No. 803,250. PATENTED OCT. 31, 1905.

R. W. SMITH.

TWO SPEED COASTER HUB FOR CYCLES.

APPLICATION FILED AUG. 22, 1904.

3 SHEETS—SHEET 1.

FIG. 1.

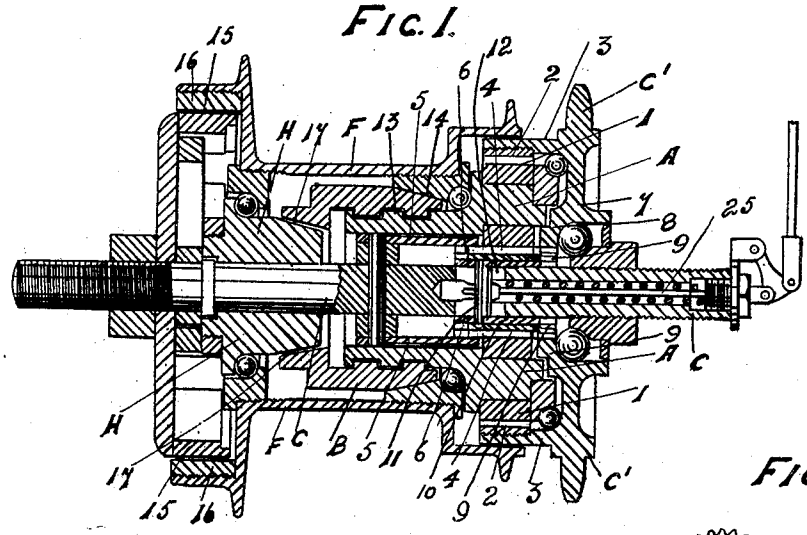


FIG. 6

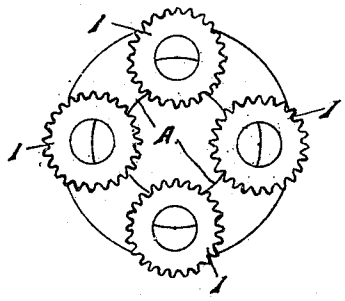


FIG. 5

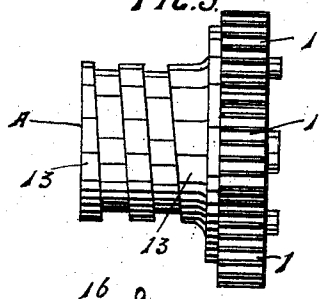
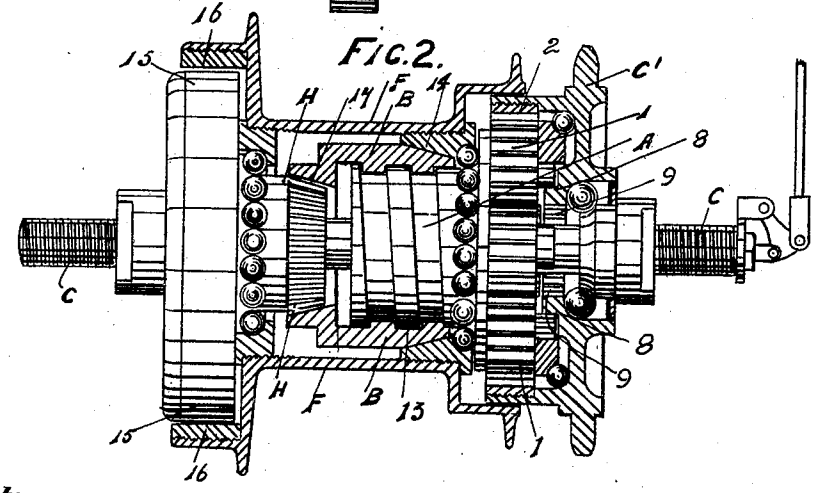


FIG. 2.



Witnesses.

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3 SHEETS—SHEET 2.

FIG. 3.

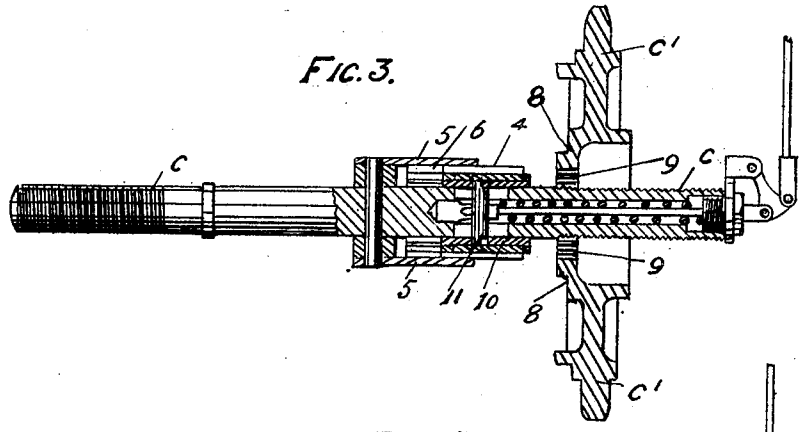


FIG. 4.

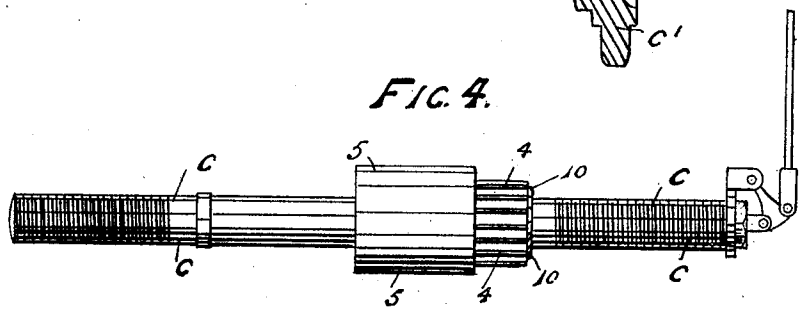
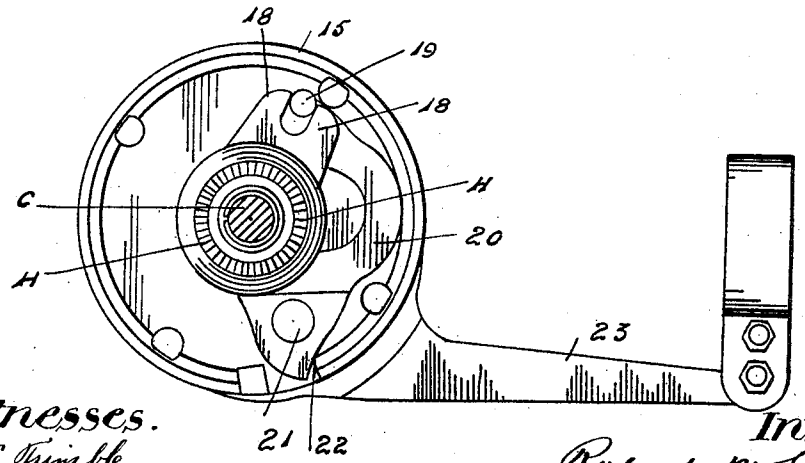


FIG. 7.



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TWO SPEED COASTER HUB FOR CYCLES.

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3 SHEETS—SHEET 3.

FIG. 8.

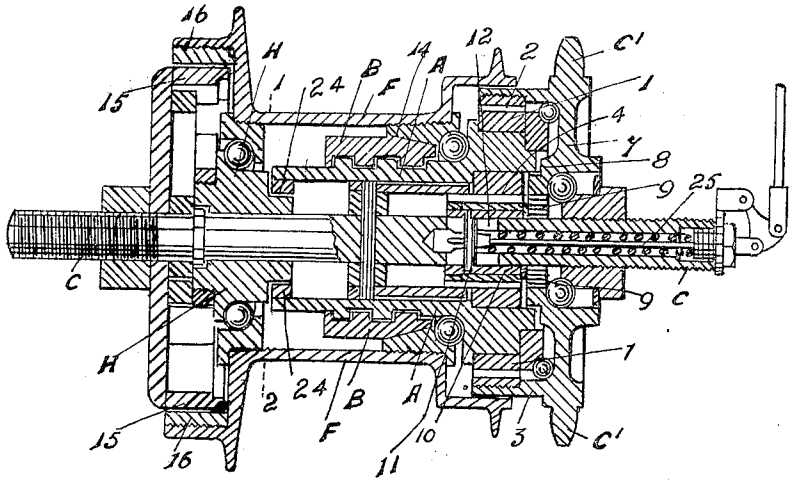
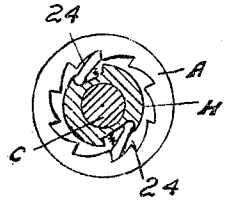


FIG. 9.



Witnesses.

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UNITED STATES PATENT OFFICE.

ROBERT W. SMITH, OF REDDITCH, ENGLAND.

TWO-SPEED COASTER-HUB FOR CYCLES.

No. 803,250. Specification of Letters Patent. Patented Oct. 31, 1905.

Application filed August 22, 1904. Serial No. 221,806.

To all whom it may concern:

Be it known that I, ROBERT WALKER SMITH, works managing director of the Eadie Manufacturing Company Limited, a subject of the King of Great Britain, and a resident of Lodge Road, Redditch, in the county of Worcester, England, have invented a certain new or Improved Two-Speed Coaster-Hub for Cycles, (for which I have applied for a patent in Great Britain, Patent No. 6,465, dated March 17, 1904,) of which the following is a specification.

This invention relates to a new or improved two-speed coaster-hub for cycles, and has for its object a compact self-contained hub giving two speeds and upon either of which speeds the hub may be driven by the forward propulsion of the pedals entirely disengaged from the driving mechanism by retaining the pedals in a stationary position and braked by a pressure on the pedals in a backward direction.

In order that this invention may be clearly understood and more easily carried into practice, I have appended hereunto three sheets of drawings, upon which I have illustrated the nature of my said invention.

Figure 1 is a section through a hub complete. Fig. 2 is a part section similar to that of Fig. 1, but showing a portion of the internal mechanism in elevation. Fig. 3 is a section through the spindle and part of the sprocket, which more clearly illustrates the means for altering the gear. Fig. 4 is an elevation of the spindle shown in Fig. 3. Fig. 5 is a longitudinal elevation of the sleeve which carries the double clutch and epicyclic gear. Fig. 6 is an end elevation of Fig. 5. Fig. 7 is an elevation of the end cap of the hub looking from the interior and illustrating the braking device when detached from the hub. Fig. 8 is a similar section to Fig. 1, but illustrating a modification in the clutches. Fig. 9 is a cross-section through Fig. 8 on the line 1 2.

In carrying this invention into effect the two speeds are obtained by means of the well-known epicyclic gear, one or more wheels 1 of which are mounted upon an independent sleeve A, so as to gear on the outside with the internal teeth 2, which are provided upon a flange 3 upon the sprocket driving-wheel D, while upon the inside they gear with the central pinion 4, which is mounted upon the fixed spindle C so as to be capable of both a lateral and rotating movement.

An enlarged collar 5, having internal teeth 6 for engagement with the one end of the central pinion 4, is fixed to the spindle C within the hub-barrel, and the outer cap or plate 7, which is provided upon the sprocket C′ to cover the end of the hub and gear with the planet-wheels 1, is also flanged out at 8 and provided with internal teeth 9 for engagement with the other end of the central pinion 4. The longitudinal movement of the central pinion 4 on the spindle may be effected in various ways—as, for instance, by a wire or rod 25, which is secured to the sleeve 10 by the cross-head 11, the spindle C being slotted at 12 to allow of the movement of the sleeve 10, upon which the central pinion 4 is normally free to rotate.

The operation of changing the gear is as follows: When the central pinion 4 is moved into engagement with the fixed teeth 6 on the spindle, the pinion 4 is prevented from rotating and the speed of the hub is retarded; but when the central pinion 4 is moved clear of the teeth 6 and into engagement with the teeth 9 on the hub-cap 7 the normal or quick speed is the result. One end of the independent sleeve A, which encircles the spindle C and carries the epicyclic gear 1, which extends into the hub and is provided on the outside with a helical thread 13 or its equivalent, upon which helical thread a helically-grooved nut or part B works and is moved laterally longitudinally either to the one end of the sleeve, where it frictionally clutches the interior part 14 of the hub F when the pedals are propelled forward, or to the other end when the pedals are pressed backward, in the course of which it frictionally clutches the brake connection or clutch part H at 17 and operates the friction-band 15 or its equivalent against any convenient part 16 of the hub F, thereby braking the hub with a power varying according to the amount of back pressure put upon the pedals, while in the case of the nut or part B being in the center, as is the case when the pedals are held stationary, the hub F is entirely disengaged from the whole mechanism and is free to rotate in either direction.

An illustration of one form of transmission of the braking movement from the brake connection H to the friction-band 15 is illustrated in Fig. 7, in which it will be seen that

the projecting fork 18 is fixed to the connection or clutch part H in such a manner as to actuate the stud 19 on the lever 20, which lever is pivoted at 21 and operates upon the end 22 of the expanding frictional ring 15, the whole being prevented from turning with the hub by the arm 23, which is clipped or otherwise fixed to any non-rotating part of the cycle. It will be readily understood that the connections between the clutch part H and ring 15 may be varied, as also the shape and configuration of the friction and fixed part of the brake.

Any suitable form of clutch may be used between the laterally-moving nut B and the hub F, on the one hand, and the laterally-moving nut B and the brake connection or actuator H, on the other hand, so long as the nut B can move or be moved into a position in which it is free from engagement with the hub, or in place of having the clutch 17 between the nut B and brake-operator H it may be arranged between the sleeve A and brake part H, as illustrated by the ratchet-clutch 24 in Figs. 8 and 9, the ratchets of which come into operation and actuate the brake immediately upon the reverse rotation of the sleeve A, which is effected by the back previous of the pedals, as before described.

It will readily be seen that the epicyclic gear for the change of speed and the driving-clutch, with means for disconnecting the tube for free wheeling, may be combined in a hub without the brake-clutch and brake mechanism, in which case that end of the hub in which the brake is shown would be mounted upon bearings in the usual manner.

Having now described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a variable-speed coaster-hub, the combination of the hub a fixed spindle, an independent sleeve surrounding the fixed spindle, epicyclic gear-wheels carried by the sleeve, a sprocket driving-wheel, gear-teeth for the sprocket driving-wheel meshing on the outside with the epicyclic gear-wheels, a central pinion mounted upon the fixed spindle having lateral and rotary movements meshing with the inside of the epicyclic gear-wheels, a collar surrounding the fixed spindle having annular gear-teeth meshing with one end of said central pinion, annular gear-teeth for the sprocket-wheel meshing with the other end of said central pinion, an actuator for positioning said central pinion on the spindle, and means actuated by said sleeve to frictionally engage the hub.

2. In a variable-speed coaster-hub, the combination of the hub a fixed spindle, an independent sleeve surrounding the fixed spindle, epicyclic gear-wheels carried by the sleeve, a sprocket driving-wheel, gear-teeth for the sprocket driving-wheel meshing on the outside with the epicyclic gear-wheels, a central pinion mounted on the fixed spindle having lateral and rotary movements meshing with the inside of the epicyclic gear-wheels, a collar surrounding the fixed spindle having annular gear-teeth meshing with one end of said central pinion, annular gear-teeth for the sprocket-wheel meshing with the other end of said central pinion, an actuator for positioning said central pinion on the spindle, said sleeve having on its outer surface a helical thread, a laterally-moving nut correspondingly grooved and working upon the outer surface of said sleeve, to frictionally clutch at one end the interior of said hub when the pedals are propelled forward, a clutch part for the other end of said sleeve to be clutched by said nut when the pedals are pressed backward, a friction-band operated by the clutch part, and a friction part for the hub coacting with the friction-band.

In witness whereof I have hereunto set my hand in the presence of two witnesses.

R. W. SMITH.

Witnesses:
LEWIS W. GOOLD,
WALTER H. E. BARTLAM.