(No Model.)

# F. A. GLADWIN.

## BRAKE FOR BICYCLES.

No. 571,561. Patented Nov. 17, 1896.

Fig. 1.

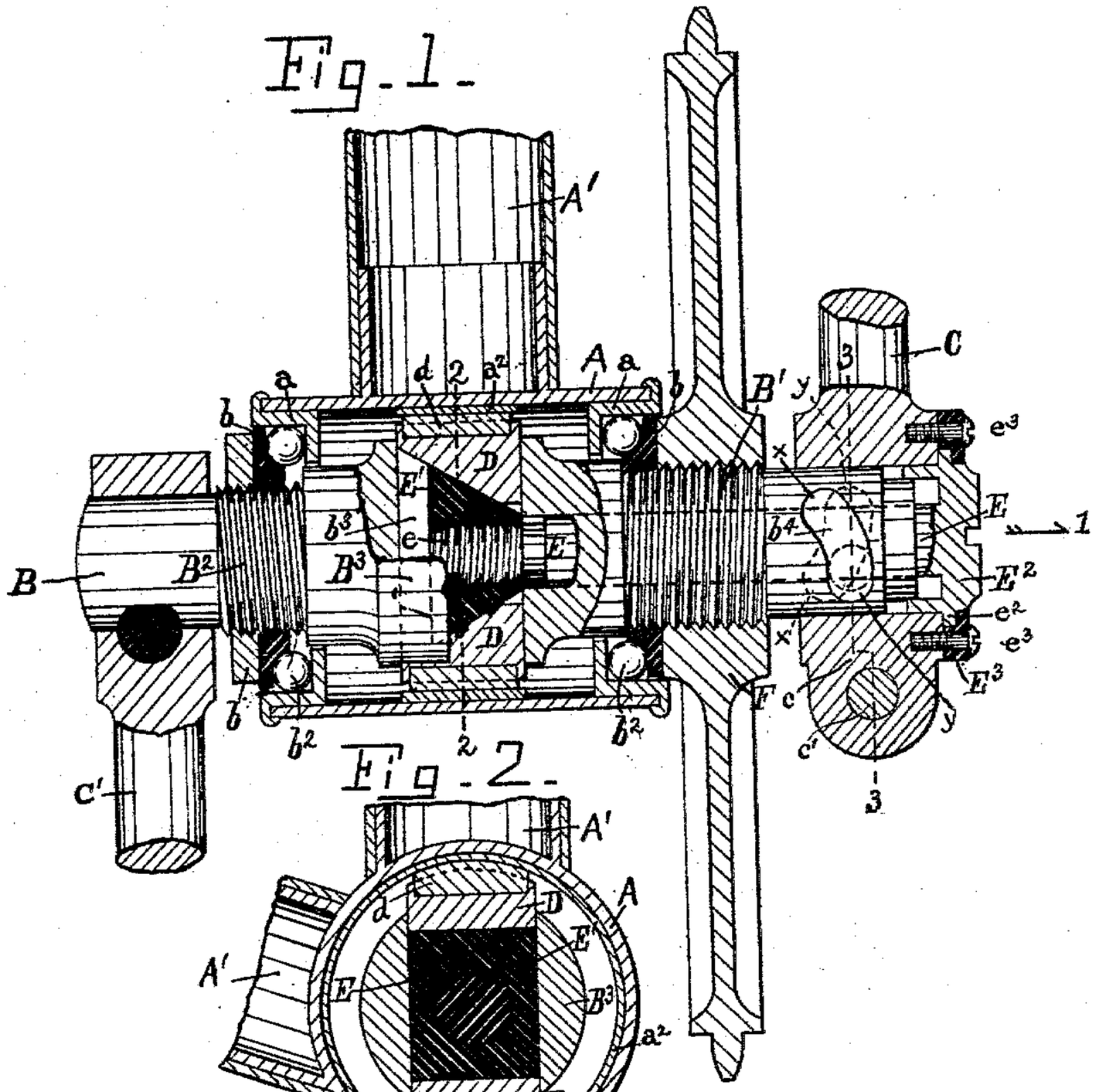
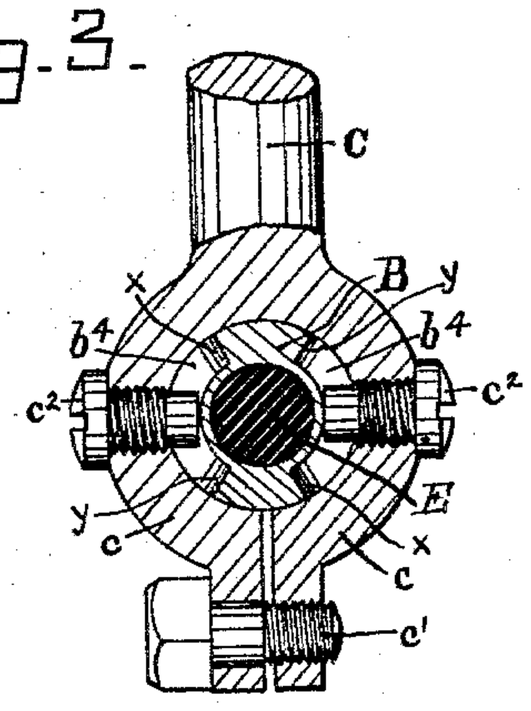



Fig. 2.




Fig. 3.

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# UNITED STATES PATENT OFFICE.

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## BRAKE FOR BICYCLES.

SPECIFICATION forming part of Letters Patent No. 571,561, dated November 17, 1896.

Application filed May 8, 1896. Serial No. 590,790. (No model.)

*To all whom it may concern:*

Be it known that I, FRED A. GLADWIN, a citizen of the United States, and a resident of the city of Rochester, in the county of Monroe and State of New York, have invented certain new and useful Improvements in Brakes for Velocipedes, of which the following is a specification, reference being had to the accompanying drawings, in which—

Figure 1 is a vertical section through the crank-hanger of a bicycle, showing the parts of the crank-shaft and connected mechanism in full lines and parts in section. Fig. 2 is a vertical section on the line 2 2 of Fig. 1, and Fig. 3 is a vertical section on the line 3 3 of Fig. 1.

The object of my invention is to produce a brake for velocipedes which is operated by pressing on one or both of the pedals, as in back pedaling; and my invention consists in the mechanisms and combinations hereinafter set forth and claimed.

In the drawings, A is the transverse tube, constituting the crank-hanger in the ordinary type of safety-bicycle, from which extend the framing-tubes A′ A′, as usual. The hanger A is provided with the ball-races *a a*, which are fastened thereto in any suitable manner.

B is the crank-shaft, and C C′ are the cranks. The crank-shaft B is threaded, as at B′ $B^2$, and ball-races *b b* are screwed thereon and held in position by a locking-nut *b′* on one end and in the form of device shown by the sprocket-wheel F on the other end, which screws upon the threaded portion B′. The balls $b^2$ are held between the ball-races *b* and the ball-races *a*. The sprocket-wheel F may be held in position on the crank-shaft in any suitable way, as by a set-screw or locking-nut.

The crank-shaft B, at the middle of the crank-hanger A, is enlarged at $B^3$, as shown in Fig. 1, and through the enlarged portion is a transverse slot $b^3$, in which are set a pair of blocks D D, wedge-formed in vertical section, as shown in Fig. 1, and rectangular in horizontal section, as seen from Figs. 1 and 2. These blocks fit closely, but with sufficient freedom to insure ease of movement in the slot $b^3$. In the outer surface of each block D is a countersunk cavity, in which is placed a pad or block *d* of suitable material, such as rawhide. Within the crank-hanger A, and in position to be engaged by the rawhide blocks *d*, is a ring $a^2$, shrunk into or fastened into said crank-hanger, so as to be rigid therewith. The crank-shaft B has an axial hole for a rod E, the end of which is screw-threaded, as at *e*, and upon these threads is fastened a wedge-shaped block E′, which rests within the slot $b^3$ and fits closely therein on its sides, but transversely does not fill said slot. Hence a slight longitudinal movement of the rod E moves the block E′ longitudinally in the cavity $b^3$. The pressure-blocks D D fit against the inclined surfaces of the wedge-block E′, and consequently a longitudinal movement of the block E′ in the direction of the arrow marked 1 in Fig. 1 separates the blocks D D from each other and presses the rawhide pads *d* against the ring $a^2$; but a movement of the rod E in a direction opposite to said arrow permits the blocks D D to approach each other and disengages the pads *d* from the pressure-ring $a^2$.

The crank-shaft B carries on one end the crank C, which carries the ordinary pedal. This crank is attached to the shaft B by a split ring *c*, (see Fig. 3,) which clamps the shaft B by means of the set-screw *c′*, but the clamping is carried only to such a degree that the ring *c* is capable of some rotary movement upon the shaft B. Underneath the split ring *c* the shaft B is provided with diagonal slots $b^4$ on opposite sides thereof, as shown in full and dotted lines in Fig. 1. These slots are arranged as portions of screw-threads of rapid pitch, and into each slot extends the end of a pin $c^2$, which is attached to the ring *c*. Consequently the crank C is capable of an oscillatory movement with reference to the shaft B, which is limited by the length of the slots $b^4$ and the size of the pins $c^2$. The rod E passes out through the end of the shaft B, which bears the pedal C, and the end of the rod E is expanded either by an integral portion thereof or by a head $E^2$, fastened thereon in any suitable manner. This head $E^2$ has a rim $e^2$, which rests on the outside of the split ring *c*, but is held to the same by a removable ring $E^3$, which fits upon the rim $e^2$ and is fastened to the split ring *c* by the screws $e^3$. The head $E^2$ therefore follows any movement of the ring *c*, which is longitudinal with re-

spect to the shaft B; but the head $E^2$ has a rotary movement with the rod E, which latter always has the same rotary movement as the shaft B; but said head $E^2$ is capable of different rotation with respect to the ring *c* on account of its being held thereto only by the rim $e^2$ and the ring $E^3$.

When the crank C, as shown in Fig. 1, is moving away from the eye of the observer, the pins $c^2$ rest in the ends X of the slots $b^4$, and the rod E has been moved in a direction opposite to that indicated by the arrow in Fig. 1, and the ring *c* rests against the hub of the sprocket-wheel F. This is the position of the parts in forward pedaling, and the blocks D are relieved from any outward pressure; but if a back-pedaling pressure is placed upon the crank C the pins $c^2$ are held against movement toward the ends X of the slots $b^4$, and the continued movement of the shaft B, driven from the driving-wheel of the bicycle through the sprocket-wheel F, causes the pins $c^2$ to slip to the other ends *y* of the slots $b^4$. This movement of the pins moves the split ring *c* in the direction of the arrow marked 1 in Fig. 1 and carries with the ring the head $E^2$, the rod E, and the block E′, thus pressing the blocks D D outward and clamping the rawhide pads against the friction-ring $a^2$ inside the crank-hanger A, creating friction between said pads and the pressure-ring, which friction decreases and stops the motion of the shaft B, the sprocket-wheel F, and, through the usual chain, checks and stops the driving-wheel of the bicycle. As soon as the back-pedaling pressure is taken from the crank, the braking friction is relieved or reduced, as desired.

My brake device is invisible, noiseless, dust-proof, strong, durable, not apt to get out of repair, and is made without adding appreciable weight to the machine. The driving-wheel may be run backward without affecting the brake mechanism.

I intend my claims to bear the broadest construction admissible in view of the state of the art.

It is obvious that this brake mechanism is applicable to other crank-operated or pitman-operated foot-power devices, such as foot-lathes, &c., as well as to velocipedes, and it is intended that the term "velocipedes" shall cover all such mechanisms.

What I claim is—

1. In a foot-power mechanism, the combination of a hollow hanger A, a driving-shaft B, a crank C, brake-blocks attached to said shaft within said hanger and movable toward and from the interior surface of said hanger, a rod within said shaft, and mechanism thereon for operating said brake-blocks and connections between said rod and a crank.

2. In a foot-power mechanism, the combination of a hollow hanger A, a driving-shaft B, a crank C, brake-blocks attached to said shaft within said hanger and movable toward and from the interior surface of said hanger, a rod within said shaft having a connected wedge-like block for moving said brake-blocks and having connections to a crank, and means for producing a differential longitudinal movement as between said crank and said shaft.

3. In a foot-power mechanism, the combination of a hollow hanger A, a driving-shaft B, a crank C, brake-blocks attached to said shaft within said hanger and movable toward and from the interior surface of said hanger, a rod within said shaft having a connected wedge-like block for moving said brake-blocks and having connections to a crank, and means for producing a differential rotary movement and a differential longitudinal movement as between said crank and said shaft.

4. In a foot-power mechanism, the combination of a hollow hanger A, a driving-shaft B having a transverse perforation within the crank-hanger and a longitudinal perforation extending from said transverse perforation to the end of the shaft, a pressure-block in said transverse perforation adapted to move toward and from the interior surface of said hanger, a rod movable in said longitudinal perforation in the shaft having a wedging-block set in said transverse perforation for operating said pressure-block, and connections between a crank and said rod for operating said wedging-block thereon.

5. In a foot-power mechanism, the combination of a hollow hanger A, a driving-shaft B having a transverse perforation within said hanger and a longitudinal perforation extending from said transverse perforation to the end of the shaft, pressure-blocks in said transverse perforation adapted to move toward and from the interior surface of said hanger, a rod movable longitudinally in said longitudinal perforation and having a wedge-like block set in said transverse perforation for operating said pressure-blocks, a crank upon said shaft having a partial rotary movement thereon, stop mechanism for limiting said rotary movement, means for producing a longitudinal movement of said crank with reference to said shaft, and connections between said rod and said crank.

6. In a foot-power mechanism, the combination of a hollow hanger A, a driving-shaft B having a transverse perforation within said hanger and a longitudinal perforation extending from said transverse perforation to the end of the shaft, pressure-blocks in said transverse perforation adapted to move toward and from the interior surface of said hanger, a rod movable longitudinally in said longitudinal perforation having a wedge-like block set in said transverse perforation whereby to press said pressure-blocks against the interior of said hanger, a crank on said shaft adapted to have a partial rotary movement with reference to the shaft, diagonal slots on the outer surface of said shaft within the bearing of the crank thereon, pins fixed to said crank and extending into said slots,

whereby said crank has a limited rotary movement and a limited longitudinal movement with reference to said shaft, and connections between said rod and said crank for moving the latter longitudinally to operate said pressure-blocks.

7. In a foot-power mechanism, the combination of a hollow hanger A, a driving-shaft B having a transverse perforation $b^3$ within said hanger and a longitudinal perforation extending from said transverse perforation to the end of the shaft, pressure-blocks D D sliding in said transverse perforation to move toward and from the interior surface of said hanger, a rod E movable longitudinally in said longitudinal perforation and having a wedge-block E′ on the end of said rod set in said transverse perforation and fitting the same on two sides but capable of longitudinal movement therein, whereby to press said pressure-blocks against the interior of said hanger, a crank C having a split ring $c$ embracing the end of said shaft and capable of a rotary movement thereon, one or more diagonal slots $b^4$ on the outer surface of said shaft within the ring C, pins $c^2$ passing through said split ring and fastened thereto and extending into said slots, whereby said crank has a limited rotary movement and a limited longitudinal movement with reference to said shaft, a head $E^2$ upon the outer end of said rod E provided with a rim $e^2$ outside of said split ring $c$ and a ring $E^3$ fitting over said rim $e^2$ and attached to said split ring $c$, substantially as described.

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