No. 664,749. Patented Dec. 25, 1900.

F. P. HINCKLEY.

BACK PEDALING BRAKE.

(Application filed Oct. 26, 1899.)

(No Model.)

FIG. 1,

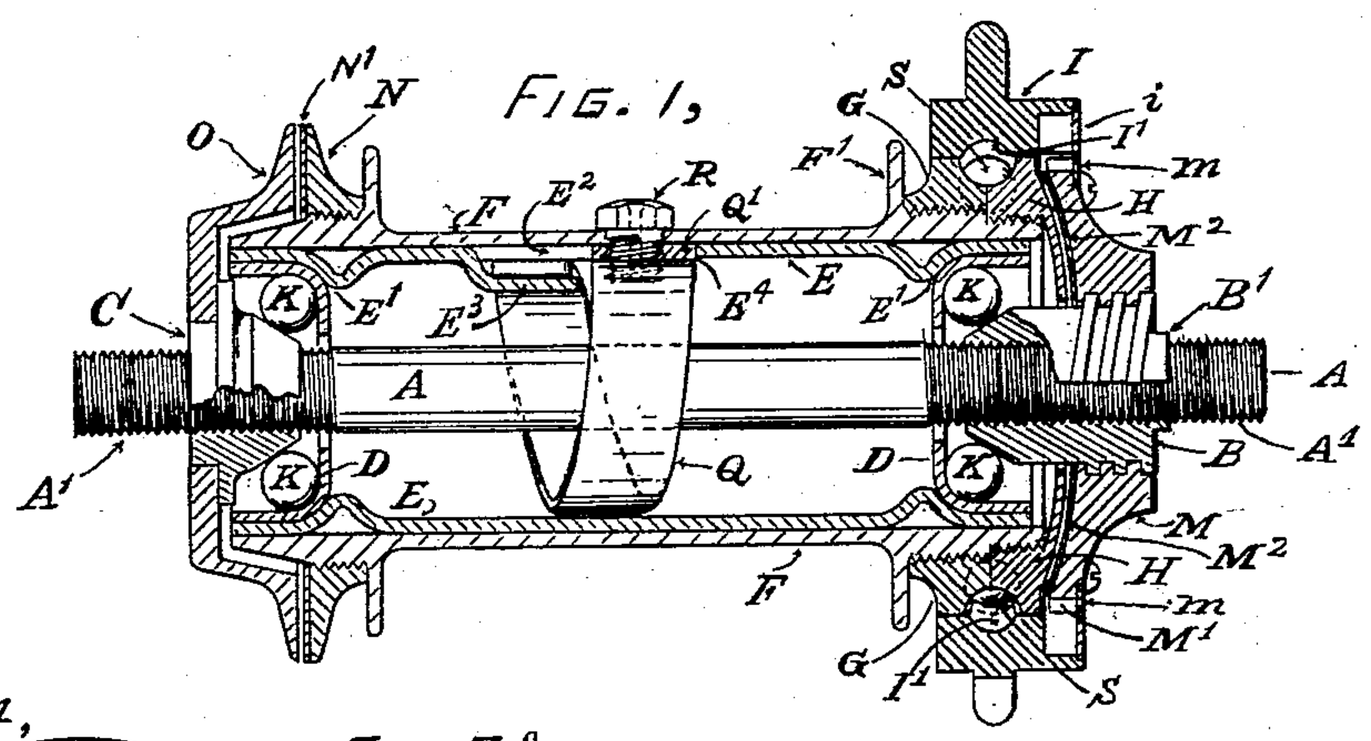


FIG. 4,

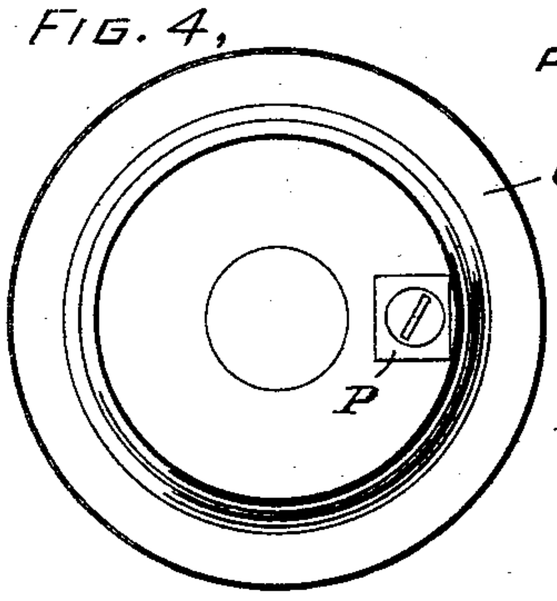


FIG. 3,

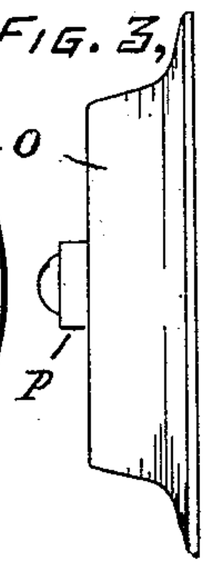


FIG. 2,

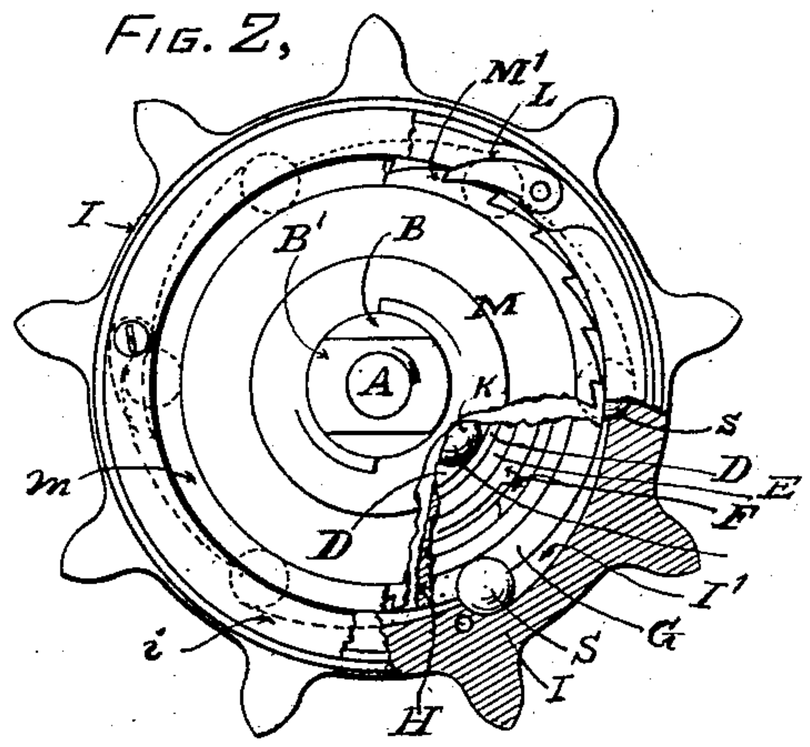
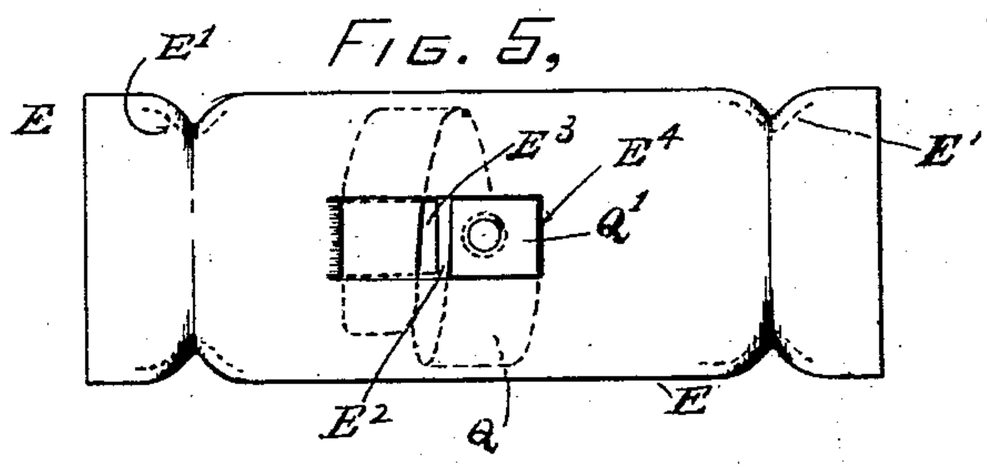


FIG. 5,



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FREDERICK P. HINCKLEY, OF JACKSON, MICHIGAN.

BACK-PEDALING BRAKE.

SPECIFICATION forming part of Letters Patent No. 664,749, dated December 25, 1900.

Application filed October 26, 1899. Serial No. 734,799. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK P. HINCKLEY, a citizen of the United States, residing at Jackson, in the county of Jackson and State of Michigan, have invented a new and useful Improvement in Bicycle Coasters and Brakes, of which the following is a specification.

My invention relates to improvements in automatic coasters and back-pedaling brakes; and the objects of my invention are to furnish an automatic coaster and back-pedaling brake which are positive in their action, a free coaster without any drag and that can be attached to any wheel without having to spread the frame. I accomplish these objects by means of the device illustrated in the accompanying drawings, in which—

Figure 1 is a central vertical longitudinal section through the hub of a bicycle embodying my invention. Fig. 2 is an elevation of the operating end of the hub, parts of which are broken away to show construction. Fig. 3 is an edge view of the brake-disk. Fig. 4 is an end view of the same. Fig. 5 is a plan view of the cup-sleeve.

Similar letters refer to similar parts and the index-figures to features of those parts.

A is a bicycle-shaft, upon which the ball-bearing cones B C are secured by the threads A′ of the shaft and reciprocal threads in the cones B C. Between the cones B C and the ball-cups D, set in the cup-sleeve E, which are firmly seated against the ledges E′, are bearing-balls K, which maintain the sleeve E and the hub F, which encircles the sleeve E, both constantly concentric with the shaft A and free to rotate about the shaft in the usual manner of a ball-bearing axle.

The shaft A, together with the cones, is secured into the rear forks of the frame in the usual manner, so that it is not necessary to illustrate the forks or the axle-nuts.

The parallel-sided projection B′ of the cone B, projecting into the fork on the sprocket side of the bicycle, is additional and positive security against the turning of the cone B.

The coasting clutch-ring G is firmly screwed against the spoke-flange F′ with a right-hand thread, and the lock-nut H is firmly screwed against the clutch-ring G on a left-hand thread, both on the hub F.

I is the sprocket-ring, which encircles the clutch-ring G and lock-nut H. Around in the periphery of the clutch-ring G and the lock-nut H is a (transversely) half-circular groove, one-half of which is in each the clutch-ring G and the lock-nut H, and equidistant in the inner surface of the sprocket-ring I are tapering tangential grooves I′, which form seats for the clutch-balls S when taken in conjunction with the groove formed in the clutch-ring G and the lock-nut H. In each of these channels are clutch-balls S, which lie loose when in the wide ends of the channels; but when the sprocket-ring I is moved around the hub and its parts in the direction of the wide ends of the channels the balls are rolled toward the narrow ends of the channels, binding as a clutch the sprocket-ring and the several parts of the hub in a fixed position in relation to each other, driving the vehicle ahead. When the motion of the sprocket is stopped, the balls are rolled back into the wide end of the channels, released, and the device is in condition for coasting.

Pawls L, pivoted to the sprocket-ring I in recesses in the said ring, as shown in Fig. 2, operate as detents on the ratchet-notches M′ on the periphery of the friction-nut M, which is screwed with a strong left-hand thread upon the cone B. When the sprocket-ring is turned backward, as in back-pedaling, the pawls engage the ratchet-notches and run the ratcheted friction-nut M along on the cone B by their left-hand thread up toward the lock-nut H, the faces of the two moving on the ring of friction fiber M^2, rigidly secured to the face of M, driving the lock-nut H, the coasting clutch-ring G, hub F, clutch-balls S, and sprocket-ring I all toward the opposite end of the shaft upon the cup-sleeve E until the friction-fiber ring N′, with which the friction-ring N is faced, strikes against the friction-disk O, which is rigidly held from turning by its lugs P, confined between the left rear fork of the frame, as B is prevented from turning in the right fork. Thus an effectual brake is obtained. When the back-pedaling ceases and the forward movement progresses, the friction-nut M moves back to its former position by means of the friction of the lock-nut H against it and the action of its thread on the thread of the cone B, and the hub F and its attachments are carried back on the

cup-sleeve E by the spring Q, secured at one of its ends to the hub F by means of the cup-screw R, the lug Q′ intervening and free to move longitudinally in the slot E. The other end of the spring Q is anchored on the tongue E^3. The end E^4 of the slot E^2 limits the longitudinal travel of the hub F to its required location on the sleeve E. When the wheel is traveling forward, the pawls L are thrown back away from the ratchet-teeth by centrifugal force.

Having thus fully described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a vehicle-wheel, a hub, a sleeve, a hub surrounding it, a spring secured at one of its ends to the sleeve and at its other end to the hub, a grooved clutch-ring, a grooved lock-nut secured thereto, a sprocket-ring provided with tapering grooves, and clutch-balls in the grooves of the clutch-ring, the lock-nut and the sprocket-ring, substantially as described.

2. In a ball-bearing vehicle-wheel, the lock-nut H, and the coasting clutch-ring G, both secured to the hub, the two having a half-circular groove around in their peripheries, the sprocket-ring I, with its inclined channels I′, matching the half-circular grooves in the coasting clutch-ring G, and the lock-nut H, forming ball-races, the clutch-balls S, operating as a clutch in the ball-races to drive the wheel forward, substantially as shown and described.

3. In a ball-bearing vehicle-wheel, the lock-nut H, and the coasting clutch-ring G, both secured to the hub, the two having a half-circular groove (transversely) around in their periphery, the sprocket-ring I, with its inclined channels I′, matching the half-circular groove in the coasting clutch-ring G, and lock-nut H, forming ball-races, the clutch-balls S, operating as a clutch in the ball-races to drive the wheel forward, and release at will by back-pedaling, the balls also keeping the sprocket-ring I, in alinement with the clutch-ring G, and the lock-nut H, in combination with the ratchet-toothed threaded nut M, fitting the threaded cone, B, and connected when back-pedaling with the sprocket-ring I, the pawls L, pivotally attached to the sprocket-ring I, operating on the ratchet-teeth to carry the friction-face of the nut M, up against the reciprocal friction-face of the lock-nut H, said nut M, the friction-ring N, having the friction-face N′, and the disk O, substantially as described.

4. In a ball-bearing wheel, a sleeve, a hub surrounding it, a spring secured at one of its ends to the sleeve and at its other end to the hub, and means for moving the hub longitudinally to serve as a brake, substantially as described.

FREDERICK P. HINCKLEY.

Witnesses:
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