No. 669,237. Patented Mar. 5, 1901.

W. S. GUBELMAN.

BACK PEDALING BRAKE.

(Application filed Aug. 21, 1900.)

(No Model.)

Fig. 1.

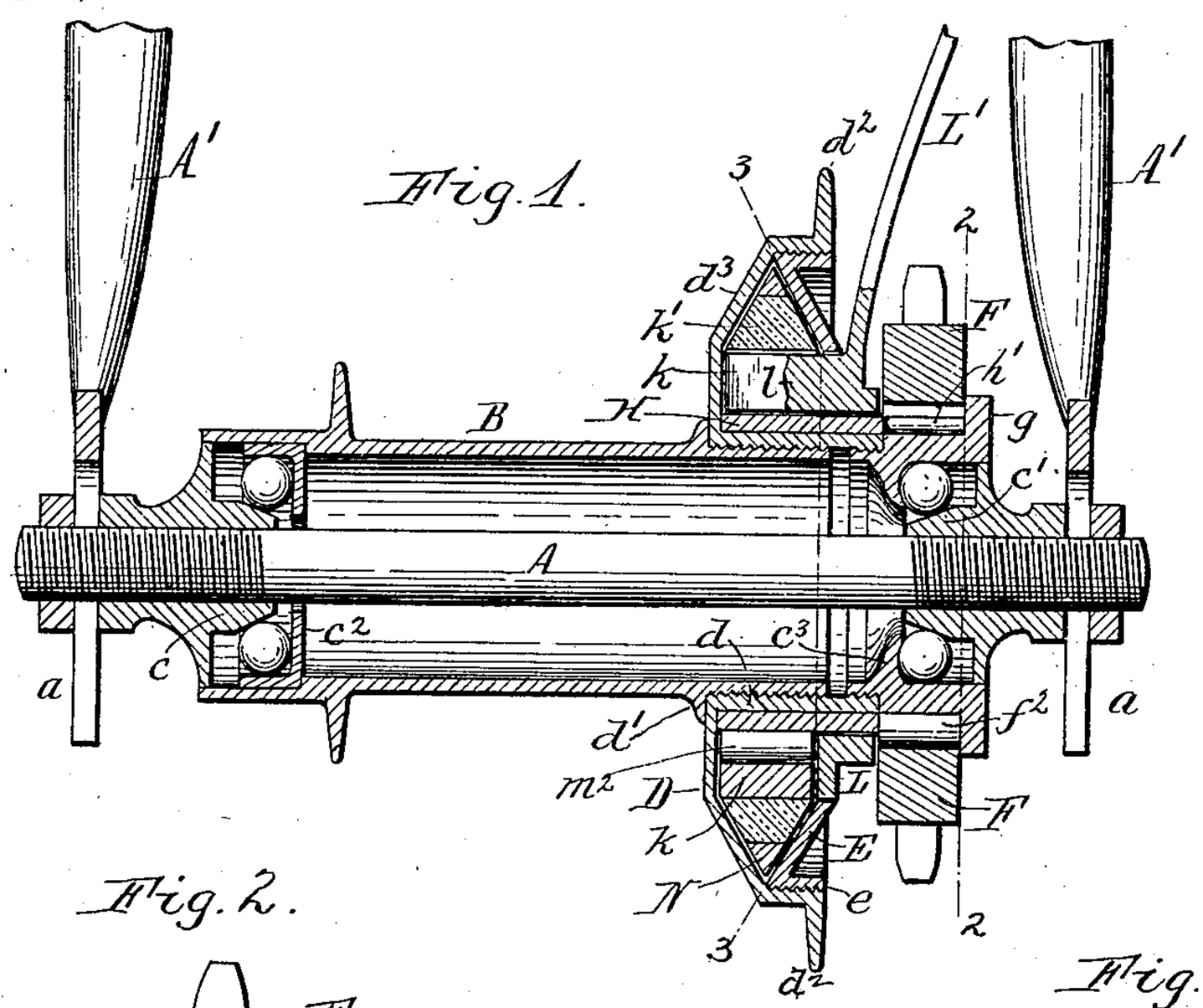


Fig. 2.

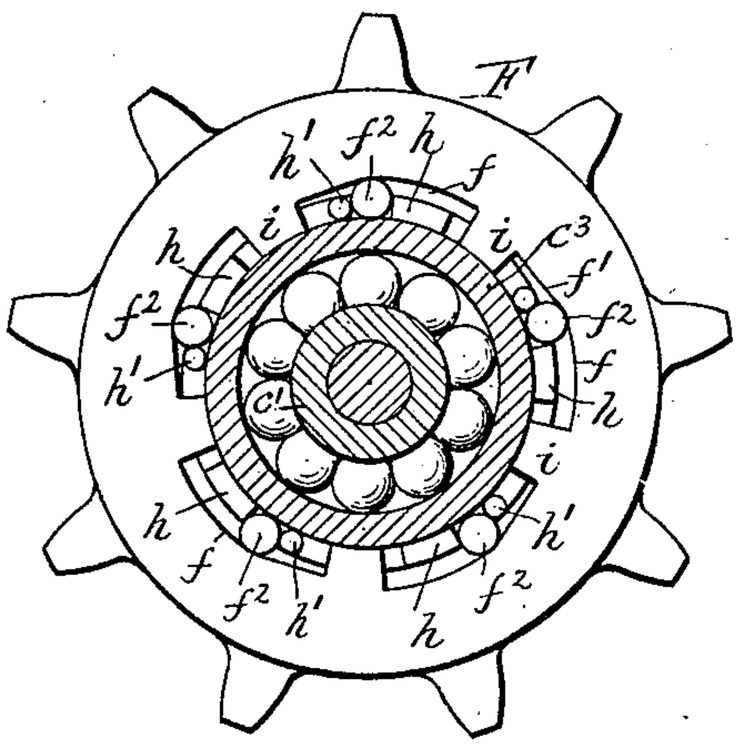


Fig. 3.

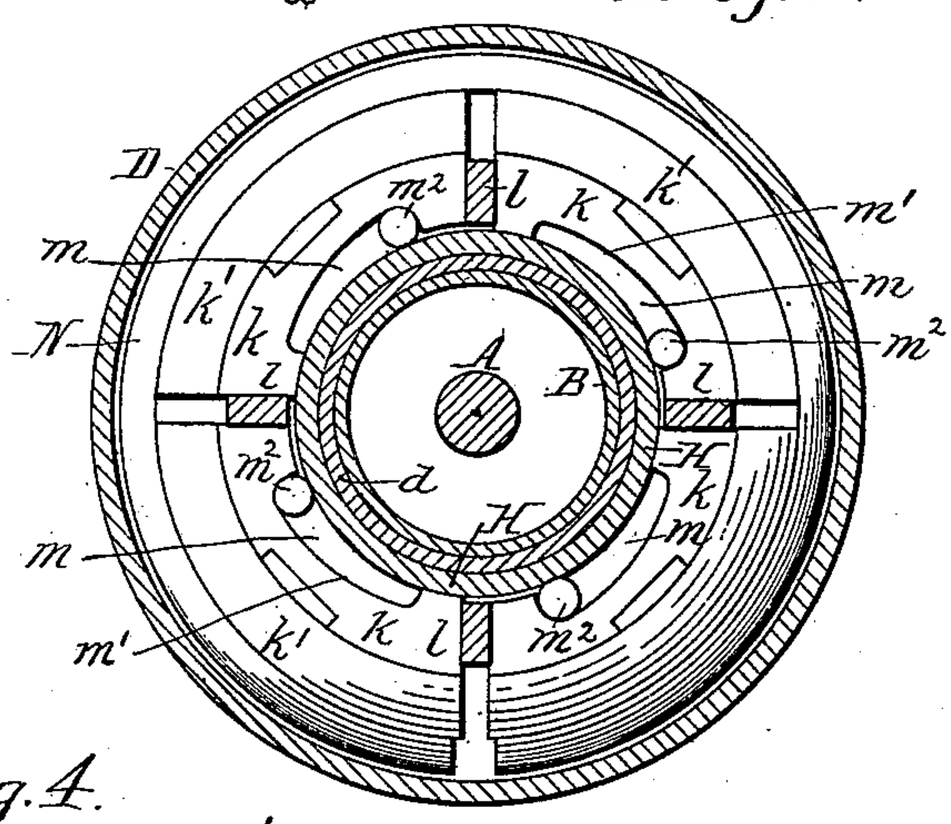


Fig. 5.

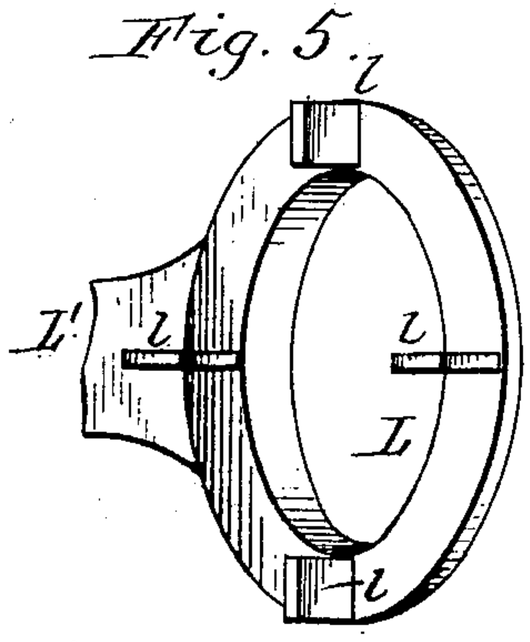
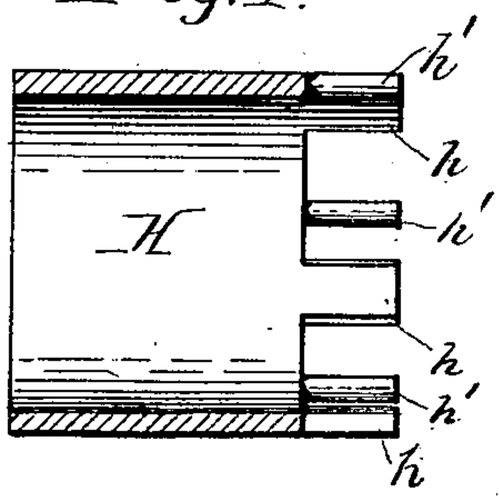


Fig. 4.



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UNITED STATES PATENT OFFICE.

WILLIAM S. GUBELMAN, OF BUFFALO, NEW YORK, ASSIGNOR TO JOHN C. CONWAY, OF SAME PLACE.

BACK-PEDALING BRAKE.

SPECIFICATION forming part of Letters Patent No. 669,237, dated March 5, 1901.

Application filed August 21, 1900. Serial No. 27,572. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM S. GUBELMAN, a citizen of the United States, residing at Buffalo, in the county of Erie and State of New York, have invented new and useful Improvements in Back-Pedaling Brakes, of which the following is a specification.

This invention relates to back-pedaling coaster-brakes; and it has for its object the provision of a brake of this character which is simple, light, and compact in construction and in which the coöperating brake-surfaces have sufficient contact area to render the brake prompt and reliable in action and which permits the velocipede to be backed.

In the accompanying drawings, Figure 1 is a longitudinal central section of a wheel-hub provided with my improved brake. Figs. 2 and 3 are transverse sections in lines 2 2 and 3 3, Fig. 1, showing the driving-clutch and the brake. Fig. 4 is a longitudinal section of the brake-actuating sleeve. Fig. 5 is a detached perspective view of the bracket which carries the stops of the brake-shoes.

Like letters of reference refer to like parts in the several figures.

A is the rear axle of a bicycle, which is secured in the slotted lugs *a* of the fork-arms A′ in the usual manner, and B is the wheel hub or barrel, journaled on the axle by ball-bearings of any suitable construction. In the construction shown in the drawings the bearing-cones *c c′* are mounted upon the stationary axle and the left-hand cup c^2 is seated directly in the end of the hub, while the other cup c^3 is screwed into the hub *d* of an annular rotary brake member or casing D. This casing is firmly screwed upon the adjacent end of the wheel-hub and abuts against a shoulder or flange *d′* of the latter. The hub of the casing D and the right-hand bearing-cup c^3 practically form extensions of the wheel-hub. The annular rim of the casing D is provided at its outer edge with an annular spoke-flange d^2, and the portion d^3 of the inner wall of the casing adjacent to its rim is preferably beveled or conical, as shown in Fig. 1.

E is a ring which forms the outer wall of the casing and which is provided with an externally-screw-threaded rim *e*, which engages with an internal screw-thread formed on the rim of the casing D. The ring E is preferably conical and beveled in the opposite direction to the conical portion d^3 of the casing D, so as to form, with the latter, an annular brake-socket of V-shaped cross-section, which tapers toward the periphery of the casing. If desired, the ring E may be formed integral with the casing D.

F is the sprocket or driving wheel, which loosely surrounds the bearing-cup or hub extension c^3 and which is connected with the same by a driving and coasting clutch of any suitable or well-known construction. The clutch shown in the drawings consists of segmental recesses *f*, formed in the inner edge of the sprocket-wheel and having inclined bottoms or cam-faces *f′* and rollers f^2 interposed between said cam-faces and the cylindrical surface of the hub extension c^3, said cam-faces trending in the proper direction to compel the hub to turn forwardly with the sprocket-wheel and to allow the hub to turn forward independently of the sprocket-wheel in coasting or to turn backward upon back-pedaling. The hub extension c^3 is provided at its outer end with an annular flange *g*, which retains the sprocket-wheel and the clutch-rollers f^2 in place thereon.

H is a rotary brake-actuating sleeve which loosely surrounds the hub of the casing D and which is provided at its outer edge with clutch lugs or fingers *h*, arranged lengthwise of the sleeve. These lugs extend into the recesses *f* of the sprocket-wheel and stand on the rear side of the radial lugs or teeth *i*, which form the end walls of said recesses, so that upon back-pedaling to reverse the sprocket-wheel the sleeve H is turned backward with the wheel by the engagement of the sprocket-wheel lugs *i* against the fingers *h* of said sleeve. The fingers *h* and *i* constitute a reversing or brake clutch. The sleeve H is provided at its outer edge in rear of each of its lugs or fingers *h* with an additional finger *h′*. These rear fingers are arranged parallel with the front lugs or fingers *h*, and each of the same is separated from the corresponding front finger by a space which is preferably wide enough to receive one of the clutch-rollers f^2 and allow the same to turn freely, one of these rollers being confined between

the fingers of each pair, as shown in Fig. 2. The sleeve H is held against lateral displacement between the inner wall of the casing D and the inner side of the sprocket-wheel or by any other suitable means.

k represents one or more radially-movable brake shoes or segments, which surround the inner portion of the brake-actuating sleeve H and which are adapted to bear at their periphery against the casing D when the brake is applied. The peripheral portion of these shoes is constructed of V-shaped cross-section to correspond to the opposing portions of said casing, as shown in Fig. 1. The brake-shoes are provided with a facing *k'* of vulcanized fiber or other suitable material which increases the braking action. The shoes are held against turning with the wheel-hub by horizontal stops or arms *l*, projecting inwardly from a stationary ring L and engaging between the opposing ends of the shoes, as shown in Fig. 3. The ring L loosely encircles the outer portion of the sleeve H and is carried by an arm or bracket L', which is rigidly secured to the adjacent fork-arm A' in the customary manner. The brake-shoes are provided in their inner edges with recesses *m*, having inclined bottoms or cam-faces *m'*, and in these recesses are arranged antifriction-rollers m^2, which bear at their outer sides against said cam-faces and at their inner sides against the cylindrical sleeve H. The cam-faces *m'* approach the surface of the sleeve in a rearward direction, so that when the sleeve H is turned rearwardly in back-pedaling the rollers m^2 are rolled toward the shallow rear ends of the recesses *m*, thereby crowding the brake-shoes outwardly against the surrounding casing or rotary brake member D.

N is a split annular spring which surrounds the brake-shoes and which by its tendency to contract holds the shoes against its expanding-rollers m^2 and the latter against the sleeve H, so as to insure prompt action of the brake upon reversing the sprocket-wheel. This spring is preferably beveled on both sides or made of V-shaped cross-section, so as to conform to the correspondingly-beveled brake-surfaces of the member or casing D. By this construction the spring augments the contact area of the brake-shoes.

The operation of my improved brake is as follows: In driving the machine in the ordinary manner the wheel-hub is caused to turn forwardly with the sprocket or driving wheel F by the driving and coasting clutch f' f^2, the brake-actuating sleeve H revolving with the sprocket-wheel and the brake-shoes *k* remaining in their retracted position. When the cranks are held stationary for coasting, the driving-clutch permits the sprocket-wheel to remain at rest and the wheel-hub to continue its forward movement within the driving-wheel. Upon back-pedaling to apply the brake the actuating-sleeve H is turned rearwardly with the sprocket-wheel by the engagement of the lugs or inner teeth *i* of the sprocket-wheel against the front fingers *h* of said sleeve, thereby causing the brake-expanding rollers m^2 to roll toward the highest ends of the cam-faces *m'* of the brake-shoes and forcing the latter outwardly against the surrounding casing or rotary brake member D and retarding or stopping the machine. As the peripheral portions of the casing D and the brake-shoes are doubly beveled or tapered outwardly, the shoes are wedged between the converging walls of the casing, thus obtaining a powerful and reliable braking action.

By providing the brake-actuating sleeve with the supplemental rear fingers *h'* the machine can be backed without thereby applying the brake. In the absence of the stop-pins *h'* the rollers f^2 of the driving-clutch would be wedged between the hub extension c^3 and the cam-faces *f'* of the sprocket-wheel upon backing the machine. The sprocket-wheel would therefore be turned backward with the hub, and as the sleeve H is compelled to turn rearwardly with the sprocket-wheel the brake would be applied and prevent backing of the machine. The rear fingers *h'* form back-stops or retainers, which prevent the rollers f^2 of the driving-clutch from thus wedging rearwardly between said sleeve and the cam-faces *f'* upon backing the machine, thereby holding the rollers in an inoperative position during the backward rotation of the wheel-hub and preventing the application of the brake. Notwithstanding that the sleeve H is mounted loosely on the hub the friction due to the pressure of the non-rotary brake-shoes *k* and their expanding-rollers m^2 against the sleeve under the contracting action of the spring N is sufficient to prevent the sleeve from turning in backing the machine.

I claim as my invention—

1. In a coaster-brake, the combination with a wheel-hub provided with a brake member or surface, of a driving-wheel mounted loosely on the hub and provided with inwardly-extending lugs or teeth, a driving-clutch connecting said wheel with the hub and permitting the wheel-hub to turn forwardly independently of the driving-wheel, a non-rotary brake-shoe movable toward and from the brake member of the hub, a rotary brake-actuating sleeve provided with lugs or teeth which extend into the path of the lugs of the driving-wheel, and a shifting device interposed between said sleeve and the brake-shoe, whereby the shoe is moved against said brake-surface when said sleeve is turned backward, substantially as set forth.

2. The combination with a wheel-hub provided with a brake member or surface, and a driving-wheel mounted loosely on the hub, of a movable clutch member interposed between the driving-wheel and the wheel-hub for driving said hub forwardly, a retaining device for holding said clutch member in an inoperative position during the backward ro-

tation of the hub, a brake-shoe arranged to bear against the brake-surface of the wheel-hub, and an actuating device for the brake-shoe connected with the driving-wheel, substantially as set forth.

3. The combination with a wheel-hub provided with a brake member or surface, and a driving-wheel mounted loosely on the hub, of a movable clutch member interposed between the driving-wheel and the wheel-hub for driving the hub forwardly, a rotary brake-actuating sleeve connected with the driving-wheel to turn backward therewith and provided with a back-stop arranged to retain said clutch member in an inoperative position during the backward rotation of the hub, a brake-shoe arranged to bear against the brake-surface of the wheel-hub, and a shifting device interposed between said sleeve and the brake-shoe, whereby the shoe is moved against said brake-surface when said sleeve is turned backward, substantially as set forth.

4. The combination with a wheel-hub provided with a brake member or surface, and a driving-wheel mounted loosely on the hub, of a movable clutch member interposed between the driving-wheel and the wheel-hub for driving said hub forwardly, a rotary brake-actuating sleeve connected with the driving-wheel to turn backward therewith and provided at its outer end with a stop-finger which is arranged on the rear side of said clutch member, a radially-movable brake-shoe arranged between said sleeve and the brake-surface of the wheel-hub, a shifting device interposed between said sleeve and the brake-shoe, whereby the shoe is moved against said brake-surface when said sleeve is turned backward, and a spring which tends to retract said brake-shoe, substantially as set forth.

5. The combination with a wheel-hub provided with a brake member or surface, and a driving-wheel mounted loosely on the hub and provided with inwardly-extending lugs, of movable clutch rollers or members interposed between said driving-wheel and the wheel-hub, a brake-shoe arranged to bear against the brake-surface of the wheel-hub, a rotary brake-actuating sleeve provided at its outer end with lugs or fingers which are arranged on the front and rear sides of said clutch members said front lugs being arranged in the path of the lugs on the driving-wheel, and a shifting device interposed between said sleeve and the brake-shoe, whereby the shoe is moved against said brake-surface when said sleeve is turned backward, substantially as set forth.

Witness my hand this 18th day of August, 1900.

WILLIAM S. GUBELMAN.

Witnesses:
JNO. J. BONNER,
CARL F. GEYER.