


By Appointment
To His Royal Highness The Duke of Edinburgh
Suppliers of Vespa Scooters

# Vespa 90

## OPERATION AND MAINTENANCE


# Vespa 90

## OPERATION AND MAINTENANCE

**DOUGLAS (SALES & SERVICE) LTD., KINGSWOOD, BRISTOL**

Telephone **67-1881**

DIVISION OF THE WESTINGHOUSE BRAKE AND SIGNAL COMPANY LIMITED

## NOTICE

We trust that your Vespa will give you excellent service, and will satisfy your every need.

This booklet, in which the simple instructions for operation and maintenance can be found, will enable you to understand and use your machine in the most advantageous manner.

To keep your VESPA in perfect running order and not to invalidate the guarantee offered by the contract, it is advisable to entrust repairs only to retailers or authorised service stations.

Demand original VESPA spare parts exclusively. All VESPA spares are made of the same material, have undergone the same machining steps and inspections as the components of your VESPA. This means guarantee for long life and normal performance of your machine and for your personal safety.

Special care should be taken with regard to fuel mixture which should consist of a good quality petrol and oil of make, grade and in the amount prescribed in this booklet, page 28.

## SERVICE EXCHANGE

Ask your Dealer for full particulars relating to the Service Exchange Scheme. The use of the facilities we offer through this medium ensures an economical, speedy, and reliable means of carrying out repairs when such become necessary.

# INDEX OF MAIN DIRECTIONS

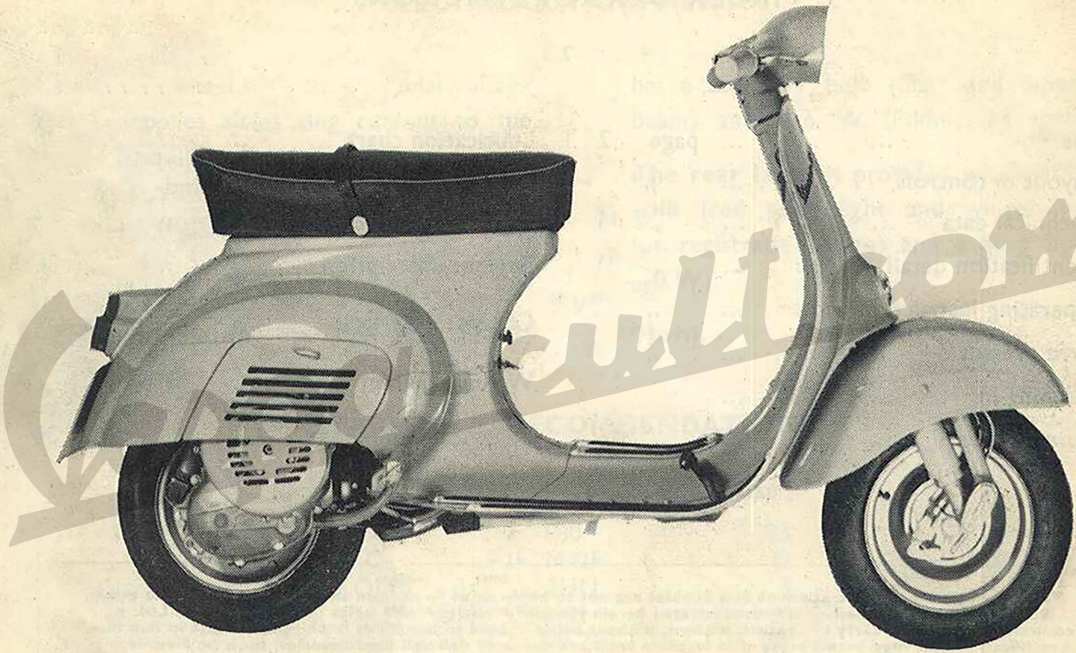
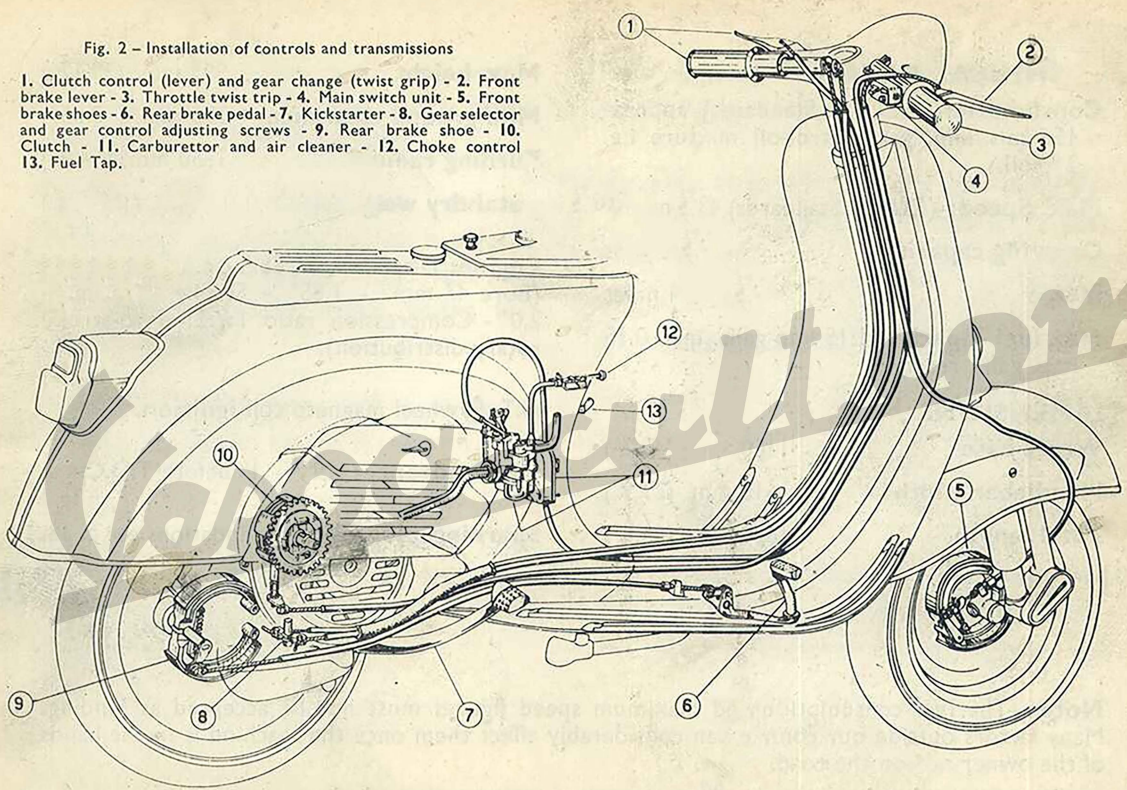


Fig. 1 – Vespa 90

Fig. 2 – Installation of controls and transmissions

**1.** Clutch control (lever) and gear change (twist grip) - **2.** Front brake lever - **3.** Throttle twist trip - **4.** Main switch unit - **5.** Front brake shoes - **6.** Rear brake pedal - **7.** Kickstarter - **8.** Gear selector and gear control adjusting screws - **9.** Rear brake shoe - **10.** Clutch - **11.** Carburettor and air cleaner - **12.** Choke control **13.** Fuel Tap.



## TECHNICAL DATA

**Consumption:** (CUNA Standards) approx. 156 mls./imp. gal., petrol-oil mixture i.e. 2% oil.

**Max. Speed:** (CUNA Standards) 43.5 m.p.h.

| | |
|---|---|
| **Carrying capacity** | 2 persons |
| **Range** | 174 miles |

**Max fuel capacity:** 1.15 imp galls. incl. 0.15 imp. galls. reserve

## DIMENSIONS

| | |
|---|---|
| **Wheel base** | 1160 mm. (45.2″) |
| **Handlebar width** | 610 mm. (23.9″) |
| **Total length** | 1650 mm. (64.9″) |
| **Max. height** | 995 mm. (39.17″) |
| **Min. ground clearance** | 225 mm. ( 8.85″) |
| **Turning radius** | 1650 mm. (64.9″) |
| **Total dry weight** | 70 Kg. (157 lbs.) |

**Engine:** Displacement 88.5 c.c. - 5.4 cu. in. - (Bore 47 mm. - 1.85″ - Stroke 51 mm. - 2.0″ - Compression ratio 1:7.2; Two-stroke rotary distribution).

H.T. flywheel magneto coil **ignition.**

**Spark advance:** 19° ± 1° before T.D.C.

**Sparking plug:** Recommendations see p. 38.

**Note.**—The fuel consumption and maximum speed figures must not be accepted as binding. Many factors outside our control can considerably affect them once the machine is in the hands of the owner and on the road.

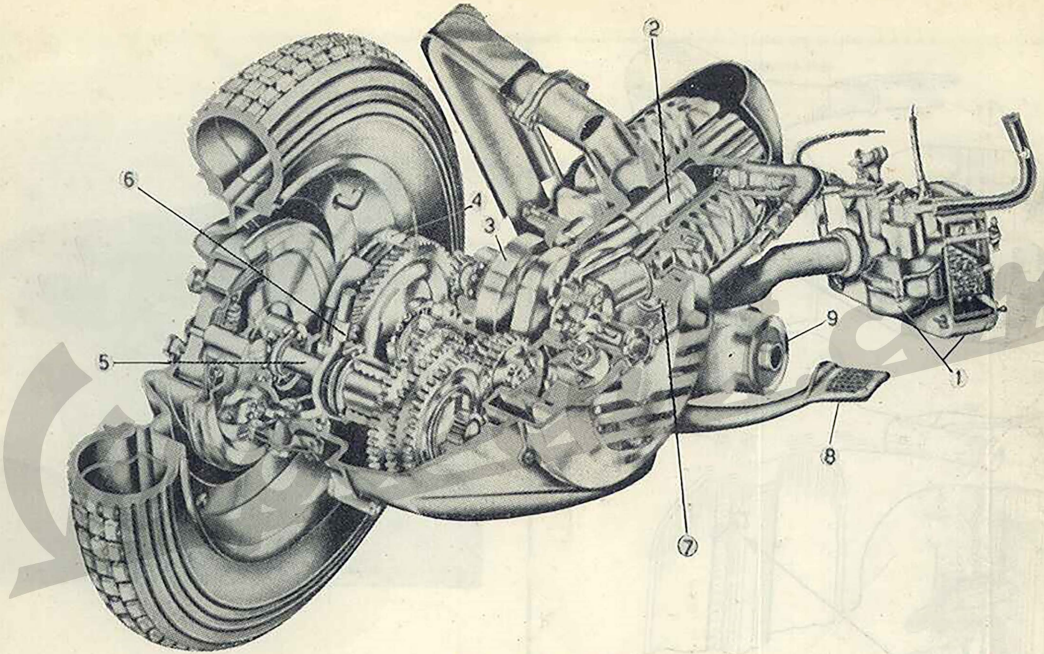



Fig. 3 - Engine section

**1.** Group carburettor air cleaner - **2.** Piston - **3.** Crankshaft **4.** Clutch - **5.** Mainshaft and gear pinion assy. - **6.** Gear shifter **7.** Flywheel magneto - **8.** Kickstarter - **9.** Crankcase swinging arm clutch side (pivoted to frame).

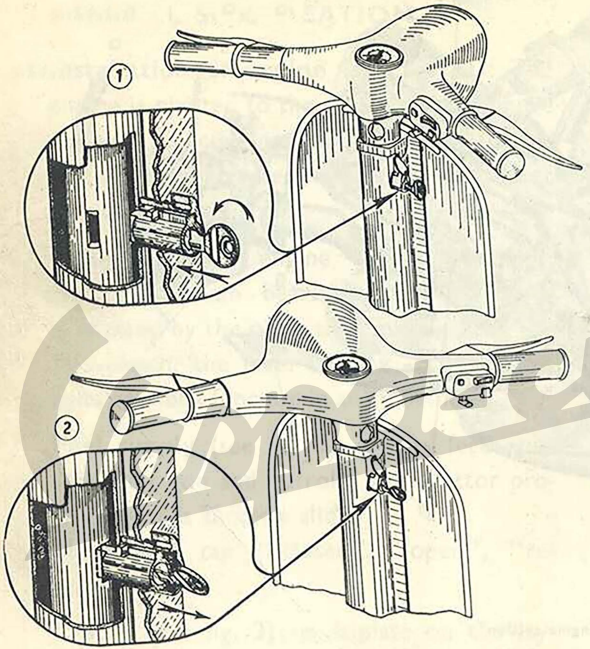



Fig. 4 - Steering lock
1. Normal position - 2. Locked position

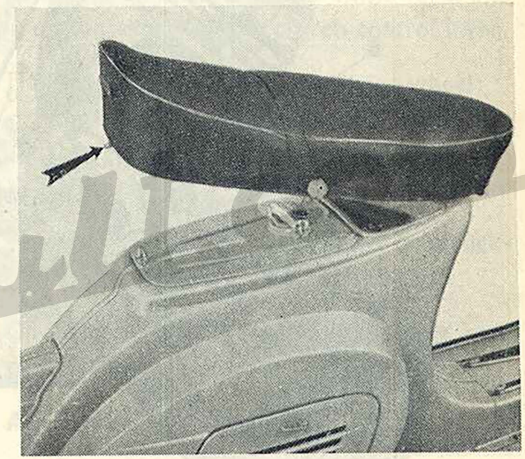


Fig. 5 - Dual Seat (for pivoting the seat on its forward edge push the lever indicated by arrow).

**A:** Open the fuel tap - **B:** Select neutral - **C:** Pull out the Choke control rod (with cold engine) - **D:** Bring throttle twist grip to idling position - **E:** Depress the Kickstarter.

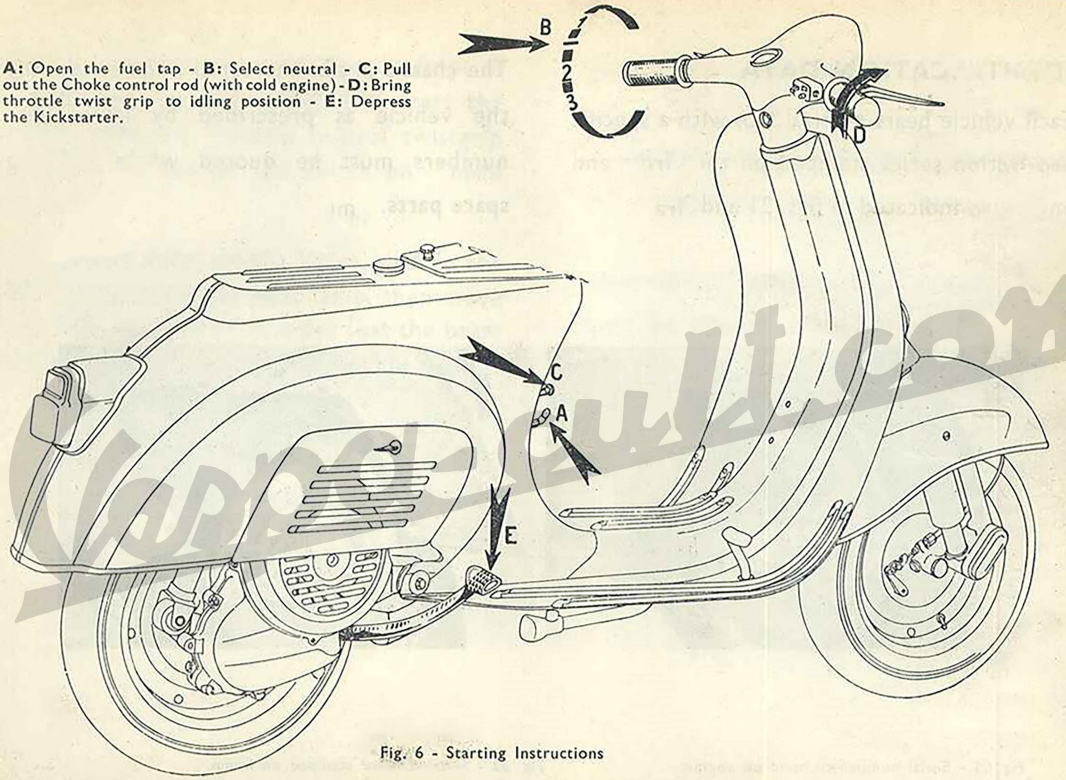



Fig. 6 - Starting Instructions

## IDENTIFICATION DATA

Each vehicle bears a Serial No. with a specific production series stamped on the frame and engine, as indicated in figs. 21 and 22.

The chassis prefix and serial number identify the vehicle as prescribed by law; these numbers must be quoted when ordering spare parts.

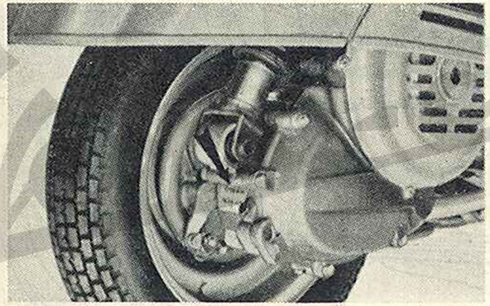


Fig. 21 - Serial number stamped on engine.

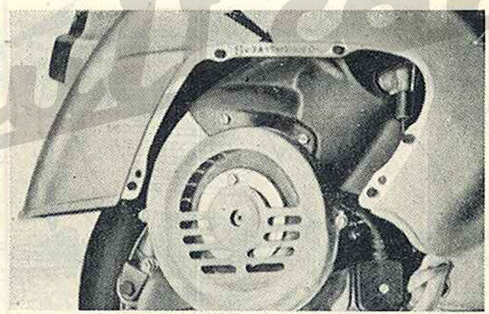


Fig. 22 - Serial number stamped on frame.

## OPERATING INSTRUCTIONS

**Before operating the vehicle:** unscrew the plug on the gear box marked "OLIO" (fig. 18) and check that the oil is level with the hole when the vehicle is standing upright.

— Check **tyre pressure:**
Front (17 p.s.i.): Rear (23 p.s.i.) solo;
Rear (33 p.s.i.): with pillion passenger.

| OPERATION | INSTRUCTIONS | NOTES |
|---|---|---|
| **STEERING LOCK** | | |
| (*a*) Locking the scooter. | To lock the vehicle it is necessary to turn the handlebars in anticlockwise direction up to the limit stop; **rotate the key and push inwards,** so that it thrusts the sliding bar against the steering column. To ease the insertion of the sliding bar into the hole of the steering column, slightly turn the handlebars from the limit stop clockwise. | When the handlebars are locked the key will now spring back to its original position and can be extracted. It can be extracted from the lock even if the handlebars are free. |
| (*b*) Unlocking the scooter. | To release the handlebars, insert the key in **the lock,** turn it **to the left** and pull it back; then turn the handlebars in the normal position. | The steering lock should **not** be lubricated. |

## OPERATING INSTRUCTIONS

| OPERATION | INSTRUCTIONS | NOTES |
|---|---|---|
| **FUEL SUPPLY** | Ensure that the fuel tank breather is always clean. **Use a mixture 2% by volume during and after running-in.** | |
| **STARTING** | — Carry out the instructions indicated on fig. 6. Do not use the choke when the engine is warm; **as soon as the engine is running smoothly bring the choke control back to its normal position.** | In case of hard starting see page 32. |
| **SETTING THE SCOOTER IN MOTION** | — With the engine running at idling speed declutch and rotate the gear change twist grip to the position of first gear (fig. 6). For setting the vehicle in motion slowly let in the clutch and gradually open the throttle. | **Do not attempt to ride the vehicle unless the handlebars rotate freely.** |
| **GEAR CHANGE** | — Close the throttle, declutch and rotate the gear change grip to a higher or lower gear, as the case may be (fig. 7). | When it is necessary to slow down do not hesitate in changing to a lower gear. |

## OPERATING INSTRUCTIONS

| OPERATION | INSTRUCTIONS | NOTES |
|---|---|---|
| **STOPPING THE ENGINE** | — Before stopping the engine change to "neutral" and then operate the cut-out button on the switch unit. | |



## RUNNING-IN PERIOD

**Up to 1,000 miles the machine should never be driven at a speed exceeding 35 m.p.h. It is important of course at all times never to let the engine labour but during its early life it is doubly important. Use your gear-box freely; never under any circumstances allow the motor to work hard.**

After first 600 miles change oil in gear box (see page 28) and check that all nuts and bolts are tight.

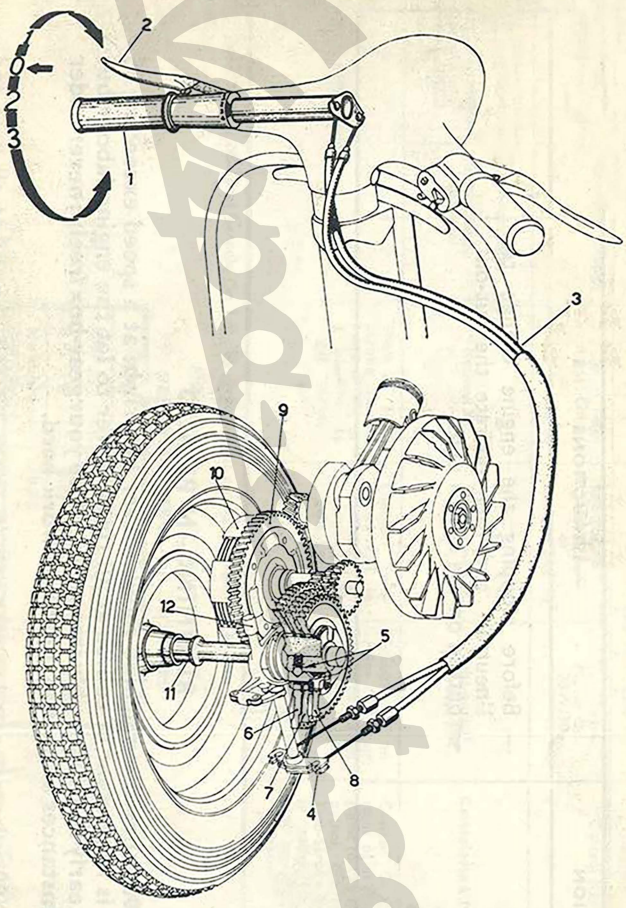


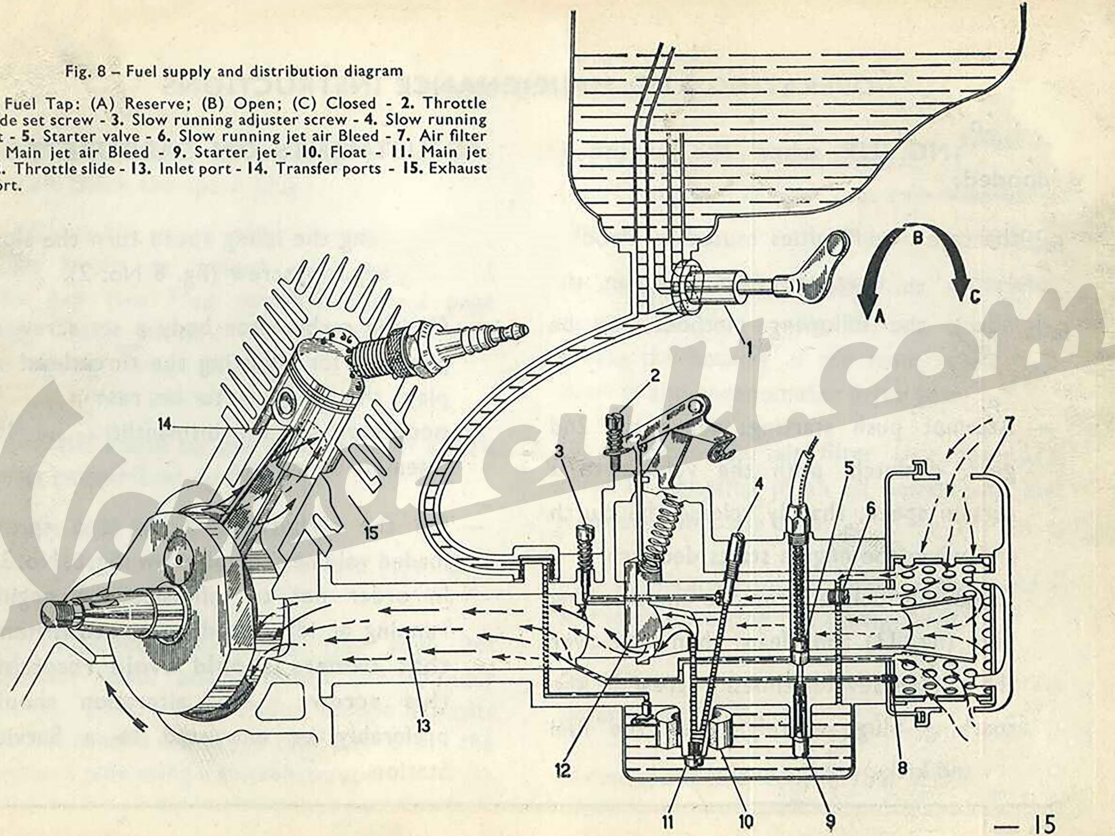

Fig. 7 – Gear Operation

1. Gear change twist grip - 2. Clutch control lever - 3. Gear change cables - 4. Gear shifter - 5. Selector group - 6. 1st gear 7. 2nd gear - 8. Top gear - 9. Helical gear - 10. Clutch - 11. Main shaft - 12. Stirrup for gear change.

**N.B.** - The position 1 - 2 - 3 on the gear change twist grip correspond respectively to bottom, 2nd and 3rd gear: the " O " indicates neutral.

Fig. 8 – Fuel supply and distribution diagram

1. Fuel Tap: (A) Reserve; (B) Open; (C) Closed - 2. Throttle slide set screw - 3. Slow running adjuster screw - 4. Slow running jet - 5. Starter valve - 6. Slow running jet air Bleed - 7. Air filter 8. Main jet air Bleed - 9. Starter jet - 10. Float - 11. Main jet 12. Throttle slide - 13. Inlet port - 14. Transfer ports - 15. Exhaust port.



## STARTING UP when the engine is flooded:

In the case of difficulties caused by flooding (presence of unvaporised mixture in the cylinder), the following methods can be used:

— Attempt push starting: select the 2nd gear, declutch, push the vehicle to a certain speed, sharply release the clutch and when the engine starts declutch.

— Close the fuel tap, remove the sparking plug (fig. 13) and clean; then kick over the engine several times. Screw in the sparking plug securely, open the fuel tap and kick over the engine.

## ADJUSTMENTS ON CARBURETTOR

For adjusting the idling speed turn the slow running adjuster screw (fig. 8 No. 2).

— On the carburettor body a set screw is provided for adjusting the throttle cable play; this screw is to be reset **only if necessary** or on dismantling and re-assembly operations.

— On the carburettor body is a spring loaded volume control screw (fig. 8, No. 3). In order not to influence the engine running at idle speed, **we recommend that owners should avoid resetting this screw.** Any alteration should preferably be entrusted to a Service Station.

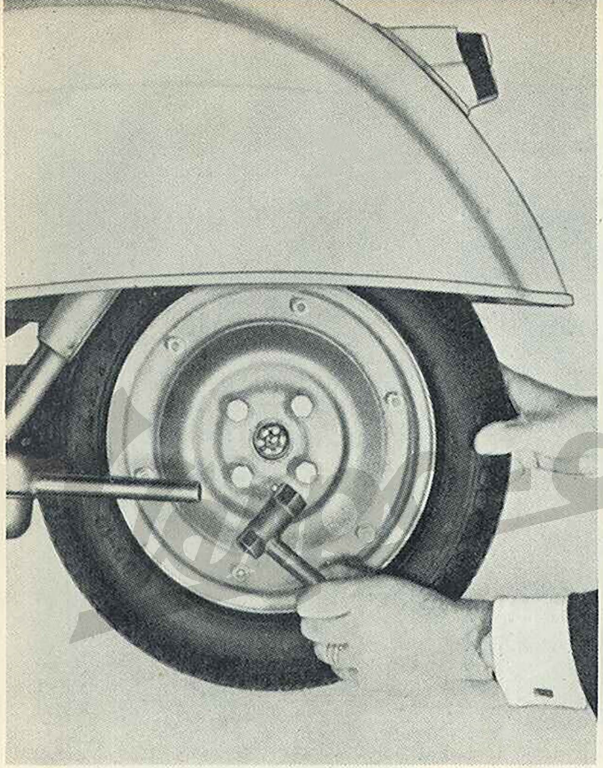


Fig. 9 - Removing wheel from vehicle

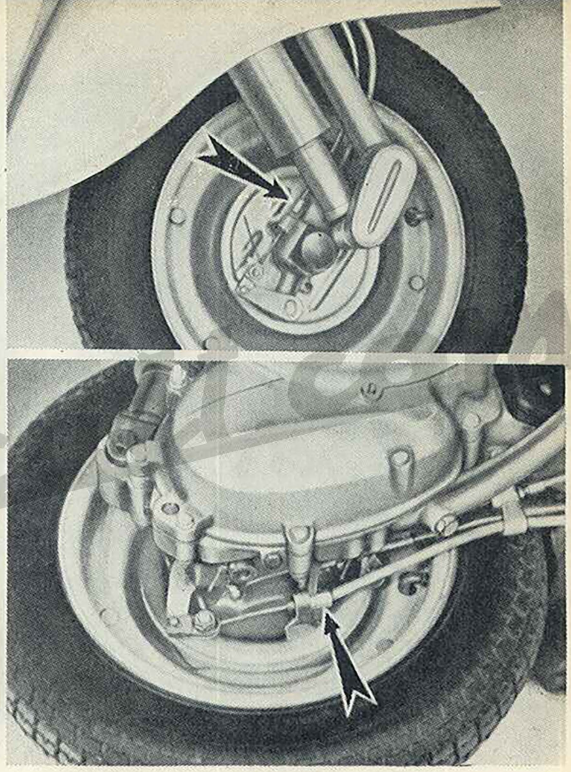


Fig. 10 - Brake adjustment

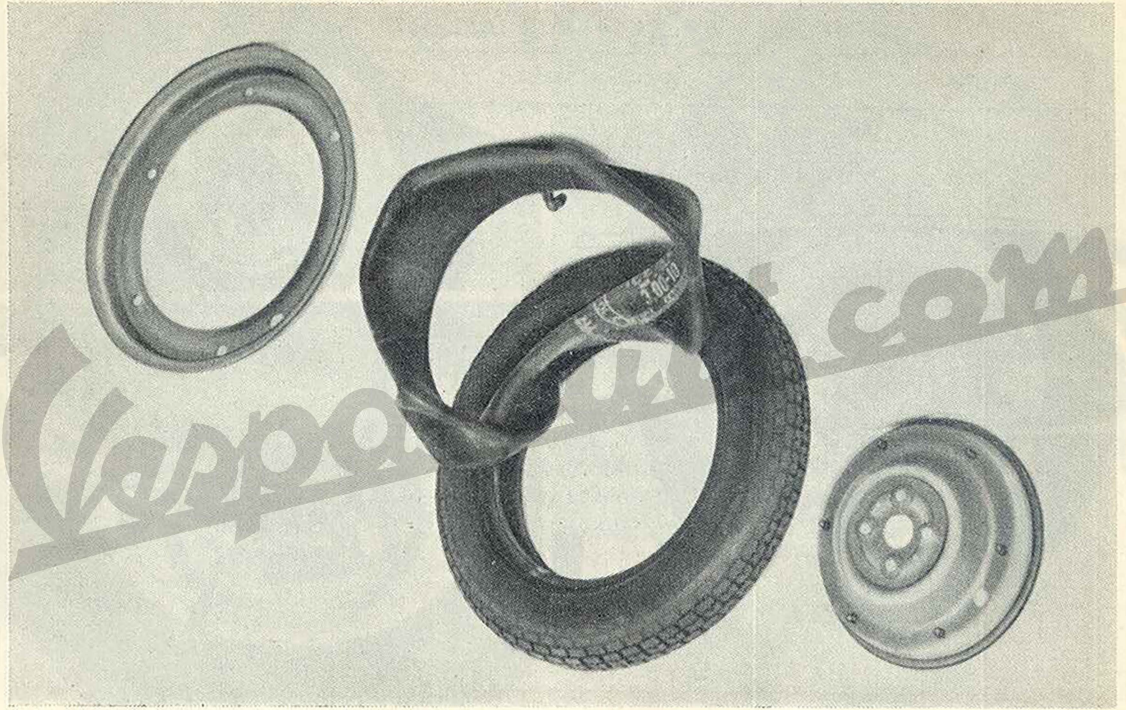
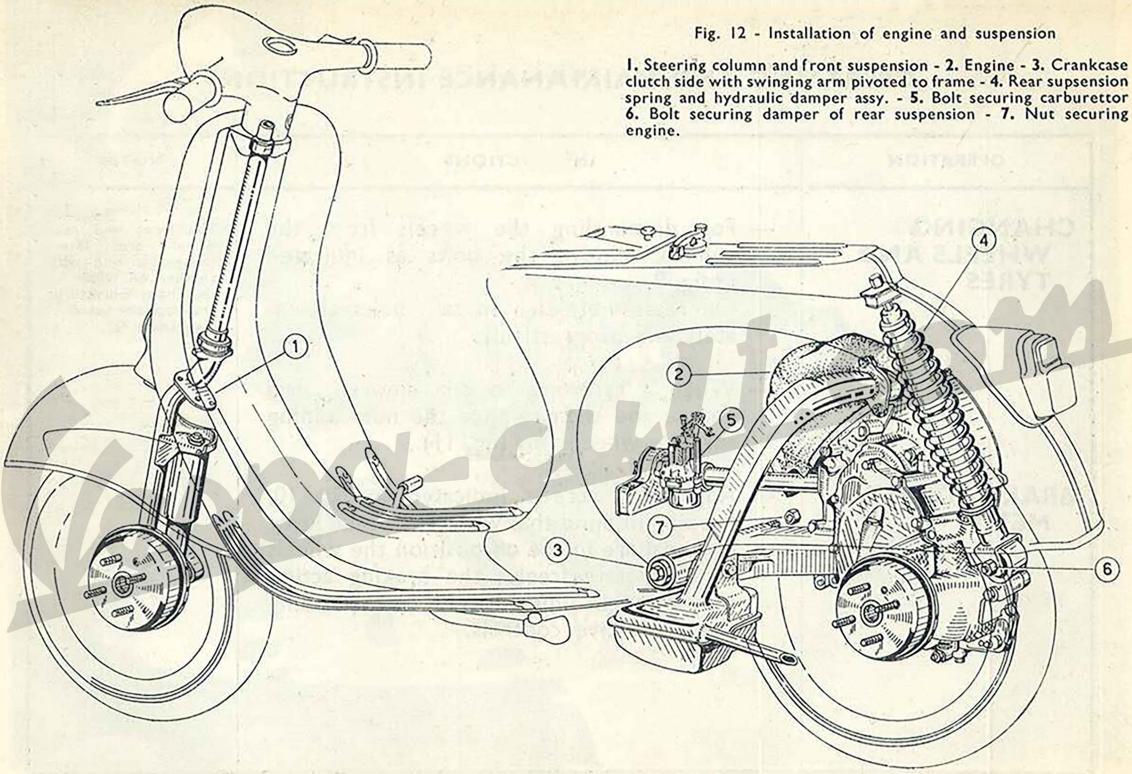



Fig. 11 - Tyre removal

| OPERATION | INSTRUCTIONS | NOTES |
|---|---|---|
| **CHANGING WHEELS AND TYRES** | — For dismantling the wheels from the vehicle remove the bolts as indicated in fig. 9. On reassembly tighten said bolts alternately and progressively.<br><br>— When a tyre has to be removed, first deflate and then remove the nuts joining the two wheel rims (fig. 11). | The front and rear wheel are interchangeable one with another on condition that the tyre pressures are regulated accordingly (page 11). |
| **BRAKE ADJUSTMENT** | — Adjust set screws indicated in fig. 10, keeping in mind that when the brake lever or pedal are in the off position the wheels should rotate freely; the braking action should begin immediately on operating the respective controls. | |

Fig. 12 - Installation of engine and suspension

**1.** Steering column and front suspension - **2.** Engine - **3.** Crankcase clutch side with swinging arm pivoted to frame - **4.** Rear supsension spring and hydraulic damper assy. - **5.** Bolt securing carburettor **6.** Bolt securing damper of rear suspension - **7.** Nut securing engine.



| OPERATION | INSTRUCTIONS | NOTES |
|---|---|---|
| **SPARKPLUG REMOVAL** | — To remove the spark-plug, rotate the knob and remove the panel; disconnect the H.T. lead and extract the spark-plug using the box wrench as indicated in fig. 13. | On reassembling the spark-plug ensure that it is screwed into the threaded hole at the correct angle. |
| **CHANGING OIL IN GEAR CASE** | — Drain off through hole (fig. 18).<br>— Introduce a small quantity of flushing oil, run the engine a few minutes to ensure thorough circulation and cleaning and drain off again.<br>— Afterwards refill gear case with new oil (up to level of the filling hole). | This operation of changing oil should be carried out with warm engine. |
| **DISMANTLING AIR FILTER** | — For dismantling the air filter (fig. 14), pivot the seat on its forward edge (fig. 5), remove the tool kit, and the control cable of the choke mechanism (the cable end ring can be seen on Fig. 14), then disconnect the | |

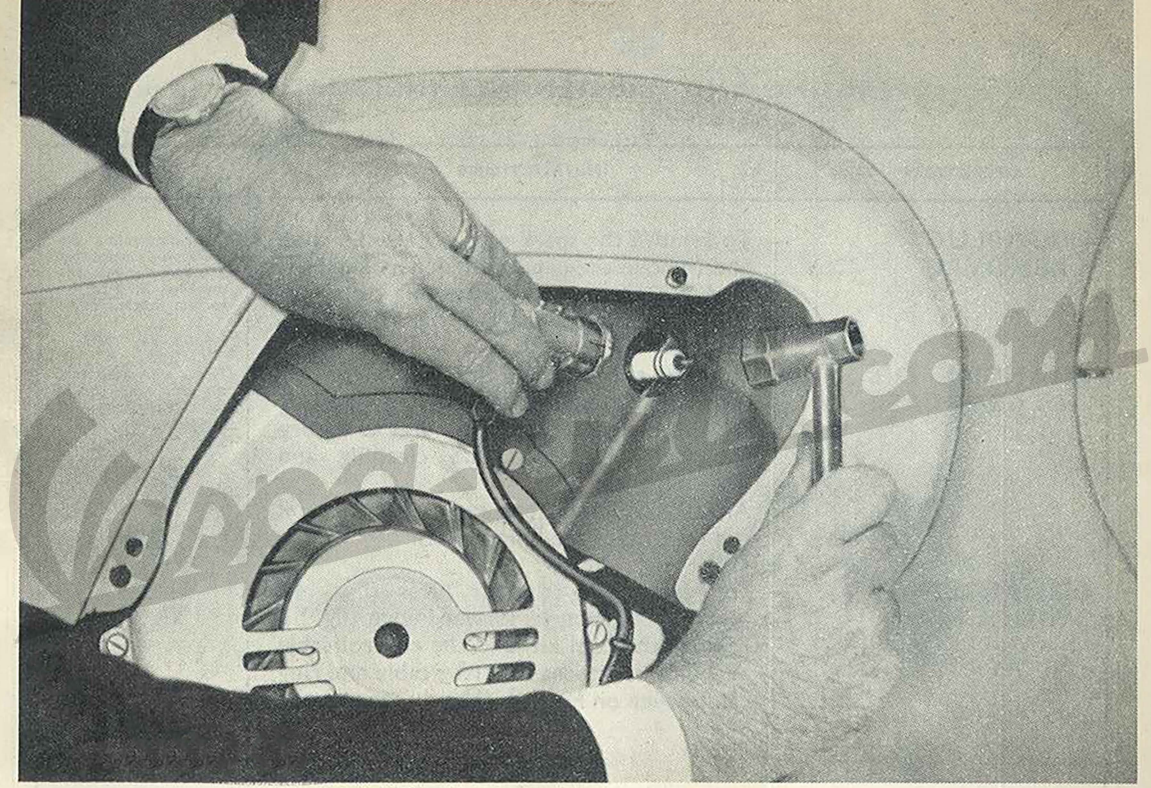




Fig. 13 Dismantling spark-plug

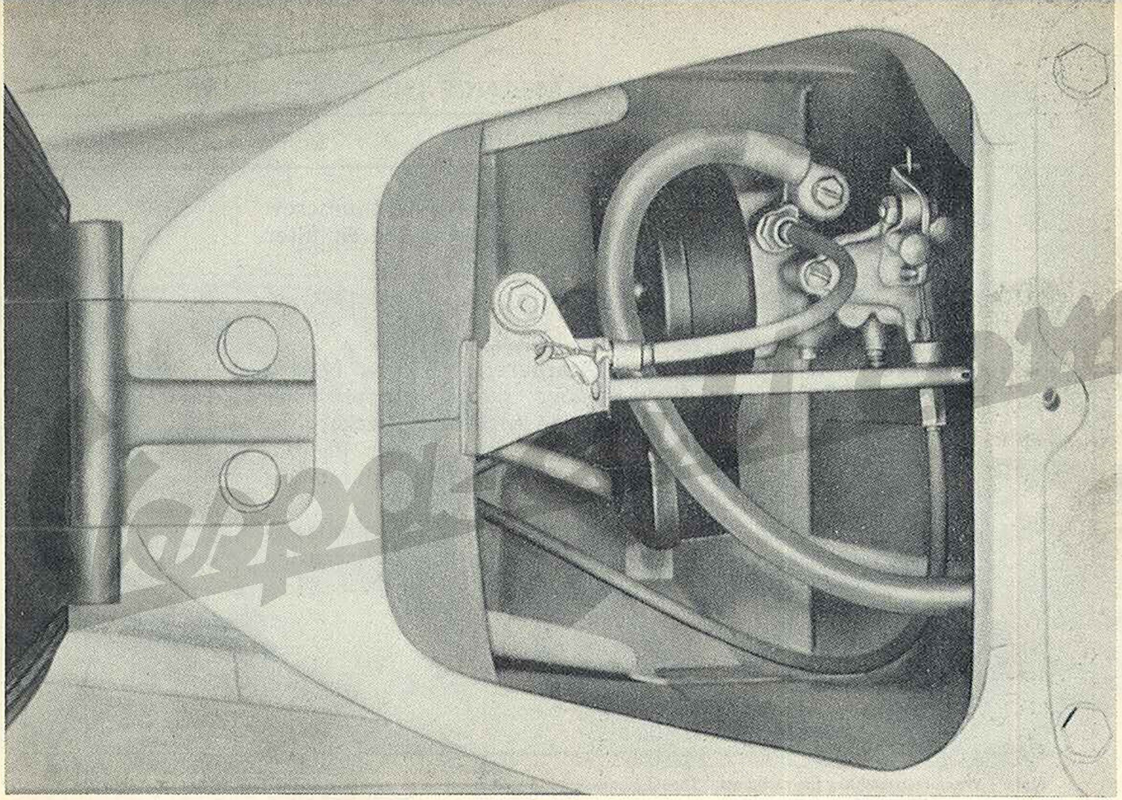


Fig. 14 - To approach the carburettor and air cleaner assy. (see instructions at page 24).

| OPERATION | INSTRUCTIONS | NOTES |
|---|---|---|
| | fuel tap rod (see Fig. 14); next unscrew the two wing nuts securing the air filter case and extract it. | |
| **DISMANTLING CYLINDER HEAD** | — Remove the carburettor (screw No. 5, fig. 12). Remove silencer, loosen bolt connecting engine to bearer bracket (fig. 12, No. 7), detach rear damper (fig. 12, No. 6) and swivel down the engine on its own bearer bracket.<br>The cylinder head can then be eased away from the unit by unscrewing the 4 securing bolts by means of a box wrench. | It is advisable when carrying out this operation to place a wooden platform underneath the rear end of the chassis foot-board, so as to obtain greater rear wheel lift than is possible by the use of the stand and, at the same time, adequate stability. |

**Note** – When re-assembling the carburettor should be mounted in such a way as to ensure that the float is located vertically.

Should difficulties of starting or running occur, check the spark plug:

— Clean the spark plug electrodes with a wire brush or emery cloth and adjust the gap (see Plug recommendations page 38). Check porcelain insulation: if cracked or broken change the plug.
Clean in neat petrol.

**It is advisable to use the types of spark plug prescribed by factory.**

**Every 4000 km (2400 miles):**
(1) - Check oil level in gear case (see lubrication chart).

(2) - De-coke the engine (see page 24) cylinder head, piston crown and cylinder ports). Ensure that residual carbon deposits do not remain inside the cylinder. Clean the exhaust pipe using a suitable scraper.

**Every 8000 Km (4800 miles):**
(1) - Change oil in gear case (see lubrication chart).

(2) - Remove the rubber plug on front suspension (No. 3 - fig. 18) and refill with grease the housing of the front wheel axle bearing and speedometer drive gear.

(3) - Remove the air filter (see page 21), clean by agitating in an oil petrol bath and if possible air blast dry.

(4) - Lubricate control cables transmissions and felt lubricating pad on flywheel.

(5) - Clean, and if necessary, set the contact breaker points (fig. 17).

In case of difficulty consult your Dealer.

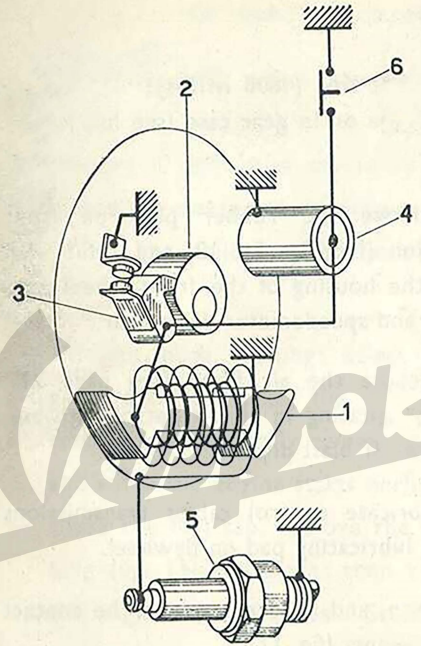



Fig. 16 - Ignition circuit

1. Flywheel coil - 2. Flywheel cam - 3. Contact breaker - 4. Condenser - 5. Sparking plug - 6. Engine cut-out switch.

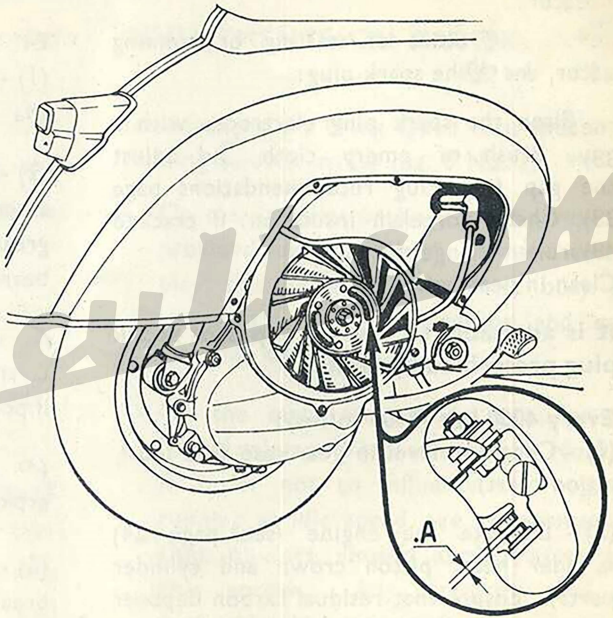



Fig. 17 - Setting contact breaker points.

A - (Point gap) = (0.011″ to 0.019″).

## LAYING UP

We recommend that the following operations be carried out:

(1) - Clean down the vehicle.

(2) - With the engine stationary, piston at the bottom dead centre position, **remove the spark plug.** Next, introduce through the plug hole 10 to 15 cc. of 30 SAE Oil. After said operation depress the kickstarter three or four times.

(3) - Drain off all fuel contained in the fuel tank; then grease over all unpainted metallic parts; next raise the wheels off the ground by placing wooden chocks under the footboard.

## CLEANING THE MACHINE

For cleaning the exposed surface of the engine use paraffin, a brush and clean rags. The painted surfaces of the machine should be sponged down with water and dried off with a chamois leather. Do not use paraffin for washing down painted surfaces.

# LUBRICATION CHART

| *Part to be lubricated* | | *Lubrication* | | | | |
|---|---|---|---|---|---|---|
| *Every 2,500* | *Every 5,000* | **Shell* | **B.P.* | *Esso* | *Wakefield* | *Mobil* |
| Gear-box topping-up | Gearbox change oil | Shell 2T Two-Stroke Oil or Shell X–100 30 | Energol Two-Stroke Oil or Energol SAE 30 | Esso Extra Motor Oil 20W/30 | Castrol XL | Mobiloil A |
| Front suspension<br>Felt pad on flywheel cam<br>Joints on brake control<br>Speedo flexible drive | Control cables<br>Gear-change quadrant | Retinax A | Energrease L.2. | Esso Multi-purpose Grease H | Castrolease L.M. | Mobilgrease M.P. |
| Engine at each re-fuelling | | Shell 2T Two-Stroke Oil in ratio of 2% or ¼ pint to 1½ galls. petrol | Energol Two-Stroke Oil in ratio of 2% or ¼ pint to 1½ galls. petrol | Essolube 30 in ratio of 2% or ¼ pint to 1½ galls. petrol. Esso Two-Stroke Motor Oil in ratio of ¼ pint to 1 gall. petrol | Castrol XL in ratio of 2% or ¼ pint to 1½ galls petrol. Castrol Two-Stroke Oil in ratio of ¼ pint to 1 gall. petrol | Mobiloil A in ratio of 2% or ¼ pint to 1½ galls. petrol or Mobil-Mix in ratio of ¼ pint to 1 gall. petrol |

*Marketed also by National Benzole Co. Ltd., by arrangement with Shell-Mex & B.P. Ltd.

After first 600 miles change **Gearbox** Oil.

## APPROVED PETROL/OIL MIXTURE

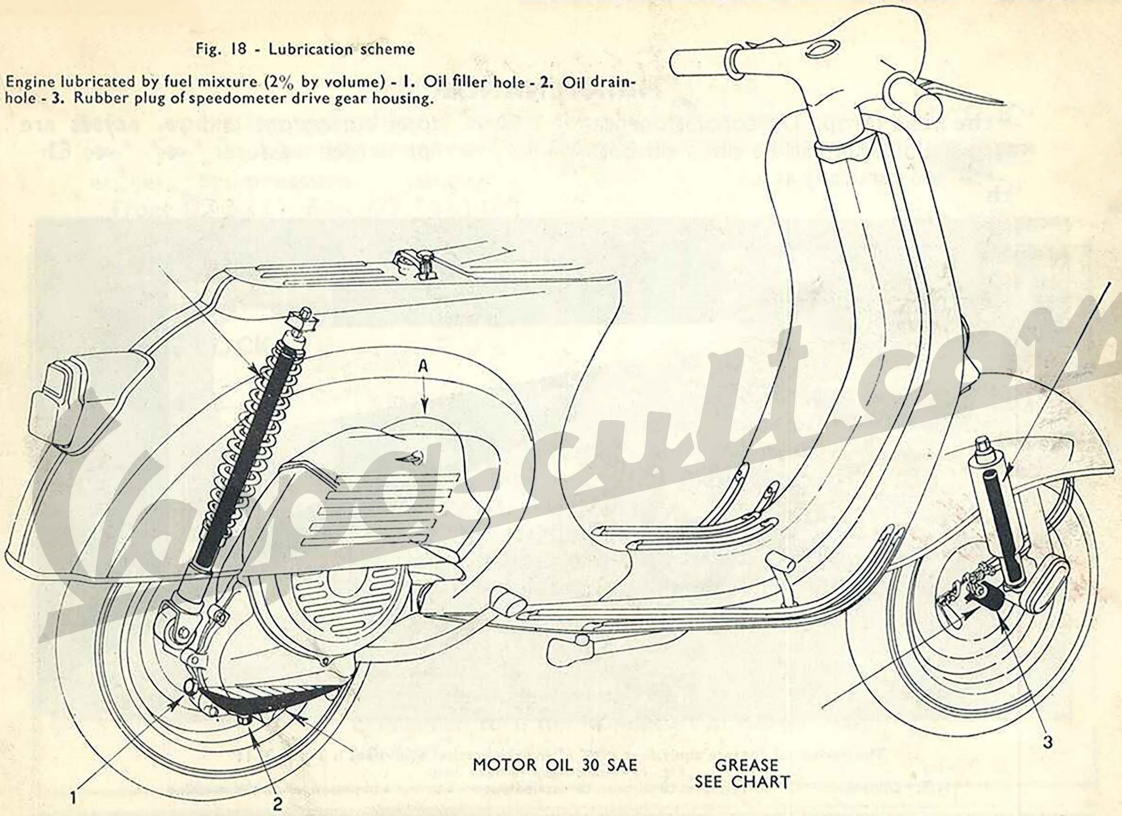
| *Make* | *Description* |
|---|---|
| Shell | 2T Two-Stroke Mixture |
| B.P. | B.P.-Zoom |
| National Benzole Co. Ltd. | Hi-Fli |

To be used with equal parts of neat petrol.

| | |
|---|---|
| Hydraulic Dampers | When not working efficiently, consult your Dealer. If servicing is required, they should always be returned to the Works. |

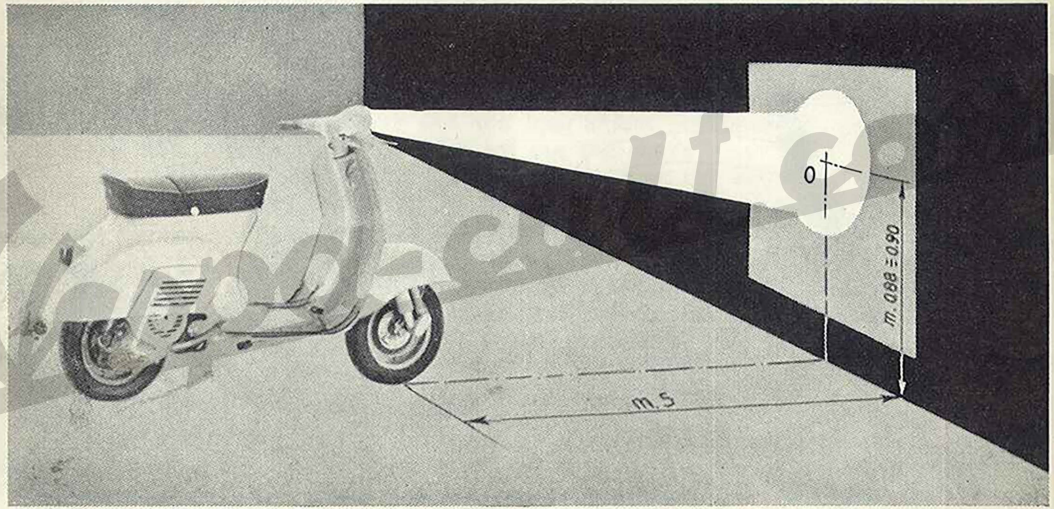
Fig. 18 - Lubrication scheme

**A:** Engine lubricated by fuel mixture (2% by volume) - **1.** Oil filler hole - **2.** Oil draining hole - **3.** Rubber plug of speedometer drive gear housing.



**Setting the head lamp.** The correct orientation of the main beam can be obtained both horizontally and vertically as follows.

Check that both front and rear tyres are inflated to correct pressures. See Chart, page 11.




The horizontal distance equivalent is 16' 6" and the vertical equivalent is 2' 10"–2' 11"
Fig. 19 - Adjustment of head lamp
N.B. - Dimension " O" corresponds to adjustment carried out with driver and passenger on the machine.

Place the scooter on a level floor in front of a white wall as seen in Fig. 19. Start the engine, hold the throttle control twistgrip at about 1/3 and set the switch on " main beam."

With two persons on the Vespa, slacken the set screw securing the head lamp, then move the latter as required in order that the beam axis coincides with point "O" on the wall.

Tighten the screw firmly.

This operation can be carried out also with the driver only sitting on the seat.

In this case, of course, the beam alignment should be altered whenever the scooter is being ridden by both driver and passenger.

# FAULT FINDING

**If the machine does not run properly, inspect and rectify as explained below. If the suggested remedies are not sufficient to eliminate the trouble, the customer should not try to carry out operations but approach an authorised Vespa Dealer, who has the necessary facilities to undertake this work.**

| Fault finding | Remedies |
|---|---|
| **HARD STARTING** | |
| **1. - Fuel system - Carburation - Ignition** | |
| Lack of fuel. | Turn to Reserve and refill as soon as possible. |
| Filter, jets, fuel tap, carburettor body clogged or dirty. | Remove, wash in petrol and blow dry. |
| Engine flooding. Air cleaner choked or dirty. | See page 16. |
| Sparking plug dirty - Porcelain of sparking plug cracked. | Disconnect the plug lead. Check if sparking occurs between lead and crankcase when the kickstarter is operated. |
| Breaker points dirty, worn or pitted; gap between breaker points incorrect. | Consult your Dealer. |
| **VARIOUS RUNNING DEFECTS** | |
| **1. - Lack of power** | |
| Silencer choked. | Clean (see page 25). |
| Cylinder head joint or sparkplug loose. | Position head correctly and tighten nuts uniformly; tighten spark plug with plug spanner. |
| **2. - Silencer or carburettor.** | |
| Back-firing. | Check the sparking plug, clean, change or set the electrode gap (see page 38). |

| Fault finding | Remedies |
|---|---|
| **3. - High fuel consumption** | |
| (a) Air filter choked or dirty or choke control set in closed or partially closed position.<br>(b) Other causes (carburettor, lack in compression etc). | Wash in pure petrol, air blast dry.<br>Free off choke control and lubricate.<br>Consult your Dealer. |
| **4. - Noisy engine - Defective clutch - Gear pinions disengage of own accord - Kickstarter assy. not meshing - Defective operation of controls and steering - Defective suspension - Defective braking.** | Consult you Dealer. |
| **5. - Defective electrical equipment.** | |
| Wire terminals disconnected or incorrectly connected.<br>Headlight beam incorrectly set. | Carefully check and connect.<br>Adjust (see page 30). |

## GENERAL SPECIFICATION

**Installation of engine** (see fig. 12): The engine is pivoted to the chassis of the vehicle through the crankcase swinging arm (clutch side). The rear wheel is fitted on the outer side of the main shaft.

**Lubrication** of engine (piston, cylinder, crankshaft, main bearing - flywheel side) is effected by the oil in the fuel mixture.
The clutch, the main bearing - clutch side, and gear box function in an oil bath.

**Fuel supply** (see fig. 8): gravity feed with mixture of oil and petrol. Carburettor provided with a throttle slide.
Three way tap ("closed", "open", "reserve").

**Clutch** (see fig. 3): multiplate on the layshaft. The unit is operated by lever located on L.H. handlebars and adjustable cable.

**Gear box** (see fig. 7): three speed drive with constant mesh gears. Operated by the twist grip on L.H. handlebar which functions in conjunction with the **clutch** control lever.

Transmission ratio engine to driving wheel:

| | |
|---|---|
| Bottom gear | 1 : 17.18 |
| 2nd gear | 1 : 9.66 |
| 3rd gear | 1 : 6.12 |

**Starting** (see fig. 6): by means of a kick-starter on the R.H. side of the vehicle.

**Cooling:** at all speeds by means of a centrifugal fan.

**Air intake:** situated inside the frame.

**Exhaust silencer:** combined expansion and absorption type.

**Chassis** (see fig. 1): of pressed sheet steel with streamlined monocoque type structure.

**Handlebars:** Light alloy casting incorporating **speedometer.** All transmission cables and various controls are enclosed.

**Steering column, suspension:** On the lower end of the steering column is pivoted the front wheel swinging hub: front and rear suspensions with helical spring and hydraulic damper.

**Wheels:** Interchangeable and made up of 10″ dia. pressed steel flanges, fitted with 3.00 - 10″ tyres.

**Brakes:** cable operated expanding type. Front brake is operated by hand-lever (R.H. handlebars); the rear brake is pedal operated on R.H. footboard.

**Parking stand:** a two legged stand with a central return spring.

**Steering lock:** the locking device operates by mean of a sliding bar engaging in the steering column.

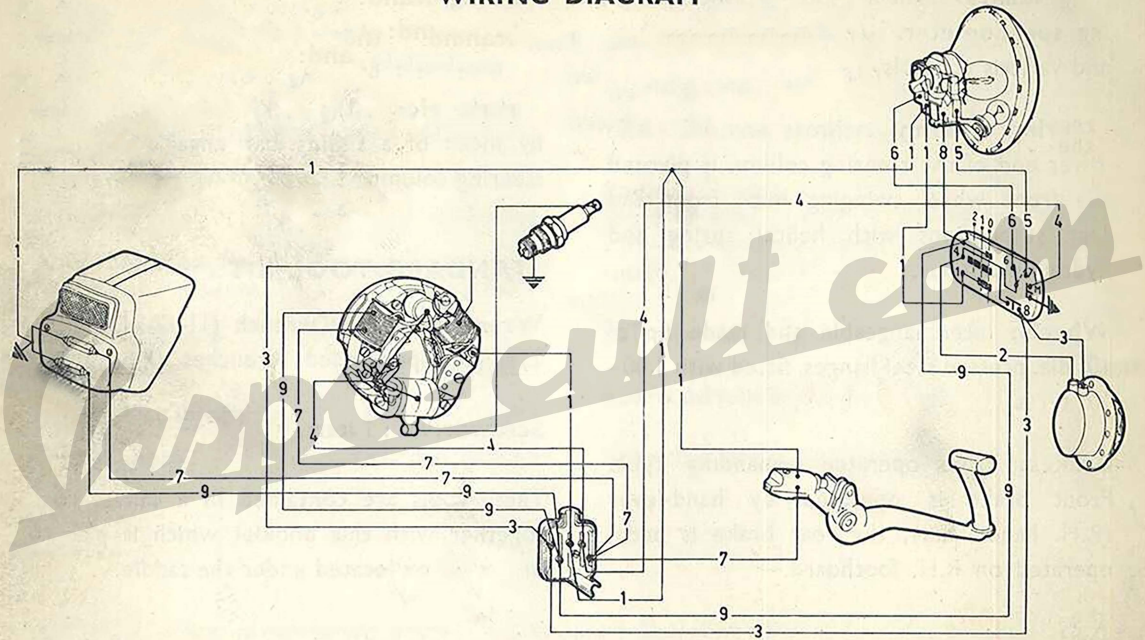
## STANDARD TOOL KIT

**Wrenches:** 1 box wrench (11-17-21 mm.); 2 single open-ended wrenches (7-8 mm.).

**Screwdriver:** 1 item.

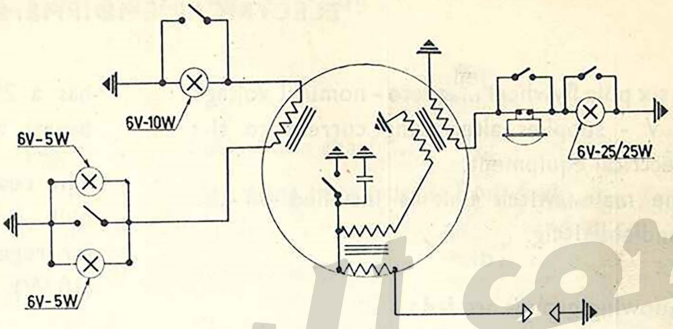
These tools are contained in a canvas roll together with this booklet which is placed in a tool box located under the saddle.

# WIRING DIAGRAM



**1.** Black - **2.** White - **3.** Green - **4.** Red - **5.** Violet - **6.** Brown
**7.** Blue - **8.** Pink - **9.** Yellow.

Fig. 19 - Installation of electrical equipment - see page 36 and electrical connections - see Fig. at the present page.



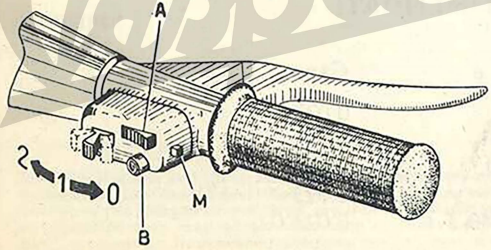




Fig. 20 - Light and dip switch

**0 - 1 - 2:** Switching lever positions. - **0.** Lights off; - **1.** Pilot light and tail lamp on; - **2.** Head light, front parking light and tail lamp on · **A:** Main and dipped beam switch - **B:** Horn button - **M:** Engine cut-out.

## ELECTRICAL EQUIPMENT

A six pole flywheel magneto - nominal voltage 6 V - supplies alternating current to the electrical equipment.
The main switch unit is installed on the handlebars (fig. 20).

Following groups are fed:

— **The headlamp,** dia. 105 mm. (4.15") has a 25/25 W bulb (main and dipped beam) and a 5 W (Pilot light bulb).

— **The rear lamp** is provided with a 5 W bulb (red pilot light and white light for registration plate) and a Stop light (10 W).

— **Horn.**



## SPARK PLUG RECOMMENDATIONS

| Make | Type | Gap |
|---|---|---|
| KLG | F80 | 0.023 |
| A.C. | M42F | 0.022 |
| LODGE | 2HN | 0.023 |
| CHAMPION | L.81 | 0.023 |
| BOSCH | W.240 T.1. | 0.023 |

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