A Power-wheel for Cycles

Ingenious 25 c.c. Two-stroke Unit with Rotary Valve Engine Housed in the Hub

A 25 c.c. two-stroke engine which drives by roller chain through a countershaft clutch, and which is built into the rear wheel, constitutes the latest motor attachment for cycles. Called the Cyclemaster, it is marketed by Cyclemaster, Ltd., 26, Old Brompton Road, South Kensington, London, S.W.7. The makers are E.M.I. Factories, Ltd., of Hayes, Middlesex. Large-scale production is envisaged.

The Cyclemaster is sold as a complete 26in cycle rear wheel, tyred and tubed, to replace the existing rear wheel. A 1¾in 18-gauge rim and 13-gauge spokes are employed in place of the more usual 20 and 15 gauges respectively. The spokes are laced to a large open-ended drum which substantially houses the engine-clutch unit. Periphery of the drum is provided with louvres to assist cooling. Riveted to the inside of the drum are the final-drive sprocket and the hub flange. Suspension of the power unit is by means of a bracket which, at its forward end, clips to the nearside chain stay of the cycle frame and, at the rear, locates on an eccentric on the hub spindle, to which the bracket is locked by a ⅜in nut. Attachment of the engine to the bracket is by ⅜in and ½in bolts passing through steel-cored rubber bushes; hence the power unit has rubber suspension. To an upward extension of the same bracket is bolted the petroil tank. Attached by a single screw below the petroil tank is a cover that shields the carburettor, which is an Amal 308. The air-cleaner and choke, and also the petroil tap, project beyond this cover.

A unique feature of the engine is that the induction port is not controlled by the piston but by a spring-loaded, steel rotary valve located between the near-side web of the crankshaft and the crankcase. The carburettor is clip-fitted to an induction pipe, and this pipe is flange-fitted to a rearward extension of the crankcase casting. The induction passage breaks the inside of the crankcase as an arcuate slot. As the piston nears the top of its stroke, a rectangular hole in the rotary valve disc registers with the slot in the crankcase wall, and the mixture continues through a hole in the crank web. Pressure on the valve disc is provided by three light coil springs locating in blind holes in the crank web. Two obvious advantages of this rotary-valve arrangement, compared with a piston-controlled port are, first, that a longer dwell of induction port opening is possible; secondly, the bulk of the mixture emerges under pressure in the vicinity of the big-end, thus tending to ensure more efficient lubrication of the bearing.

Caged needle-rollers are employed for the big-end, and the crankshaft is supported on three substantial, caged ball bearings, one housed in each half of the crankcase, and the third in the primary drive or clutch case, acting as an outrigger for the engine sprocket. Beyond this third bearing the mainshaft is extended to accommodate a Wico-Pacy Bantamag.

Of steel, the connecting rod has a phosphor-bronze bush at the small end; the gudgeon pin is retained in the piston bosses by circlips. A two-ring, domed-top, light-alloy piston is employed. Two in number, the transfer ports in the cast-iron cylinder are contoured to promote good scavenging. An aluminium-alloy cylinder head is employed. Three nuts, screwed on to through-studs from the crankcase, secure the head and barrel. Both bore and stroke measure 32mm, equal to 25.7 c.c.

Exhaust and tail pipes are detachable respectively from the cylinder and silencer. The latter is of welded-up steel construction and contains three baffles which give a passage formation; there are no small holes to become clogged.

From the engine sprocket to the countershaft clutch the drive is by ½×⅜in roller chain. As the clutch housing is built in unit with the engine, adjustment of the primary drive is not, of course, provided.

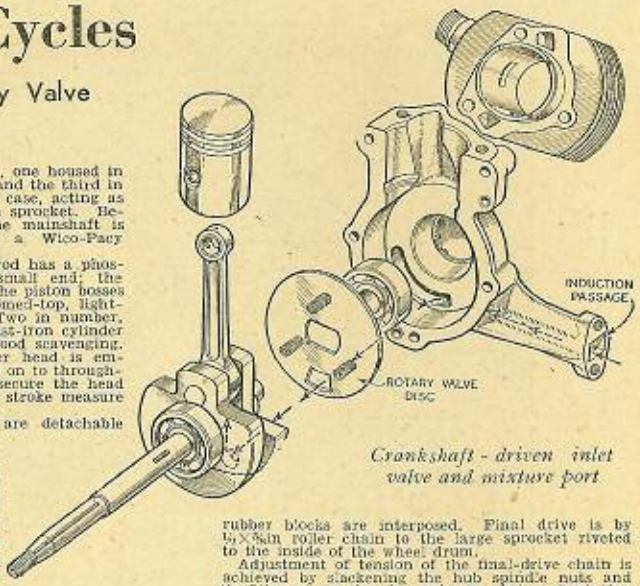
Running in oil, the single-plate, cork clutch has its friction inserts in the clutch sprocket, and really substantial back and presser plates. Four coil springs located in thimbles are employed. Operation is by means of a two-start quick-thread and thrust pin. This pin has a thrust ball race, a refinement that should reduce any need for clutch adjustment to a minimum. Nevertheless, adjustment is provided at the cable stop and also on the thrust pin. The handlebar lever has a trigger device for holding the clutch out of engagement when required.

The clutch centre is a parallel fit on the nearside end of the countershaft, to which it is keyed and retained by a nut. Supported on two journal ball bearings, the countershaft carries, at its offside end, a member with face dogs and, beyond that, a sprocket mounted on a Oilite bearing. The inner face of the sprocket is also dogged, and four shock-absorber rubber blocks are interposed. Final drive is by ½×⅜in roller chain to the large sprocket riveted to the inside of the wheel drum.

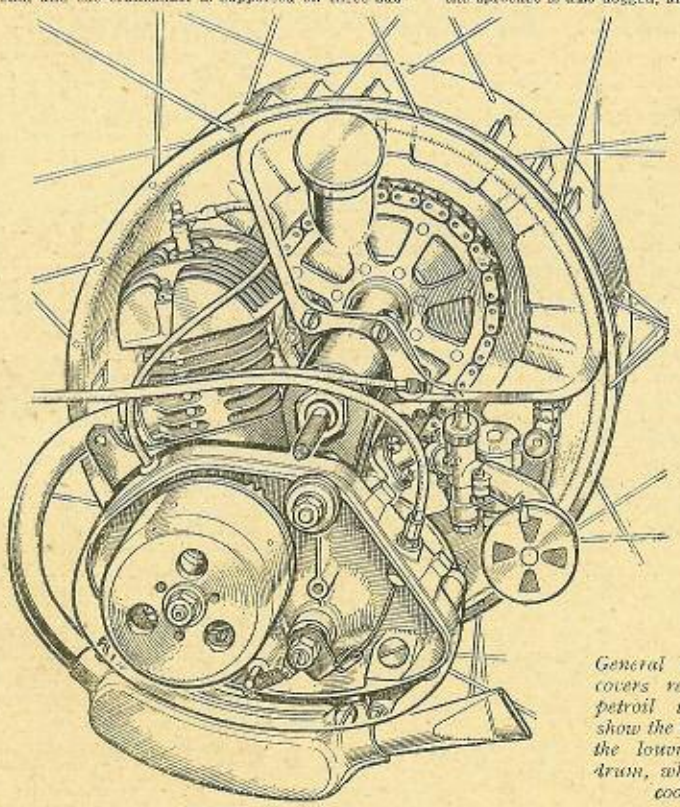
Adjustment of tension of the final-drive chain is achieved by slackening the hub spindle nuts and the ⅜in nut securing the engine bracket, and rotating the hub spindle, which is squared at its nearside end for the purpose. It will be recalled that the engine bracket is eccentrically mounted on the hub spindle. The wheel hub runs on non-adjustable, heavy-duty ball journal bearings.

Tank capacity is 2½ pints. The oil-to-petrol proportion is 1 in 25 of S.A.E. 20 viscosity oil. An oil measure (one per tankful) is provided with the filler cap. Sparking plug type is K.L.G. F50. Overall gear ratio is approximately 18 to 1. Total weight of the wheel, including tyre and tube, is 33lb. Maximum power output is 0.6 b.h.p. at 3,700 r.p.m., equivalent to about 15 m.p.h. road speed, and maximum torque is 0.9 ft-lb at 3,000 r.p.m. The engine will, however, rev far beyond its power peak, and will cruise comfortably at 18 to 20 m.p.h. on the level. A fuel consumption figure of 300 m.p.g. at 18 to 20 m.p.h. is claimed. The price is £25, including fitting.

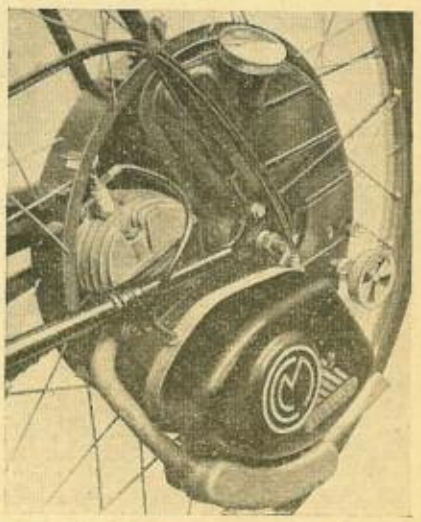
Starting drill is to pedal off and let in the clutch. In a short ride over level roads at the E.M.I. Works, it was found that the engine started easily, was so quiet as to be almost inaudible in thick traffic, and had a marked tendency to be free from irritating four-stroking. The machine cruised happily at over 15 m.p.h. on little more than half throttle opening. It could be throttled down to a walking pace, with the engine pulling smoothly even against a head-wind, without resort to the clutch. Indeed, leisurely circles were turned in a 12ft-wide road with the clutch fully home. From a walking pace, the engine picked up strongly and smoothly. As a result of this excellent low-speed torque and the smoothly operating clutch, no more than a quarter-turn of the pedals was required to make a standing start with the engine running.



Crankshaft-driven inlet valve and mixture port



General layout with the covers removed and the petroil tank ghosted to show the final drive. Note the louvres around the drum, which give a fan-cooling effect



How the Cyclemaster looks with everything in place. Carburettor choke and petroil tap project beyond the cover

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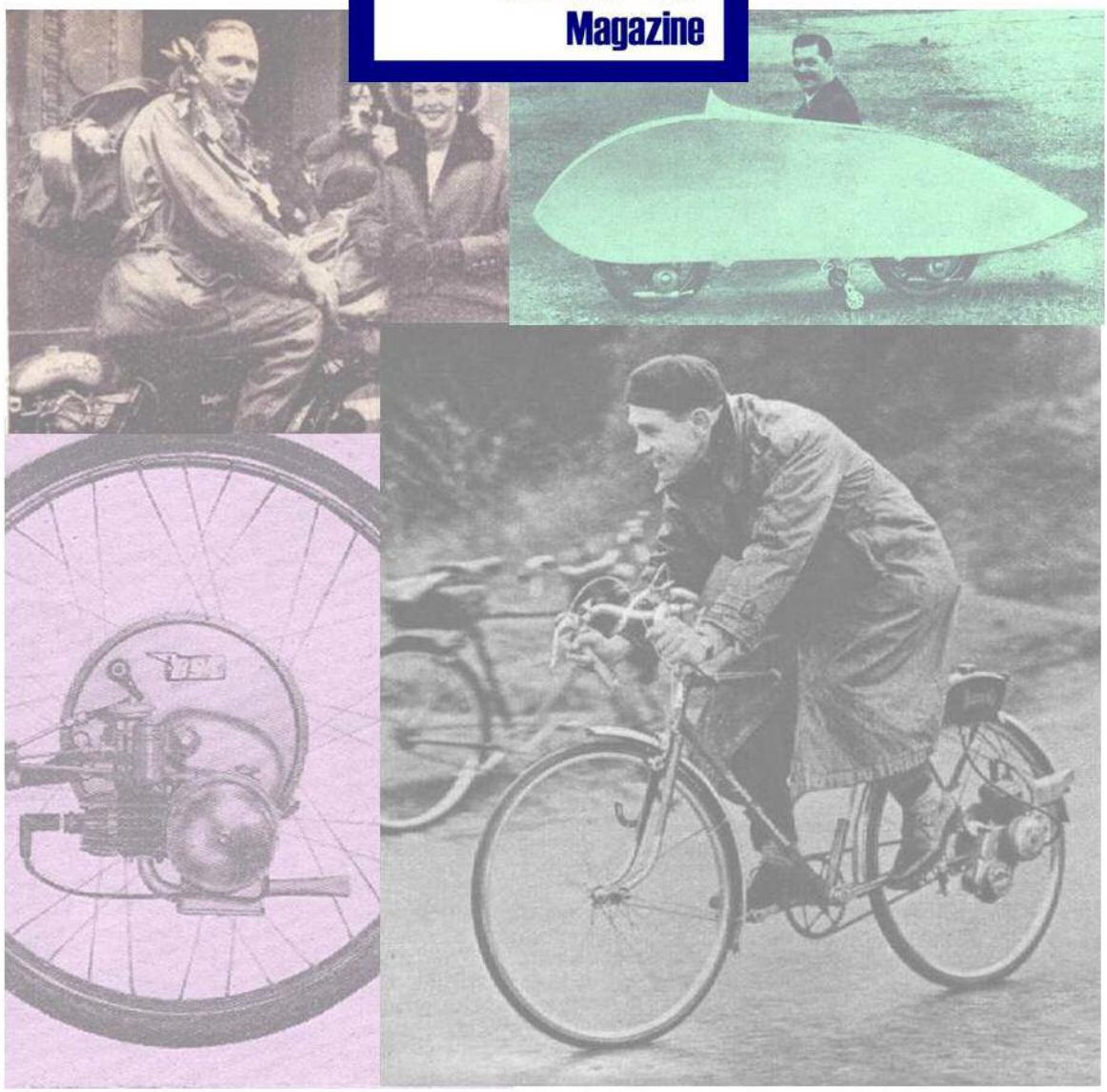

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