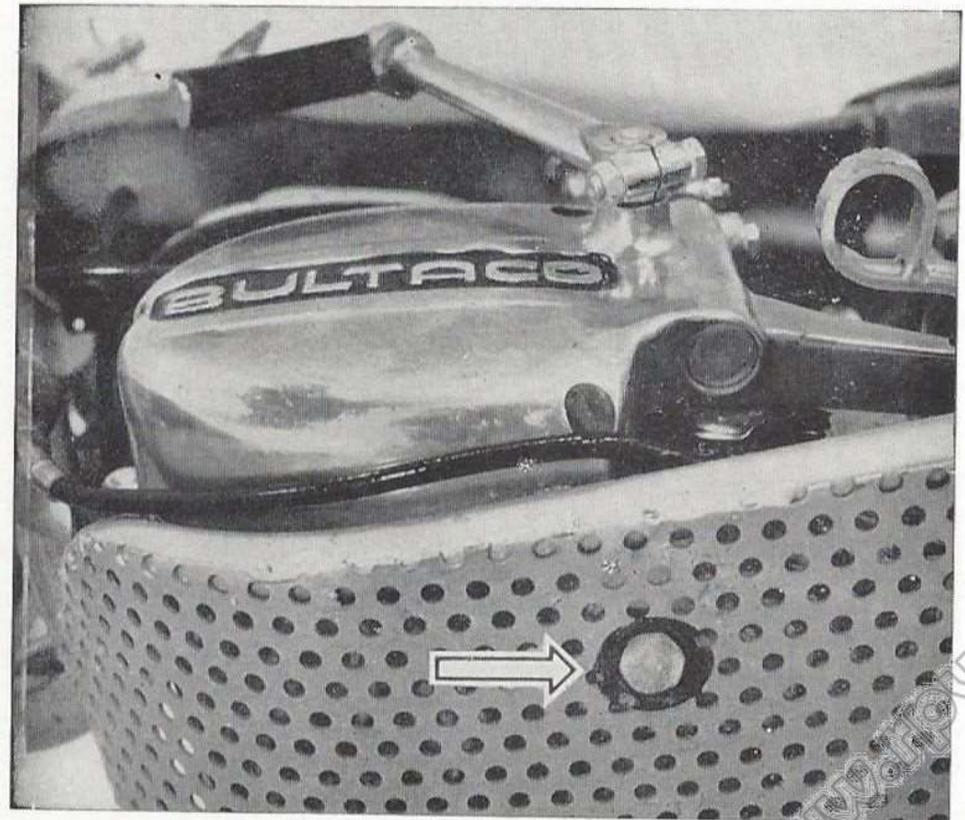


C. GEARBOX

The gearbox is located inside the engine cases behind the engine proper. The gearbox should contain 600 cc. of SAE 90 motorcycle-gearbox lubricant or SAE 90 automobile hypoid-lubricant. You should check the level of the lubricant in the gearbox before taking your first ride.

The gearbox filler-plug is located on top the engine cases, near the carburetor. Remove the filler plug with a coin or a stub screwdriver. If necessary, add lubricant to bring the lubricant level up to the groove. Replace the filler plug.

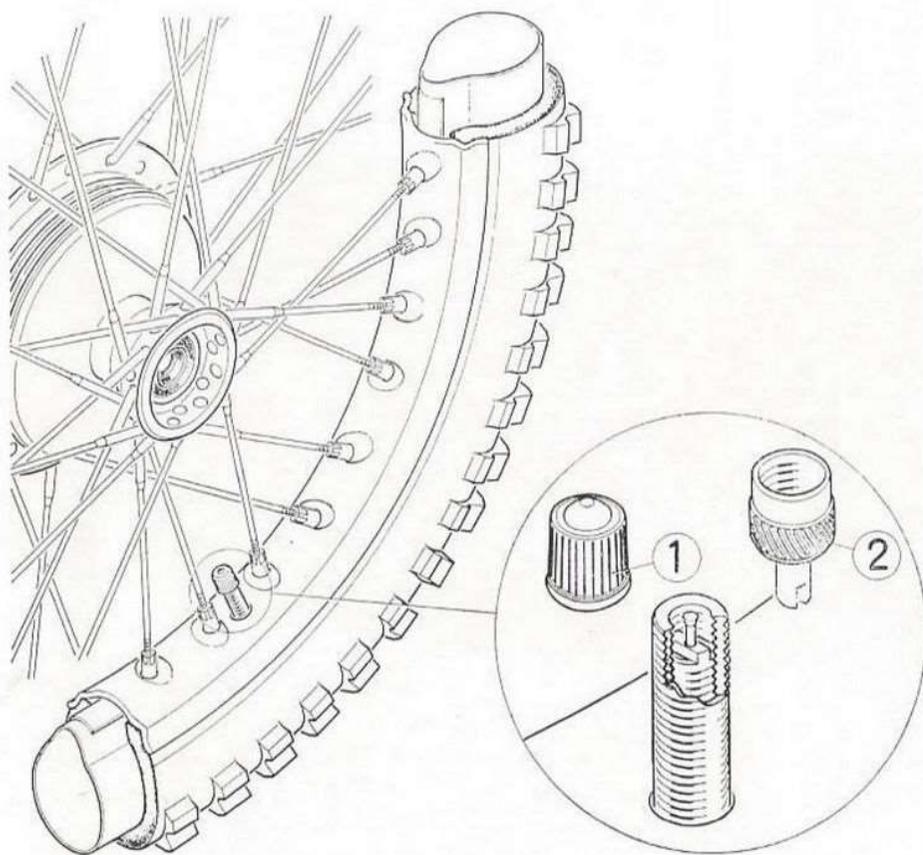
Fig. 15



D. TYRE PRESSURES

Tyre pressures will affect the handling of any motorcycle. Since good handling is one of the Alpina outstanding features, you should make certain that the tyres are inflated properly. Use valve caps on the valve stems. Check the tyre pressures frequently, with a good-quality pressure-gauge.

Fig. 16



1. Plastic cap. — 2. Special cap with key.

SUGGESTED TYRE PRESSURES FOR DIFFERENT TERRAIN

TYRE PRESSURE	FRONT	REAR
FOR TRIALS	5 lbs/sq"	4 lbs/sq"
FOR TRAILS	8 »	6 »
FOR PAVEMENT	14 »	12 »

E. NUTS & BOLTS

Fit the 22 mm wrench to the front-axle nut, and fit the dipstick in the hole drilled in the other end of the axle. Check to make certain that the front axle nut is tight. In the same manner check the rear-axle nut.

Check the handlebars for tightness. Test the handlebar control to make certain that their mounts are tight. The controls themselves should have some play on their mounts.

Check the other nuts and bolts for tightness. Do not tighten the cylinder-head nuts of the adjusting-screws on the carbureter.

Note: If you are a person of unusual strength, do not enter into a contest of wills the nuts and bolts on the motorcycle. The nuts and bolts are made of steel suitable for the purpose, but nuts and bolts do not have unlimited strength. Use discretion when tightening them.

IV. RIDING

This chapter tells about the running-in period. It also tells how to start the engine, how to put the motorcycle in motion, how to shift gears, and how to stop.

If you are not experienced in trial riding, get an experienced trails rider to show you how to get the most out of your Alpina.

A. RUNNING-SPEEDS

The running-in period consist of the first 900 miles of operation. During the run-in period, do not exceed the speeds listed below. Afterwards, increase your speeds progressively.

	1st gear	2nd	3rd	4th	5th
1. First 300 Miles.	10mph	15 mph	18 mph	29 mph	40 mph
2. Next 600 Miles.	13mph	17 mph	21 mph	38 mph	48 mph

B. STARTING THE ENGINE

Before starting the engine in the morning, note following instructions:

- 1st Pull the clutch lever to the end.
- 2nd Move the kickstarter crank three or four times.
- 3rd Leave the clutch lever at its normal position, and start the engine normally. Starting the engine and engaging 1st gear should be done without violence.

Under normal conditions the engine should be started in the following manner:

1. Check fuel lever.
2. Turn the gas-tap on, with the lever pointing straight down.
3. Tickle the carbureter, until a few drops of fuel overflow the float bowl.

4. Put the gearshift lever in neutral, between 1st gear and 2nd gear.
5. Hold the motorcycle in a upright position. Rotate the twistgrip about 1/4 of its travel, and hold it there.
6. Place your right foot on the kickstarter foot-bar. Kick downward sharply. When your foot strikes the footpeg hold the kickstarter there until you are certain that the engine is, or is not going to fire. If the engine does not start on the first kick, allow the kickstarter to return to its normal position, and kick again.
7. When the engine is running, use enough throttle to keep it running. Do not rev the engine hard, however when it is cold or when the gearbox is in neutral.

C. STARTING OFF

With the engine running sit in the saddle of the Alpina. Place your right foot, on the footpeg. With your left hand pull the clutch lever to the handlebar, and hold it there. With your right foot, press down on the gearshift lever to engage first gear.

Open your left hand slowly and smoothly to let out the clutch. As the clutch begins to engage, feed more throttle to avoid stalling the engine.

When the motorcycle is moving at several miles-per-hour, put both feet on the footpegs, and steer with the handlebars and you body weight. At speeds above 10 mph. you will steer primarily with your body weight, leaning the machine toward the direction you wish to take.

D. BRAKING

To stop the machine, pull the clutch and apply both brakes gently. By using the brakes gently for a while, you will run them in properly, and you will become familiar with their operation.

On dirt, the rear brake will slow you the best; use the front brake sparingly. Stopping on dirt takes longer than stopping on pavement.

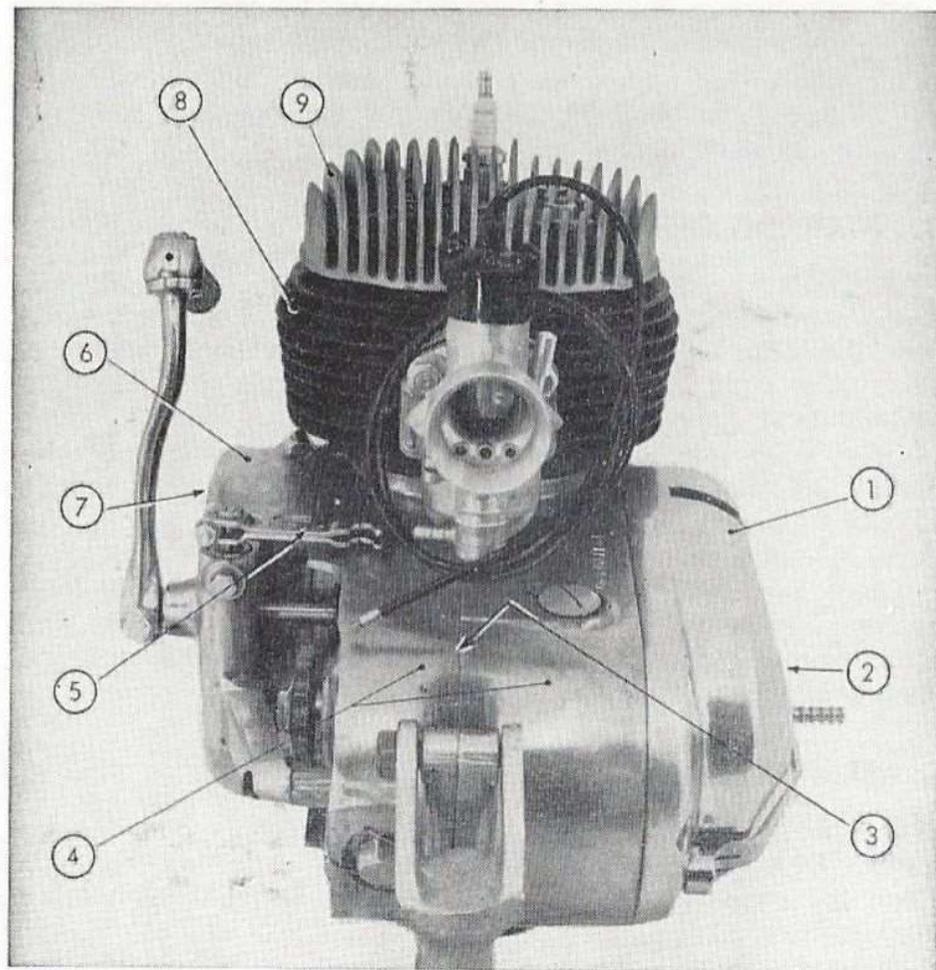
Never use either brake hard enough to lock up the wheel.

V. MAJOR COMPONENTS OF THE ALPINA

This chapter gives a brief description of the major components of the Alpina. Later chapters give detailed instructions for lubrication and maintenance of the components.

A. THE ENGINE

Fig. 17

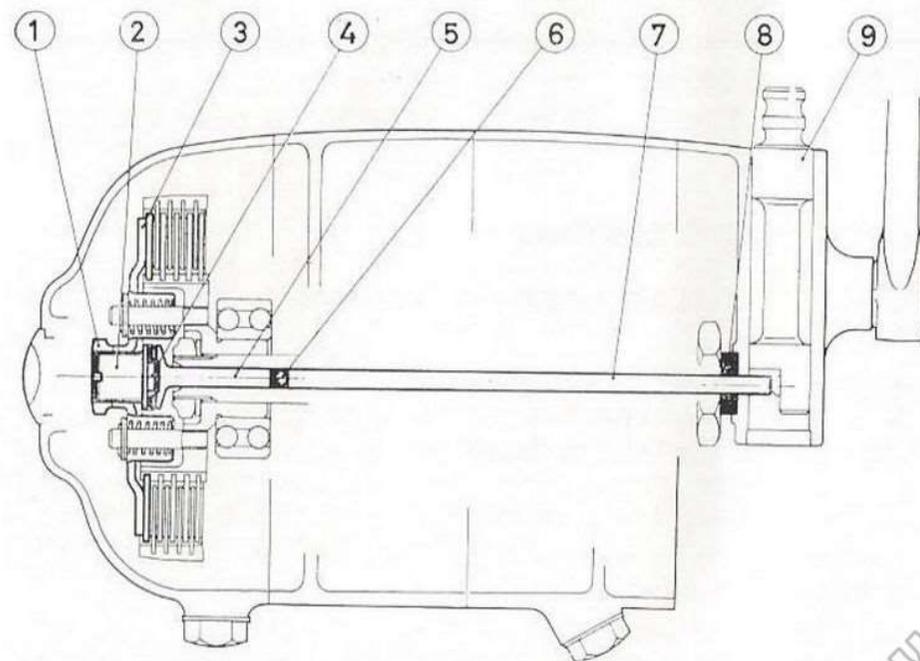


1. Primary Case. — 2. Clutch. — 3. Gearbox. — 4. Engine Cases. — 5. Clutch Linkage. — 6. Magneto Case. — 7. Magneto Flywheel. — 8. Cylinder. — 9. Cylinder-head.

The Alpina has a single-cylinder, two-cycle engine, with displacement and bore according to the cubic capacity, but all the versions with the same stroke, 60 mm. Please see specification table on page 54.

The great advantage of the two-cycle engine, is that it is very, very simple the manufacturer has figured out the complicated port-desings, cylinder-head shapes, piston and ring desings, and materials-specifications to build an engine this is powerful as well as reliable. There are few moving parts, because the engine has no valves or valve-train components. The Alpina engine is tuned to deliver a great deal of power at low engine speeds, for good performance on difficult terrain.

Fig. 18



1. Clutch adjusting screw nut. — 2. Clutch rod adjusting screw. — 3. Clutch plate and disc. — 4. Ball-race. — 5. Clutch rod elongation. — 6. Steel-ball. — 7. Clutch rod. — 8. Protection washer. — 9. Clutch operating shaft assembly.

Barring unusual circumstances, the Alpina engine will give troublefree operation if the ignition-timing is correctly adjusted; a sparkplug of the right heat-range is used; and of the carburetor is properly adjusted for the climatic conditions in your region. If you will work with your dealer to see that these requirements are satisfied, you will receive maximum pleasure from riding your Alpina.

B. THE CLUTCH

The clutch cable rotates a shaft with lever situated on the left side of the engine. The shaft with lever pushes against a long rod. On the other side of the engine, the rod presses against the outer clutch-plate, allowing one set of clutch plates to disengage themselves from the other set of clutch plates. This disconnects the power train between the engine and the gearbox.

C. THE FRAME

The Alpina single-loop frame was specially designed for the Alpina. It combines lightness with rigidity. Each frame is handligned to provide precise steering. The frame is welded, because we feel that this is the strongest, safest way to make frames.

D. THE GEARBOX

The Alpina has a five-speed constant-mesh gearbox. Because the gears are continually meshed, shifting is smooth and fast. A new drum-type selector replaces the traditional camplate. This new shifting-drum is much more rugged than a camplate.

The gearbox is very robust and has been tested in numerous trials with very satisfactory results. The ratios are matched to the power curve of the engine. First gear is very low; second and third are also low. Fourth is spaced out a bit. Fifth is way up there, for fast highway riding. The gearing is very good for both on and off the road riding.

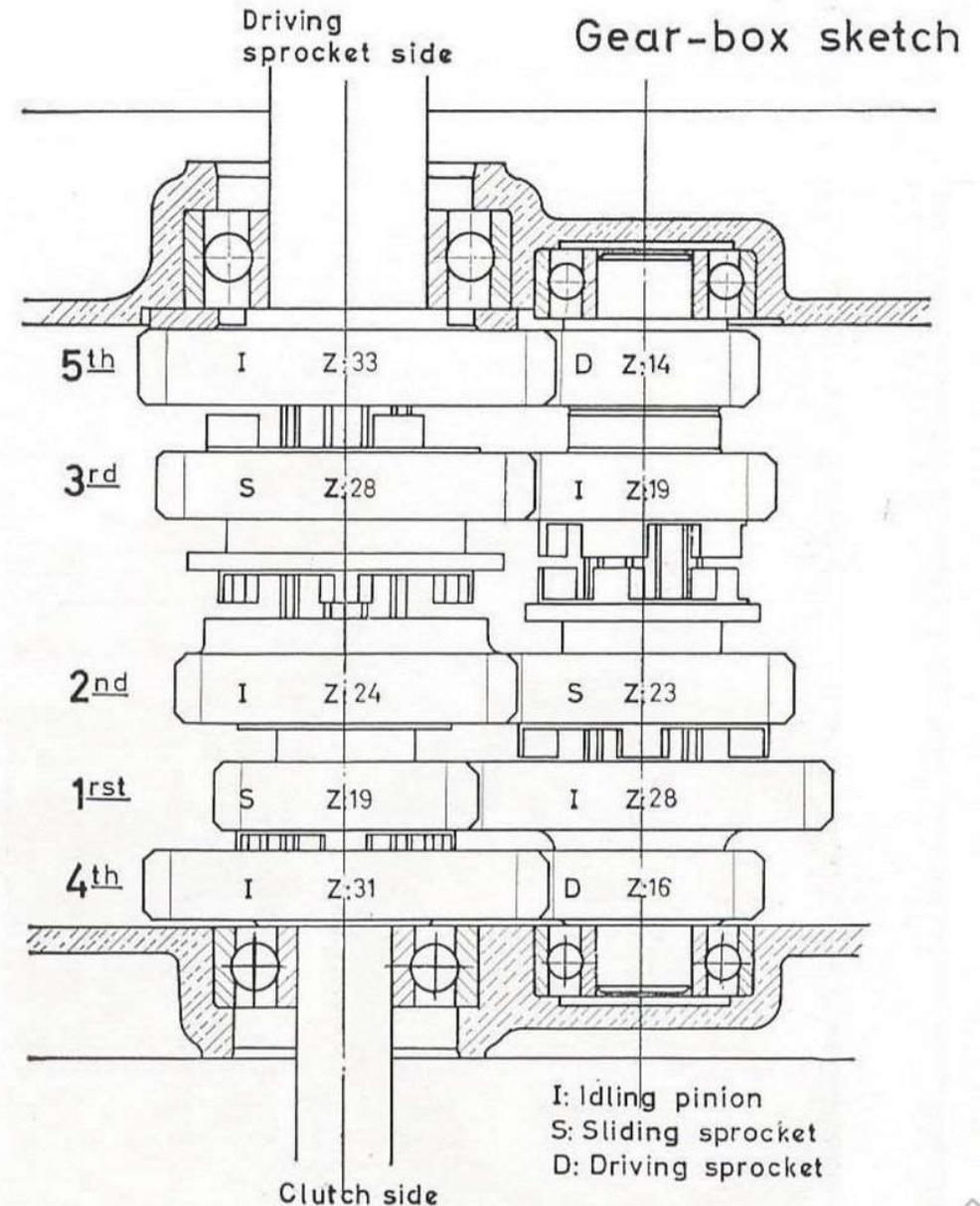
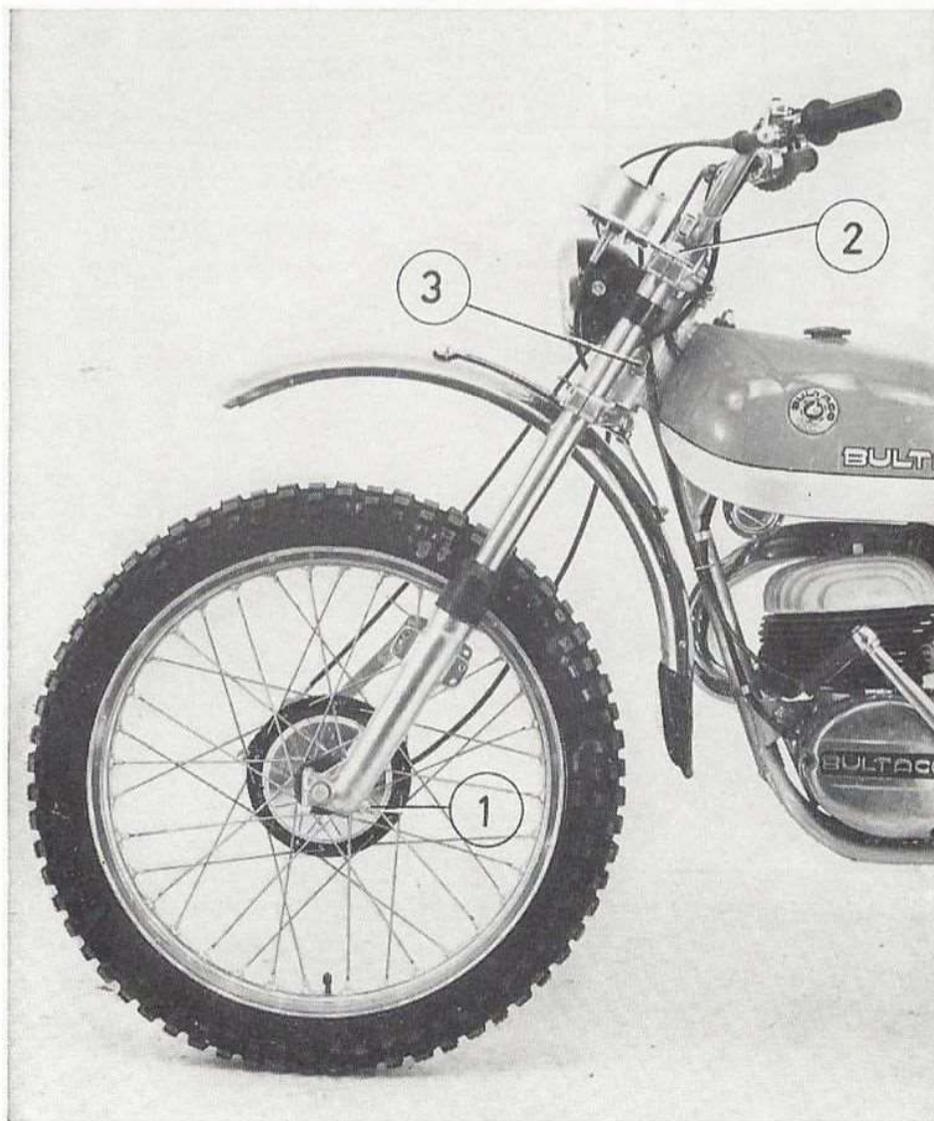


Fig. 19

E. THE STEERING AND SUSPENSION

Fig. 20



1. The drain screw. — 2. The filler plug. — 3. Steering lock.

The angle at which the front forks are attached to the frame determines, largely, whether the motorcycle will steer quickly, slowly, or even sluggish. The Alpina fork-angle is good for all-round use. The steering is stable enough for fast riding on dirt roads and high-ways.

The front forks are of telescopic-hydraulic construction. They provide 6 1/2" of travel. The three-way adjustable rear shocks provide 3-15/16" of travel. The Alpina steers a stable path across tricky obstacles.

F. THE WHEELS AND BRAKES

The wheel hubs are machined from light alloy, for minimum unsprung weight. The light-alloy rims are the strongest rims available on the market. The machine is fitted with internal-expanding, leadings-shoe brakes.

G. ELECTRICS

The Alpina does not require a battery. A flywheel on the left side of the engine contains cast-in magnets.

The ignition coil, located just below the magneto flywheel, generates current to operate the sparkplug. Current flows from the ignition coil to the contact-breaker points, then to the high-tension coil, and finally to the sparkplug.

The lighting coil, located next to the ignition coil, generates AC current to power the 61volt-headlight the tail light and the horn.

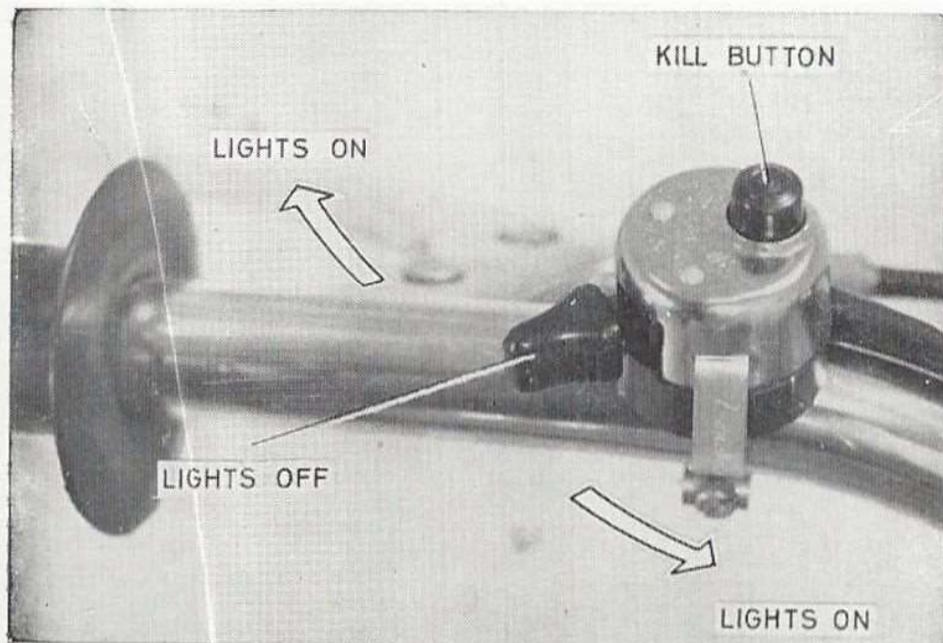
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1. Lights for Electrical Installation

a) The Switchbox.

The switchbox should be mounted on the left side handlebar. Place the switchbox so that it can be reached quickly and easily with your left hand. The illustration shows how to use the switchbox.

Fig. 21/1



b) The Headlight.

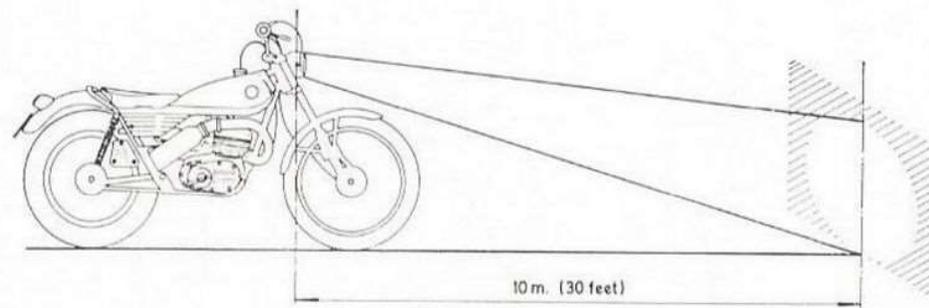
The headlight has a bayonet bulb 35/35 W-6V. To adjust the headlight beam follow these instructions:

At night, on flat ground or pavement, position the motorcycle so that it is perpendicular to a wall 30 feet away (measure the distance), with the sidestand retracted, start the engine, and turn on the low headlight beam. The beam is oval, and the bottom of the beam should just touch the bottom of the wall. If the bottom of the beam is too high, or too low, you should reposition the headlight unit.

To adjust the position of the headlight unit, loosen the two 14 mm mounting-bolts. Tilt the headlight unit up or down until the bottom of the beam just touches the base of the wall. Then tighten the mounting bolts.

To change the headlight bulb, remove the screw beneath the headlight rim. Remove the rim and headlight assembly from the headlight unit. Rotate the bulb-holder and remove it from the headlight assembly. Remove the bulb and install a new one. Reassemble the headlight unit in the reverse order.

Fig. 21/2



c) The Taillight.

The tail has one bulb of 15/5w.-6v with purpose.

To change the light bulb follow these instructions: Rotate the taillight lens ccw and remove it from the tail light assembly. Press and rotate ccw for remove the bulb. Replace with a new one. Replace the tail light lens.

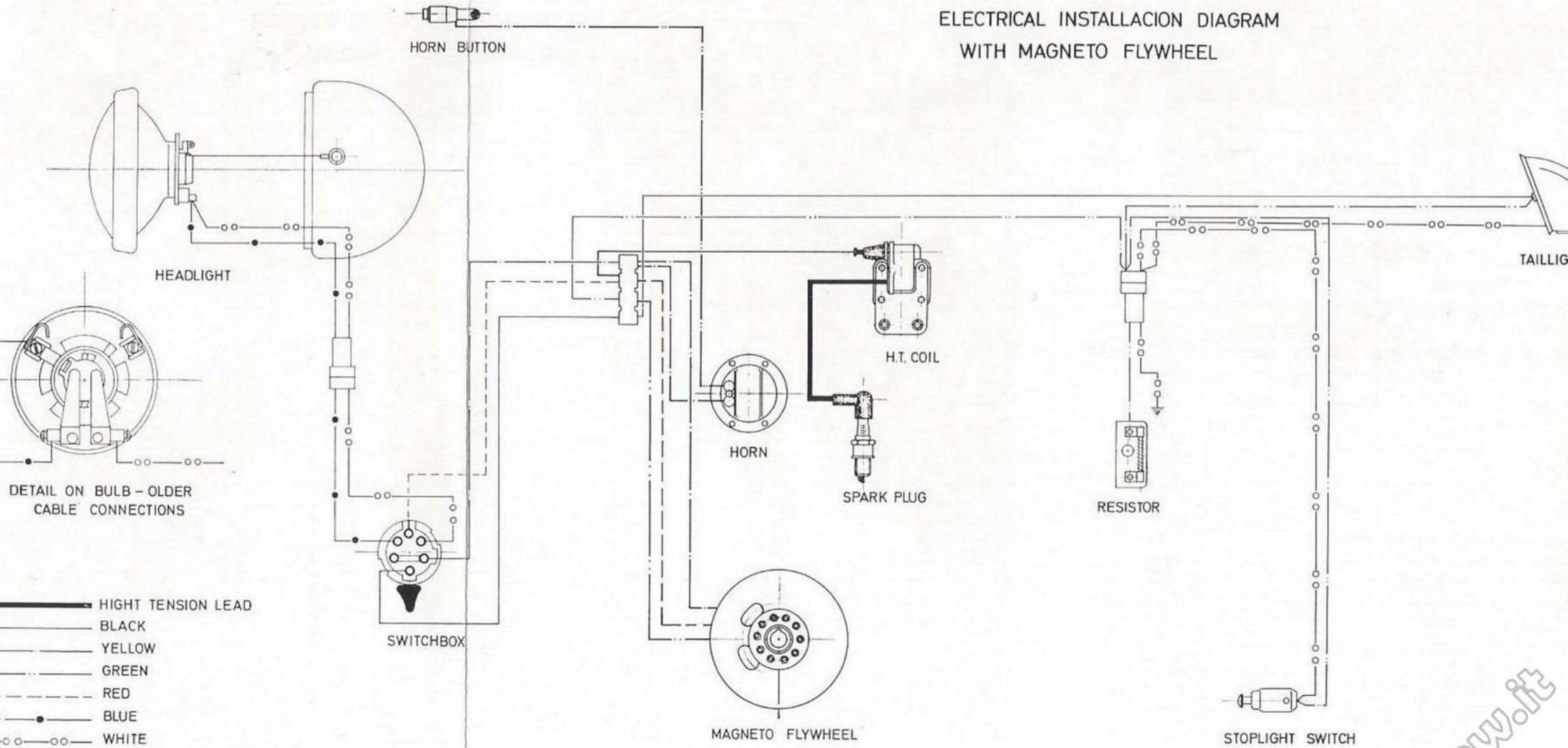
d) The Stoplight Switch.

The stoplight switch is fixed directly upon rear brake rod. When the pedal is depressed the stoplight should begin to illuminate after the pedal has been depressed 1/4".

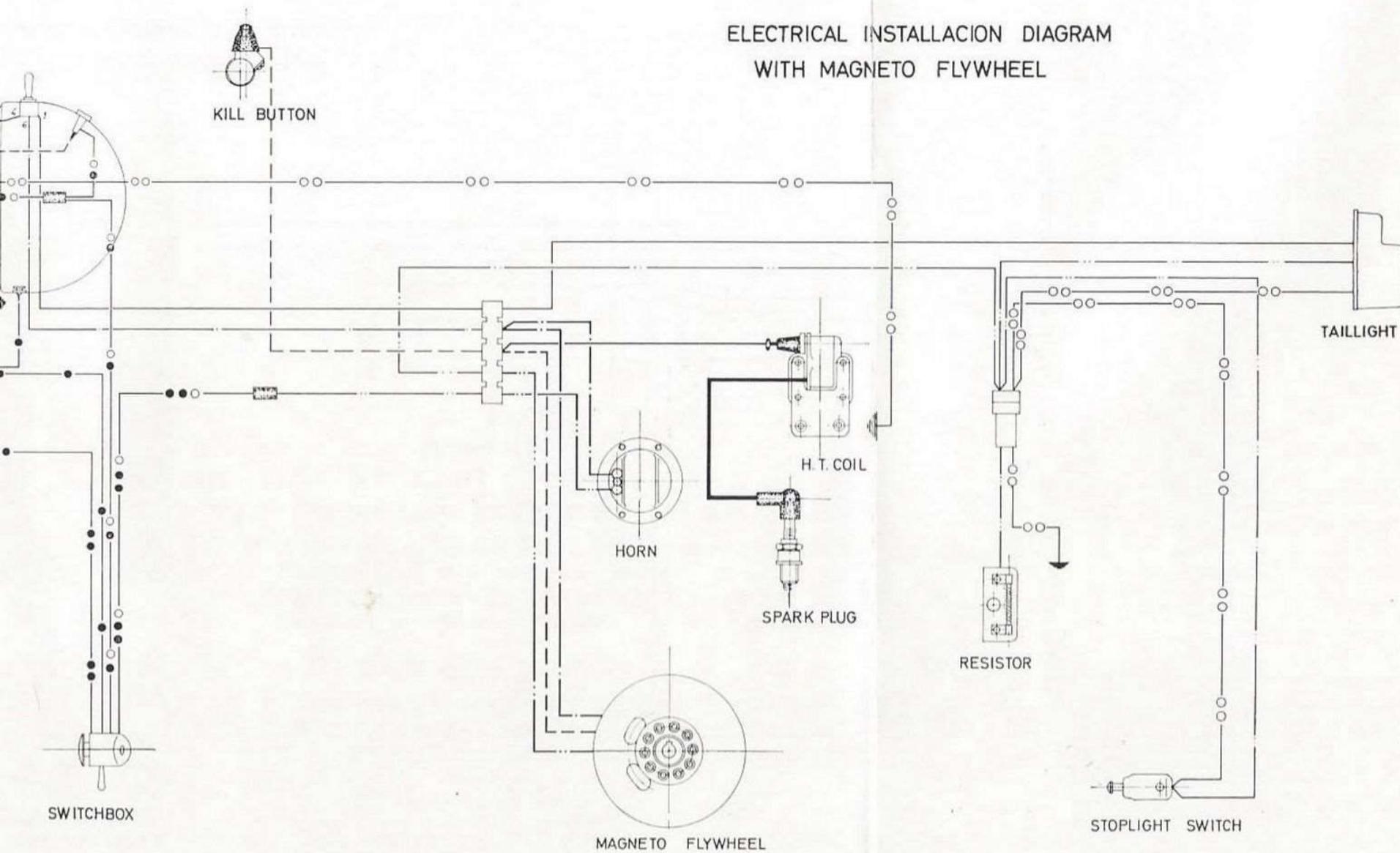
e) The acoustic switch

The acoustic switch is fixed on the right side handlebar. Place the switch so that it can be reached easily with your right hand.

ELECTRICAL INSTALLACION DIAGRAM WITH MAGNETO FLYWHEEL



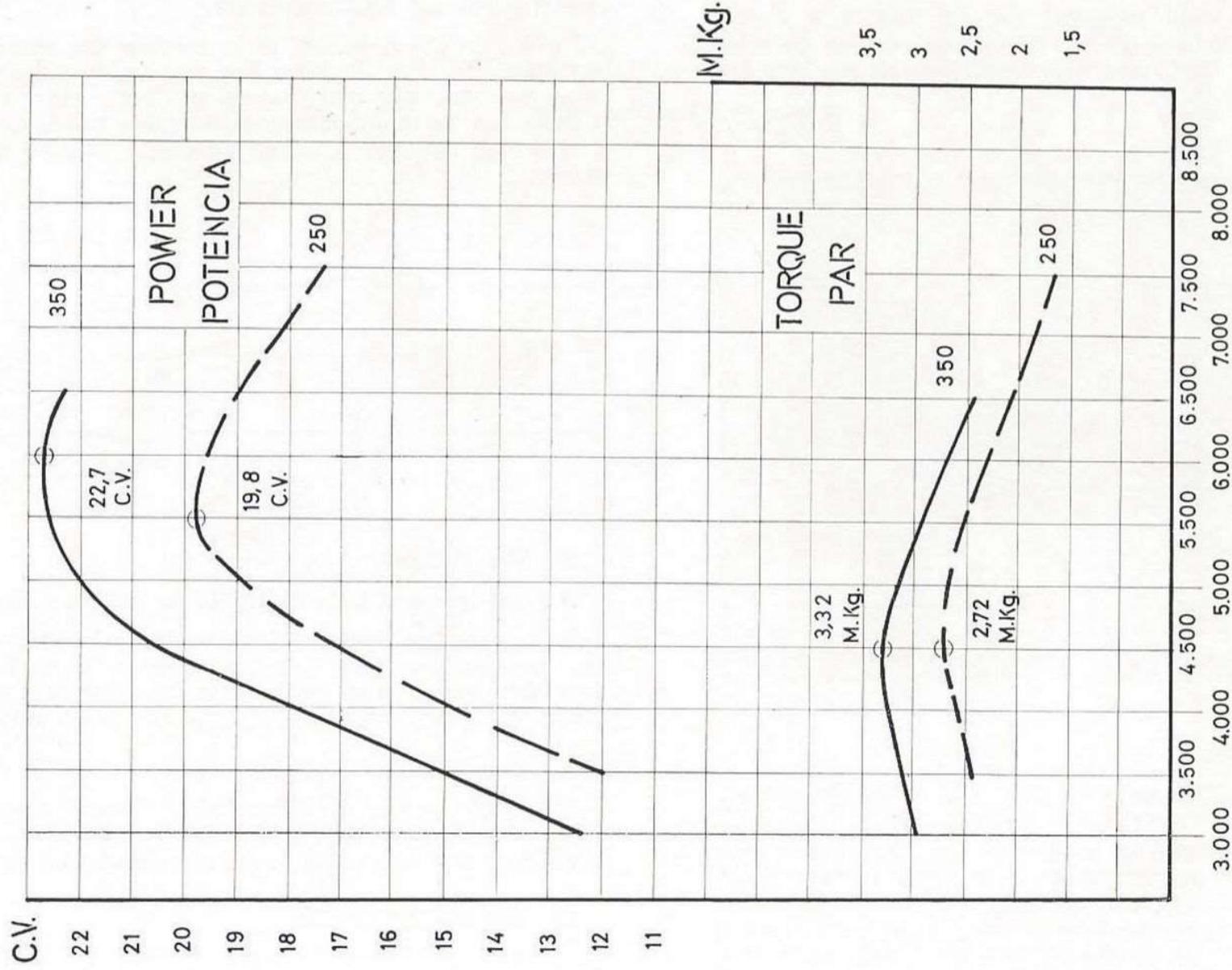
ELECTRICAL INSTALLACION DIAGRAM
WITH MAGNETO FLYWHEEL



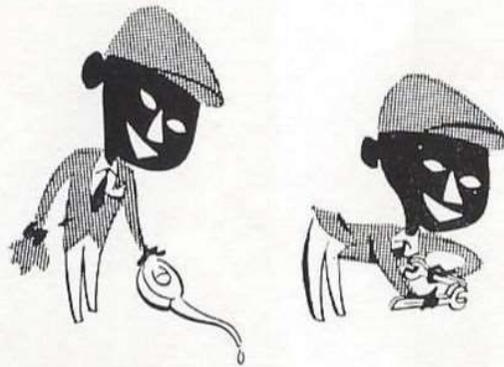
LUCAS INSTALLATION - Fig. 21

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VI. TORQUE AND POWER CURVES



250 and 350 Engines



LUBRICATION AND MAINTENANCE

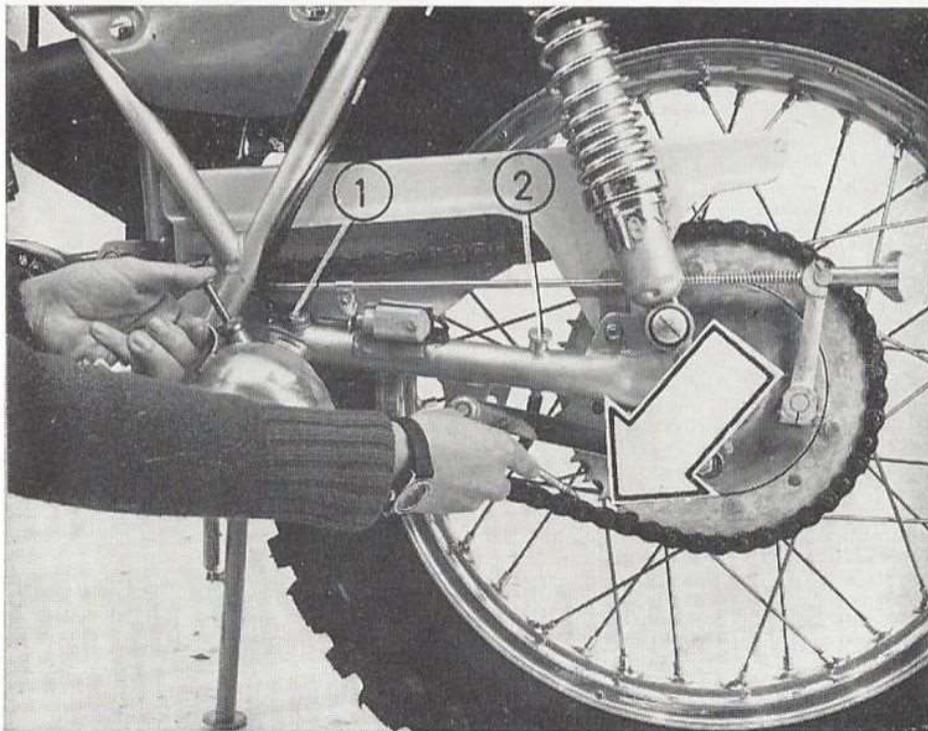
VII. SCHEDULED LUBRICATION

The Alpina does not require much lubrication however, the required lubrication should be provided most of it you can to yourself.

A. LUBRICATION BEFORE AND AFTER EACH TRAIL

1. **Rear Chain.** Use a motorcycle-chain lubricant, available at motorcycle shops. We recommend a penetrating lube that evaporates quickly, leaving a film of heavy grease inside the chain rollers. To lubricate the rear chain, prop the motorcycle so that the rear wheel is off the ground. Apply the lubricant to the top side of the lower chain-run, just a head of the rear sprocket.

Fig. 22



1. Filler Plug. — 2. Pass valve.

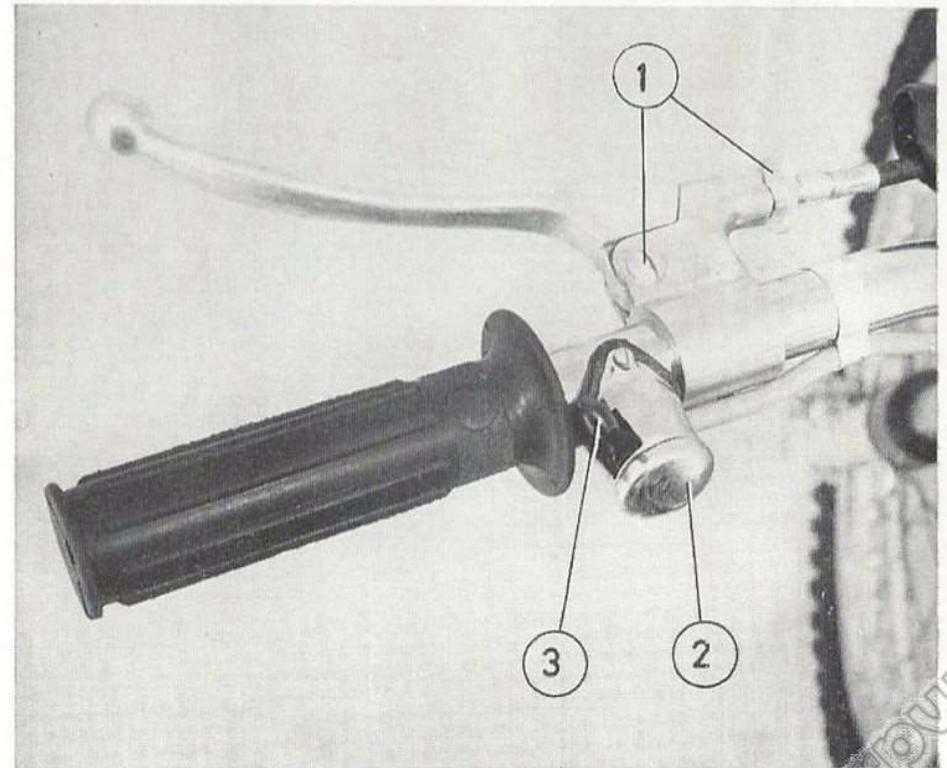
Rotate the rear wheel slowly as you apply the lubricant. Make certain that the lubricant is applied to the inside and outside of both sides of each chain link.

Recent models have an oil tank incorporated on the right side of the swinging arm which lubricates the chain while the machine is running, through an adjustable pass valve. The capacity of this tank is 130 cc SA 40.

However, in case of much rain and mud the best protection of the secondary chain is obtained by using Synthetic grease type BARBATIA 4 (Shell), GRIPPA 40S (Sastrol), or SUPERGRASS 801 (Bardahl). See pag. 32. Table 5.

2. **Handlebar Brake Lever.** Use good-quality SAE 10 motor oil or all-purpose oil. Work a few drops into the brake-cable fitting and the pivot of the lever, and oil the exposed portion of the inner cable.

Fig. 23



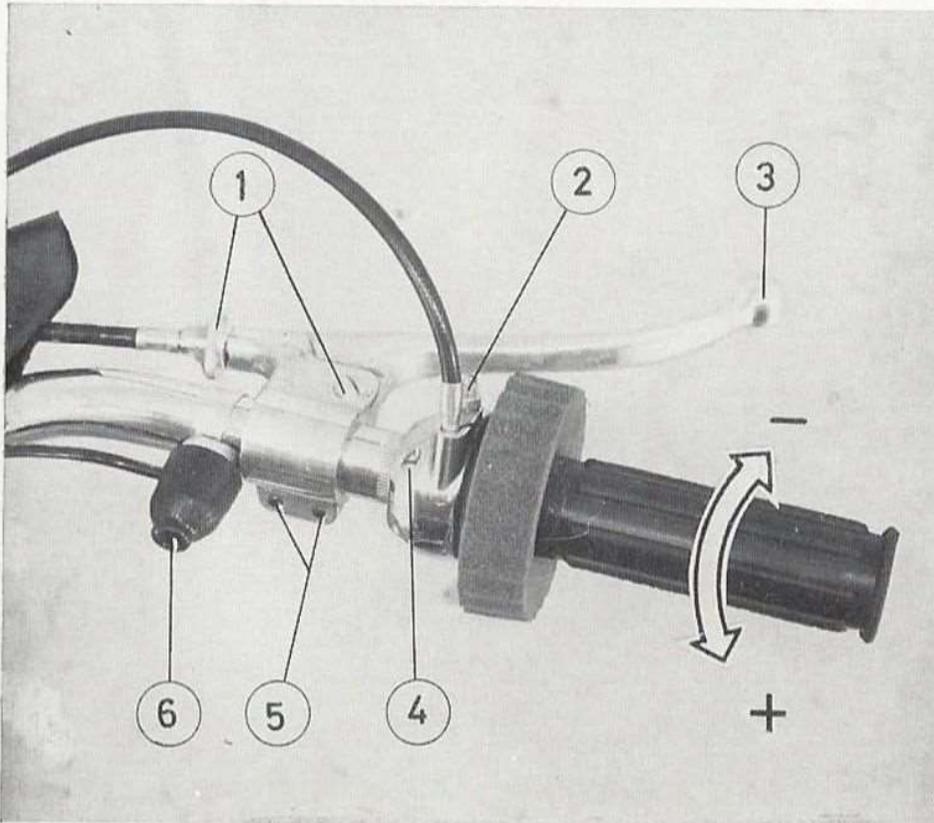
1. Grease. — 2. Horn button. — 3. Lights.

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3. **Handlebar Clutch Lever.** Use good-quality CAE 10 motor oil or all purpose oil. Kork a few drops into the clutch-cable fitting and the pivot of the lever, and oil the exposed part of the inner cable.

4. **Throttle Cable.** Use good-quality SAE 10 motor oil, or all purpose oil. Pull the outer throttle-cable out the twist-grip, exposing a short section of the inner cable. Run oil down the inner cable.

Fig. 24



1. Grease.

5. **Primary Case.** Use 300 cc of SAE 30 motorcycle primary case lubricant. Drain the primary case and fill it with fresh lubricant, as described in Chapter III, «Preparation».

6. **Gearbox.** Use 500 cc of SAE 90 motorcycle-gearbox lubrication, or SAE 90 automobile differential lubricant (CASTROL ST). Drain the gearbox and fill it with fresh lubricant, as described in Chapter III, «Preparation».

7. **Magneto Felt Wiper Pad.** Use distributor-cam lubricant, available from car dealers auto-parts houses. The felt wiper pad is located behind the magneto flywheel (Fig. 46, pág. 45). To lubricate it, remove the 13 mm kickstarter-lever nut and bolt. Remove the kickstarter-lever.

Remove the four 5 mm Allen screws from the magneto case the bottom screw is located behind the clutch-cable clamp. Remove the magneto case from the engine. Shift the gearbox to neutral. Remove the sparkplug.

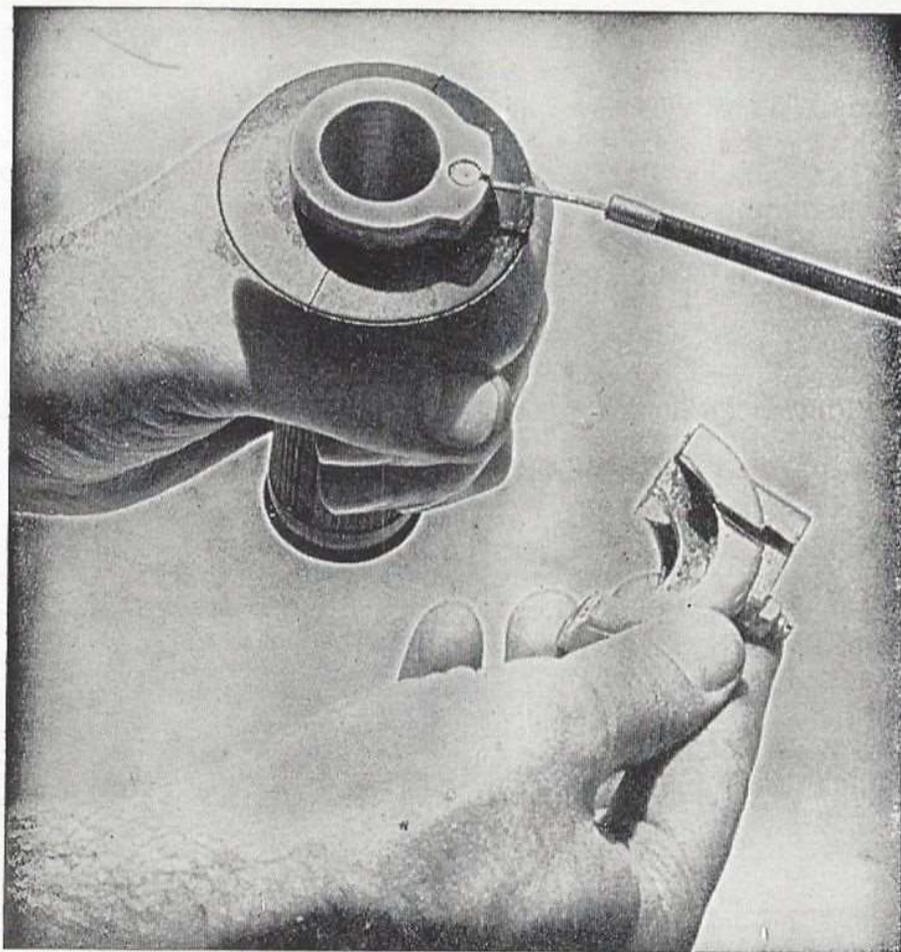
Rotate the magneto flywheel CCW until the first hole in the face of the flywheel is at the bottom of the flywheel. Behind the top edge of this hole, you will be able to see the felt pad. With your little finger or a spatula, work distributor-cam lubricant into the felt pad.

Reassemble the magneto case and tighten the clamp screws. Attach the kickstarter lever and install the sparkplug.

Note: If at any time you dealer removes the magneto flywheel to adjust or remove the contact-breaker point's ask him to lubricate the felt wiper pad at the same time.

8. **Twistgrip.** Use multi-purpose grease. To grease the twistgrip, remove the two screws that clamp the twistgrip guides to the handlebar. Remove the twistgrip assembly from the handlebar.

Lift off the plain guide and coat its inner groove with grease. Pull down the guide that houses the throttle cable, and coat its groove with grease.



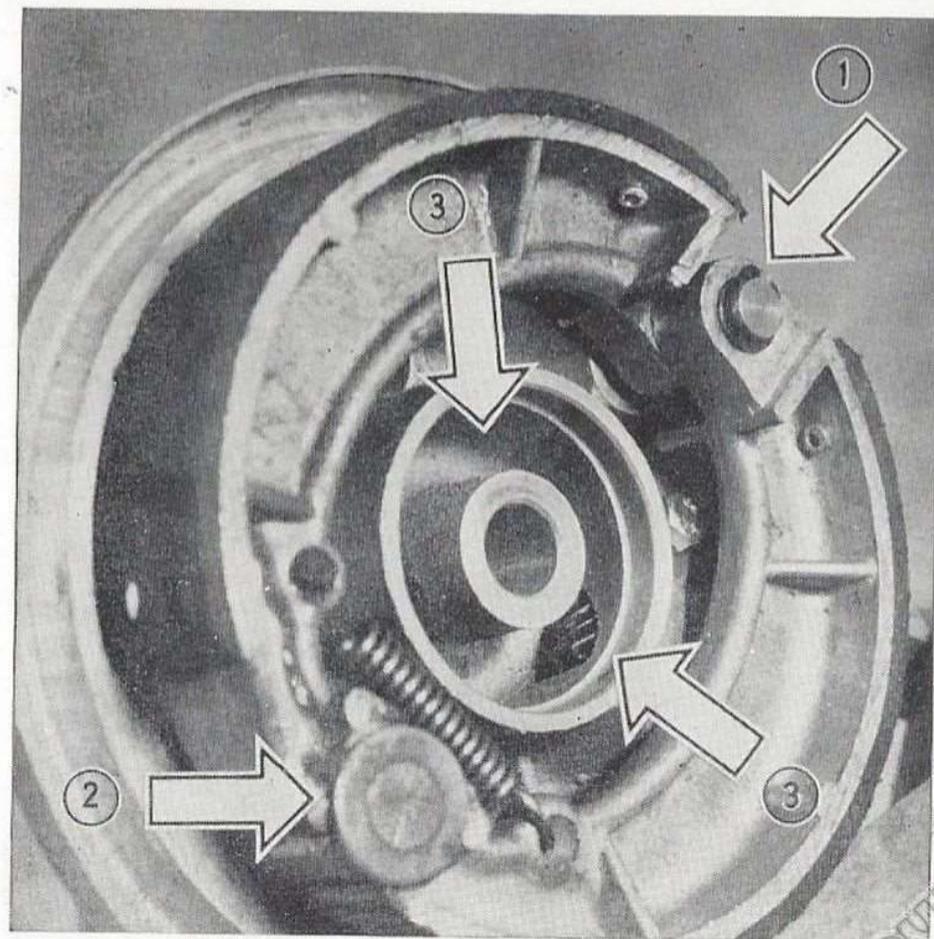
1. Refill with grease the inner part.

Fig. 25

Reassemble the guides on the twistgrip. Slide the twistgrip assembly into the handlebar until the end of the twistgrip rubber is just free of the end of the handlebar. Fit the two screws to the twistgrip guides and tighten them, checking to see that the twistgrip guides and tighten them, checking to see that the twistgrip is still free to rotate smoothly.

9. Front Brake. Use brake-cam grease, or high temperature grease. Remove the front wheel from the motorcycle (for details, see the chapter «Detailed Maintenance Procedures»). Remove the brake backing-plate from the wheel hub being careful not to touch the brake linings or the brake drum with your hands. Spread a thin layer of brake-cam grease or high temperature grease on the cams that operate the brake shoes.

Fig. 26



1. Grease the brake shoes axles. — 2. Grease the brake cams. — 3. Refill with grease the inner part.

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Reassemble the front wheel and reassemble it in the motorcycle. Use multi-purpose grease sparingly to grease the terminals of the cable.

10. **Rear Brake.** Use brake-cam grease, or high-temperature grease. Remove the rear wheel from the motorcycle. Remove the brake locking-plate, and grease the brake cams. To remove brake rod refer to page 56. Reassemble the rear wheel and mount it in the motorcycle. Be sure that all spares are correctly positioned.

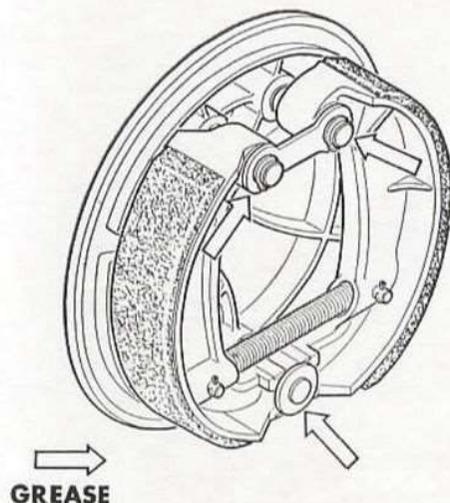


Fig. 26/1

11. **Clutch Cable.** Loosen the clutch-cable tensor. For details see the chapter «Detailed Maintenance Procedures». Coat the terminals of the cable with motorcycle-chain lubricant. Reassemble the clutch cable.

12. **Speedometer Cable.** Use speedometer-cable lubricant, available at car dealer's or auto parts-houses. To lubricate the speedometer cable, unscrew the nut that mounts the speedometer cable to the speedometer assembly.

Pull out the inner cable. Grease it with speedometer-cable lubricant. Replace the inner cable. When it is positioned correctly, you will not be able to rotate it with your fingers. Attach the cable to the speedometer unit, and reassemble the headlight unit.

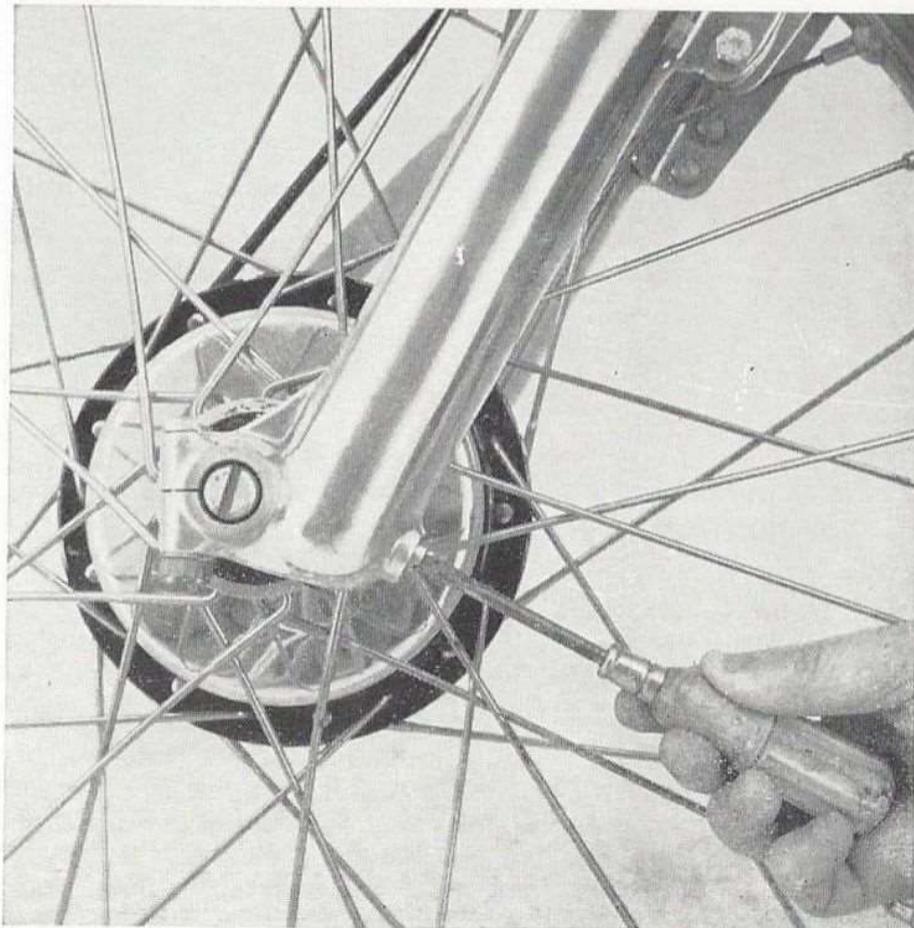
C. LUBRICATION AFTER 6 TRAILS

1. **Steering Bearings.** Ask your dealer to grease the steering bearings and adjust the bearing sea «lithic grease» type CASTROLEASE LM (Castrol), MULTIPURPOSE GREASE 4 (Esso), ALVANIA EP2 (Shell), or SUPERGRASE 512 (Bardahl) should be used.

2. **Wheel Bearings.** Disassemble the wheel as indicated in the chapter «Detailed Maintenance Procedures» (pages 50 and 55). Examine the condition of the bearings, and use the above mentioned type of grease.

3. **Front Forks.** Use SAE 30. To change the oil in the front forks, remove the drain-plug screw at the rear, near the bottom, of each fork leg. Apply the front brake and work the forks up and down to force out all the oil. Replac the drain-plugs screws.

Fig. 27



With a 29 mm wrench, rotate the filler plug at the top of each fork tube CCW and remove it. Pour 175 cc of oil into the filler hole of each fork tube. Position the filler plugs on top the fork tubes. Install each plug by pressing down on it until its threads engage with the threads in the fork tube. Then rotate plug CW, and finish tightening it with the 29 mm Wrench.

The machine leaves the factory with SAE 30. However, in cold weather we would advise you to use a thinner oil. See Table on page 20.

Fig. 28



1. Dismounted handlebars.

4. TABLE SHOWING EQUIVALENCES OF OILS FOR THE SHOCK-ABSORBERS

MAKE	GRADUATION				
	SAE 5	SAE 10	SAE 20	SAE 30	SAE 40
ESSO	TERESSO 43	TERESSO 47	TERESSO 52	TERESSO 65	TERESSO 85
SHELL	TELLUS 21	TELLUS 27	TELLUS 33	TELLUS 41	TELLUS 69
BARDAHL	161/3		161/6	161/9	161/12
REPESA (For Spain)	REPSOL ARIES 40	REPSOL ARIES LIGERO	REPSOL ARIES MEDIO	REPSOL ARIES 700	REPSOL ARIES 800

5. TABLE OF EQUIVALENT LUBRICANTS

BRANDS	TYPES AND SYMBOLS							
	SAE 10	SAE 20	SAE 30	SAE 40		SAE 140	GREASES	
	△	□	▽	<>	Mix with gasoline	○	○ (2)	● (3)
ESSO		ESSOLUBLE 20 W	ESSOLUBLE 30 W	CASTROL XL 20 W 40	ESSOLUBLE 40 W	HIPOID 140	MULTIPURPOSE GREASE H	
SHELL	CARNEA 21 CLAVUS 17	TALPA 20	TALPA 30	TALPA 40	SHELL SUPER TWO STROKE	DENTAX 140	ALVANIA-EP2	BARBATIA 4
BARDAHL		HOME AND OFFICE	HOME AND OFFICE	ESSOLUBLE 40 W	BARDAHL VBA (1)	BARDAHL 451/SF	SUPER GRASS 512 BARDAHL	SUPER GRASS 801 BARDAHL
CASTROL	CASTROL 10 W	CASTROLITE 10 W 30	CASTROLITE 10 W 30		CASTROL XL 20 W 20	HIPOID 140	CASTROLEASE L M	GRIPPA 40 S
FINA					FINAMIX-3			

(1) Proportion in normal use: 4 % (25:1)

(2) Lithic types

(3) Synthetic types.



VIII. GENERAL MAINTENANCE SCHEDULE

To maintain your Alpina in optimum conditions you should make some simple, periodical checkings —apart from the greasing— as detailed in the malow kilometer (mileage) table.

Details on the procedure of these simple checkings, as well as the varios adjustments, are explained is chapter IX.

After the first 500 Kms.

- Clean and caliper the contact breaker points.
- Tension the secondary chain (see p. 54).
- General tensioning of nuts and bolts (see p. 18).

Every 1.000 Kms.

- Clean and coliper the sparkplug (see details on p. 34).
- Clean the carbureter air filter (see details on p. 36).
- Clean the gasoline entry to carbureter filter (see p. 38).
- Tension and grease the secondary chain (see p. 54).

Every 3.000 Kms.

- Clean and caliper the contact breaker points (see p. 34).
- Clean the gas tap filter (see p. 38).

Every 5.000 Kms.

- Clean the engine from carbon deposits (see p. 47).
- Change the clutch oil (see p. 16).
- Change the gearbox (see p. 17).

Every 10.000 Kms.

- Clean the tank with gasoline (see p. 42).
- Check the steering adjustment.
- Change all the drive cables (see p. 40, 49 and 52).



IX. DETAILED MAINTENANCE PROCEDURES

Your Bultaco dealer has the necessary tools and experience for maintaining your Alpina satisfactorily. However we list here some of the more common maintenance procedures, for those riders who are experienced at maintaining motorcycle, and who have the proper tools.

A. SPARKPLUG

1. **Installing a New Sparkplug.** Before installing a new sparkplug, tighten the nut at the top of the sparkplug with a pair of pliers, so that it cannot come loose. Use a gapping tool to set the clearance between the electrodes at 0.19".

Screw the sparkplug fingertight into the cylinder head. Then use a sparkplug wrench to tighten the plug until you have begin to compress the copper gasket.

Install the sparkplug cap. If the cap does not snap into the wire clamp inside the cap until it will grasp the sparkplace on the plug, remove the cap from the plug and bend plug tightly. Force the high-tension wire into the cap to make certain that there is still a good electrical conection.

2. **Heat-Range.** As a general rule we recommend using sparkplugs of the following heat-range.

Unfortunately, there are no hard and fast rules regarding the heat-range to use because many factors—including type of gasoline, gasoline-oil ratio, air density, carburetion, and the heat-range or the sparkplug—affect the amount of heat developed in the combustion chamber.

The heat-range of the sparkplug and the adjustment of the carbureter are related. A sparkplug of the right heat-range in relation to the carburetion will generally have brown or medium-grey electrodes. The porcelain that surrounds the bottom of the sparkplug will generally be dark-brown or black, and dry or only slightly-moist. However, a few brands of sparkplug will give different readings when the heat-range is correct.

Brand of Sparkplug

ENGINE	LODGE	BOSCH	FIRESTONE	CHAMPION	KLG
250	CLNY	W145-T30	F-18 L	N12 Y	FE-30
350	3HLN	W260-T2	F-47 L	N-3	FE-100

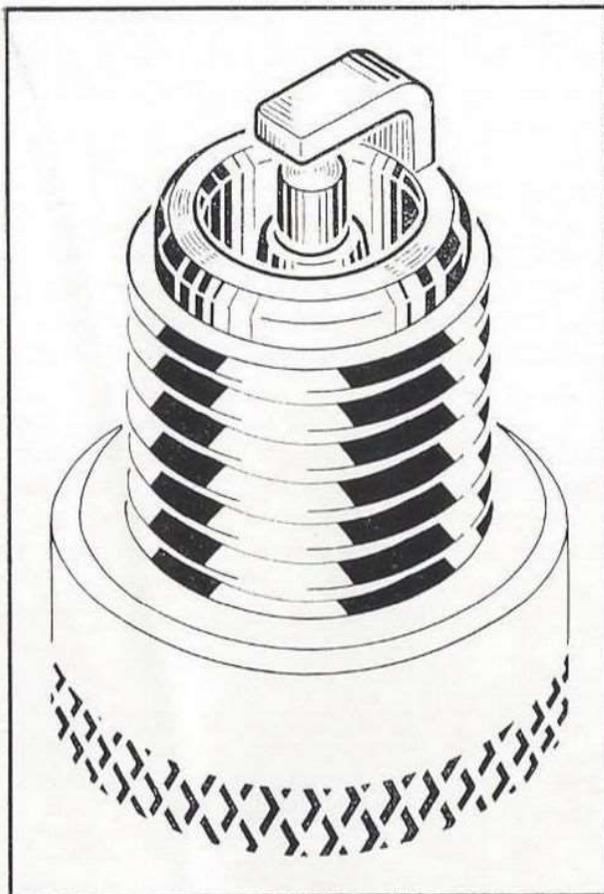


Fig. 29

GOOD

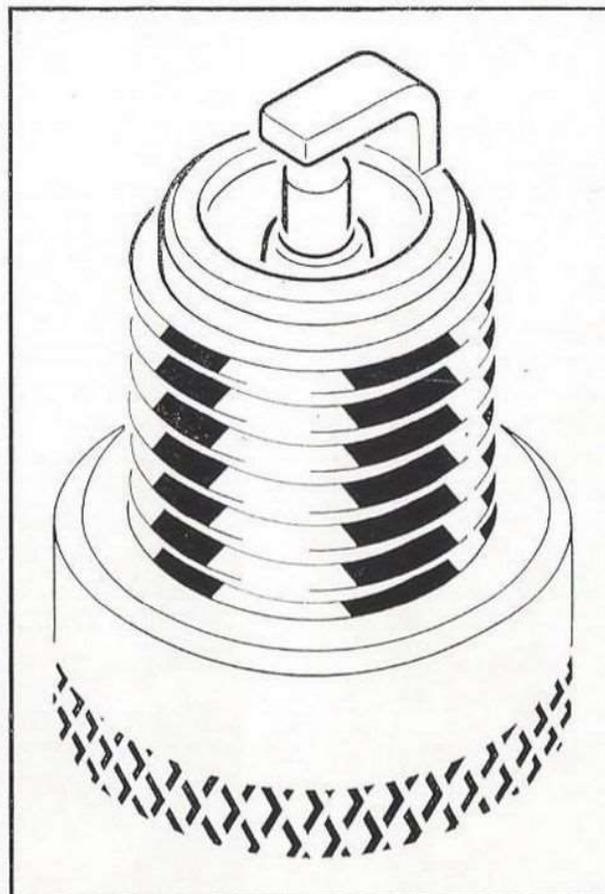


Fig. 30

TOO COLD

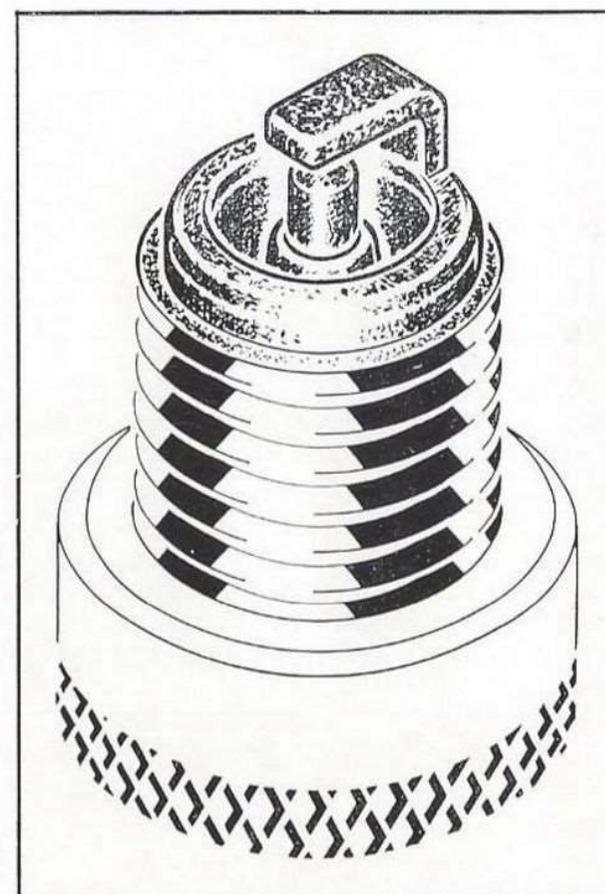


Fig. 31

TOO HOT

A sparkplug that is too hot in relations to the carburetion will generally have white or light-grey electrodes. The porcelain surrounding the centre electrode will be light-grey or white. Sometimes, even the bottom edge of the sparkplug will be light-grey or white. A sparkplug with these colour generally indicates that the heat-range of the plug is too hot, or that the carburetion is too lean. Under these conditions, the engine will overheat. Under extreme conditions of overheating, piston seizure can occur. On the sparkplug will attract small or large quantities of metallic salts and become partially or completely shot-circuited, or «wiskered».

A sparkplug that is too cold in relation to the carburetion will be black with carbon, and oily. In such a case, the heat-range of the sparkplug is too cold, or the carburetion is too rich. The engine may be hard to start, and it will run poorly at high rpm.

3. Checking the Heat-Range relative to the Carburetion. When you have the throttle half-open, the carburetion needle regulates the flow of fuel. When you have the throttle wide-open, the carburetor main-jet regulates the flow of fuel.

To check whether or not the sparkplug and the carburetion are correct for your geographical location, you will need to take sparkplug reading at half throttle and at full-throttle. If one of the reading is good, and the other is poor, you will need to adjust the carburetion. If both readings show that the sparkplug is too hot or too cold, you will need to install a sparkplug of a different heat-range.

To take a sparkplug reading, ride the motorcycle with the throttle half-open (the twistgrip rotated halfway to its full-on position) for several hundred yards in third gear. Pull the clutch, and the same instant, close the throttle fully. Hold in the clutch, and coast to a stop. Remove the sparkplug and check its coloration to see whether it is too hot, satisfactory, or too cold. Install the sparkplug in the engine.

To take the second sparkplug reading, ride the motorcycle for several hundred yards in fourth gear with the throttle wide-open. Again pull the clutch, close the throttle fully and coast to a stop. Remove the sparkplug and take another reading.

If both of the sparkplug readings shows the right colours, the sparkplug heat-range and the carburetion are correct for your climatic conditions.

If the mid-throttle reading showed that plug was too hot or too cold, but the full-throttle reading showed the right colour; you will need to adjust the positioning of the carbureter needle. For details, see the section on carbureter maintenance.

If the mid-throttle readings showed the right colour, but the full throttle reading showed that the plug was too hot or too cold, you will need to use a different-size main-jet in the carbureter. For details, see the section on carbureter maintenance.

If both sparkplug readings showed that the plug was too hot, fit sparkplug of the next-colder heat-range and take another set of plug readings. If the second set of readings show that the sparkplug is still too hot, you may be able

to correct the condition with a still-colder sparkplug. Or you may need to reposition the carbureter needle and change the main jet. Or, the reading may be an indication of an air leak in the carbureter or elsewhere.

If both initial sparkplug reading showed that the plug was too cold, fit a sparkplug of the next-hotter heat-range, and take another set of readings. If the sparkplug is still too cold, fit a warmer sparkplug. Or, you may need to reposition the needle and changed the main jet. Or the reading may be an indication that the sparkplug is not getting enough electrical energy.

If you have any doubt as to the correct colour-reading of the brand of sparkplug that your are using, have your dealer make the readings or recommend a particular sparkplug for you to use. Once the correct heat-range or sparkplug has been determined, it will remain correct as long you do not alter the carburetion, and the climatic condition do not vary widely.

Note: During the first few hundred miles of riding, it is better if the mixture is too rich, because a new engine tends to run hotter. And it is ALWAYS better to have the mixture a little bit too rich than a little bit too lean.

B. CARBURETION

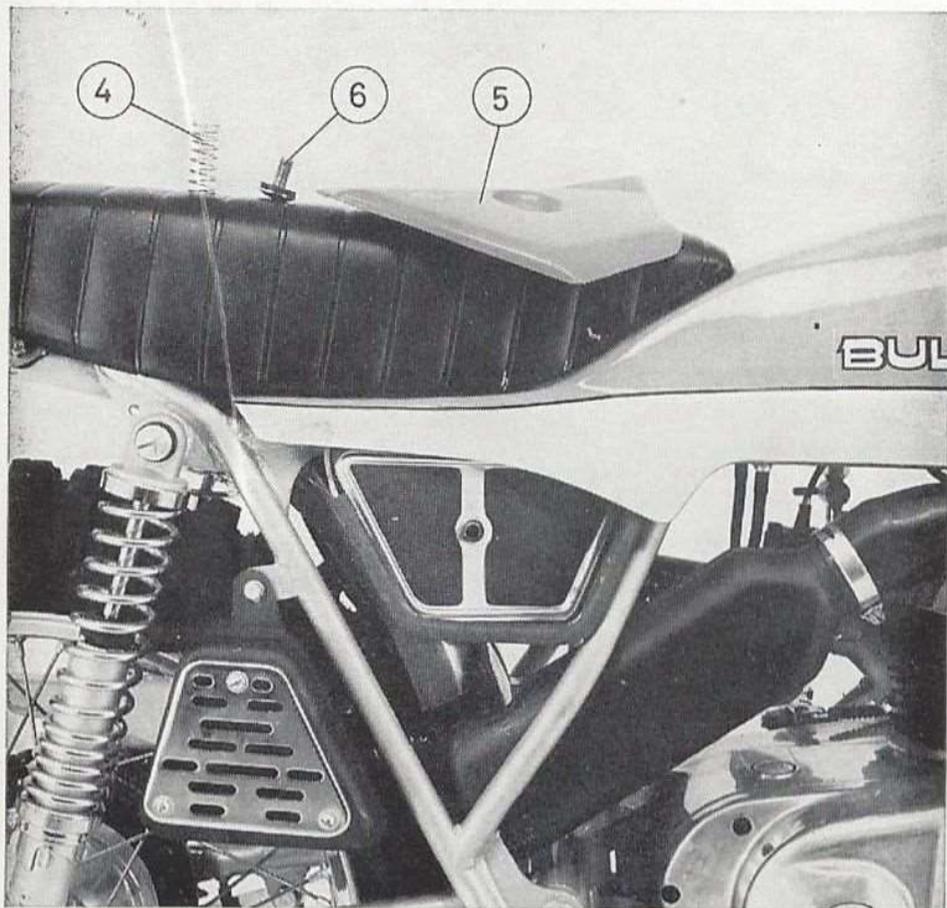
1. **Cleaning the Air-Cleaner Element.** To clean the air-cleaner element, you will need to remove the cap on the right hand side.

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Remove the filter element lid. Remove the filtering agent and the screen in gasoline, and dry them with compressed air.

To soak the filtrant element in oil, and to wring manually before mounting it.

Fig. 32



4. Spring. — 5. The cap. — 6. Fixing screws.

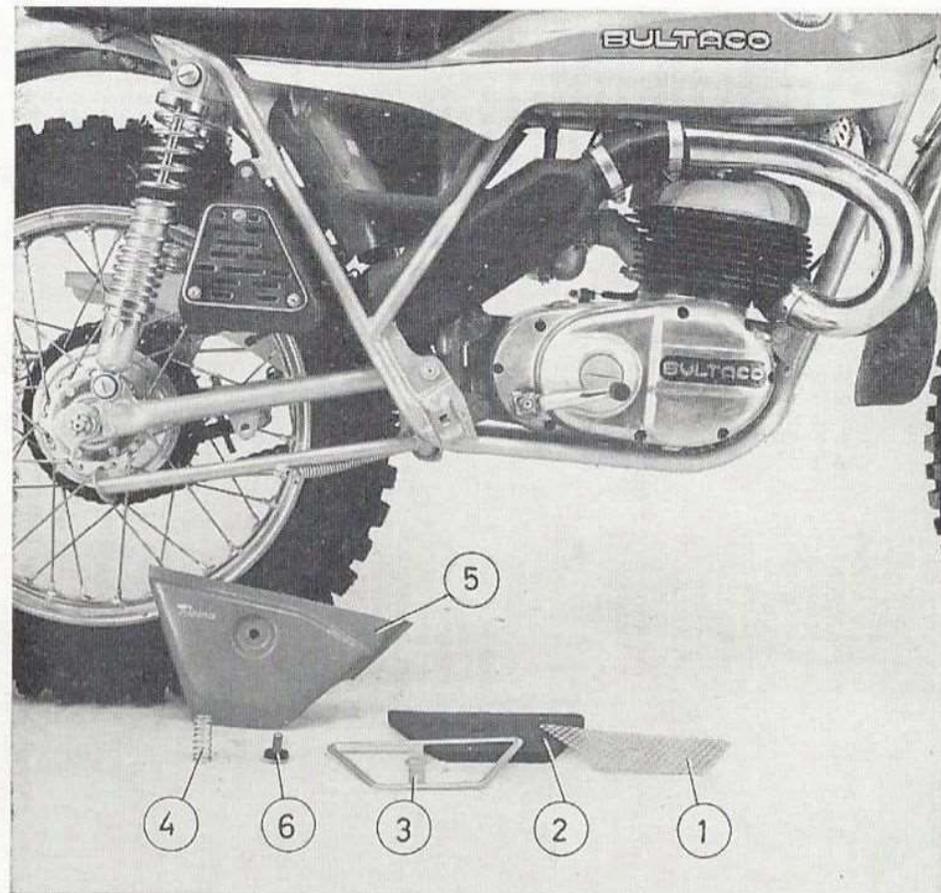


Fig. 33

1. Filter wire mesh. — 2. Filtering agent. — 3. Filter element lid.
4. Spring. — 5. Cap. — 6. Fixing screw.

Wipe the air cleaner unit dry with a rag, and then coat the insides with multipurpose grease. Insert the filter wire mesh, the filtering agent and the filter element lid compress the spring and position the cap fixing with screw.

2. Cleaning the Carburetor Fuel-Filter. Remove the 13 mm bolt that attaches the fuel-line fitting to the carburetor. Remove the fuel-line fitting. Remove the filter screen (3, Fig. 36). Wash the screen in gasoline. Reassemble the carburetor.

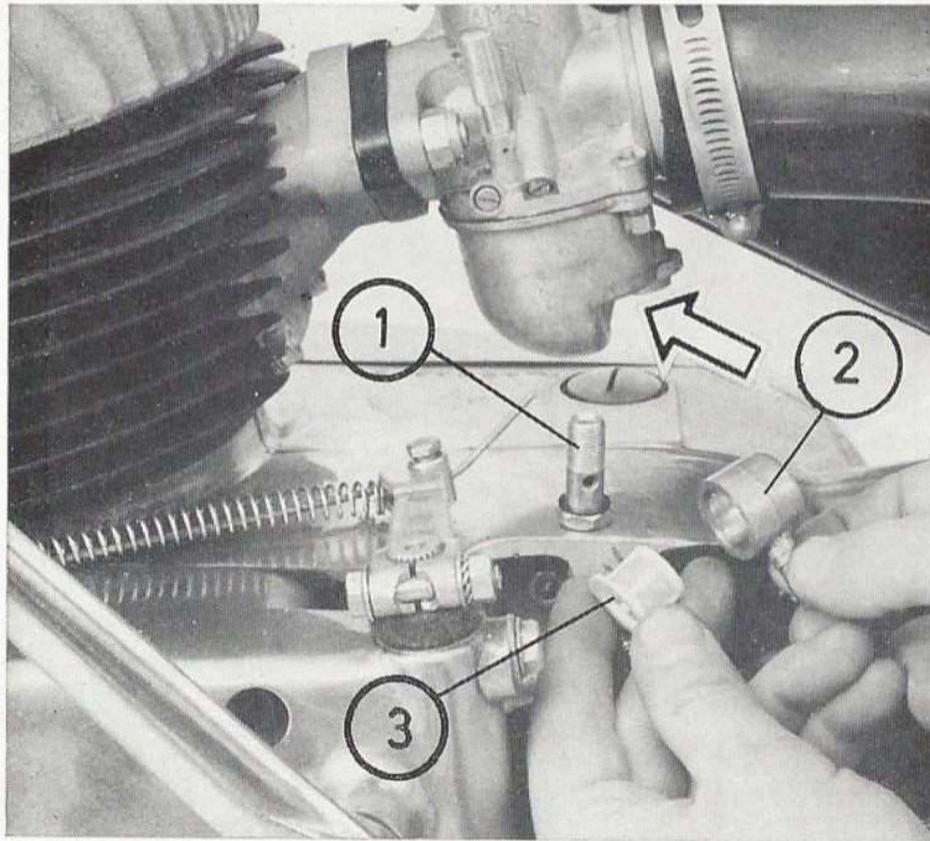
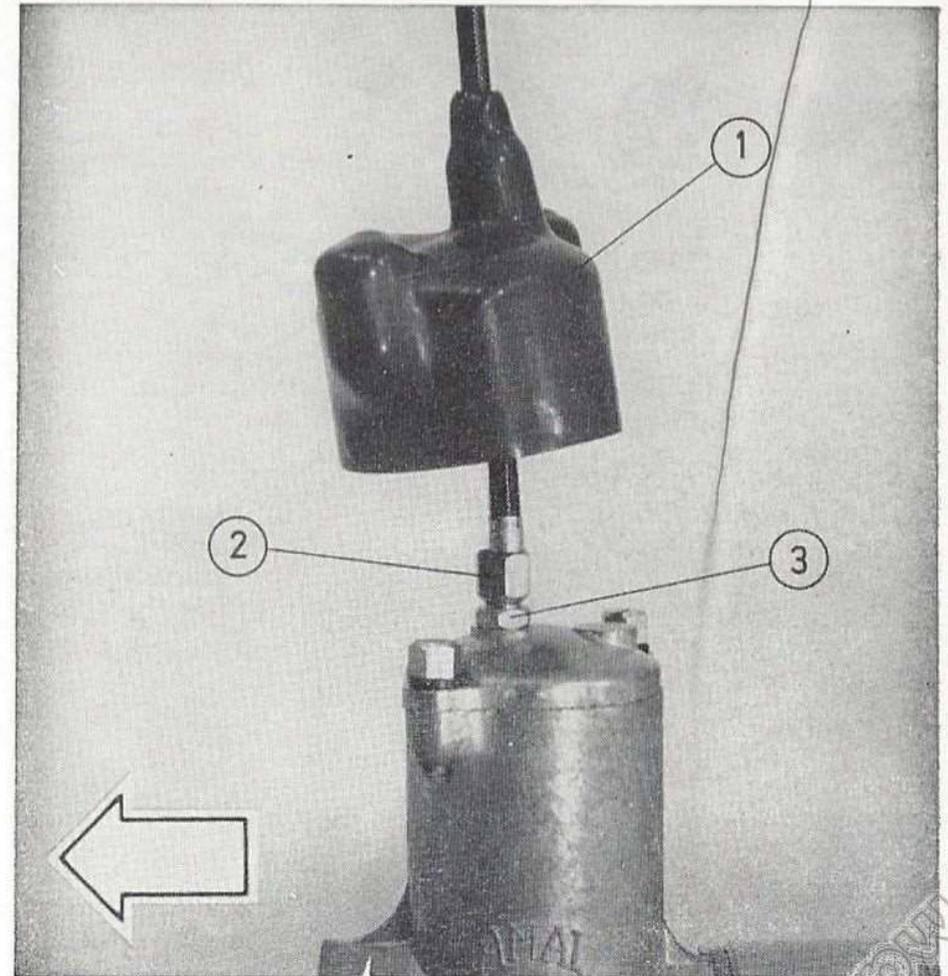


Fig. 34

1. 13 mm. bolt. — 2. Petrol feed hanjo. — 3. Filter screen.

3. Adjusting the Play in the Throttle Cable. If, at idle, the engine runs faster when you turn the handlebar to the right, the throttle cable is too tight. If the engine hesitates when you want to accelerate strongly from idle, the throttle cable is too loose. You can adjust the play in the throttle cable with the cable adjusted located atop the carbureter.

To adjust the play in the throttle cable, pull up the rubber dust-cover (5, Fig. 36) to expose the cable adjuster (7, Fig. 36). Loosen the locknut (6, Fig. 36) at the base of the adjuster, by rotating it CCW. To increase the play in the throttle cable, rotate the adjuster CW to retract in into its mount. To tighten the throttle cable and decrease the play rotate the adjuster CCW to extend it from its mount. When the adjuster is positioned satisfactorily, tighten the locknut and pull the rubber dust-cover down over the adjuster.



1. Protector rubber. — 2. Cable adjusted. — 3. Locknut.

Fig. 35

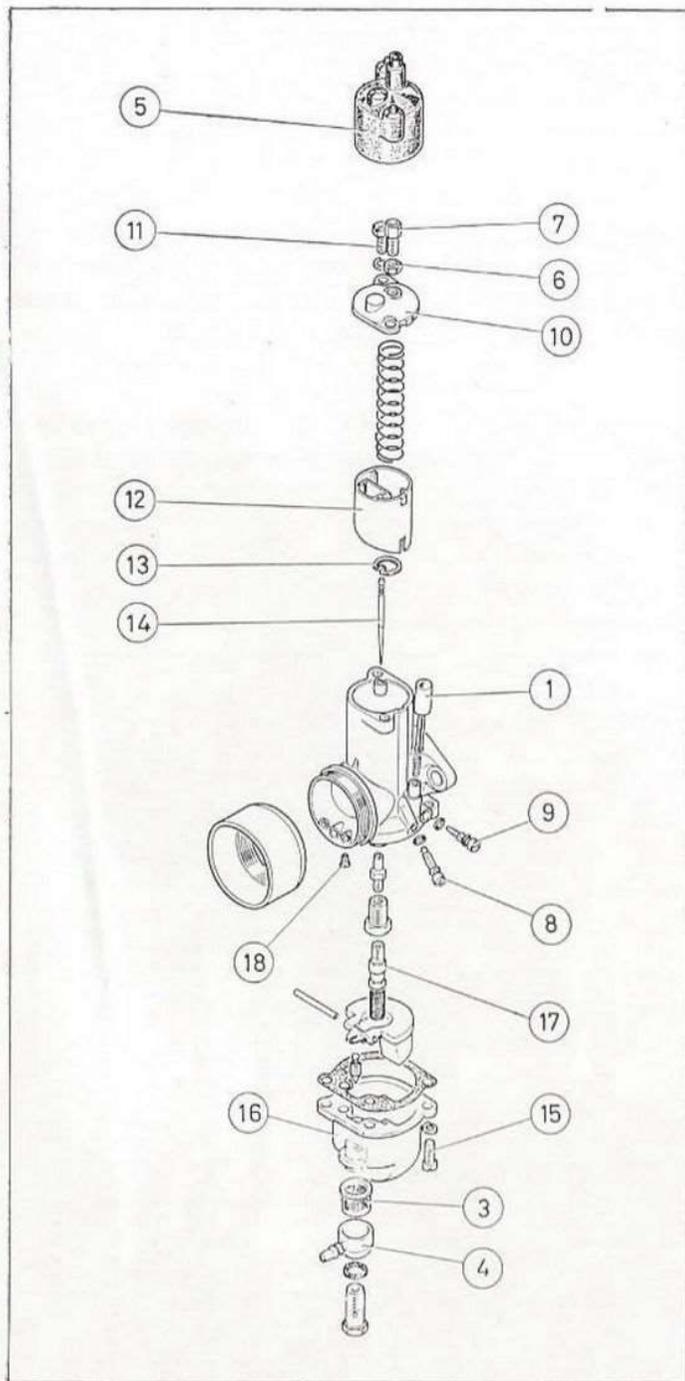


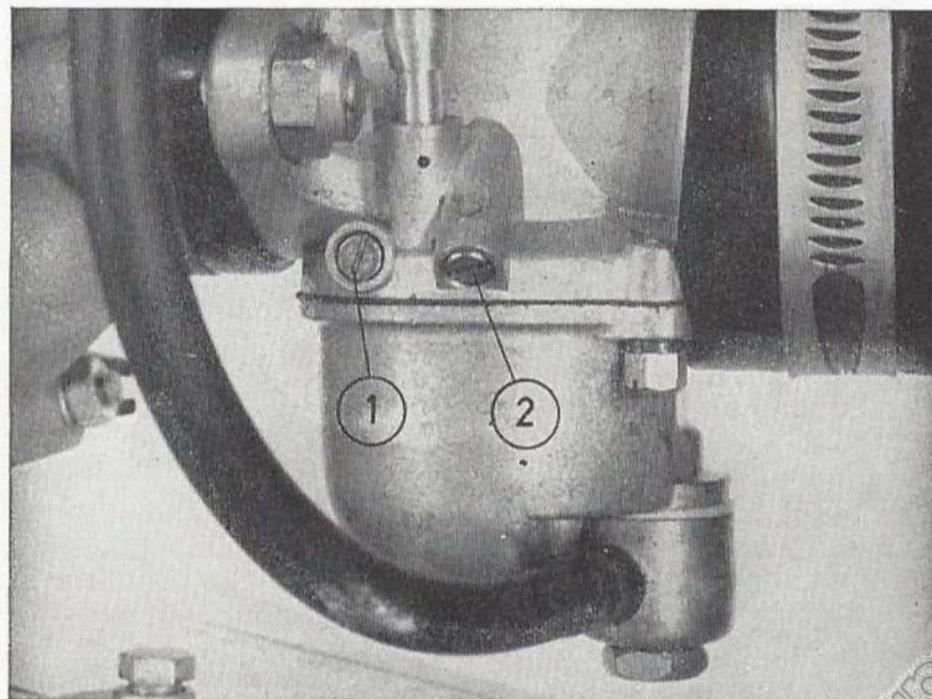
Fig. 36

4. **Adjusting the Idle.** The engine should idle fast enough so that you can shift smoothly from neutral to first gear.

The idle adjuster (8, Fig. 36) is a spring-loaded screw that points toward the ground on the left side of the carburetor. To decrease the idle speed, rotate the screw CCW with a screwdriver. To increase the speed of the engine at idle, rotate the screw CW.

If the engine dies early at the idle speed you have selected, the idle mixture may be too rich or too lean. Above and to the right of the idle screw, near the intake manifold, is the spring-loaded low-speed air-screw (9, Fig. 36). It regulates the mixture at idle.

Fig. 37



1. Air Screw. — 2. Idle Screw.

To adjust the mixture at idle, first make certain that the air-screws is at its normal setting. Rotate the screw CW until it bottom, and then back it off 3/4 turn. If the machine does not idle well at this setting, and has a fairly-loud, uneven «bonk» sound, rotate the air screw CW until the engine dies because the mixture is too rich. Back off the screw one turn, and start the engine again. Now count the turns as you rotate the screw CCW until the engine dies because the mixture is too lean. Add the first turn of the screw to the number of turns between the two extremes, and then rotate the screw CW half the distance between the extremes.

If the engine still refuses to idle, the fuel passages or the pilot jet may have become clogged, and it would be well to have your dealer disassemble the carbureter and clean it thoroughly.

5. Changing the Needle Position. If, when you took the sparkplug reading at mid-throttle, the sparkplug was too hot or too cold, and you did not correct the condition by using a sparkplug of a different heat-range, you will need to reposition the needle.

If you have a rubber cover on the top part of the carbureter, remove it. Remove the two screws from top of the carbureter. Lift off the carbureter-top and pull out the slide.

The needle (14, Fig. 36) is attached to the slide (12, Fig. 36) by means of a spring clip (13, Fig. 36). There are three grooves in the needle. Note the groove to which the clip is presently attached. Remove the clip and withdraw the needle.

If the sparkplug reading at mid-throttle showed that the sparkplug was too hot, then mixture is too lean. To richen the mixture, raise the position of the needle in the slide by mounting the clip in the next-lower groove of the needle.

If the sparkplug was too cold, the mixture was too rich. Lean the mixture by mounting the clip in the next-higher groove of the needle, to lower the needle in the slide.

Fit the slide to the carbureter, with the large oval cutout in the bottom of the slide facing the air cleaner. Fit the top to the carbureter, with the tongue in the top mated to on the carbureter and tighten the two screws. Tighten the air-hose clamp-screw.

6. Changing the Main Jet. If, when you took the sparkplug reading at full throttle, the reading was too rich or too lean, and you did not correct the condition by changing the heat-range of the sparkplug, you will need to use a different main jet.

The main Jet (17, Fig. 36) is situated inside the float chamber (16, Fig. 36) so, in order to change the main jet, you should dismount the carbureter from the motorcycle and then remove the bottom part of it and separate the float chamber. The main jet is now visible. Select a 8 mm wrench, and rotate the main jet CCW to remove it from the carbureter. The main jet normally supplied in the Alpina 250 is, for example, a number 160. (See page 53).

If the sparkplug reading at full throttle showed that the plug was too hot, then mixture is too lean, and you will need to fit a larger main jet. To richen the mixture, fit the next-largest main-jet, a number 170. Reassemble the carbureter and take another sparkplug reading. If necessary, go up to a number 180.

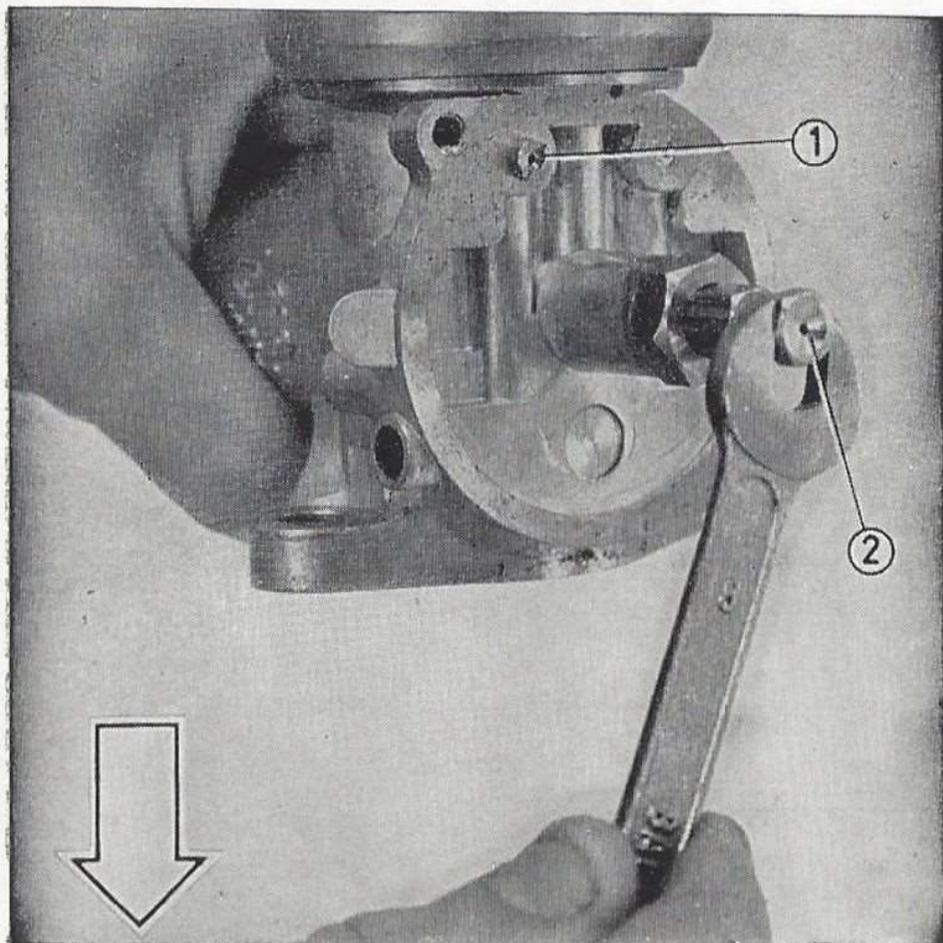
If the initial reading showed that the sparkplug was too cold, then the mixture is too rich, and you will need to fit a smaller main jet. Install a number 150 main jet, and take another sparkplug reading. If necessary, go to a number 140 main jet.

Remember that during the run-in period, you want the mixture to be too rich, and that it is ALWAYS better to have the mixture a little bit too rich than a little bit too lean.

7. Changing a Throttle Cable. To change the throttle cable, remove the top part (10, Fig. 36) of the carbureter and the slide (12, Fig. 36). Note the position of the spring-clip in the grooves of the throttle-cable fitting from the slide, and remove the cable from the carbureter assembly.

Remove the twistgrip assembly from the handlebar. Remove the plain guide from the twistgrip assembly. Pull down the other guide. Align the inner cable with the slot in the guide, and remove the cable from the guide. Remove the cable fitting from the twistgrip. Remove the throttle cable from the motorcycle.

Fig. 38



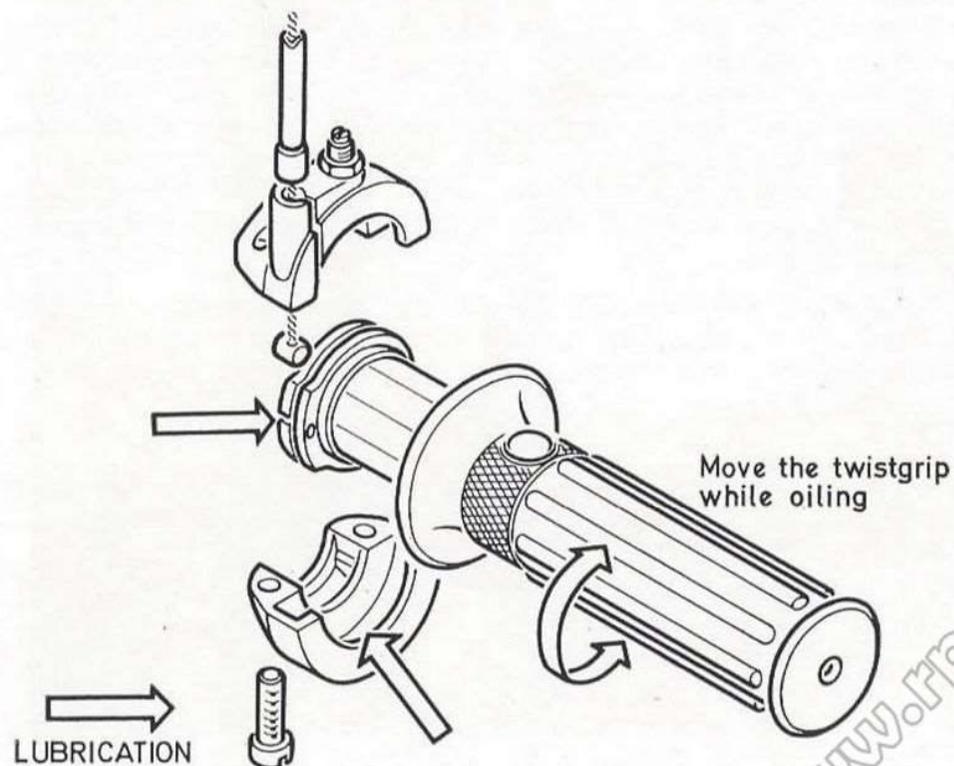
1. Pilot-jet. — 2. Main jet.

Lubricate a new throttle cable. Insert the end of the cable with the smaller fitting between the front of the petrol-tank and the frame on the right side of the motorcycle. Feed the cable through until the fitting emerges near the cylinder head of the engine.

Mount the larger fitting at the other end of the cable to the twistgrip. Then fit the inner cable to the slot in the twistgrip guide, and position the twistgrip in the guide. Fit the other guide to the twistgrip. Install the twistgrip assembly on the handlebars. Make certain that the throttle cable doesn't have any sharp bends, and that it can't get caught inside the front-brake lever.

Retract the cable adjuster in the top of the carburetor. Thread the cable through the top of the carburetor and the spring, and hook the cable into its slot in the slide. Attach the needle and its spring clip, positioning the clip in the same groove of the needle as when you removed it. Reassemble the carburetor.

Fig. 39



Check the rotation of the twistgrip, to make certain that it works smoothly and that the cable is not pinched between the gas tank and the frame. If necessary, use the cable adjuster to loosen or tighten the cable so that the engine does not speed up when you turn the handlebars to the right.

8. Cleaning the Gas Tank. Remove the fuel line from the gas tap. Remove the front fixation of the gas tank with a 13 mm wrench. Being careful not to damage the saddle, lift the rear of the gas tank, and remove it from the motorcycle.

Unscrew the filler cap, pour gasoline into the petrol-tank, and replace the filler cap. Swirl the gasoline vigorously in the petrol-tank. Remove the filler cap, and pour out the gasoline. If the gasoline contains sediment, pour in fresh gasoline and repeat the process. Continue until the gasoline that you pour out of the petrol-tank contains no sediment.

With a 14 mm wrench, rotate the gas tap CCW and remove it from the petrol-tank. At the top of the tap is a fuel filter; clean it in gasoline. Inspect the gasket, and the gasket surface on the tap and the gas tank. If the gasket is worn or uneven, discard it and fit a new one. If either gasket surface is irregular, smooth it carefully with a blunt screwdriver, removing any dirt or lumpy paint-particles. If, when you mount the gas tap, it is able to turn too far, add a second gasket.

Position the petrol-tank on the frame. Mount the 13 mm chromed nut, tightening it only until it has started to compress its rubber gasket. Fit the fuel line to the fuel tap.

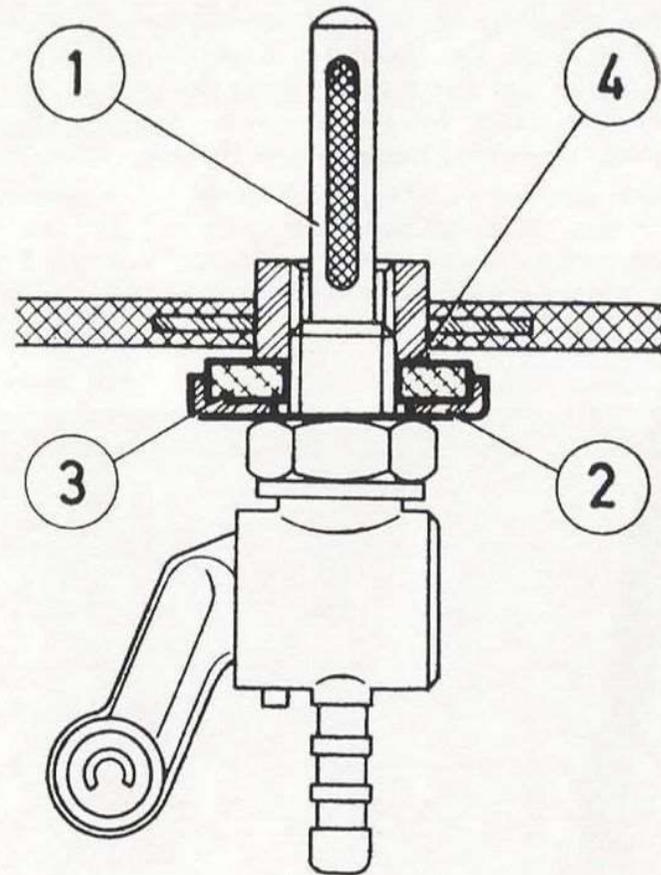


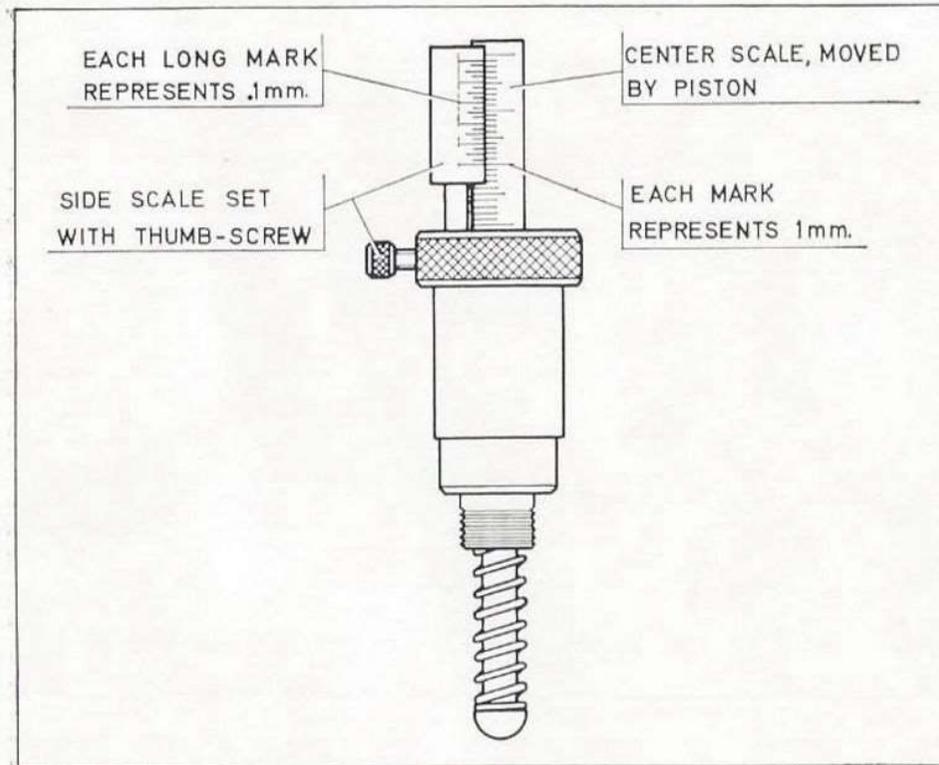
Fig 40

1. Filter. — 2. Fasher housing. — 3. Rubber washer. — 4. Surfaces, very regular.

C. IGNITION TIMING

In order for the Alpina to run properly, the ignition timing must always be set so that the contact-breaker points open when the piston is between 2,5 mm and 2,7 mm Before Top Dead Centre (BTDC).

Fig. 41



To adjust the timing, remove the 10 mm nut and the bolt from the kickstarter lever. Remove the kickstarter lever. Remove the four 5 mm Allen screws from the magneto case, and remove the magneto case. Remove the sparkplug. Shift the gearbox into neutral.

Screw the Bultaco vernier-gauge. Part number 132.974, into the sparkplug hole. Rotate the magneto flywheel CCW until the centre scale on the vernier gauge is at its highest point. At that position, the piston is at a Top Dead Centre (TDC).

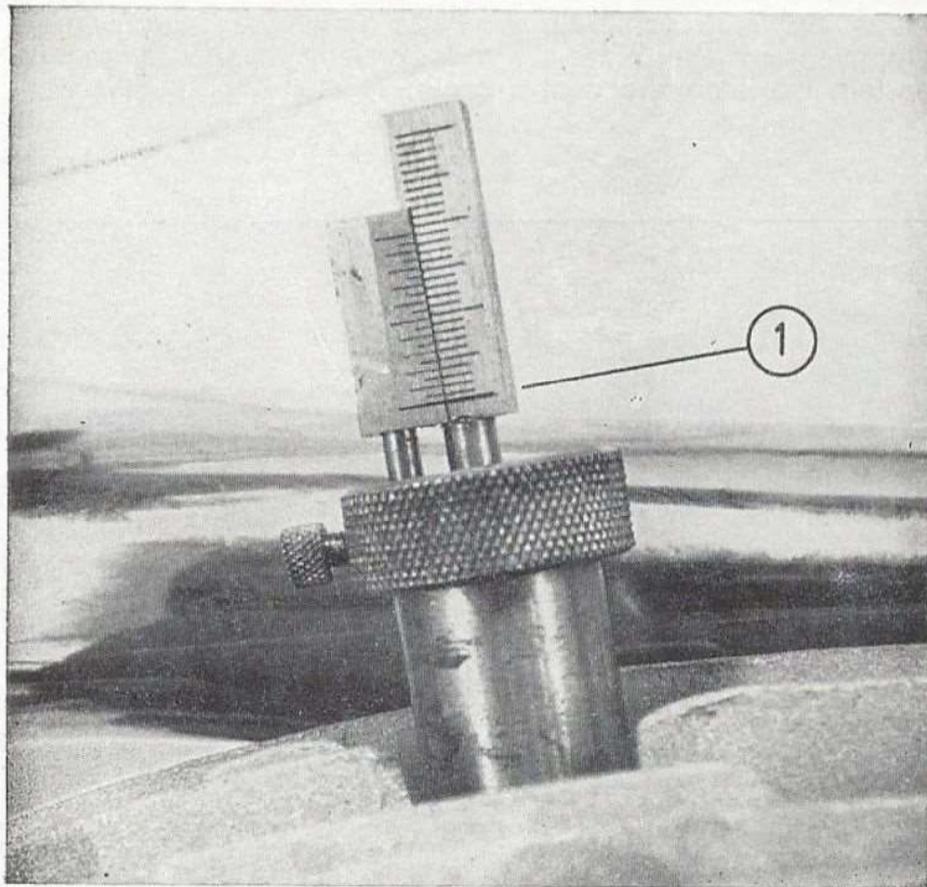
Leave the piston positioned exactly at TDC. Loosen the thumbscrew that positions the side scale of the vernier gauge. Move the side scale up or down until the bottom mark engraved on the side scale is exactly aligned with the bottom mark on the centre scale. Tighten the thumbscrew.

Fig. 42



Loosen the clamp positioning the electrical wires beneath the magneto flywheel. Pull back the plastic insulator to expose the connection between the red wire and the black wire.

Fig. 43



1. The gauge adjusted with the piston at TDC.

Plug the Bultaco timing-light, Part number 132-071, into a 110-volt wall socket. Flip the switch to «Si»; the bulb will burn. Insert the banana plugs of the two test-wires into their sockets on the timing light. Touch the alligator clips together; the bulb will stop burning.

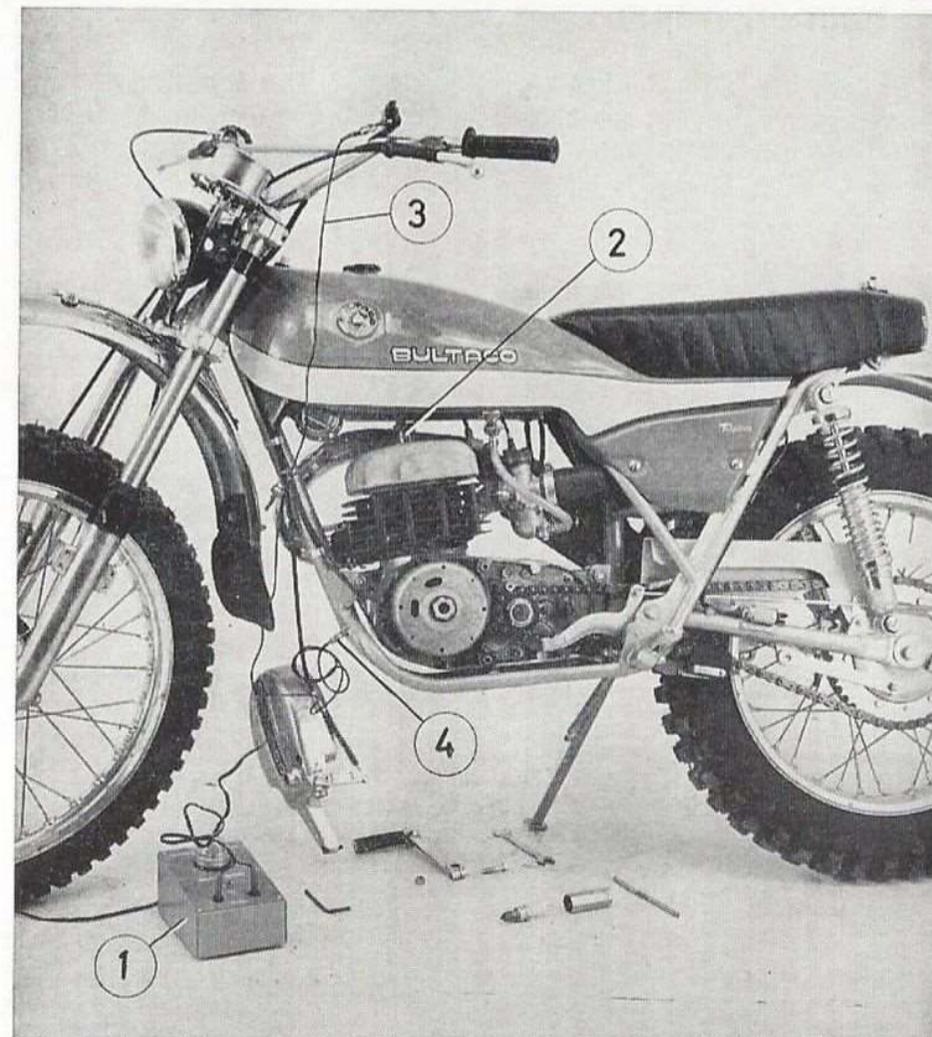


Fig. 44

1. Timing-light. — 2. Vernier gauge. — 3. To Kill button.
4. To Hearth (Frame).

Attach one of the alligator clips to the bare connection between the red wire and the black wire, being careful to see that the alligator clip cannot touch the engine case. Attach the other alligator clip to the Hearth (Frame).

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Rotate the magneto flywheel CCW. Never rotate the flywheel in the opposite direction while timing the engine, or you will get false readings.

Watch the vernier gauge as you rotate the magneto flywheel. The centre scale will move downward. Then it will stop for a while. Finally, it will begin to move upward. At this point, rotate the magneto flywheel very slowly, and watch timing light. At the instant when the light begins to burn, stop the rotation of the magneto flywheel. You have found the exact point at which the contact-breaker points are opening; now you must read the vernier gauge to find out how far the piston is below (or above) Top Dead Centre.

The centre scale of the vernier gauge is graduated in 1 mm increments. Read the number of marks on the centre scale between its bottom mark («0») and the bottom mark on the side scale to get the whole number—in millimetres—of ignition timing. For example if two marks on the centre scale lie between the bottom mark on the centre scale and the bottom mark on the side scale, then the ignition timing is 2 mm BTDC.

The side scale of the vernier gauge is graduated so that you read the longer marks as 1 mm increments. If the bottom mark on the side scale was not exactly aligned with a mark on the centre scale, there will be a decimal fraction.

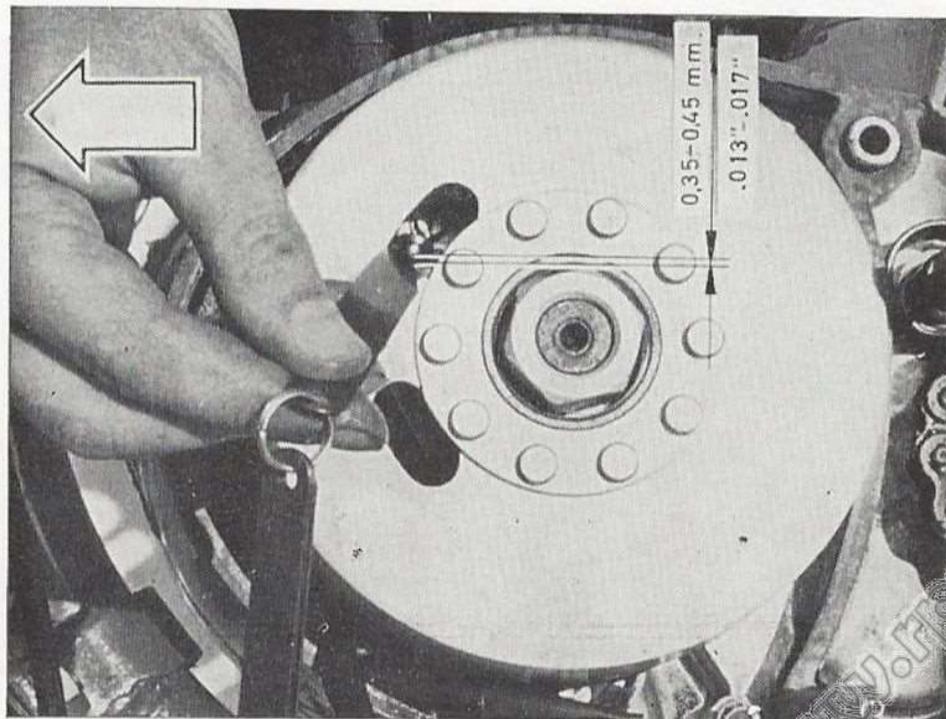
To read the decimal fraction of the ignition timing, count the number of long marks on the side scale above the bottom mark («0»), up to the first long mark that is most nearly aligned with a mark on the centre scale. Thus, on the side scale, if the fifth long mark up from the bottom mark were aligned with a mark on the centre scale, you would read «.5 mm». Combining this reading with the reading from the centre scale, you would find that the ignition timing is 2.5 mm BTDC. The points would be opening when the piston, travelling upward, was 2.5 mm below its highest point (TDC). But the points should be opening earlier, when the piston is somewhere between 2.5 and 2.7 mm BTDC, so the timing is late, or retarded. The engine is losing power. Should the timing become still further retarded, the engine will get sick.

If you increase the gap between the contact-breaker points, they will open sooner, and advance the timing, but you should not exceed the maximum-allowable gap of .45 mm.

Rotate the magneto flywheel until the points are visible behind the second hole in the face of the flywheel. At this position, the points are at their widest opening. Insert a feeler gauge between the points. If they are not at their maximum of .45 mm you can proceed to adjust them and advance the timing.

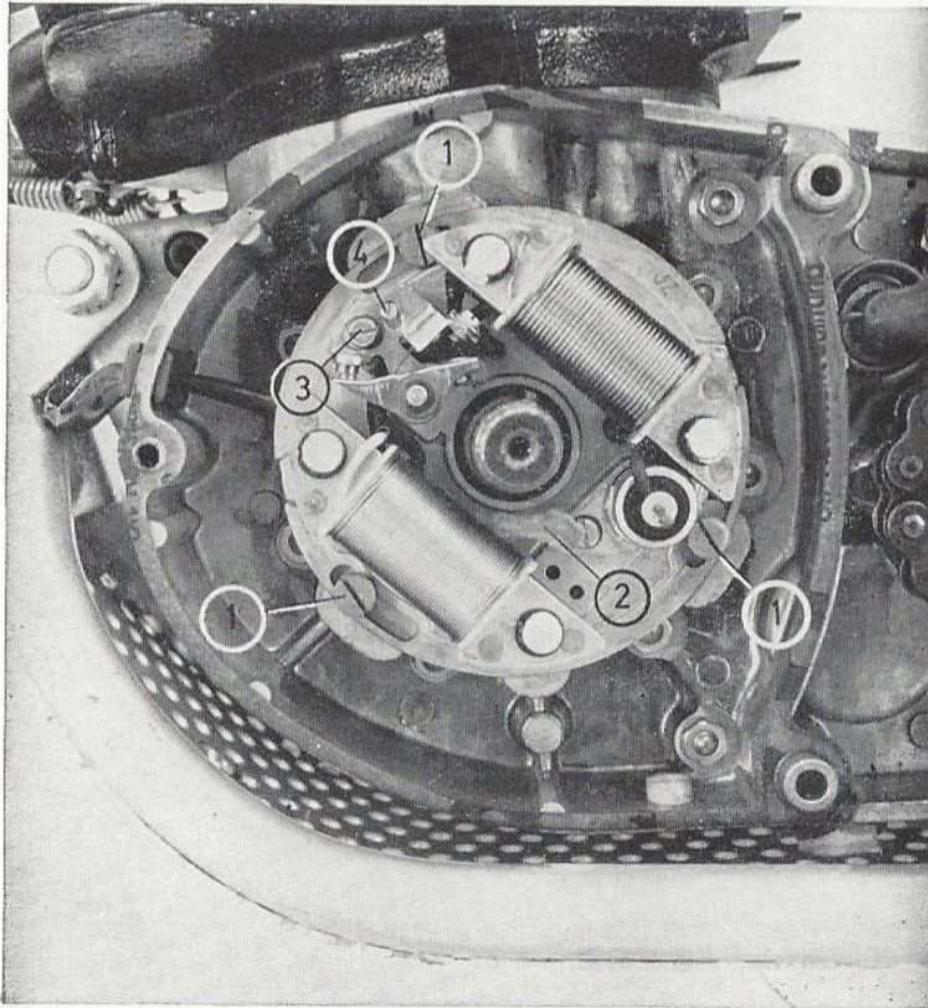
Above the points are two adjusting-screws. The large one, on the left, locks the points in place. Loosen it slightly. The smaller screw on the right is an eccentric that varies the

Fig. 45



points-gap. Turn the small screw CW just enough to take up the slack, and then a tiny bit more. Normally, this will increase the gas slightly and advance the timing considerably (occasionally, you will find an eccentric that works in the opposite direction). Now tighten the large screw on the left.

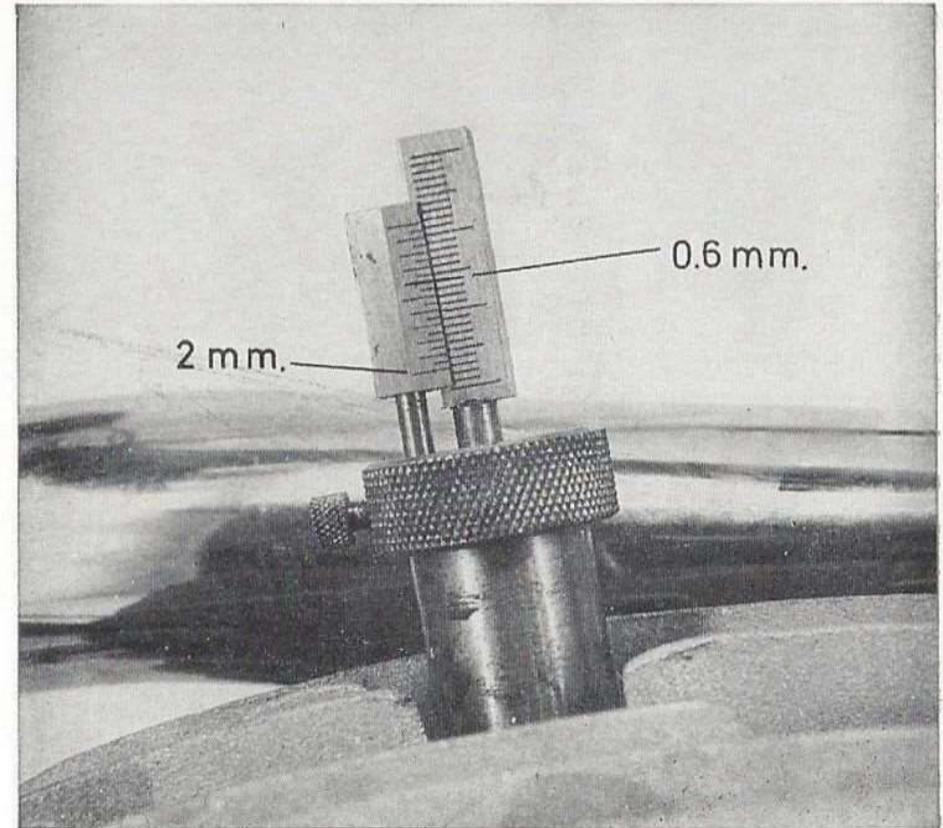
Fig. 46



1. Magneto back plate fixing screw. — 2. Felt Wiper Pad. — 3. Contact breaker fixing screw. — 4. Contact breaker adjusting screw.

Again check the timing with the vernier gauge and the timing light. If necessary, adjust the point-gap again, and recheck the timing. Repeat the process until the timing light shows that the points are opening somewhere between 2.5 mm and 2.7 mm BTDC. This usually requires three or four attempts. When the ignition timing is correct, check to see that the points-gap is still within tolerance.

Fig. 47



When you have completed the adjustment, remove the alligator clips from the engine. Slide the plastic insulator back over the connection between the red wire and the black wire. Arrange the wires behind the clamp, and tighten the clamp. Install magneto case and the kickstarter lever. Remove the vernier gauge and install spanning.

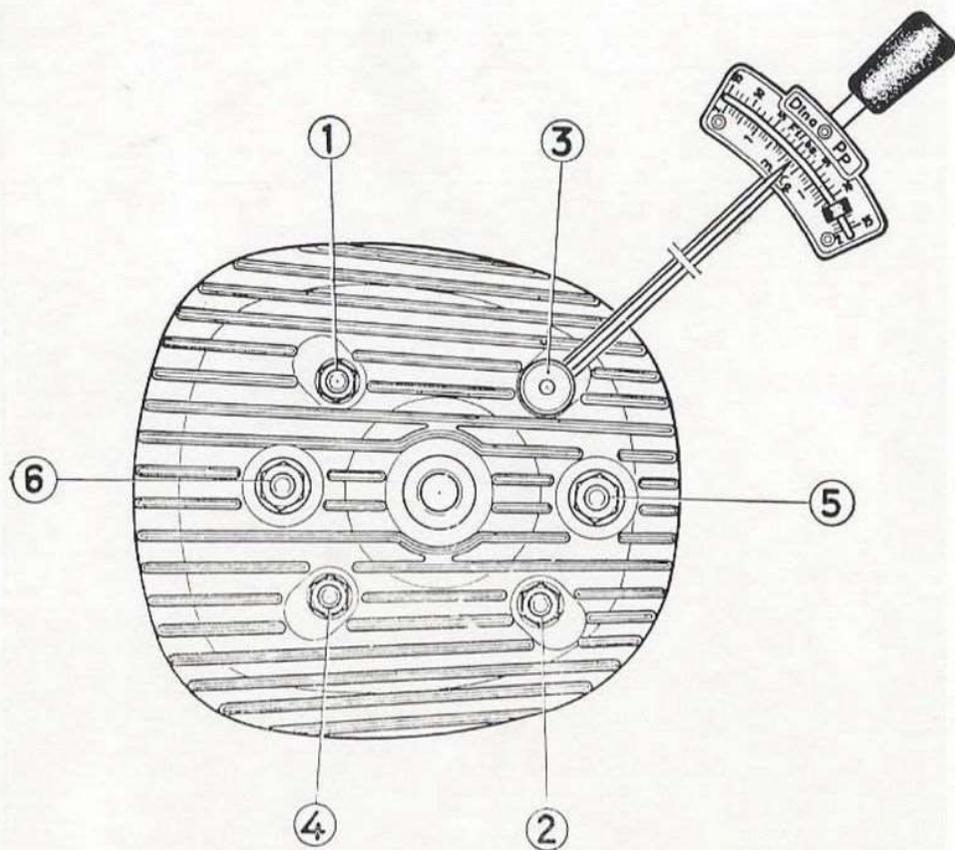
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D. THE COMBUSTION CHAMBER

Do not attempt to remove the cylinder head if you do not have the proper torque wrench. Do not use a torque wrench that reads higher than 15 ft/lbs. If you use the wrong torque wrench, or if you try to guess at the torque readings you run the strong risk of tightening the cylinder-head nuts unevenly, which can cause piston seizure. The Bultaco torque wrench is Part number 132.063.

Motor 250

Fig. 48



Notice the drawing of the cylinder head. The narrow end of the head faces the rear of the engine. Notice the number assigned to each cylinder-head nut. Loosen the nuts one-

half turn each, in the following order: 1, 2, 3, 4, 5 and 6. Repeat the process three more times, until each nut has been loosened two turns. Remove nut number 1. With a sharp scribe, mark «1» on the side. Do the same with numbers 3, 4, 5 and 6. Remove the cylinder head, being careful not to allow any of the flat washers to fall down into the engine.

Find a screwdriver that has a blade with dull edges and file or grinder, set the dull screwdriver to scrape carbon deposits gently from the cylinder head. If the head has deposits of hard carbon, chip off the carbon in small flakes. Be careful to avoid gouging the soft alloy. When you have finished scraping carbon, wash the head thoroughly in gasoline or other suitable solvent.

To clean the top of the piston, use the kickstarter lever to bring the piston up to Dead Centre. Scrape the top of the piston gently with the dull screwdriver, and blow the loose carbon out of the cylinder.

To clean the ports in the cylinder liner, use the kickstarter lever to bring the piston down to its lowest point. Use the screwdriver to remove any carbon deposits that might have built up around the edges of the ports. Bring the piston slowly back to Top Dead Centre and blow away the loose carbon.

Inspect the mating surfaces of the cylinder and the head. If any sharp ridges have been gouged up on either surface, or if either surface is dirty, smooth it carefully with the dull screwdriver. Do not use a gasket or sealing compound between the cylinder and the head.

Position the head on the cylinder, with the narrow portion of the head facing the rear of the engine. Put the flat washers on the cylinder-head studs. Start the cylinder-head nut marked «1» on the stud marked «1» in the drawing similarly mount nuts No. 2, 3, 4, 5 and 6, until each is fingertight.

Use the torque wrench with a 14 mm socket to torque each nut to 2 ft/lbs in the following sequence: 1, 2, 3, 4, 5 and 6. Repeat the sequence, tightening each nut 2 ft/lbs each time around, until the cylinder-head nuts have been torqued to 11 ft/lbs nuts No. 5 and 6. Nuts No. 1, 2, 3 and 4 should be torqued to 14/lbs.

E. THE CLUTCH

There should be some play in the clutch linkage. You should be able to pull handlebar lever until there is a gap of $3/166'$ between the top edge of the lever and the top edge of its mount before you encounter resistance. If there is no play in the clutch mechanism, the clutch may be able to slip while the motorcycle is moving; this is hard on the clutch.

If there is much play in the clutch linkage, the clutch may not be disengaging all the way when you the lever; this can cause the clutch to drag which may be damaging to the gearbox.

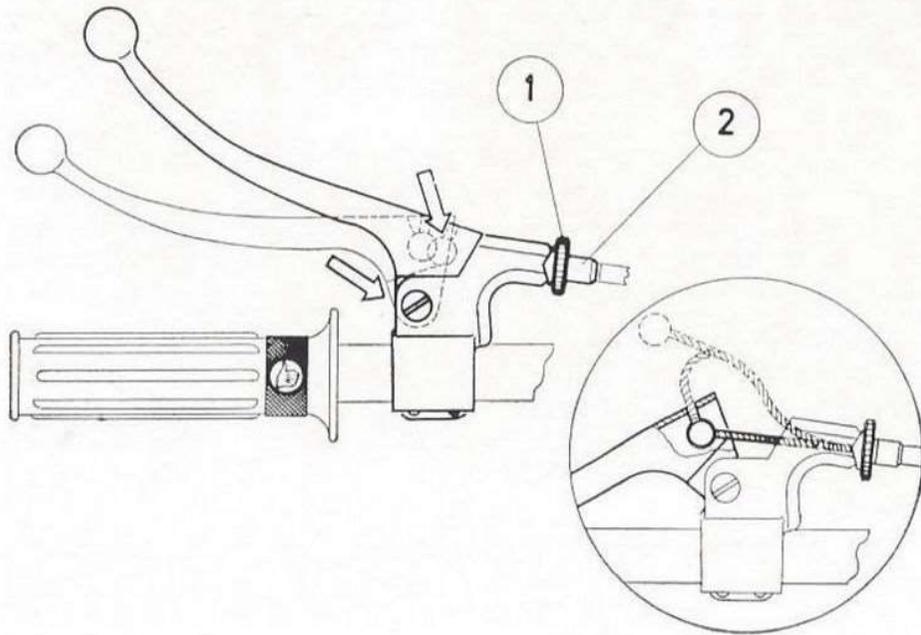
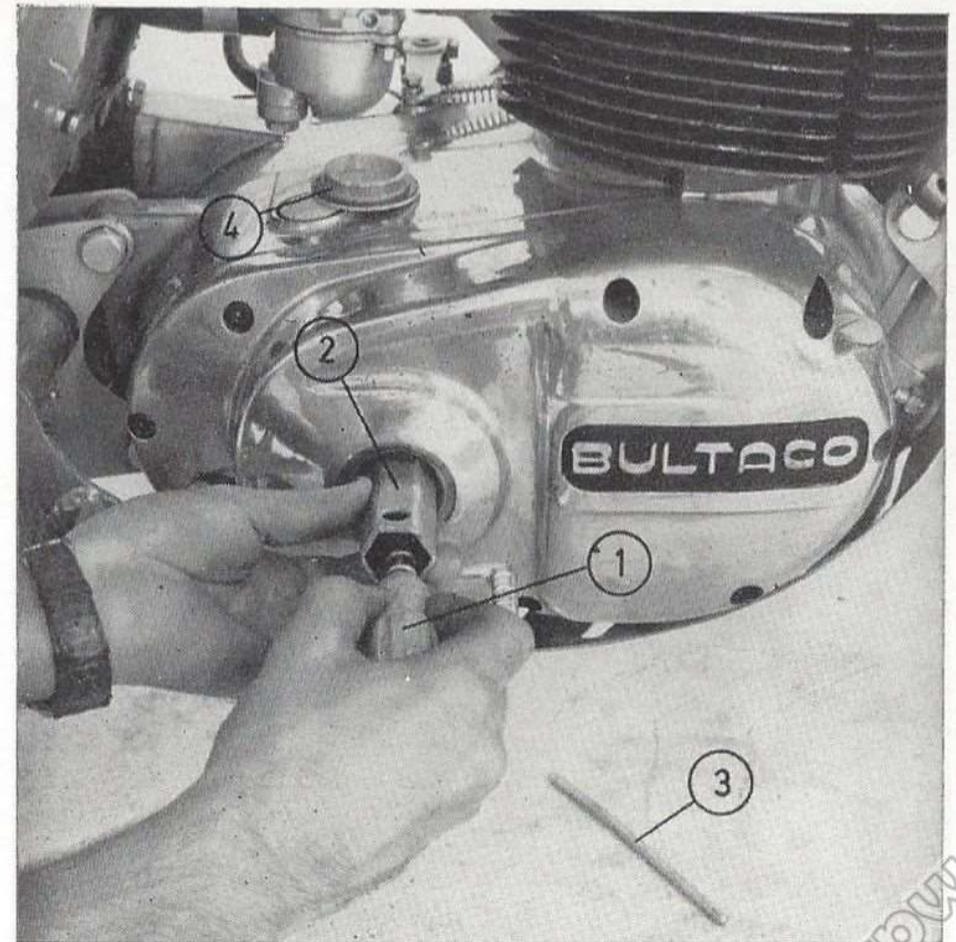


Fig. 49

1. Serrated wheel. — 2. Adjuster.

You cant adjust the play the clutch linkage with the cable adjuster on the handlebar-lever mount. If there is no more adjustment available there, you cant adjust the operating shaft in the clutch case.

Fig. 50



Screwdriver. — 2. Sparkplug wrench.

1. **Using the Cable Adjuster.** To increase the amount of play in the clutch linkage, rotate the serrated wheel on the handlebar mount so that the adjuster is retracted for enough into the mount to give the necessary amount of play.

To decrease the amount of play, rotate the wheel so that the adjuster is extended from the mount.

2. **Adjusting the Clutch Operating Shaft Assembly.** If the cable adjuster is extended all the way, and there is still too much play in the clutch cable, adjust the clutch rod adjusting screw inside the clutch case.

Before adjusting the Clutch Operating Shaft Assembly, retract the cable adjuster into the handlebar mount. With a large, screwdriver, remove the adjusting screw cap from the side of the clutch case. Insert the sparkplug wrench into the case, and loosen the clutch adjusting screw... nut by rotating it CCW. Insert the screwdriver into the case, and rotate the clutch rod adjusting screw CW until it bottoms. Then rotate the clutch rod adjusting screw CCW a half-turn. Tighten the clutch adjusting screw nut and check to see that the position of the clutch rod adjusting screw has not changed very much. Adjust the cable adjuster to get the correct amount of play at the handlebar lever.

Pull the handlebar clutch-lever several times while watching the travel of the clutch cable clamp housing above the magneto case. If the clamp housing bottoms against the magneto case before the lever reaches the handlebar, you will need to reposition the clamp on the clutch cable. Loosen the clamp bolt with a 6 mm wrench. Pull the clamp about 1/2" toward the end of the cable. Tighten the clamp bolt. Adjust the clutch operating shaft assembly in the same manner before to take up the slack. Adjust the cable adjuster.

3. **Installing a New Clutch Cable.** If the clutch cable becomes worn or kinked, you will need to replace it with a new one. Remove the clutch cable, above the magneto case. Pull the clutch handlebar-lever to the handlebar. Grasp the

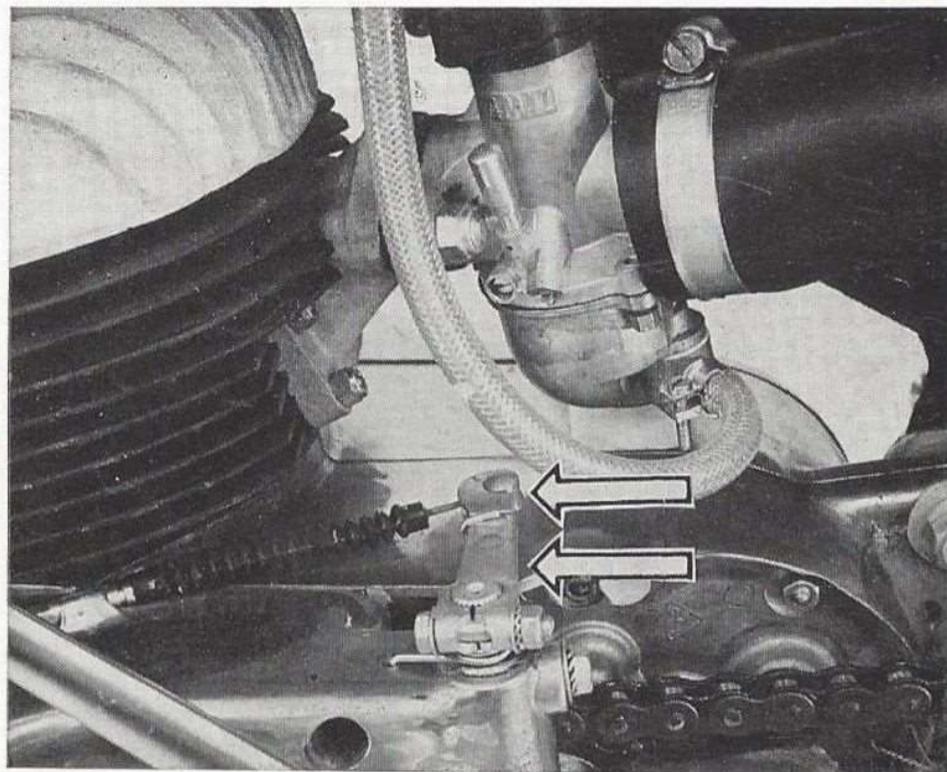


Fig. 51

exposed inner-cable and bend it around until it is lined with the slot in the handlebar lever. Remove the cable clutch from the motorcycle.

Thread the cable through the handlebar cable-adjuster and in the handlebar lever, and install the cable fitting. Thread the cable through the retainers on the front downtube of the frame, so that the cable does not make any sharp bends. Thread the inner through the outer-cable stop above the magneto case.

Position the cable clamp in the housing connected to the clutch operating shaft assembly. If necessary, adjust the amount of play in the cable adjuster and the clutch rod adjusting screw.

Note: If the clutch is slipping even through the cable is adjusted correctly, the clutch springs may need adjustment or replacement. Your dealer can make these adjustments.

3. Tighten hard the two plugs with a 29 mm wrench to pull the stanchions into the top bracket.
4. Tighten hard the fixation of the lower bracket to the stanchions on both sides.

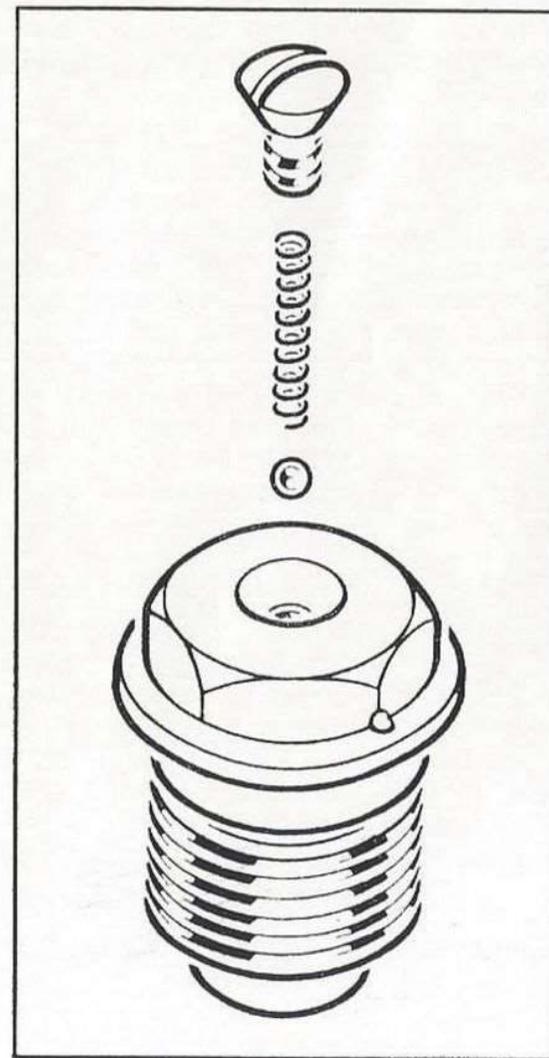
Fig. 52

F. THE FRONT FORKS

1. **The Filler Plugs.** If oil is leaking out of the top of either of the fork tubes, the check-valve in the filler-plug is not seating properly. Remove the filler plug with a 20 mm wrench. Remove the small screw from the top of the plug. Turn the plug upside down, and remove the spring and the ball-bearing. Clean the plug, the spring, and the ball in gasoline, and reassemble them.

2. **Rigidity of the Front Fork.** If the front fork and steering has a tendency of bending —particularly after several falls— you should follow these instructions to obtain the original rigidity:

1. Loosen the fixation of the lower bracket to the stanchions on both sides.
2. Centre the fork, by pressing on the handlebars.



G. THE FRONT WHEEL

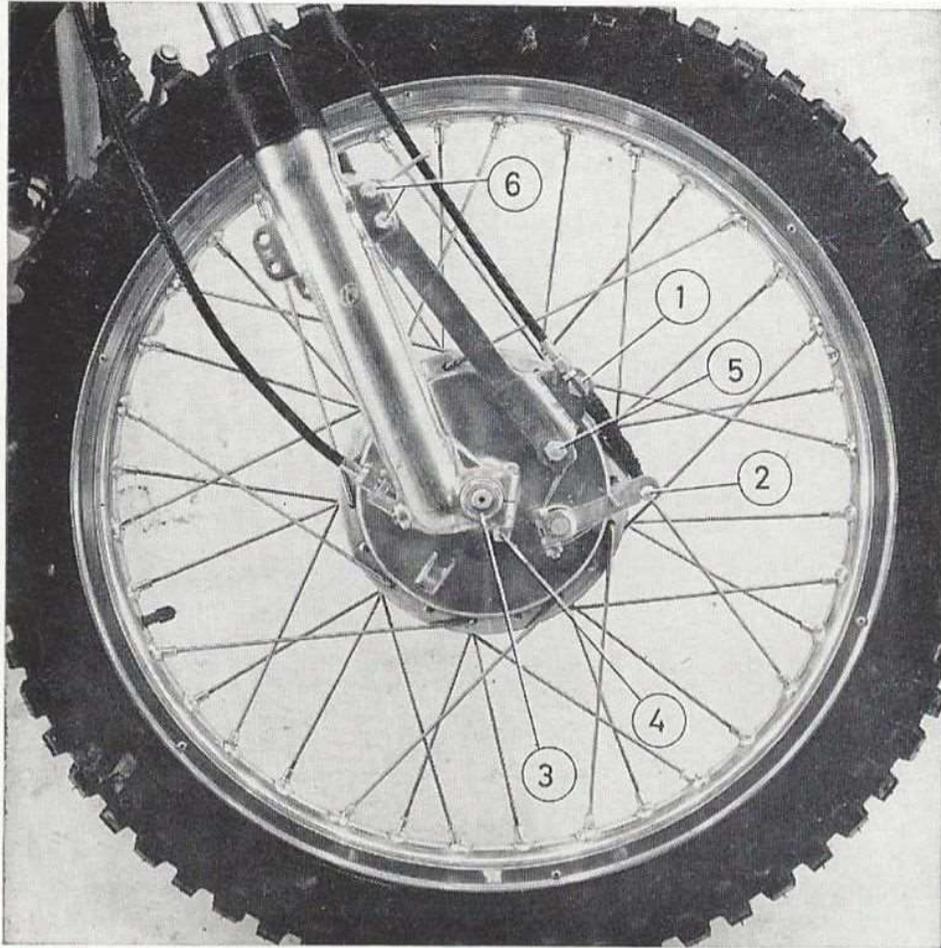


Fig. 53

1. Cable adjuster. — 2. Cable end. — 3. Axle nut. — 4. Axle-clamp nut.
5. 14 mm nut. — 6. 6.10 mm nut.

1. Checking the Spoke Tension. To check for correct spoke tension, wiggle each spoke gently. If the spoke nipple at the rim is able to move, the spokes are too loose. One or two loose spokes will do no harm. If several spokes on each side of the rim are loose, however, have your dealer adjust them.

2. Removing the Front Wheel. Support the frame so that the front wheel is off the ground. Remove the brake cable from the front wheel. Loosen the two 10 mm nuts and bolts that clamp the anchor plate to the right forkleg. Remove the 14 mm anchor-plate nut from the brake backing-plate. Remove the anchor plate from the backing plate.

Loosen the four 10 mm axle-clamp nuts and bolts. With the dipstick and the 22 mm wrench, remove the axle nut. Remove the axle from the left side of the machine. Remove the front wheel from the motorcycle. Remove the brake backing-plate.

To reassemble fit the brake backing-plate to the front wheel. Position the wheel between the front forks, with the backing plate on the right side. Fit the anchor plate to the stud the backing plate. Insert the front axle from the left side of the wheel.

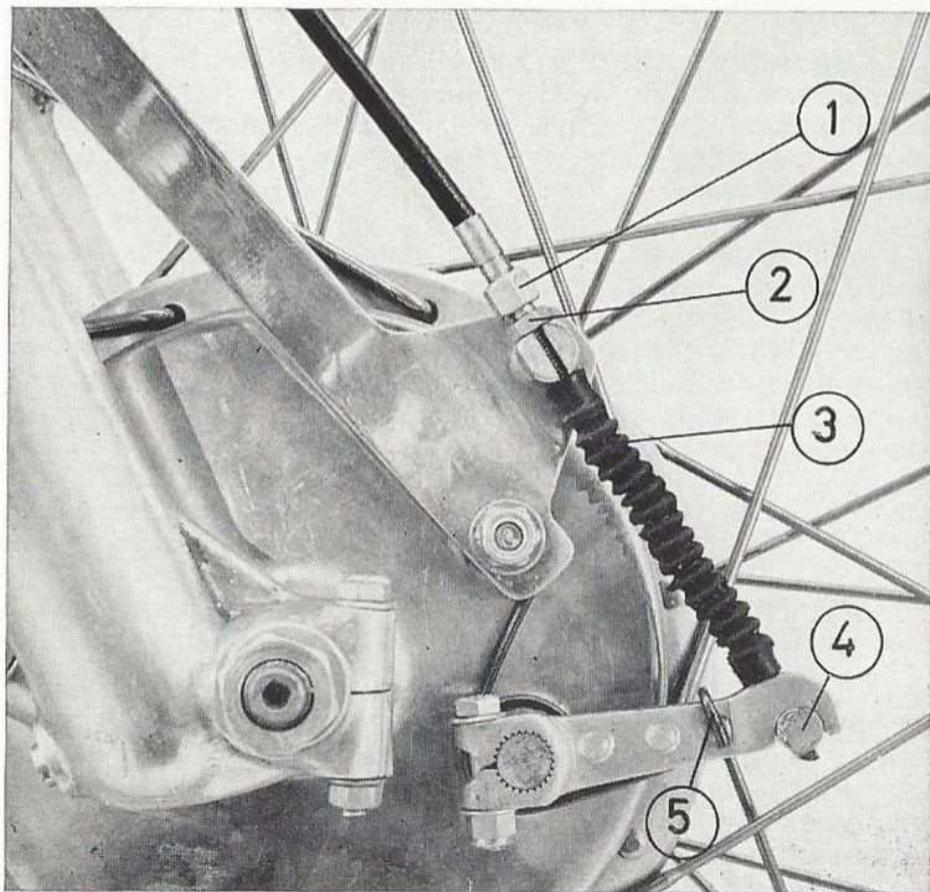
On the front axle, mount the flatwasher, the lockwasher, and the axle nut. Tighten the nut slightly. Tighten the four 10 mm axle-clamp nuts and bolts. Now tighten the axle nut securely. Mount the anchor-plate nut on the backing-plate and tighten it. Tighten the two 10 mm anchor-plate nuts and bolts on the right fork-leg. Position the cable in the slot in the brake arm.

H. THE FRONT BRAKE

The rider with average-size hands will want the front brake to be locked tight when the brake lever is about halfway in toward the handlebar. If there is less travel, you lose some of the fine control of braking. Riders with very small hands may want the handlebar lever to come closer to the handlebar before the front wheel is locked, for greater leverage. You can adjust the travel of the handlebar lever with the cable adjuster. If this does not give you enough adjustment (after the motorcycle has many miles on it), you can vary the positioning of the brake arm on the backing plate.

1. **Using the Cable Adjuster.** To increase the travel of the handlebar lever before the front brake is locked, rotate the serrated wheel on the handlebar mount so that the adjuster is retracted for enough into the mount to give you the desired amount of increased lever-travel. If you wish to decrease the travel of the front-brake lever, rotate the serrated wheel so that the adjuster is extended from the handlebar mount.

Fig. 54



1. Cable adjuster. — 2. Cable adjuster locking nut. — 3. Protector rubber. — 4. Cable end. — 5. Spring.

Prop the motorcycle so that the front wheel is off the ground. Spin the front wheel and make certain that the brake is not dragging. If the brake is dragging, rotate the serrated wheel to retract the cable adjuster into its mount until the brake no longer drags.

2. **Adjusting the Brake Arm.** If the cable has been repositioned, and the handlebar lever still has too much travel, you will need to reposition the brake arm. Retract the cable adjuster.

Remove the 10 mm locknut from the clamp-bolt on the brake arm at the backing plate. Remove the arm from its splined shaft. Holding the arm just above the shaft rotate the arm about 30 degrees CCW from its position. Fit the arm, to its splined shaft and mount the 10 mm locknut. If necessary adjust the cable adjuster. Check to make certain that the brake is not dragging.

3. **Changing a Front-Brake Cable.** Remove the inner brake-cable from the brake arm. At the handlebar lever, bend the cable around until you can remove the cable-fitting from the lever. Remove the inner cable from the motorcycle.

Thread the inner cable through the cable adjuster and the handlebar mount. Insert the cable fitting into the handlebar lever. Position the cable along the right fork-leg. Fit the cable to the brake arm.

If necessary, adjust the cable adjuster. Make certain that the brake is not dragging. Make certain that there are no sharp bends in the brake cable.

4. **Cleaning the Brake Linings.** Remove the front wheel from the motorcycle. Remove the brake backing-plate from the wheel.

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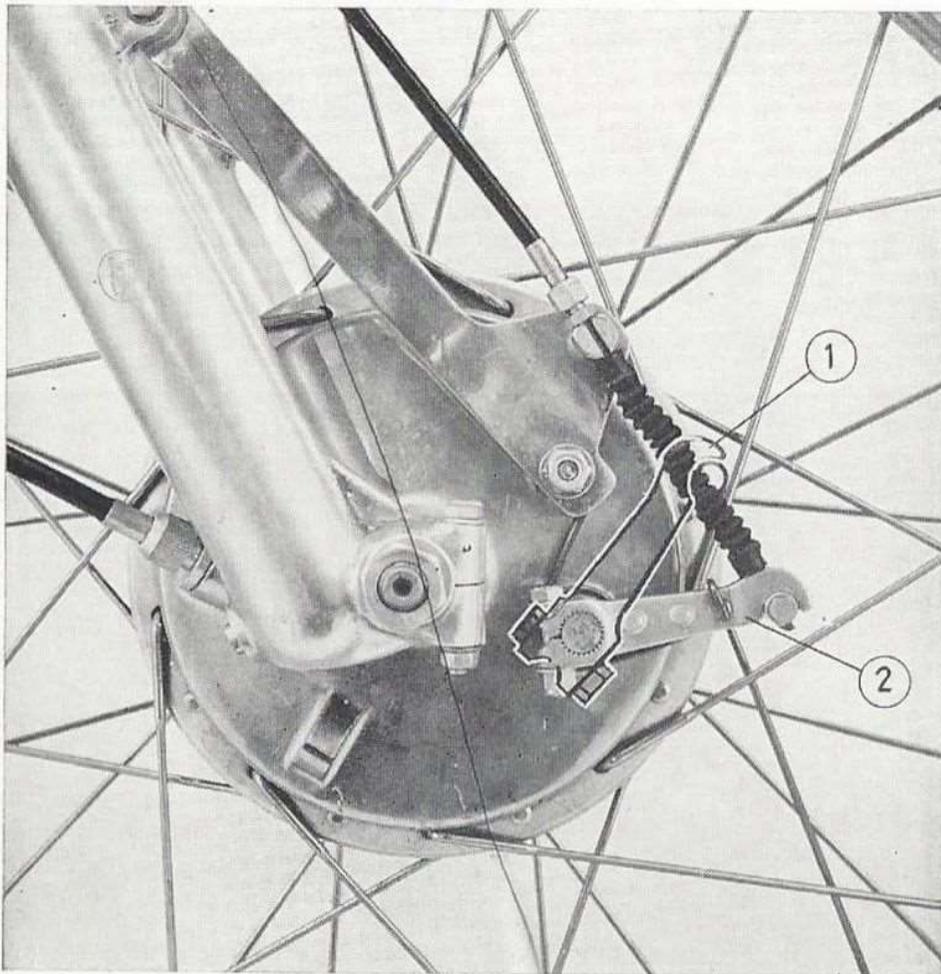


Fig. 55

1. Old position. — 2. New position.

Inspect the brake linings, being careful not to touch them with your fingers. The linings should be clean and dry. They should show even wear. The surfaces should be slightly rough.

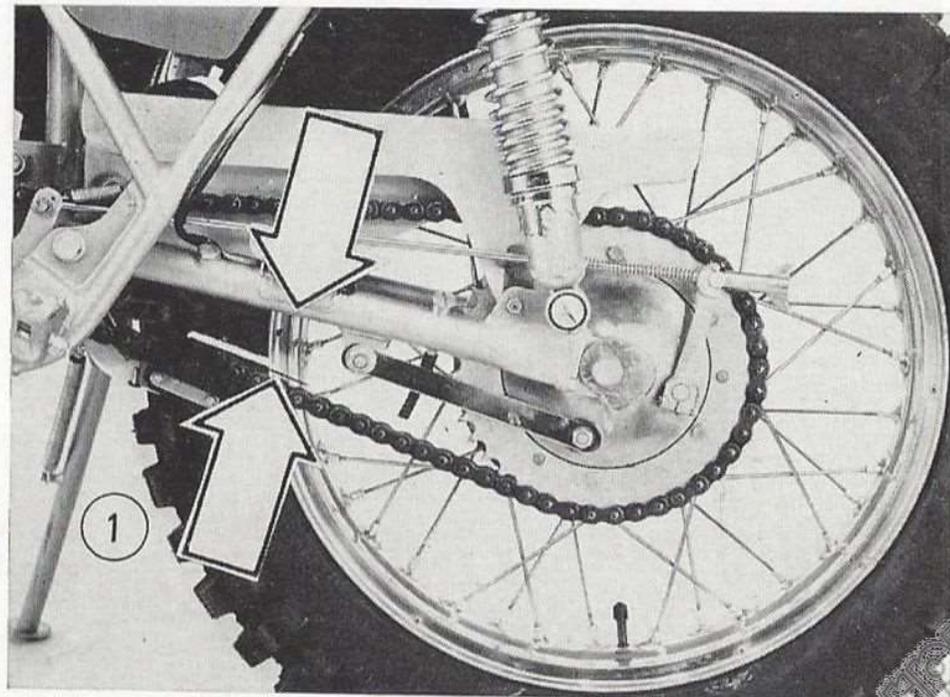
If at any point the linings are thinner than $1/16''$, have your dealer replace them with new ones. If the linings are deeply and unevenly worn, have your dealer replace them with new ones and machine the brake drum if necessary. If the linings are damp with any substance other than water, have them replaced with new ones.

If the linings are shiny or glazed, roughen them with a medium-cut file. Use gentle, even strokes of the file to cut the glaze, and follow the contour of the lining.

Clean the backing-plate and the lining with compressed air, if necessary, lubricate the brake cams lightly with brake-cam grease or high-temperature grease, making certain that none of the grease gets on the linings.

Fit the backing-plate to the front wheel. Install the front wheel in the motorcycle.

Fig. 56



1. When play is over $1/4''$ adjust rear chain.

J. THE REAR CHAIN

1. **Tensioning the Chain.** Prop up the frame so that the rear wheel is off the ground. With the gearbox in neutral, rotate the rear wheel until you find the tightest point in the lower run of the rear chain. When play is over 1/2" adjust rear chain.

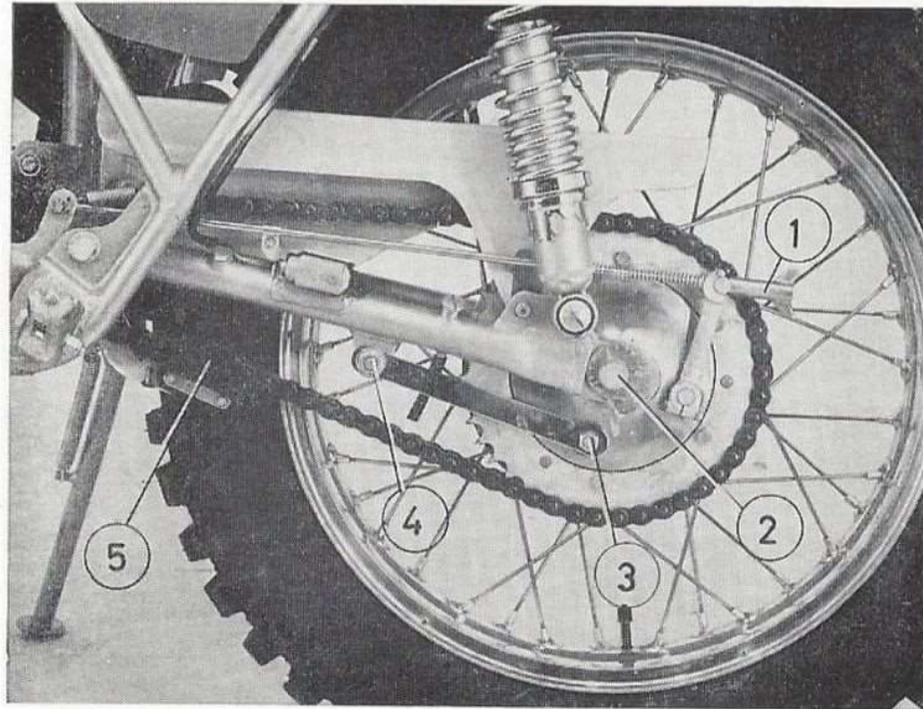


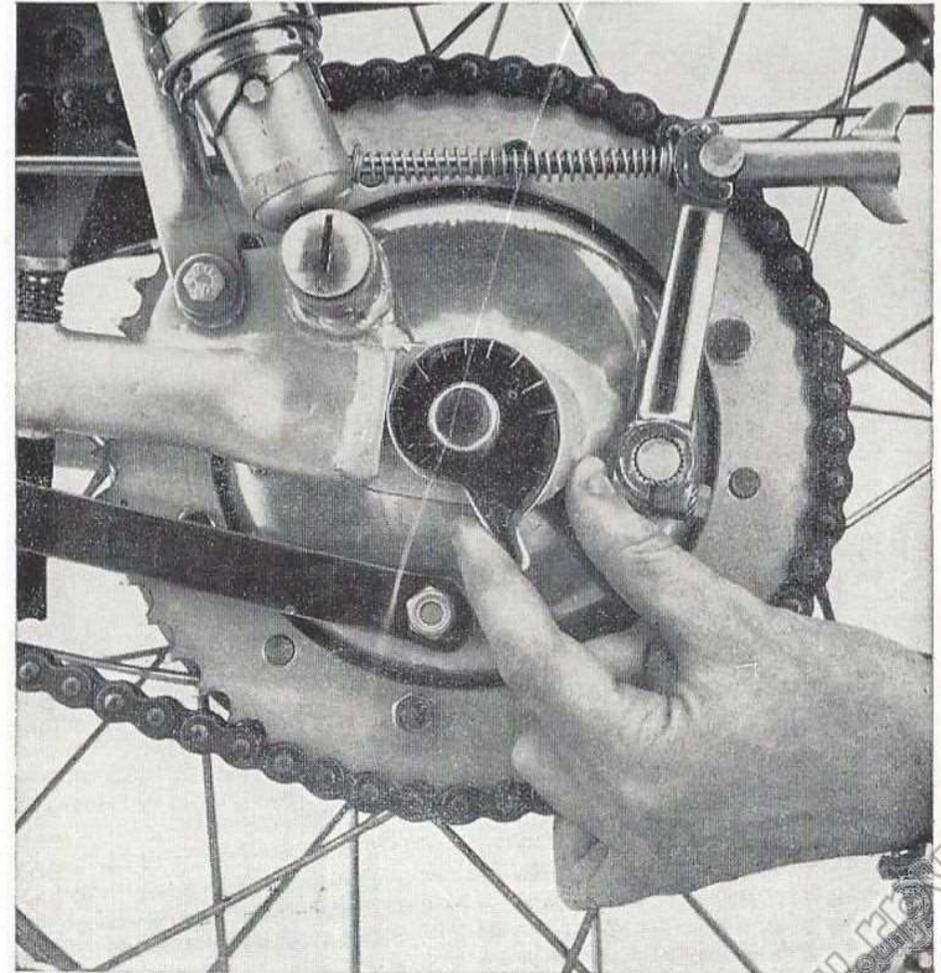
Fig. 57

1. New adjuster. — 2, 3 and 4. Loosen. — 5. Chain Tensioner.

Also loosen the 14 mm nut at the other end of the anchor plate. Count the number of threads on the brake-rod protruding from the brake-rod nut. Rotate the brake-rod nut CCW to loosen the brake linkage. With the 22 mm wrench and the dipstick, loosen the axle nut.

Two rear-wheel adjusting-cams are fitted to the rear axle. If the rear chain is too loose, rotate the left-side adjusting-cam CCW the distance of one mark on the cam (from the

Fig. 58



left side of the motorcycle). Rotate the right-side cam the distance of one mark CW (from the right side of the motorcycle), if you were directly behind the motorcycle, both cams would rotate in the same direction.

Check the chain tension, and if the chain is still too loose, rotate both cams another mark. If you always rotate both cams the same amount, the rear wheel will stay aligned. Continue to check chain tension and to rotate the cams until you have obtained the correct tension.

If the rear chain is too tight, rotate left-side adjusting-cam CW the distance of one mark, and rotate the right-side

cam CCW one mark. If necessary, tap the cams gently with a mallet to seat them against their flanges on the swinging arm. Check the chain tension. Continue to check the chain tension and rotate the cams until you have obtained the correct tension.

Tighten the axle nut securely. Tighten the nuts at both end of the anchor plate. Rotate the brake-rod nut CW and return in to its previous position.

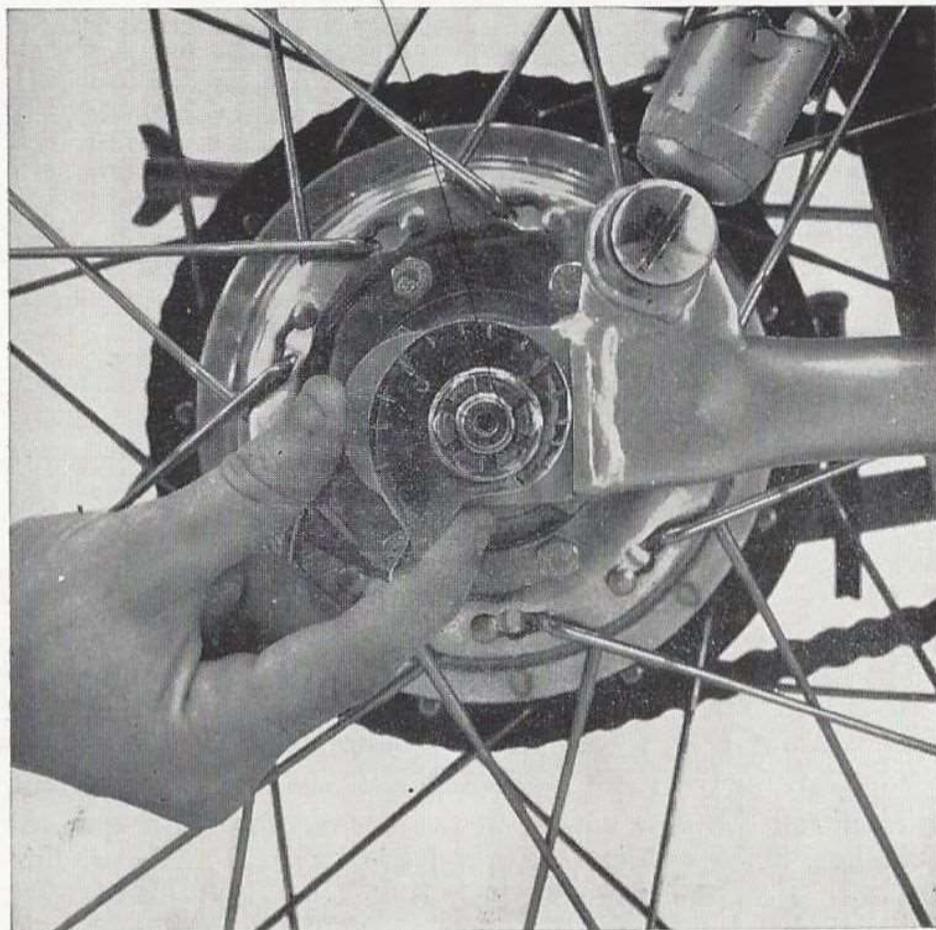
2. Cleaning the Chain. Prop up the frame so that the rear wheel is off the ground, and shift the gearbox to neutral. Loosen the nuts at both ends of the anchor plate. Loosen the brake-rod nut. Loosen the rear-axle nut. Rotate both adjusting cams to their minimum tension positions. Tap the cam gently with a mallet to seat them against their flanges on the swinging arm.

Locate the master link. Rotate the rear wheel until the master link is positioned so that you can get at it. Press the jaw of a pair of pliers against the master link so that one jaw bears against a leg of the spring clip, and the other free of the stud nearest the open end of the clip. Remove link. Remove the stud plate and separate the chain. Rotate the clip discard it. Remove the outer plate of the master the rear wheel to remove the chain from the sprockets.

Inmerse the chain in a pan of gasoline. Scrub the rollers and both sides if the links with a bristle brush. When the chain is clean, inmerse it in a pan of hot grease, and stir the chain around to get grease into all of the rollers. Remove the chain, and allow it to cool.

Fit the chain to both sprockets. Connect the ends of the chain with the master-link stud-plate. Fit the outer plate. Position a new spring clip with the closed end nearest the direction of chain travel. If the master link is in the lower chain-run, the closed end faces the rear wheel. If the master link is in the upper chain-run, the closed end of the clip faces the countersaft sprocket. Fit the clip to the stud nearest the colsed end of the clip Use pliers to force the clip over the other stud. Tension the chain. Tighten the anchor-plate nuts and the axle nut. Reposition the brake-rod nut.

Fig. 59



3. **Cleaning the Chain.** When the old chain has become so worn that it has permanent kinks, or the rollers have a great deal of stretch, remove the chain and replace it with a new one. As a general rule, a new rear-chain will stretch rapidly for a short while, so that you will need to re-tension it several times. After that, it will stretch more gradually.

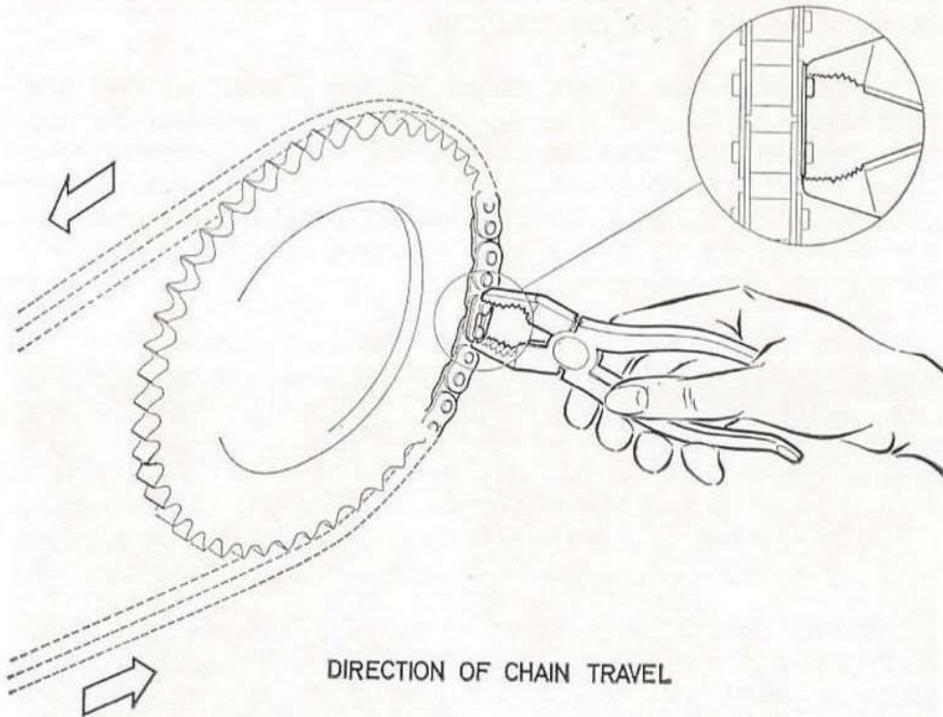


Fig. 60

K. THE REAR WHEEL

1. **Checking the Spoke Tension.** Check the spoke tension, in the same manner as for the front wheel. If necessary, have the dealer adjust the tension of the spokes.

2. **Removing the Rear Wheel.** Support the motorcycle so that the rear wheel is off the ground. Remove the brake-rod nut. Press down on the rear-brake pedal, and remove the brake-rod from the brake arm. Remove the 14 mm anchor-plate nut from the backing-plate stud. Loosen the 14 mm nut

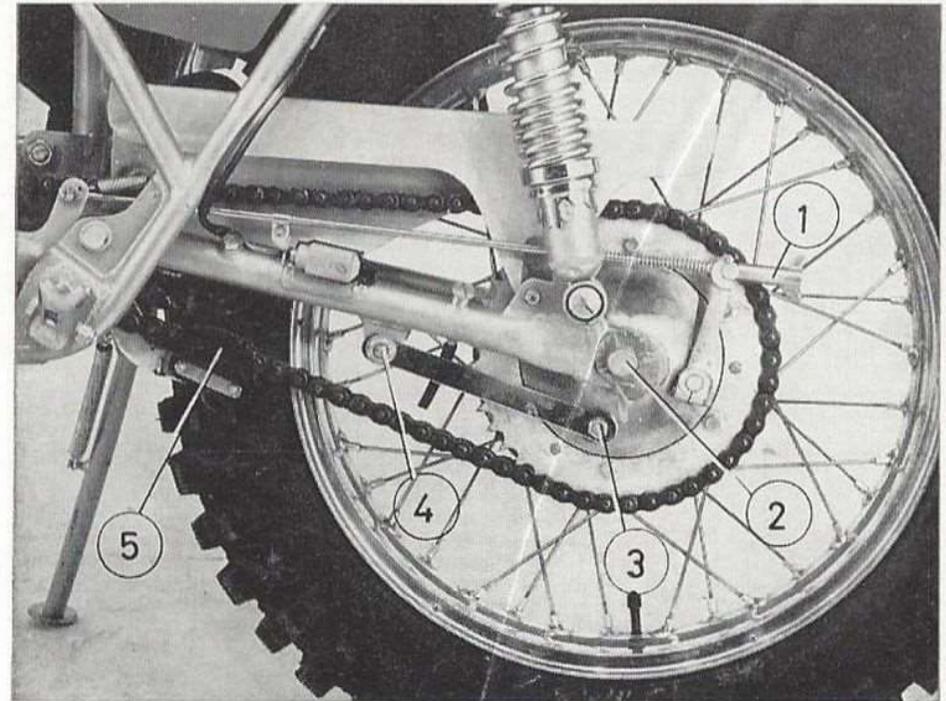


Fig. 61

1, 2 and 3. Remove. — 4. Loosen. — 5. Chain Tensioner.

at the other end of anchor plate, and remove the anchor plate from the backing plate. Remove the rear chain. Remove the rear-axle nut and the washers. Remove the rear axle. Remove the rear wheel from the motorcycle. Remove the backing plate from the rear wheel.

To install the rear wheel, fit the backing-plate to the wheel hub. Position the wheel between the forks of the swinging arm, with the rear sprocket facing left. Position the spacer between the right side of the wheel and the swinging arm,

in line with the axle holes. Fit one of the adjusting cams to the axle and insert the axle from the left. On the right side of the wheel, mount the other adjusting-cam, the lock washer, the flatwasher, and the axle nut.

Fit the anchor-plate to its stud on the backing plate, but do not mount the nut. Tighten the axle nut slightly. Mount the rear chain. Mount the spring on the brake rod. Fit the brake-rod nut loosely on the end of the brake rod.

Tension the rear chain. Tighten the axle nut securely. Mount the 14 mm nut on the backing-plate anchor-plate stud. Tighten the nuts at both ends of the anchor plate. Position the brake-rod nut at its original setting.

L. THE REAR BRAKE

The rear brake should be locked after the rear-brake pedal has travelled about 2". To adjust the pedal travel, use the brake rod nut. If you cannot get enough adjustment with the nut, you will need to reposition the brake arm on the backing plate.

1. **Using the Brake-Rod Nut.** Prop the motorcycle so the rear wheel is off the ground. Shift the gearbox to neutral. Rotate the brake-rod nut CW and spin the rear wheel until the brake begins to bind. Rotate the brake-rod nut one turn CCW, and test the action of the brake pedal.

2. **Adjusting the Brake Arm.** If the motorcycle has many miles on it, and you cannot get a satisfactory adjustment with the brake-rod nut, you will need to reposition the brake arm. Remove the brake-rod nut. Remove the brake rod from the brake arm. Remove the 10 mm locknut from the brake arm. Remove the brake arm from its splined shaft. Holding the arm just above the shaft, rotate arm about 30 degrees CW from its old position, and mount it on the splined shaft. Mount the 10 mm locknut. Fit the brake rod and position the brake-rod nut.

3. **Cleaning the Brake Linings.** Remove the rear wheel from the motorcycle. Remove the brake backing-plate. Inspect the brake linings in the same manner as for the front brake.

If necessary, roughen the linings, or have them replaced. Clean the backing-plate with compressed air. Lubricate the cam lightly with brake-cam grease or high-temperature grease. Reassemble the rear wheel.

NOTE: Every time the rear brake is adjusted it is recommended that the position of the stoplight switch be carefully observed. The correct position is obtained when the brake pedal, in rest position, touches the stoplight switch plunger without excessive pressure... and that the stoplight is activated after the brake pedal has been depressed slightly.

Fig. 62



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X. TROUBLESHOOTING

If the engine stop, or fails to start, use the following checks lists, in the order given, to identify the problem.

1. The gas tap may be in the closed position or it may no haven been turned to «reserve» if the fuel supply is low.
2. The petrol tank may be empty.
3. The sparkplug cap may have come off, or it may be loose on the sparkplug.
4. The sparkplug may be oiler, or it may be whiskered, or it may haver a short that it difficult to see. Try a new sparkplug.
5. There may be no spark. Fit the sparkplug cap to the new sparkplug, and lay the sparkplug on the cylinder head, with the metal base of the plug grounded to the head. With the gearbox in neutral, use the kickstarter to see if you're getting a bule spark.
6. The fuel line or the fuel-filter muy have become clogged with sediment.

If you are unable to locate or to overcome the difficulty, check with your dealer. If the engine runs, but does not run properly, check with your dealer.



XI. CLEANING THE ALPINA

The Alpina is a handsome machine when it is clean. The lines are not complicated, so you can clean the machine quickly and easily.

1. **Washing.** Cover the end of the exhaust pipe with a plastic bag. Hold the bak in place with a large rubber-band. Stuff plastic bags beneath the front of the saddle, to block the air-cleaner intake. Apply Gunk, or a similar cleaner, by spraying or with a painbrush. Use it sparingly on plainted surfaces, and keep it of the saddle and the brake backing-plates. Hose the machine with water, bein careful to avoid directing the stream against the backing plates, or beneath the saddle from the front. Wipe off the machine with a clean, solft rag and remove all traces of the solvent from painted surfaces.

2. **Waxing.** Use a silicone-base wax. Apply the wax with a soft, clean cloth, and rub it in well with circular motions. Use another, soft, clean cloth to polish the surface to a high luster.

Do not use a ire brush, or abrasives such as emery cloth, to clean or polish the chrome surfaces or the spokes.



XII. PREPARING THE MACHINE FOR STORAGE

If you wish to store the machine for several months, first clean it carefully. Then coat the chrome-plating and other metal surfaces with a light film of oil.

Empty the petrol-tank. Drain the carburetor. Remove the drain plugs and drain the primary case and the gearbox. Plug the drain holes with clean cloths.

Remove the sparkplug and pour 10 cc of SAE 30 oil into the sparkplug hole. Use the kickstarter to move the piston up and down a few times. Stop the piston at Top Dead Centre. Plug the sparkplug hole with a clean, dry cloth.

Prop up the motorcycle so that the tyres do not support its weight. Let some of the air out of the tyres. Cover the motorcycle with a plastic cover that reaches down to the ground.



XIII. DETAILED SPECIFICATIONS

A. ENGINE

	250	350
1. Number of cylinders	1	1
2. Type of engine	Two-cycle	Two-cycle
3. Bore (mm)	72	83.2
4. Stroke (mm)	60	64
5. Displacement (cm ³)	244.29	347.95
6. Compression ratio	9:1	9:5:1
7. Bhp. @ rpm.	19.8 @ 5500	22.7 @ 6000
9. Torque	2.72 @ 4500	3.32 @ 4500

B. CARBURETER

1. Brand	AMAL	AMAL
2. Manufacturer's description	627	627
3. Diamet. of mixing chamber (mm)	27	27
4. Slide	3	3
5. Needle	U-2nd. pos.	U-2nd. pos.
6. Needle jet	106	106
7. Main jet	160	180
	30	20

C. INTERNAL GEARING

1. Engine sprocket (T)	16	
2. Clutch sprocket (T)	38	
3. Primary-drive ratio	2.375 revs of the crankshaft for each rev of the gearbox mainshaft	
4. Countershaft sprocket (T)	12	13
5. Rear sprocket (T)	42	42
6. Rear-drive ratio	3.50	3.23
	revs of the gearbox mainshaft for each rev of the wheel	
7. Total ratio	8.29	7.65
	revs of the crankshaft for each rev of the rear wheel	

D. GEARBOX

1. 1st gear ratio	0.287:1
2. 2nd gear ratio	0.442:-
3. 3rd gear ratio	0.625:1
4. 4th gear ratio	0.8821:1
5. 5th gear ratio	1:1

6. Type of lubricant SAE 90 motorcycle-gearbox lubricant, or SAE 90 automobil hiroid lubricant
7. Quality of lubricant 600 cc { 21.117 England fluid ounces
20.289 U.S. fluid ounces

E. CHAINS

1. Primary Chain

a. Brand	JORESA	
b. Manufacturer's description	ASA 2035	
c. Pith	3/8"	(9.53 mm)
d. Diameter of roller	0.2	(5.08 mm)
e. Distance between faces	0.295"	(7.50 mm)
f. Number of links	52	

2. Rear Chain

a. Brand	JORESA	
b. Manufacturer's description	SPECIAL 55	
c. Pith	5/8"	(15.875 mm)
d. Diameter of roller	1/64"	(10.16 mm)
e. Distance between faces	1/4"	(6.48 mm)

F. CLUTCH

1. Type Multi plates in oil bath
2. Type of lubricant SAE 30
3. Quality of lubricant 300 cc { 10.5588 England fluid ounces
10.144 U.S. fluid ounces

G. ELECTRICAL EQUIPMENT

1. Type of system Flywheel magneto
2. Brand FEMSA
3. Lighting current 40 W
4. Voltage 6 V
5. Direction of rotation CCW
6. Contact-breaker point-gap0137" - .0177" (0.35 - 0.45 mm)
7. Ignition timing BTDC - .098" - .106" (2.5 - 2.7 mm)

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8. Light Bulbs

a. Headlight	35 x 35	w. — 6 v.	(FER 250)
b. Taillight	4.5	w. — 6 v.	(FER 151)
c. Stoplight	15	w. — 6 v.	(FER 155)

H. SPARKPLUG

1. Size	0.551"	(14 mm)
2. Reach	3/4"	(19 mm)
3. Gap013" - .017"	(0.35 - 0.45 mm)

	250	350
a. Lodge	CLNY	3HLN
b. KLG	FE 30	FE 100
c. Bosch	W 145 - T 30	W 260 - T 2
d. Firestone	F18-L	F47-L
e. Champion	N-12Y	N-3

I. STEERING

1. Type of bearing	2 sets of ball bearings
2. Diameter of ball	3/16"
3. Number of balls/bearing	22
4. Distance between bearing	5 9/16"

J. FRONT SUSPENSION

1. Type	Telescopic
2. Dampening	Hydraulic
3. Travel	6 1/2" (165 mm)
4. Type of oil	Hydraulic SAE 30
	175 cc { 3.85 England fluid ounces
	4.62 U.S. fluid ounces

K. REAR SUSPENSION

1. Type	Swinging arm
2. Type shock absorbers	5-way adjustable telescopic, with hydraulic dampening
3. Travel	3 15/16" (100 mm)

L. WHEELS

1. Front rim	WM 1 (1.6) x 21"
2. Front tyre	
3. Rear rim	WM 3 (2.15) x 18"
4. Rear tyre	4.00 x 18" Knobby

5. Front Tyre Pressures

a. Trial	5 lbs/sp"
b. Trails	8 lbs/sq"
c. Pavement	14 lbs/sq"

6. Front Tyre Pressures

a. Trial	4 lbs/sq"
b. Trails	6 lbs/sq"
c. Pavement	12 lbs/sq"

M. BRAKES

1. Type	Internal expansion: leading-shoe, trailing-shoe
2. Front brake diameter and width.	Ø 140 x 35 mm
3. Rear brake diameter and width.	Ø 140 x 40 mm

N. GENERAAL

1. Gas tank capacity	2.9 U.S. gallons (10.5 litres)
2. Cruising speed	65 mph (105 kph)

3. Proportion of Oil in Gasoline

a. Regular SAE 40 motor oil .	5 %	
b. Two-cycle oil	4 %	
4. Wheelbase	52.3"	(1.330 mm)
5. Overall length	79.3"	2.020 mm)
6. Saddle height above ground ...	29.5"	(750 mm)
7. Ground clearance	11.03"	(280 mm)
8. Foot-rest height above ground .	13.8"	(350 mm)
9. Handlebars, height & width ...	40.9" x 38"	(1.040 x 860 mm)

11. Empty weight

	250	350
Lbs.	213	218
Kgs.	97	99

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