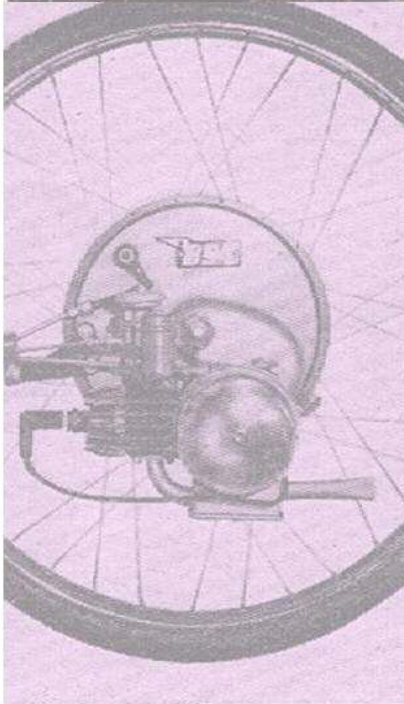


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OVERHAULING THE VINCENT

Service Instructions for a Popular Cyclemotor : Dismantling and Re-assembling the Unit

By L. WATERS

AFTER removal from the suspension unit the Firefly engine is easy to work on and the toolkit spanners will cope with all the smaller nuts which are B.A. sizes (0, 1 and 2). Further required are one or two good screwdrivers, pliers, a stout socket spanner in 14mm. sparking-plug size, a rawhide mallet and some jointing compound.

An extractor is essential and the use of two assembly guides is advisable to prevent damage to oil seals when reassembling. These tools are simple to make up as illustrated and such few modifications as there are can easily be incorporated in earlier units.

Dismantling the Engine

Drain the oil from the gearcase so that the

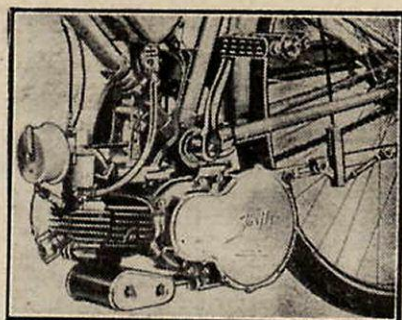


Fig. 1.—The Firefly cyclemotor engine fitted beneath the bottom bracket of a bicycle.

engine can be turned upside down for removal of the exhaust pipe and silencer; next the 11 gearcase cover screws are removed and the cover lifted off. Reverse the engine for dismantling the driving roller bearing cover (4 screws) and the cover plate of the contact

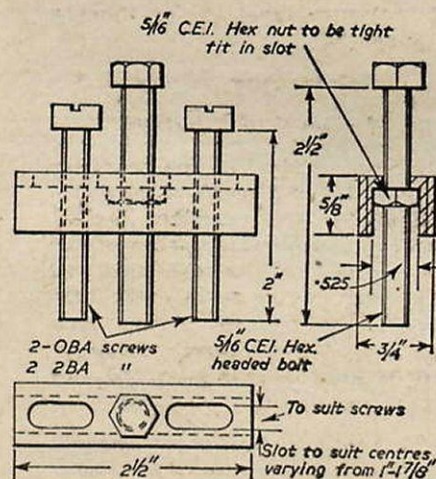


Fig. 2.—A simple universal extractor for withdrawing the pinion, rotor gear and driving roller.

breaker housing; the clip retaining the cover may only be swung clear after the screw has been slackened off. Again reverse the engine so that the left-hand side faces up,

Firefly

lock the gears against each other and slacken off both nuts with a box or ring spanner (sparking plug size).

There is a plain washer under each nut and both gears can now be withdrawn with the extractor—the large alloy gear first. Use the extractor with 0 B.A. bolts and screw it in deep enough not to strip the threaded holes, yet not so far that the bolts will protrude on the inside and damage the stator or crankcase. Remove the key from each shaft.

At this stage the driving roller can be locked against the crankcase with a stud or rod of suitable diameter and the large nut unscrewed. Remove four 0 B.A. nuts and lever off the roller support evenly. There is a plain washer under each nut and it is advisable to tap the two forward studs inwards to avoid fracture or distortion of the support casting. The tab washer under the driving roller nut is not normally locked. Withdraw the driving roller using the extractor with 2 B.A. bolts and drive out the roller shaft towards the left with the rawhide mallet. Again note the key.

The 0 B.A. spanner is used for unscrewing the four cylinder head nuts; under each is one washer on low compression heads and two under high compression units. Gently lever the head off the barrel; if the latter is tight on the studs use the rawhide mallet against the support lug to free. Remove the two slotted plugs for a thorough cleaning of the transfer ports.

On the right-hand side the remaining four 0 B.A. nuts retaining the crankcase are removed and the studs withdrawn; the top and bottom centre ones are tight as they locate the crankcase halves. Remove one screw from each roller mudguard, withdraw the cable grommet at the rear of the case and detach the terminal; the wire can now be pulled out from the left.

Remove the cylinder base washer, support the engine by the rear of the gearcase and the cylinder studs to separate the crankcase by tapping the left-hand mainshaft with the rawhide mallet. The flywheel assembly should be carefully levered out of the right-hand case and no hammering on the right-hand mainshaft is permissible as this is easily burred and, indeed, the flywheel plug might be driven inwards to foul the con-rod. The mainshaft oil seals are of the spring-loaded synthetic rubber type and fitted with the spring facing inwards. The left-hand seal is larger as it embraces the pinion boss; a narrow rubber ring seals the face of this boss. Both mainshaft seals are retained by a wire circlip and the groove must not be damaged otherwise the seal will blow out in service.

The main bearings are washed out with clean petrol and checked for signs of roughness in spinning, shake of the inner ring, or damage to the cage. For renewal the crankcase must be heated up to 275 deg. F. and the stator removed from the left-hand component. Final work to the right-hand crankcase involves removal of the contact breaker base plate; detaching the terminal is necessary for pulling the wire through the grommet. Do not loose the small eccentric for adjusting the contact breaker points; the large eccentric with flange base is for adjustment of the ignition timing.

The big-end should have no perceptible

up-and-down play and visual inspection of the bearing cage is possible through the gap between con-rod and flywheels; side-shake is not detrimental. If the big-end is in need of renewal the complete flywheel assembly with con-rod should be returned to the manufacturers with the piston removed. After prising out the circlips the gudgeon pin can be pushed out, but if tight the piston should be warmed up. Sticking of rings is rare on these engines and normally they can be lifted out of their grooves in the conventional manner. Remove the contact breaker cam from the right-hand main-

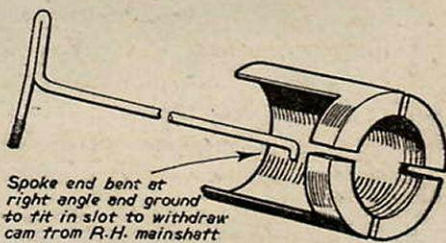


Fig. 3.—To withdraw the contact-breaker cam, the tool illustrated must be made. An old bicycle spoke is ideal for the purpose.

shaft; the retaining screw has a left-hand thread. The cam is withdrawn with a ground spoke (Fig. 3).

Electrical System

It is advisable to place a keep on the rotor magnets when dismantled; if necessary

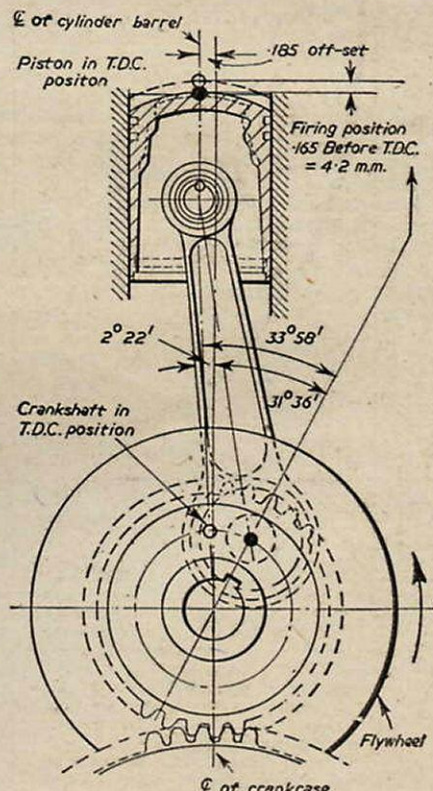


Fig. 4.—The drawing above shows the setting for the correct ignition timing and also the timing of the rotor gear.

these can be re-magnetised. If the gear has been overheated the magnets may work loose; check for tightness of the pole shoe screws and punchlock if required. The single

punch dot on the rotor gear is the one for timing the generator and unless this is correct the engine will not run. Place the piston at T.D.C. and turn the gear until the punch dot is at the 9 o'clock position, i.e. with the piston at T.D.C. the dot is nearest to the pinion directly in line with centre line of the cylinder barrel.

After Engine No. 51732 the stator is retained by 2 B.A. in lieu of 4 B.A. screws; earlier engines can be modified as illustrated if the stator is loose. The coils should be inspected for damage to the insulation and they must not be compressed by the gearcase. To obtain the necessary clearance most stators are fitted with a triangular shim on each screw. A continuity check on the coils will not show up a short-circuit and in case of doubt fit a replacement stator.

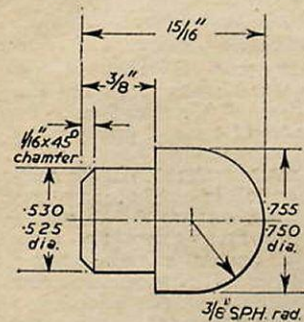


Fig. 5.—The assembly guide for the right-hand mainshaft oil seal.

terminal with the wire leading to the ignition coil. Bending the arm of the stationary point inwards may lead to shorting on the contact breaker base plate; on the moving arm the brass strip behind the spring must be well earthed. A loose fibre block on the moving arm can be re-riveted; the wick can be discarded and is not used on later engines. Make sure that the pivot pin is free in its bush and parallel to the fibre block; the arm must not foul the crankcase at the riveting point of the return spring.

Do not omit the small steel washer on the pivot pin; the contact breaker cam will foul and eventually cut through the arm. Contact points should line up squarely and the moving arm may be re-set taking care not to damage the contact. Before re-riveting a fixed point, make sure that the contact is in the correct position relative to the moving arm one and verify that the insulation has not broken down.

The condenser must be tight in its clip otherwise excessive arcing will occur at the contact breaker points; slight arcing is normal and not detrimental. As the lighting of the cycle is connected to the coil, any short-circuit in the set will also short out the ignition; the wiring of the cycle must therefore be in first-class order.

Re-assembling the Engine

Prior to re-assembly in the reverse order of dismantling, all parts must be carefully cleaned. New gaskets and washers should be used throughout and the following points are worthy of note. Jointing compound is used on the left-hand crankcase half only and the guide illustrated in Fig. 5 is used to prevent damage to the right-hand mainshaft oilseal during assembly. It is advisable to leave the two o B.A. studs of the roller support in the crankcase to locate the halves before closing the joint. The cylinder base washer is fitted with some jointing compound smeared on the face of the crankcase mouth.

The contact breaker cam is timed by placing the piston 4.2mm. before T.D.C. and with a point gap of .018in. the cam is rotated in the mainshaft until the contacts just begin to open. The cam is then locked by means of the special screw with left-hand

thread. Finer adjustment can later be made on the baseplate if necessary.

The roller shaft must be a good fit in the left-hand bearing and if slack the shoulder can be plated up to the required oversize. It is important that the driving roller is fitted with the two withdrawal holes facing to the right or subsequent removal will be very difficult. The bearing in the roller support must be well seated to prevent the locking washer from fouling the inner race. No jointing compound is used on the bearing cover gasket and the necessity of assembling all parts of the engine with oil need hardly be mentioned.

The "nose" illustrated in Fig. 8 is used for assembling the driving roller shaft into the oilseal and the slot clears the key; no gaiter springs are used in the roller shaft seals. The rotor gear must be well down on its taper to avoid fouling the gearcase cover. It is advisable to shorten the 3/4in. plugs of earlier engines to 1/2in. so that they will not foul the gears when the washers are compressed; hard fibre washers for these plugs are available. The breather on top of the gearcase only requires cleaning at extended intervals and this component is not intended for filling the gearcase. The capacity of the gearcase up to the level of the filling plug is

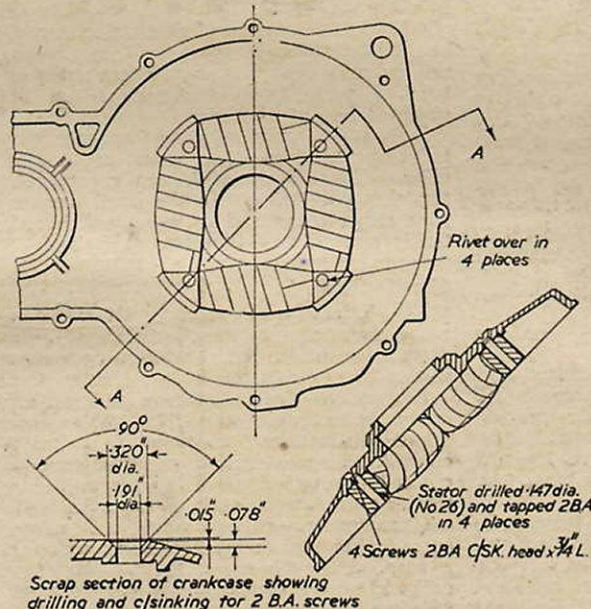


Fig. 6.—General arrangement of the stator showing the amendment that has been made to engines after No. 51732 where the stator is retained by 2 B.A. screws instead of 4 B.A. types.

approximately one fluid ounce; S.A.E. 30 engine oil is required.

Piston-ring gaps should not exceed .006in. and a scored or badly worn barrel must be re-bored; .020in. oversize pistons are available. Always use new gudgeon pin circlips. With the introduction of Premier grade fuels the high compression cylinder head with .750in. depth of dome became available and standard on engines from No. 53095 onwards.

Fitting and Riding Hints

With a view to improving access to the power unit for maintenance it is recommended that oilbath chaincases are removed from cycles whenever possible. On some machines a more straight pull on the engine is obtained by mounting the cable abutment to the outside of the cycle chainstay as illustrated in Fig. 7. If required the clevis on the pullbar can be re-riveted the other way round.

There must always be oil in the gearcase and cheesehead screws are recommended for the cover; they are standard from engine No. 51980 onwards. With the earlier pattern

countersunk screws over-tightening is to be avoided as this distorts the cover.

Starting trouble from cold will occur if the vanes of the carburettor air strangler do not shut properly. Flooding the carburettor by laying the machine over on its right-hand side materially assists quick starting.

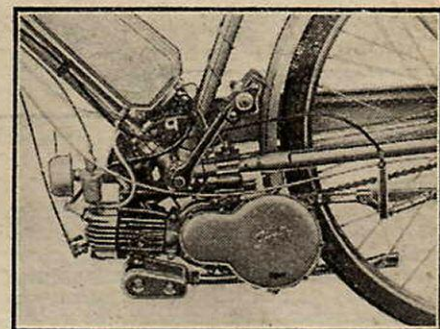


Fig. 7.—Another view of the Firefly showing the mounting of the cable abutment on the outside of the cycle chainstay.

It is, of course, essential that the rear tyre is maintained in good condition and inflated to the correct pressure. If the tread is allowed to wear to any extent the roller will slip in wet weather with consequent loss of power. Brakes should be carefully maintained and adjusted. It is not generally realised that speeds of 20 m.p.h. are readily approached with a cyclemotor, and to stop a machine from this speed demands much better braking power than is usually necessary with a pedal cycle. With cable-operated brakes it is a wise precaution to add a drop of oil to the various moving parts and the exposed portions of the inner cable.

General Lubrication

There is no point in departing from the oil-to-petrol ratios recommended by the manufacturers of the cyclemotor. Some riders add extra oil to the petrol mixture to be on the safe side, but it is a practice to be deplored. Too much oil will cause poor pulling, an inducement to oilied-up plugs and piston rings, and the formation of carbon in the engine and exhaust system.

Incidentally, it is worth mentioning that once oil and petrol have been mixed, they will not separate again. There is therefore little point in shaking the machine from side

to side after it has been standing a while. What is worth doing is to switch off the fuel 200yd. or so before the last stop of the day is made so that the float chamber is more or less drained. This will eliminate any chance of the more volatile portions of the petrol mixture evaporating, leaving only oil in the chamber. Should any oil or grease find its way on to the roller it should be removed immediately, otherwise the tyre will be severely damaged.

Fig. 8.—Oil seal nose for driving roller shaft.

