No. 645,998. Patented Mar. 27, 1900.

E. H. FISHER.

BICYCLE.

(Application filed Jan. 27, 1898.)

(No Model.)

Fig. 1.

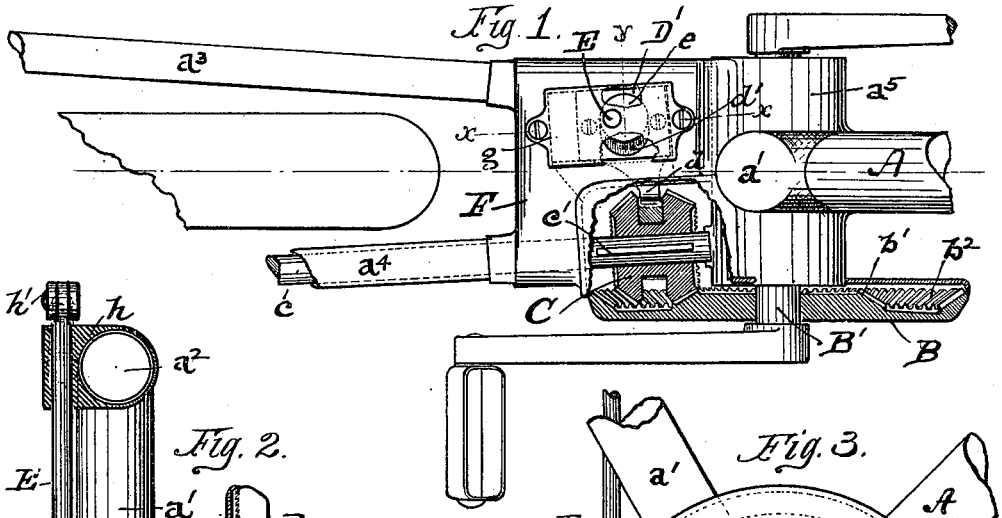


Fig. 2.

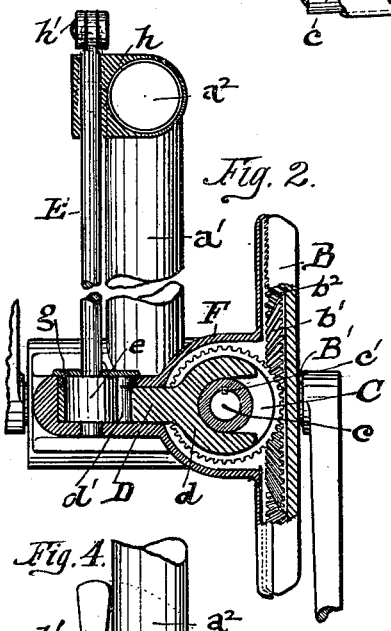


Fig. 3.

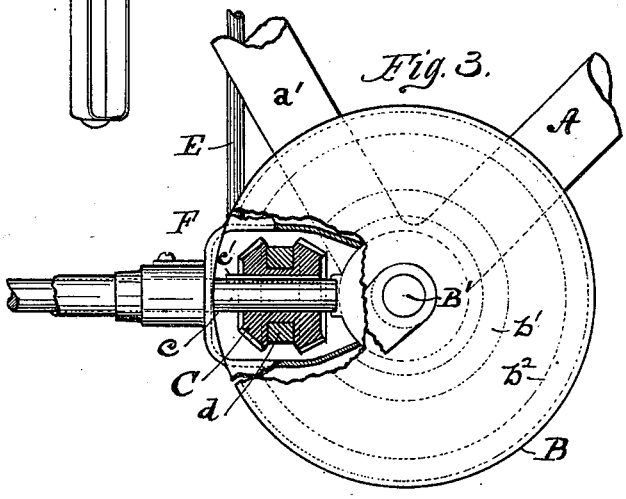


Fig. 4.

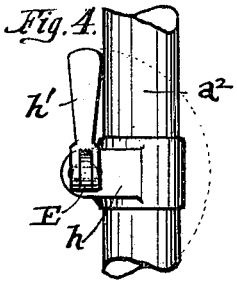


Fig. 5.

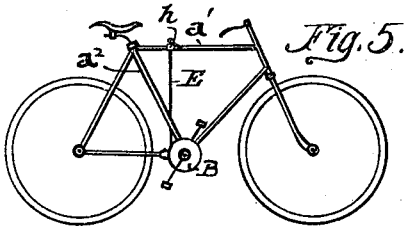


Fig. 6.

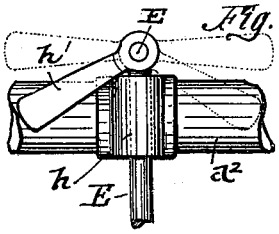


Fig. 7.

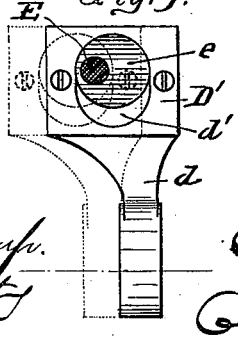
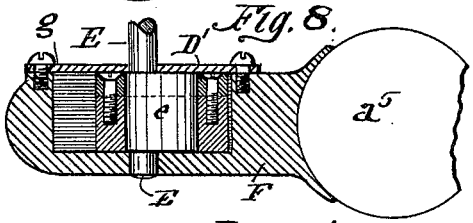


Fig. 8.



Witnesses.
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UNITED STATES PATENT OFFICE.

EDWIN H. FISHER, OF CINCINNATI, OHIO.

BICYCLE.

SPECIFICATION forming part of Letters Patent No. 645,998, dated March 27, 1900.

Application filed January 27, 1898. Serial No. 668,128. (No model.)

To all whom it may concern:

Be it known that I, EDWIN H. FISHER, a citizen of the United States, residing at Cincinnati, Ohio, have invented new and useful Improvements in Bicycles, of which the following is a specification.

My invention relates to bicycles of the class embodying a transmitting-shaft between the pedal-shaft and driving-wheel, its object being to produce a convenient means of varying the speed at will, thereby increasing the power upon occasion—as, for example, in ascending gradients.

To this end my invention consists in the combination, with the transmitting-shaft, of a disk attached to the pedal-shaft having two concentric sets or rows of gear-teeth at one side of the same and means for engaging one or the other of said sets of gear-teeth with the transmitting-shaft at will.

It also consists in the combination of said change-gear device with means adapted to effect the change conveniently while in motion.

It also consists in the embodiment of said invention in a mechanical structure wherein all the desired functions are performed to the best advantage, yet simple and inexpensive in cost and maintenance.

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

Figure 1 is a plan view of my invention applied to a bicycle, partly sectioned to show construction; Fig. 2, an elevation from the rear cross-sectioned through the gear-shifter. Fig. 3 is a side elevation sectioned through the shifting gear; Fig. 4, a detail plan view of the upper horizontal brace of the bicycle-frame, showing the eccentric-rod and its operating-lever; Fig. 5, a general elevation, on a reduced scale, of a bicycle complete, showing the relative position of the operating-rod; Fig. 6, a detail side elevation of the upper brace of the bicycle-frame, showing the operating-lever in locked position; Fig. 7, a plan view of the gear-shifters detached; and Fig. 8, a detail cross-section, on line $x\ x$ of Fig. 1, lengthwise through the housing, showing the construction of shifter-block.

Referring now to the drawings, A designates generally the frame of the ordinary bicycle, and a' a^2 the approximately-vertical post, rising from the crank-shaft bearings and the top horizontal brace, respectively. The crank-shaft B′ is provided with a disk B, having two concentric rows of gear-teeth b' b^2 at the inner side, and the transmitting-shaft c, arranged in the usual manner, has a double gear C, adapted to mesh alternately with the rows of teeth upon the disk B, according to its position upon the shaft c. The double gear C has a "spline" connection c' with its shaft c, permitting it to be moved longitudinally upon the same without losing its non-rotative connection. This is accomplished by a slide D, having a lateral arm d, adapted to engage the central hub of the double gear C and carry the same as the block or slide D is shifted forward or backward. The slide D is provided with a vertical aperture d' through the same from side to side, adapted to receive an eccentric e, mounted on a vertical shaft E, mounted as presently described.

The slide D and double gear C are carried in a housing F, suitably formed, connecting the rear forks a^3 a^4 of the bicycle-frame with the hanger a^5, which constitutes the bearing of the crank-shaft B′. The form of this housing as I prefer to construct it is seen in plan view, Fig. 1, fore and aft sections, Figs. 3 and 8, and cross-section, Fig. 2. It has a cavity adapted to receive the slide-block D, the upper wall of which cavity is perforated to receive between parallel fore and aft edges a guide-plate D′, secured by screws to the block D, as in Fig. 8, by which the block D is guided in its fore and aft movements. A covering-plate g is secured over all. The eccentric-shaft projects vertically downward through the covering-plate g, through the perforation of the slide-block and its guide-plate, and seats in the bottom of the housing F. The shaft extends thence upward through a loop-piece h, secured to the upper brace a^2, and is provided with a pivoted handle h', adapted to lie down beside and catch against the brace a^2 as a lock. It may now be explained that the cavity in the slide-block D and guide-plate D′ is so formed as to permit the eccentric to turn half a revolution only on its axis, as illustrated in Fig. 7, and in such ultimate positions forms a lock for the slide D to hold the gear C in mesh with one or the other of the rows of gear-teeth on the disk B. The

handle h' of the eccentric-rod thus swings over the brace a^2 and engages by gravity behind it in each ultimate position as a gravity-catch, as shown by dotted lines in Figs. 4 and 6. An intermediate catch may be arranged at such a radius as will hold the gear C entirely disengaged from the disk-gear B, if desired.

It will be seen by Fig. 5 that the handle h is in convenient reach of the rider and may be manipulated easily while the machine is in motion. The arrangement described always affords a visual indication to the rider of the position of the engaging gears.

The teeth of the gears deviate somewhat in their form from the principles of correctly-designed gear-teeth; but when so constructed the wheels will turn each other around.

I claim as my invention and desire to secure by Letters Patent of the United States—

The combination with a disk provided with two concentric rows of teeth, of a gear upon the transmitting-shaft adjustable to engage either of said rows of teeth, a sliding shifter carried in the frame of the bicycle and perforated to receive an operating-eccentric, an eccentric working in the opening in the shifter, a rod carrying said eccentric and extended outward to a convenient position on the frame and a handle upon said rod adapted to be turned to engage over the upper brace, substantially as and for the purpose specified.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

EDWIN H. FISHER.

Witnesses:
L. M. HOSEA,
HERBERT J. ALLSUP.