

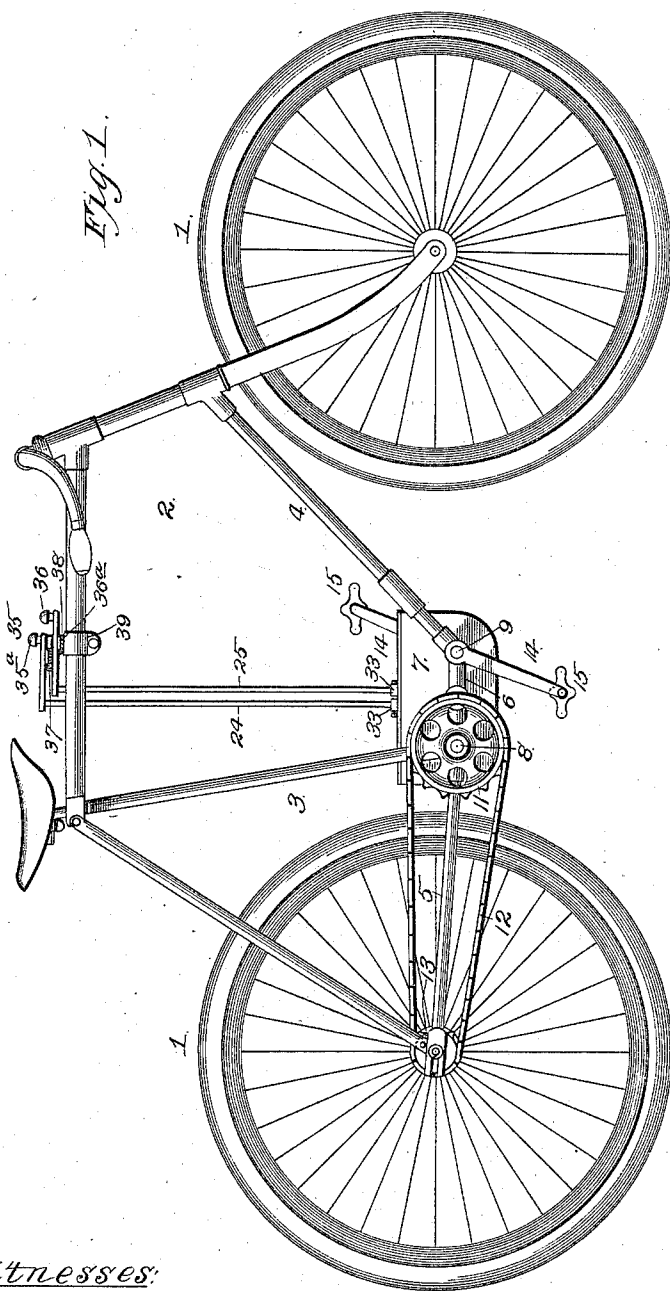
(No Model.)

2 Sheets—Sheet 1.

J. W. BRASFIELD & J. H. JENKINS.
SPEED GEARING FOR BICYCLES.

No. 580,366.

Patented Apr. 13, 1897.



Witnesses:

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M. R. Remley,

Inventors,
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By *Algonut Algon.*
Attys.

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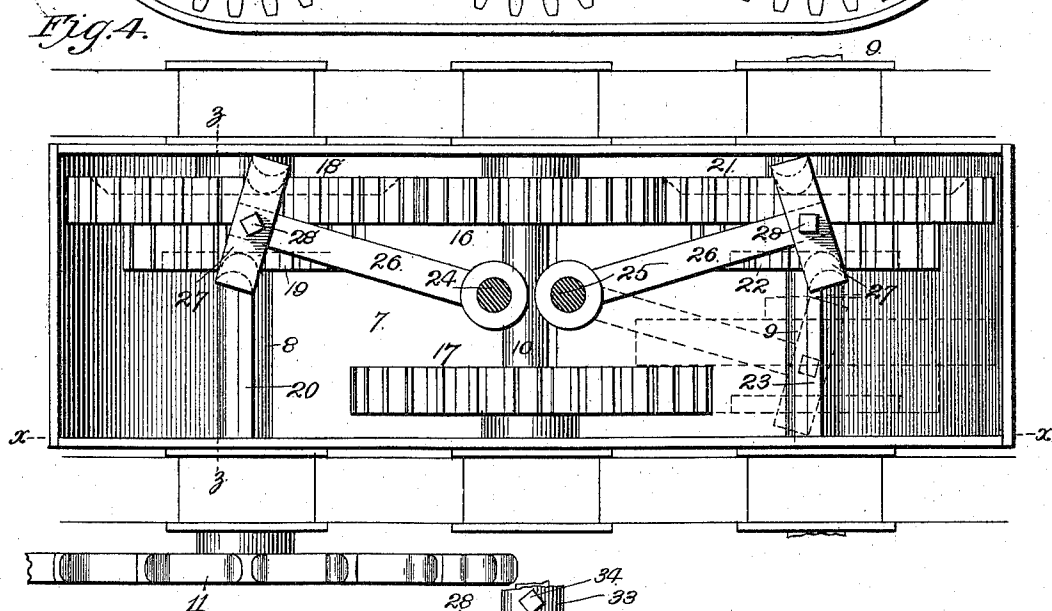
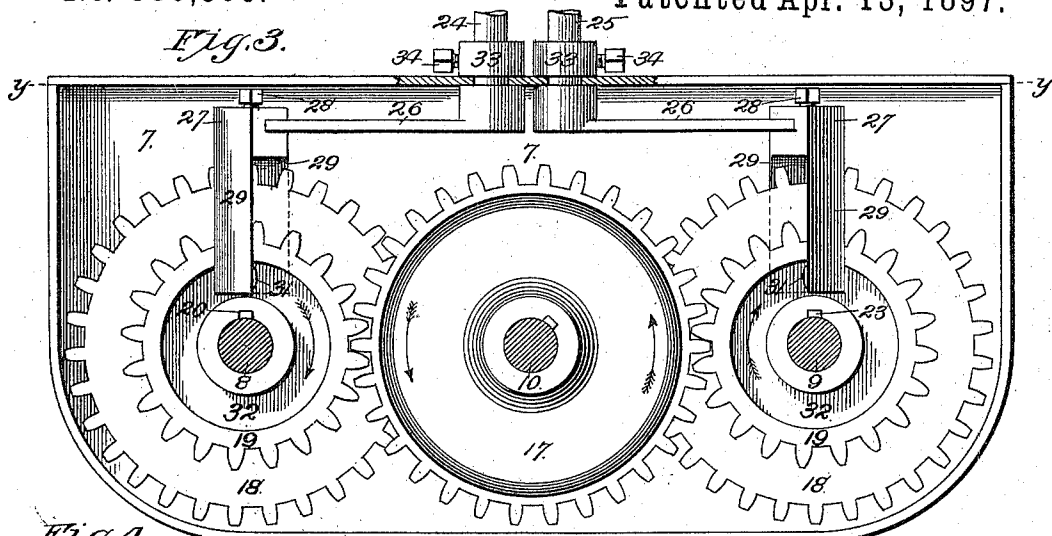
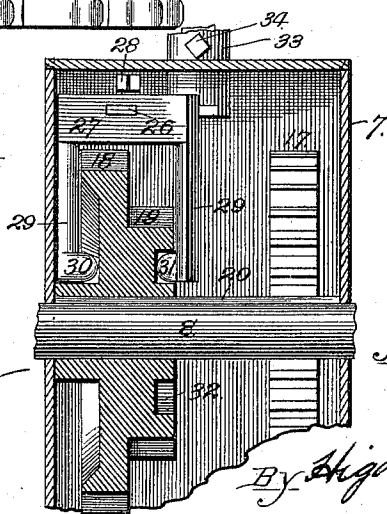


Fig. 5.



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UNITED STATES PATENT OFFICE.

JAMES W. BRASFIELD AND JOSEPH H. JENKINS, OF SMITHVILLE, MISSOURI.

SPEED-GEARING FOR BICYCLES.

SPECIFICATION forming part of Letters Patent No. 580,366, dated April 13, 1897.

Application filed December 26, 1895. Serial No. 573,334. (No model.)

To all whom it may concern:

Be it known that we, JAMES W. BRASFIELD and JOSEPH H. JENKINS, of Smithville, Clay county, Missouri, have invented certain new and useful Improvements in Speed-Gearings for Bicycles, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part hereof.

Our invention relates to speed-gearing for bicycles; and our object is to produce mechanism of this character whereby the rider may easily and quickly change the speed by raising or lowering the gear or may throw the pedals entirely out of gear, by means of such mechanism, with the drive-wheel of the machine. By lowering the gear it is obvious that hills may be climbed with less exertion, but at a diminished speed, and that when the gear is raised the speed is increased at a corresponding or proportionate expenditure of power.

With these objects in view our invention contemplates in particular a construction whereby the machine may be propelled under a low, a medium, or a high degree of power, and consequently at different speeds.

Other objects of the invention will appear in the following description and be pointed out in appended claim.

In the drawings which illustrate the invention, Figure 1 represents, principally in side elevation, a bicycle embodying our invention. Fig. 2 represents, on an enlarged scale, a top plan view of part of the same. Fig. 3 represents a sectional view taken principally on the line *x x* of Fig. 4. Fig. 4 is a section taken on the line *y y* of Fig. 3. Fig. 5 is a vertical section taken on the line *z z* of Fig. 4.

In the said drawings, 1 designates the wheels of a bicycle.

2 designates the frame. This frame, as shown, is of different construction and configuration from the ordinary bicycle-frame, though its precise construction or configuration is immaterial and forms no essential part of our improvement. As shown, the seat braces or standards 3 are in duplicate and parallel, and the front braces 4 are also in duplicate and parallel. (See Fig. 2.) The seat brace or braces 3 form a junction with the rear forks 5 in the customary manner.

The front braces 4, however, are preferably coupled at their lower ends to the lower ends of the braces 3 by means of the horizontal parallel sections 6 of the framework, and said sections 4 may in turn be connected by the cross-brace 4^a. Arranged between the parallel portion 6 of the frame and the lower ends of the braces 3 and 4 and supported rigidly in such position, in any suitable manner, by attachment to the frame is the casing 7, and extending transversely through said casing and journaled in the portion 6 of the frame are the shafts 8, 9, and 10. The shaft 8 carries upon one end in the customary manner a sprocket-wheel 11, and said wheel is connected by means of the sprocket-chain 12 to the small sprocket-wheel 13, mounted rigidly upon the rear or drive wheel of the bicycle. Mounted rigidly in the customary manner upon opposite ends of the shaft 9 are the crank-arms 14, which are provided with the pedals 15. Keyed rigidly upon the shaft 10 within the casing 7 are the comparatively small and large cog-wheels 16 and 17, at a suitable distance apart.

18 and 19 designate, respectively, the integrally-formed large and small cog-wheels, which are mounted so as to slide upon and rotate with the shaft 8. This relation is accomplished by providing said shaft with a longitudinal key or spline 20, which engages a corresponding groove in said wheels 18 and 19.

21 and 22 designate similar integrally-formed cog-wheels, which are mounted to slide upon and rotate with the shaft 9, and to accomplish this they are provided with grooves which engage the longitudinal key or spline 23 of said shaft.

24 and 25 designate parallel rods which are journaled near their upper and lower ends in the top bar of the frame and the top plate of the casing, and 26 designates arms which are mounted rigidly upon their lower ends within the casing. Said arms engage openings in the upper ends of the clutches 27, and this connection is made positive by set-screws 28, which are carried by the clutches and impinge upon said arms. Said clutches are forked or of inverted U shape, and their depending arms 29, which are preferably rounded at their inner sides, as shown in dotted lines, Fig. 4, are arranged contiguous to the

outer faces of the wheels 18 19 and 21 22. At the lower ends of said arms project inwardly against the outer face of the wheels 18 and 21 and 19 and 22, respectively, the rounded lugs 30 and 31, the lugs 31 preferably engaging annular grooves 32 of the small cog-wheels, as shown. As arranged, the arms 26 at the lower ends of the rods 24 and 25, by bearing against the underside of the top plate of the casing 7, which top plate is preferably secured by screw-bolts, prevent any upward movement of the said rods, (or this may be accomplished in other ways,) and to prevent any downward movement of the same we preferably mount upon said rods the collars 33 and secure them by means of set-screws 34, adjacent to the top of the casing, as shown. The rod 24 preferably projects to a higher plane than the rod 25, and mounted rigidly upon their upper ends, so as to swing in parallel horizontal planes, are the forwardly-projecting arms provided with handles 35 and 36, respectively, at their outer ends, and said arms, which are preferably of spring metal, are provided with depending teeth 35^a and 36^a, respectively, to engage one of the notches or recesses *a*, *b*, or *c* of the segmental plates 37 and 38. Said plates may be supported horizontally in any suitable or preferred manner, but the plate 37 must be arranged above the arm of the rod 25 and the plate 38 below said arm, as shown in Figs. 1 and 2. We preferably construct said plate as shown in the drawings—that is, form them integrally and clamp them upon the top bar of the frame by a sleeve 39. They may obviously be secured in other ways, however, without departing from the spirit of our invention.

In the drawings we have shown the cog-wheels 17, 18, and 21 of the same diameter and the cog-wheels 16, 19, and 22 of equal diameter. This proportion, however, may be varied as required.

As arranged in Figs. 4 and 2, the machine is geared to its normal speed—that is, the large gear 21 upon the pedal-shaft drives the small gear 16, and said gear in turn drives the large gear 18 upon the sprocket-wheel shaft, which in effect is practically the same as when the sprocket-wheel is mounted upon the pedal-shaft direct, leaving out of consideration, of course, the friction in the gearing. At the same time the depending teeth 35^a and 36^a engage the notches *a* of the plates 37 and 38, respectively, as shown clearly in Fig. 2 by dotted lines.

When it is desired to lower the gear and therefore make it easier for the rider to propel the machine uphill, the rider grasps the handle 36 and swings it to the right until its tooth engages the notch *c*, and this causes, as will be readily understood, the cog-wheels 21 and 22 to assume the position shown in dotted lines, Fig. 4. The small cog-wheel in such position meshes with the large cog-wheel of the shaft 10. The motion is transmitted from pedal-shaft to the sprocket-wheel by means

of the cog-wheels 22 and 17 and 16 and 18, the small wheels driving the large wheels in both instances.

When it is desired to increase the speed of the bicycle, supposing the gearing to be in the position shown in full lines, Fig. 4, the rider grasps the handle 35 and moves it to the left until its tooth comes into engagement with the notch *c* of the plate 37, and this causes, through the intermediate connections, the wheels 18 and 19 to slide to the left upon the shaft 8 until the small wheel 19 meshes with the large wheel 17. In this arrangement the power is transmitted from the pedal-shaft to the sprocket-wheel shaft through the medium of the gear-wheels 21 and 16 and 17 and 19, the large wheels driving the small wheels in both cases with a consequent increase of speed. Supposing, when on a downgrade, that the rider desires to coast, he grasps either handle and manipulates it until the teeth of the lever engage the middle notch. By so doing he throws and holds, as the case may be, the wheels 21 and 22 or 18 and 19 midway between the wheels 16 and 17 and entirely out of connection with either. It is apparent that when in this position the foot may rest upon the pedals without causing the latter to revolve. If the wheels 21 and 22 are thus disengaged, the rotation of the drive-wheel will cause the rotation of the shaft 10 through the medium of the interposed gearing, but if the wheels 18 and 19 are thus disengaged the remainder of the gearing within the casing, together with the pedals, will be stationary, as will be readily understood.

It will be noticed that access may be easily had to the gearing for oiling or other purposes by simply slipping upward the collars 33 upon the rods 24 and 25 and then withdrawing the screw-bolts which hold the top plate in position, when the latter may be raised. The precise construction of the casing, however, is immaterial, as it is designed simply as a means for protecting the gearing.

From the above description it is obvious that we have produced a speed-gearing for bicycles which will be found exceedingly valuable, particularly for use where there are a great many hills and for touring purposes, and that we have produced a gearing which combines such desirable features with extreme simplicity, strength, and durability of construction at a comparatively small expense. It will also be noticed that a machine provided with such gearing may be used for any kind of service, as there are no small parts to get out of place or to become injured or broken.

It is to be understood, of course, that slight changes in the form, proportion, or arrangement of parts may be made without departing from the spirit and scope of our invention.

Having thus described the invention, what we claim as new, and desire to secure by Letters Patent, is—

In a bicycle, the combination of a casing

supported by the frame, a shaft journaled therein, and provided with shiftable gear-wheels and geared to the drive-wheel of the bicycle, a second shaft journaled therein, and
5 also provided with shiftable gear-wheels and with pedal-carrying cranks, an intermediate shaft provided with rigid gear-wheels, a removable top for said casing, vertical rods journaled therein and in the top bar of the
10 bicycle-frame in advance of the seat, crank-arms 26 secured to the lower end of said rods, forked clutches embracing the opposite sides of said shiftable gear-wheels and adjustable upon said crank-arms, a clasp embracing the
15 top bar of the frame in advance of said rods and provided with horizontal segment-plates provided each with three notches, one of said

plates being disposed in a higher plane than the other, and spring-metal crank-arms secured to the upper ends of said rods, one of
20 them extending between and the other above said plates and provided with depending teeth to engage the notches of the plate below, and provided at their outer ends with upwardly-
25 projecting handles, all arranged substantially as shown and described.

In testimony whereof we affix our signatures in presence of two witnesses.

JAMES W. BRASFIELD.
JOSEPH H. JENKINS.

Witnesses:

E. B. THATCHER,
JACOB MCFALL.