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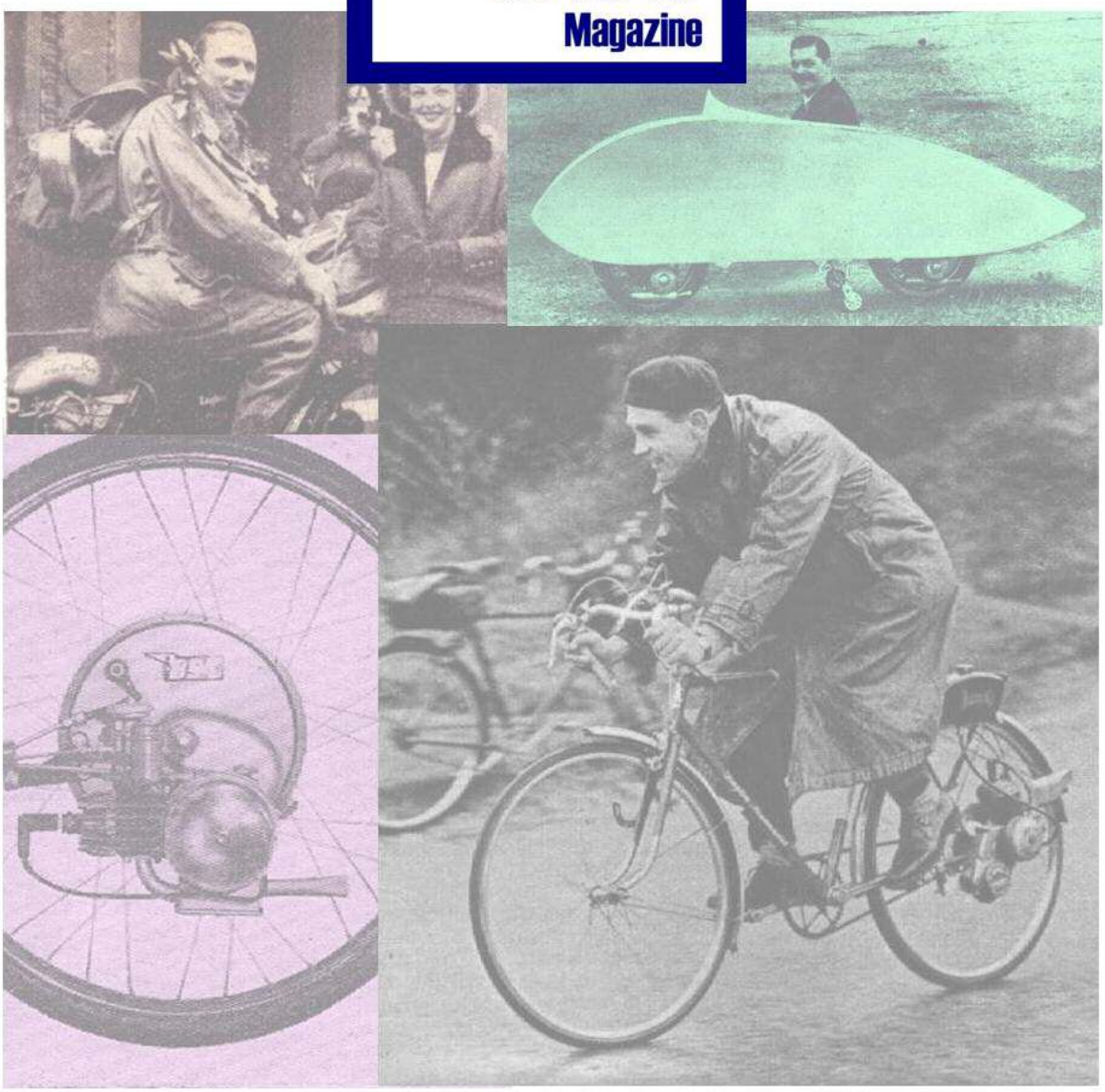

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Motor Cycle & Cycle TRADER

TRADER AID SERIES

Servicing Data Sheet No. 27

PHILLIPS PANDA MOPED

Manufacturer: Phillips Cycles Ltd., Smethwick, Birmingham, 40.

The Phillips Panda moped is a successful attempt to produce a well-made utility moped at a really competitive price. It has a most attractive appearance and the low riding position, with large saddle, gives rise to favourable comment. A comprehensive specification includes a robust and easily operated clutch which enables the rider to keep the engine running while the machine is stationary, as when halted at traffic lights, and to pull away from a standstill without recourse to pedalling. Engine performance is very good and braking power more than adequate. The Panda is sold complete with generator lighting set, electric horn, number plates, licence holder, carrier, tool bag and tools. Available as extras are legshields, wind-shields and pannier bags, all styled and finished to suit the machine.

The air-cooled single-cylinder two-stroke engine is a well tried Continental design, many thousands of which have been put into world-wide service over the past few years. It has a chill cast aluminium cylinder with a cast-iron liner, a detachable aluminium alloy cylinder head, with decompressor operating into the exhaust port and an aluminium alloy piston. The engine runs "backwards" (crankshaft rotation is anti-clockwise viewed from the magneto side) and engine power is transmitted from the crankshaft to the clutch countershaft by a pair of gears (14T on crankshaft and 55T on countershaft) housed behind the magneto. The clutch is a dry multi-plate design. Engine starting is by pedal operation and two methods are recommended:

(1) With clutch engaged and decompressor lifted, pedal the machine to approximately 8 m.p.h. and then release decompressor.

(2) With machine on stand (and ensuring rear wheel to be clear of ground) and pedal in convenient position, engage clutch and depress pedal (using decompressor if necessary).

In both cases the throttle should be slightly open (not more than $\frac{3}{16}$ in. of twist-grip rotation) and the choke needle depressed for cold starting. After warming-up the engine, full operation of the twist-grip will return the choke to its normal position.

The engine is mounted in rubber in the 17 in. tubular cradle type frame, which has brazed lugs, and which incorporates a combination bracket for pedal drive (with nylon bushes), rear engine mounting and centre stand.

USEFUL DATA

Piston and cylinder. Bore—40.5 mm.; stroke—38.25 mm.; swept volume—49 c.c.; compression ratio—6 to 1. The light alloy piston carries two pegged piston rings. Ring end gap: New, 0.007 in.; maximum worn end gap, 0.020 in. Standard ring dimensions: 40.5 mm. outside diameter; 37.7 mm. inside diameter; 2.5 mm. depth. Gudgeon pin diameter—10 mm.

Crankshaft and clutch shaft. The crankshaft, supplied as an assembly only, runs on ball journal bearings (see Bearing table). Crankcase compression is maintained by seals fitted in magneto case (crankshaft seal) and in crankcase (clutch shaft seal). Both seals measure 15 mm. by 24 mm. by 7 mm. Crankshaft end float is adjusted by shims fitted between main bearings and crankshaft bob weights. Clutch shaft end float is adjusted by shims fitted on magneto end of shaft, and the shaft runs on two ball journal bearings (see Bearing table).

ENGINE BEARING TABLE

(sizes in mm.)

Location	Outer	Inner	Width	Type
Crankshaft (left side)	32	15	8	16002
,, (right side)	42	20	8	16004
,, (behind magneto)	32	15	8	16002
Clutch shaft (left side)	32	15	9	6002
,, ,, (right side)	32	15	8	16002

TRANSMISSION. The multiplate clutch, which runs dry, incorporates a thrust bearing which is in operation when the clutch is out of engagement. Six clutch springs are fitted and the spring free-length is 31/32 in.

Sprocket sizes: (power drive) driving sprocket 12T; rear wheel sprocket 52T.

Gear ratio: 17.3 to 1.

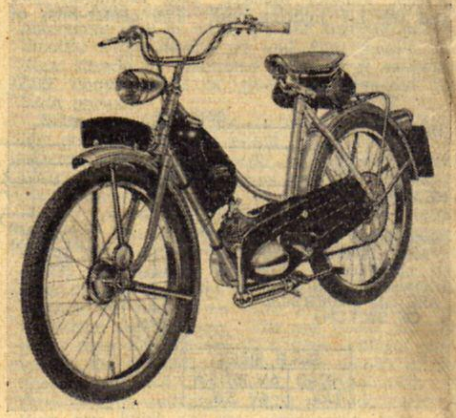
Chains: (Power) 117 pitches of $\frac{1}{2}$ in. pitch by $\frac{3}{16}$ in. wide extra heavy duty. (Pedal) 93 pitches of $\frac{1}{2}$ in. pitch by $\frac{1}{4}$ in. wide.

WHEELS. Tyre sizes: 23 in. by 2 in. Tyre pressures (lbs. per sq. in.):

With rider weighing	Front	Rear
10 stone or under	25	36
11 stone	27	40
12 stone	29	44
13 stone or over	31	48

Schrader type valves are fitted to inner tubes.

Brake lining size: (front) $3\frac{1}{4}$ in. by $\frac{3}{16}$ in. by $\frac{1}{4}$ in. (two per wheel). Coaster hub at rear.



Spoke sizes: Long, $9\frac{5}{16}$ in. by 13g. Short, $9\frac{3}{16}$ in. by 13g.

Carburettor. Bing, model 1/12/27 with oil damped air filter and self-cancelling cold-start enrichment device. Main jet—64; needle size—No. 2; needle position—bottom groove. Slow running adjustment by screw located at left side of carburettor (near fuel inlet). Fuel filters fitted: (1) on to fuel tap; and (2) into carburettor fuel inlet union.

Flywheel magneto. Miller type FW17. L.T. output—6v. 18w. (wiring diagram gives bulb sizes). See also "Electrical System". Ignition timing—3.2 mm. ($\frac{1}{8}$ in.) before top dead centre. Contact breaker gap—.012 in. (points fully open).

Spark plug. KLG F20 (14 mm. thread, 12.5 mm. reach); electrode gap .015/.020 in.

General. Weight—70 lb.; wheel base—45 in.; overall length—70 in.; overall height—38 in.; petrol consumption—180/200 m.p.g.; petrol tank capacity—$6\frac{1}{4}$ pint (including reserve). Engine number stamped on plate at rear of magneto housing. Frame number stamped on nearside top of saddle tube.

RECOMMENDED LUBRICANTS

Engine. Lubricated by petroil mixture of the following proportions:

16 parts of top grade petrol to 1 part of two-stroke self-mixing oil.

OR

20 parts of top grade petrol to 1 part of SAE 20 engine oil. (Castrol, Mobiloil, Shell, Esso, B.P. Energol).

Clutch thrust bearing, apply grease gun occasionally.

Air Filter. Every 1,000/3,000 miles, remove filter, wash clean in petrol, dip in SAE 20 engine oil, drain and refit.

Cables. Lubricate monthly with light oil using, by preference, a force-feed cable lubricator.

Chains. Keep lightly oiled. Every 3,000 miles remove from machine, wash clean in petrol, immerse in molten chain grease, remove surplus grease and refit chain with closed end of spring link facing in direction of travel.

approximately ⅛ in. free movement at handlebar control. Refit fairing.

Removing engine from frame. Remove engine fairings. Turn off petrol tap, pull feed pipe from carburettor. Loosen carburettor securing clip pinch bolt, twist carburettor off induction pipe and tie up to seat tube. Undo snap connector on main lighting cable. Slacken pinch screw holding decompressor lever assembly to cylinder head and remove this assembly. Loosen clutch cable adjuster, press in clutch operating lever, unhook cable and unscrew adjuster from engine mounting bracket. Disconnect drive chain spring link and remove chain. Remove 2 nuts holding exhaust pipe to cylinder and 1 bolt holding exhaust tailpipe to rear engine mounting bracket. Remove exhaust assembly. Undo clutch bracket securing bolt and unhook clutch operating lever from clutch centre stud. Remove 4 bolts on front engine brackets and 1 bolt on rear engine bracket. Lift out engine unit.

Dismantling of engine. With engine removed from frame, clutch and magneto removed as described above, and with cylinder head removed as for decarbonising, proceed as follows. Raise cylinder about 2 in. on cylinder holding studs and place wooden piston support block (measuring 1½ in. wide by ⅜ in. thick with ¼ in. slot cut out to accommodate connecting rod) under piston. Hold piston down on support block and withdraw cylinder and rubber sealing ring. Note manufacturers stamped numerals on piston top, or scribe arrow at front top of piston, for correct position for re-assembly. With piston on support block, remove gudgeon pin circlips using circlip pliers. Support side of piston and drive gudgeon pin clear of small end bush using brass drift of suitable diameter. Do not drive gudgeon pin out completely if piston is to be used again. Remove piston from connecting rod. Remove 4 bolts securing crankcases within magneto housing, note that top front bolt has slotted head. Remove 2 bolts at rear of magneto housing and rear engine plates. Hold engine with magneto side upward clear of bench and tap crankshaft end with hide mallet freeing magneto housing from engine. Check number of shims on clutch shaft for re-assembly. Grip magneto side crankcase, hold engine clear of bench, tap crankshaft end with hide mallet separating magneto side crankcase from drive side crankcase and crankshaft. Hold crankshaft, and using hide mallet tap drive-side crankcase off crankshaft. Hold clutch shaft and tap crankcase free of clutch shaft.

Wash all parts in petrol and dry with air line. Check condition of all bearings. If replacements required, heat crankcases holding end bearings and tap crankcases firmly on wood block till bearings come out, fit new bearings while crankcases are still heated. All other bearings can be removed using suitable diameter drift and replacements fitted in a similar manner. Remove and discard all oil-seals. Remove all traces of old jointing materials from joint faces. Examine crankshaft for big end wear. Side-play in connecting rod is permissible, but end movement indicates that crank pin bearing is worn and replacement is necessary. Separate components of crankshaft assembly, other than small end, are not supplied, therefore crankshaft assembly complete must be fitted if wear is present in big end bearing. Replace small end bush if worn, by driving out worn bush with suitable diameter brass drift, press in new bush, chamfered end first, drill oil-ways in bush using oil holes in connecting rod as a guide, and ream till gudgeon pin is sliding fit in small end bush. Examine cylinder for wear. Replace cylinder and piston if excessive wear is shown in cylinder bore by stepped lip at limit of piston ring travel. Check piston ring end gaps of new piston, file to give .007 in. end clearance when placed in cylinder. Check the joint faces of crankcases for damage. Lightly oil all bearings, drive pinions on crankshaft and clutch shaft, big end bearing, small end bush, piston and cylinder. Assemble in reverse order of dismantling fitting shims to clutch shaft as noted when dismantling and fitting shims as required to crankshaft if replacement assembly has been fitted. Finally, fit magneto and set ignition timing as described under "Electrical System". Use new gaskets, cylinder base rubber ring and oil seal. Use shake-proof washers under nuts and bolt heads on crankcase securing bolts and tighten bolts evenly.

CARBURETTOR

Under normal working conditions the carburettor will require no maintenance except dismantling for cleaning purposes when routine decarbonising takes place. To dismantle the carburettor, turn off fuel tap, pull off fuel pipe from carburettor, loosen clamping screw on the induction pipe and withdraw carburettor taking care that the induction pipe fibre sleeve is not damaged. Loosen 2 screws holding on the mixing chamber top, do not attempt to remove these screws as they will remain in the cover. Withdraw the cover, cover gasket, throttle slide complete with needle, spring and clip, choke slide clip and throttle cable. The choke slide will free itself when withdrawn from the mixing chamber. Unhook the throttle cable from the slide and remove the needle, clip and spring, noting which groove is used for the clip location. Unhook the air filter wire circlip, releasing the filter element. Unscrew the float chamber fixing nut and remove float chamber and float. Remove the float needle lever hinge pin, releasing the float needle and hinge lever. Unscrew the main jet using a screwdriver and remove the needle jet with a box spanner. Remove the slow-running adjusting screw. Unscrew fuel feed union and fuel filter which is located within the union. Wash all parts, except gaskets, in petrol. Blow out all passages and jets using compressed airline or tyre inflator. Do not probe jets or passages with wire. Immerse air filter element in oil and allow to drain before assembly.

The only components likely to require replacement due to wear are the throttle needle, throttle slide, needle jet and float needle and these should be examined carefully if excessive fuel consumption or poor performance has been noticed.

When assembling the carburettor the following points should be noted. The float needle tapered end fits upwards in the carburettor body and the angled edges of the hinge lever face downwards. The needle and main jets should not be over-tightened as both are easily broken. The throttle needle clip must engage in the same groove from which it was removed unless fuel mixture has to be altered, in this case engage the clip in a higher groove to weaken the fuel to air ratio or in a lower one to richen the mixture. Do not move the clip more than one groove at a time without road testing the machine to check the results of the change. It will be found that assembly of throttle slide and choke parts is made easier if they are fitted to the carburettor with the throttle in the fully open position. Gaskets on mixing chamber top and float bowl must be in good condition and induction pipe sleeve must not be re-used if split or damaged.

When assembly is complete, refit carburettor with the mixing chamber vertical on induction pipe, warm up the engine and set slow running adjuster screw and take up cable slack on adjuster, finally tightening lock nut.

Should the engine fail, due to fuel stoppage, check that transparent fuel pipe is full of fuel, if not, remove fuel tap and check the tap filter for blockage. If the fuel is reaching the carburettor, remove the fuel union nut and examine the union nut filter for blockage, before further dismantling is done. Should the engine fail due to apparent fuel failure and all feed pipe and fuel passages be clear, check that the 2 air passages from the air filter chamber to float chamber (also the passages in the mixing chamber walls) are clear.

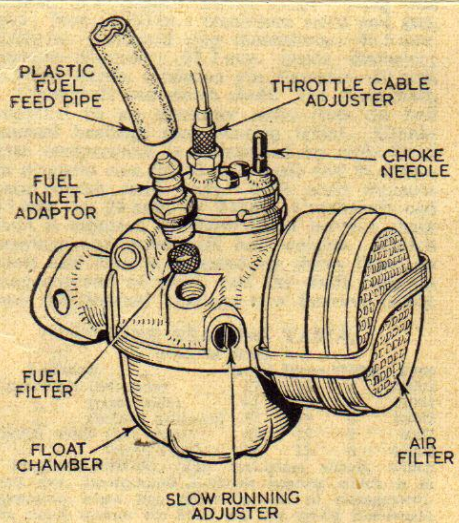


Fig. 3: Exploded diagram of the carburettor on the Phillips Panda moped

Special tools

The only special tools required for work on the Panda are: Flywheel extractor, clutch extractor and flywheel wrench. All are obtainable from Phillips Cycle Co. Ltd.

The next servicing data sheet in this series will deal with the

NORMAN LIDO 50 c.c. Moped and will be included in the issue dated January 1, 1960.

Wheel hubs. Every 1,000 miles put 3 to 4 drops of engine oil into hub lubricators. Do not over-lubricate front hub. Periodically, lubricate control lever pivots, centre stand pivots, pedal bearings with engine oil.

ELECTRICAL SYSTEM

A Miller FW17 flywheel magneto, of anti-clockwise rotation, provides HT current for ignition and LT alternating current for lighting and electric horn. It consists of the usual stator plate and rotor (or flywheel), and a push-on cover keeps the unit dry and clean. The stator plate carries the ignition coil, condenser, contact breaker, cam lubricator pad and the LT lighting coil. The centre-boss of the 4 magnet flywheel acts as the contact-breaker cam and it is tapered internally to mate with the tapered engine mainshaft. A location peg in the mainshaft engages with a key-way in the flywheel boss to give approximate ignition timing. Exact timing is obtained by slightly rotating the stator plate, after slackening the two securing screws, **clockwise** to advance the timing and **anti-clockwise** to retard. The flywheel is slotted to provide access to the contact breaker points and to the stator securing screws. The LT output of the generator varies but little over a fairly wide range of engine r.p.m.

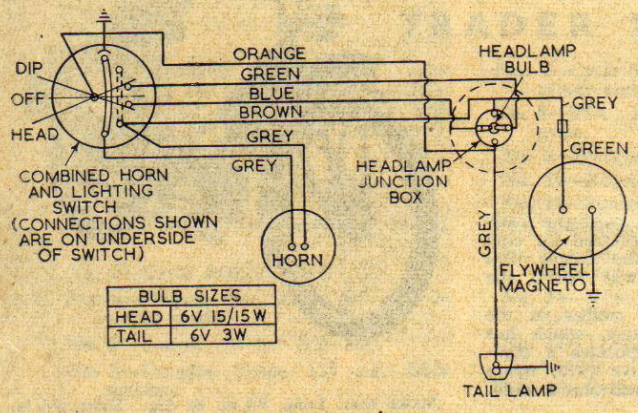


Fig. 1: Details of the lighting circuit on the machine

MAINTENANCE OF ELECTRICAL SYSTEM

Removing and refitting magneto. With a twisting movement remove flywheel cover by hand. Using an accurately fitting 14 mm. socket spanner undo flywheel securing nut (RH thread) tapping the tommy bar or wrench if necessary. Remove nut and spring washer and extract flywheel from its taper using extractor obtainable from Phillips Cycles Ltd. Place flywheel on clean sheet of paper and, as an aid to easy re-assembly, scribe a line on stator plate and fixed housing. Remove the two stator securing screws and lift out stator plate, pulling LT and HT wires through the housing grommet. Place stator plate inside flywheel. Re-assembly is reverse of dismantling and the stator plate should be fitted with the scribed lines coinciding. Before fitting flywheel ensure that mating tapers are clean and free from oil. Tighten flywheel nut securely and check contact breaker gap and ignition timing as shown in the following paragraphs.

Checking contact breaker gap. Remove push-fit flywheel cover and spark plug. Rotate flywheel until contact breaker fibre heel is resting on highest point of cam and contact breaker is accessible through flywheel slot. Slacken contact plate securing screw and, using a narrow (⅛ in.) bladed screwdriver turn eccentric adjuster pin as necessary to obtain points gap of 0.012 in. Re-check gap after tightening securing screw.

Retiming ignition. After checking c/b points gap, insert a screwdriver through the flywheel slots, slacken the stator securing screws. Find piston top dead centre position then turn flywheel in clockwise direction through some 90 degrees of crankshaft rotation. Then turn gradually anti-clockwise until piston is 3.2 mm. (⅛ in.) before TDC. (**Note:** Engine rotates anti-clockwise at timing side). Rotate stator plate (clockwise to advance timing, anti-clockwise to retard) until c/b points are just breaking. Re-tighten stator securing screws, replace spark plug and flywheel cover. Road test machine to check performance.

Servicing ignition system. After first 500 miles, and thereafter as necessary, check c/b points gap. Keep points clean and free from grease. Fine emery paper can be used to clean points, finally wiping them with petrol-dampened clean cloth. The c/b arm must be free to pivot and the points must seat squarely over the whole surface. The c/b cam lubricator pad should be kept damp with oil.

After first 500 miles, and thereafter every 1,000 miles, clean spark plug (using sand-blast cleaner) and re-set electrode gap to 0.015/0.020 in.

Servicing lighting system. To check LT output disconnect LT output cable (green joining to grey) at snap connector. Connect an AC moving coil voltmeter (with 1 ohm load resistor) between the green wire and machine earth. Run engine at 2,000 r.p.m. and a reading of at least 3V should be obtained.

The wiring must be firmly fixed to the frame and all connections kept secure. The component parts of the system (lamps, horn, handlebar switch, etc.) must make good electrical contact with the machine frame (earth).

ENGINE REPAIRS

Decarbonising. (Every 2,000 miles).

Remove decompressor lever and cable assembly, HT lead and spark plug. Remove exhaust assembly. Remove 4 nuts and washers securing cylinder head. If difficult to remove, tap cylinder head at front and rear with hide mallet and lever off with a screwdriver close to joint face, taking care not to use undue force. Using soft scraper remove all carbon from cylinder head. Compress spring of decompressor, remove split pin and release valve. Clean out valve seating and vent hole to exhaust port, lightly grind in valve and assemble using new split pin. If valve seat burned, replace valve. Set piston at TDC and clean piston top with scraper. Hold cylinder down, rotate engine till piston is at BDC and clean out exhaust port taking care that cylinder bore is not scratched. Move piston to TDC and clean loose carbon from piston top. Lightly oil cylinder bore, refit cylinder head using new gasket and tightening down securing nuts evenly. Clean spark plug, set gap to 0.018 in. and refit. Refit decompressor lever and cable assembly allowing 0.018 in. clearance at valve end. Dismantle silencer by unscrewing tail-piece nut and pulling off silencer baffles and body. Clean out holes in conical baffles, tail-piece outlet and exhaust pipe. Assemble silencer and baffles and refit exhaust assembly using new gasket. Fit HT lead. Road test machine.

Removing clutch and refitting. Remove left side fairing. Unhook clutch cable from operating lever, unscrew clutch bracket fixing bolt and remove operating lever assembly. Disconnect rear chain at spring link. Press in clutch cap, unhook wire circlip and remove clutch cap with stud, thrust bearing and cap locating spring. If thrust bearing is to be examined remove the circlip on outer face of clutch cap using circlip pliers and release bearing and stud. Note which side of bearing is inwards for correct re-assembly. Grease bearing and refit to clutch cap using new circlip. Remove grub screw in clutch centre nut and remove centre nut (17 mm. socket). Remove spring carrier plate, springs, spring cups and pressure plate noting position of dome on carrier plate for correct re-assembly. Remove clutch plates noting order of removal.

Using special extractor, withdraw clutch bell housing and sprocket, roller bearing and drive sleeve. If roller bearing has to be replaced, remove circlip on sprocket inner face and press out bearing. Note condition of sprocket teeth, if hook-shaped replace sprocket. If excessive side-movement in assembly replace thrust washer. Grease roller bearing and assemble using new circlip. Check clutch plates for wear, distortion of slotted centre hubs, burn marks on outer periphery drive dogs, or buckling and replace as necessary. Do not wash clutch plates in petrol or paraffin, or allow to come in contact with oil. Check free length of clutch springs, replace if less than 31/32 in. Assemble clutch in reverse order of dismantling. Make certain of correct order of clutch plate assembly. Fit springs and spring cups into corner plate, dome of carrier plate inwards, and hold against pressure plate for ease of assembly. Tighten centre nut securely before fitting grub screw. If clutch cap bearing has not been dismantled, introduce a small amount of grease into cap bearing via centre stud hole with grease gun. Connect up rear chain with closed end of spring link facing direction of chain travel. Refit operating lever assembly with washer between bracket and engine plate and set cable adjuster to give

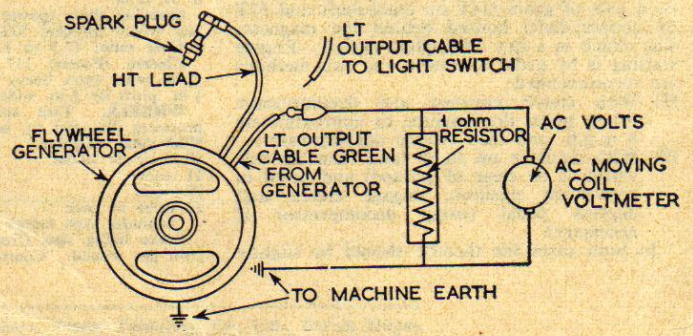


Fig. 2: How to check the L.T. output — a moving coil voltmeter is connected between output cable and machine earth

TRADER DATA SHEETS

NOW available to "Trader" subscribers are 26 other servicing data sheets dealing with cycle repairs and maintenance and with motor cycle repair and overhaul. They are:

No. 1—Sturmey-Archer Dynohubs, types GH6, AG and FG.
No. 2—B.S.A. Winged Wheel Model W1.
No. 3—Cyclo Benelux gear.
No. 4—Villiers Mk. 8E — 197 c.c. 2-stroke engine.
No. 5—Sturmey-Archer AW hub.
No. 6—Douglas Vespa 125 c.c. GLS scooter.
No. 7—Cycle lighting sets: maintenance, repair and fitting.
No. 8—BSA 125 c.c. Bantam motor cycle.
No. 9—Norman Cyclemate.
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No. 21—Phillips' Gadabout moped.
No. 22—BSA Dandy lightweight scooter.
No. 23—Villiers two-stroke twin.
No. 24—Norman Nippy de luxe moped.
No. 25—Miller AC4 generator.
No. 26—Raleigh moped.

Copies of these Service Sheets, which are invaluable to dealers' repair departments, may be obtained by readers at 1s. each or 11s. a dozen.

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