

(No Model.)

H. R. & E. T. COLLINS.
BICYCLE.

2 Sheets—Sheet 1.

No. 544,427.

Patented Aug. 13, 1895.

Fig. 1.

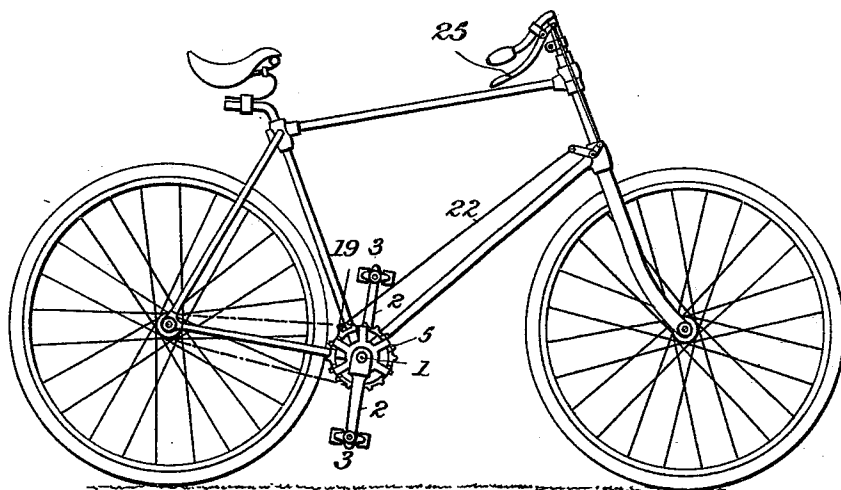
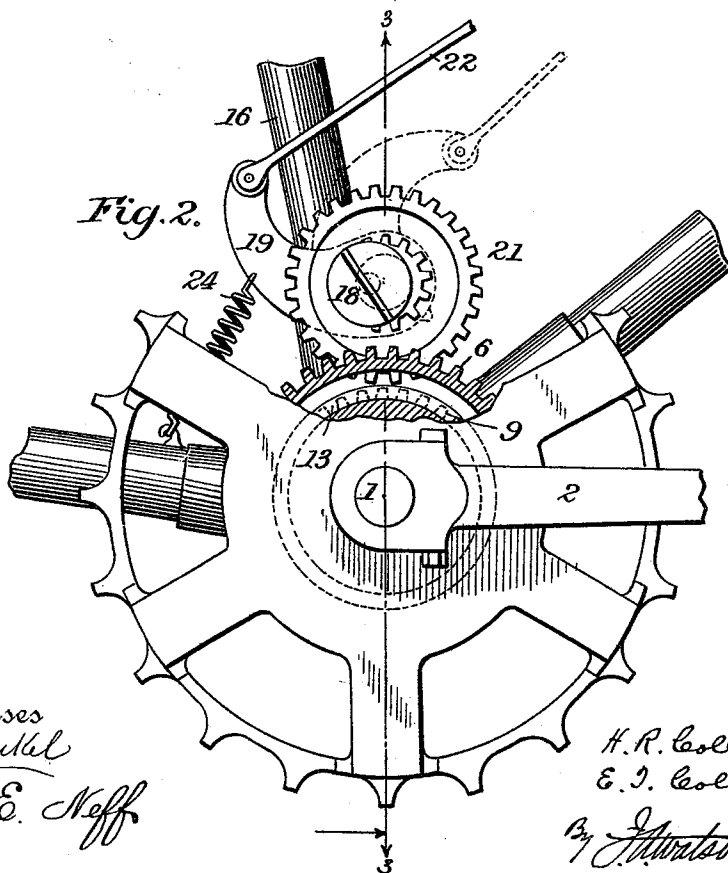


Fig. 2.



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Fig. 3.

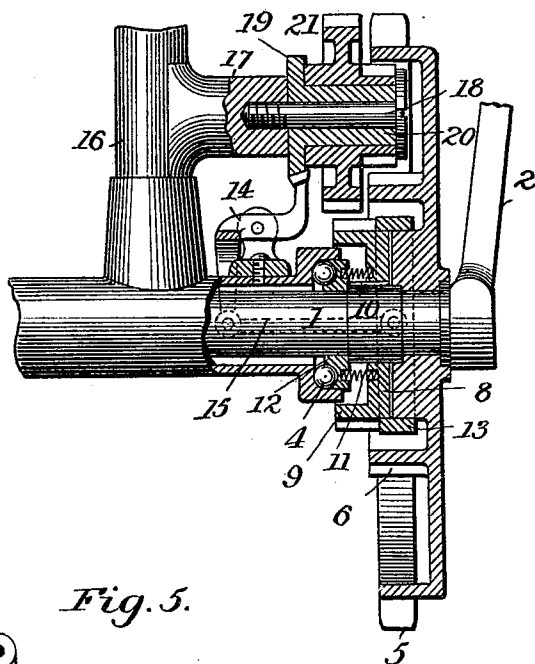


Fig. 4.

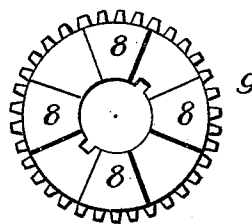


Fig. 6.

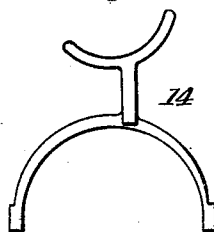


Fig. 5.

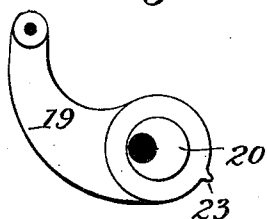
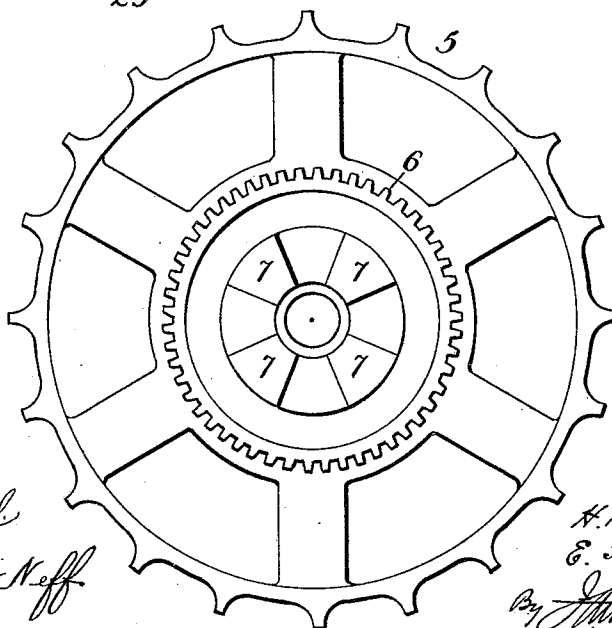


Fig. 7.



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UNITED STATES PATENT OFFICE.

HARRY R. COLLINS AND EDMUND T. COLLINS, OF SOUTH BETHLEHEM,
PENNSYLVANIA.

BICYCLE.

SPECIFICATION forming part of Letters Patent No. 544,427, dated August 13, 1895.

Application filed March 12, 1895. Serial No. 541,459. (No model.)

To all whom it may concern:

Be it known that we, HARRY R. COLLINS and EDMUND T. COLLINS, citizens of the United States, residing at South Bethlehem, in the county of Northampton and State of Pennsylvania, have invented certain new and useful Improvements in Bicycles, of which the following is a specification.

The object and purpose of our invention is to provide light, simple, and effective mechanism for the propulsion of bicycles and tricycles, whereby the speed of the machine may be reduced relatively to the speed of the pedals and cranks, or the leverage of the cranks increased relatively to the speed of the wheel, which is the same thing.

The purpose of the invention is to enable riders to climb hills which are too steep to ascend with machines as ordinarily constructed and to render the climbing of ordinary hills much easier than at present.

In carrying out the invention we employ certain mechanism which we will now proceed to describe, reference being had to the accompanying drawings, in which—

Figure 1 is a side view of a bicycle employing our improvements. Fig. 2 is an enlarged side view, partly in section and partly broken away, showing the invention in detail. Fig. 3 is a sectional view taken on the line 3 3 of Fig. 2; and Figs. 4, 5, 6, and 7 are enlarged detail views of several of the parts.

Our invention is applicable to any of the well-known bicycles, and in the drawings it is shown applied to one of ordinary construction. The crank-shaft 1 is provided with cranks 2 and pedals 3 of usual construction, the shaft being mounted in suitable ball-bearings 4 in the frame. The sprocket-wheel 5 is loose upon the crank-shaft, and upon its inner face there is a gear 6 of about half the diameter of the sprocket-wheel. On the inner face of the hub of the sprocket-wheel are projections 7, which form one member of a clutch. The other member consists of corresponding projections 8 upon a pinion 9, which is arranged to slide on the crank-shaft, but compelled to turn with it by suitable means, such as the feather 10. The pinion 9 is normally pressed into engagement with the sprocket-wheel by a series of springs 11, which fit in

sockets in the pinion and opposing sockets in a ring or washer 12 of the crank-shaft bearing, the part 12 being fixed on the shaft.

Upon the cylindrical outer surfaces of the clutch-teeth 7 and 8 there is a flat ring 13, which serves as a guard to keep dust and dirt out of the clutch, and also serves to draw the pinion 9 and its clutch member back and out of engagement with the sprocket-wheel. The ring 13 is connected with the two prongs of a lever 14. The lever 14 is pivoted to the main frame above the crank-shaft, and the said prongs are in the form of a semicircular yoke, one prong extending down on each side of the shaft to about the middle thereof. The prongs are connected to the ring 13 by a pair of links 15. The means for operating the lever 14 will be presently described.

Upon the central main tube 16 of the frame is a boss or projection 17, into which is rigidly screwed a bearing-pin 18. Upon the bearing-pin is pivoted a lever 19, having an eccentric hub 20, and upon this hub is journaled a double pinion 21 of two diameters. When the lever 19 is thrown in the position shown in full lines in Fig. 2 its eccentric hub is revolved so as to hold the pinion of larger diameter just above the sliding pinion 9 on the crank-shaft, and the pinion of smaller diameter just above the gear 6 on the sprocket-wheel. If, however, the lever 19 be drawn forward by the rod 22 or other means into the position shown in dotted lines in Fig. 2 the double pinion 21 will be thrown into engagement with the gears 6 and 9. During this forward movement of the lever 19 a projection 23 on the hub of the lever engages the upper end of the lever 14 and depresses it, thus drawing the ring 13 backward and disengaging the pinion 9 from the sprocket-wheel. The rod 22 is preferably operated by means of a lever 25 on the handle-bar and suitable intermediate connections, in the manner in which the brake-operating rods are usually operated. The lever 19 is normally drawn back to hold the double pinion out of engagement with the crank-shaft and sprocket-wheel by means of a spring 24 connecting the lever with a portion of the main frame. If desired, the double pinion 21 and movable parts may be provided with ball-

bearings and other antifriction devices, and the mechanical details of the invention may be somewhat changed without departing from the spirit thereof.

- 5 In using the bicycle provided with our improvements, the springs 11 and 24 normally hold the parts so that the sprocket-wheel is compelled to rotate with the crank-shaft, and the bicycle operates the same as those ordi-
 10 narily in use. When a hill is to be ascended the lever 25 is operated by hand, and, without stopping the machine or getting off, the clutch between the pinion 9 and the sprocket-wheel is disengaged and the double pinion 21 thrown
 15 into engagement with the gears 6 and 9. With the parts built to the proportion shown in the drawings, the leverage is thus increased in the proportion of three to one and the labor of climbing the hill very much reduced.
 20 The additional parts necessary to provide a bicycle with our improvements need weigh but two pounds, and the additional weight is thus inconsiderable in view of the advantages to be gained.
 25 Having described our invention, what we claim, and desire to secure by Letters Patent, is—

In a bicycle the combination with the crank shaft, of a sprocket wheel loose upon said shaft and provided on its inner face with a gear 6 and clutch projection 7, a gear 9 adapted to slide upon and turn with the shaft and having clutch projections upon its outer face adapted to engage with the sprocket wheel, a flat ring 13 encircling the clutch members of said gear and sprocket wheel, a lever pivoted above the shaft and having its lower end forked and connected with the ring 13 by links 15, a double pinion arranged to be thrown into and out of engagement with the gears upon the shaft and sprocket wheel, and means for throwing the double pinion into engagement with said gears and simultaneously operating the forked lever and the ring 13 to disengage the clutch, said flat ring forming a dust proof casing or cover for the clutch, substantially as described.

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

HARRY R. COLLINS.
 EDMUND T. COLLINS.

Witnesses:

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