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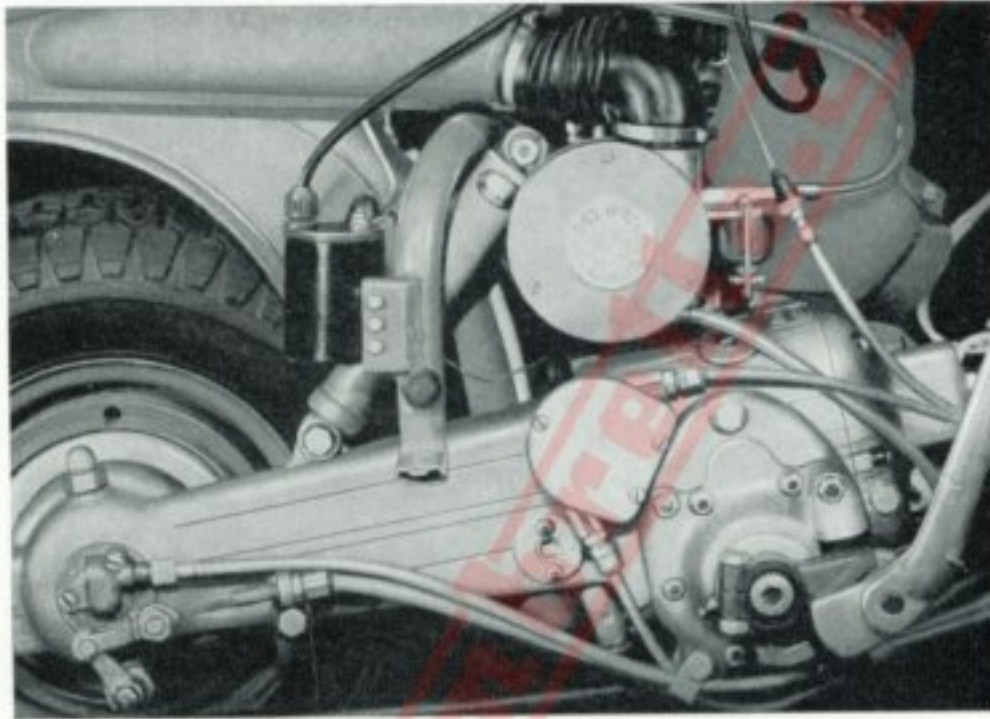
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Doncaster 3846

# Ld 150, Mks. I, II, III, and Ld 125

## Maintenance



Engine unit of the Mk. III 150 Ld

### Tyres

Check the tyre pressures and set to 16 lb/sq. inch front and 24 lb/sq. inch to 30 lb/sq. inch rear according to load.

If it is necessary to remove the wheels, do so by unscrewing the three domed nuts around the wheel rim with a 14 mm. spanner. In the case of the front wheel also slacken the spindle nuts using the sparking plug spanner and ease the wheel from the suspension links towards the rear, holding the thick washers next to the spindle nuts clear of the recesses in the links. There is also a thin washer between the offside link and the brake backplate.

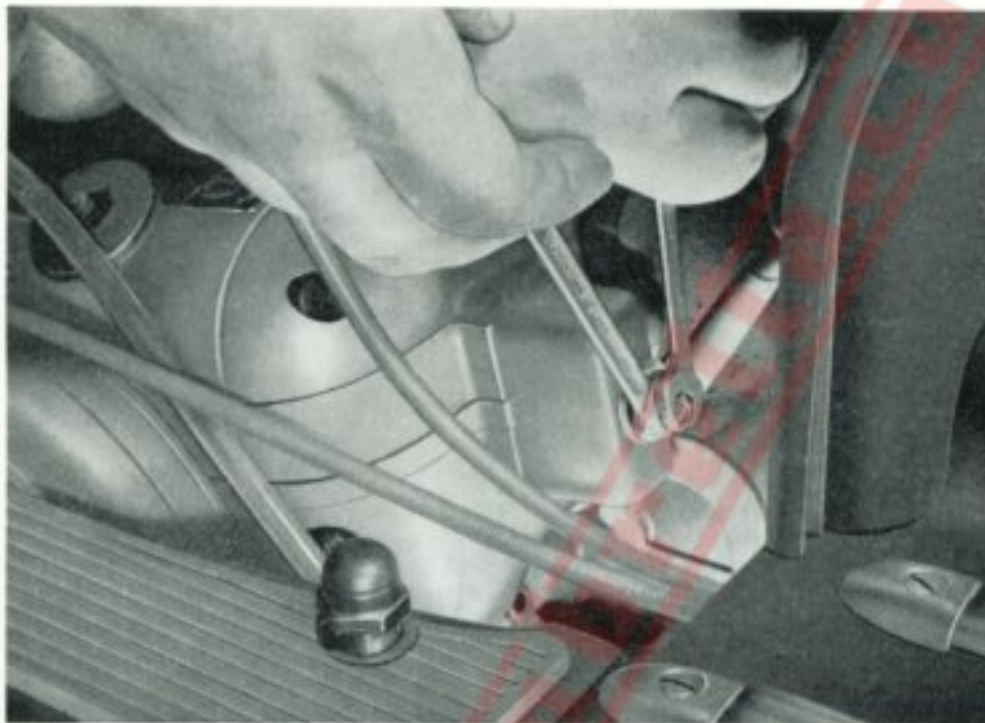
Do not unscrew the remaining three rim nuts until the tyre is completely deflated and avoid excessive pressures in the tyre at all times, but particularly when only the three nuts remain securing the rims.

Be sure to enter the projection on the offside suspension link into the slot on the brake back plate when replacing the front wheel in the forks and tighten the spindle nut with the weight of the foot on the spanner. Also keep the rim fixing nuts tight and don't lose the spring washers.



## Cable Adjustments

Front and rear brakes can be adjusted by the knurled screw at the hand lever and the threaded support on the side of the transmission case respectively. Tighten these cables until the wheels will just rotate without any resistance of the brakes being felt.

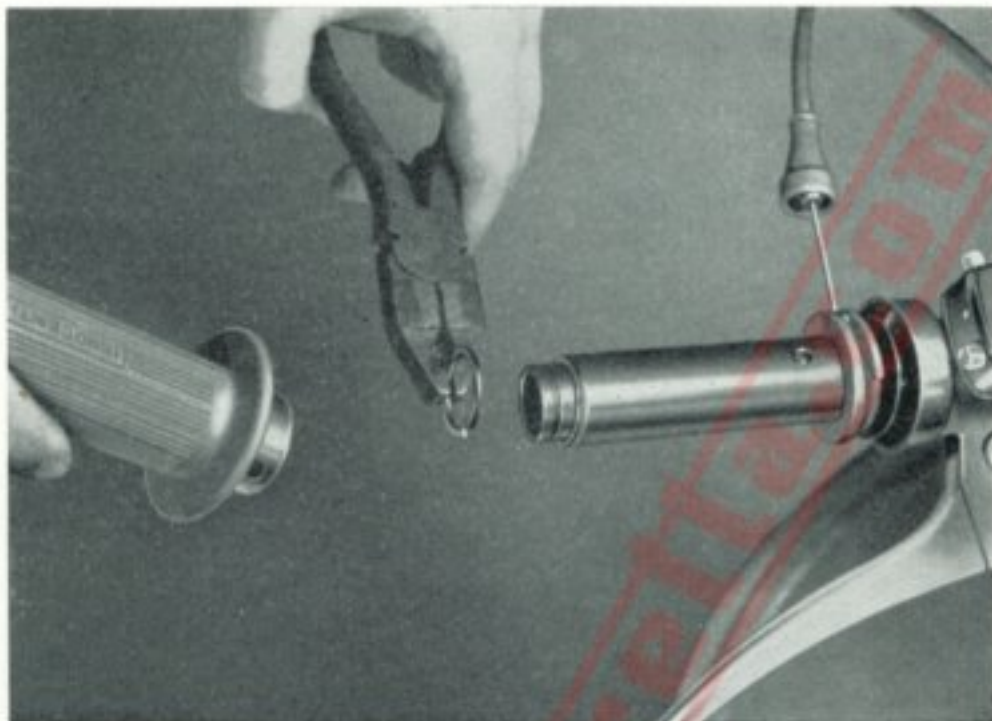


Adjusting the 8 mm. nuts on the clutch pull-rod

The clutch is also adjusted by a knurled screw at the handlebar but there should be at least  $\frac{3}{4}$ " free movement at the tip of the lever. When no further adjustment remains at the lever end, remove the 19 mm. domed nut from the centre of the clutch cover on the offside at the front of the engine compartment and slacken the two 8 mm. hexagon nuts locked together on the end of the clutch withdrawal pull rod beneath, using suitably thin spanners. Set the nuts in a position which will allow the adjustment at the handlebar end to be restored and re-tightened. (Do not overtighten or clutch slip will be experienced).

The throttle cable is adjusted at the carburettor end and should be tight enough to avoid free play of the twist grip but not cause the engine speed at tickover to increase when the handlebars are turned. The twist-grip can be prevented from self-closing by slackening the nut and screw on the aluminium support beneath the lighting switch. And then tapping the whole support with a mallet towards the twistgrip and the end of the handlebar. Afterwards re-tighten the nut. Machines after Engine 190851 have a conical spring washer, part No. 11770402, between the twistgrip and lever support. This can be fitted to previous machines with advantage.

The gear cables must be without free play but when adjusting them avoid placing any tension on the cables which would make the gear change stiff.



Dismantling the twist grip assembly

### Lubrication

Use a two-stroke oil in the petrol/oil mixture as for the Li models, in the proportion of 1-20. Alternatively, half a pint of oil may be added to every gallon of petrol.

When changing the gearbox oil, the correct plug to remove is the one situated beneath the engine immediately ahead of the lug on the frame which contains the torsion bar; the adjacent plug fitted by a 19 mm. spanner contains the spring loading the gear engagement pawl and this must not be removed.

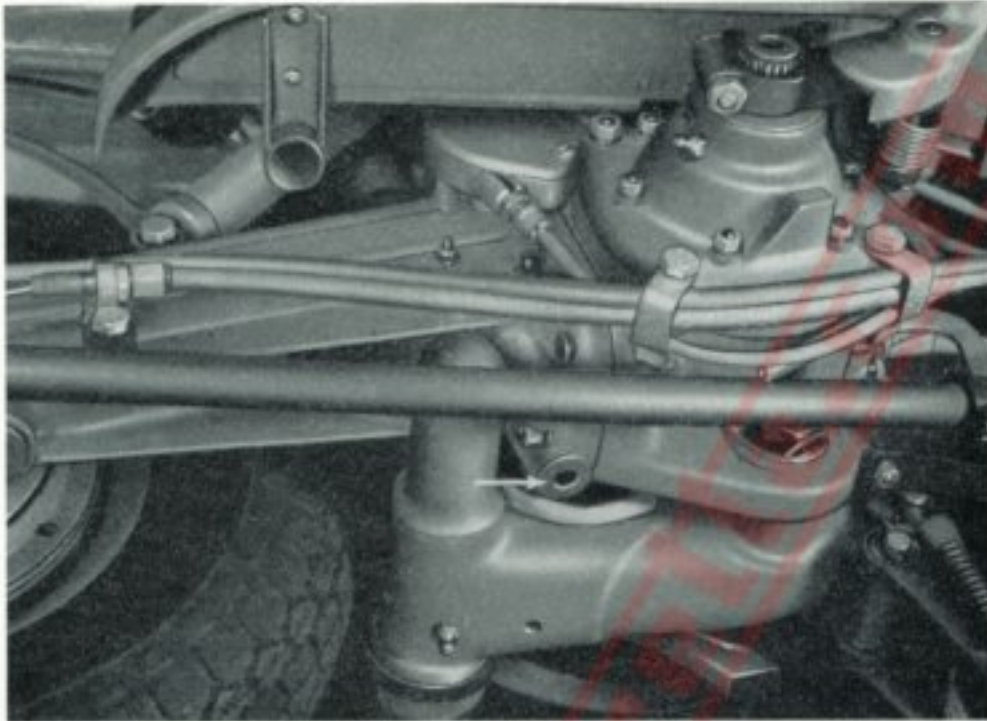
When refilling, use oil of 30 grade in summer, 20 grade in winter. These are thinner than recommended for warm climates and will help to prevent the clutch plates from sticking on cold mornings. With the introduction of the Mark II and III machines the capacity of the gearbox was increased from  $\frac{1}{2}$  pint to  $1\frac{1}{4}$  pints to the level plug. This is situated on the clutch cover and fitted by a 14 mm. spanner. On later models it is on the side near the offside pillion footboard but on Mark I machines it is beneath the cover. With these it is permissible to add an extra  $\frac{1}{4}$  pint when the level plug is replaced to avoid having to top up frequently.

The oil in the back axle need not be changed but the filler cap should be removed to make sure it is well up to the level. If topping up is needed add 140 grade oil.

All Mk. II and III machines have cable oilers grouped at the bend of the frame tube immediately behind the front mudguard. They should be used as described for Li Series I and II. For the front brake cable the oiler is situated in front of the suspension box of the forks and care should be taken to prevent excess oil from draining on to the brake linings.

Lubricate the choke control by applying a little oil around the stem of the knob.





Arrow shows gearbox oil drain plug

Periodically the end of each cable should be detached from its support furthest from the handlebar and a plastic pipe attached to a force-feed oil can may then be fed over the nipple, and inner cable, on to the outer to provide a joint through which the oil can be pumped. In these cases the gear cables will need to be detached from the handlebar end on machines prior to Engine 150351 when the detachable cable nipple was first introduced.

Soft grease such as Castrolase CL must be used for the torsion bar bearing and the front suspension, and to the torsion bar bearing the grease gun should be applied until grease is seen to come from behind the rubber sealing ring to the side of the grease nipple. This latter is located beneath the machine approximately 3" ahead of the front of the rear wheel.

Less important are the grease points on the rear brake pedal and the knuckle joint behind the engine fan cowling but particular care must be taken when greasing the rear brake cam spindle and the front wheel hub. Too much grease will cause some to enter the brakes and render them ineffective. Preferably dismantle the hubs and smear the brake cam spindles and brake shoe pivots with high melting point grease (Castrolase W.B. or equivalent) and after removing the oil seals on the front wheel spindle pack this same grease around the bearings. Note that where the oil seals are of the type having a spring ring surrounding the inside rim, the open side should face outwards in order to prevent damage or displacement of the seals if any pressure builds up in the hub.

The high melting point grease should also be used for the magneto side bearing. Access to this is obtained by removing the nearside pillion foot-board (held by four 8 mm. nuts) and the fan cowling. On models prior to Engine 189700 proceed by slackening the carburettor clamp securing bolt with an 8 mm. spanner (preferably of the tube type with an extension) and after twisting and pulling the carburettor from its spigot, release the

cowling at this point and undo two of the screws connecting the cowling halves. Leaving the third and least accessible screw in place, slacken the pinch screw holding the fan cowling clamp ring in place around the magneto housing, using a short screwdriver inserted through the slot in the edge of the cowling at the front to reach the screw which is hidden, but can be felt near the magneto terminal block.

Pull off the cowling from the nearside, allowing the offside half to pivot on the remaining connecting screw around the front of the cylinder. Later machines have a lip at the joint of the two cowling halves and the three nuts and bolts are accessible to an 8 mm. tube spanner. With these, the carburettor does not have to be taken off but it will be necessary to remove the three screws around the outside of the cowling because a flywheel fan of increased diameter prevents the clamp ring from being taken off.

It is most important to remove the plug, fitted by a 10 mm. spanner, adjacent to the grease nipple when applying grease to the main bearing. Otherwise grease will be forced into the crankcase.

Because of the trouble involved in reaching this grease point it will usually be convenient to do this only at 3-5,000 mile intervals when attention to the magneto contact points is required. At the same time ensure that the felt pad rubbing on the flywheel cam opposite to the contact breaker points receives a few drops of oil. This is very necessary to keep the heel of the contact arm from wearing but do not overdo it or oil will find its way between the points and cause misfiring.

### **Battery**

All Lambrettas use a negative earth. Connect the " — " terminal of the battery to the frame. Even momentary reversal of the connections will cause the fuse to burn or ruin the rectifier. If in doubt check that the battery has been charged with the indicated polarity before fitting.

Replace the fuse when burned only after tracing and correcting the cause of the burning. Use 5 amp fuse wire for machines with battery parking lights and 8 amp for L.D.A. self-starter models.

**Battery Maintenance** Refer to Maker's instructions.

### **Sparking Plug**

Set the gap by tapping the outer metal point towards the central electrode. Approximately .020" will be a satisfactory measurement.

Always make sure that the H.T. lead is tight in the bakelite suppressor cap fitting over the plug and also at the H.T. coil connection. Replace the lead if it has been chafed by the throttle cable and position the lead so that it does not touch any moving parts. The Recommended Sparking Plug is the " CHAMPION " L5.



## Control Cables

On machines after Engine 150351 the inner cables of the gear change were detachable and this was done to front brake and clutch cables after Engine 173451. The modification can be made fairly simply on earlier models to allow the gear and front brake cables to have the detachable nipple fitted, but the clutch requires a different lever (part No. 40060166) to be fitted to the clutch cover.

The throttle cable can be fitted with the detachable nipple (assembly 15022030) used on the clutch and gear cables, to enable the inner cable only to be replaced in an emergency, but for this and the choke no separate inner cables are supplied. The owner is well advised to carry spare inner cables and detachable nipples.

Gear cables or throttle cables should be detached from the end further from the handlebars and by slackening the 10 mm. pinchbolt holding the aluminium support adjacent to the twistgrip, the support may be loosened and slid along the handlebar to allow access to the cable so that the inner may be withdrawn and the new one entered. Where the soldered type of nipple is fitted to the gear change remove the offside pillion footboard. Take off the selector box cover, the selector box and arm from the casing before attempting to slip out the cable nipple from the selector arm. The box is held by three screws which can be reached with a large screwdriver if first gear is selected. Since the screws will be very tight they should each be loosened by a blow from a hammer and drift placed on the screw head. A circlip surrounds the selector shaft and must be lifted off before the assembly can be withdrawn by levering with a screwdriver behind the box. Note the position of the selector arm on the splines for refitting.



Move the support along the handlebar and slip out the throttle cable

On assembly the cables should be replaced in the selector arm and the unit fitted back into place before attempting to solder the nipples at the handlebar end. Pull the inner cables as tight as possible with a pair of pliers before selecting the position to solder the nipples and after fitting them, cut the cable cleanly with good cutters or a cold chisel and splay the ends of the wires where they are to be soldered.

Alternatively, the selector arm can be replaced with the modified part, No. 12030315, to accommodate the later type of inner cables and detachable nipples. Note that with the introduction of the Mk. II and Mk. III models the length of the longer of the two gear cables was further increased, and again still more on LDA's.

Cables with oilers can be fitted to machines previous to Engine 190850 not having them as original equipment, but note that the front brake and clutch cable were increased in lengths after Engine 173451, when they were re-routed, crossing one another in front of the handlebars to give a more gentle sweep. Later cables can be fitted in earlier models but not vice-versa.

This has particular importance in the case of the front brake cable where sufficient loop must exist in the cable between the eye on the suspension box and the support on the brake backplate to allow for suspension movement. If there is too little the cable will tighten as weight depresses the suspension and when the front brake is applied the wheel may lock with serious consequences.

Inner cables can be removed from clutch or front brake controls by detaching the cable end further from the handlebars and taking out the pivot and nut retaining the hand lever. Pulling the hand lever away from its socket will draw out the inner cable.

Changing the complete cable on a Mk. I machine is best accomplished after removing the headlamp and horn support casing. This is held in place by two countersunk screws which face the rider on the inside of the legshield and two 10 mm. bolts disclosed when the headlamp is removed after taking out the securing screw at the bottom of the rim. Some early models may need a 4½ mm. allen key to fit these two bolts but most have a hexagon.

Help the removal of the cables from the plastic sheaths by inserting oil and use grease when sliding in replacements.

Where cables assembled with soldered nipples are used for clutch or front brake controls, it will be found that no ferrule is fitted to the replacement outer cable. Be very careful therefore to see that the slotted cable stop is slipped into position on each end of the cable after fitting and turn the cut end of the wire coil forming the cable outwards with a pair of pliers to avoid the possibility of it being squeezed in by the pressure against the cable stop and thus pinching the inner wire.

To replace a choke cable, remove the carburettor after slackening the pinch bolt holding it to the manifold and unscrew the choke unit. Fit the new part by entering the appropriate end into the choke knob support and pressing the nipple, which passes through the support, into the knob. Pass the nipple on the lower end through the adjuster and hold the spring compressed in position with the fingernails whilst attaching the brass valve. Ensure that a small amount of play exists in the cable or otherwise the choke will not close properly.

Self-starting operating cables are supplied complete with adjusters where fitted and the later types having the lever mounted on the side of

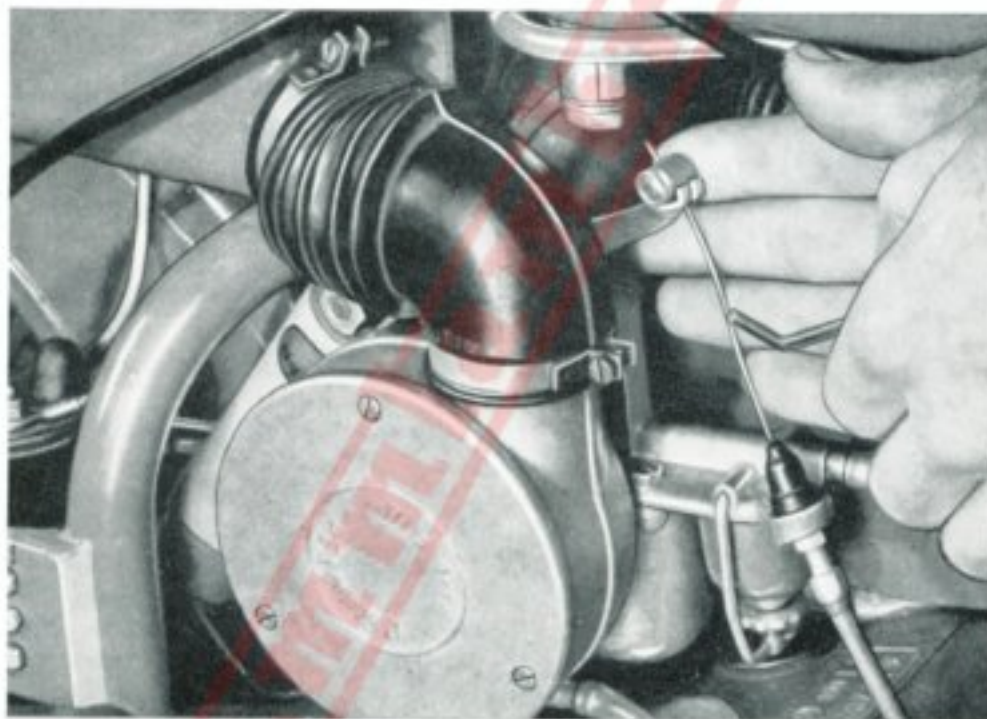


the glove box are shorter. To dismantle the cable, remove the starter motor and switch and press out the small pin fitting across the switch cover end where the cable enters covered by a rubber sheath. Care will be needed to line up the drilled end of the new cable for the pin to be re-inserted. Make sure that once in place, the sleeve moved by the outer cable slides easily over the nipple. Otherwise, reduce the nipple by filing. Re-new the rubber sheath over the cable end if torn or water can enter and corrode the switch.

Mk. III LDA machines are fitted with rear brake cables and lower gear cables of increased length.

When inner cables of the type secured by a detachable nipple are to be changed, the repair can be accomplished quite simply. The split cable stop is still fitted to both ends of the clutch and front brake cables and the selector box ends of the gear cables. Since it may become lost, spares should be carried together with the inner cables and detachable nipples. The part No. is 11770805.

Besides the tools in the kit, which includes the  $3\frac{1}{2}$  mm. allen key 15086066, a medium sized pair of pliers are necessary. With these, the detachable nipple can be held while the  $3\frac{1}{2}$  mm. allen grub screw is slackened or tightened, and also, in the case of the gear change, the inner cables can be pulled taut.



Using the detachable nipple 1 5022030 to secure a throttle inner cable

Provided that the spare inner cable for the gear change is of the longer type, it may be used for either side and the excess cut off after fitting. Be sure to bend over the small end left protruding through the nipple so that it cannot press on the projecting lug in the selector box and prevent either first or top gear from engaging properly. Note that the position of the gears in the gearbox will not be affected by the cable adjusters but the position of the handlebar lever will. If the lever is too high or low so that

the red numbers do not correspond with the arrow, slacken one adjuster and tighten the other and the lever will move one way or the other.

The throttle cable has soldered nipples at both ends, but if the nipple is removed from the carburettor end of a new cable the inner can be taken and used to replace a broken cable by entering it into the outer cable from the handlebar end and attaching it to the twistgrip after moving the support clamp as previously described.

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## Brakes and Wheels

Although the cables and brakes operating cams and pivots must be lubricated in order to move freely with a minimum of friction, the brake linings on the shoes need to be protected from oil and grease. The lining surfaces should be quite clean and if dirty or oily the shoes can be washed in clean petrol and after drying, the surface only of the lining may be wiped with carbon tetrachloride (sold as "Pyrene" or "Thawpit"). The same procedure may be followed for the steel insert of the brake drum.

The shoes should bear evenly on the drum and the shoe positions on the brake back plate should never be reversed after they have been used.

Where some of the lining shows heavy rubbing, emery cloth can be used to relieve the high spot. If necessary assemble the unit, try the brake and dismantle again, several times until even contact all over both shoes is obtained by judicious use of the emery cloth. Do not remove more of the lining than is absolutely essential or their condition may be made worse than originally. A rough surface is not desirable. When the linings are worn so thin that the cam is unable to press the shoes outwards to make satisfactory contact with the drum before reaching an angle which no longer gives efficient operation, service exchange shoes should be purchased.

To remove the rear hub, unscrew the centre nut with a 27 mm. ring spanner. That is supplied in the tool kit can be used provided that on re-assembly it is hammered home in order to obtain the necessary tightness of the nut with the small length of arm on the spanner. Some machines will have a locking screw visible in the centre of the nut and this screw has a 5 mm. 0.8 mm. pitch left-handed thread. If using the hub extractor 37061/E with these, take care to see that the end threads in the hole are recessed out with a  $\frac{3}{16}$ " drill to a depth of  $\frac{1}{4}$ ", to prevent fouling of them by a point of the tool. Early models have a round centre nut with three notches, which is not so easy to tighten as the one with the 27 mm. hexagon and should be replaced with the later type.

The extractor screws into the two 6 mm. threaded holes in the hub on either side of the centre nut. The screws and centre bolt of the tool should be tightened and the hub removed by hitting the bolt bearing on the end of the axle squarely with a hammer. If several blows are needed, tighten the bolt a little between each blow, but take care not to over-tighten. Alternatively the hub can be jarred from its taper fitting by hitting the offside of the tyre with a wooden mallet.

After the circlip on the brake shoe has been lifted off, the two shoes can be prised off taking care that they withdraw evenly and avoiding excessive pressure which will snap the shoe at the pivot.

Replace the pair on the back plate together with the spring in position; do not try to lever the spring on afterwards.

If oil is entering the brake drum in the case of Mark III models, check that the end of the silencer tailpipe is not lying too close against the transmission case near to the brake cam spindle; it should be bent as far out from the case as its bracket will allow. Any oil around the centre inside the hub near the axle will indicate failure of the axle oilseal which should be replaced, not forgetting also the rubber ring which is between the axle support casing and the oilseal housing flange. Overfilling of the gearbox can sometimes cause oil from this to force its way into the axle end of the case, but it can be prevented by drilling a hole approximately  $\frac{1}{8}$ " diameter in

the top of the front piece of the clutch cover above where the clutch operating arm enters. This relieves any pressure in the gearbox and is present on some Mark I and all Mark II and III machines.

For attention to the front brake, slacken the nut between the offside suspension link and the brake backplate with a 19 mm. spanner after loosening the offside spindle nut and before undoing the nearside one.

Take the wheel complete from the links. Complete the removal of the offside spindle nut and the back plate fixing nut. If the backplate now sticks, drive the spindle towards the nearside with a mallet, not forgetting to re-centre it afterwards.

Remove the shoes as described for the rear brake. In this case the pivot circlip is a small wire ring which is best levered off with the aid of two small screwdrivers. Grease the pivot and cam before re-assembly, taking out the cam if need be to lubricate its spindle.

The wheel bearings are of the journal type and need no adjustment.

Dismantle by driving out the spindle and tap out the bearings with the aid of a small diameter drift passing obliquely through the centre of one bearing to press on the edge of the other from the inside. A circlip retains the bearing on the nearside, providing sideways location of the hub.

Two sorts of oilseal are fitted, the later ones being of the standard type having a spring ring supplementing the pressure of the inner rim on the shaft. These must face outwards so as to prevent damage to them if pressure builds up due to greasing of the hub. The early type have no spring ring and face inwards. They are interchangeable as a group complete with distance pieces. Note that they will squeak if dry and should therefore be assembled with a little grease.

When fitting the wheel back into the front forks take care to enter the projection on the offside link into the slot in the brake backplate.

A thin washer is fitted to the wheel spindle in addition to the two thick ones. This is placed between the offside suspension link and the nut retaining the brake backplate. Occasionally an extra washer may be needed to fit between the backplate and the centre to prevent rubbing on the brake drum.





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# Carburettor

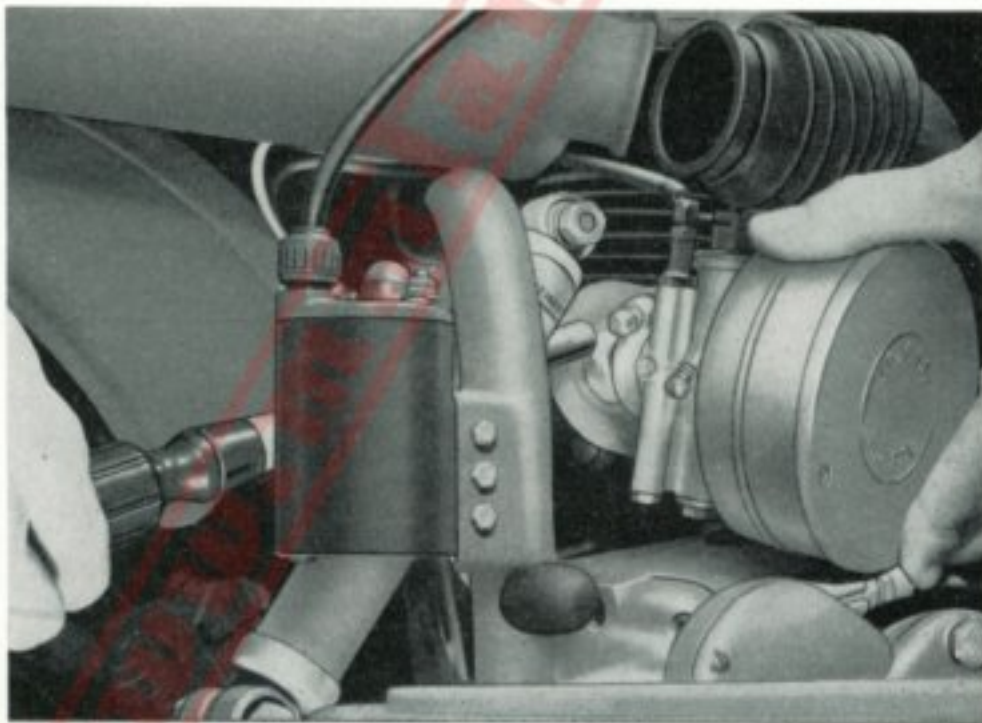
Once the slow running adjusting screws have been set, no attention will be needed except perhaps to lower the taper needle in the throttle slide so that its spring clip rests in the topmost of the three grooves in the needle, when the machine has covered a few thousand miles or the consumption tends to increase. Some wear does take place between this needle and its corresponding jet and since they have a considerable effect on petrol economy, the pair should be replaced with new parts if in doubt.

To dismantle the carburettor, pull off the petrol pipe, unclip the throttle cable and pull the end right through the protective rubber and cable adjuster. Slacken the pinchbolt clamping the carburettor to the manifold on the cylinder and twist and pull the carburettor towards you.

Disconnect the choke cable unit using a 10 mm. spanner.

The main jet is above the hexagon plug in the base of the carburettor and is screwed into the throttle needle jet. The diameter of the needle jet (2.55 mm.) remains unchanged on all LD Models, but the main jet should be No. 72 for Mark I LD 150, No. 75 for Mark II and III LD 150, and No. 68 for Mark III LD 125.

Undoing the two 8 mm. slotted screws on the float chamber top will enable this to be lifted away complete with petrol filter and throttle slide. The filter is dismantled by slackening the knurled nut in the stirrup which holds the bowl against the top of the assembly with a cork washer in between. The float is plastic and although unlikely to leak it should be shaken in order to hear whether there is petrol within; if so replace with a new part. The needle fits with its groove in a clip at the base of the float and should present an unworn conical point to the seating in the cover. Take care that the cut-away portion of the throttle slide faces towards the



Slackening the 8 mm. pinchbolt with socket spanner 1010 to release the carburettor

air cleaner; it is prevented from rotating by the spring loaded screw set slantwise in the carburettor body, which acts as an idling speed control. The other and similar screw lying horizontal, immediately behind the air cleaner, is the mixture strength adjustment for the pilot jet.

The pilot jet can be reached with a small screwdriver after the main and needle jets have been removed. The normal position is approximately one and a half turns out from fully screwed in.

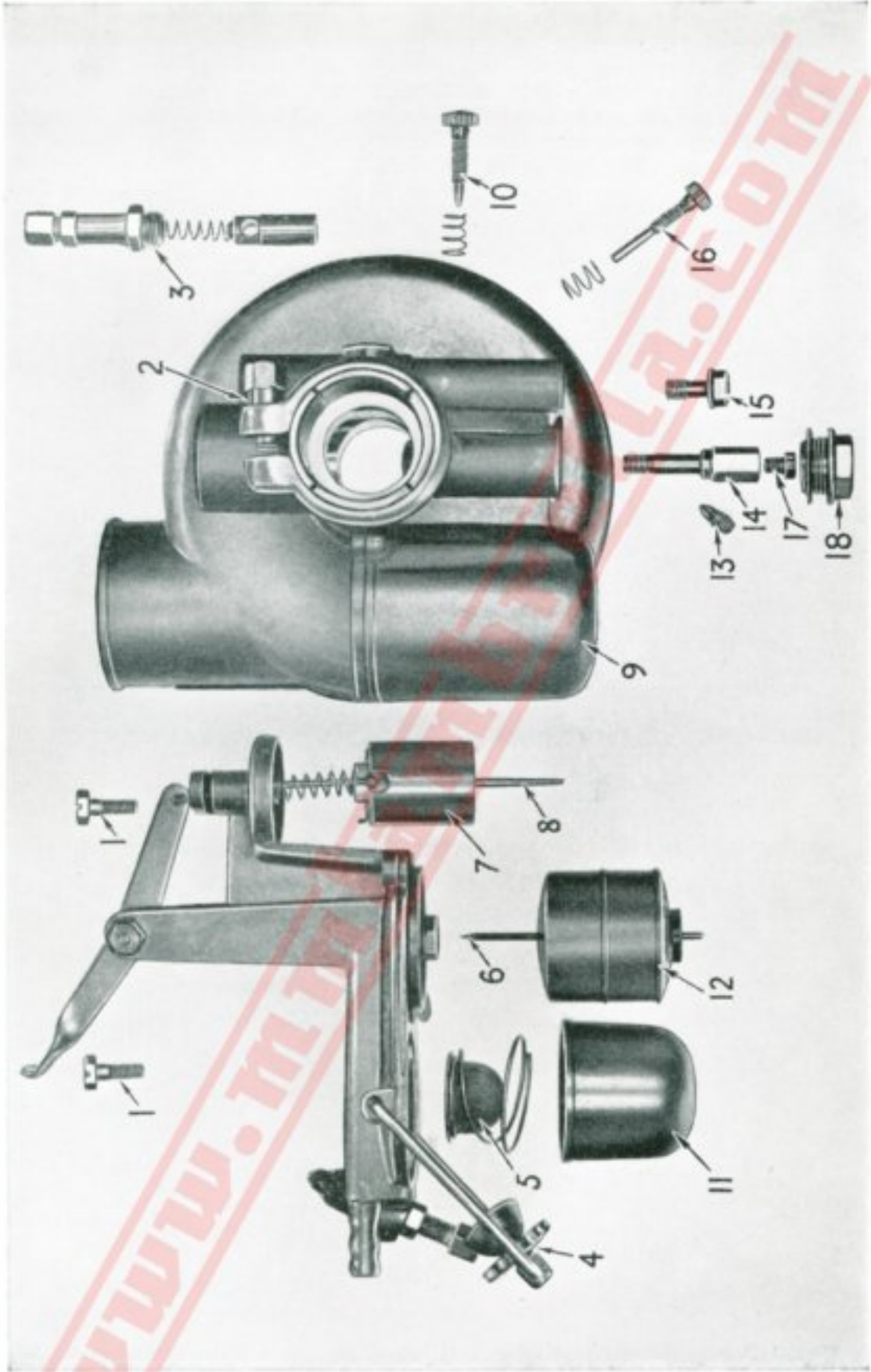
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### EXPLODED ILLUSTRATION OF MA19B4 CARBURETTOR

#### Page 120      NUMERICAL LIST OF PARTS

- |                         |                          |                         |
|-------------------------|--------------------------|-------------------------|
| 1. Top fixing screw     | 7. Throttle slide        | 13. Idling jet          |
| 2. Clampring, pinchbolt | 8. Throttle needle       | 14. Needle jet          |
| 3. Choke assembly       | 9. Carburettor body      | 15. Starter jet         |
| 4. Filler bowl stirrup  | 10. Idling mixture screw | 16. Throttle stop screw |
| 5. Filter               | 11. Filter bowl          | 17. Main jet            |
| 6. Float needle         | 12. Float                | 18. Base plug           |
-





# Decarbonising

Besides the tool kit, it is essential to have a 11 mm. socket spanner to fit the cylinder head nuts and it does help to have the special tool for the ring nut holding the exhaust pipe to the cylinder. However, both this and the ring nut around the filler neck of the petrol tank can be turned by using a hammer and drift. If the small end bush is to be replaced an extractor will be needed to press out the old bush and a reamer will have to be used to remove the excess metal from the new bush to obtain a good fit with the gudgeon pin.

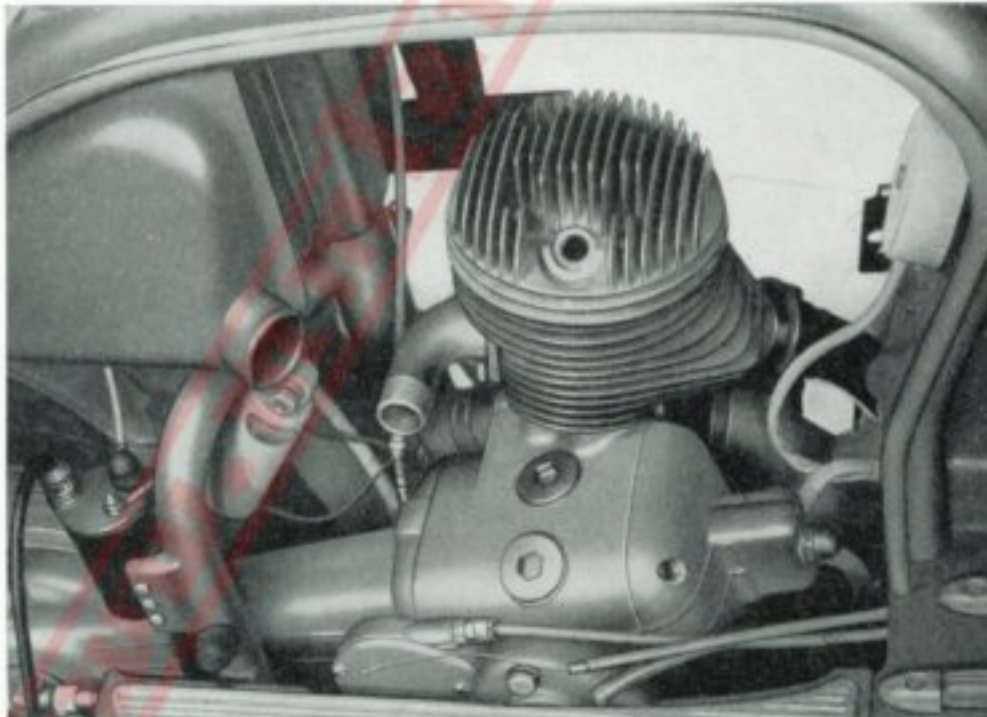
Up and down movement of the connecting rod will not generally exceed  $\cdot002$ " unless over 30,000 miles have been covered or the bearing has suffered through lack of lubrication. However, the clearance in the bearing at the piston end will give rise to a loud rattle at high engine speeds or at a very slow tick-over;  $\cdot008$ " wear may be allowed. No clearance is permitted between the piston and the gudgeon pin although the two may be an easy sliding fit; if up and down play is perceptible here the piston must be replaced.

Piston rings need not be renewed unless the gap between their ends exceeds  $\cdot070$ ".

Begin dismantling, after removing the side panels and pillion footboards, by taking off the carburettor. Disconnect the petrol pipe and the throttle cable. With Mark III machines it is also necessary to undo one of the clips holding the rubber inlet hose. Unscrew the choke unit with a 10 mm. spanner.

Unscrew the sparking plug and take off the fan cowling.

Take out the petrol tank, pulling off the spring clip attaching the



The cylinder exposed for dismantling and decarbonisation



petrol tap control rod, undoing the blind nut in the middle of the saddle bracket and unscrewing the notched ring around the filler neck. For early types rotate the tank anti-clockwise viewed from above and take out towards the nearside. On others tilt the tank to one side and slide out.

Take off the silencer, undoing the 10 mm. nut from the stud on the crankcase lug near the pivot on the frame, and the ring nut around the cylinder, using the special tool No. 57842 or a hammer and drift.

Unscrew the four cylinder head nuts and lift this and the cylinder barrel from the studs. Take out the circlips from both sides of the piston and press out the gudgeon pin using an extractor.

Remove all the carbon from the exhaust port, piston crown and cylinder head.

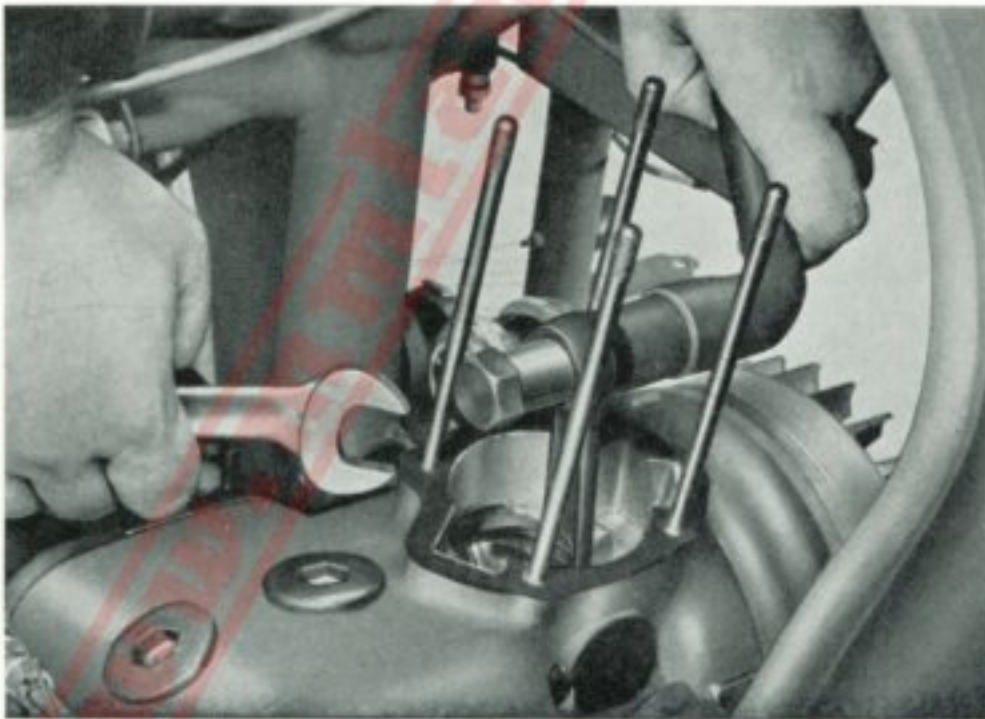
Ease the piston rings from their grooves if stuck, and clean the grooves with an old piece of ring or similar instrument. If the original ones are satisfactory and not stuck, leave the grooves alone. New rings must have an end gap of at least  $\cdot 012''$  when fitted in the bore.

Note that two different diameters of gudgeon pins have been used, those prior to Engine 127815 being 14 mm. and all subsequent ones 16 mm.

Re-boring the cylinder will not be necessary until the clearance between the piston skirt and the upper part of the bore exceeds  $\cdot 012''$  which should not be before about 20,000 miles or more have been covered.

If a new piston has to be fitted, the noise which sometimes accompanies it while bedding in may be lessened by relieving the edges of the exhaust port and the upper edge of the inlet. Use a small half round file and remove most metal at the centre of the port edge, tapering off towards the corners.

New small end bushes may be blank or have the oilways ready cut. If they are not cut, where applicable, drill the two holes in the appropriate



Using the small end bush extractor 1061

position to line up with those in the connecting rod, and after pressing the bush into place, saw through the bush with a piece of hacksaw blade or junior hacksaw to cut out the oil slots. Where the bush already has two slots, position it in the connecting rod so that the slots are symmetrically placed on either side of the rod even though only one slot may cut in the end of the rod.

When using an expanding reamer, take a small even cut at each pass, turning the adjusting nuts half a turn every time. Be sure to obtain a good surface finish in the bush and avoid tilting the reamer. The gudgeon pin must not be tight and .0005" clearance is permissible. Replace the gudgeon pin as well if any marking is present on its surface, refit the circlips.

Oil the piston rings and press them into position in their grooves, making sure that the locating peg in each groove is in position at the gap of the ring. Allow the cylinder barrel to slide over the rings by the pressure of its own weight, only squeezing the ring into place with the finger-tips to assist it.

Do not forget the aluminium gasket between the cylinder and head. If severe "pinking" has been experienced which cannot be cured with a colder type of sparking plug it may be of advantage to fit two gaskets here.

When replacing the silencer get the ring nut as tight as possible around the exhaust stub on the cylinder, replacing the copper jointing ring if at all damaged. See also that the extension or tailpipe is pressed as far home as possible to avoid leakage or rattle. In the case of the latest type of tailpipe, pull the end with its bracket as far away from the end of the transmission case and the rear brake mechanism as possible. If it is too near, oil may leak from the pipe on to the casing and into the brake drum.

Fit the petrol tank and join up the petrol tap control, observing that it fits loosely into its socket in the petrol tap or otherwise the control piece



Allow the cylinder to slide on by its own weight while positioning the rings



will be tilted on its rubber washer and allow petrol to leak. The cure if needed is to swing the tap slightly about the 16 mm. hexagon plug fixing it to the tank to a position which allows the rod to enter the socket easily.

After replacing the flywheel cowling, turn the engine with the kick-starter to ascertain that the fan is not touching the cover and see that the pinchbolt is tight. Push the carburettor right home on its spigot and tighten the pinchbolt, having first attached the choke and set the instrument so that it is upright.

If hardened with age the plastic petrol pipe should be renewed. Note that the new one must not be too long. The other pipe attached to the bottom of the air cleaner is a drain and not so important.

When putting the H.T. lead and suppressor cap back on the sparking plug, set the lead so that it will not be chafed by the throttle control.

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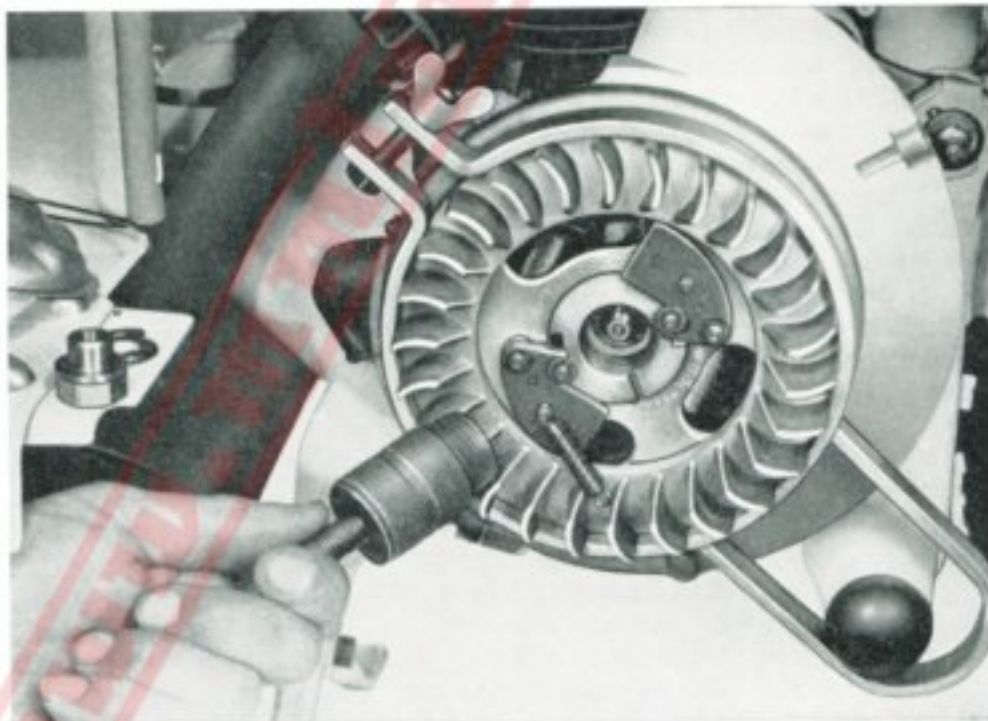
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## The Flywheel Magneto and Generator

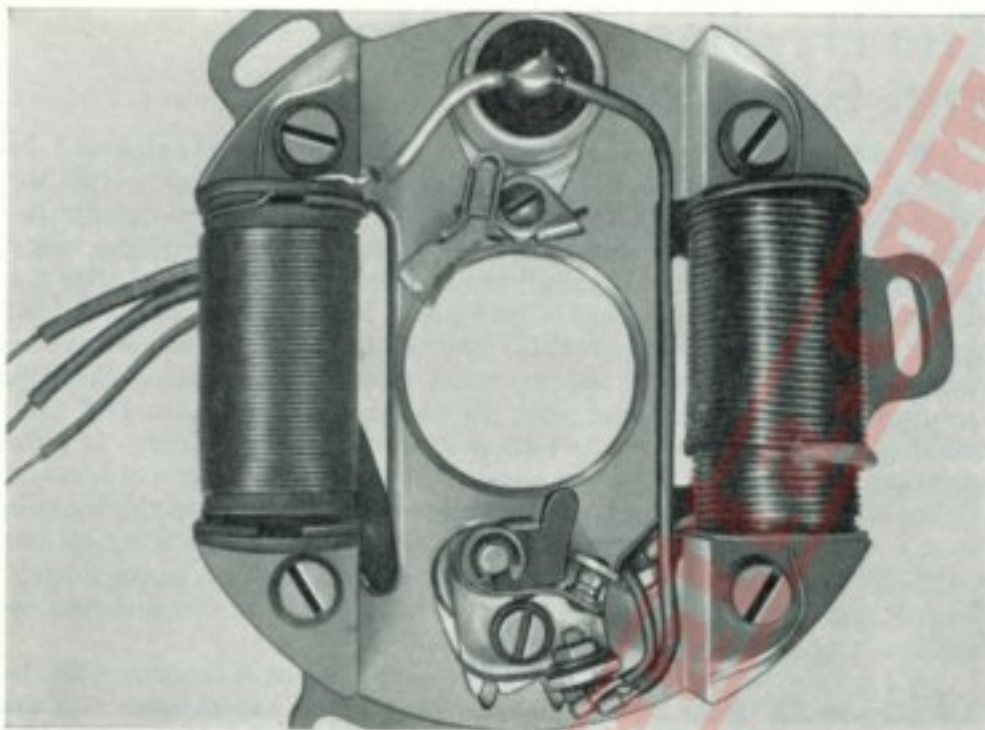
If the ignition trouble is suspected, the sparking plug should be removed and also the bakelite cover on the H.T. lead if fitted. Hold the end of this lead  $\frac{1}{4}$ " from a convenient point on the engine and operate the kick-starter vigorously by hand. A spark should jump the  $\frac{1}{4}$ " gap every time the motor revolves. If there is no spark whatsoever, even after the gap has been reduced to a hair's breadth, a broken connection or short circuit to earth must be suspected. The only connections which may be faulty are the connection of the two green wires at the terminal block on the magneto near the exhaust pipe, the two connections to the H.T. coil, and the earth connection of the second wire from the H.T. coil. If these are sound, then one of the green wires at the terminal block which is not that to the H.T. coil, should be disconnected. This leads to the ignition cut-out on the handlebar switch, and may possibly be worn through and touching the frame, or it may have become short-circuited in the switch. If so, a spark will be produced when the wire has been disconnected by testing with a  $\frac{1}{4}$ " gap as previously described.

If a satisfactory spark is observed when the engine is rotating with the H.T. lead held  $\frac{1}{4}$ " from the cylinder and difficulty is experienced with the engine running, the sparking plug should be examined. If the porcelain insulator, which can be seen behind the sparking points of the plug is not of a pale appearance such as is obviously caused by a high temperature which allows no blackening deposits to form, then such deposits may cause a leak for the current which will prevent any spark from being delivered. Normally the sparking plug gap should be approximately .020" and this should be re-set at not greater than 500 mile intervals.



Holding the flywheel with tool 49220/E while applying the extractor 37058 2E





Stator plate of the Filso magneto

Examine the H.T. lead closely for signs of burning or chafing as by the throttle cable and change its position or replace it as necessary. Also note that a faulty suppressor in the sparking plug cover can give ignition trouble.

The ignition system may be either of Filso or Marelli manufacture and when ordering replacements the make should be specified. H.T. coils, which are fitted on the frame externally to the magneto, are interchangeable and both may be replaced by the Bosch T J/6 coil which is cheaper. In fact, in an emergency any 6-volt car coil could be used.

Contact points for the Marelli system are parts No. 00831611 and for the Filso up to Engine 126950 are No. 00811434. From this engine number onwards, the automatic advance and retard mechanism is fitted and the filso contacts are of a different type having the part No. 00811432.

If the engine misfires at various speeds or steadily gets more and more difficult to start, then it is worth examining the contact points. If the engine tends to stop when the headlights are switched on, this can only be caused by the contact points or sparking plug gap which requires adjustment.

Dismantle the flywheel cowling as described in the chapter on maintenance, remove the sparking plug and also the circlip and dust cover from the flywheel centre. Filso units with automatic advance and retard mechanism also have a plastic ring behind the dust cover. To take off the flywheel it is essential to have a holding tool No. 49220/E, a 19 mm. socket of specially reduced outside diameter No. 1015 and an extractor No. 37058. Note that there is a spring washer behind the flywheel nut which must not be lost and when the flywheel is extracted a small woodruff key will be seen.

The contact points are on the stator plate beneath the shaft end.

Almost opposite them and also bearing on the cam in the centre of the flywheel is a felt pad which must be oiled occasionally to prevent rapid wear of the contact heel. Attention need only be given to this when the points are adjusted, but avoid over-oiling it because any excess will foul the contact points and cause misfiring.

The points should be set squarely opposite one another and when the new ones are fitted, after making sure that the appropriate washers are in place, bend the fixed point with a pair of pliers or tap it with a hammer and small drift into the position which exactly aligns it with the point on the contact arm.

Some oil is necessary on the contact arm spindle but be sure to wipe off all excess afterwards.

All the different contact points are locked by a single screw which can be reached through the apertures of the flywheel. After this is slackened enough to permit the plate holding the fixed contact to be adjusted, the plate may be moved by wedging the screwdriver between the locking screw head and the side of the plate in the case of most Marelli points, by fitting the screwdriver into the vee-notch of most Filso points and twisting, or by turning the small eccentric screw set in the plate near the locking screw in the case of the early Filso and latest Marelli types.

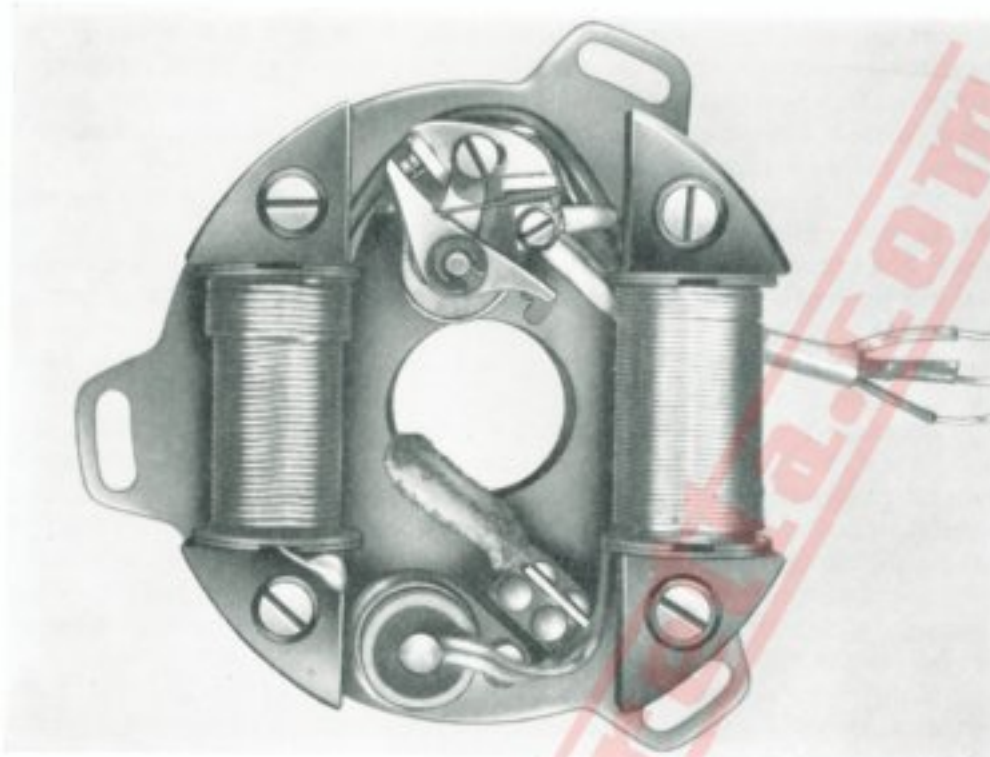
The gap cannot be set to any definite measurement for the best results but must be varied until it is found that the points just begin to separate when the ignition timing marks coincide. Increasing the gap gives the effect of advancing the timing and reducing the gap retards it.

The setting of the stator plate, which is adjustable by three screws in slotted holes fixing it to the inner flange member, is arranged so that the in-between pole position occurs 10 degrees before the timing marks which are in turn 26 degrees before top dead centre of the piston. This total



Filso contact points, Note locking screw and V-notch adjustment





Stator plate of the Marelli magneto

amount of 36 degrees corresponds to a movement of  $1 \frac{1}{16}$ " of the flywheel rim and the ignition advance of 26 degrees corresponds to  $1 \frac{1}{16}$ ". Mark III flywheels with the larger rim which prevents the cowling clamp ring from being removed must have greater measurements of 2" and  $1 \frac{1}{16}$ " respectively.

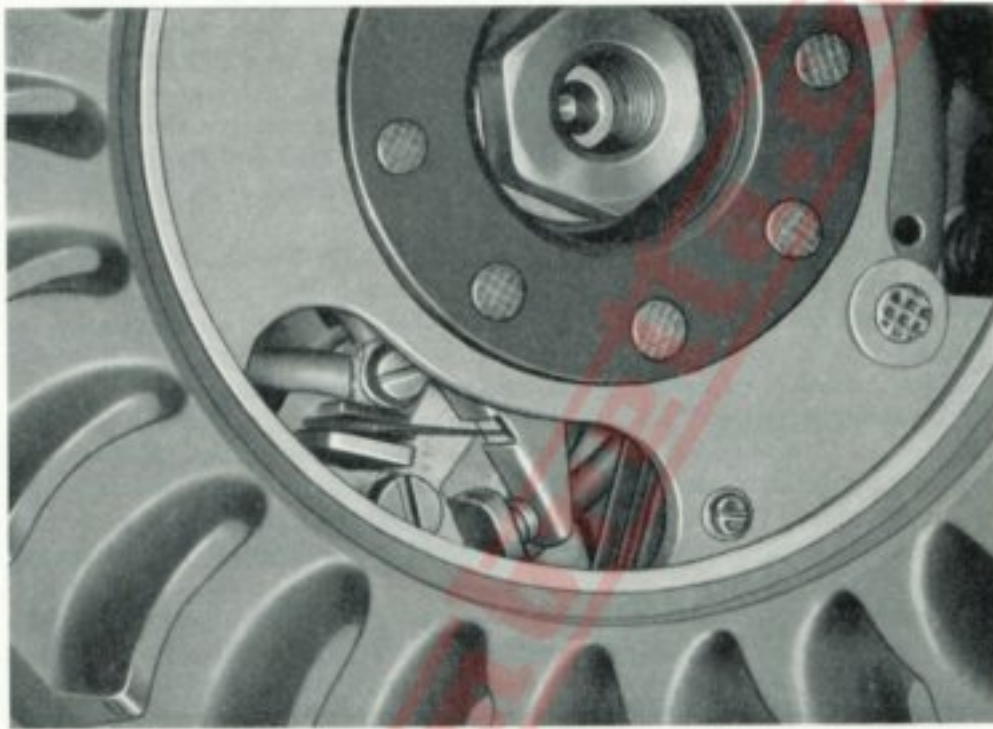
The stator plate setting is fixed at the Factory and should not generally have to be altered. If it has to be, the flywheel must be removed in order to get at the screws.

If there are no timing marks on the flywheel, they may be made by turning the flywheel to the point where the piston at the top of its stroke, which can be felt with a screwdriver inserted through the sparking plug hole or better still determined with a dial gauge, using the special holder No. 48059, then scribing a line at any point on the flywheel rim to coincide with another on the adjacent housing. Next measure the appropriate distance of  $1 \frac{1}{16}$ " or  $1 \frac{1}{8}$ ", according to flywheel diameter, from the mark on the flywheel and make a second to the left of (anti-clockwise from) the first. When the flywheel is turned clockwise until the second mark aligns with the mark on the housing, the position is then found where the contact points should separate and the ignition spark occur. This will correspond to a reading of 3.8 mm. on a dial gauge.

If a Contact Tester is connected between earth and the green wire at the terminal block on the left of the magneto housing, and switched on, the sudden deflection of the needle as the flywheel is turned slowly will show the moment of separation of the points. Alternatively a piece of thin paper between them can be used to indicate when pulled gently, the moment that the pressure is released. To correct the timing, vary the gap as mentioned previously, making it larger or smaller according to whether the points separate too late or too soon respectively in terms of anti-clockwise (normal) rotation of the flywheel.

Adjustments must be made with the automatic advance mechanism held in the outwards or advanced position. This is fitted from Engine 126950.

When dismantling for cleaning or greasing, note that there is one particular way round for the cam of the Filso flywheel, if it is put back the wrong way the spark will occur 180 degrees out of time.



Marelli contact points



# Lighting

The lighting coil produces an alternating current as the flywheel rotates and this is used to operate the lights and the horn, and to charge the battery when fitted.

The output from the lighting coil is approximately 27 watts at 3,000 revolutions or about 30 miles per hour in top gear. This would therefore exactly balance the consumption of a 24 watt headlamp and a 3 watt tail lamp. The nominal voltage of 6 should just be reached under these conditions and a suitable test would be to measure this between the headlamp connection and earth, with the engine running in gear and the back wheel raised clear of the ground for a speedometer reading. On open circuit without any load the voltage will rise above 15.

If a lower value than 6 volts is measured with the headlamp illuminated, it may be due to wrong connections, incorrect bulbs, or a weak output. In the latter case the gap between the flywheel and coil pole pieces can be checked with a feeler gauge entered through the openings of the flywheel face and varied by slackening the two screws holding the generating coil and moving it within the limits of the screw holes which are slightly oversize for the purpose. Do not let the gap be less than .005" or the flywheel may rub with consequent damage to the magnets through the vibration caused. Re-magnetisation which is often necessary on an old machine can only be carried out by returning the flywheel to Lambretta Concessionaries Ltd.

Burning out of the rearlampbulb can occur if there is a bad connection to the headlamp. This is often caused by the dipswitch as it is moved from one headlamp beam to the other and momentarily disconnects both. Normally the copper piece moving with the lever should bridge the contacts before leaving one of them, but if it is bent this may not happen and the rear lamp bulb will receive the full generator output for long enough to ruin it.

Where parts of the headlamp have to be replaced it should be noted that various makes are fitted. The first, Cardini, are now obsolete and therefore any replacement will have to be of reflector and bulb holder together, although rims and glasses are interchangeable with other makes. The three others are Carello, C.E.V. Pagani and Aprilia.

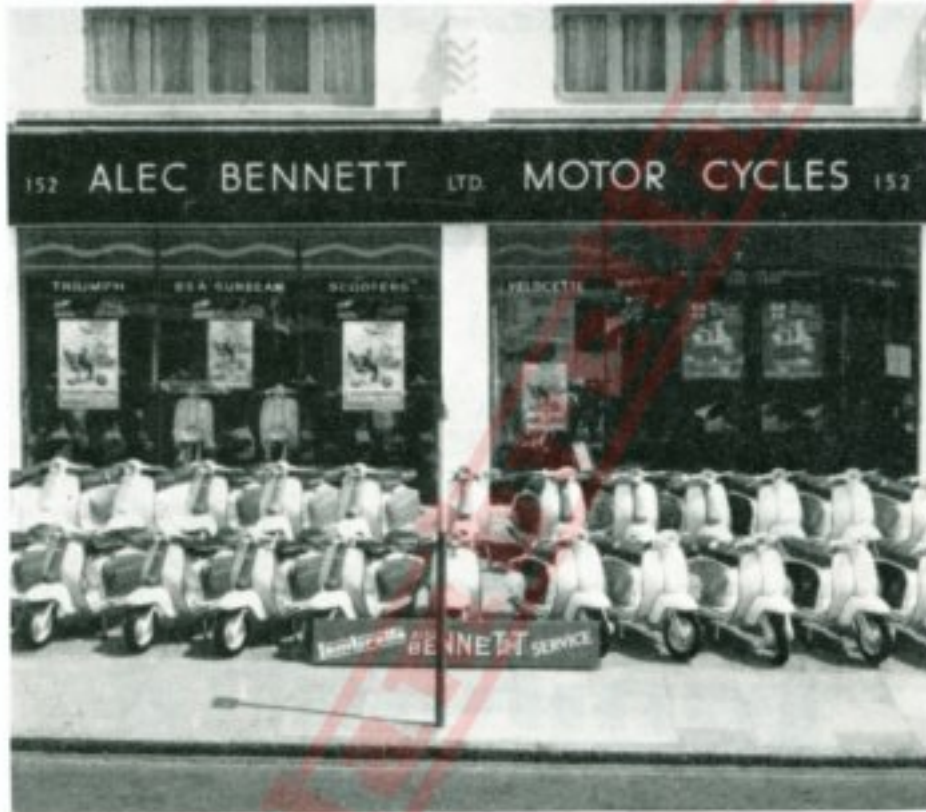
Battery operated parking lights are fitted to all Mark III 150's but not Mark III 125's. They can be fitted as an accessory to Mark I 150's only but on very early ones with the brass earthing tag at the magneto terminal, the lighting coil will have to be changed for the later type with the extra tapping.

Only use the battery lights for parking and then just for short periods, because the battery does not hold a very great amount of charge.

The horn is operated by the alternating current except on self-starter models. It has an earth return on Mark I and II machines and current is supplied to it when the horn button on the lighting switch is pressed. On Mark III machines with the square type of lighting switch the horn has two terminals and a connection is made with either of these direct to the main feed at the junction behind the headlamp. The wire from the second terminal then only has to be earthed by pressing the operating button in order to sound the horn.

The battery operated horn of the self-starter machine has an adjuster

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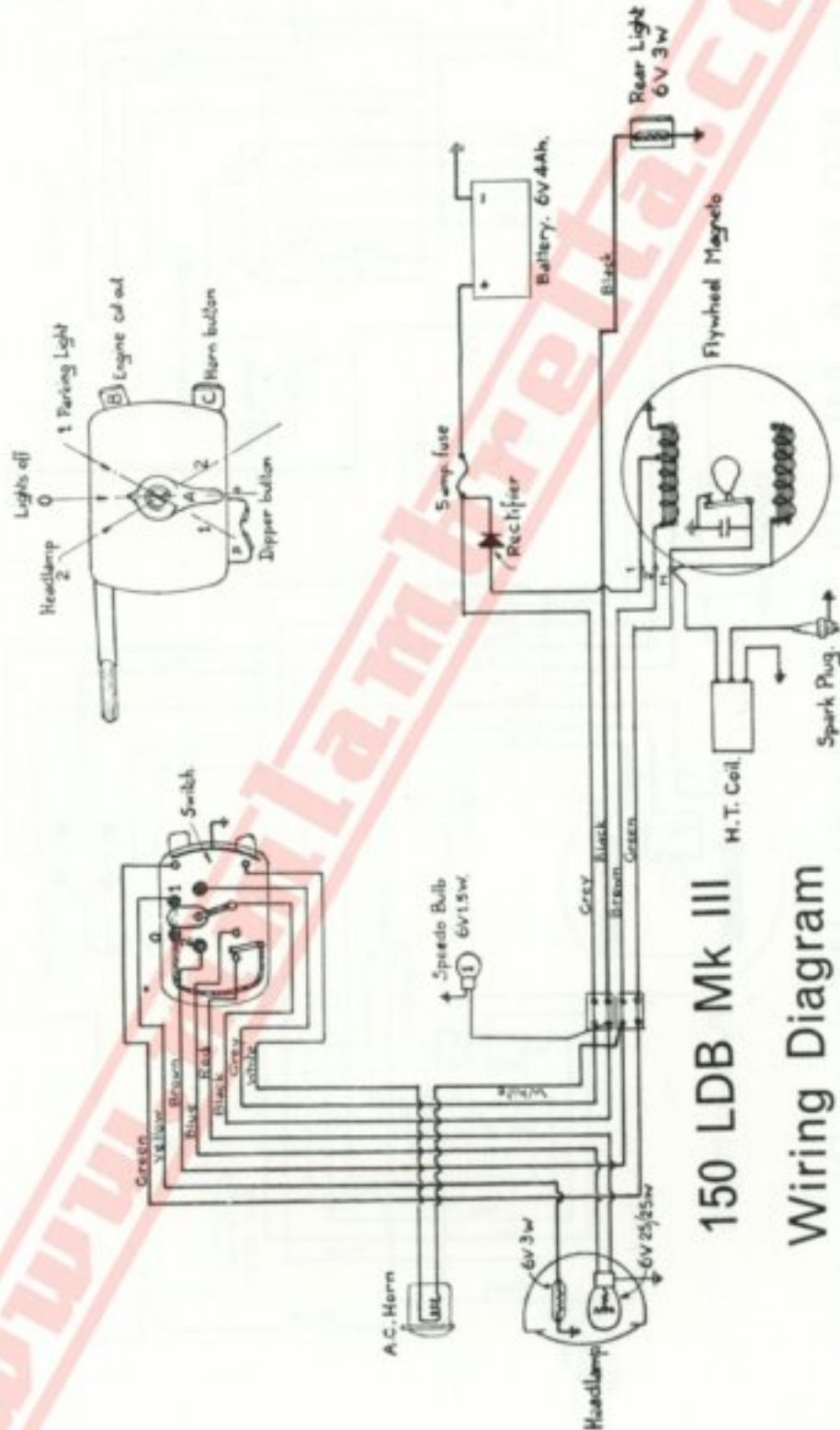
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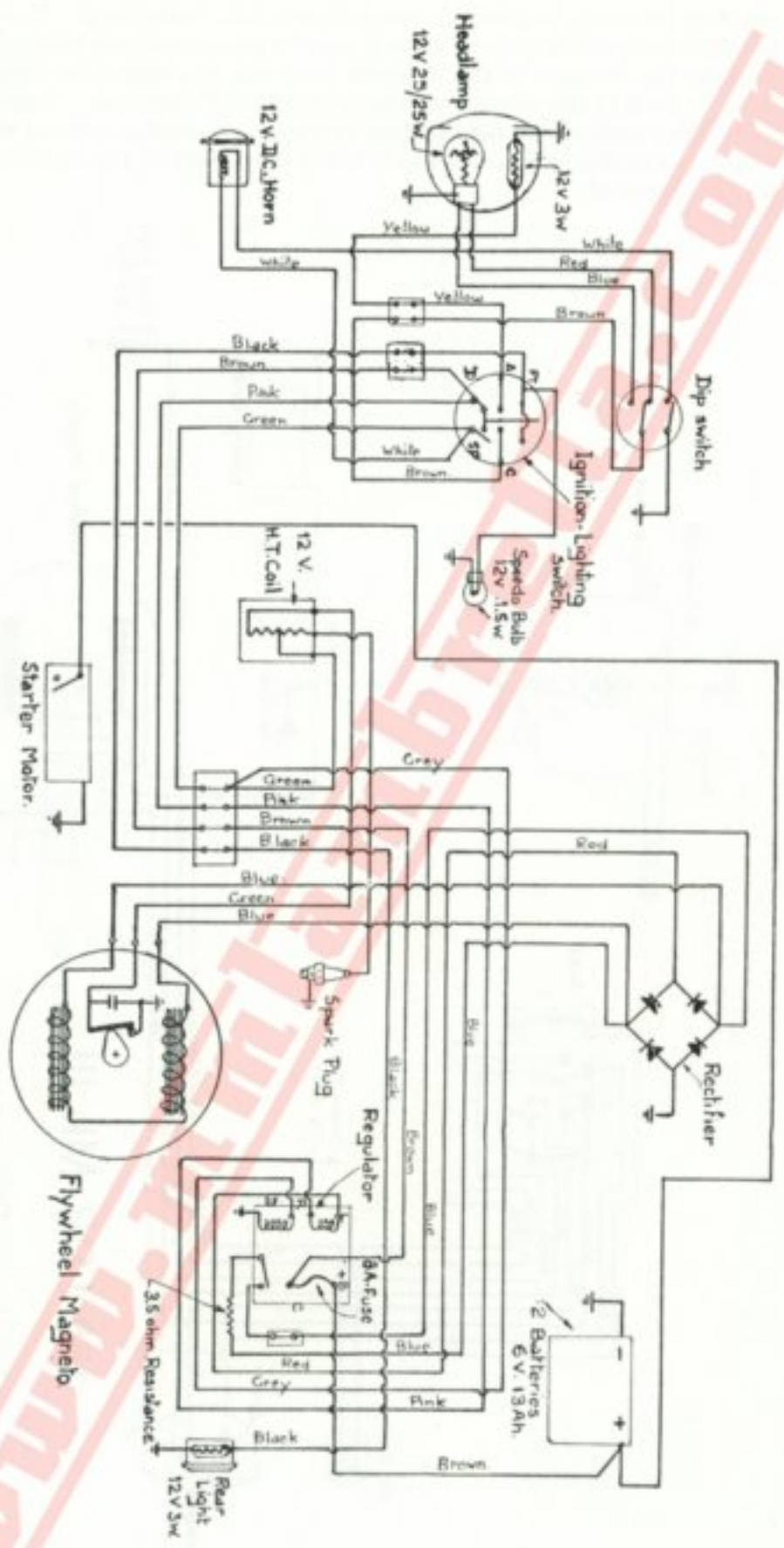
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screw in the back, but none is fitted on the A.C. instrument. However, if the note from one of these is weak it may be improved after taking it off by altering the distance of the magnets from the diaphragm by tapping the sides or back of the aluminium casing with a light hammer. Experiments carried out with a horn held against earth and the button pressed while the engine is running, will show which is the best place to tap to bring about an improvement.



150 LDB Mk III  
Wiring Diagram





Lambretta 150 LDA MK I-III Self Starter Wiring Diagram