(No Model.) 2 Sheets—Sheet 1.

P. E. DOOLITTLE.

BRAKE MECHANISM FOR BICYCLES.

No. 576,561. Patented Feb. 9, 1897.

Fig. 1.

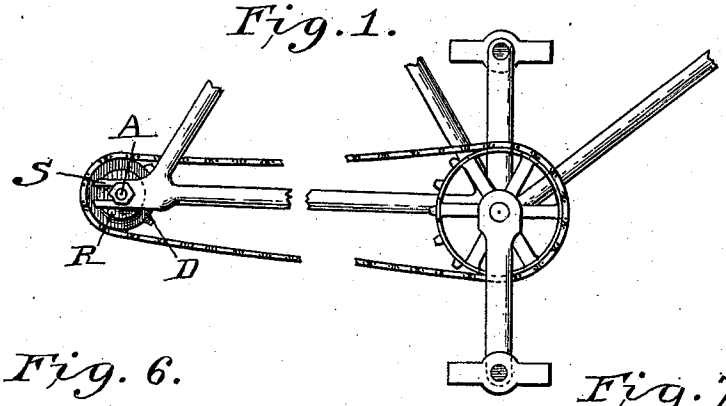

Fig. 6.

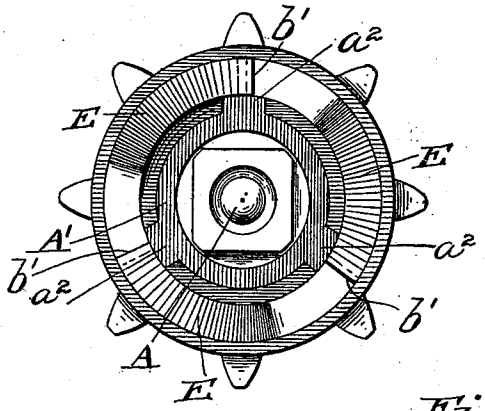

Fig. 7.

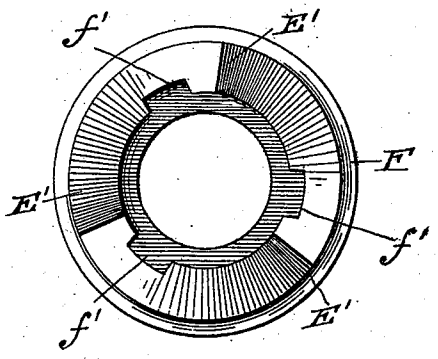

Fig. 8.

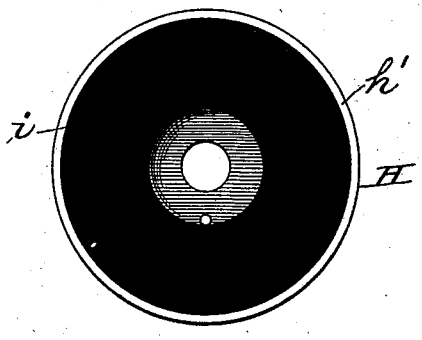

Fig. 9.

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(No Model.) 2 Sheets—Sheet 2.

P. E. DOOLITTLE.

BRAKE MECHANISM FOR BICYCLES.

No. 576,561. Patented Feb. 9, 1897.

Fig. 2.

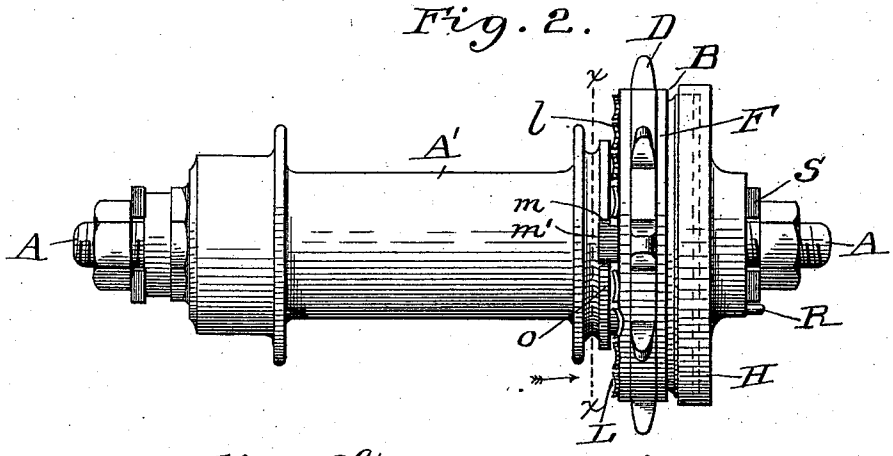


Fig. 3a.

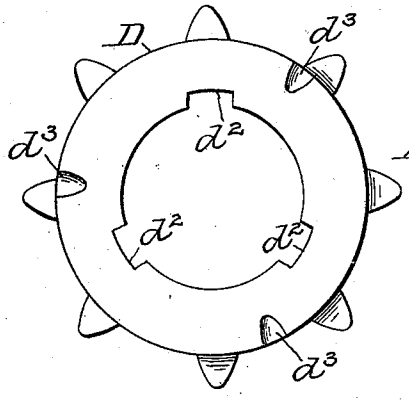


Fig. 4.

Fig. 3.

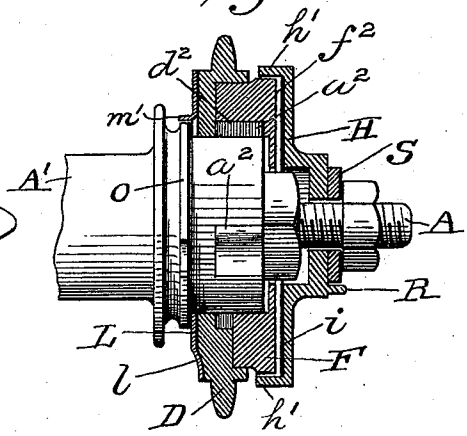
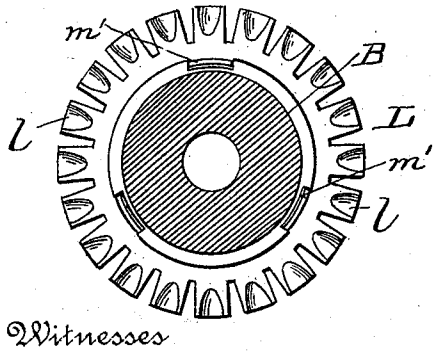
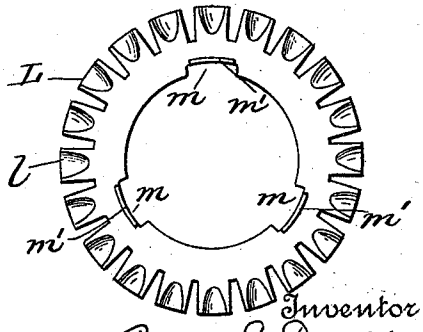


Fig. 5.





Witnesses

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UNITED STATES PATENT OFFICE.

PERRY ERNEST DOOLITTLE, OF TORONTO, CANADA.

BRAKE MECHANISM FOR BICYCLES.

SPECIFICATION forming part of Letters Patent No. 576,561, dated February 9, 1897.

Application filed August 19, 1896. Serial No. 603,245. (No model.)

To all whom it may concern:

Be it known that I, PERRY ERNEST DOOLITTLE, a subject of the Queen of Great Britain, residing at Toronto, in the county of York and Province of Ontario, Dominion of Canada, have invented certain new and useful Improvements in Brake Mechanism for Bicycles and other Vehicles; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use same.

My invention relates to improvements in brake mechanism for bicycles and similar vehicles; and it consists of certain improvements upon the invention set forth in my application, Serial No. 588,912. In that application there is shown and described an automatic friction-brake connected with the driving means and operated by the reversing action of the driving means in back-pedaling.

My present improvements are intended to increase the strength and efficiency of such a device, and to improve the spring-locking means and render the same less sensitive in operation during ordinary riding.

To these ends my invention consists of the means as hereinafter described and claimed.

My invention is illustrated in the accompanying drawings, in which—

Figure 1 is a side view in elevation of a pedal-shaft, chain, and sprocket-wheel with my invention attached; Fig. 2, a plan of the axle and hub of the driving-wheel with sprocket and brake mechanism; Fig. 3, a view in elevation, partly in vertical section, of matters in Fig. 2; Fig. 3^a, an inner face view of sprocket-disk; Fig. 4, a sectional view in direction of arrow on line $x\ x$ of Fig. 2; Fig. 5, an inner face view of the spring-disk; Fig. 6, an outer face view of sprocket; Fig. 7, an inner face view of movable brake-disk; Fig. 8, an inner face view of friction-disk, and Fig. 9 a detail plan view of sprocket-wheel and brake-disk, the former broken away to show engaging sections.

Referring to the drawings, A A′ are the spindle and hub, respectively, of a rear driving-wheel, and B is the sprocket end of the hub. D is the sprocket-wheel on said driving-wheel. The sprocket end of the hub B is provided on its periphery with projections or lugs a^2, and the sprocket D with recesses d^2 on its inner circumference. When the sprocket is slid onto the hub, the projections a^2 of the latter enter the recesses d^2. The sprocket is then pushed beyond the lugs to its seat and turned so as to bring the recesses d^2 out of engagement with the lugs, whereby the sprocket is held against lateral movement on the hub by said lugs. On its outer face the sprocket D is provided with raised teeth or sections E in the form of inclines, the highest parts of which terminate in abrupt, inwardly-beveled shoulders b'. F is a brake-disk on the hub provided on its inner face with similar teeth E′ and shoulders. These respective teeth or sections together form a clutch, and when set together the shoulders b' of the respective teeth engage, their inner beveled faces meeting, and the inclined faces of the teeth are in close and continuous contact, so that in their locked position the thinnest portions of the brake-disk rest against the thickest portions of the sprocket-wheel. The disk F is provided with recesses f', which when this disk is placed on the hub engage with the lugs a^2. The disk is by this engagement made to rotate with the hub, but is also at the same time permitted a lateral movement thereon.

In my former application I have shown in the principal form of the device the sprocket-wheel itself as adapted to move laterally on the hub and contact with the friction-disk. In this case the sprocket has merely a limited rotary movement on its support, and the lateral movement is confined to the separate brake-disk, thus obviating any possible danger of injury to the driving means due to sidewise strain on the sprocket and change of alinement of the chain.

H is a disk plate, having an inwardly-extending annular rim h' and rigidly mounted on the spindle A. Within the rim h' the face of the plate is provided with a frictional surface i, which may be composed of leather, rubber, or other suitable frictional material. The outer plain face f^2 of the brake-disk F acts as a friction-plate and is adapted to enter within the rim h' of disk H and impinge against said disk, as hereinafter described.

R is a pin or lug on the outer face of the disk H to contact with the forked frame S for

the purpose of preventing the disk from turning with the brake-disk when the pressure is applied.

L is a serrated spring-disk, stamped out of thin steel and placed on the hub, so as to bear against the inner face of the sprocket-wheel. The inner periphery of this spring is cut out at intervals and bent inward and upward to form recesses m and flanges m'. The recesses enable the spring to be slipped over the projections a^2, while the flanges m' are adapted to be held between the segments of a small rim or collar o on the hub to prevent the rotation of said spring. The teeth l of the disk are bent or curved outward, so as to bear strongly against the inner face of the sprocket and stiffen the spring action of the disk. At certain intervals the sprocket is provided on its inner face with notches or depressions d^3, that engage with correspondingly-situated teeth of the disk, which teeth by such engagement constitute spring-catches, as and for the purpose hereinafter described.

The operation of the device is as follows: In the act of back-pedaling, or reversing the movement of the wheel to check its forward direction, the power exerted on the sprocket tends to turn it slightly backward on the hub. This reverse action causes the engaging sections of the respective faces of sprocket and brake disks to ride upon each other and forces the brake-disk in against the face of the friction-disk A. The pressure of the brake-disk against the friction-disk increases as the inclines rise upon each other. The same backward movement of the sprocket overcomes the resistance of the circular spring, and the notches on the sprocket are forced out of engagement with the spring-teeth. As the curved teeth cause the spring-disk to press hard against the sprocket at all points, when the backward pressure on the sprocket is relieved the action of the spring is such as to still hold the sprocket-wheel turned back and the brake-disk against the friction-disk until released by a forward pressure of the driving means, which carries the sprocket beyond the holding force of the spring. When the sprocket-wheel and brake-disk are locked together in their normal condition, the pressure of the spring-disk against the sprocket holds them in this position until the reverse pressure of the driving means is again exerted to overcome it. The outwardly-bent teeth of the disk render the same a stiff holding-spring that will effectually prevent the too-free rotation of the sprocket and the consequent undesired operation of the brake during ordinary riding, while the spring-catches formed by the engaging notches and teeth still further insure the accomplishment of this end and serve to lock the sprocket and brake-disk against any pressure except that produced by the sudden and intentional checking of the forward movement of the driving means.

It will be seen that the same brake action of the two disks carrying the engaging inclined teeth may be accomplished whatever may be the means of reversing the rotary disk and whether the same is a sprocket-disk or not, whenever such action is sufficient to force the inclined teeth upon each other, the amount of friction produced being controlled by the amount of back pressure exerted. The action of the brake is entirely automatic, being controlled by and corresponding to the pressure exerted by the rider in checking the forward movement of the wheel in back-pedaling.

The parts of the brake are made to fit so closely as to wholly exclude dust and dirt.

Having thus described my invention, what I claim is—

1. In a bicycle or other vehicle, in combination with the driving-wheel and driving means, a friction-disk mounted on the axis of said wheel, a second disk mounted on a support and directly connected with the driving means, a brake-disk on said support between said driven disk and friction-disk, and means to force said brake-disk against the friction-disk to retard the forward movement of the vehicle, substantially as described.

2. In a bicycle or similar vehicle provided with driving means, a disk to which the driving means are applied, said disk provided on one face with raised sections, a brake-disk on the hub of the driving-wheel secured against rotary movement relatively to the hub and having raised sections to engage with said first disk, a friction-disk on the axis of said driving-wheel, with which the brake-disk is adapted to engage, whereby on the reverse movement of the driving means the driven disk is made to ride upon the brake-disk and force it laterally against the friction-disk, substantially as described.

3. In a bicycle or similar vehicle in combination with the driving means, a disk to which the driving means are applied, said disk having a limited rotary movement on the hub of the vehicle, a brake-disk having a lateral movement on said hub, clutch mechanism connecting said disks, a friction-disk with which said brake-disk is adapted to engage on the reversing action of the driving means, and means on said hub to prevent the lateral movement of said driven disk and the rotation of said brake-disk, substantially as described.

4. In a bicycle or other vehicle, in combination with the driving-wheel and driving means, a friction-disk mounted on the axis of said wheel, a second disk rotatably mounted on a support and secured against lateral movement thereon, said rotatable disk directly connected with the driving means, a laterally-movable brake-disk on said support between said driven disk and friction-disk, means to force said brake-disk against the friction-disk to retard the forward movement of the vehicle, and locking means to normally prevent the engagement of said brake and friction disks and to lock them when so engaged, substantially as described.

5. In a bicycle or similar vehicle, in combination with the driving means and driven disk and a brake mechanism connected therewith, said brake mechanism operated by the reverse movement of said driving means, a spring-disk on the hub of said vehicle, said disk provided with projections bearing against said driven disk, and notches on said driven disk to engage with corresponding projections of said spring-disk, substantially as and for the purpose described.

6. In combination with the hub of a driving-wheel of a bicycle or other vehicle, the sprocket-disk and brake-disk thereon, a spring-disk on said hub provided with means to prevent its rotation and means to resist the rotation of said sprocket-disk, lugs on said hub, a seat for said sprocket-disk formed between said lugs and spring, recesses in said sprocket and spring disks to enable them to be passed over the lugs, and said brake-disk provided with recesses to engage said lugs, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

PERRY ERNEST DOOLITTLE.

Witnesses:
EDMUND S. SNEWIN,
WM. O. BROWN.