(No Model.)

R. S. ABERNETHY.

BICYCLE PROPULSION.

No. 589,952. Patented Sept. 14, 1897.

Fig. 1.

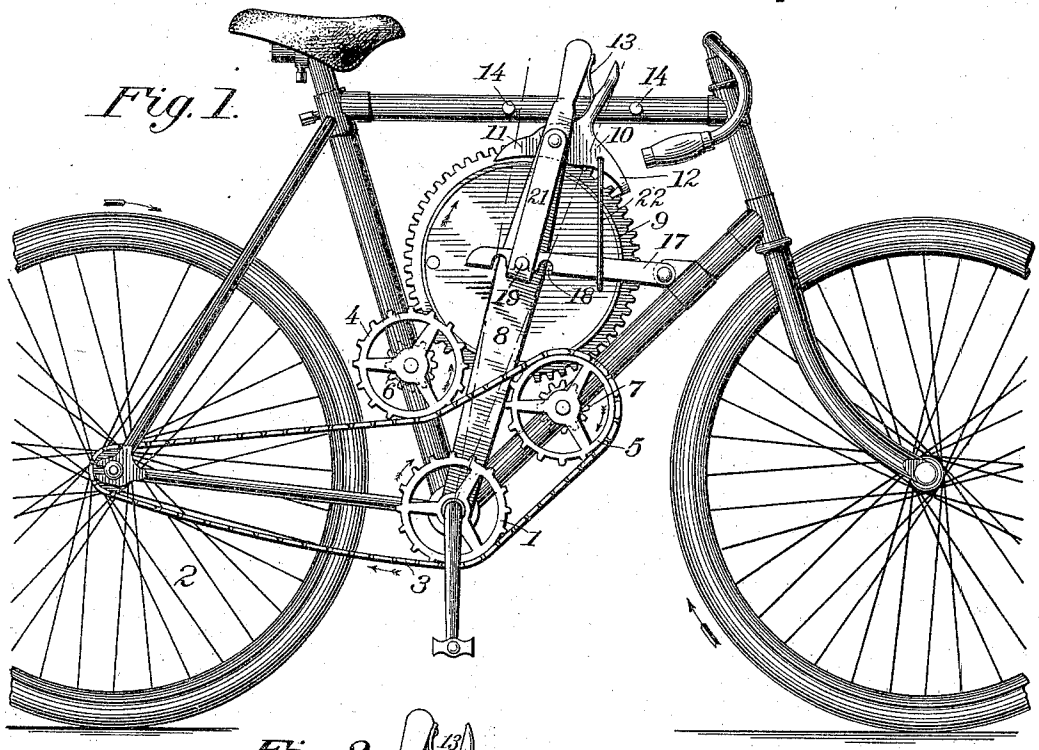


Fig. 2.

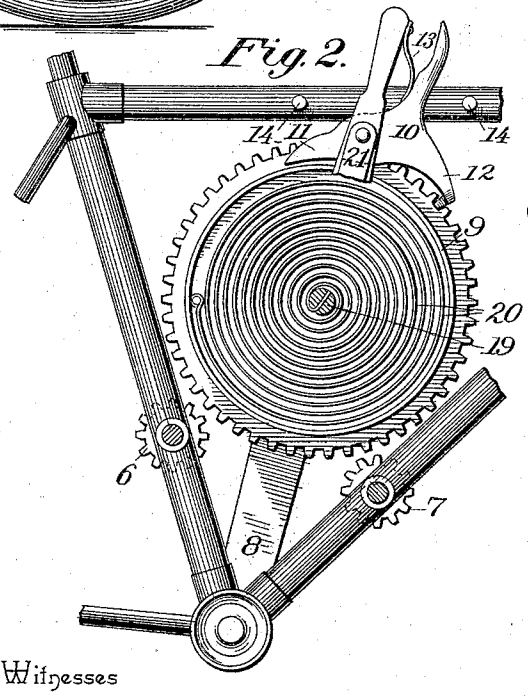


Fig. 3.

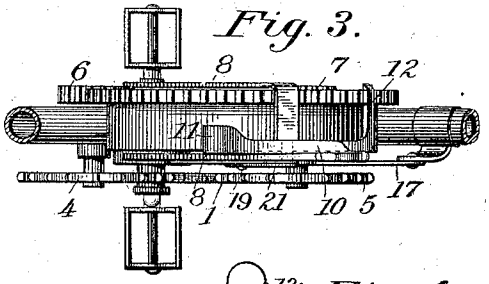
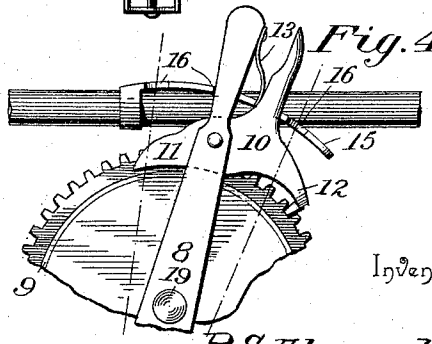


Fig. 4.



Witnesses

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UNITED STATES PATENT OFFICE.

ROBERT SIDNEY ABERNETHY, OF CONNELLYS SPRINGS, NORTH CAROLINA, ASSIGNOR OF ONE-HALF TO J. E. COULTER, OF SAME PLACE.

BICYCLE PROPULSION.

SPECIFICATION forming part of Letters Patent No. 589,952, dated September 14, 1897.

Application filed May 20, 1897. Serial No. 637,380. (No model.)

To all whom it may concern:

Be it known that I, ROBERT SIDNEY ABERNETHY, a citizen of the United States, residing at Connellys Springs, in the county of Burke and State of North Carolina, have invented a new and useful Bicycle Propulsion, of which the following is a specification.

This invention relates to certain new and useful improvements in the propelling mechanism of bicycles, tricycles, and road-machines of like nature, and has for its object to combine with the ordinary foot propelling means mechanism for storing energy when the machine is descending a grade or running upon a level surface, to be subsequently utilized for hill-climbing or to assist in propelling the machine through sand and mud and over such surfaces which require more than ordinary effort on the part of the rider for moving the machine forward.

The mechanism for attaining the ends of the invention is of novel construction and combination and places within reach of the rider simple and effective means for reserving power which would otherwise be spent and to expend the same to materially assist in propelling the machine when required, said mechanism being disposed so as not to be in the way and easily operated and adapted to be secured in any one of three positions according as power is being stored or expended or the mechanism held out of action.

For a full understanding of the merits and advantages of the invention reference is to be had to the accompanying drawings and the following description.

The improvement is susceptible of various changes in the form, proportion, and the minor details of construction without departing from the principles or sacrificing any of the advantages thereof, and to a full disclosure of the invention an adaptation thereof is shown in the accompanying drawings, in which—

Figure 1 is a side elevation of a bicycle, showing the application of the invention. Fig. 2 is a detail view of an intermediate portion of the bicycle-frame, showing the relation of the essential parts of the propelling mechanism. Fig. 3 is a top plan view of the propelling mechanism, the framework of the machine being broken away. Fig. 4 is a detail view of different means for securing the lever or pivoted frame at an adjusted position.

Corresponding and like parts are referred to in the following description and indicated in the several views of the drawings by the same reference-characters.

The invention is designed for road-machines of any type or pattern, although shown in connection with a safety-bicycle, and is to be arranged so as to be within convenient reach of the rider for instant use.

The bicycle illustrated comprises the sprocket-gear 1, secured to the crank-axle in the ordinary manner, and the drive-wheel 2, having a sprocket-gear secured to its hub in the usual manner to receive motion from the sprocket-gear 1 by means of the sprocket-chain 3. Sprocket-idlers 4 and 5 are located a short distance from the sprocket-gear 1 and are disposed so that the sprocket-chain 3 passes beneath the sprocket-idler 4 and over and around the sprocket-idler 5, whereby the sprocket-idlers 4 and 5 are driven in reverse directions. A spur-gear 6 has connection with the idler 4, so as to rotate therewith, and a spur-gear 7 is similarly mounted so as to turn with the idler 5.

In order that the strain may be about evenly distributed upon opposite sides of the machine-frame, the sprocket-idlers 4 and 5 are located upon one side of the frame and the spur-gears 6 and 7 upon the opposite side. The sprocket-gear 1, idlers 4 and 5, and the sprocket-gear of the drive-wheel are in the same plane, whereby the sprocket-chain may operate without being deflected or causing any binding or undue friction between it and the cogs of the sprocket-gears with which it operates.

A lever or frame 8 is suitably fulcrumed, preferably in line with the crank-axle, but in such a manner as not to cause any frictional engagement therewith, and a spring drum or barrel 9, of ordinary construction in spring-motors and trains of gearing actuated by spring-power, is applied to the lever or frame 8 and moves therewith. This spring barrel or drum is disposed so that its toothed portion may be brought into engagement with either of the spur-gears 6 and 7, according as

it is required to store power in the spring or expend the power previously stored therein. When descending a grade or moving easily over a level surface, the spring may be wound, thereby storing power therein, by moving the upper end of the lever or frame 8 toward the rear of the machine to bring the toothed portion of the barrel or drum into engagement with the spur-gear 6. After the spring has been sufficiently wound the power is reserved by moving the lever or frame 8 so as to bring the spring barrel or drum into a position intermediate of the spur-gears 6 and 7. For hill-climbing or to propel the machine over a sandy or muddy road the power held in reserve may be expended by moving the upper end of the lever or frame forward, so as to bring the spring barrel or drum into engagement with the spur-gear 7. A hand-latch 10 is pivoted to the upper portion of the lever or frame 8, and its active end is adapted to engage with the toothed portion of the barrel or drum to hold the latter from turning, which is essential to prevent the wasting of the power stored in the spring when the toothed portion of the drum is disengaged from the spur-gear 6. A brake-shoe 11 is formed with the hand-latch and extends in an opposite direction to the toothed end 12 and is adapted to engage with the peripheral portion of the barrel and hold it from turning when the hand-latch is disengaged from the toothed portion of the barrel, whereby the momentum of the machine may be controlled in a measure. A spring 13 is secured at one end to the part 8 and its opposite end engages with the hand-latch, so as to hold the toothed portion 12 normally in engagement with the toothed part of the barrel. Stops 14 project laterally from the upper frame-bar and limit the forward-and-backward movement of the lever or frame, so as to prevent crowding of the teeth when either part 6 or 7 is in mesh with the toothed portion of the barrel.

The lever or frame 8 is held by positive means at the limit of its movement in each direction or at an intermediate point by suitable means, and, as shown in Fig. 4, a curved bar 15 is secured to the upper bar of the machine-frame and is formed with three notches 16 to receive the handle of the lever or frame, which is sprung laterally to make engagement with or be disengaged from the said part 16, as will be readily understood.

As shown in Fig. 1, a bar 17 has pivotal connection at its front end with the machine-frame in any convenient way, and its rear end has notches 18 to engage with an end portion of the pin 19, upon which the barrel or drum turns and to which the inner end of the spring 20 is secured. A plate or strip 21 is secured to a side of the lever or frame 8, and the free end of the pivoted bar 17 operates in the space formed between the parts 21 and 8. A link 22 connects the hand-latch 10 with the pivoted bar 17, and upon operating the hand-latch the bar 17 is moved to disengage its notched end from the pin 19, thereby permitting the part 8 to be shifted to the desired position, and when adjusted it is held by the free end of the bar 17 engaging with the pin 19 in the manner set forth.

The lower end of the link has a limited play with reference to the pivoted locking-bar 17 to admit of the hand-latch moving sufficiently to release the spring barrel or drum without disturbing the part 17, and the hand-latch has ample movement to permit of the locking-bar being actuated upon pressing the hand-latch back farther after its toothed end has been disengaged from the teeth of the part 9.

Having thus described the invention, what is claimed as new is—

1. In a propelling mechanism for road-machines, the combination of independently-mounted spur-gears reversely driven and operatively connected with the drive-wheel and with the normal means for propelling the machine, a movable spring barrel or drum, and means under the control of the rider for shifting the said spring barrel or drum to bring it into engagement with one or the other of the individual spur-gears or to an intermediate position, substantially as and for the purpose set forth.

2. In propelling mechanism for road-machines, the combination of independently-mounted spur-gears reversely driven and operatively connected with the drive-wheel and with the normal means of propulsion, a spring barrel or drum, means for shifting the said spring-barrel to bring it into engagement with one or the other of the individual spur-gears or to an intermediate position, and a locking means for securing the barrel against rotation when out of mesh with the spur-gears and when moving from one position to another, substantially as and for the purpose set forth.

3. In propelling mechanism for road-machines, the combination of independently-mounted spur-gears reversely driven and operatively connected with the drive-wheel and with the means for normally propelling the machine, a spring barrel or drum, means for shifting the said barrel from one to the other of the individual spur-gears or to an intermediate position, means for securing the spring-barrel against rotation when out of mesh with the said spur-gears, and a locking mechanism for holding the said spring-barrel in any one of its several positions, substantially as set forth.

4. In propelling mechanism for road-machines, the combination of reversely-driven spur-gears operatively connected with the drive-wheel and with the means for normally propelling the machine, a spring-barrel adapted to intermesh with either one of the spur-gears or to be brought to an intermediate position, a hand-latch for engaging with the toothed portion of the spring-barrel, and a brake-shoe forming a part of the hand-latch and adapted to engage with the peripheral portion of the said spring-barrel, sub-

stantially as set forth for the purpose described.

5. In propelling mechanism for road-machines, the combination of reversely-driven spur-gears, a spring-barrel, a movable support therefor, a hand-latch carried by the movable support to hold the spring-barrel against rotation when out of mesh with the spur-gears, and a bar for holding the movable support in any desired position and operatively connected with the hand-latch to move simultaneously therewith, substantially as and for the purpose set forth.

6. In propelling mechanism for road-machines, the combination of reversely-driven spur-gears, a spring-barrel, a pivoted support therefor, a notched bar to engage with a lateral extension of the pivoted support to hold the latter in an adjusted position, a plate secured to the pivoted support to hold the free end of the notched bar in place and direct it in its movements, a hand-latch to hold the said spring-barrel against rotation when out of mesh with the spur-gears, and a link interposed between the notched bar and hand-latch, substantially as set forth.

7. In propelling mechanism for road-machines, the combination of reversely-driven spur-gears operatively connected with the drive-wheel and with the means for normally propelling the machine, a spring-barrel, a lever carrying the spring-barrel, means for securing the lever in an adjusted position, a hand-latch pivoted to the lever and adapted to control the movement of the spring-barrel, and stops extending across the path of the aforesaid lever to limit its movement, substantially as set forth.

8. In propelling mechanism for road-machines, the combination of separate and individual idlers independently mounted and reversely driven and located to one side of the plane of the machine-frame and operatively connected with the drive-wheel and with the means for normally propelling the machine, individual spur-gears connected with the respective idlers to rotate therewith and located upon the opposite side of the plane of the machine-frame, a spring-barrel adapted to have its toothed portion brought into engagement with either of the spur-gears, a movable support for the spring-barrel, a hand-latch for holding the spring-barrel against turning when out of engagement with the spur-gears, and a locking means for securing the movable support in any one of its positions, substantially as set forth.

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

ROBERT SIDNEY ABERNETHY.

Witnesses:

JAMES F. ABERNETHY,

E. J. ABERNETHY.