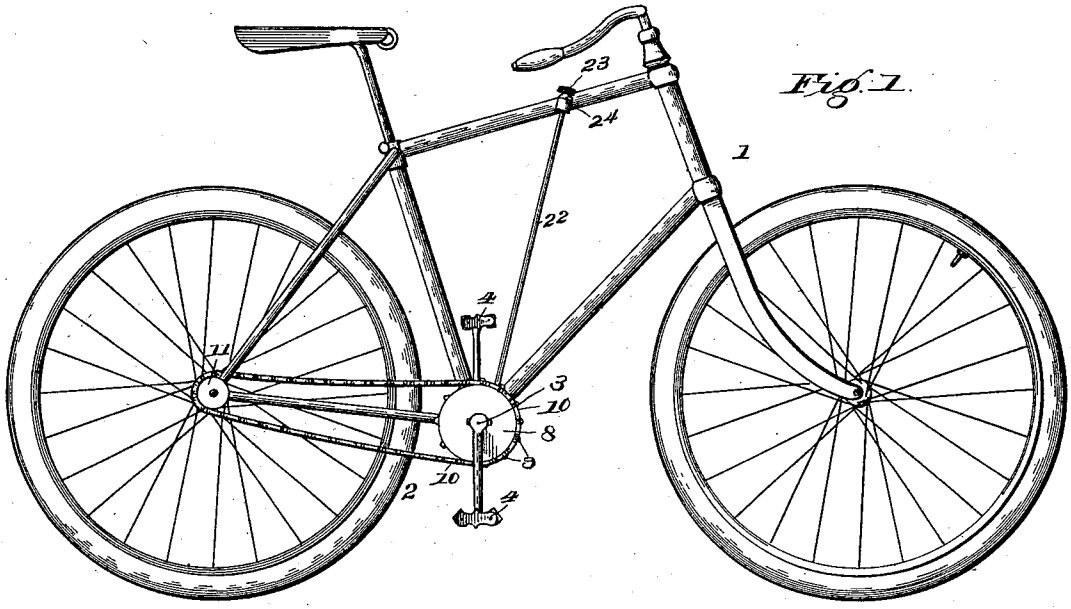
(No Model.)

W. H. BRIGHT.

MULTIPLE GEARING.

No. 521,133. Patented June 5, 1894.

Fig. 1.



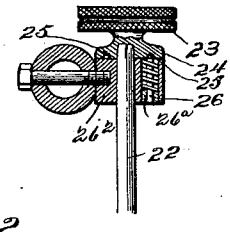


Fig. 2.

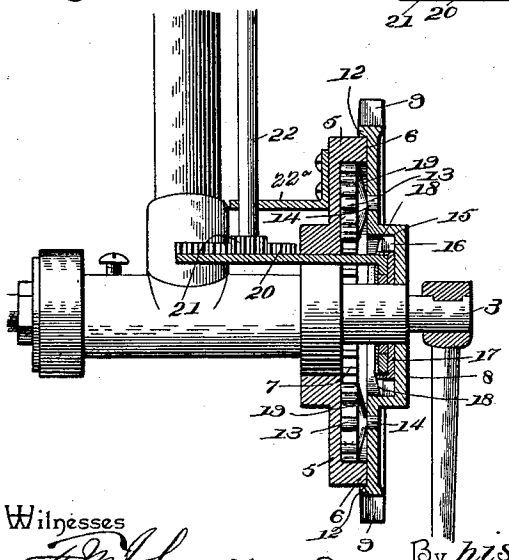


Fig. 3.

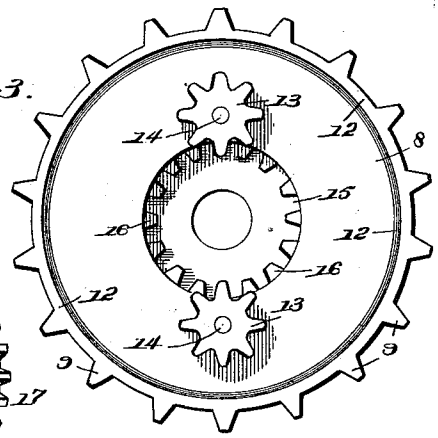


Fig. 5.

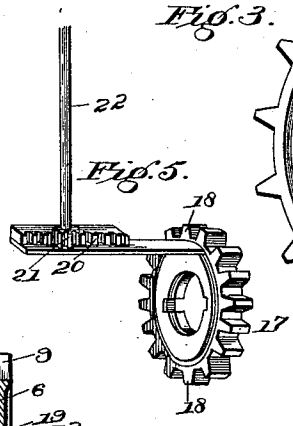
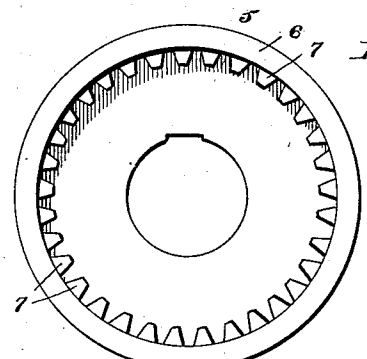


Fig. 4.



Inventor

Witnesses

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[illegible]

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WILLIAM H. BRIGHT, OF MORROW, OHIO, ASSIGNOR OF ELEVEN-TWELFTHS TO PETER B. DUNHAM, JONAH ANDERSON, ANNIE V. BRIGHT, F. M. COUDEN, A. W. STARKEY, A. SELZER, D. B. WILSON, ALBERT RUTTERER, A. C. BOWMAN, AND EUGENE DUNHAM, OF SAME PLACE.

MULTIPLE GEARING.

SPECIFICATION forming part of Letters Patent No. 521,133, dated June 5, 1894.

Application filed November 10, 1893. Serial No. 490,576. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM H. BRIGHT, a citizen of the United States, residing at Morrow, in the county of Warren and State of Ohio, have invented a new and useful Multiple Gearing, of which the following is a specification.

My invention relates to multiple gearing for bicycles and similar vehicles, and it has for its object to provide a simple and inexpensive, direct and efficient construction whereby the pedal shaft and chain-wheel may be geared for either power or speed, or may be disconnected for coasting, by means under the control of the rider and capable of manipulation and adjustment without dismounting or checking the movement of the treadles.

A further object of the invention is to provide a construction in which the co-operating parts are compactly disposed so as to take up little if any more space upon the pedal shaft than an ordinary sprocket gear, to avoid setting the treadles at a greater distance apart than in the ordinary construction.

Further objects and advantages of this invention will appear in the following description, and the novel features thereof will be particularly pointed out in the appended claims.

In the drawings: Figure 1 is a view of a bicycle provided with a gearing embodying my invention. Fig. 2 is a transverse sectional view of the gearing and means for adjusting the same. Fig. 3 is an inside view of the sprocket disk. Fig. 4 is a similar view of the fixed plate and adjustable pinion. Fig. 5 is a detail view, in perspective, of the means for adjusting the movable pinion.

Similar numerals of reference indicate corresponding parts in all the figures of the drawings.

1 represents the frame of the bicycle, 2 the driving wheel, 3 the treadle shaft, and 4 the treadles, all of the ordinary construction.

5 represents a fixed plate which is secured to the frame around the treadle shaft, and is provided with a peripheral overhanging flange 6, provided with internal gear-teeth 7, thus forming an internal fixed gear.

8 represents a sprocket disk, having external sprocket-teeth 9, which engage the chain 10 connected to the pinion 11 of the driving-wheel. The sprocket-disk is loosely mounted upon the treadle shaft and is provided with an inwardly-extending peripheral flange 12, which meets the outwardly-extending flange 6 of the fixed plate. In the cavity thus formed between the fixed plate 5 and the loose sprocket-disk 8 are arranged planetary gears 13, which are mounted upon pivot-pins 14, carried by the loose disk. The loose disk is provided around the treadle shaft with an annular cavity 15, in which are arranged internal clutch-teeth 16.

Feathered upon the treadle shaft is an adjustable pinion 17, which corresponds in size with the cavity 15, and is adapted to be fitted thereinto to engage the clutch-teeth 16; and the planetary gears are arranged at such a distance apart that, when properly adjusted, the adjustable pinion will engage both of said gears simultaneously. The inner side of the adjustable pinion and the outer sides of the planetary gears are beveled, as shown respectively at 18 and 19, whereby, when the pinion is arranged at an intermediate point between the limits of its movement, it will be out of engagement with both its clutch-teeth and the planetary gears, and thus will leave the sprocket-disk free to rotate independently of the treadle shafts. When the adjustable pinion is in engagement with the clutch-teeth 16, or at the limit of its outward movement, the sprocket-disk is locked directly to the treadle shaft, whereby the parts operate as in the ordinary construction of gears of this class in which the sprocket or chain wheel is keyed to the treadle shaft and when the adjustable pinion is in engagement with the planetary gears, or at the limit of its inward movement, the rotary motion of the treadle shaft will be communicated through the planetary gears to the sprocket-disk, and as the planetary gears are permanently in engagement with the internal fixed gear, the motion of the sprocket-disk will be a quotum or dividual part of that of the treadle shaft. The ratio of the two motions will depend upon

the relative sizes of the pinion and planetary gears.

The mechanism for operating the adjustable pinion consists of a rack-bar 20, which extends inward beyond the fixed plate 5 and is engaged by an intermeshing spur-gear 21 fixed to the lower end of a rotary shifting-rod 22, which is journaled in suitable bearings provided therefor and which extends upward to within convenient reach of the rider and is provided with a suitable handle 23. The lower bearing for the shifting-rod is formed in a bracket 22^a extending inward from the fixed plate 5.

It is apparent that the rotation of the shifting-rod 22, by means of its handle 23, will cause a longitudinal movement of the rack-bar 20, and thus move the adjustable pinion to engage either the planetary gears or the clutch-teeth, or to occupy a position between the planes of the planetary gears and the clutch-teeth to permit independent rotation of the sprocket-wheel. Thus the adjustable pinion may be arranged in either of three positions, respectively to lock the sprocket-gear to the treadle shaft, to allow independent movement of the sprocket-disk for coasting, and to cause the pinion to mesh with the planetary gears to increase the power, and in order that the rider may set the pinion in either of these positions without experimenting, I provide a lock consisting of a disk 24, carried by the handle 23, and having, in its under surface, a series of three sockets or depressions 25, and a spring-actuated pin 26, provided with a beveled upper end to engage one of said sockets or depressions and mounted in a vertical guide 26^a formed in a box 26^b in which the upper end of the shifting-rod is journaled. As the handle of the shifting-rod is turned, this locking pin engages the sockets or depressions successively, and thus indicates to the operator the exact position of the adjustable pinion.

The connection between the rack-bar 20 and the gear 17, whereby the latter is capable of free rotation and is adapted to be moved transversely to occupy either of its three positions above described, forms no part of my invention, and may be varied according to the taste and skill of the manufacturer, but in the drawings I have shown said rack-bar provided at its outer end with a ring which fits in a surface groove in the inner side of said gear 17 and is held therein by a plate or flange, as shown in Fig. 5. A detailed description of this part of the construction is unnecessary for the reason above assigned.

From the above description it will be apparent that the mechanism is susceptible of various changes in form, proportion and minor details, which may be resorted to without departing from the spirit, or sacrificing any of the advantages of the invention.

Having described my invention, what I claim is—

1. The combination with a treadle shaft, of a fixed internal gear, a rotary sprocket-disk loosely mounted upon said shaft and provided with internal clutch-teeth, planetary gears carried by the sprocket-disk and meshing permanently with the internal gear-teeth, an adjustable pinion slidably mounted upon the treadle shaft and adapted to engage either the clutch-teeth or the planetary gears, and means for operating said pinion, substantially as specified.

2. The combination with a treadle shaft, of a stationary plate, an internal gear carried by said plate, a sprocket-disk loosely mounted upon the treadle shaft and having a peripheral flange to meet the outer edge of the internal gear, clutch-teeth arranged in a cavity in the sprocket-disk, planetary gears carried by the sprocket-disk and permanently engaging the internal gear-teeth, an adjustable pinion feathered upon the treadle shaft and adapted to engage either the clutch-teeth or the planetary gears, said planetary gears and adjustable pinion being beveled upon corresponding sides to enable the latter to occupy a position between the clutch-teeth and said gears, and means for operating the adjustable pinion, substantially as specified.

3. The combination with a treadle shaft, of fixed internal gear, a loose sprocket-disk provided with clutch-teeth, planetary gears carried by said disk, and an adjustable pinion feathered upon the treadle shaft and adapted to engage either the clutch-teeth or the planetary gears, of a rack connected to said pinion, a shifting rod provided with a spur-gear in engagement with said rack, and a locking device consisting of a plate carried by the shifting-rod and provided with spaced sockets or depressions, and a spring-actuated locking pin to engage said sockets or depressions successively to hold the adjustable pinion in either of its adjusted positions, substantially as specified.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

WM. H. BRIGHT.

Witnesses:
JOHN H. SIGGERS,
GEO. C. SHOEMAKER.