(No Model.) 3 Sheets—Sheet 1.

A. D. ANTHONY.

BICYCLE GEARING.

No. 522,547. Patented July 3, 1894.

Fig. 3.

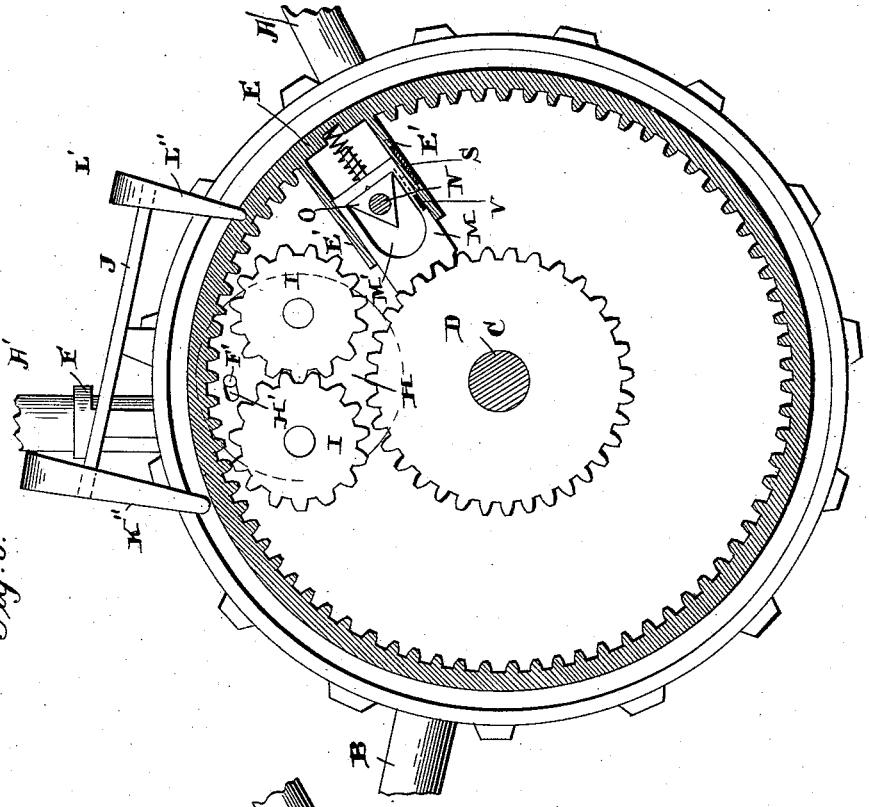
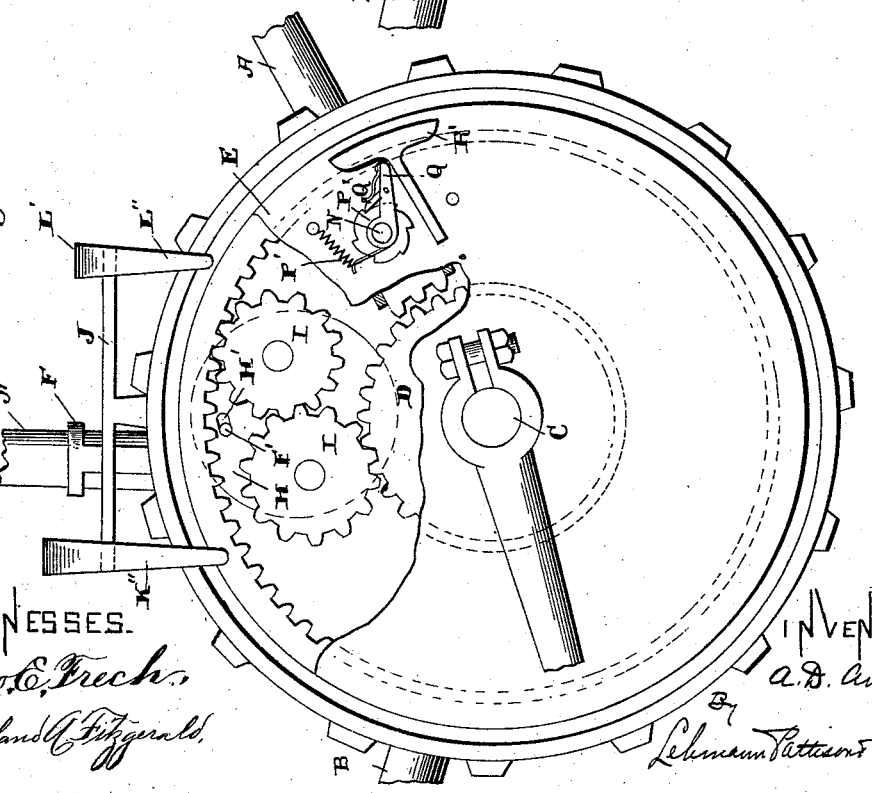


Fig. 4.



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(No Model.) 3 Sheets—Sheet 2.

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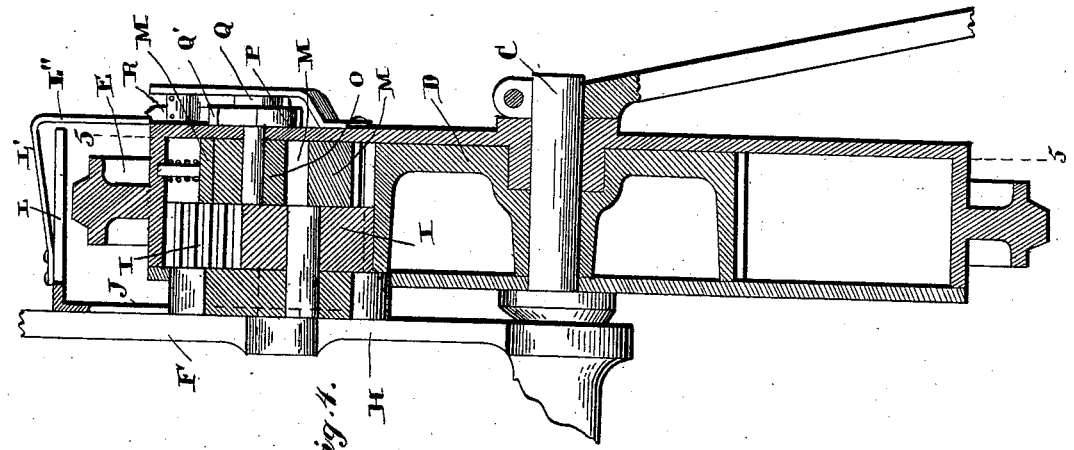

Fig. 4.

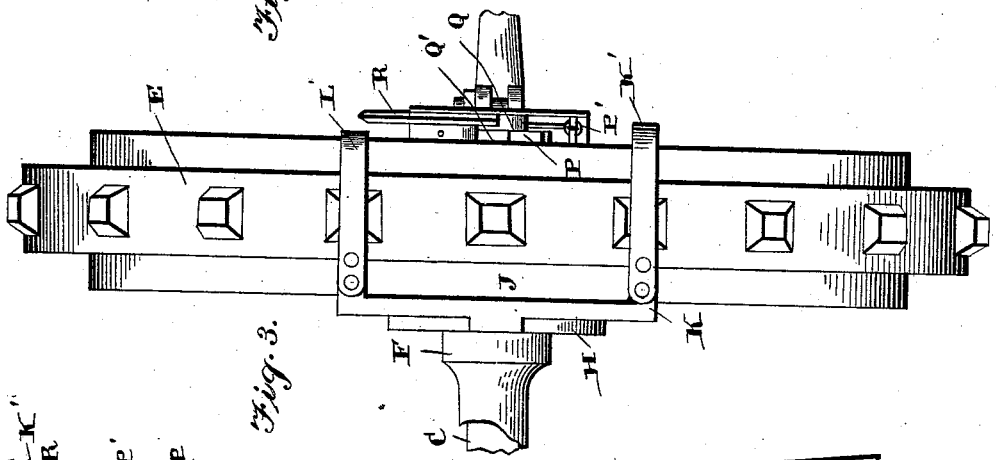

Fig. 3.

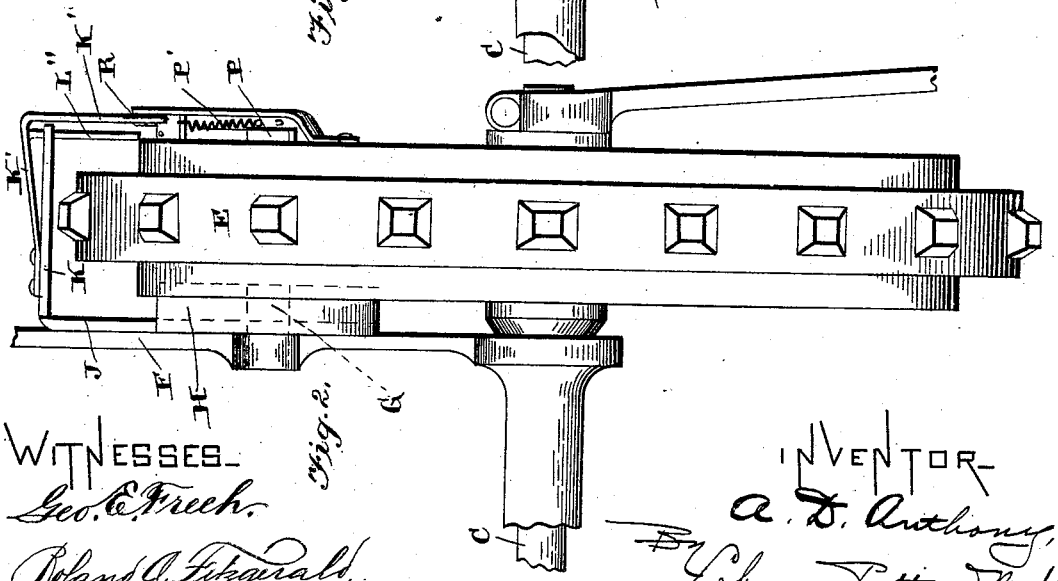

Fig. 2.

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Fig. 9.

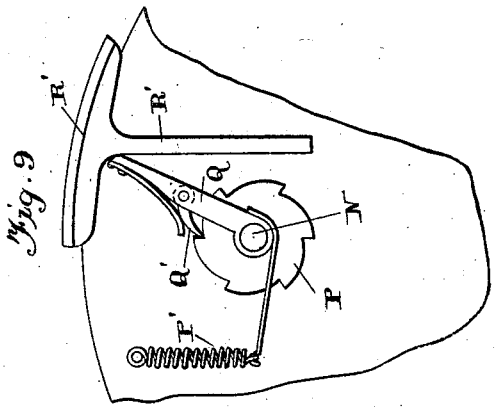


Fig. 6.

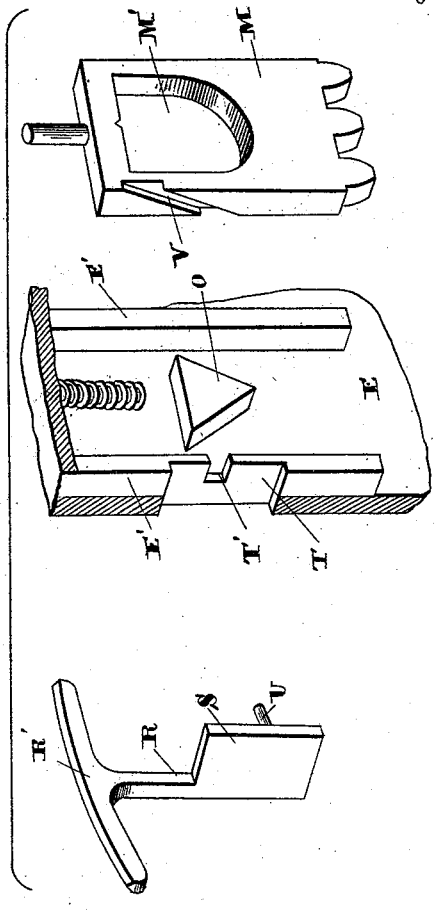


Fig. 8.

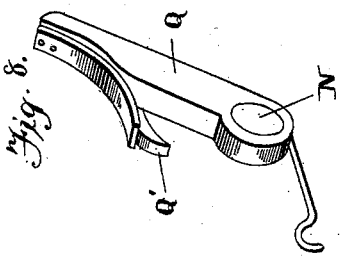
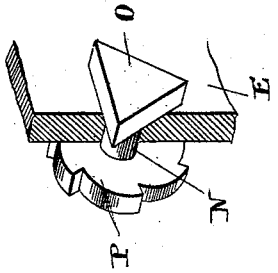


Fig. 7.



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UNITED STATES PATENT OFFICE.

ALONZO D. ANTHONY, OF GROTON, NEW YORK.

BICYCLE-GEARING.

SPECIFICATION forming part of Letters Patent No. 522,547, dated July 3, 1894.

Application filed March 22, 1893. Serial No. 467,193. (No model.)

To all whom it may concern:

Be it known that I, ALONZO D. ANTHONY, of Groton, in the county of Tompkins and State of New York, have invented certain new and useful Improvements in Bicycle-Gearing; 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 pertains to make and use it, reference being had to the accompanying drawings, which form part of this specification.

My invention relates to an improvement in bicycle gearing, and it consists in the novel features of construction, and in the combination and arrangement of parts which will be fully described hereinafter, and especially referred to in the claims.

The object of my invention is to provide an improved differential gearing for bicycles, whereby the same may be run at a fast or slow speed, or thrown entirely out of gear for coasting or other purposes, when it is desired to run the same simply by momentum.

Referring to the accompanying drawings;—Figure 1, is a side elevation of my improved gearing, a portion of the capping plate being broken away. Fig. 2, is a front view of the same. Fig. 3, is a plan view. Fig. 4, is a vertical cross sectional view of the gearing. Fig. 5, is a vertical longitudinal sectional view of Fig. 1. Figs. 6, 7 and 8, are enlarged detail views of the guard operating mechanism. Fig. 9 is an enlarged detail view of the ratchet and guard.

A designates the portion of the machine frame leading to the front wheel and B the fork in which the rear wheel is mounted. Journaled in the frame is the drive shaft C and keyed thereon is gear wheel D. Loosely mounted upon the shaft is the internally cogged sprocket wheel E. This wheel is larger than wheel D, which it incloses.

F is a standard rising vertically from the journal box of the frame which is secured at its upper end to the seat standard A′, as shown. Extending transversely through this standard is shaft G having secured to its projected end the disk H. Journaled on the inner side of this disk are the two engaging pinions I which when the said disk is properly adjusted engage respectively the gear D and the wheel E. The disk is slotted as at H′ and projecting therein from standard F is stop F′, and by this means the movement of the said disk is regulated, as a slight movement throws the pinions in engagement with the gear wheels without wedging as the stop F′ limits the movement of the same. An opposite movement of the disk throws the pinions out of engagement, as will be readily understood.

The shaft G is so mounted in the standard F, as to have a rather stiff and unyielding movement therein so as not to be effected by jolts or jars of the machine, but which requires a decided push in the following described manner to turn the same. Secured to disk H is the angular frame J, and extending outward over the gearing are the two arms K and L, the former being slightly longer than the latter, and, secured to their respective upper sides are the flat springs K′ L′ having their ends turned down, as shown. These springs are normally sprung upward or raised from the surface of the arms to which they are secured and are depressible by the operator's foot. The end K″ of spring K′ is longer or depends farther than the corresponding portion of spring L′ for the purpose to be presently explained.

The pinions I are for the purpose of giving to the wheel E, a slower movement than driving wheel D. For giving the said wheels the same movement or in other words for connecting them I provide a longitudinally movable spring actuated clutch M which moves in guide-way or frame E′ projecting from the inner periphery of wheel E. An inward movement of this clutch which is in accord with its spring pressure, drives the same into engagement with gear D, and in this way the wheels D and E are made rigid and turn in unison. For effecting the movement of this clutch, I project through the side of wheel E a short shaft N having secured to its inner end the triangular cam O, which turns in a recess M′ formed in the clutch M. The lower portion of the recess is curved, as shown, while the upper side is straight and provided with a notch to engage and hold the edge of the cam which has been turned to it. When one of the cam edges is thus engaged the clutch is raised from engagement with wheel D while when the same is turned so as to engage flatly

the upper side of recess M, the clutch is automatically pushed inward by its spring and in engagement with the said wheel. Keyed to the shaft N just outside the wheel E is the ratchet P, and loose on the shaft end is the lever Q carrying on its inner side the spring actuated dog Q′, which engages the ratchets for the purpose of turning shaft N. The lever Q is held normally in a forwardly extending position by spring P′, so that when it has been pushed backward in moving the said ratchet and shaft it is returned to position for a new start.

The ends of springs K′, L′, depend over the outer end of lever Q, but can only engage the same when pushed down flat upon their respective arms, and the latter of spring L′ having a shorter down turned end than the other spring can only reach the said lever when its supporting arm is turned forward, the limit of its movement in the direction indicated by arrow, Fig. 5, which throws the pinion I out of engagement with the wheels D and E, as shown in dotted lines in Fig. 5. This spring is designed expressly for adjusting the gear for a more rapid speed by throwing out of gear the pinions I and immediately thereafter releasing the clutch so that it may engage wheel D.

The arm L is moved from the position shown in solid lines to that shown in dotted lines in Fig. 5, by the operator placing his foot thereon and pressing downward which partially rotates the frame and releases the pinions from engagement with the gear wheels. The gearing may be allowed to remain in this position for coasting or at other times when it is desired to run the machine by momentum, as neither the said pinions nor the said clutch connects the gear wheels D, D, when in said position. The arm L being thus pressed downward a depression of the spring L′ will bring its down turned end into the path of and in engagement with the upper end of lever Q, and the latter in its backward movement, with relation to wheel E, will turn the ratchet and the shaft to which the same is secured, thus partially rotating the cam O, permitting the clutch M to drop into engagement with wheel D, thus making rigid the two gears.

The arm K and the spring K′ are for the purpose of changing the mechanism from the rapid to the slow motion and this is accomplished by depressing the said spring which engages the upper end of lever Q, and partially rotates the same, thus turning cam O and raising clutch M out of engagement with gear D. At the completion of this operation the gears D and E are entirely independent of each other. A depression of arm K turns frame J throwing the pinions I into operation, as in Fig. 5.

Without some safety device it is apparent that if by accident the spring K′ should be depressed it would again operate lever Q and throw the clutch down, with the result that both the fast and slow gearings would be in operative positions, causing either a sudden stoppage of the machine or a wreck of the driving mechanism. To obviate this danger I provide a laterally movable guard R having a sharpened upper end R′. As before stated the arm K is slightly longer than arm L so that the springs K′, L′, carried thereby are not in line as they depend over the lever Q. Now when the gears I are in operation as in Fig. 5, the said guard is projected outward as shown in Figs. 2 and 3, into the path occupied by the depending spring end K″, and as the lever Q is directly beneath one end of this guard it is impossible for the same to be reached by the spring even though the same be depressed as the guard being directly in its path will be deflected so as to make an engagement with the lever impossible. In like manner when the clutch M is in operative position the said guard having been automatically adjusted by the downward movement of the clutch is directly in the path of spring L′, as in Fig. 4, so that an accidental depression of the latter cannot serve to raise the clutch.

From the above it will be understood that the guard is drawn inward when the clutch is in operative adjustment, and is thrown outward when the same is raised and the gears I brought into operation. For accomplishing this adjustment I form the guard with a lateral projection S which moves in a depression T in a guide frame E′ which latter is formed with the horizontal slot T′, through which a stud U projects which is carried by the projection S, and which extends into the downwardly and outwardly inclined groove V in the edge of clutch M. By this arrangement when the clutch is moved upward the stud following the groove V will be forced outward laterally and being rigid with guard R of course the latter is moved also. The downward movement of the clutch reverses the operation drawing the stud and guard inward.

A bicycle gearing is thus provided which may be adjusted for either low or high speed or may remain quiescent for momentum running, the whole being under perfect control of the rider.

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

1. An improved bicycle gearing comprising a drive shaft, a gear thereon, a cogged sprocket wheel concentric with the shaft, a clutch carried by the sprocket and adapted to engage the said gear, and a speed reducing gearing interposed between and adapted to engage the gear and the cogged surface of the sprocket, substantially as shown and described.

2. An improved bicycle gearing comprising a drive shaft, a sprocket wheel concentric therewith, a revoluble support, engaging gears journaled to the support, a mechanism for

connecting rigidly the sprocket and drive shaft, and a means for operating the said support for the purpose of throwing the gears in and out of engagement with the sprocket and drive shaft and which means also operates the said mechanism for effecting the rigid connection, substantially as shown and described.

3. An improved bicycle gearing comprising a drive shaft, a sprocket wheel concentric therewith, a revoluble disk, pinions journaled thereto and projected between the sprocket and shaft, a frame movable with the disk for the purpose of adjusting the same, and a means for connecting rigidly the sprocket and shaft, which is also operated by the frame, substantially as shown and described.

4. An improved bicycle gearing comprising a drive shaft, a sprocket wheel, a clutch for connecting the same, a revoluble cam for operating the clutch, a lever for turning the cam, and one or more depressible spring arms for actuating said lever, substantially as shown and described.

5. An improved bicycle gearing comprising a drive shaft, a sprocket wheel, a recessed clutch for connecting the same, a cam revoluble in the recess of the clutch, a ratchet wheel movable with said cam, a lever, a dog carried thereby which engages said ratchet, and a means for actuating the lever, substantially as shown and described.

6. An improved bicycle gearing comprising a drive shaft, a sprocket wheel, a longitudinally movable clutch carried by the latter for connecting it with the shaft, a lever and a connection between the same and the clutch for actuating the latter, depressible arms for actuating the lever, and a guard for the lever which is movable laterally in the path of said arms, for the purpose, substantially as described.

7. An improved bicycle gearing comprising a drive shaft, a sprocket wheel, a clutch carried by the latter for engaging it with the shaft, one side of said clutch being formed with an inclined slot, a lever and a connection between the same and the clutch for operating the latter, depressible arms for operating the lever, a guard for the lever, and a projection thereon which plays in the slot in the clutch whereby the guard is moved laterally in the path of said arms, for the purpose, substantially as described.

8. An improved bicycle gearing comprising a drive shaft, a sprocket wheel, a clutch for connecting the latter with the shaft, a lever and a connection between the same and the clutch for operating the former, depressible arms of different lengths extending over the sprocket having their ends turned down to engage said lever and a guard for the lever which is movable laterally in the paths of said downward turned ends, substantially as shown and described.

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

ALONZO D. ANTHONY.

Witnesses:

INEZ MASON,

ELLA F. BROWN.