

# The Fagan New Three-Speed Gear Hub.

**F**EW cycle accessories have enjoyed such a continued growth in demand, until now considered by most as indispensable fittings to any machine with the name, as the Fagan variable speed hub. That success, and coupled with it the trend of the year towards a three-speed variation, led the talented inventor, Mr. J. Fagan, of Dublin, to re-devise his gear, and adapt it for the purpose of a three-speed mechanism of neat proportions, light in weight, but substantially equal to the older one, and, therefore, likely to prove as durable and satisfactory as its prototype. The accompanying diagrams will serve to show the leading features of the new hub, though here let it be added neither shows them as clearly as might have been

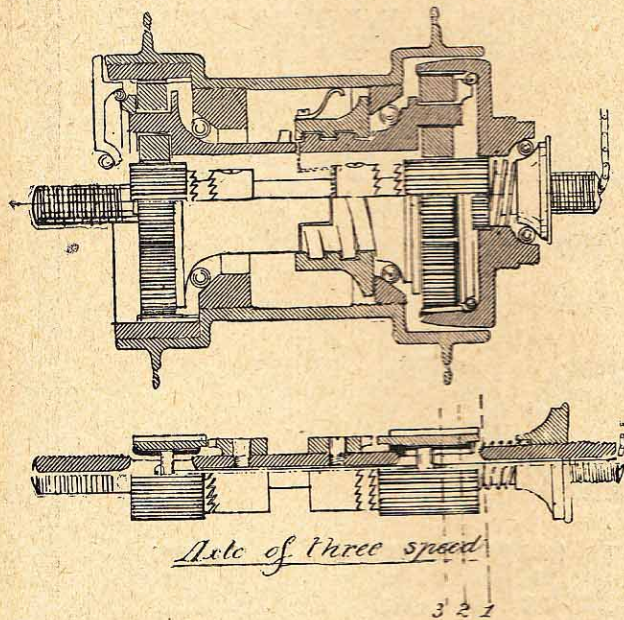


Fig. 1.—The Fagan Three-Speed Hub in Part Section—Also Axle of Same.

The lines show the relative positions of the earth cap and the sun pinion on (1) low gear, (2) middle gear, and (3) high gear.

wished. They were both prepared from the patentee's tracings, these apparently being the only reproducible mediums extant.

The inventor's design embraces a hub interchangeable in parts, and adaptable as (a) a two-speed; (b) two-speed coaster; (c) three speed; (d) three-speed coaster; and (e) as a single-speed coaster. Fig. 1 shows the hub in part section fitted as a three-speed gear, and also (below) the arrangement of the saw toothed clutches for operating the speed changes. The axle carries two sets of planet pinions and their cages, the series on the right engaging with an internal toothed cap mounted on the axle, and upon which the chain ring is mounted, while the series on the left engage with an internal toothed sleeve fixed to the hub. The axle has also mounted on it two sliding sleeves, on both of which a sun wheel is mounted. The sliding pinions engage

with respective sets of planet wheels, and are provided on their inner sides with ratchet teeth which alternately engage with the corresponding teeth on the two fixed boxes on the axle. The control medium is common and simultaneous to all, e.g., by sliding the sun pinions to the right, the pinion on the axle's left side is locked to the axle. The sun pinion has its right-hand side ratchet toothed, and is, therefore, engageable with similar teeth on the cap which carries the chain wheel.

Fig. 2 shows the complete hub in elevation and part section. A, A', are the two cages, each carrying planet pinions b, b', c, which gear with the sun pinions d and e, one being mounted at each end of the axle. These latter have a lateral movement on the axle, and have ratchet teeth f, g, on their edges. Hence on moving them to the right, the teeth f of the left-hand member d engage with the corresponding ones h on the left side of the boss i, which is fixed to the axle. Or, again, if moved to the left, the teeth g of the right-hand sun

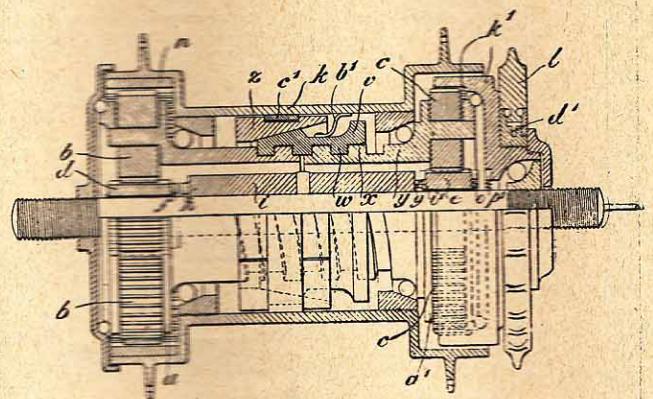


Fig. 2.—The Fagan Three-Speed Hub in Elevation and Part Section.

pinion e engage with the ratchet teeth i' on the right-hand side of the boss. Thus, if the sun pinions be moved to the right, the left-hand sun pinion becomes locked to the axle, but if moved to the left the right-hand sun pinion will be locked to the axle.

The cages are driven through the right-hand set of planet wheels c, by an internal toothed cap k', on which the chain wheel l is fixed, and the hub is driven through the left-hand set of planet wheels b, and an internally toothed cap n, fixed to the hub.

## How the Gear Changes are Effected.

The high gear is obtained by locking the sun pinion d to the fixed boss i, the drive being thence through the cage a, and the two sets of epicyclic gears b and c, so that the hub k is, therefore, driven at a faster speed than the cages. The gears on the right-hand side being held locked, there is, therefore, only the one set in action on the high gear.

For middle gear the sun pinion e and the planet train c are locked to the cap k', the cage a being driven at the same speed as the cap. This is effected by the sun

pinion e being provided with ratchet teeth o (on the right side) which, when the pinion (e) is moved to the right, engage with the ratchet teeth p1 on the cap (k1).

The low gear is obtained by releasing the sun pinion d, and locking the sun pinion e to the boss i on the axle, and again driving through the cap (k1) and the planet wheels b and c, the gear reduction being thus effected.

The self-contained hub brake consists of a sleeve v, having a quick pitch screw w, on its inner periphery, which engages with an external screw or worm x on a hollow boss y (integrally provided with the cage ar) and a split drum z, which surrounds the sleeve (v). Within this the coned ends of the sleeve (v) are adapted to

engage. The effect of back-peddalling is to cause the sleeve (v) to continue to rotate by means of a friction spring b1 (fitted to it) which presses against the inner periphery of the hub (k), hence the sleeve (v) is moved laterally by the difference in the rotation speeds. The lateral movement of the sleeve (v) causes it to engage with the surrounding split drum (z) and forces it outwards against the hub (k), thereby braking its speed of rotation. As before remarked the hub lends itself for a ready conversion to a two speed, two-speed coaster, or single coaster hub, so that the essential of Mr. Fagan's invention is the clever adaptation he has devised for an existing and successful device to what, it is to be hoped, will prove a still more successful three speed and coaster hub.

## Ten Years of Chemicco Growth.

**T**O the observant business man, few matters possess greater interest or afford finer object-lessons than the birth and growth of a business. One of the most remarkable instances of rapid, solid development in our own industry must certainly be that of the County Chemical Co., Ltd., of Moor Street and Park Street, Birmingham, and London, Manchester, and Glasgow.

Ten years ago, almost to a day, the present head of

and, bringing his practical knowledge of chemistry to bear on the matter, he was soon offering to cyclists wares a little better than any they had hitherto known, and to the trade some very welcome additions to their stock.

And so was born the County Chemical Co. of Coleshill in a shop hardly big enough to swing the proverbial cat, as witness our illustration thereof.



Birthplace of the County Chemical Co., Ltd., 1896.

the concern, Mr. Wilfrid Hill, was a chemist in quite a small way in rural Coleshill, an outlying district of Birmingham. But that was only the beginning. Mr. Hill saw his opportunity and grasped it. Himself a practical cyclist of several years' standing, he soon recognised that the lubricating and burning oils, the repair outfit and the hundred and one other necessities of the cyclist of those times left much to be desired,

But it was a healthy youngster, and before long the need for more room and a closer touch with the trade necessitated a move into Birmingham.

The first lines put on the market were cycle oils—Searchlight and Non-Clog—both prime favourites with the trade to-day.

Once located in Moor Street, the first city home of the Company, the business grew by leaps and bounds

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