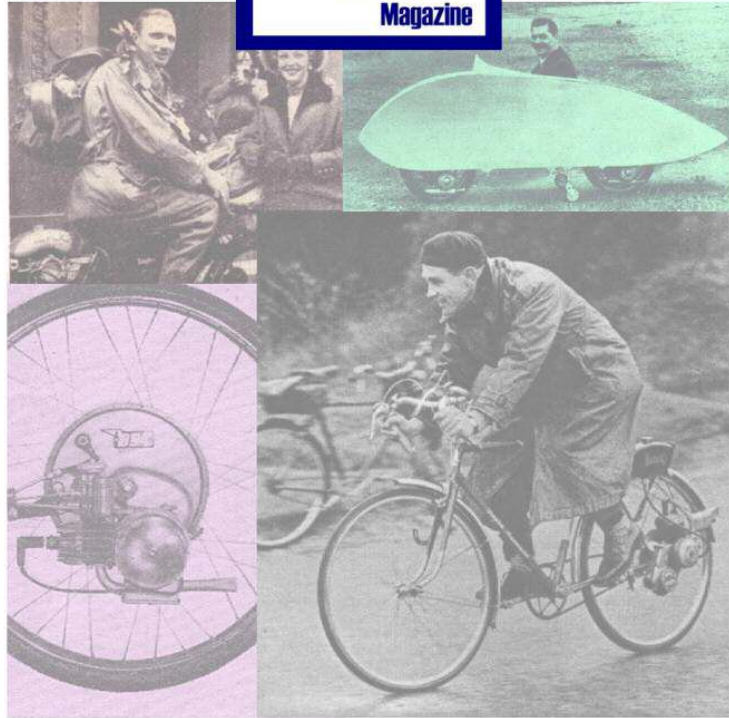


IceniCAM Information Service



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MAINTENANCE INSTRUCTIONS

for

THE

VINCENT

Firefly

POWER CYCLE

and

ALL WEATHER CYCLE MOTOR

VINCENT ENGINEERS (STEVENAGE) LTD

STEVENAGE

HERTS

ENGLAND

INTRODUCTION

Entirely British built by the manufacturers of the World's Fastest Standard Motorcycle, the Firefly brings high-quality mechanized transport within reach of everyone.

Supplied either as a motor attachment for existing cycles, or as a complete Power Cycle, the precision-made power unit offers outstanding design features, combined with simplicity of operation and ease of maintenance.

The owner of a modern power unit is not expected to tinker with the machine and, in fact, discouraged from interfering with certain details, so that technical knowledge is by no means essential for deriving the utmost pleasure from modern auto-cycle ownership. On the other hand any vehicle will repay time spent on correct maintenance, in reduced wear and tear and greater fuel economy. The necessary instructions are contained in this booklet.

FITTING THE FIREFLY TO CONVENTIONAL PEDAL CYCLES

See Figs. 1 and 4

Before fitting the "Firefly", ensure that the bicycle is in sound general condition, particularly as regards tyres and brakes. On bicycles fitted with a bottom bracket stirrup brake, the operating rod, stirrup, etc., must be removed and the use of the "Phillips" cable rear brake set No. 410 is recommended. Removal of oilbath chaincases from cycles is advisable to facilitate access to the engine for maintenance.

(1) Remove the left-hand pedal crank from the cycle; if the machine is fitted with a narrow bottom bracket spindle, an adaptor is available from the dealer who supplied the "Firefly". This adaptor is fitted as illustrated enabling the crank to clear the motor. Shorten the cycle rear mudguard if necessary.

(2) Fit the lower frame clamp loosely to the cycle front down tube.

(3) Assemble the front lugs of the suspension unit to the lower frame clamp, placing two of the four locating washers provided on the left-hand side of the clamp. At this stage the retaining bolt should be finger tight only.

(4) Remove securing nut from the retaining bolt at rear of the suspension unit clamp assembly and remove the top clamp plate. Ensure that the alignment plate is correctly positioned (this is clearly marked with the word "Front") and that the cradles are so arranged that the cut-aways provided clear the frame lugs. Swing the rear end of the suspension unit upwards, with the retaining bolt passing between the chain stays of the cycle. Fit

the top clamp plate so that the offset hole for the retaining bolt is to the left of the cycle, viewed by rider astride. Fit securing nut, washer, and partly tighten.

(5) Lightly oil the suspension rubbers and slide the engine into position from the front to the rear, after removal of the small screw in the left-hand front slide. The engine should move smoothly in the slides. Remove engine from suspension unit.

(6) The roller engaging lever is passed between cycle wheel and left-hand chain stay; after suitably arranging the cable, ensuring there are no sharp bends, fix the lever to the left-hand side of the handlebar. On some cycles it is better to lead the cable along the outside of the chain stay (see Fig. 4). A straight lie of the pull bar unit is very important for ease of roller engagement. If necessary the forward clevis of the pull bar can be fitted reversed as illustrated. On earlier units this involves re-riveting the clevis; on later units and Power Cycles the clevis is screw fitted.

(7) Remove left-hand wheel spindle nut and mount the rear end of the pull bar unit; omit washer if necessary. Replace wheel nut

and partly tighten. Refit engine to slides, replace small screw in left-hand slide, and attach the front end of the pull bar unit using the slotted link pin secured by a split pin.

(8) Adjustments to the position of the suspension unit and depth of roller engagement should now be made ensuring that:—

- (i) Engine position laterally allows a minimum of $\frac{1}{8}$ " clearance between gear case and tyre.
- (ii) When roller is disengaged there is a minimum clearance of $\frac{1}{8}$ " between roller and tyre.
- (iii) When roller is engaged it compresses the tyre tread to a depth of $\frac{3}{16}$ ".

As various makes of bicycles have slight dimensional differences, the exact procedure for adjustment will vary slightly. There are, however, three points only at which adjustment can be made:—

- (a) The height of the front of the engine.
- (b) The lateral position of the engine.
- (c) The length of the adjuster on the pull bar unit.

(a) can be adjusted by raising or lowering the lower frame clamp on the cycle down tube. Raising the clamp withdraws the roller from the tyre and lowering the clamp moves the roller towards the tyre.

(b) The lateral position of the engine is controlled at the front by locating washers referred to in para. 3 and at the rear by sliding the alignment plate on the cradles. Displacement of the locating washers may be necessary to obtain adequate clearance between gear case and tyre.

(c) Having adjusted the roller position roughly by (a) and (b), turn the adjusting sleeve to obtain the correct depth of roller engagement with the tyre tread.

(9) Fit the top frame clamp to the upper lug of the petrol tank with the bolt provided, temporarily removing the lower half of the clamp, and fit the adjustable lower tank lugs to the bottom frame clamp. Fit the top clamp to the frame down tube and tighten. The coil can be rotated in its housing if the high tension terminal tends to foul the frame down tube. An extra clamp is included to raise the tank if necessary, independent of the engine.

(10) Connect petrol hose to fuel tap.

(11) Attach high tension lead to sparking plug. Attach the wire with the red tab to the coil terminal marked "SW"; attach the other wire to the coil terminal marked "CB".

(12) Fit the dual control lever to the right-hand side of the handlebar, taking care to arrange the cables in a suitable manner, avoiding tight bends.

(13) Refit the bicycle pedal crank, using the adaptor if necessary.

(14) Connect the lighting set of the cycle with the terminal on the coil marked "SW" but a switch will have to be fitted if the bicycle headlamp is not originally so equipped.

(15) The exhaust pipe is attached to the silencer box by means of a clip; a second clip is secured to the pulley support as illustrated on Fig. 3.

(16) **IMPORTANT.** If the unit is dispatched dry, SAE50 engine oil must be injected to the level of the filling screw on the rear of the gear case. See also under "Lubrication."

(17) Some cycles may benefit from a larger rear wheel chain sprocket for easier starting.

(18) For use with 28" wheels the pull bar can be lengthened by re-positioning the axle bracket, if extra holes are drilled as shown in Fig. 4. The Adjusting Sleeve provides the remaining length required to accommodate this wheel size.

CONTROLS

See Figs. 1 and 2.

The combined throttle/decompressor control is fitted to the right-hand side of the cycle handlebar; turning the lever outwards to "D", releases the compression for easy starting. Moving the lever inwards towards "T" opens the throttle and increases speed.

The roller engaging lever is mounted to the left-hand side of the handlebar; a trigger, "R", is provided for locking the lever in the drive position. The air filter of the 308 type Amal carburettor is fitted with a choke operated by a lever; the "SHUT" and "OPEN" positions are clearly marked on the housing. The petrol tap is open when the lever is in line with the fuel hose.

All units from Engine No. 54949 and Power Cycles are fitted with a choke which is controlled from the handlebar. For starting from cold the sequence of operation is to fully over-open the

throttle lever by depressing the spring trigger on same, which means that by so doing, the beak strangler of the carburettor is fully closed.

As soon as the engine fires the throttle lever should then be closed to the desired road speed, during which action, of course, the spring trigger, having been released, will click back into place and thus prevent the rider inadvertently putting the device into operation again should the throttle be opened fully.

The main advantage of this system is that with very cold conditions where it may be found that some strangulation is again necessary in a short time after having started, the above outlined procedure can again be indulged in without any trouble from the rider's point of view, such as having to dismount and reset a strangulation device.

Power Cycles are fitted with a "Perry" coaster rear hub and stirrup front brake; on the latter the blocks are adjustable and cable stretch can be taken up by means of the adjuster at the lower end. In all respects these controls follow conventional cycle engineering practice, for which no special instructions are issued.

PREPARING FOR THE ROAD

For riders who have no previous experience of riding an auto cycle, or a pedal cycle equipped with a motor, it is a good plan to ride without attempting to start the engine until thorough familiarity with control levers and brakes is obtained. Spend a few minutes adjusting the controls and saddle to a comfortable position.

The importance of an adequate oil level in the gearcase at all times is again emphasized. Motor attachments are dispatched dry so that the gearcase must be filled with SAE50 engine oil as indicated under Point 16 of the fitting instructions. On Power Cycles the gearcase is filled prior to dispatch from the Works so that on these machines it is sufficient to merely check the level. Damage to the gearcase cover by outside impacts is to be avoided as such damage may easily lead to oil leakage.

PETROL AND OIL

Always verify that there is sufficient petrol/oil mixture in the tank. The tank holds 5 pints (2.84 litres). Petrol and oil must be mixed in a separate tin before putting into the tank; the correct proportion is 20 : 1. This may be obtained by mixing 3 measures of oil with $\frac{1}{2}$ gallon of petrol using the oil measure attached to the filler cap of the tank. Fuel consumption is approximately 170 m.p.g. at speeds of 19-22 m.p.h. SAE20 engine oil is recommended, i.e. Wakefield's Castrolite, Vacuum Mobiloil Arctic, Shell X-100 Motor Oil 20/20W, B.P. Energol SAE20W or Essolube 20.

In view of the compression ratio of 5 : 1 petrol of commercial grade (low octane rating) can be used for the petrol/oil mixture.

The use of Self-Mixing Two-Stroke oils (Castrol Two-Stroke Oil or Mobilmix TT) for the petrol mixture is approved. With these lubricants the mixing ratio is 16 : 1, i.e. $\frac{1}{2}$ pint of self-mixing oil to each gallon of petrol.

Certain of the oil companies whose lubricants are recommended in this publication provide dispensing equipment which ensures the use of a petrol/oil mixture for two-stroke engines in the ratio of 20 : 1. Service by means of such equipment is approved.

Suitable lubricants for the gearcase are: Vacuum Mobiloil D, Shell X-100 Motor Oil 50, B.P. Energol SAE50, Essolube 50 and Wakefield's Castrol Grand Prix.

IMPORTANT NOTICE. The manufacturers can accept no responsibility whatever for damage to engines caused by inadequate lubrication.

RIDING

1. Open petrol tap.
2. Set choke in "Shut" position (leave open when engine is warm).
3. Engage the driving roller by pulling the ratchet lever to the snap position.
4. Push the throttle lever to the right (to ease compression), pedal to gain some speed, push the throttle lever slightly to the left and the engine will start. (For engines fitted with the type 335/3 carburettor see under "Controls".)
5. The choke should be opened when the engine begins to run unevenly, indicating that it is warmed up. The distance necessary to achieve this will vary from a few yards in hot weather to perhaps 200-300 yards in very cold weather.
6. For economy and long life run the engine up to $\frac{3}{4}$ throttle opening, although the throttle may be opened fully occasionally.

Do not allow the engine to run excessively fast down hills and do not engage the running engine with the bicycle stationary but pedal to gain suitable speed. Normally main road hills can be

taken without pedal assistance. When riding down long hills the engine may be disengaged, idling or stopped, but do not engage the engine again until the speed of the cycle has dropped to approximately 10 m.p.h. To stop, close the throttle, apply the brakes of the cycle and release the trigger of the roller engaging lever when the machine is nearly at a standstill. It is good practice to close the petrol tap some 100 yards before the engine is to be stopped for more than a few minutes. Some riders prefer to leave the roller permanently engaged, starting and stopping by using the decompressor only.

Running-in.

The engine should be run-in carefully for the first 300 miles at speeds not exceeding 20 m.p.h. It is emphasised that the life and efficiency of the unit will be greatly affected by careful running-in and correct use thereafter. Nuts and screws should be checked for tightness after some initial mileage, especially the crankcase and gear case drain plugs.

MAINTENANCE

Lubrication.

After approximately the first 200 miles drain the oil from the gear case by removing the plug at the bottom and refill with SAE50 engine oil to the level of the filling plug adjacent to the rear tyre. (See Fig. 1.) Thereafter drain and refill every 500 miles.

Lubricate the contact breaker fibre pad with a few drops of engine oil. (See Fig. 3.) Oil the front and rear slides of the engine suspension and do so more frequently during bad weather conditions. Inject a few drops of SAE50 engine oil into the hole provided in the cover plate of the right-hand driving roller ball bearing.

Adjustments.

1. Contact Breaker Gap (See Fig. 3).

Every 500 miles check the contact breaker gap for .018" to .016" clearance. For access slacken off the screw at the lower end of the contact breaker cover retaining clip and swing this aside to the right. On some narrow crank cycles the chain may have to be opened at the connecting link or screw and removed from the chain wheel. To check the contact breaker gap, release compression by turning the decompressor lever outwards with the right hand and with the left hand rotate the driving roller anti-clockwise until the contact points are fully open. The fibre pad is then just resting at the beginning of the circular cam and the feeler should slide in easily between the points without play. To adjust the gap, slacken off the two contact breaker Plate Screws, turn the gap adjuster and set the gap as necessary. After setting and tightening the screws re-check the setting and refit the cover.

2. Sparking Plug.

Check the sparking plug at regular intervals; the correct gap is .018"-.020". Use the feeler gauge of the combination spanner for the sparking plug as well as for the contact breaker.

3. Driving Roller.

The depth of engagement of the driving roller with the tyre can be adjusted after slackening off the nuts on both ends of the adjuster which can then be set according to requirements. For average weather conditions the recommended depth is $\frac{3}{16}$ " but for snow $\frac{1}{4}$ " is preferable. (See Fig. 4.) An adjuster enables cable slack to be taken up.

One turn of the adjusting sleeve alters the length of the push-pull rod by approximately $\frac{3}{16}$ " and the same amount of engagement.

Remember that with the handlebar Engaging Mechanism Control in the "Disengaged" position the clearance between roller and tyre should be $\frac{3}{8}$ " - $\frac{3}{16}$ ".

4. Throttle Cable.

A knurled adjuster with locknut is provided at the lower end of the throttle cable to take up slack. The adjuster should not be used to obtain fast idling as this would reduce the braking capacity of the engine.

5. Ignition Timing.

After the first 200 miles the ignition timing can be re-checked. The timing is .165" (4.2 mm.) before Top Dead Centre, .171" being equivalent to $\frac{1}{14}$ ". This is set at the Works and the rider should only check periodically the contact breaker gap and adjust as indicated in para. 1. Any correction of the ignition timing should be effected as follows:—

- (a) Set the contact breaker gap to .018".
- (b) Turn the piston .165" (4.2 mm.) before Top Dead Centre.
- (c) Slacken the two contact breaker Base Screws.
- (d) Turn the Base Eccentric to get contact breaker just starting to open.
- (e) Tighten the Base Screws.
- (f) Re-check the setting.

6. Carburettors.

Engines up to No. 54949 are fitted with the Amal Type 308/23 carburettor whereas subsequent units and all Power Cycles are equipped with the Type 335/3 instrument. The difference in operation of the choke or air strangler is illustrated in Figs. 1 and 2.

Maintenance on either type is confined to ensuring that the fuel tap and pipe are clear, also that the jet, the float chamber and their passages are free from impurities and water. see Fig. 6. The air filter should also be kept clean by immersing in petrol and afterwards dipping in clean SAE20 engine oil which should be allowed to drain away. On the 308/23 type operation of the strangler lever with the foot is to be avoided as this may result in distortion of the shutter vanes which causes difficult starting from cold.

Most carburettors of either type are fitted with a 30 main jet. This may be reduced to 27 for greater economy, the 27 jet being standard on all Power Cycles. Standard needle position is middle notch, but this may be altered by experiment to suit specific conditions of operation. Some Power Cycles are dispatched with the needle in the second groove from the top.

A No. 2 throttle valve was fitted as standard until Aug., 1955; thereafter a No. 4 slide became standard in the interest of even greater fuel economy. The size of the needle jet (.0745") should not be altered. The bleed hole in the carburettor adaptor should be clear and unobstructed at all times.

On Power Cycles the float needle is of the detachable pattern and the float chamber cover is modified to avoid flooding at high engine speeds. These parts can be fitted to earlier motor attachments equipped with this type of carburettor if due to vibration on lightweight cycles flooding at speed should be experienced.

To withdraw the throttle valve one simply unscrews the mixing chamber cap (C), when the throttle valve assembly complete can be pulled straight out. The important thing to remember, however, is when assembling same (having removed the air filter) that the strangler must be fully depressed to its closed position with the

aid of a screwdriver or some blunt instrument introduced through the air intake of the carburettor. Then, holding it in this fully closed position the throttle (G) should be introduced into the mixing chamber, and the mixing chamber cap (C) screwed on a few threads. The screwdriver or suchlike can then be withdrawn from the main air intake which will allow the beak strangler to return to its fully open position, and the throttle valve (G) will then be quite free in the body. The mixing chamber cap (C) can then be fully tightened and the carburettor is ready for operation.

It is important to observe the last mentioned sequence of operations, otherwise any attempt to force the throttle valve into the mixing chamber without so doing will result in the tail of the beak strangler being bent, which will entirely upset its operation.

Excessive Petrol Consumption is nearly always caused by flooding due to impurities in the float chamber and around the needle valve seating. The float needle is guided in the base of the float chamber (V1), so also see that this pocket is not filled up with sediment. A bent float needle will cause flooding so, when refitting the float chamber cover, place the needle seating projection carefully over the needle point when the blunt end of the needle has already been placed in its guide (V1) at the base of the float chamber.

If the taper end of the float needle after long use has a deep groove in it, replace it and never try to grind the needle in.

See that the main jet (K) and the needle jet (J) are screwed up gently but firmly. If the engine falters as you open the throttle wide, look out for a choked main jet (K). If the acceleration is poor as you open up the throttle, you might raise the needle (F) by one notch. On the other hand, after long use if the performance

was good but the consumption heavier than usual, you might drop the needle (F) by one notch.

You are not likely to have to tune the carburettor when purchased new as a correct mixture is maintained at all throttle openings, viz.:—

At full throttle, by the size of the main jet.

At small openings, by the throttle cutaway and, in intermediate positions, by the position of the needle.

7. Cycle Maintenance.

Lubrication of cycle parts follows conventional cycle maintenance practice for which no special instructions are issued other than the fact that the use of an oil can filled with good quality cycle oil is recommended. This type of lubricant is available from most cycle retailers.

Points to lubricate are the hubs, bottom bracket, pedals, steering head, and front forks. A few drops for each lubrication point at weekly intervals are adequate.

The recommended slack of the cyle chain is $\frac{3}{8}$ " at the tightest point.

Care is necessary to ensure that the gearcase of the engine remains clear of the side of the rear tyre at all times. Fouling may easily occur if the offset mounting clamp is incorrectly fitted. Sometimes adjustments to the lateral position of the engine may be required by displacement of the locating washers referred to in para 3 of the Fitting instructions.

DECARBONISING

The engine should be decarbonised every 1,500-2,000 miles or whenever power begins to fall off. The cylinder head is removed after undoing the four 0-BA nuts; by working carefully the owner may be able to preserve the original asbestos gasket although the fitting of a new gasket is advisable. It is necessary to remove the silencer box so that the exhaust port may be cleaned. Carbon is scraped off the cylinder head as well as piston top; the use of a suitably shaped soft scraping tool is recommended with a view to preventing damage to alloy parts. The silencer side plates should be removed by undoing the two 0-BA nuts so that the internals of the silencer may be scraped clean with a blunt knife or stiff wire brush. The tail pipe should also be cleaned if necessary.

At alternate decarbonisations, the cylinder barrel should be removed for a check on the condition of piston and rings as well as freedom of the latter in their grooves. When the closed gap exceeds .006" it is advisable to renew the rings. Removal of the cylinder barrel is also recommended for cleaning of the transfer ports.

It should be noted that most nuts, bolts and screws used in this precision-built cyclemotor are British Association (B.A.) sizes; if any of these items should be lost or damaged, genuine replacement parts should be obtained from the nearest stockist.

ELECTRICAL EQUIPMENT

The Alternating Current 6-volt Generator has an output of 9 watts. Any headlamp with built-in or separate switch can be used; the tail lamp wire is usually attached to the headlamp

terminal. The recommended headlamp bulb is 6 volts, 6 watt; the tail lamp bulb is 6 volt .04 amps. If a dry battery is used for stationary lighting, an extra 3.5 volts pilot bulb is required in the headlamp.

On Power Cycles the headlamp switch has three positions:

O = Off.

D = Head and tail lamp current supplied by engine.

B = Head and tail lamp current supplied by dry battery which can be fitted inside headlamp shell.

On these machines the headlamp bracket is fully adjustable.

Damage to the contact breaker cover is to be avoided as this may lead to ingress of water or distortion of internal components. As the lighting set of the cycle takes current from the ignition coil terminal, any short circuit in the set will also short out the ignition. The wiring of the cycle must, therefore, be kept in first-class order.

Note that the alloy Rotor gear is timed and that the engine will not run unless this timing is correct. To re-time after withdrawal of the gear, place the piston at TDC and turn the gear until one of the punch marks is at the 9 o'clock position, i.e. with the piston at TDC the punchmark is nearest to the small pinion on the centre line of the cylinder barrel. Markings may be a single punch dot or two dots in addition to a single dot. Either marking can be used for timing, the alternative dot(s) being provided for rotating the gear through 90 degrees after extensive use.

RECOMMENDED ACCESSORIES

Sparking Plug.—Original equipment is K.L.G. F20 which meets the requirements of most users. For maximum performance on long distance runs K.L.G. F50 can be substituted. Alternative plugs: Champion L-10 or Lodge C-14.

Earlier units are equipped with a 25,000 ohm T.V. Interference Suppressor of Lucas manufacture inserted into the sparking plug H.T. lead. On later engines and all Power Cycles a 5,000 ohm suppressor is incorporated in the waterproof cap for the sparking plug.

Rear Tyre.—Rear tyre wear is insignificant due to the driving roller diameter of 3.22"; the roller is furthermore resiliently mounted thereby ensuring a smooth drive. A special cyclemotor tyre is recommended, a suitable cover being the Avon "Powermaster" (Roller Drive). An inner tube with Schrader valve can be used for easy checking of the inflation pressure. The recommended pressure for the rear tyre is 60 lbs. per square inch. Underinflation will cause roller slip and rapid tyre wear.

Original equipment for the Power Cycle is:—

Rear: Avon Powermaster (Roller Drive) 26" × 1½" × 1⅜", recommended inflation pressure 60 lbs./sq. in.

Front: Avon "Speedster" 26" × 1⅜", recommended inflation pressure 25 lbs./sq. in.

A few early Power Cycles were equipped with Avon Powermaster (Direct Drive) tyres, 26" × 2" × 1¾" Front and Rear. For these tyres the same inflation pressures apply as for the later machines.

PERFORMANCE CHARACTERISTICS

The two-stroke motor has a bore of 38 mm. and a stroke of 42 mm. giving a capacity of 47.6 cc. The power developed is 1 b.h.p. at 4,200 r.p.m. The weight of the complete engine only is approximately 24 lbs.

Power Cycle Dimensional Data:

Dry Weight	72 lbs.
Overall Width	22"
Overall Height	41¾"
Overall Length	75"
Wheelbase	44¾"
Ground clearance	4½"
Minimum seat height	34½"

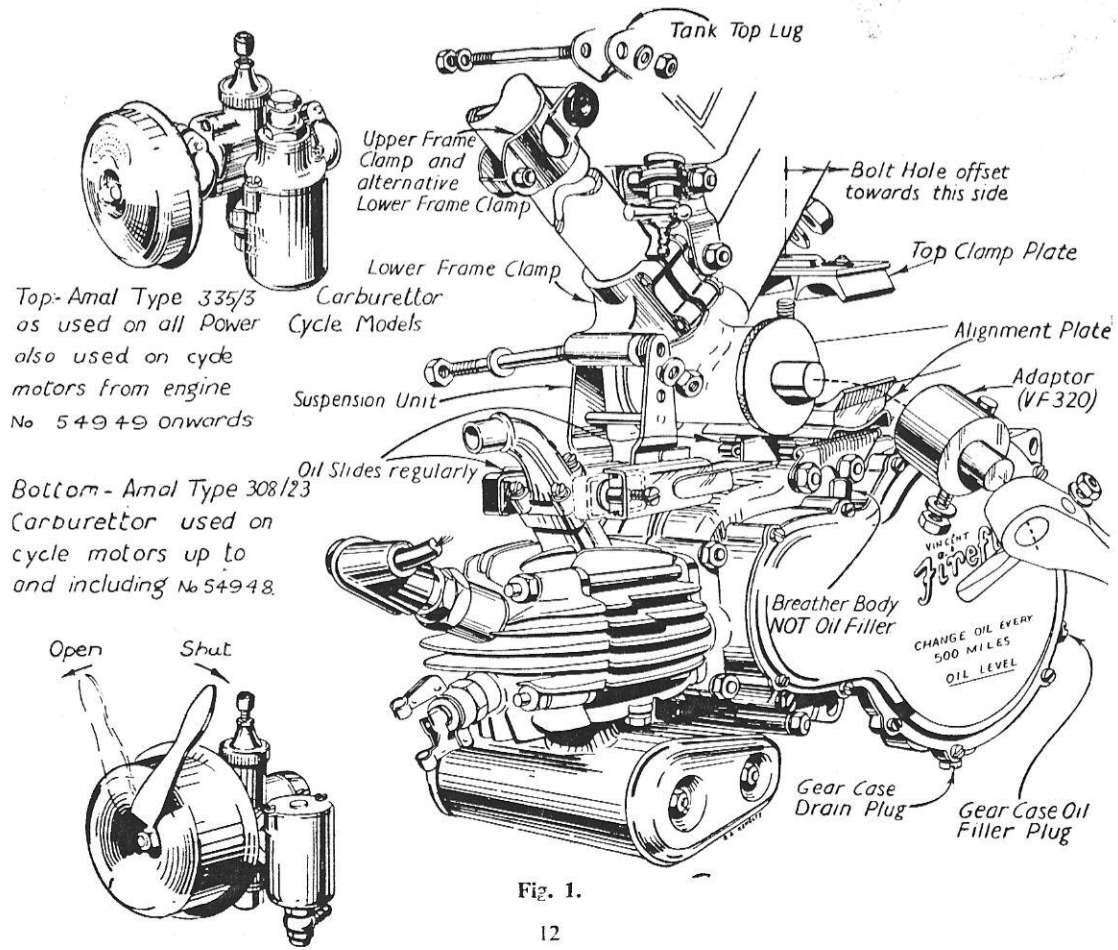
NOTE

Contrary to accepted practice, Vincent Engineers (Stevenage) Ltd. are not in a position to enter into direct correspondence with private customers on matters of general maintenance, upkeep, lubrication, equipment, accessories and any subjects which are considered within the scope of the Retail Trade. In cases where Dealers are in need of reference to the Manufacturers, the engine number and Power Cycle Frame Number must be quoted.

Those requiring further information on the power unit are referred to the following available publications:—

"Firefly" Service Guide and Fault Finding Chart
7 pp. including exploded diagram. Price 1/- post free.

"Firefly" Spares List
October, 1953. 8 pp. Price 9d. post free.



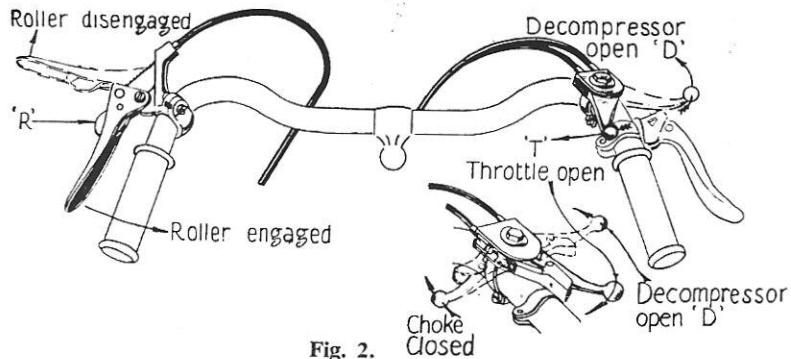


Fig. 2.

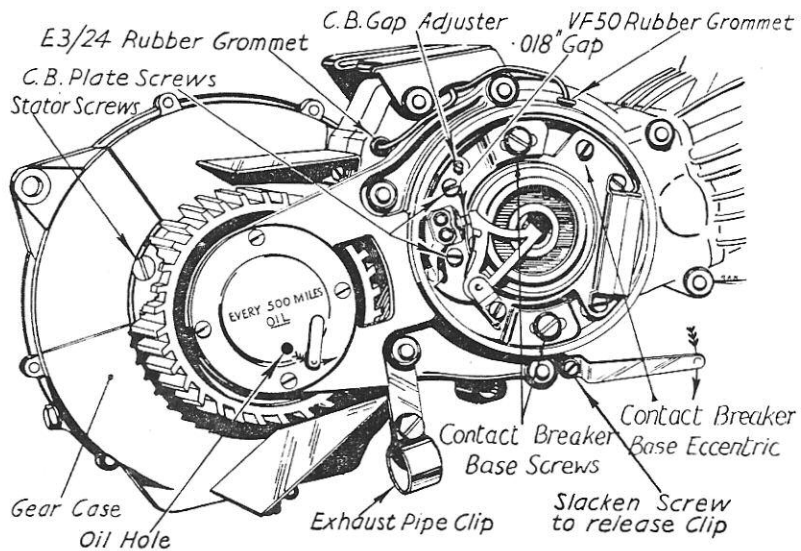


Fig. 3.

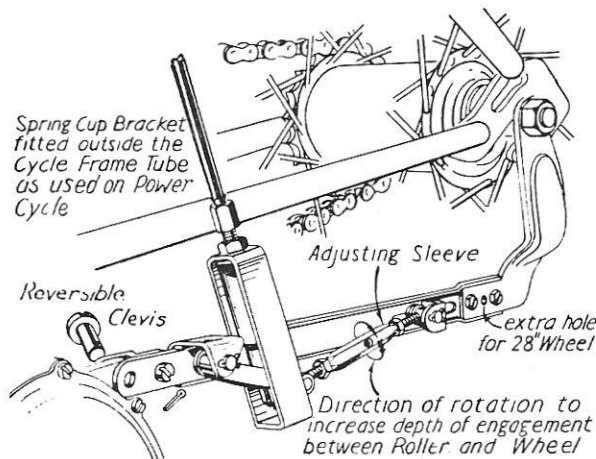
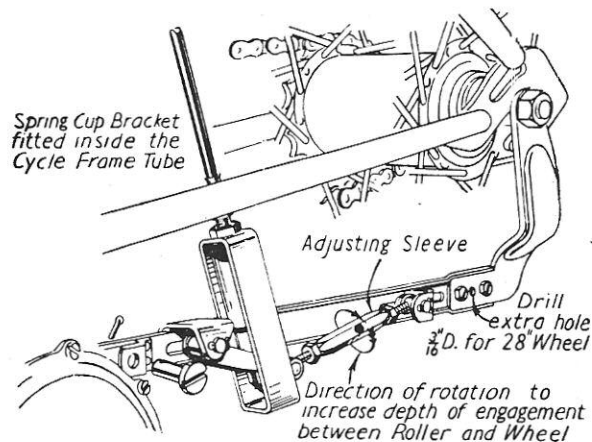


Fig. 4.

Firefly

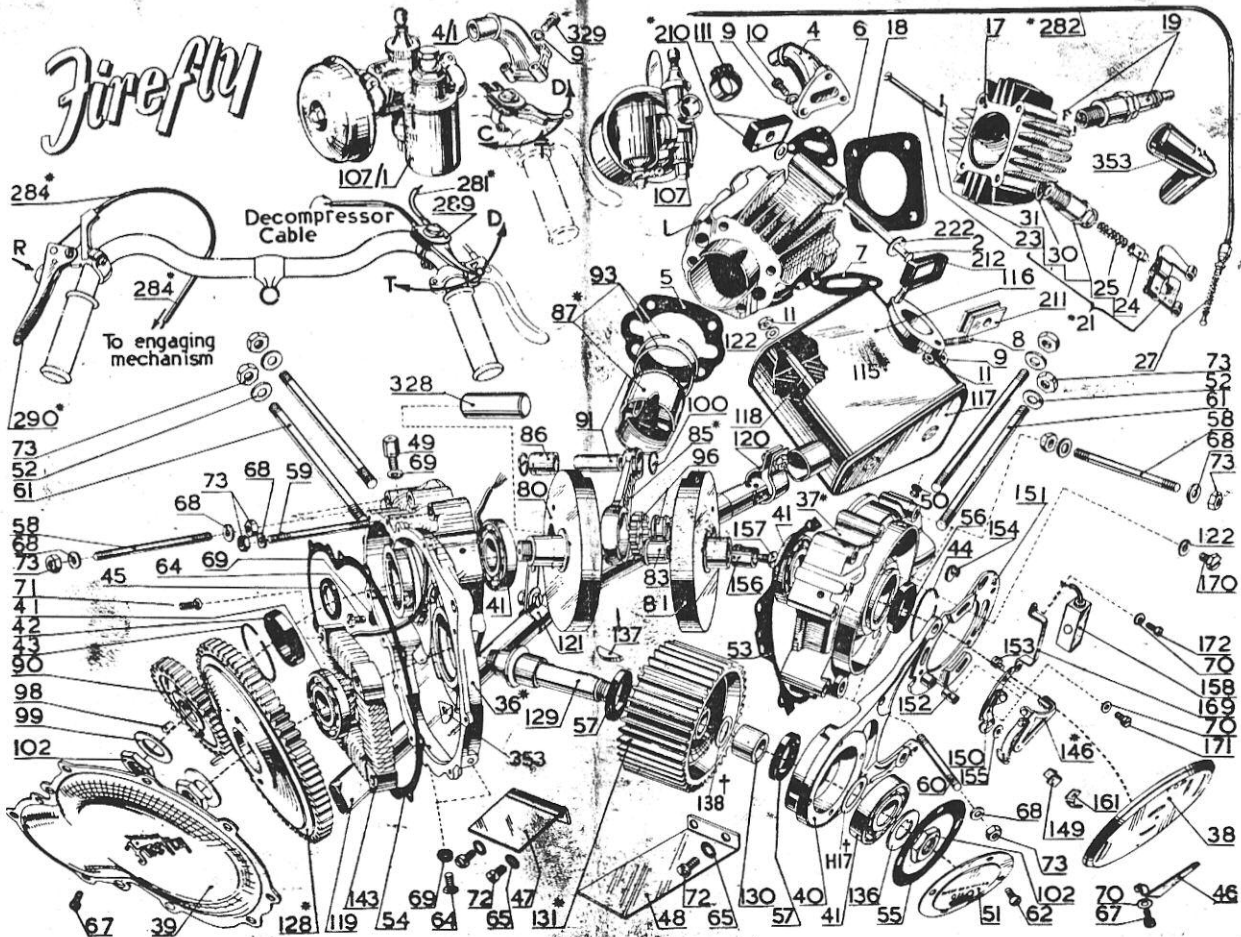


Fig. 5.

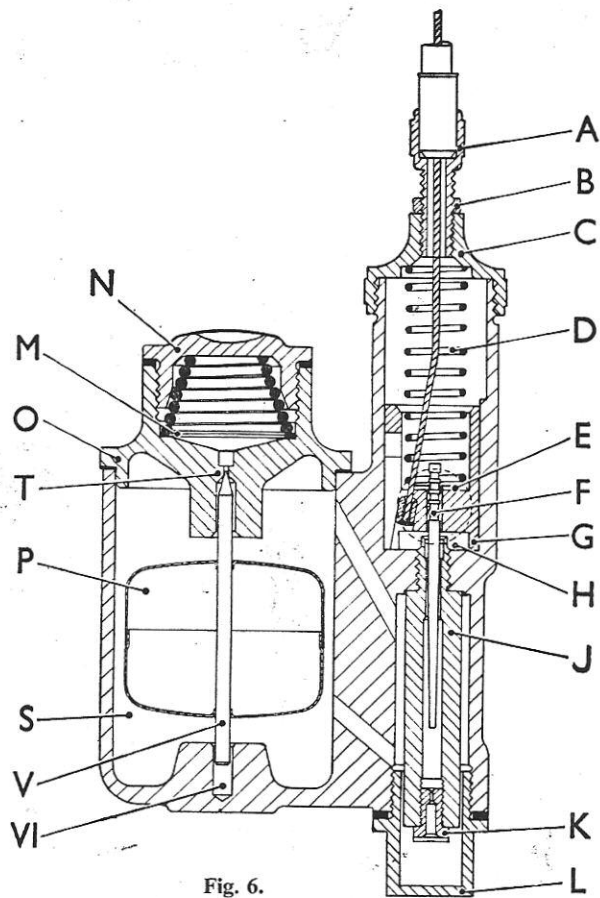


Fig. 6.

- | | |
|----------------------------|--------------------------------|
| A. Cable Adjuster | E. Needle Clip |
| B. Cable Adjuster Lock Nut | F. Taper Needle (for Throttle) |
| C. Mixing Chamber Cap | G. Throttle Valve |
| D. Throttle Spring | H. Mixing Chamber |
| J. Needle Jet | P. Float |
| K. Main Jet | S. Float Chamber |
| L. Jet Chamber Plug Screw | T. Valve Seat for Float Needle |
| M. Gauze Petrol Filter | V. Float Needle |
| N. Fuel Filter Cover | VI. Needle Valve Guide |
| O. Float Chamber Cover | |

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