

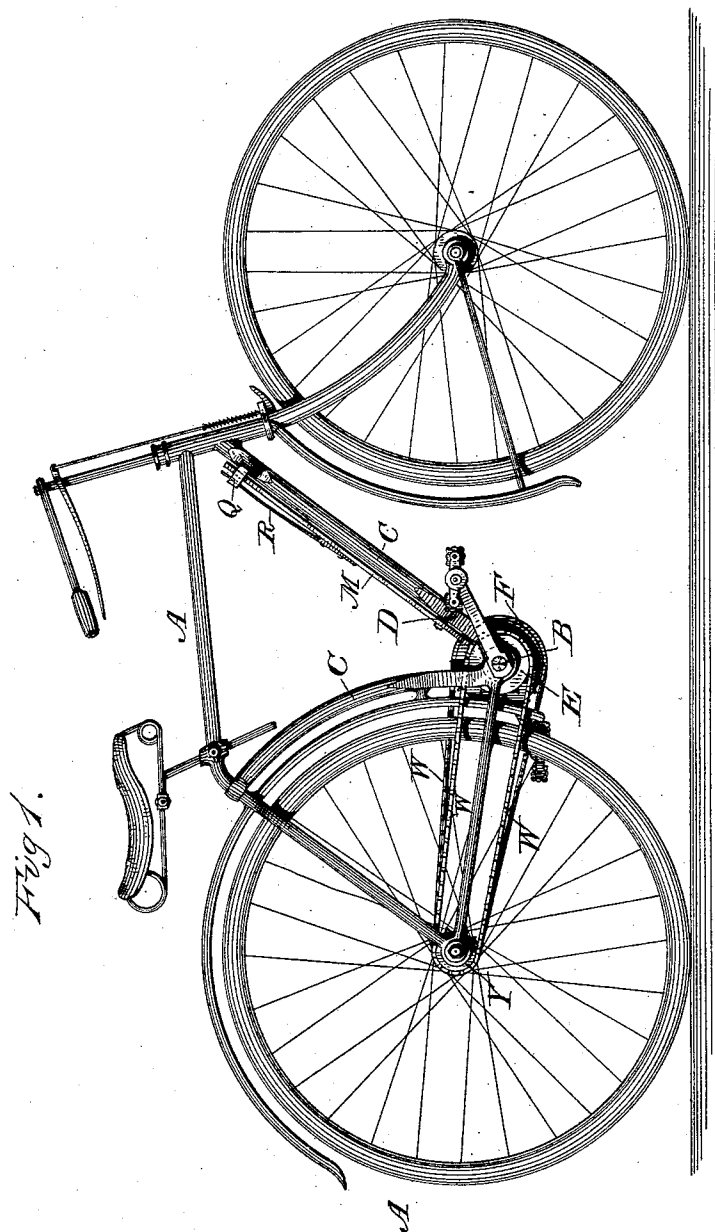
(No Model.)

3 Sheets—Sheet 1.

A. S. SWARTHOUT.
BICYCLE.

No. 486,687.

Patented Nov. 22, 1892.



WITNESSES
Harry King
Benj. G. Cook

INVENTOR
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(No Model.)

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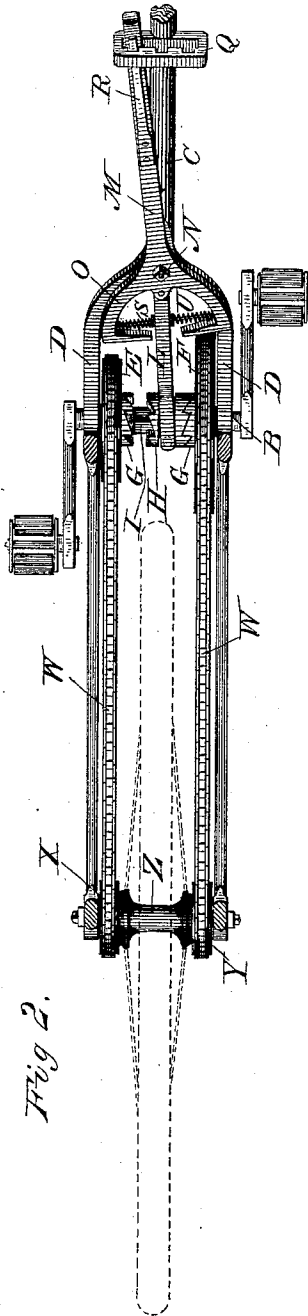


Fig 2.

WITNESSES

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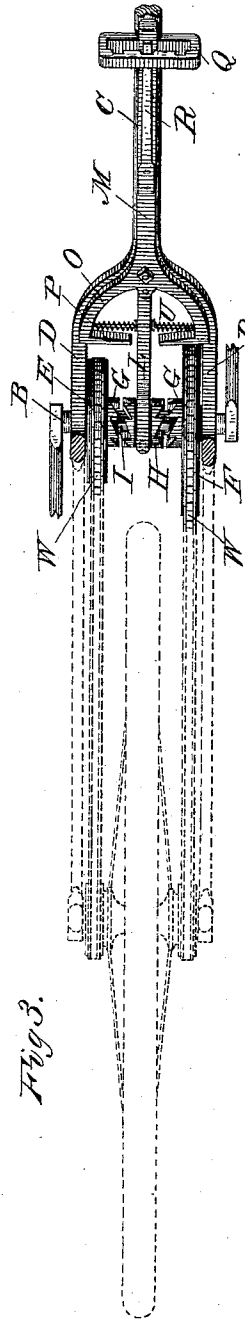


Fig 3.

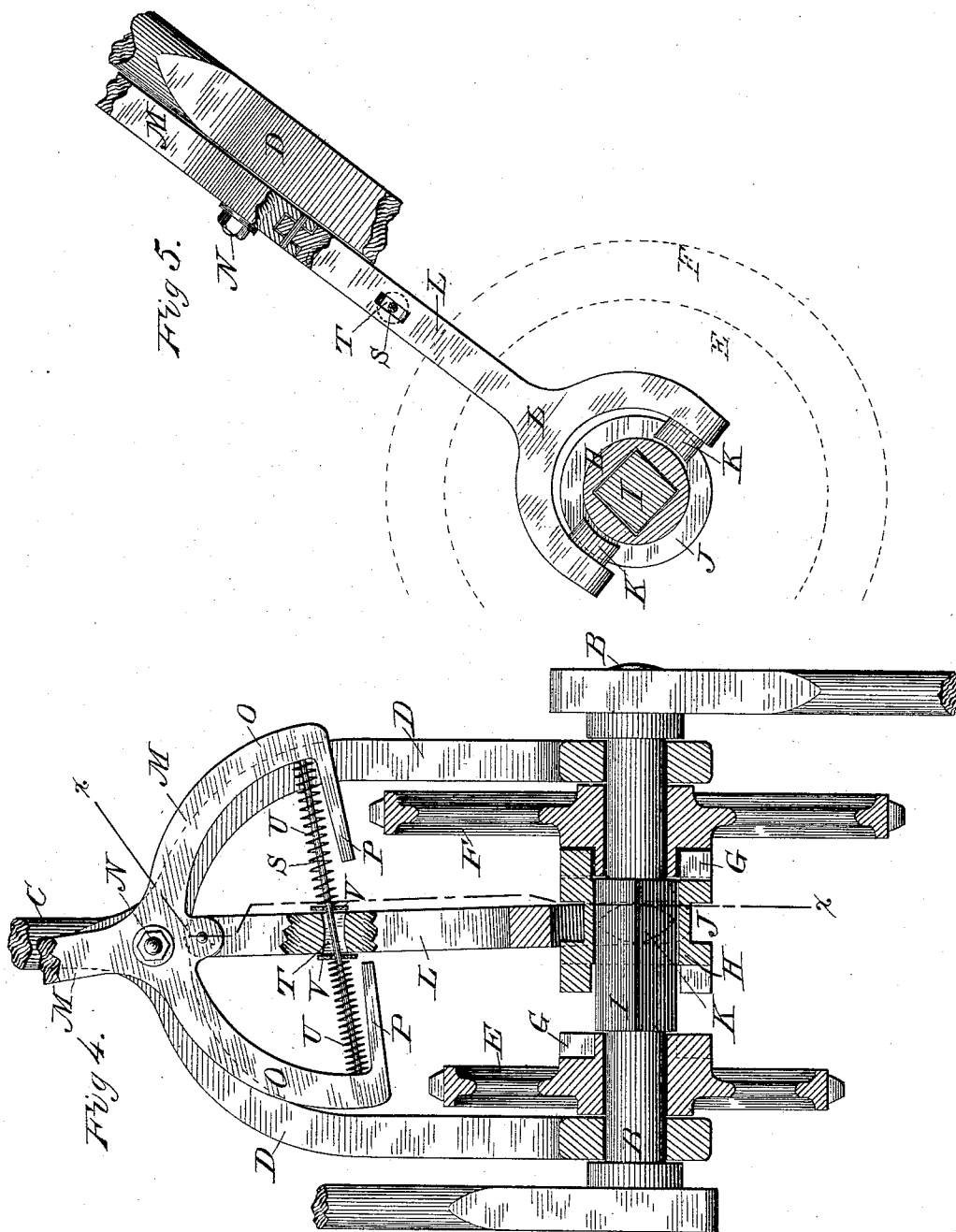
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UNITED STATES PATENT OFFICE.

ALBERT S. SWARTHOUT, OF POUGHKEEPSIE, NEW YORK.

BICYCLE.

SPECIFICATION forming part of Letters Patent No. 486,687, dated November 22, 1892.

Application filed June 9, 1892. Serial No. 436,097. (No model.)

To all whom it may concern:

Be it known that I, ALBERT S. SWARTHOUT, a citizen of the United States, residing at Poughkeepsie, in the county of Dutchess and State of New York, have invented certain new and useful Improvements in Bicycles; 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 the same.

This invention relates to an improvement in bicycles.

The object of the invention is to provide mechanism to increase the power requisite to propel a machine uphill, whereby the exertion of the rider and the strain and the consequent wear upon the working parts of the machine is reduced to a minimum.

A further object is to provide mechanism, which may be operated in a ready and efficient manner to increase the speed of the machine on level ground.

A further object is to provide mechanism that will insure a positive coaction between the operative parts of the power-changing mechanism, whereby certain operation of the said parts will be effected when actuated for either of the above-named purposes.

A final object is to provide a bicycle having combined mechanism that will increase both the power and the speed of the propelling mechanism and render the said mechanism inoperative when it is desired to "coast" or ride downhill, whereby the friction and noise between the movable portions of the propelling mechanism is avoided at a time when it is unnecessary.

With these objects in view the invention consists in the construction and combination of parts of a bicycle, as will be hereinafter fully described and claimed.

In the accompanying drawings, forming part of this specification, Figure 1 is a side elevation of a bicycle embodying the invention. Fig. 2 is a top plan view, partly in section, of the rear portion of the bicycle, showing the clutch or power-changing mechanism in engagement with the clutch-face of the sprocket-wheel for increasing the speed of the machine. Fig. 3 is a similar view showing the clutch out of engagement with the clutch-

faces of both the sprocket-wheels. Fig. 4 is an enlarged detail vertical view, partly in section, showing the construction of the power-changing mechanism; and Fig. 5 is a side elevation, partly in section, and taken on the line $x x$ of Fig. 4, showing further details of the power-changing mechanism.

Referring to the drawings, A designates a bicycle, which may be of any of the well-known designs as to the wheels and the frame, the latter, in this instance, being of that type known as a "diamond" frame.

B designates the pedal-shaft, which is journaled in suitable bearings in the drop frame or reach C, which latter is formed, preferably, with a yoke D to afford a bearing for both ends of the shaft. Upon the shaft are mounted two sprocket-wheels E and F, the former of which is the power-wheel and the latter the speed-wheel. These wheels are loosely mounted on the shaft B and have a movement independent of the shaft—that is, they are free to rotate on the shaft without imparting any motion thereto. The inner face of each wheel is provided with a clutch-face G, designed to be engaged by a movable clutch H, the function of which is to lock either of the wheels E or F, as desired, when either speed or power is required. As stated, the sprocket-wheels are loosely mounted on the pedal-shaft, and in order to render the clutch effective in its operation it follows that it should rotate with the shaft and at the same time be free to move laterally thereon in order to be brought into engagement with the clutch-faces of the wheels E and F. In order to effect these two results, the pedal-shaft is provided between its outer portions on which E and F rotate with means to prevent independent rotation of the clutch and preferably with a squared portion I, on which the clutch works, and by which the rotary motion of the shaft causes the clutch to revolve positively, whether in or out of engagement with either of the clutch-faces. The clutch is provided with a peripheral groove J, in which works the pins or rollers K, carried by the lower ends of a shifter L, the upper end of which is pivoted to a lever end for throwing the shifter into and out of operative position. The lever M is pivoted to the reach at N, and is provided at its lower end with a

yoke O, carrying inward-projecting fingers or stops P, designed to insure the positive engagement of the clutch with either clutch-face G and to hold the shifter in its locked position. The upper end of the lever extends through a rack-plate Q, and is provided with a spring R, designed to engage the notches in the said plate to hold the lever in its adjusted position. S designates a rod carried by the lower portion of the lever M and working in an opening T in the shifter. Upon this rod are mounted two springs U, one end of each of which bears against the yoke portion of the lever, the other end of each of the springs bearing against disks or washers V, resting against the two sides of the shifter. The function of these springs is to give the initial movement to the shifter when the lever M is moved to throw the clutch into engagement with either of the clutch-faces, the fingers P also serving to assist in the said movement.

W designates two sprocket-chains which pass around the wheels E and F, and also around sprocket-wheels X and Y, carried by the drive-wheel shaft Z, which latter is of the ordinary construction and needs no further description.

In the operation of the device it will be supposed that the clutch is in the position shown in Fig. 3—that is, out of contact with either of the clutch-faces of the sprocket-wheels E and F. Now suppose it is desired to gain increase of speed for use on the level road. In this event the lever is thrown to the left, which movement compresses the spring on the left-hand end of rod S and causes the shifter L to move to the right, thus bringing the clutch into engagement with the clutch-face on wheel F, in which position it will remain until the lever is again moved. As stated, the springs on rod S impart the initial and practically the entire movement to the shifter; but in order that the movement may be positive the fingers P are employed, which contact with the shifter to assist in its lateral movement and also serve to prevent the disengagement of the clutch from the clutch-face of the wheel from any cause while it is held in engagement with the clutch-face by the spring. When additional power is required for the purpose of climbing a hill, the clutch is shifted to the opposite clutch-face, and when it is desired to coast the clutch is moved to the position shown in Fig. 3, when the sprocket-wheels will revolve without imparting motion to the pedal-shaft, thus allowing the feet of the rider to rest without movement upon the treadles and at the same time

avoiding the noise and friction caused by the operation of the clutch-ratchet.

The ratchet form of clutch is shown in the drawings because it is preferable in affording means for the gradual adjustment of treadle-speed to that of the drive-wheel shaft when the rider desires to impart propelling power after "coasting."

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

1. In a bicycle, the combination, with the drive-wheel and the pedal-shaft, each of which is provided with sprocket-wheels, one set of which is composed of wheels of different diameters, and one set of which is loosely mounted on the pedal-shaft, of a clutch having a lateral movement on and a rotary movement with the pedal-shaft, means for exerting initially a yielding pressure, and means for exerting, finally, a positive pressure to advance said clutch in engagement with one of the loose wheels, and chains for connecting each set of wheels.

2. In a bicycle, the combination, with the pedal-shaft carrying loosely-mounted clutch-face sprocket-wheels, of a clutch adapted to slide on said pedal-shaft and to turn therewith a pivoted lever, a shifter pivoted to said lever and connected to the clutch, a yielding connection between the shifter and the lever, and means carried by the lever to retain the clutch in positive engagement with its coacting clutch-face.

3. In a bicycle, the combination, with the pedal-shaft, of two sprocket-wheels loosely mounted thereon and provided with clutch-faces, a pivoted lever having a forked lower end provided with inward-projecting fingers, and a spring-actuated shifter pivoted to said lever and engaged with said clutch and located in the path of movement of the fingers.

4. In a bicycle, the combination, with the pedal-shaft, of two sprocket-wheels loosely mounted thereon and provided with clutch-faces, a clutch having a sliding engagement with said shaft, a pivoted lever, a shifter pivoted thereto, a spring between the lever and the shifter, the energy of which is exerted to hold the clutch in engagement with the clutch-faces, and means for holding the lever in fixed adjustment.

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

ALBERT S. SWARTHOUT.

Witnesses:

BENJ. M. FOWLER,
IRVING ELTING.