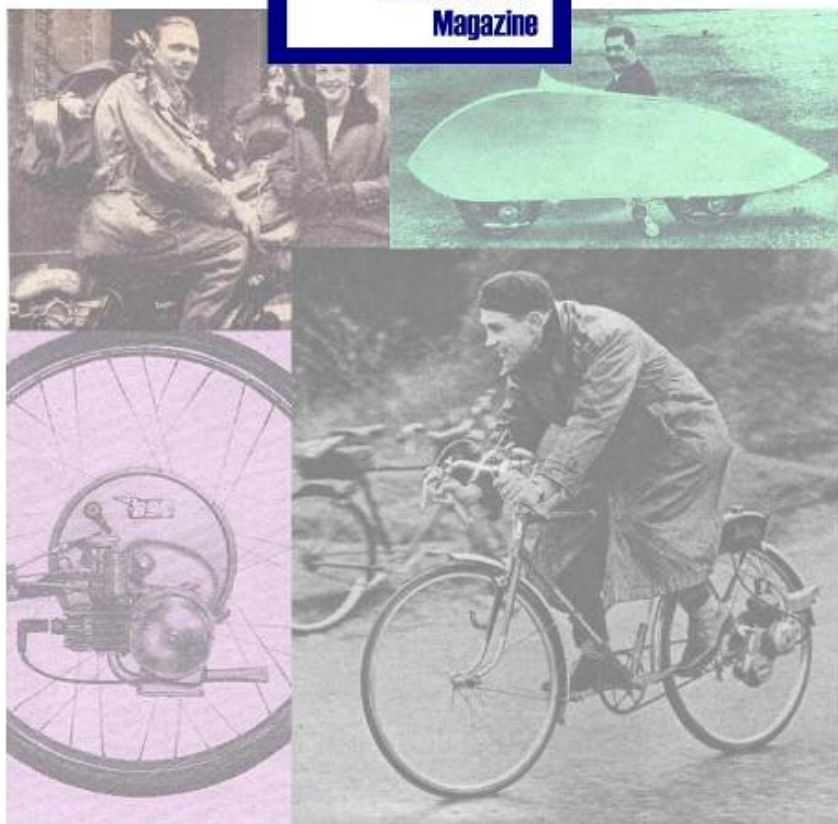


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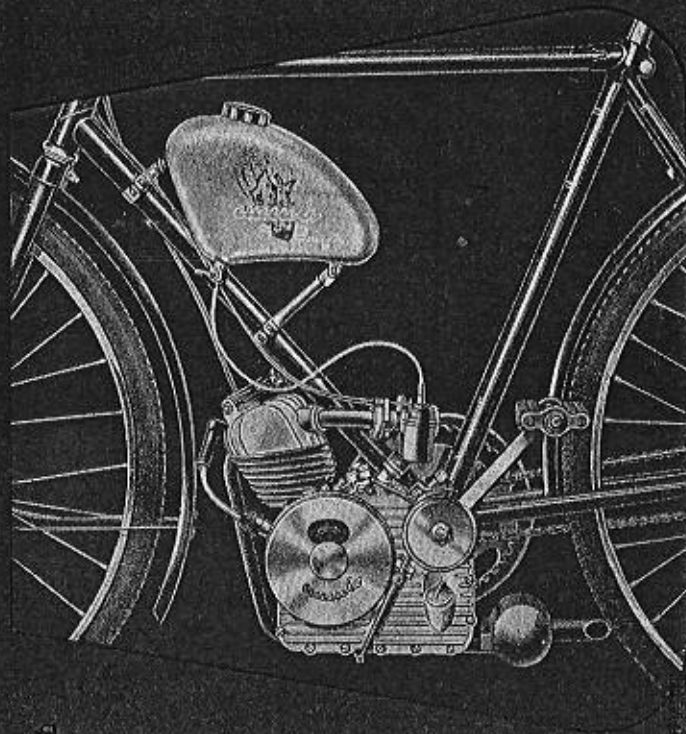


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Ducati

CUCCILO

CYCLE AUXILIARY MOTOR

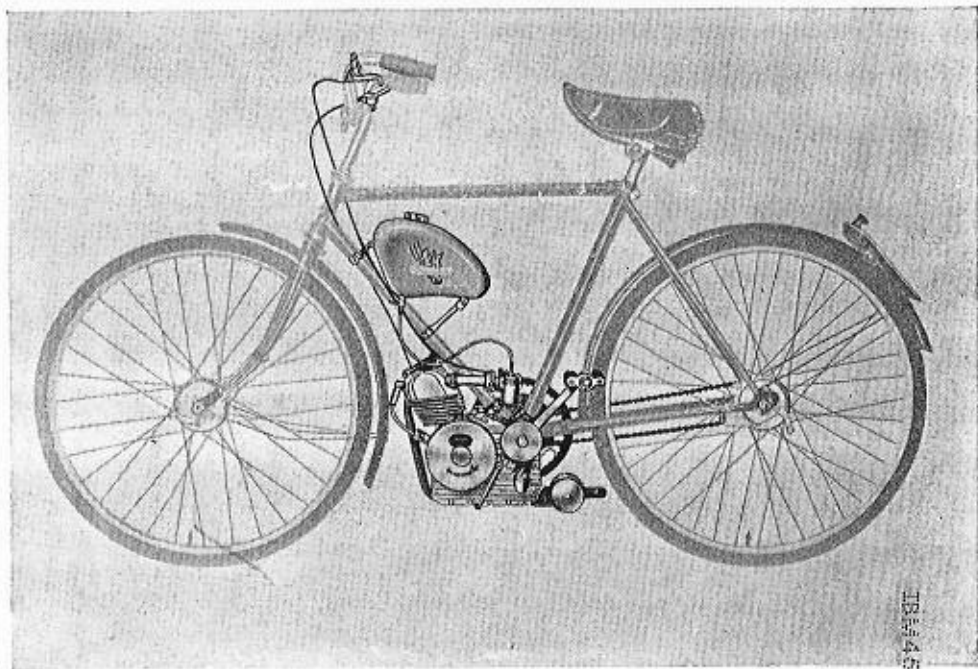


It's miles ahead!

INSTRUCTION MANUAL

INSTRUCTION MANUAL

DUCATI
“CUCCIOLO”
(LITTLE PUP)



1844602

48 c.c. 4 STROKE O.H.V. CYCLE AUXILIARY MOTOR

An Outstanding Achievement in Precision Engineering

U.K. Distributors:

BRITAX (London) Ltd., 115-129, Carlton Vale, London, N.W.6

Telephone: Maida Vale 9351 (7 lines)

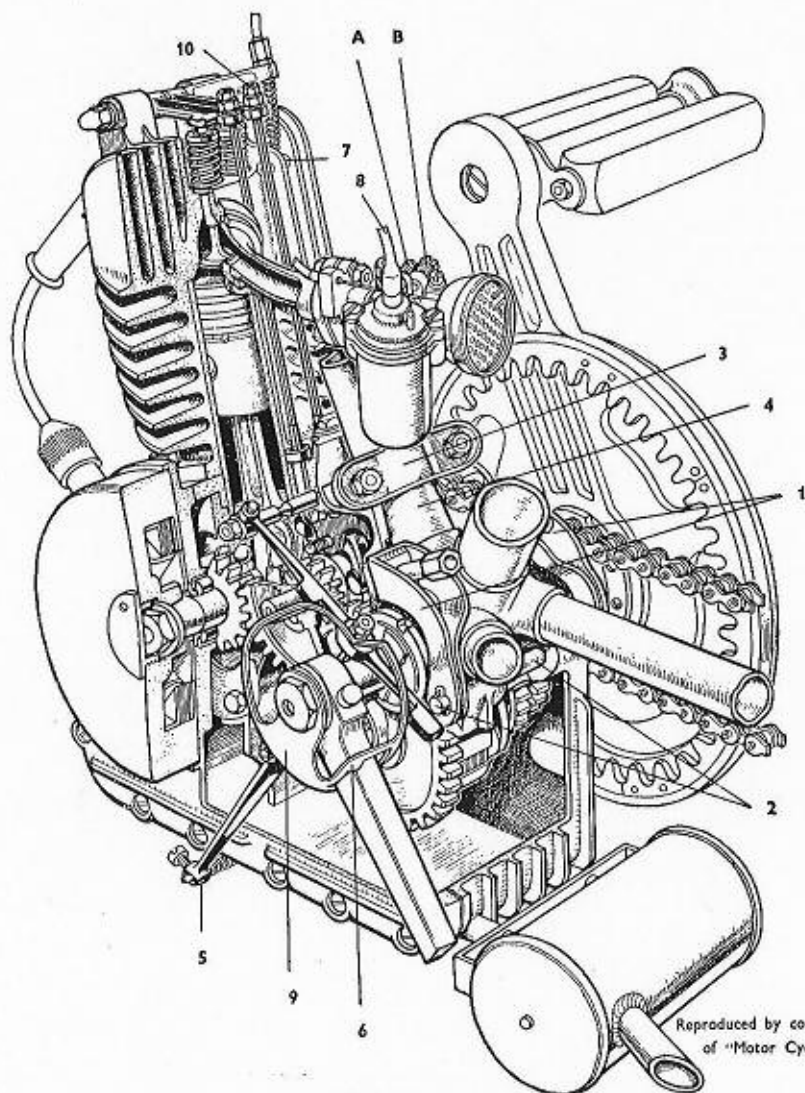


Fig. 1

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TECHNICAL DATA

THE 'CUCCILO' is an Auxiliary Unit designed to fit ordinary pedal cycles for the purpose of substituting motor power for human effort, every other advantage connected with cycling being fully retained. There are well over 250,000 'Cucciolo' Units in every-day use on the Continent and many more in other parts of the world. Throughout the British Isles the 'Cucciolo' is proving itself extremely successful and increasingly popular.

The 'Cucciolo' is a precision-built Four Stroke overhead valve engine, of advanced design which incorporates every desirable feature of the bigger class motor-cycle engines. Outstanding performance and extremely low running costs make it a most versatile and useful unit to solve the problem of individual transport without effort.

'Cucciolo' has the standard four-stroke system of operation and only petrol is poured into the tank avoiding the nuisance, when refuelling, of preparing a mixture of oil and petrol as required by most two-stroke motors. This also saves considerable trouble when starting the engine, as the Spark Plug is not likely to become fouled by oil. Carbon deposit on piston, valves and cylinder head is reduced to a minimum, whilst the sump lubrication system is fully efficient, practical, and inexpensive.

Power is transmitted to the back wheel by the actual cycle chain. The drive is, therefore, absolutely positive. The 'pull' of the engine being continuous and steady, there is far less strain on the chain, and less wear on the tyres than with the alternate effort of foot-peddalling. Normal cycle tyres are used, and as the power is not transmitted by friction drive against the tyres, safe and economical riding can be enjoyed on any road surface, and in any weather conditions.

The 'Cucciolo' Unit has been designed to bring an effective transformation of the usual 'push-bike' into a really efficient 2-speed ultra light-weight 4-stroke motor-cycle at a minimum of cost, and what is more important, at a record minimum of running expenses.

It is not a 'make-shift' addition or attachment, but an extremely neat, clean and compact Unit which brings simple, safe, economical and, above all, energy-saving cycling to the business man or woman normally using tram, bus, train or car, for day-by-day transport.

The working man and girl whose job is beyond the ambit of the ordinary cycle, and the elderly man or woman who is past 'pushing pedals' finds the time and money saving 'Little Pup' most helpful. The more speedy and economical transport made possible with the 'Cucciolo' particularly appeals to the younger set, especially those who expend their energies in other sports.

The weight of the engine (17½ lbs. complete), is evenly distributed between front and back wheel. The low positioning, together with the gyroscopic effect of the fly-wheel and the absence of the alternate thrusts of foot-peddalling, contribute to make bicycle riding comfortable, steady, safe and effortless.

With a total weight of approximately 200 lbs. between the rider and the bicycle, petrol consumption is about 275 miles per gallon on level roads. With steady riding on good surfaced level roads 300 miles per gallon has been obtained on continuous rides of 68-80 miles, at an average speed of 20 m.p.h.

The recommended speed of the 'Cucciolo' properly fitted and having suitable gear ratios is about 20 m.p.h. Higher speeds are obtainable, but when the motor is fitted on a normal bicycle with unsprung frame, it is not advisable to travel at speeds in excess of that recommended.

Petrol tank capacity is approximately half a gallon. Automatic reserve supply is always available from the right lower part of the tank, and should the machine run out of petrol a tilt of the bicycle to its left side will transfer this reserve to the 'tap side' allowing another 5 to 10 miles running of the motor.

Pedal riding of the bicycle fitted with the 'Cucciolo' Unit is available whenever desired provided the gears are in neutral position. When riding with the power of the motor it is always possible to assist the engine with a few light pedal strokes should quicker acceleration or greater speed in hill climbing be desired.

GENERAL INFORMATION

The tools supplied with each motor are:—

1 double ended flat spanner (8 and 10 mm.). (1) (Fig. 2)

1 double-ended tubular spanner (14 and 21 mm.). (2) (Fig. 2)

These, together with a screwdriver and a pair of pliers are the only tools needed to fit the 'Cucciolo' Unit to a bicycle frame of standard design.

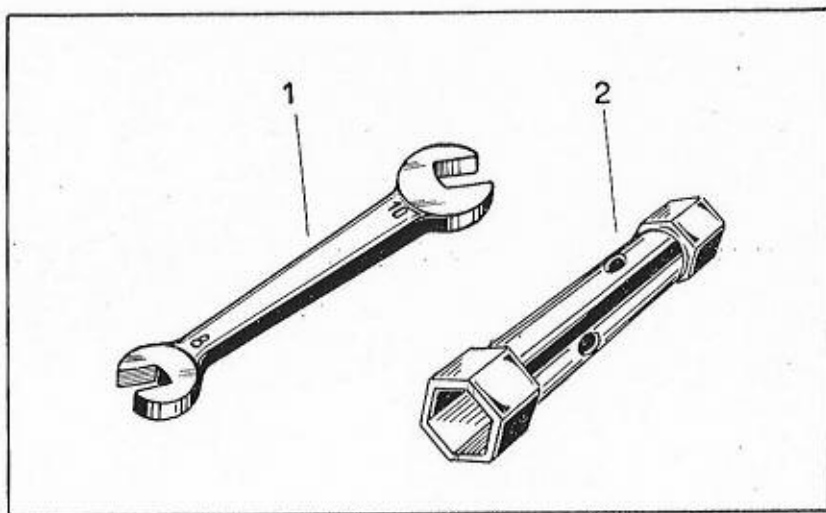


Fig. 2

The local Borough or County Council will issue your licence with a Registration Book in which your number for the plates for the front and rear of your cycle will be found.

Your Driving Licence

Payment of a fee of 5/- permits you to obtain a provisional licence, which will entitle you to use your 'Cucciolo' immediately, observing that 'L' plates must be fitted to your cycle. In due course, when experience has enabled you to pass your driving test the 'L' plates may be removed.

Licence Holder and Horn

These may be obtained from your dealer for a small charge.

FITTING INSTRUCTIONS

Fitting of the 'Cucciolo' Unit to the Bicycle Frame

1. *Dismantling of the pedal axle and cranks* (Bottom Bracket Spindle).
Unscrew the lock-ring and the near side (left) bottom bracket cup. Take from the assembly the axle (spindle) with the two pedal cranks. Of these only the left crank and its pedal together with the right pedal but without its crank will be utilised.
2. If the cycle is fitted with a 'roller' lever or wedgwood type brake, a small modification is required, and the 'Cucciolo' agent will fit this to the cycle at small extra cost.
3. *Re-assembling of Bottom bracket spindle and bearings.*

The original spindle should be replaced with the new 'Cucciolo' spindle supplied with the Unit. When re-assembling the bearings, pack the cups with fresh grease, this will also hold the balls in position and fitting is made easier. The 'Cucciolo' spindle must be fitted with the threaded end on the near side (left) side of the bicycle. Three different types of axles are used, the only varying distinction between each, is the ball race spacing and the old spindle should be compared with the one supplied, this will enable the 'Cucciolo' agent to supply the correct one for the machine.

4. *Fitting of the Motor to the frame* (Fig. 1).

The motor unit should be fitted in order that the semi-circular recess fits snugly on the lower part of the bottom bracket of frame, and that the cradle holds firmly to the bicycle main bar (also called front down bar). The recess should fit around the bottom bracket with packing placed between the crank case and the bottom bracket, and at the cradle—the two clamps (1) encircle the top part of the bottom bracket, and are kept in position by the pin attaching the motor (2). Against the cradle is fitted the clamp (3) which clamps round the down tube (4).

Attention must be given while tightening the clamps (the necessary spanner is supplied with the motor) that the valve operating rods of the motor do not touch or are too near to the bicycle down tube (4). (A clearance of $\frac{3}{32}$ " is sufficient). If the clearance is not sufficient, an extra layer or two of red fibre or metal packing can be inserted at the engine recess. Attention must also be paid to the distance between centre of the slip sprocket (see Fig. 5), and the centre of the bottom bracket spindle, which is $2\frac{5}{8}$ ". If distance is not correct either the inner teeth of the crank-wheel will engage too deeply into the slip sprocket causing stiffness

in pedalling, or will not engage enough, resulting in undue strain and eventual damage to the slip sprocket. It is equally important that the crank support be $\frac{1}{8}$ " past the line of the slip sprocket as shown in Fig 6. By sighting from the top, correct alignment can be checked. Twisted frames or lugs sometimes require uneven packing of the engine so that this will line-up with the chain. (See Figs. 3 and 6). As an example, the thicker packing on the right will move the front of the engine to the left, and *vice-versa*. It is seldom necessary to pack unevenly.

Clamps (1 and 3) can then be tightened. Tighten first, slightly clamp (3) then slightly clamp (1), then fully both (1) and (3), alternating the spanner between right and left side nuts. With the tightening of these four nuts the motor is fitted. Make sure that the engine fits snugly against the bottom bracket of the frame and does not step over the locking ring of the bottom bracket bearing cups.

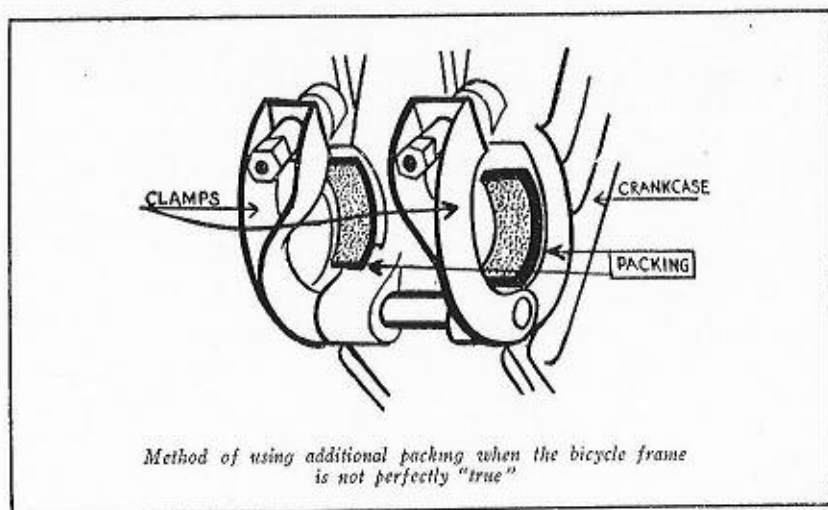


Fig. 3

Should interference be experienced at this point, and it is not possible to tighten clamps (1), it will be necessary to remove with a file or grinding wheel, the excess portion of the locking ring where protruding.

5. *Fitting of Crankwheel support and crankwheel.*

The crankwheel support may now be assembled on to the right end of the 'Cucciolo' spindle, making sure to fit the cotter pin carefully and tightly. The support must be $\frac{1}{8}$ " past the line of the slip sprocket, as shown in Fig. 6, in order that the toothed insert, runs freely and true in the centre of the rollers of the slip sprocket. The crankwheel is then secured to the crank support by means of the six flathead screws and lockwashers. Check for smooth and silent revolving of crankwheel and correct meshing of teeth with slip sprocket. Now fit the guard over the

six screws and screw the original pedal into the end of the crank. Incidentally, it may be found that the pedal thread is rather tight; this is intentional, as pedal axle threads are often loose or worn; when fitting a very tight pedal, a 9/16 x 20 t.p.i. tap will open out the thread as required.

6. *Synchronising of the Automatic Gear Pre-Selector.*

In order to synchronise the gear change it is necessary to slacken completely the clutch adjusting screw (1) (Fig. 4). With the gear in neutral and the left pedal down, thread the Bowden wire into the eyelet of the clutch lever (5) (Fig. 1) and pull until the two contacting parts are about $5/32$ " from the pre-selector bell-shaped cam. The Bowden wire should then be locked with the screw (5) (Fig. 1). The screw (1) (Fig. 4) is then adjusted to give $\frac{1}{8}$ " play at Handlebar Lever. (See Maintenance Page 14). With the left pedal forward the low gear will automatically be engaged by actuating the clutch lever.

With the left pedal down the gear change will be back in neutral position. With the left pedal backwards (or correspondingly the right pedal forward) the top gear will be engaged, upon operation of the clutch.

7. *Transmission.*

A fixed sprocket can be fitted on the back wheel. This will not eliminate the free wheel riding of the cycle, this being obtained by the slip sprocket.

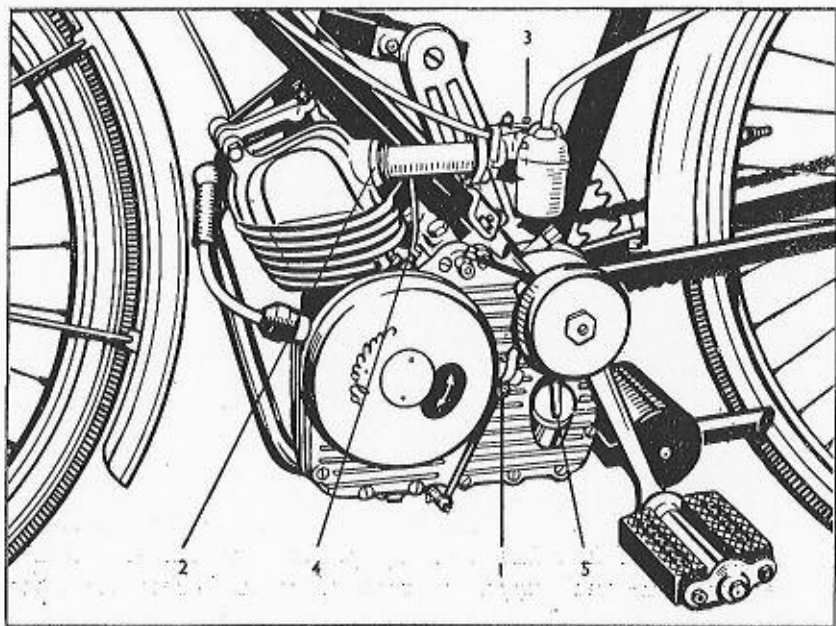


Fig. 4

The fixed wheel will make it possible to start the engine by 'Momentum' or pushing, also permitting use of the motor as a brake. Recommended ratios for the back wheel sprocket are:—

28" wheel	26" wheel
'A' 18 tooth	'A' 17 tooth
'B' 19/21 tooth	'B' 18/20 tooth

N.B.—'A': Normal use of the motor with two speeds, for a rider of normal weight on normal roads.

'B': Normal use of the motor with two speeds, for a heavy-weight rider in hilly country.

The bicycle chain can now be fitted. As the circumference of the power sprocket is smaller than the original pedal crank, it will be only necessary to shorten the chain a few links. Adjust back wheel to give fairly tight chain (about $\frac{1}{2}$ " up and down free movement).

8. In order to complete the fitting of the 'Cucciolo' it only remains to:—

(a) Fit the Petrol Tank astride the back mud-guard. For this purpose the tank is supplied with suitable mounting brackets. It is advisable to place one layer of insulating tape between brackets and frame. The tank may also be fitted at the front down-bar, if a luggage carrier is desired over the back wheel, and the 'Cucciolo' agent will fit whichever is required.

(b) The carburettor should be perfectly level. Its position can be corrected by loosening the locking ring (2) (Fig. 4), which locks the induction tube to the engine. Fit the Bowden cables which are supplied:

1. To the carburettor, the Bowden wire to the throttle is threaded in the hole of the little thimble on the lever of the carburettor throttle and locked with the screw (3) (Fig. 4).

2. The Bowden wire for the valve lifter is fixed on the top part of the cylinder head with a small nipple (7) (Fig. 1). Note that the operation of the valve lifter control is 'inverse', that is, the Bowden wire is fixed while the casing does the 'pushing', therefore, do not tape the casing too tightly to the bicycle frame. For neatness the casing can be passed through a small piece of metal tubing or sleeve, 1" long, and this sleeve can then be neatly taped to the down-bar, together with the clutch and throttle Bowden control casings. It is recommended to oil or grease the inner cable of all Bowden controls before fitting, thus ensuring smooth and long life service.

(c) Fit the plastic petrol tube to the petrol tap and to the carburettor (8) (Fig. 1). (For easy fitting dip ends of tube in hot water for a few seconds). The pipe may be secured alongside the seat-bar with tape.

(d) Electric current (A.C.) at 6 volts is generated by the flywheel magneto when the engine is running.

A 6-volt, 6-watt bulb should be fitted to the headlamp and a 6-volt 3-watt

bulb should be fitted to the rear lamp. The bicycle headlight wire should be secured to the insulated terminal (4) (Fig. 4). Check that engine is in good electrical contact with the bicycle frame, also the headlamp bracket. About twelve watts are available from the flywheel generator, sufficient for bright headlight and tail light illumination.

(e) Check brakes for efficiency, especially if the free-wheel back sprocket has been retained, as the motor will not then contribute as a brake. A chain guard is not necessary with the 'Cucciolo' unit, because the pedal crank gives full protection. However, if it is desirable to cover the rear part of the chain (Ladies' bicycles) the usual chain-shield can be fitted—just cut away a small part at the forward section, clearing the slip sprocket.

The preceding instructions have been set out in detail to show that the fitting of a 'Cucciolo' Unit to any standard bicycle frame does not require any special skill and can be undertaken very successfully by the owner of the bicycle himself.

Fitting is straight-forward and calls for attention only at the bottom-bracket assembly in order that correct alignment and clearance between the valve operating rods, and the front down bar is obtained.

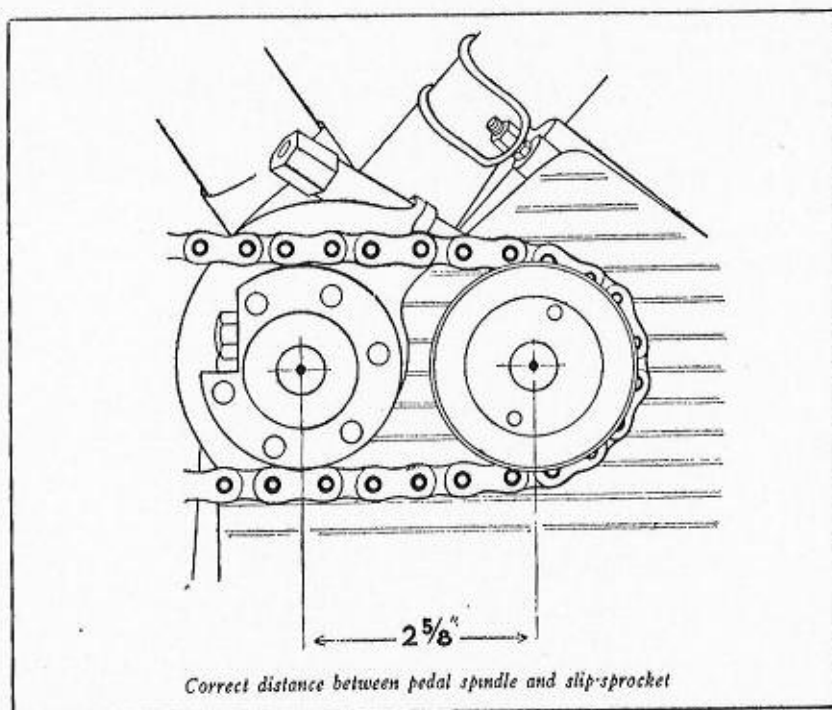


Fig. 5

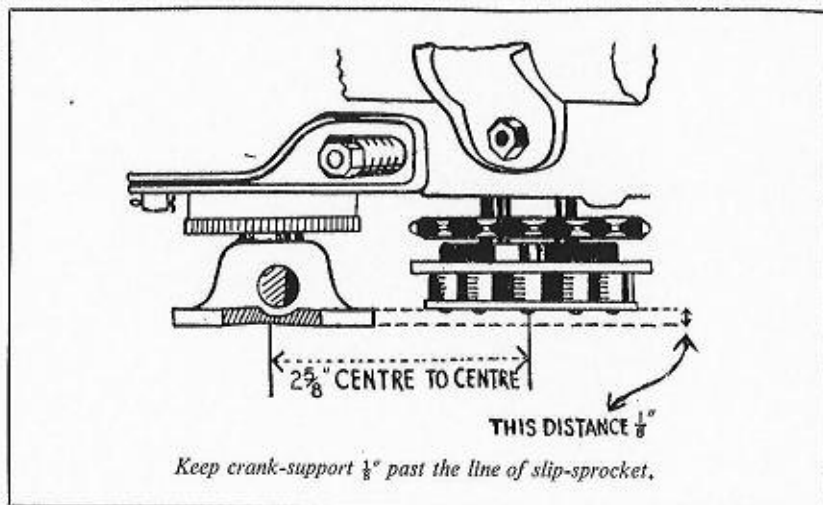


Fig. 6

RUNNING AND RIDING INSTRUCTIONS

N.B.—Every 'Cucciolo' Motor is delivered after having been fully tested on the bench, but not 'fully run-in'.

Lubrication: Every motor is delivered dry; before it is started unscrew the plug on the left side of the engine (5) (Fig. 4), fill the crank case with one pint of motor oil, as stated in the specifications on page 16.

With such quantity and with the motor horizontal (normal design of the cycle frame and bicycle on the level) the oil level should come almost to the opening of the filling plug. As the position of the oil filling plug has been specially designed for correct oil level, subsequent topping up of the oil level is extremely simple. Never let the oil level fall below $\frac{3}{8}$ " of the opening of the filling plug. Check this every 150-200 miles. In any case, after the first 150-200 miles, and then every 500-700 miles, the oil should be completely drained and new oil put in. Drainage is effected by unscrewing the plug under the crank case with the tube spanner, supplied with the tool kit. To obtain a full drainage, this operation should preferably be done whilst engine is warm.

Priming: Open the tap under the petrol tank, and make sure that the petrol reaches the carburettor by pressing for a few seconds the brass priming rod on the top of the carburettor. This operation (which should not be overdone) is advisable when starting a cold engine, but is not necessary when the motor is warm as this would over enrich carburation and make starting of the engine more difficult.

Upper Cylinder Lubrication is advisable during the 'running-in' period, but not necessary afterwards. Add this lubricant to the first gallon of petrol in the proportion normally supplied by any petrol-service station.

Starting the Engine: 'Kick-start'—this is the normal way to start the engine *when the bicycle is fitted with a standard free-wheel sprocket.*

Make sure the gears are in the neutral position, this being so, there will be no difference from an ordinary bicycle, and pedalling will be as usual.

When a speed of approximately 4/5 miles per hour has been reached with the aid of the pedals, pause with your right pedal in a horizontal forward position (pre-selection of high gear) (always 'kick-start' the engine in high gear). Pull in the exhaust valve lifter control, pull in fully the clutch control lever and release, this movement will automatically engage the top gear and the release will make it ready to be 'kick-started'. 'Kick-start' with the left pedal, release valve lifter towards the end of the 'kick' and open throttle slightly above idling position, never start engine under compression. If the engine fails to start, merely lift the exhaust trigger and repeat the kick.

When engine is running, open the throttle slowly to match engine revolutions to bicycle speed. (If the top gear does not mesh immediately when clutch control lever is actuated, move the pedals just a few inches back and forth with clutch lever half pulled).

Should the engine start jerkily due to insufficient riding speed, or should the motor give irregular firing or be slow to start, you can help it with a few pedal strokes, after the initial 'kick', but without touching the clutch lever.

With a new engine 'kick starting' will be found to be stiff, but when the engine has been run in (after one gallon of petrol has been used), starting will gradually become easier.

Important: Start always and only in high gear, in order not to submit pedals, chain and sprockets to excessive effort. Use the valve-lifter.

Low gear should be used when moving from a halt with the engine already running, or immediately after the engine has been started in high gear if it is felt that the engine is under strain, and if it is not desired to pedal for a few yards.

FIXED WHEEL BACK SPROCKET

(Condensed Instructions)

Starting the Engine: 'Momentum Starting'.

1. With the gear change into neutral position, pedal the cycle until a speed of 3 or 4 m.p.h. is reached.
2. Pull in valve lifter trigger.
3. With the right pedal forward, pause and pull clutch lever in fully and release again, thus engaging high gear which will immediately start the engine revolving. Rotation of the engine is thus obtained by the momentum gained while pedalling.
4. Release valve lifting control and open throttle slightly. The engine will fire immediately. You may commence pedalling as soon as the clutch is released in order to help the engine.

Operation of the Gears: From what has been said before, the automatic operation of the pre-selector is already evident; operating the clutch lever disengages the clutch and changes the gear simultaneously.

With the pedals in a vertical position (left or right pedal down) actuating the clutch will disengage either gear into neutral position (remember to slightly close the throttle when operating the clutch, so as to 'float' the power of the motor).

If the clutch is not actuated the pedals are completely free either with the motor engaged in one or other gear, or neutral position.

From this it will be understood that the clutch lever should never be actuated while pedalling. Therefore, it is advisable to have the pedals in the desired gear position before actuating the clutch lever and actuate the lever without moving the pedals. When the engine is not running, it may be found necessary to move the machine back and forth while the clutch lever is kept about half-way, in order that the gear may find its way into mesh.

To change gear 'smartly' while riding, operate as follows:—

- (a) To change from high into low gear, slightly close the throttle just before pressing the clutch and open the throttle decisively before releasing the clutch.

(b) To change from low into high gear, close the throttle slightly and open it after the clutch has been pressed and released. These particulars will be best learned in actual practice, just as when first learning to ride or drive a motor cycle or a car.

To use the machine as a normal bicycle, select neutral gear.

When it is necessary to use the clutch, but without changing gear, just remember to have the pedals in the position corresponding to the gear in operation at that time.

The clutch does not wear if it is kept 'pulled', even for minutes at a time (riding through traffic, stopping at traffic lights, etc.).

To stop the engine, actuate clutch and operate valve lifter lever holding the left pedal down in order to pre-select into neutral gear at the same time, and be set for the next start.

To change into low gear, have left pedal forward, pull and release clutch while opening throttle. Decrease throttle if changing from low into high or neutral gear. When riding downhill (with fixed sprocket back wheel) the motor will be a helpful brake.

For the first 150/200 miles it is not advisable to exceed more than 15 m.p.h. to avoid excessive over-heating. For any kind of motor the 'running-in period' is most important and the life of the engine depends on it. Use small throttle openings, without labouring of the engine until about 1 gallon of petrol is used. Careful running-in will amply repay.

MAINTENANCE

Every 500-700 miles, drain oil (plug will be found under crank case), flush and refill with 1 pint of recommended oil.

Summer grade 40/50 S.A.E.

Winter „ 30 S.A.E.

Lubricate Valves, Rockers and Pull Rod Guides with one drop only of engine oil. Lubricate Control Cables and Levers in similar fashion.

Every 1,000—1,500 miles:—

Adjust Tappetts (Engine cold)

Inlet Valve .006 thou.

Exhaust Valve .008 thou.

Check with Feeler Gauge between Rocker and Valve stem Cap.

To adjust, slacken lock nuts on pull rod, insert appropriate size feeler and tighten nuts. Feeler should be sliding fit when correctly adjusted. Adjustment should be carried out with piston on T.D.C. of compression stroke and flywheel mark 'M' in line with corresponding mark on crank case.

Contact breaker points are accessible by rotating inspection cap on flywheel (either left or right).

Points should break when line on circumference of flywheel marked 'A' corresponds with line on crank case. Correct gap with piston at T.D.C. is .010 thou.

Sparking Plug: Clean Plug and reset gap to .018 thou. Correct type plug is Champion L-10s.

Periodical Adjustment and Maintenance: Clutch Cable should be adjusted to give $\frac{1}{8}$ " play at Handle Bar lever. Clutch push rod operation is adjusted by screw and locknut, found at left of oil filler cap.

To adjust, slacken locknut and tighten screw until screw touches push rod, slacken screw $\frac{1}{4}$ turn and lock in position. Rear chain should be adjusted to give approximately $\frac{1}{2}$ " up and down movement.

Petrol Filter and Carburettor Adjustments: Both petrol tank and carburettor are provided with filters to reduce to the minimum the possibility of fuel stoppages. To clean filters, drain tank and unscrew tap, the filter being fitted to this component.

A pump or an air line is a convenient method to use.

The Carburettor Filter is cleaned in the same way. Method of removal is:—Remove petrol pipe and two screws retaining Carburettor top. Unscrew needle valve assembly and filter will be revealed.

Should it be necessary to adjust the slow running or carburation, carry out adjustments in the following order:—

- (1) Check level of Carburettor and tightness of induction locking ring, also Flange bolts. Clean pilot and main jets. Pilot Jet is on top of Carburettor. Main Jet underneath.
- (2) Pilot Jet control is effected by the lower screw (marked 'A' in illustration) which should be screwed right home and slackened approximately one turn, final adjustments should be carried out when engine is thoroughly warm. Clockwise to weaken and reverse to richen mixture.

The screw above (marked 'B') is merely to regulate speed of tickover.

If you run out of petrol remember that the right lower section of the tank is the automatic reserve supply. Just tilt the bicycle on the left side in order to 'pass-over' the reserve to the side where the outlet tap is fitted.

Decarbonising will not be necessary until approximately 3,500—4,500 miles have been covered and this, as with any major overhaul, is best left to a competent Motor/Cycle engineer, as the 'Cucciolo' is in every way the same, in principle, to its larger counter-part.

Regular maintenance to your 'Cucciolo' will ensure years of efficient and trouble-free riding, and will amply repay the small amount of time involved.

SPARE PARTS

A full range of spare parts and tools including over size pistons and rings are available for the 'Cucciolo'. These should be ordered through your local agent, stating Engine No. and date of purchase, together with description of replacements required.

GENERAL DATA

Cylinder Bore	...	...	39 mm.
Stroke	...	...	40 mm.
Compression Ratio	...	...	6.24 to 1.
cc.	...	...	48.
B.H.P.	...	...	1.25.
Max. Revs.	...	...	5,200.
Speed m.p.h.	...	...	25—30. (Plus).
Spark Plug points	...	...	18/20/1000"
Spark Plug (14 mm.)	...	...	Champion L-10s.
Tappet Clearance	...	Inl.	.006
" " "	...	Exh.	.008
Sump capacity	...	approx.	1 pint.
Grade of oil	...	...	30.
Petrol tank capacity	...	...	$\frac{1}{2}$ gall.
Running-in period	...	...	200/250 miles.
Petrol consumption	...	...	250/300 m.p.g.
Upper cylinder oil may be used for running-in purposes.			

NOTES

IBM4502



**YOUR LOCAL AGENT WILL BE PLEASED TO
ASSIST WITH ANY FURTHER ADVICE OR
AID THAT YOU REQUIRE IN OBTAINING
THE UTMOST SATISFACTION FROM YOUR
DUCATI "CUCCIOLO"**

