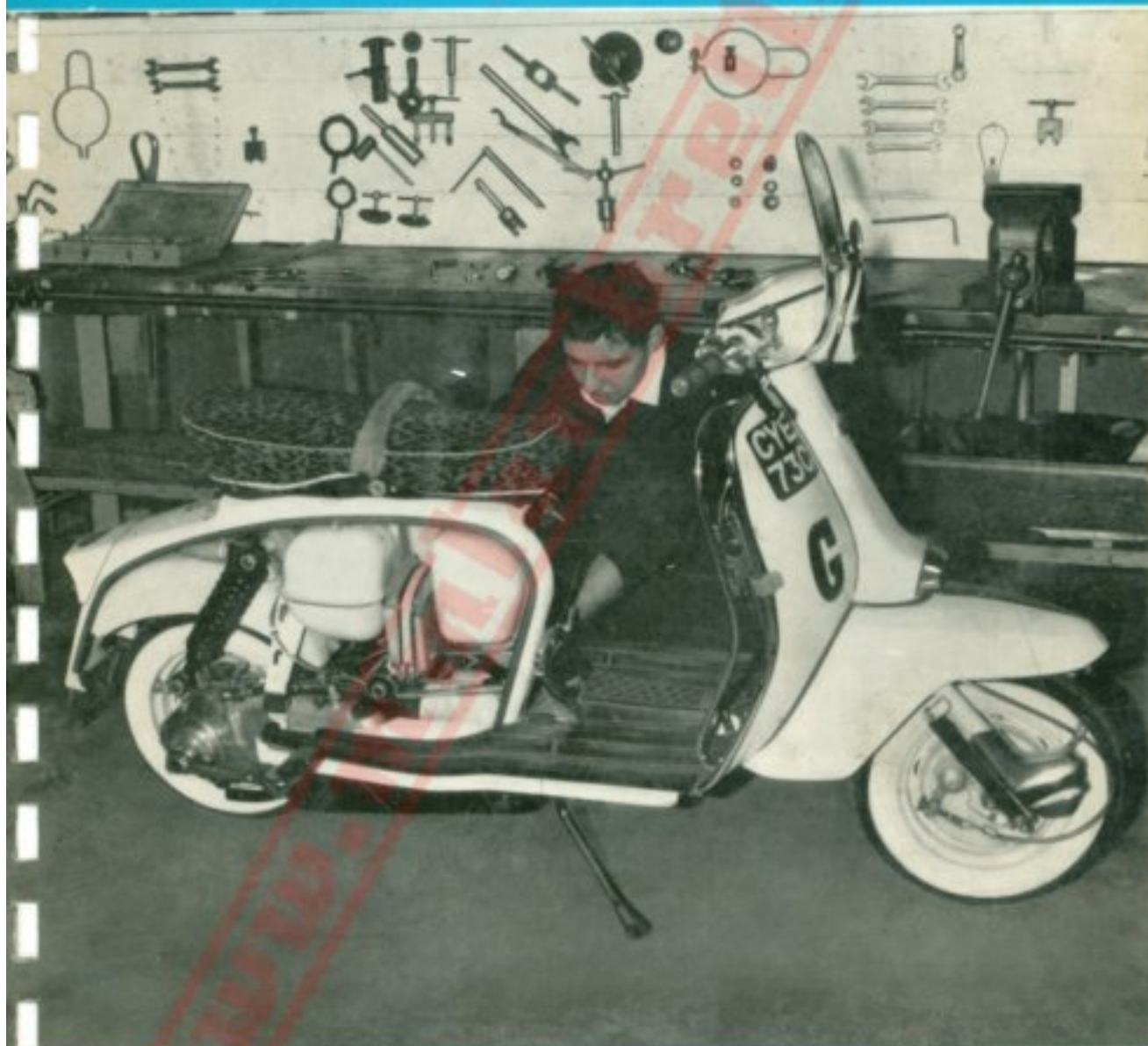


The official  
**Lambretta**  
home workshop  
manual



A simple guide to do-it-yourself maintenance  
on all Lambretta motor scooters

**Lambretta**

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# the official Lambretta home workshop manual

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written by  
**G. Beresford**

compiled by  
**R. C. White**

FIFTH EDITION

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1961-2	TV175, LI (Mk II) and Rally Master		3-EVIIS
1962-6	Slim Style 125cc, 150cc, 175cc and 200cc		3-EVII
1962-3	Commercial 175LI		6-FAM7L

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# Introduction

This book is intended primarily, for the Lambretta owner who wishes to do his own maintenance. While it is realised that there are many within the Lambretta riders ranks who are keen technicians and able mechanics, the majority are drawn from those who wish to own means of personal transport and to know how to keep it on the road, but have little or no technical knowledge.

It is, of course, necessary with all mechanical devices to pay certain routine attentions to them, to make simple adjustments in order to counteract inevitable wear and, perhaps, be able to replace broken or worn parts which may be required as a result of accident, neglect, or sheer long life.

In the following pages, an attempt has been made to describe in simple language how to deal with every job of maintenance likely to be required by any Lambretta during the course of its life. It should be understood that much of the maintenance work detailed hereafter may never have to be undertaken so the uninitiated need not be overawed when faced with a book of this magnitude or think he or she is going to be called upon at some time or another to perform all the tasks described.

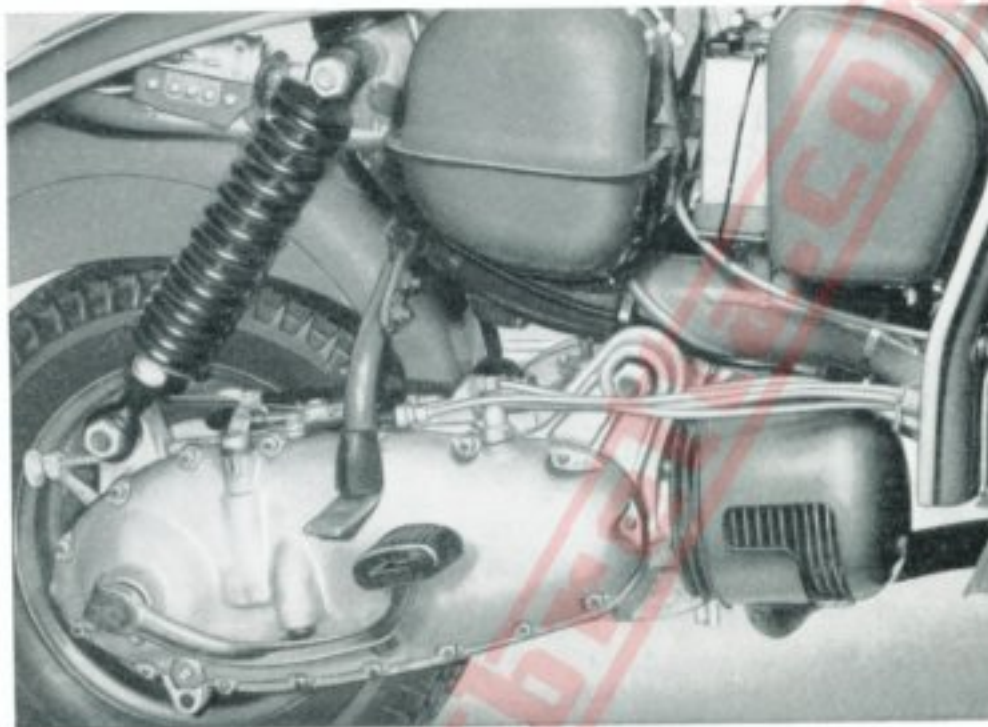
Bear in mind that neglect is, probably, the chief enemy of anything mechanical; the longer you defer a job you know should be done, the worse it will be and by putting it off you will only involve yourself in needless trouble, expense and, by no means unlikely, danger to life and limb.

Try to be a good rider; good machine handling on the road is the first act of maintenance. Flashy acceleration, violent braking, lurid cornering impress few favourably—and never policemen—but they impose stresses under which, sooner or later, the best of machines will lose their efficiency or, perhaps, will break down completely. Too much emphasis cannot be placed on the proper lubrication of all parts. Pay attention to the word "proper" and don't skimp or overdo your oiling.

# Lambretta

# Maintenance

## LI SERIES I AND II, TV SERIES II



The engine and transmission unit of the TV Series 2 and the Li

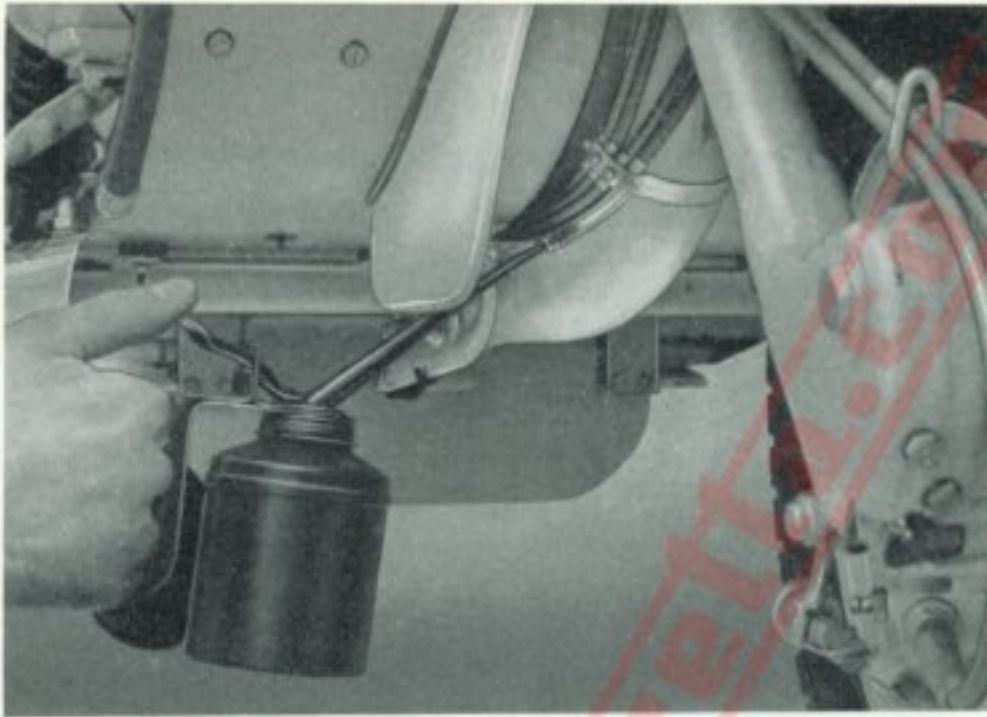
Make sure the engine receives proper lubrication with every gallon of fuel. Commercial grade petrol is quite satisfactory, but choose an oil by one of the five leading companies intended for two-stroke engines and see that the fuel tank receives it. There is no advantage in using a greater proportion of oil in the petrol than 4% or 1 : 25, nor in resorting to any special additives; some could be harmful. Petroil obtained ready mixed from a dispenser at a fixed ratio of 1 : 20 is satisfactory, otherwise half a pint of oil may be mixed with one and a half gallons of petrol. The fuel tank has sufficient capacity for this when the reserve level is reached.

Monthly, reset the sparking plug gap. The Champion N5 is recommended, although this is now replaced by the N4. Where it is found that the porcelain insulator exposed in the combustion chamber becomes blackened, the hotter running N8 should be selected. Alternatively, in competition use, the colder running N3 may be necessary to avoid overheating.

Take care in removing and refitting the sparking plug because the insulator is easily broken, avoid exerting any side force which would cause the plug spanner to tilt.

Oiling the control cables is accomplished by means of a force feed oilcan with a short piece of plastic tubing attached as illustrated. The cable lubricators for the clutch, throttle and gears are grouped around the main frame up inside the front mudguard. The choke control has no lubricator but requires a few drops of oil at the operating knob.





Applying an oilcan to the cable lubricators using a short piece of plastic pipe

Tyre pressures are seldom too high in practice but often unnecessarily low.

Generally, pressures of 18 lb./sq. in. front and 28 lb./sq. in. rear will be suitable in Britain. These will cater for an occasional pillion passenger, but when one is continually carried, together with luggage, the rear tyre should be increased to 34 or 36 lb./sq. in. The same will do for both Li and TV, possibly increasing by 2 lb./sq. in. for the latter if driven at high speed. Never exceed the maximum recommended inflation pressure and take particular care when using a high pressure air line.

Gearbox oil should be drained away and replaced with new oil every 3,000 miles.

The thick 90 grade oil is used for the gearbox; be sure to obtain an ordinary motor oil and not the E.P. variety. One and a quarter pints fills the system to the level plug and this is the only requirement for proper lubrication of the whole transmission. The rate of loss should be less than  $\frac{1}{4}$  pint in 500 miles. Where this is exceeded, it may be that the oilseal between the crankcase and gearbox is unduly worn. It will lead to smoking of the exhaust and heavy carbon deposit in the cylinder.

Grease the nipples for the front suspension pivot bearings on the front fork boxes and also those beneath each suspension link for the spring guide cups with one or two strokes of a grease gun every 1,500 or 3,000 miles, using soft grease such as Castrolase C.L. or equivalent. Most recent machines have self-lubricating bushes for the suspension pivot bearings and for these no attention is needed. Also use soft grease for the rear brake pedal spindle and the brake cam spindles. The greaser on the front brake backplate is located at the fulcrum of the brake lever arm but it is not present on early models. The rear one is on the back of the engine unit casting and below the suspension mounting point. With both of these, be very sparing with the application of grease; better still



remove the hubs and brake shoes so that the cam and shoe pivots may also be smeared with grease and any excess wiped away before it can reach the linings on the shoes and reduce the brake efficiency. This is essential on a new machine where it is possible for a greasing point to be missed on initial assembly in spite of careful inspection.

When the front brake is dismantled, grease the wheel bearings with high melting point grease, Castrolase WB or its equivalent, applied through the nipple on the hub centre. Wipe away any excess which has come through the oilseal and press the oilseal back if it is dislodged by the grease gun pressure. Lubricate the speedometer drive gears sparingly with soft grease, the latest nylon type require hardly any attention. Also apply grease to the nipple on the brake backplate for the worm gear spindle bearing, but do not overdo this and grease the cable to the instrument by wiping it clean and applying the merest smear without any excess. To remove the cable it is necessary to take off the handlebar cover.

The main bearing on the generator side of the crankshaft is packed with soft grease on all Series II Li models and on the TV Series II after engine 109375. Previous to this, the bearing relied upon petrol/oil lubrication which is quite satisfactory provided that the recommendations are followed.

This bearing does not require attention except on assembly and neither do the steering bearings which are also packed with bearing grease.

Cable control levers and twistgrips are greased on assembly as are the stand pivots and the side panel catches. The panel catches in particular will benefit from periodic attention from the oil can. Note that the steering safety lock and the glove box lock will benefit by a few drops of oil introduced into the keyholes occasionally.

A little oil is also needed on the felt pad which rubs on the cam in the centre of the flywheel and prevents the contact point heel from wearing. To get at this, the fan cover and flywheel dust cover must be removed, but attention will only be needed when new and at 3,000 to 5,000 mile intervals, it may be given when the contact points are adjusted.

The Exide 3-EC7 is the standard battery fitted and attention is similar to that for any battery of the lead-acid type having normal level of electrolyte. Top up to, but not above, the level indicated, with distilled water. Do this not less often than monthly and arrange to have the battery recharged independently, if necessary, at a rate of not over one half an amp. Never let it stand in a discharged state; contact the local Exide Service Agent if a query arises.

Should overcharging of the battery take place more frequent topping up may be required, but never overfill. Ensure that the positive terminal cannot touch the toolbox, even allowing for movement which inevitably occurs.

Regularly check the tightness of all nuts and bolts. Those sometimes affected are silencer nuts, saddle and rear number plate bolts, and the four nuts and bolts holding the handlebar casting to its clamp around the fork stem. The steering bearings themselves will usually need one adjustment after bedding down, and wheel and hub nuts should be checked for tightness. It should go without saying that small nuts do not need to be tightened with as much force as large nuts and discretion must be exercised particularly with regard to the silencer fixing nuts. On the other hand, the centre hub nut of the rear wheel can only be tightened

satisfactorily with a long ring spanner or torque wrench. If the spanner in the toolkit is used, be sure to hammer it home very securely.

Where a torque wrench is available, the setting for the rear hub nut should 120 lb.ft. except on early Li models having a 20° taper angle of the cone which forms the joint with the axle. These should have the nut tightened to 150 lb.ft.

Wheel rim nuts can be tightened sufficiently with the 14 mm. socket end of the standard plug spanner, but a 6-in. bar should be added to give more leverage.

The wheels should be changed, front to rear, at every service in order to keep tyre wear even. Moving the wheel to a different position on the same hub is enough to counteract irregularities caused by ovality of brake drum.

In the event of a puncture, do not make a repair with an ordinary cycle patch, except as a temporary measure. A vulcanised patch, on the other hand can be quite permanent.

To remove the inner tube, after taking the wheel from the machine and unscrewing the valve to ensure no pressure remains, take off the remaining nuts from the rim securing studs. Put the wheel flat on the ground, part the rims slightly and hold them separated by interposing a small block of wood between them. Place the feet and hands as shown, pulling on the upper rim to release it from the tyre. Considerable force may be needed, but do not use tyre levers which would only damage the tyre and rims.



Hold the wheel rims apart with a wooden wedge then pull the upper rim free

When refitting the front wheel, it is of overriding importance to locate the recess in the brake backplate over the projection on the offside suspension link. This holds the entire assembly from rotating when the brake is applied.



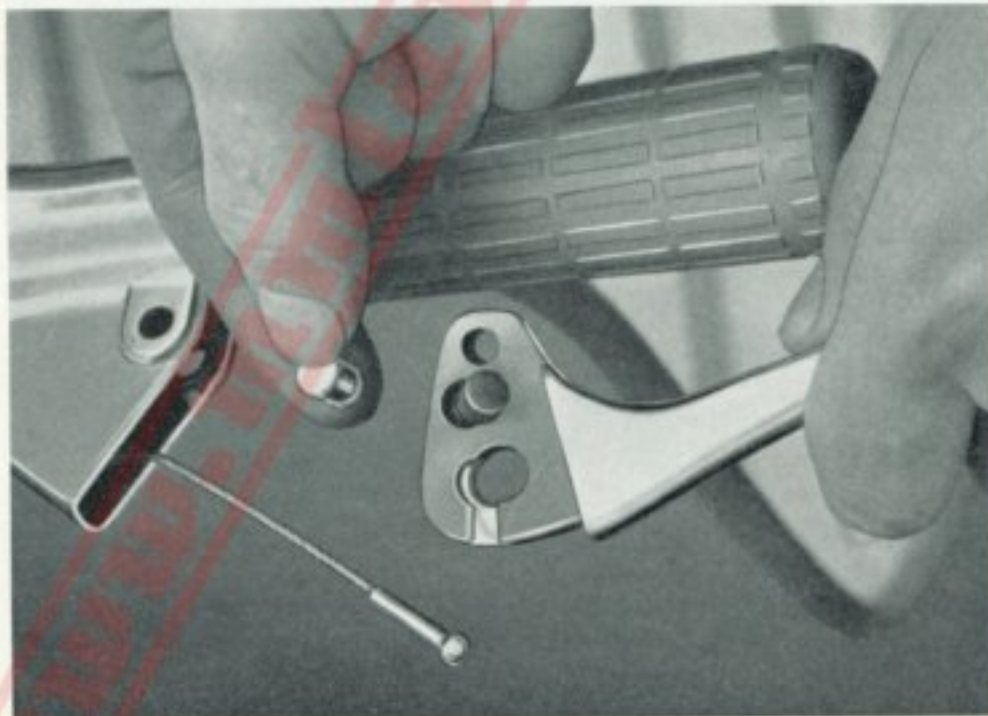
## Control Cables

All cables have threaded adjusters at the ends further from the handle bar controls, apart from the throttle cable. The throttle and gear change cables should have no free play but neither must they be in tension until the twistgrip is turned. Clutch and brake cables should have sufficient slack movement to ensure no slipping of the clutch and no rubbing of the brake. This particularly applies to the rear brake which should have enough free travel to allow for expansion of the supporting casting as it warms up.

If repeated breakage is experienced then generally the end connections are at fault, and an easing of the trunnion hole in the lever to give freer movement may remedy the fault in clutch and brake cables. Insufficient depth of the slot in the lever causing chafing of the wire can also be rectified by filing.

A later type of trunnion, part 19022016, is cut across its axis to accommodate the cable end and this is to be preferred to that with the cut along the axis. On more recent models the inner wires of the clutch and front brake cables are thicker and have a longer soldered nipple. They are parts 19022040 and 19065070 respectively and require a wider slot in the trunnion and handlever. The latter only changes part number, becoming 19062024.

To change a front brake or clutch inner wire, disconnect the end of the cable further from the handlever, using the 8 mm. spanner for the brake or the 3½ mm. allen key and a 9 mm. spanner for the detachable nipple of the clutch. Pliers, if possessed, will also suit this purpose. Undo the handlever pivot with the screwdriver and pliers. Pull the lever away, bringing with it the inner wire.



Take care not to lose the trunnion and spring loaded pad in the handlever

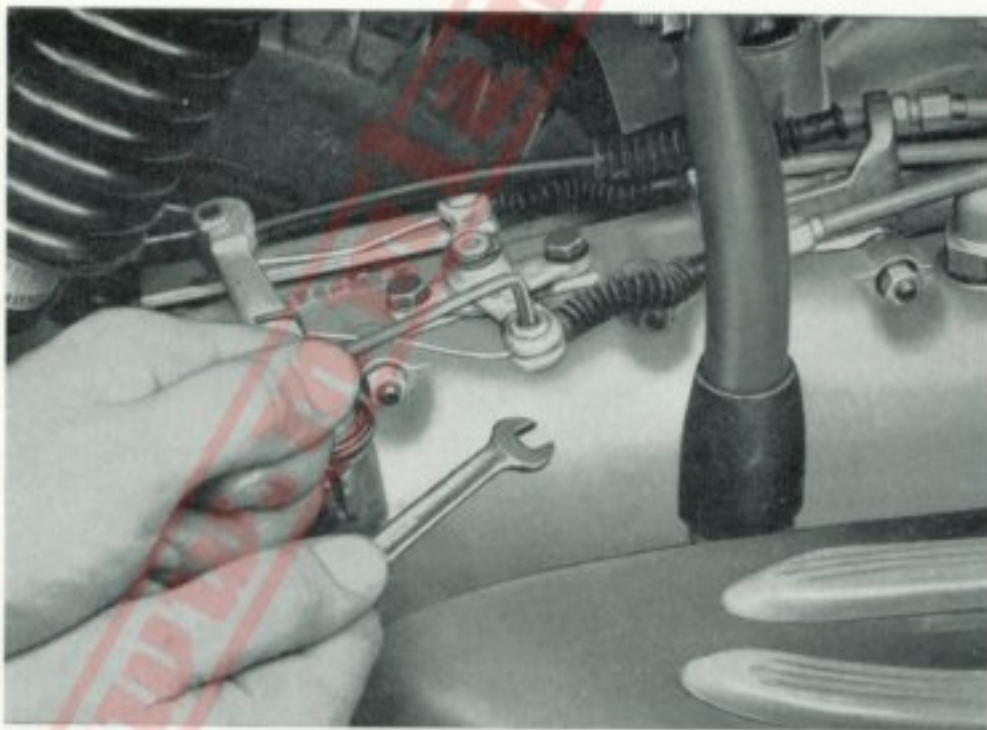
On most types there will be found, or lost, a little spring-loaded plastic button set in the handlebar near to the cable end location. Unless care is taken, it will spring out as the lever is lifted away from the support.

The new inner wire is entered from the lever end and pushed steadily through. Seldom is the outer cable disturbed and unless it is, the handlebar cover need not be removed. Clamp the other end of the wire in a position to allow adjustment of the control to be made. With the clutch, do not overtighten the grub screw or the wire may be damaged.

A modification recommended for the route of the front brake cable if it is to be disturbed and after taking off the handlebar cover, is to withdraw it from inside the steering stem and pass it down between the frame tube and the front casting where the other cables run. This affects early Li Series I, others being already so routed.

Remove the handlebar cover to replace a complete clutch, throttle, or front brake cable and to renew the inner wires of the gear change. It is held by two screws beneath the handlebar and with the Series II the headlamp, held by three screws and washers in slots around the rim, must also be taken off. Afterwards, lift the cover, complete with speedometer, at the same time easing the speedometer cable into the fork stem from the lower end beneath the mudguard to give the necessary slack. Disconnect the speedometer cable and the light and the handlebar cover must be lifted away.

There are two gear cables, one on either side of the pulley. The nipples must be set so that there is no free play in the cables or the twistgrip, but also the twistgrip position must correspond with the gear engaged. Thus, if it is found that the twistgrip indicator shows 2, when third is engaged, then move the nipples at the gearbox end so as to give slack in the cable nearer to the pillion footrest and reduce it at the other.

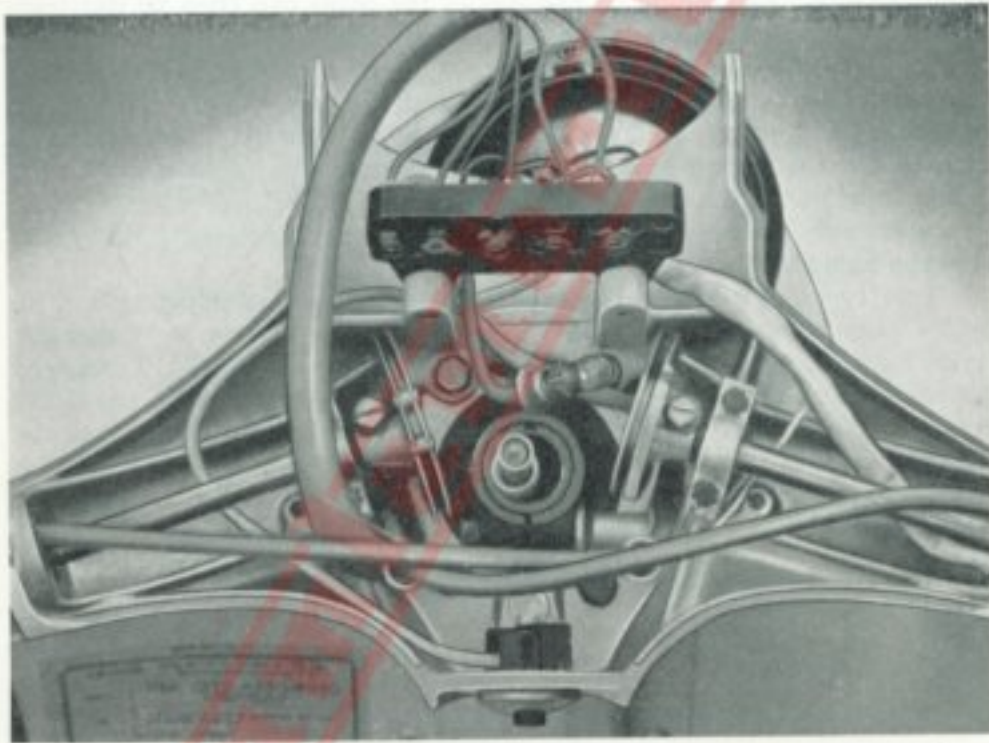


The 3½ mm. allen key from the tool kit fits the gear change cables nipples



Notice that if the twistgrip moves too high on the handlebar, or too low, in first or top gears respectively, then it may slip out of that gear. Slipping from second or third will not be caused by this but can happen if the cables are adjusted too tightly or not lubricated, so making the mechanism stiff.

End float of the twistgrips is controlled by spacing washers between the cable pulleys and the adjacent spherical bearings. The pinchbolt holding each pulley may be withdrawn and the grip and the control rod be pulled out of the handlebar, provided that the clutch cable is disconnected from the handlebar where the gear change side is concerned. The rod need not normally be removed, but the unit can be slid back far enough for the splines of the rod to disengage from the pulley and permit spacing washers to be added. With the throttle twistgrip, there is a dished spring washer between the grip and the handlebar support and the spacing washers behind the pulley enable this to be loaded to the extent of providing friction at the twistgrip and so prevent self-closing of the throttle.



The gearchange and throttle cable pulleys within the handlebar

Although the throttle cable can only be obtained complete, the inner may be removed and fitted in emergency by attaching it to the lever on the carburetter with a detachable nipple, part 15022030, of the type used with the clutch and gear change. Unsolder the original nipple from the cable by holding a lighted match beneath it. To give sufficient free length of the inner wire, cut a very small amount from the outer, but be careful not to shorten it so much that the suspension movements of the engine cause the throttle to open. The cable adjuster on the carburetter top should be set afterwards to give a very small amount of free play in the cable when the twistgrip is shut and then the spring-loaded throttle stop screwed in to give an even idling speed.

Where a complete cable of any type is to be changed it will be expedient to remove the front casting together with the mudguard. This is not difficult, but it involves undoing the four countersunk screws which face the rider on the inside of the legshield and the two 8 mm. screws securing the ends of the mudguard. Also remove the headlamp with its four screws on the Series I, and take out the two 10 mm. bolts behind, which secure the casting to the frame. These two bolts have heads taking a 5 mm. allen key on the Series II and are hidden behind the Innocenti badge. This can be prised from its spring clip with a penknife.

On reassembly take particular care with the horn wires and speedometer light wire to avoid trapping them or allowing them to be chafed through by the control cable wires.

The rear brake cable can become corroded and to overcome this, the inner wire may be taken out and greased after slackening the 17 mm. clamp nut at the pedal end and detaching the adjuster at the rear.

The choke cable also has no provision for lubrication and may fail occasionally. The carburetter is best removed to allow the choke unit to be unscrewed. The nipple on the end of the cable can then be slid from the brass valve and the assembly will fall off. This gives extra slack where needed, so that the cover to the rear part of the operating lever assembly can be slid back and thus enable the forward end of the cable to be detached. Earlier types are different; with these the operating lever must be twisted until internal pegs on its spindle align with a slot in the plastic front of the housing and then it may be pulled forward to disclose the cable end. Reassemble in the reverse order, compressing the spring with the fingernails so as to refit the brass valve.

Two types of choke cable exist, the later, part 19015050, using an angled piece of metal tube where it enters the carburetter. With early Series I care must be taken not to trap the cable, part 15015010, between the battery and the toolbox, or suspension movements will cause the choke to open. Thread the cable through to the carburetter through one of the stamped holes in the battery support bracket.

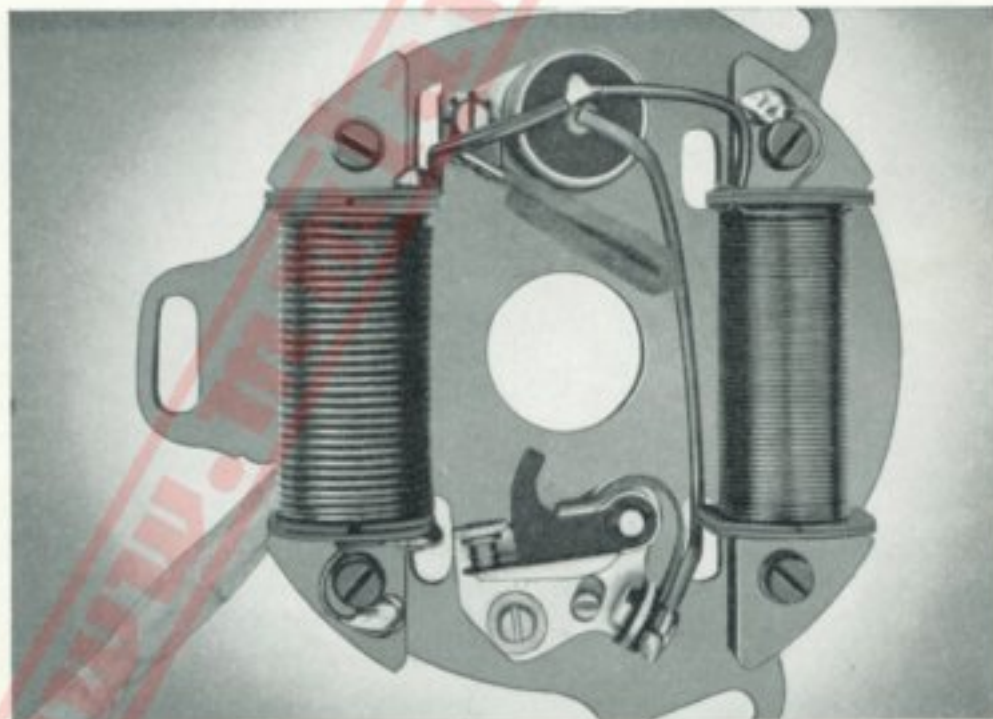


## Ignition and Lighting

Before looking for an ignition fault, check that there is an adequate supply of fuel to the engine.

The insulation within the H.T. coil and also that of the H.T. lead and suppressor plug cap is more likely to fail when the sparking plug gap has burned wide and also in damp weather. Note that as the engine moves with the suspension, so does the H.T. lead bend. Sufficient slack must exist to prevent it from being pulled from its end connections, but even so, cracks can develop in the insulation which will allow the spark to track to earth. Replace a damaged lead and do not try to repair one with insulating tape; it will not be effective against the very high voltage, except in great thickness. The spark will also sometimes track across the surface of the suppressor cap and leak to the control cables which pass very close by. The cap will usually show a permanent mark or a small burned hole if this has occurred.

To obtain access to the generator, unscrew the five 8 mm. screws around the flywheel cowling and remove it, having first taken off the carburetter and nearside pillion footboard, although the latter is not essential on early type machines. In the centre of the flywheel is a dust cover held by two 7 mm. screws on the Filso and Marelli units and by a circlip and three-tongue bayonet fitting on the Ducati. The Marelli has only one aperture in the face of the flywheel to view the contact points which are situated above the centre, but this is enough to allow adjustment to be carried out. The others have two or three. Ignition, which coincides with the moment of separation of the contact points, should occur  $23^\circ$  before top dead centre of the piston. This is roughly equivalent to a measurement of one and a quarter inches at the rim of the flywheel.



The stator plate of the Ducati magneto and generator

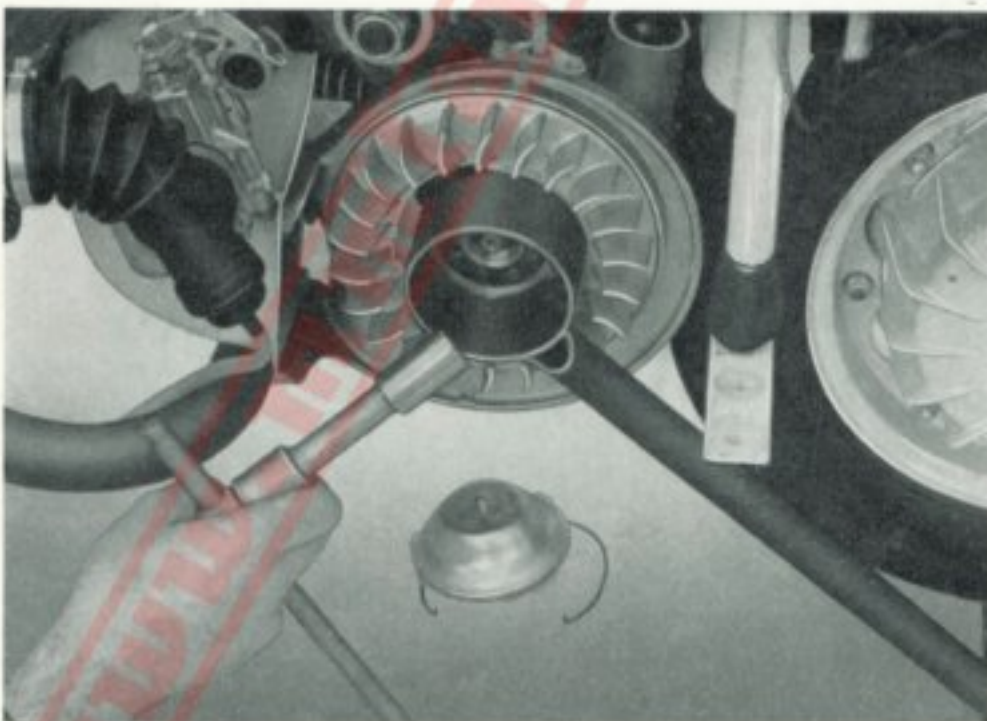
With the Li engine and the TV Series II, the normal direction of rotation when viewed on the face of the flywheel is clockwise.

The stator plate has a small range of adjustment by means of slotted holes where it is secured to the support flange, but it is set by the Factory so that one of the positions when the pole pieces of the flywheel are exactly spaced between the pole pieces of the coils, occurs  $10^{\circ}$  before the ignition point, or a total of  $33^{\circ}$  B.T.D.C. Thus the only resetting that should be required is to the maximum gap of the contact points which will alter in use through burning and wear which takes place with the fibre heel of the moving contact on the flywheel cam.

This wear will be hardly apparent unless the felt pad which also rubs on the cam receives no oil; when dry, this gives the effect of reducing the gap between the contacts to nothing within a few hundred miles. No other reason can cause the ignition timing to alter or "slip". A few drops of engine oil give adequate lubrication for several thousand miles.

Because variations in the maximum gap of the contacts affect the moment of separation and hence the timing, no fixed measurement for the gap can be given and the requirement will vary from one machine to another. Usually it will be between  $.010$  in. and  $.020$  in. Adjust the gap until ignition occurs  $23^{\circ}$  B.T.D.C., increasing the gap to advance the timing and vice versa.

To fit new contacts or for similar attentions, the flywheel must be removed. It is held by a taper on the crankshaft, with a key to position it, and retained by a 17 mm. nut with a left-hand thread. The LD flywheel extractor 37058 will release it from the taper; the genuine tool has a  $\frac{1}{2}$  in. diameter centre bolt which is essential for the force required. It therefore follows that the extractor body must be screwed fully home into the flywheel. When refitting the flywheel, ensure that the tapers are



Applying the 17 mm. socket spanner to the flywheel secured by the holder 58013



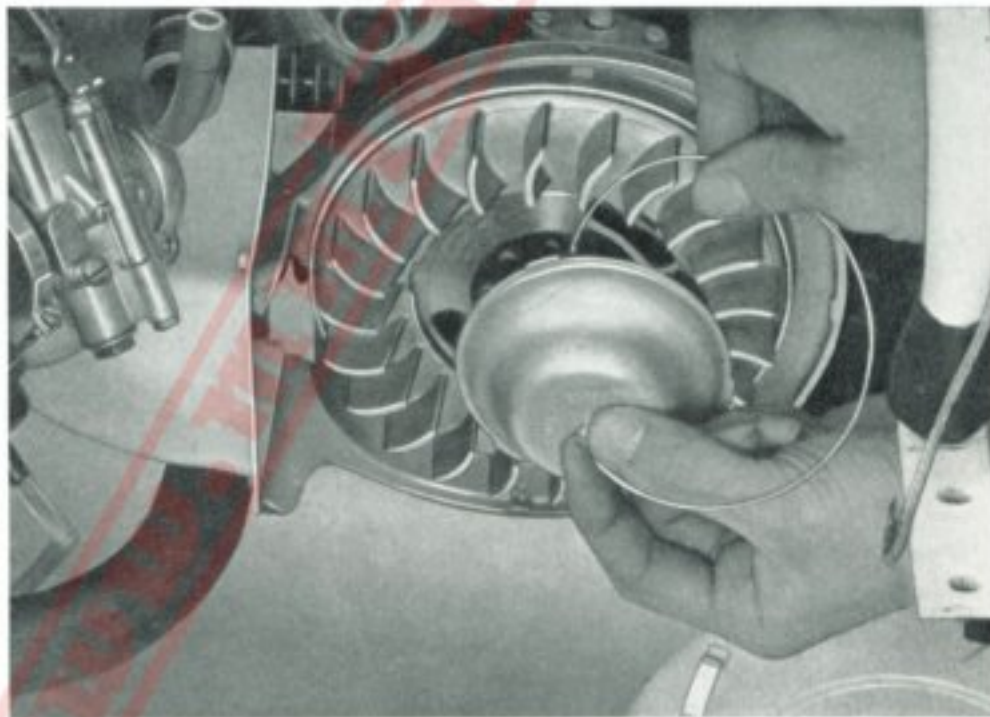
clean and dry, and that the nut is tightened properly with the correct socket spanner. It is essential that the flywheel be held with special tool No. 58013.

When ordering replacement spare parts for the generator, specify the make of equipment fitted, whether Filso, Marelli or Ducati. Do not attempt to interchange any parts because small differences exist which can upset the performance of the ignition at low speeds. The name is clearly shown in most cases, but the Filso is distinguishable by the vee notch adjustment for the contact points as against an eccentric screw for the other two. The Ducati has a brass flywheel, whereas the others are grey metal.

With the external H.T. coil, different types may be used where necessary except in the case of Filso equipment. The type fitted to the Li, as with that on the TV Series I, is very sensitive to the H.T. coil characteristics and for good starting only the correct Filso H.T. coil, part 00811384, will give really satisfactory results.

Make sure that the contact points face one another squarely and without overlapping. To achieve this, bend the support of the fixed point with a pair of pliers. Do not attempt to file new points, although sometimes they have a transparent protective coating which must be removed with fine emery cloth. Part numbers for the contact sets are: Filso 00811419, Marelli 00831599 and Ducati 00840022.

The rivet holding the spring blade on the Marelli contact arm rests very near to the flywheel cam in operation and it is specially flattened to avoid it. Check this if the primary circuit does not measure correctly. Beware of faults such as this in imitation or pattern parts. Besides the manufacturers quoted, only ICET are genuine.



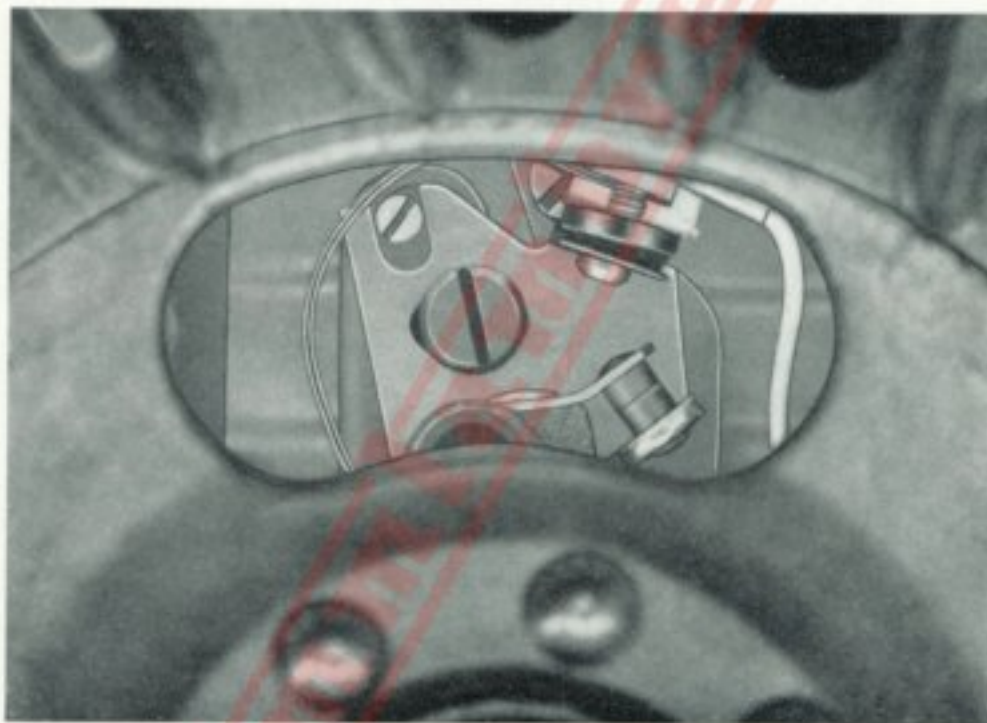
A circlip and three tongue fitting holds the Ducati dust cover

A labyrinth dust seal was introduced between the flywheel and generator support flange on the Series I Li by forming another lip on the flange to envelope the rim of the flywheel. The later flange becomes part 19010051 and if a replacement is required for an early model, only the later type of part will be supplied and it may be necessary to reduce the outer diameter of the rim of the original flywheel to prevent rubbing.

Ducati flywheels can suffer from loosening of the fan ring in some cases and this will give rise to a scraping noise. The fan is originally held only by two hollow rivets around the outside edge and a remedy consists in removing the flywheel and drilling and tapping four holes in the face between the magnets. Use a  $\frac{1}{4}$  in. or 6 mm. diameter thread to a total depth of over an inch and fit countersunk screws.

Series II machines have a greater protrusion of the part supporting the main bearing in the centre of the generator flange and this interferes with the stator plate of the Marelli and the first Ducati type. No change of part numbers has been given but the later Ducati stator is altered to accommodate this and the condenser is mounted to the flywheel face.

#### Marelli contact points.

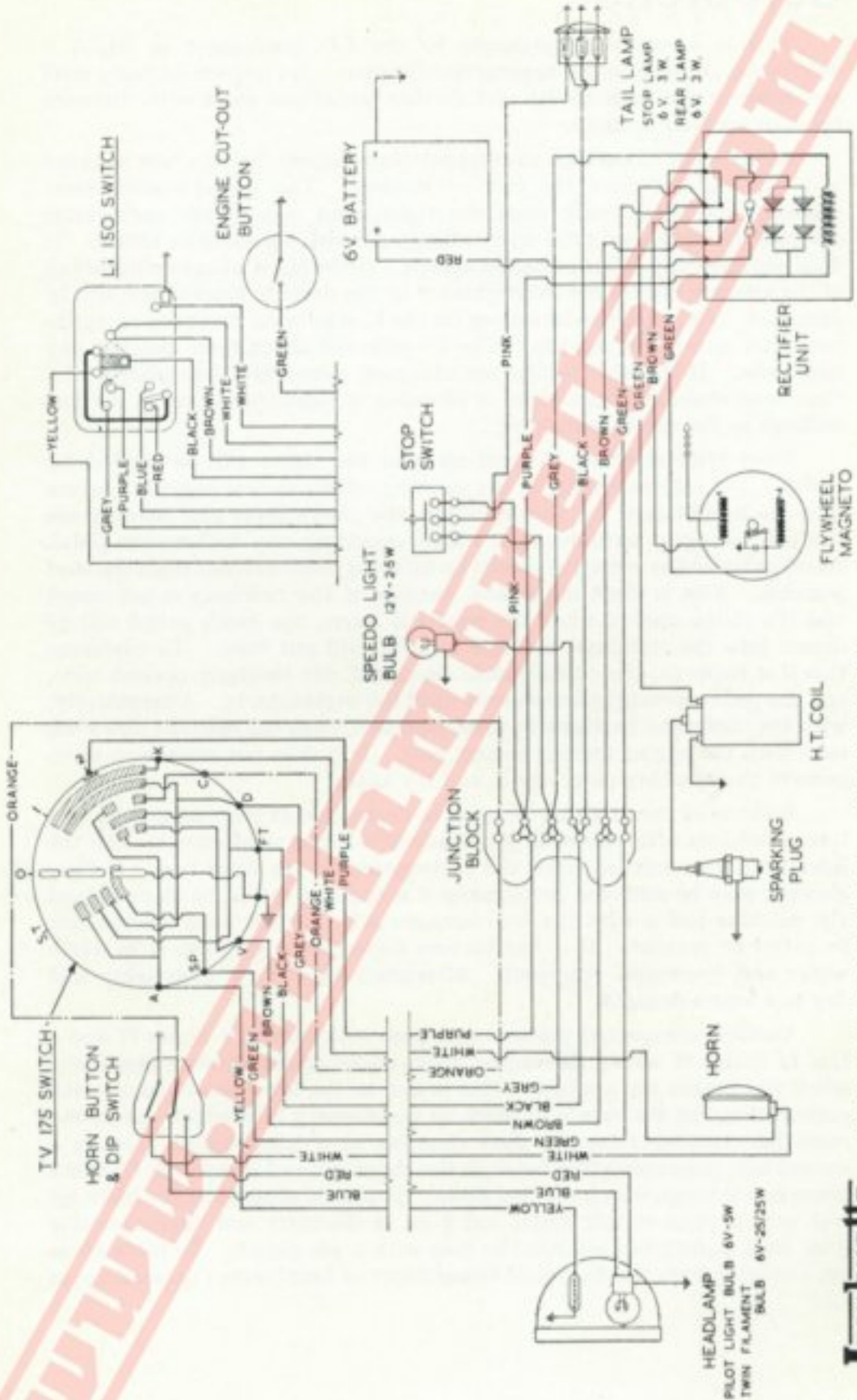


The large screw secures the contact plate, a small screw in the U slot adjusts the points

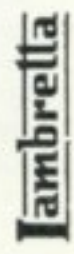
#### Lighting

Headlamps may be either of two manufacturers, Carello or C.E.V.-Pagani and there are two types of each. The Carello differ in the diameter of the bulb holders and the C.E.V. are distinguishable by one having six tags around the inside of the rim and the other ten. Separate pieces are not interchangeable and therefore the type must be specified when ordering spares.





TV 175 & LI 150 SERIES II WIRING DIAGRAM



# Carburettor

This is identical in principle to the LD instrument of which a description is given in the appropriate chapter. Jet and choke body sizes are different for each model and further variations exist with different types of air filter systems.

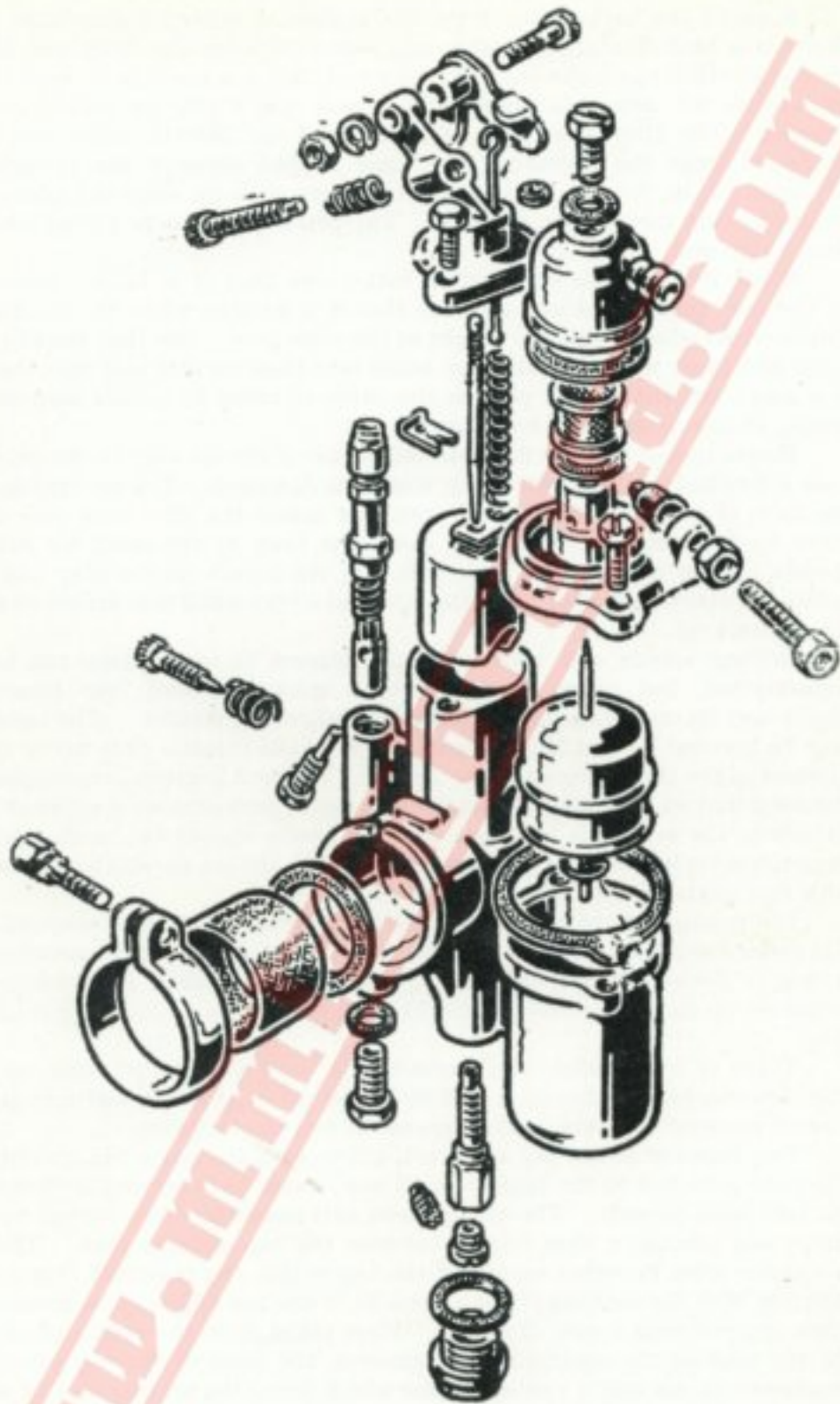
Adjustment to the slow running setting is required with a new machine and this will influence the ease of starting. The spring-loaded screw standing out horizontally from the right hand side of the carburettor controls the petrol air ratio when idling and with the throttle closed. It does not have any effect at higher speeds. Screwing it in causes richening of the mixture but do not overtighten it or the delicate tapered end will be damaged. An approximate setting for the Li is to bring it out one complete turn after screwing it right in. The TV will need about three quarters of a turn only. If the best results are obtained more than one quarter of a turn from these positions there is probably a blockage in one of the fine drillings in the carburettor body.

Even after standing for half an hour the choke will be needed for starting, but only first thing in the morning will the richest possible mixture have to be obtained by turning down the choke lever and leaving the throttle twistgrip entirely shut whilst operating the kickstarter pedal. At other times the twistgrip should be turned a small amount from the shut position. This is most important, because if the twistgrip is left closed and the choke opened when the engine is warm, too much petrol will be drawn into the crankcase and the mixture will not burn. To overcome this if it happens, the choke should be closed, the twistgrip opened wide, and the pedal operated continuously until the engine starts. Alternatively, with the choke and twistgrip in these positions, push the machine down the road with the engine turning in first gear. If it does not start even then, remove the sparking plug, dry it and try again.

Because of the artificial increase in depression at the carburettor, the later machines with the small jet sizes will not run satisfactorily with the inlet hose disconnected from the carburettor or the filter box. A filter element may be removed temporarily if it is suspected to be blocked, and the machine tested with the hose reconnected. Do not wash the element in petrol or paraffin. If it has become fouled with oil, wash it in warm water and household detergent. Afterwards rinse very thoroughly and dry in a warm draught.

Another unexpected problem can arise with some TV Series II and a few Li Series II where the engine stalls under closed throttle conditions when the brakes are applied. This is due to the low level of fuel in the carburettor, but the cure is to block an unnecessary hole which enters the main jet chamber from the float chamber at a steep angle. This is a second hole communicating between the chambers and is separate from the lower one through which the fuel flows. It can be plugged at the main jet end with a piece of soft metal rod  $\frac{1}{8}$  in. in diameter and approximately  $\frac{1}{2}$  in. long, lightly tapped into the hole with a pin punch. Suitable plugs are available from the Technical Department of Lambretta Concessionaires Ltd.





S1 Li carburettor assembly MA19 BS5

Remove the carburettor from the engine in order to dismantle it. There is a heat insulating washer and collar between the body and the inlet pipe which can make the joint very stiff, but it is possible to work the carburettor off, after slackening the 8 mm. pinchbolt, by pulling and twisting. The filter hose pulls off easily and the throttle cable can be unclipped from the operating lever and slipped through the threaded adjuster. Take out the choke cable complete with its slide and plunger by unscrewing the 10 mm. pedestal. The petrol pipe can be pulled away from either end.

When refitting the carburettor make sure that it is fully "home" on the inlet pipe spigot and set it so that it is upright when the machine stands on its wheels with the weight of the rider only. See that the choke cable and short tube extension are fitted into their sockets and that there is a small amount of free play in the cable in order to ensure complete closing of the choke when not in use.

Restriction of the fuel flow will only occur if the air vent to the petrol tank is blocked or if the petrol tap washer is damaged. The air vent is in the form of a tube with one end open just inside the filler neck and the other to the atmosphere halfway down the tank at the front for early models. Later ones do not have this, but the handle of the filler cap is hollow with both ends open inside the tank and a very small hole drilled under the centre loop.

Driving speeds and habits are the biggest factors influencing fuel consumption, but other than these and ignition timing, the throttle needle and its corresponding jet will commonly affect results. The needle may be lowered so that the clip securing it to the throttle slide fits in the topmost of the three grooves in the needle. This will improve consumption provided that on re-testing the machine no loss of performance is noticeable. Otherwise the setting is too weak and the needle should be raised again. Sometimes replacement of both the needle and the jet in which it moves with new parts is beneficial.

The position of the needle can affect "pinking". A small amount of this under conditions of heavy load may be tolerated, but if it is persistent, raising or lowering the needle may provide a cure. Only if "pinking" continues up to high speeds at full throttle, will a larger main jet give any help.

There is little point in experimenting with various jet sizes on a standard machine, although a slightly larger main jet can sometimes give a small increase in power at the expense of fuel consumption.

Two types of petrol tap are fitted, either with the name SIL or OMC. They are attached to the tank by a 19 mm. union nut carrying both right and left hand threads. The nut tightens anti-clockwise when viewed from above and pinches a fibre washer between the tap and the tank. There is a gauze filter mounted on top of the tap within the tank and this may interfere with dismantling; it is a press fit in the tap and may be removed when gripped with a pair of pliers. When taken from the tank and after the pin holding the control rod is removed, the front of the tap may be unscrewed to disclose a rubber washer which forms the seating face of the tap. It can be renewed if damaged and that with four holes for the SIL is part 19005501 and the other with three holes for the OMC is part 19005502. The moving part of the tap is spring loaded against the rubber washer and can be put back in either of two positions. Only one of these will allow proper operation, but it will be obvious on examination.

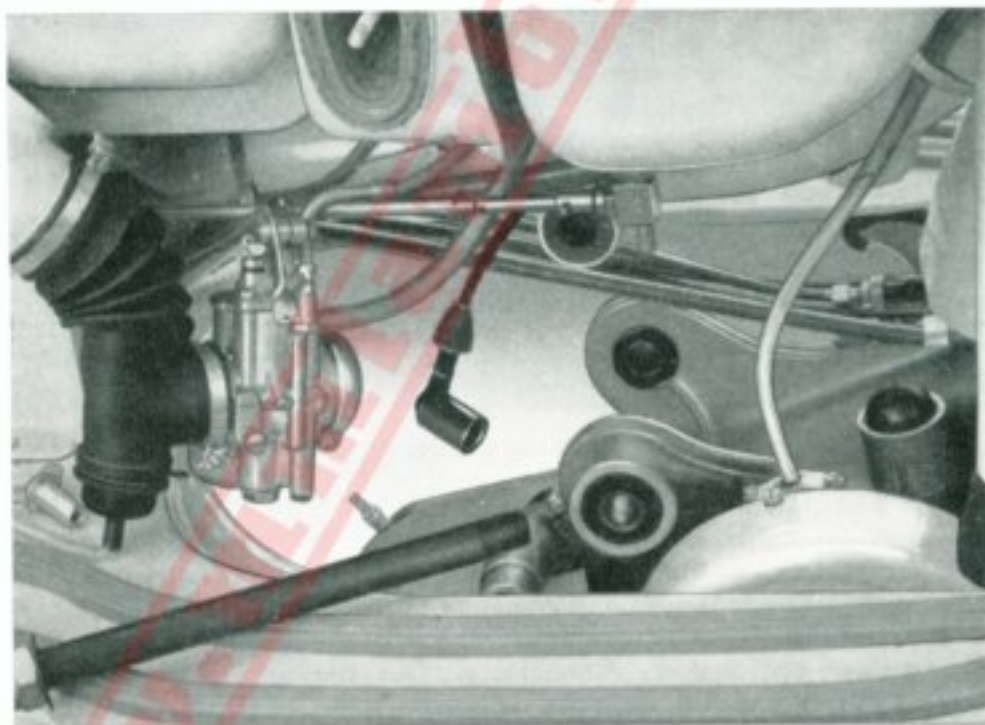


# Decarbonisation

With the machine on its stand and the side panels removed, allow the engine to pivot and the cylinder to drop down below the frame, by taking off the suspension unit. This is held by two 24 mm. nuts and is an easy sliding fit on the supporting pins provided that it is pulled off squarely. Take off the bridge piece between the footboards by undoing the two screws secured with 8 mm. nuts from beneath. Unscrew the remaining 8 mm. nut from the front of the offside pillion footboard and the two from the nearside.

Take offside footboard away complete with the support arm at the rear after unscrewing the two 14 mm. nuts and bolts holding it. There are two further 8 mm. nuts at the rear of the nearside footboard making a total of seven of these and all have rubber washers between the joints. Two more rubber washers are placed between the bridge piece and the footboards.

An alternative method which avoids dismantling the footboards and will appeal where the 8 mm. nuts are rusted, is to leave all these parts in place, including the suspension unit, and remove the main engine pivot bolt. This is held by two 24 mm. nuts and after removing either, the pin can be driven out to the opposite side with a hammer and drift. The only previous dismantling necessary is to remove the carburettor, the H.T. lead from the sparking plug and the copper braid earthwire from the rearmost screw of the flywheel cowling.



Engine pivot bolt removed as an alternative method of gaining access to the cylinder

A disadvantage is that the engine and machine remain relatively unsupported and further operations are therefore rather difficult.

Remove the carburettor by twisting and pulling it from the inlet pipe after taking off the petrol pipe, slipping the throttle cable end from its

position, pulling it out of the adjuster, and slackening the 8 mm. pinchbolt which clamps the carburettor in place. Leave it hanging by the choke cable but unscrew the butterfly nut joining the inlet hose to the filter in order to allow it to move to the side. If the carburettor jams on the inlet pipe, leave it and the two can come off together afterwards.

Unscrew the sparking plug and the 14 mm. bolt which is adjacent to the plug hole and secures the cylinder cowling. Two 8 mm. screws, one above and one below, hold this cowling to the generator flange to the left of the fan cover; after these are undone the cowling can be moved forward until impeded by the exhaust pipe where it will give sufficient clearance to get at the two 11 mm. brass nuts holding the exhaust pipe to the cylinder. Three of the 10 mm. crankcase cover nuts also hold the silencer and tail pipe brackets; undo these and the silencer and exhaust pipe may be removed in one piece.



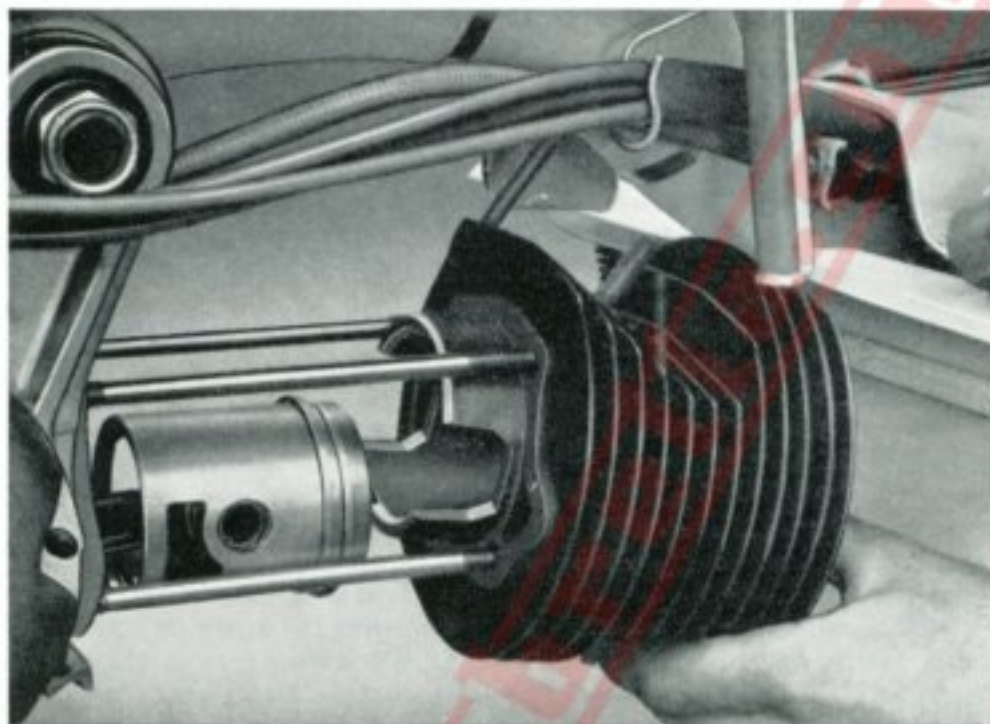
Move away the cowl to reach the 11 mm. nuts of the exhaust pipe

An alternative with early models is to take off the silencer separately and leave the cylinder and exhaust pipe attached to one another, but there is only freedom for further dismantling where the exhaust pipe is of the short type, terminating at the point where the tube lies at a right angle to the machine. With others it continues to circle round and joins a short stub on the silencer. The silencer, part 19018060, with the longer stub should not be interchanged with the later, part 19018240, even complete with exhaust pipe, because it was designed for the engine with the first type of carburettor air intake system.

Unscrew the four 14 mm. cylinder head nuts; the smaller end of the sparking plug spanner fits these, but a ring or socket spanner is better. When the cylinder head is off slide the cylinder forward a little and then undo the two 11 mm. nuts holding the carburettor inlet pipe. There is a soft gasket between the pipe and the cylinder and care must be taken not to



overtighten these nuts on reassembly or the flange may distort and break. The cylinder can now be wriggled off the supporting studs and the piston will slide out and remain behind. Take very great care of the cylinder, for the fins are fragile.



The cylinder just clears the frame

The piston will have a surprising amount of free movement and can give the impression that the bearings are considerably worn. It is important that there shall be almost imperceptible endwise movement; that is, forwards and rearwards in relation to the machine. The common source of slackness here is the small end bush in the end of the connecting rod, through which the gudgeon pin passes. This pin fits in a well finished bore in the piston in which it may slide or be a fairly tight push fit but there must be no clearance between the pin and the holes in the piston.

There will be free play between the gudgeon pin and the bush, and in fact it must not be assembled new with less than  $.0005$  in. It is not essential to fit a replacement bush until wear has increased the clearance to  $.008$  in., although noise will be audible from the bearing when the engine is running.

Some machines have a caged needle roller at the small end and this should not need any attention at all. Be careful with it when pressing in the gudgeon pin or damage may be caused if it forces against the end of the cage. If, for any reason, the bearing surface in the connecting rod eye should become spoiled, a special bronze bush would have to be inserted and reamed to take the gudgeon pin direct.

There are the usual circlips in grooves in the piston on either side of the gudgeon pin and provided they are fitted properly in the grooves they will never come out unaided. To remove them and be sure of not bending or breaking them, a pair of circlip pliers should be used. Further, it is

preferable to have a gudgeon pin extractor. If this is not possessed there is a danger of bending the connecting rod when pressing out a tight pin.

Clean the carbon from the piston crown, the cylinder head and the exhaust port of the cylinder. Do not clean the piston sides or touch them with anything abrasive. If the rings do not spring out of the grooves freely, remove them by parting the gap with the nail of each thumb and pressing the sides of the ring with the tip of each forefinger to keep the stress even so that it does not break diametrically opposite the gap. See the illustration. Clean the back of each groove with a piece of broken piston ring such as is likely to be available. Do not scrape any aluminium from the sides of the grooves. There is no advantage in renewing the rings until the end gap, seen when the ring is placed by itself squarely in the cylinder, exceeds .040 in. New rings must have a gap of not less than .008 in.

Small scratches will show in the cylinder bore at all times, but the only serious symptoms of wear are deep grooves by the exhaust port, running up and down in line with the piston.

Should it prove necessary to have a new or service exchange cylinder and piston at any time, make certain that the replacement is of the correct type. Series II pistons have their base formed in an unbroken ring, whereas the Series I is shorter and the cut away portion on either side is open at the base. Series II cylinders have four cooling fins above the exhaust port and four below; Series I have four above and three below.

Reassemble the piston on the small end, with the arrow on the crown facing towards the exhaust side, so that the locating pegs in the piston ring grooves are positioned one either side of the exhaust port. Put the cylinder back by fitting it on the studs and sliding the piston in, at the same time compressing the rings into their grooves. Rock the cylinder gently from side to side to help them to enter but whatever happens, do not use force.

Tighten the cylinder head nuts evenly. The original aluminium gasket between the head and cylinder can be put back unless it is damaged or shows signs of burning at any point. Note that the copper-asbestos gasket between the cylinder and exhaust pipe will only line up with the port in one position. If the wrong way round, it will slightly obstruct the exhaust gases.



Gently removing the piston rings



## Engine and Transmission

Either the pillion footboards may be removed or alternatively the main engine pivot bolt can be taken out, then undo the sixteen 10 mm. nuts holding the silencer brackets and engine casing cover and also slacken the exhaust pipe clamp in order to expose the clutch, gearbox and kickstarter mechanism.

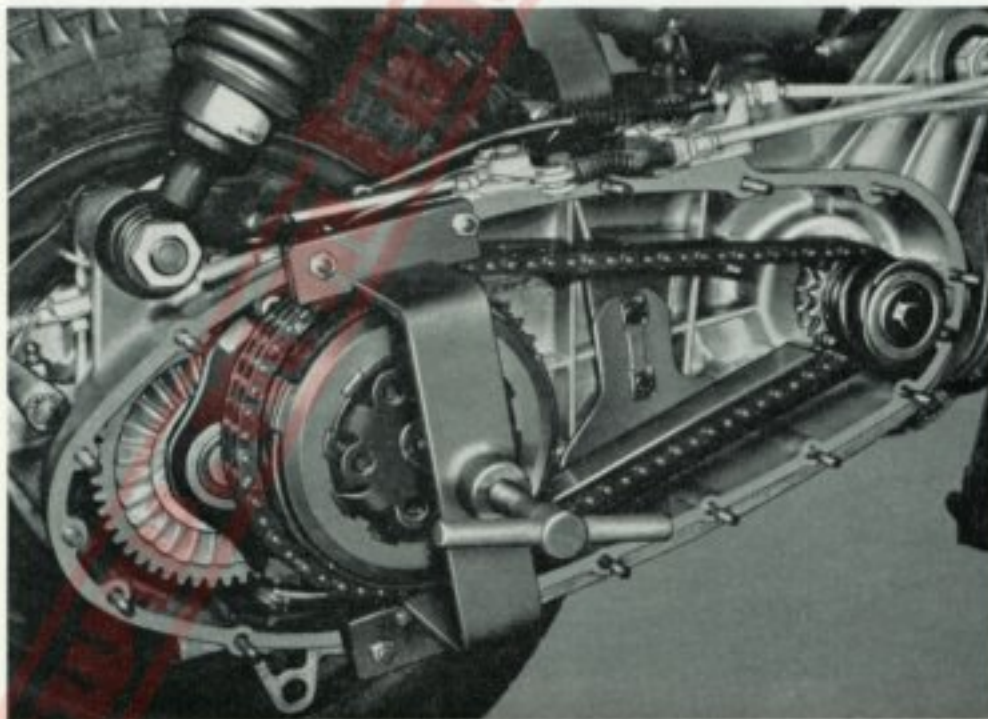
The cover comes away complete with the kickstarter pedal.

The silencer may be freed from the exhaust pipe after slackening the 14 mm. clamp bolt by placing a piece of wood against the inside of the curve of the exhaust pipe from the offside and hitting it with a hammer to loosen the joint.

To dismantle the clutch use the compressing tool 59351 to compress the springs while the circlip retaining the plates is removed. Do not lose the small cap, acting as a thrust pad to the withdrawal mechanism, fitted to the carrier plate which will now be released and together with the clutch plates and five springs should slide easily off the splines of the inner and outer members of the clutch. If it is necessary to check the freedom of the plates on their splines, do this with the outer steel pressure plate in position, because this prevents distortion of the centre piece.

A 22 mm. nut holds the clutch to the gearshaft and the two parts are splined. With the majority of machines, a tab washer is turned up against the nut and anchors it to a raised rivet head on the centre piece, but this is not essential.

Tool 59804 prevents the centre from turning as the nut is undone, and extractor 59328 is available although not always necessary, to remove it from the splines; when it has been removed, the outer clutch member which carries the chainwheel and runs freely on the centre piece supported



Applying the clutch compressor 59351

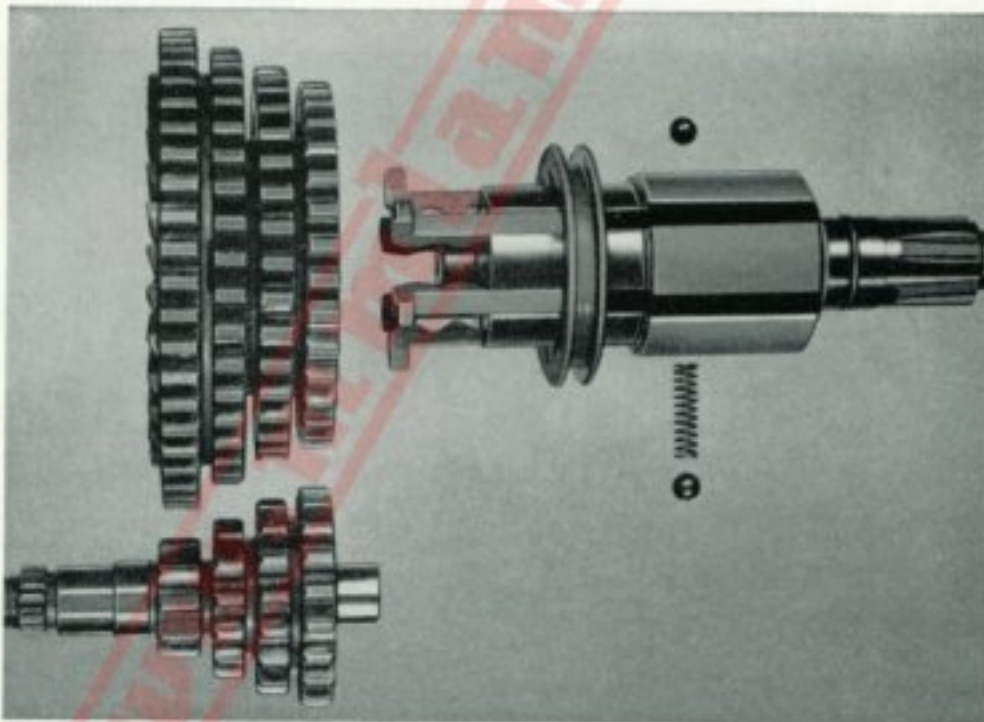
by two needle roller races, can be slipped out of the chain and taken off. If the splines of the inner member are bent during the operation, they may be straightened easily afterwards.

Distance washers between the clutch unit and the gearshaft bearing determine chain alignment, and provided that the same ones are replaced behind the clutch members on reassembly, no check should be necessary on chain alignment; but if the sprockets or associated parts have been renewed, careful measurement of the depths of the sprocket faces below the face of the casing must be made and the number and thickness of the distance washers varied to give an equal reading for each sprocket. A special bridge piece 57865 for assembling a dial gauge to compare these distances is available.

Some difficulty may be experienced in positioning the five springs on reassembly, see chapter on GT 200.

The centre of the chainwheel forms a torque damper to reduce the stress on the gear teeth in case of inaccurate gear selection. With exceptionally rough treatment, some of the seven springs of the unit can buckle and bend out the side plates until they touch the gear casing behind and break. Where this occurs this chain wheel should be replaced with the solid type Part No. 19920110.

Dismantling and reassembly of the gearbox and rear hub is substantially as described for GT 200, page 36.



The four gears, gear cluster and axle showing the gear engaging cursor



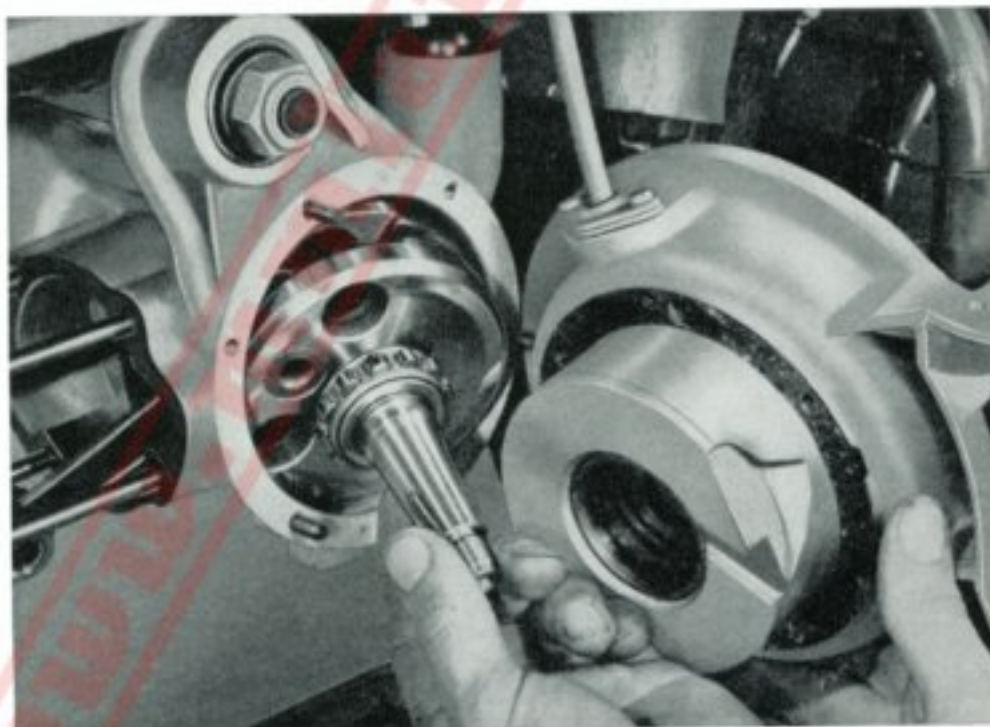
As a group, the four gears on the axle and the gear cluster can be inter-changed among the 125 Li, the 150 and the TV Series II. Thus the lower gear ratios of the smallest machine can be fitted to the 150 Li or the TV for sidecar use. The ratios of the 150 Li are not sufficient reduction for the TV with a passenger carrying sidecar, but the 125 ones are adequate for both models.

Number of teeth :	Li 125	Li 150	TV 175
1st gear .. .. .	51	50	49
2nd gear .. .. .	42	41	40
3rd gear .. .. .	39	37	37
4th gear .. .. .	35	34	33
Gear cluster .. .	9	11	12
	12	14	14
	16	17	18
	19	20	21

The kickstarter assembly is similar to that on the GT 200, see this section for dismantling and assembling.

If the cylinder and piston are dismantled as for decarbonising, and the unit casing cover removed, it will be little extra work to take out the crankshaft and main bearings.

Without disturbing the clutch, unscrew the 14 mm. bolt holding the engine sprocket shock absorber lock collar, spring and cam. Remove the flywheel cowl and the flywheel as previously described. Take off the stator plate, undoing its three 10 mm. bolts and disconnecting the wires at the junction on the rectifier box. Unscrew the three 10 mm. nuts which remain holding the bearing support flange and withdraw this by inserting two of the stator plate fixing bolts into the special threaded holes provided ; screw them in evenly to press off the flange. If it is very tight, the special tool 49188 will be useful.



The crankshaft is taken out from the generator side

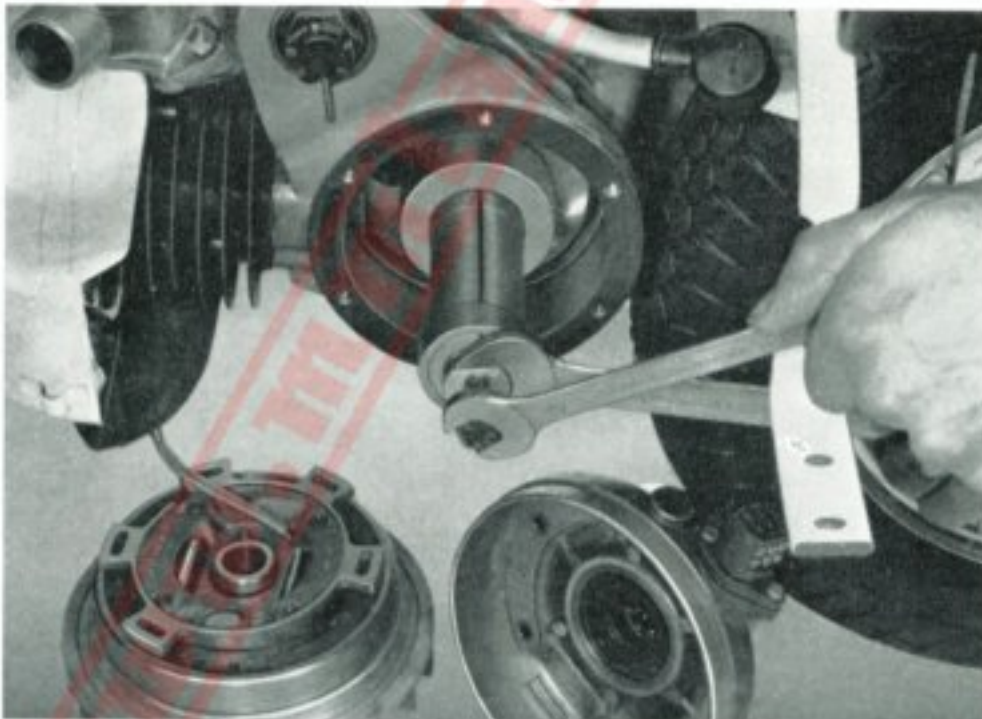
The crankshaft will now come out through the aperture left by the removal of the flange if a  $\frac{1}{2}$  in. drift of soft metal is placed against the end of the shaft inside the sprocket sleeve on the offside and tapped with a hammer.

On Series II machines, there is an oil thrower washer behind the sprocket sleeve on the crankshaft and the face of the crankcase is machined away slightly to accommodate it.

Wear can occur to the oilseals on the crankshaft under certain conditions and in time the one on the driving side may allow gearbox oil to escape into the crankcase. This will cause excessive carbon deposits to form and can lead to obstruction of the silencer or damage to the piston by partial seizure following the thick lacquer which builds up. The oilseals may have one or two lips pressing on the highly polished surface but the two types are entirely interchangeable.

The oilseal is fitted into a flange held by four screws to the crankcase wall where it also retains the drive side bearing with a gasket in between. The oilseal faces with the open side, where a small spring ring is visible, towards the crankshaft centre and is pressed into the flange from behind. Loss of gearbox oil into the crankcase will be due to bad fitting of the oilseal and the flange. Do not mistake moulding marks in the casing for the cause of such trouble. Take care not to damage the oilseal when refitting crankshaft.

Six different crankshafts exist. Three for the TV Series II, having longer connecting rods than the Li and distinguished by two flats machined on the wheels on the big-end. The more recent of these parts, 19212040 and 19212140, have a polished shoulder raised on the generator side similar to that on the drive side. The earlier one, part 19212010, has a single oilseal only on the generator side and is without a shoulder on that side.



Take particular care in fitting tool 50405 to extract the main bearing sleeve



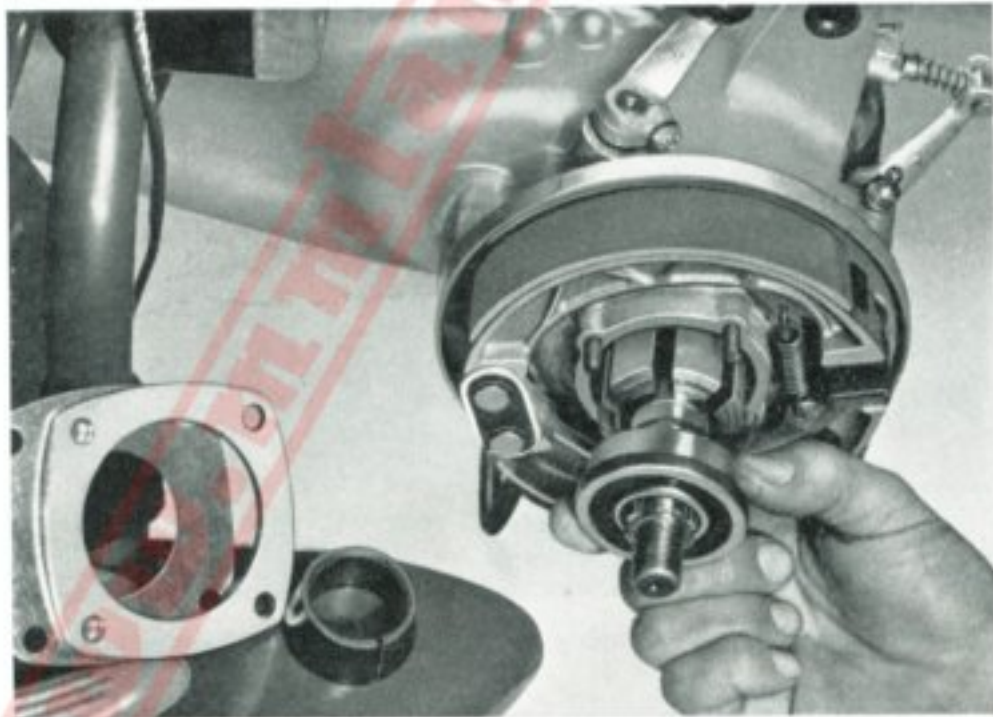
The first type of Li crankshaft, part 19012010, is also without the shoulder on the generator side which the second and third shafts possess. The difference between the latter two is that part 19012040, has a bronze bush in the small end, and the other, part 19012140, a caged needle roller. However, this type has again been changed to 19912190, which has increased big-end side float similar to the SX 200. With this shaft a new piston, part 19912310, must be fitted incorporating spacer washers on either side of the small end eye. Where there is only the alteration of the small end bearing, the crankshafts are interchangeable. This also applies to the latest type if a new piston is fitted.

If at any time the crankshaft has to be replaced, a complete new assembly will be necessary. Big-end clearance; up to  $\cdot003$  in. is permissible. Side float may exceed  $\cdot016$  in. on the earlier types and up to  $\cdot080$  on the latest type part 19912190.

Special tool 63703 is necessary to remove the later type of bearing inner ring and care must be taken not to damage the jaws of the tool.

To replace the axle oilseal it is only necessary to take off the hub and remove the bearing retaining plate and washer held by four 10 mm. nuts. The old oilseal can be levered out with a screwdriver.

If the bearing is to be removed, the main casing cover must be taken off and, without further dismantling, top gear should be engaged and the axle driven towards the nearside with the help of a drift placed on the exposed end. This will dislodge the bearing from its seating and the axle can then be tapped back into position provided that the washer, ring and first gear which will have dropped down, are aligned. Care must be taken not to drive the axle out further than necessary or the spring loaded balls controlling the gear positions will fly out.



Driving out the wheel bearing with the axle

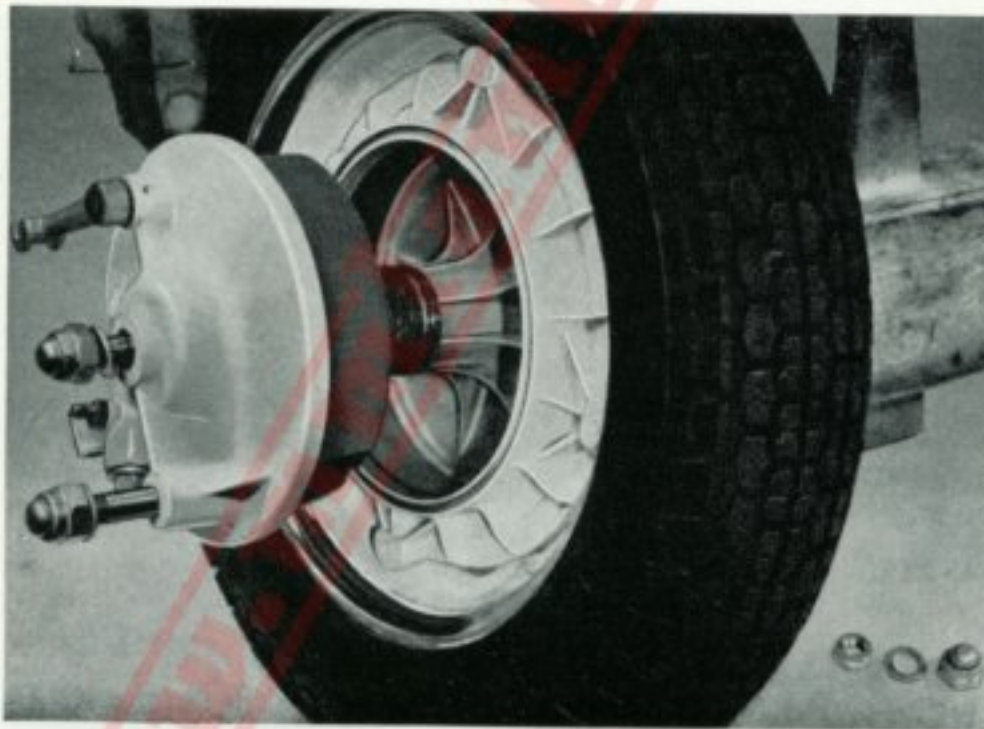
## Wheels, Steering and Frame

Take out the front wheel by slackening the 21 mm. spindle nuts on either side, then, facing the machine from the front, lift with the fingers under the suspension links and press downwards and rearwards with the thumbs on the spindle nuts. Provided that the washers behind the nuts are kept out of the recesses in the hooked ends of the links, this will allow the front wheel complete to slide out towards the back and afterwards be lifted out to the offside.

Still attached by the speedometer and brake cable, the wheel can be turned over and freed from the hub by undoing the four 14 mm. domed nuts around the rim. Leave the other four alone.

Where the brakes are to receive attention, slacken the offside spindle nut in the usual way, but, before undoing the one on the nearside and removing the wheel, also slacken the 19 mm. nut on the offside of the spindle behind the suspension link. Afterwards, take off the offside nuts and washers and the brake backplate may be lifted off complete with brake shoes.

The TV wheel differs in that the brake anchor is formed by a stud on the backplate taking a 21 mm. nut locking it to the suspension link. This must also be loosened before the wheel can be removed. Further, the brake backplate cannot be lifted off the wheel spindle because of a shoulder on the latter; the spindle must be driven out from the nearside as illustrated.



Removing the front brake backplate of the TV complete with the wheel spindle

The wheel bearings are of the journal type for which there is no adjustment. Side movement of one sixty-fourth of an inch is permissible at the wheel rim. The oilseals are of the normal type but it will be seen that



they are assembled with the side showing the coiled spring ring towards the outside. This prevents them from being damaged by pressure during greasing and it is important to follow the recommendations for lubrication.

On reassembly, do not neglect to fit the brake anchor location of the backplate on to the corresponding peg on the offside suspension link. The thick plain washers on the spindle lie immediately behind the 21 mm. end nuts, but the extra and thinner washer on the offside fits between the suspension link and the 19 mm. nut retaining the backplate. Lock this nut firmly in conjunction with the similar one on the nearside before finally tightening the end nuts. If the sparking plug spanner is used for that final operation, do not be satisfied with hand tightness, but use the pressure of the foot as well.

To remove the rear wheel, mount the engine unit on the jack provided in the toolkit, fitting the appropriate fork of the Y-piece into the lug at the bottom rear of the unit. Enter it into the hole from behind, that is, between the wheel and the lug. Unscrew the four 14 mm. domed nuts retaining the wheel and withdraw it, edging the tyre past the nearside panel catch hook. Although a little difficult, it is possible to do this provided that the recesses in the rim are fitted down between the cooling fins of the hub whilst the tyre is wangled out. It can be facilitated by cutting approximately half an inch from the inner prong of the panel catch hook. As long as no more is taken, this will not interfere with the action of the catch.

There is no need to detach the wheel from the hub if the brakes are to receive attention, but undo the 27 mm. centre hub nut. This must be very tight and it is essential to follow the instructions in the maintenance chapter. Some models have three holes in the hub spaced around the centre and threaded 8 mm. diameter and 1.25 mm. pitch for extractor 64015. Earlier machines have only two holes, threaded 6 mm. diameter and 1 mm. pitch, and the extractor, number 59826, is not strong enough to pull the hub from the tapered cone on the axle without assistance. Tighten the extractor with a normal pressure on the spanner and hit the tyre from the offside with a heavy hammer. This will not damage the tyre if it is properly inflated and is usually sufficient alone to remove the hub without using an extractor. Particularly reluctant cases may have to be dealt with by extractor 64727 or 69000 which is suitable for both types.

Early Series I Li models have a 20° angle of taper on the split cone which fits between the rear hub and the axle and on later machines it is altered to 11°. On no account should the wrong angle cone be used with a hub because the tightness of the hub on the axle depends on the good fit of these parts. The splines on the axle do not play an important part in the joint. If at any time, the hub nut is not tightened properly, slight movement will occur and cause wear of the conical surfaces and also of the part of the axle where the cone fits. Subsequently, no amount of tightening the hub nut could be successful in retaining the hub and a new hub, cone and axle would be necessary. Replacement hubs of the 11° type only are available, complete with the cone piece; the axle remains unaltered.

Do not omit the spring washers behind the 14 mm. rim nuts and tighten these adequately, although avoiding excessive force which would stretch the studs and eventually lead to failure. When the rim nuts are not tight, particularly on the rear wheel, a knocking sound is heard as the machine is rolled along. This is easily confused with a broken tooth in the

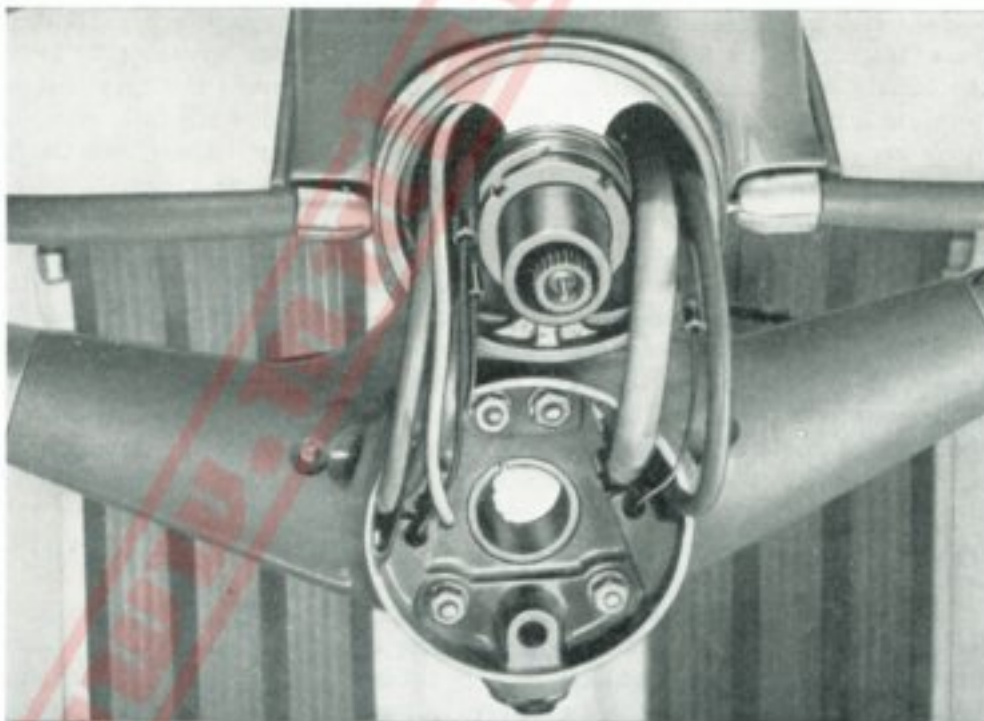
gearbox. If allowed to persist, the holes in the rim become elongated and cut their way through the studs.

With the exception of the early Li Series I, the rim securing studs fitted to the wheel hubs are detachable and may be replaced in a case of breakage. They are distinguishable in having a thin, 12 mm. hexagon at the back but this is barely enough to take a spanner to remove the stud. Better, the hub should be taken off and the hexagon gripped in an engineer's vice. The stud, part 19044002, has a left hand thread in the hub, of 10 mm. diameter, 1 mm. pitch.

Brake shoes are identical, front and rear, but they should never be interchanged because the even pressure obtained after running in will be upset and their operation will give a feeling of sponginess. Besides the occasional need for cleaning, all that can be required during servicing is to lubricate the cams and pivots. For this the shoes should be removed and the bearing surfaces smeared with high melting point grease. Each pair is secured by two circlips and when these are removed together with the pivot bridge and spring plate, the shoes may be pulled off together with the return spring. To assist this in the case of the front brake, disconnect the cable from the brake cam lever and twist the cam through 90°. Do not use undue force which will break the shoes, but make sure that they are withdrawn squarely.

Service exchange brake shoes complete with linings are available when the existing linings become worn.

In order to tighten the steering bearings, the handlebars must be removed. After taking off the cover, disconnect the clutch, throttle, gear and front brake cables at the ends furthest from the handlebar, and undo the clamp around the frame where the cable oilers are situated. Press the speedometer cable end down until it is level with the top of the fork stem and out of the way.



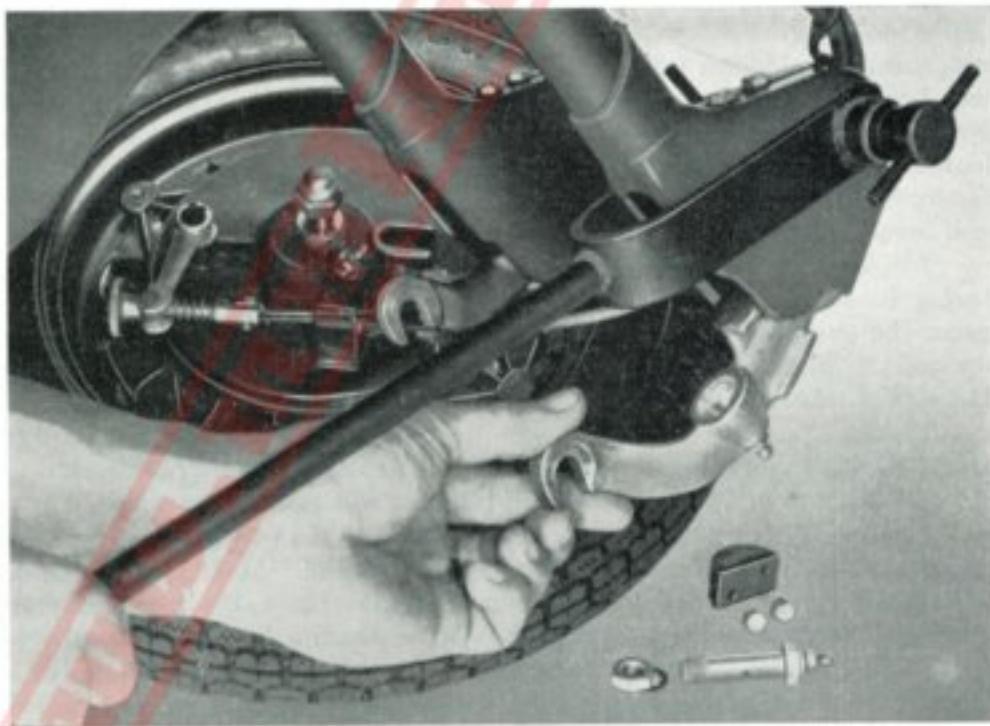
The handlebars removed to allow adjustment of the steering bearings



Unscrew the handlebar clamp pinchbolt and remove it completely. This bolt passes across the base of the handlebars and is fitted by a 10 mm allen key such as part 19086061 or the oil plug tool and the special key 57836. Early models have a nut on the bolt with a similar hexagon and two spanners are needed. After this, force the handlebars upwards with a mallet or the palm of the hand. When free of the fork stem, the slack in the control cables will enable the handlebars to be turned over and rested down on the driver's side of the legshield. Looseness of the steering will also be notice if the four 10 mm. nuts and bolts holding the centre iron forging to the aluminium handlebar casting are loose. The nuts can be seen beneath the handlebars only after these are removed.

Reposition the locknut and upper bearing track of the steering bearing adjustment, eliminating any slackness but leaving the steering entirely free to turn. The workshop tools 40482 and 40490 are almost essential in order to ensure that the threaded rings are properly locked together and considerable force must be applied to them. Recent machines have a washer fitted between the two parts but this is not a substitute for proper tightening. It cannot be applied to earlier models as a groove is necessary in the fork stem for a tongue on the washer to engage.

The steering bearings of the Li and TV are similar but on recent models, the cup has an increased length of the spigot fitting into the frame and the part number is 19061023. It is not, however, suitable for the earlier type frame, although the frame part number is not changed to indicate the difference. An alteration to the forks makes it important to have the cone, part 19060028, with a bevelled edge on the inside to seat over the relatively large radius at the base of the fork stem. In this case, the washer previously fitted beneath the cone is omitted. The forks are distinguished by two fork legs which are formed from a single tube curved into a U and



Using the fork spring compressor 58021 to release the suspension link

welded to the stem bracket, whereas the earlier type has separate legs brazed into a forged lug.

Only the later type of fork is available, even as a service exchange, and therefore where the original earlier type is to be replaced, a new cone also will be required, part 19060028. Other modifications involved are to the short mudguard attached to the forks which has an extended bracket, becoming part 19060160, and the front brake cable which should be re-routed to follow down the outside of the frame tube instead of within the fork stem.

The forks are quite simply removed from the frame after unscrewing the steering bearing adjusters, but dismantling the front suspension requires a special spring compressing tool 58021. The forks need not be removed from the frame, but take out the front wheel complete and remove the lower rubber buffer from the end of the fork leg where it is held by two 10 mm. bolts. Unscrew the 19 mm. nut from the suspension pivot, drive out the pivot bolt and tighten the thumbscrews of the compressor tool into the holes vacated by the bolt. Lever the suspension spring up to the limit of travel of the tool and pull out the suspension link; this will allow the spring to be released and the guide parts to fall out. Take care during reassembly, to hold the thin washers either side of the suspension link eye in position as it is entered into the fork leg. If the forks are to be returned for exchange, make sure that both plugs forming the top location of the springs in the forks also come out.

To remove the twistgrip rubber, if required, grease the outside, roll the lipped end back on itself towards the end of the handlebar. Never try to take it off by pulling. When replacing it, make sure that all trace of grease is removed from the twistgrip sleeve and the inside of the rubber; it will push on easily.

If the steering lock has to be taken out, remove the handlebar cover and undo the grub screw placed immediately above the lock; on Series II machines it is hidden under the engine cut-out button; with the TV it will be necessary to unscrew the knurled ring holding the lighting and ignition switch and pull it out of the way in order to get to the screw. The lock is not a very tight fit and can be pulled out or levered away with a penknife under the edge. Do not use force on the hinge of the lid or it will break.

Inside the recess where the lock fits will be seen the upper end of a spring loaded plunger. This must be pressed down with a screwdriver when the handlebars are turned to one side, and prevented from springing up again, whilst the lock is reassembled, by pressing the handlebars towards the straight ahead position.

Do not attempt to force the lock by twisting the handlebars, but if it sticks through neglect of lubrication, rock the steering gently from side to side, after turning the key, and the plunger will probably release.

The speedometer requires no attention other than to avoid any excess grease on the cable which may enter the instrument. Make sure the cable and connections are always tight or otherwise the cable may misalign and cause bending stresses on the inner drive which will result in breakage.

Failure of the inner cable can also be due to a kink in the outer or a fault in the instrument itself. The latter is not easily detected and if repeated breakage of the cable is experienced, a service exchange speedometer may be required.