No. 676,629. Patented June 18, 1901.

J. C. MOORE.

CRANK MECHANISM FOR VELOCIPEDES.

(Application filed Aug. 24, 1900.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 2.

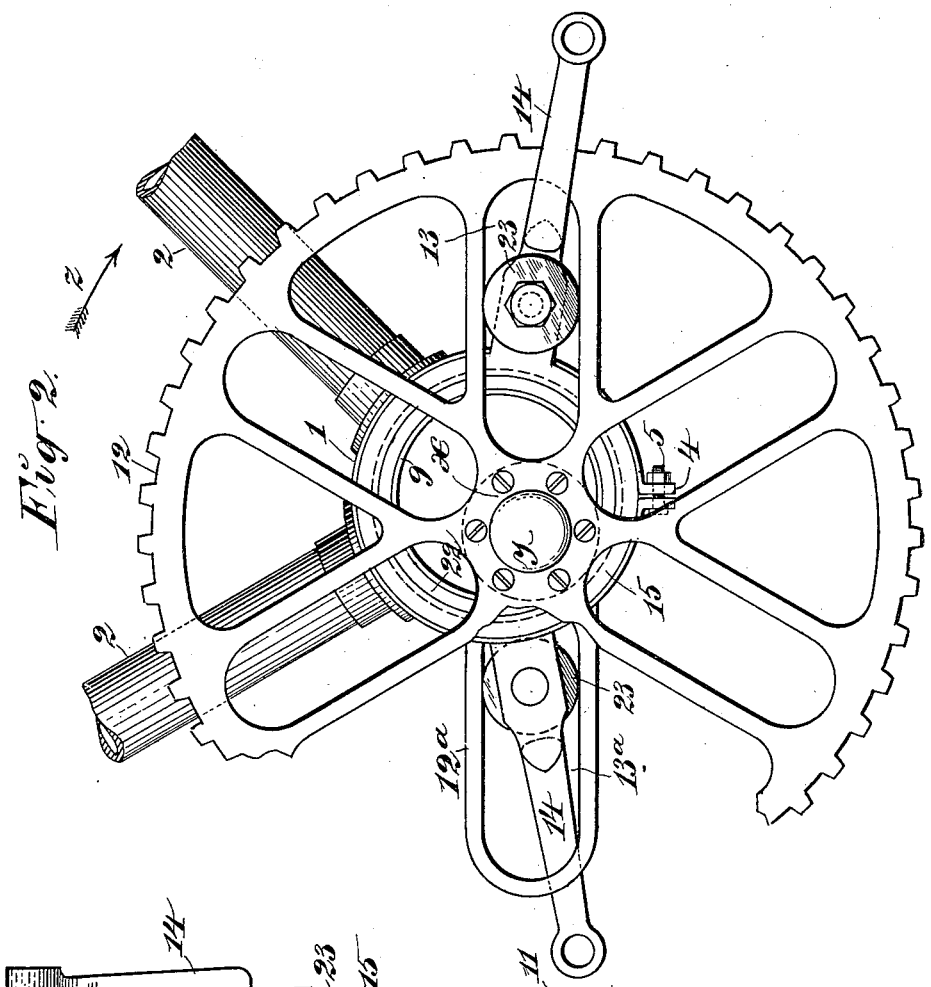
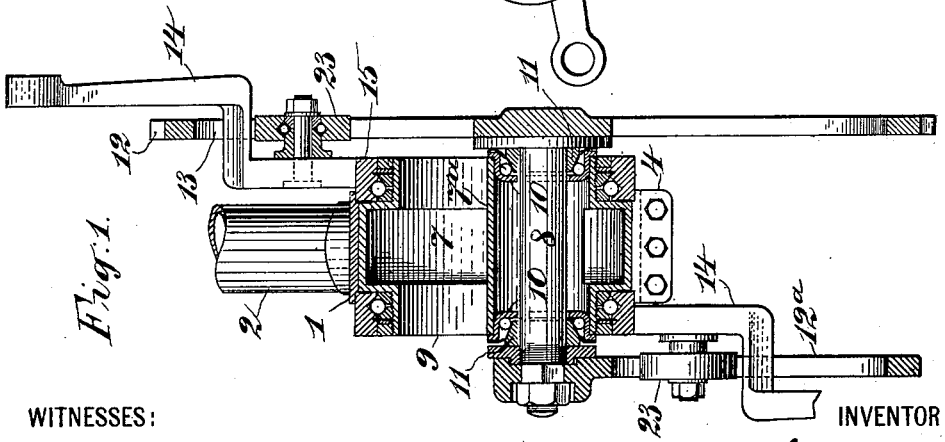


Fig. 1.



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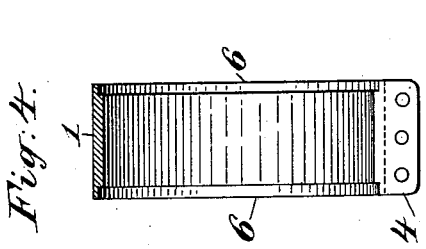

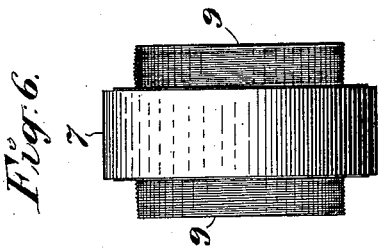

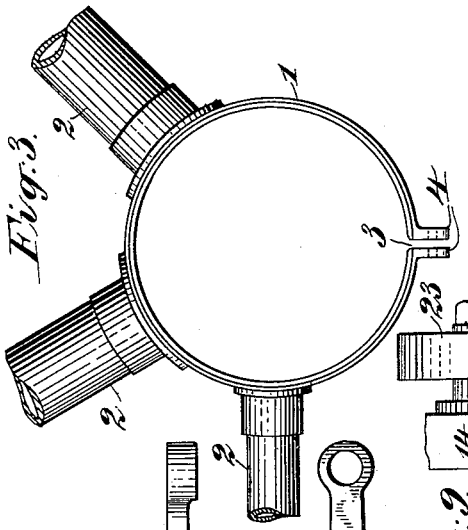

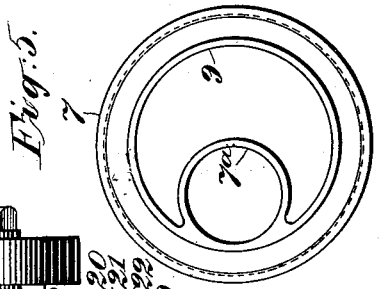

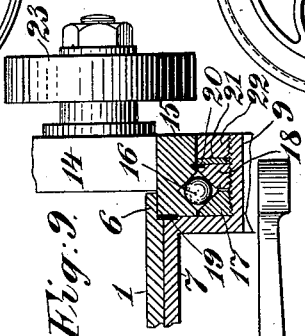

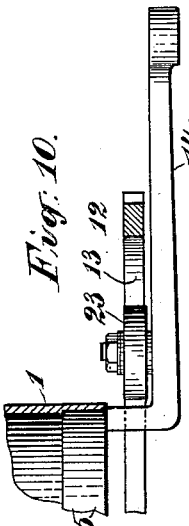

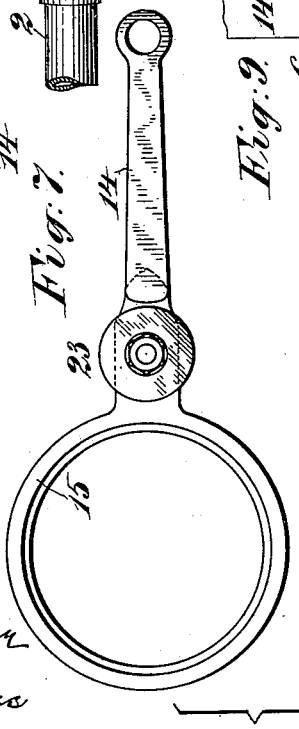

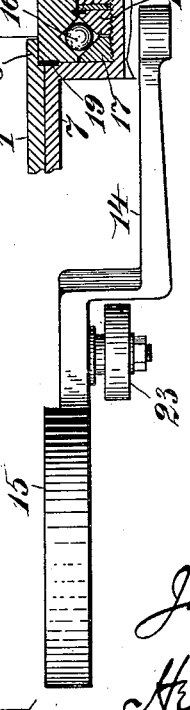

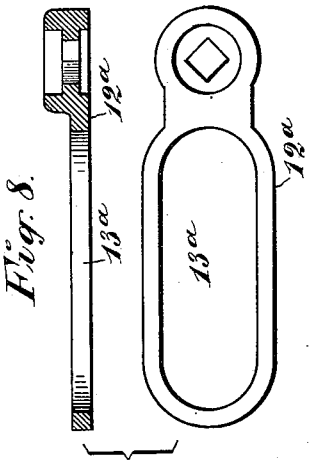

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UNITED STATES PATENT OFFICE.

JEHU C. MOORE, OF BROOKLYN, NEW YORK.

CRANK MECHANISM FOR VELOCIPEDES.

SPECIFICATION forming part of Letters Patent No. 676,629, dated June 18, 1901.

Application filed August 24, 1900. Serial No. 27,890. (No model.)

To all whom it may concern:

Be it known that I, JEHU C. MOORE, a citizen of the United States, residing in the borough of Brooklyn, county of Kings, and city and State of New York, have invented certain new and useful Improvements in Crank Mechanisms for Velocipedes, of which the following is a specification.

This invention relates to crank mechanisms for velocipedes, and particularly for bicycles, in which the shaft carrying the driving sprocket-wheel is mounted eccentrically in the crank-hanger and the cranks are mounted on the crank-hanger eccentrically to the said shaft. The crank carries a driving-roller stud which engages and travels in a radial track-slot in the sprocket-wheel or driving-arm. On the other side where there is no sprocket-wheel the driving-stud on the crank plays in a track-slot in a driving-arm set opposite to the slot in the sprocket-wheel. Such a construction is illustrated, for example, in my United States Patent No. 669,542, of March 12, 1901; and the object thereof is to obtain an increased leverage on the downstroke or the effective portion of the travel of the crank, as will be understood. In my said patent the sprocket-wheel shaft is mounted in heads fitted on the respective ends of the crank-hanger and capable of being drawn tightly into place by through-bolts. The eccentricity of the shaft relatively to the center about which the crank turns is always the same; but the shaft is shiftable bodily about said crank-center, so as to vary the point at which the cranks begin to increase in length and at which they reach the maximum length, so as to adapt the invention to different riders.

The object of the present invention is in part to improve the means for mounting the shaft thus shiftably in the crank-hanger and in part to effect other minor improvements, which will be hereinafter fully described.

In the accompanying drawings, which serve to illustrate the invention, Figure 1 is a transverse section through the crank-hanger in the plane of the sprocket-wheel shaft. Fig. 2 is a side elevation of the parts seen in Fig. 1. Fig. 3 is an end view, and Fig. 4 a sectional view, of the crank-hanger. Fig. 5 is an end view, and Fig. 6 a side view, of the bearing-cylinder for the shaft. Fig. 7 includes a side view and plan of the crank. Fig. 8 includes a longitudinal section and a side view of the slotted arm on the shaft. Fig. 9 is an enlarged sectional view illustrating the ball-bearing and dust-guard of the crank. Fig. 10 is a view of the crank, showing a slightly different arrangement of the roller-stud.

1 is the crank-hanger forming part of the frame, some of the tubular members 2 of the latter being rigidly secured thereto in a known way. The crank-hanger, Figs. 3 and 4, is in the form of a short relatively thin cylinder, with a slit 3 at its lower side to permit of contraction to a moderate extent, the margins of the slit being provided with suitable flanges 4 to receive clamping-screws 5, Fig. 2. The hanger will be, by preference, counterbored or rabbeted at its ends, as best seen at 6 in Fig. 4.

7 is a bearing-cylinder for the sprocket-wheel shaft 8. The cylinder 7 will be or may be hollow and of such diameter as to fit quite snugly into the crank-hanger; but it has at its respective ends reduced and screw-threaded portions 9. Situated eccentrically in the cylinder 7 is the bearing tube or shell 7^a for the shaft 8, and in the respective ends of this tube are secured the cups 10, which form, with the balls and the cones 11, the ball-bearings of the shaft. The cylinder 7 may be slipped into the hanger 1, turned about its axis therein to the extent desired, and then secured where set by means of the clamping screw or screws 5.

On the shaft 7, at one side of the velocipede, is secured the driving sprocket-wheel 12, and on the shaft at the other side is secured a driving-arm 12^a, Fig. 8. The sprocket-wheel and arm have each a radial slot 13 and 13^a, respectively, which are set opposite to each other when the parts are secured to the shaft. For the purposes of this invention the sprocket-wheel 12 may be considered merely as a slotted driving-arm, as it performs precisely the same function as the arm 13. Its functions as a sprocket-wheel are merely incidental and are common to all chain-driven velocipedes.

14, Fig. 7, is the crank provided with a

bearing ring or yoke 15. The preferred form of bearing for the crank will be best understood by inspection of Figs. 1 and 9, the latter being an enlarged sectional view thereof.

Within the yoke 15 is formed a suitable V-shaped ball-track to receive the balls 16. There are two ring-cones 17 and 18, screw-threaded to screw onto the reduced threaded end 9 of the cylinder 7. In assembling the parts the ring-cone 17 is first screwed onto the end 9 and up to the shoulder. A washer 19 to serve as a dust-guard is then placed in a recess in the end of the cylinder 7, as seen in Fig. 9, and the yoke 15 placed to receive the balls 16. The balls are placed and the outer ring-cone 18 screwed up to effect the proper adjustment. Another washer 20 is now placed in grooves cut in the cone 18 and yoke 15 to serve as a dust-guard. A metal washer 21 is slipped on and a ring-nut 22 screwed on as a jam-nut to hold the cone 18 firmly in place. The rabbet 6 in the hanger allows the yoke 15 to extend outward a little beyond the periphery of the cylinder 7. This rabbeting is not, however, essential to the present invention.

The crank 14 (see Figs. 1, 2, and 7) is so bent as to extend out through the slot in the sprocket-wheel, this being necessary in order that the pedal on the crank may be outside of the chain, and the same construction may be employed, though not necessarily, at the other side of the frame, where the arm 12^a is situated.

On the crank is mounted a roller-stud 23, so placed as to engage the slot in the sprocket-wheel or arm, as the case may be. This roller-stud will by preference consist of a roller mounted on ball-bearings on a stud secured in the crank.

It will not be necessary to set forth the general operation of the crank mechanism here further than to say that x, Fig. 2, represents the center about which the crank turns and y the center about which the sprocket-wheel shaft turns, the distance from one center to the other being the measure of eccentricity. Moving in the direction of the arrow z when the crank 14 is above and alined with both of these centers it is of the maximum length. The power is applied through the roller 23 bearing on the track forming the margin of the slot in the driving-arm.

In the principal views the crank is represented as springing from the edge of the yoke 15 and as having the roller-stud mounted on the outer face of that portion of the crank which is at the inner side of the slotted driving-arm or sprocket-wheel. This construction is clearly shown in Figs. 1 and 7; but the construction shown in Fig. 10 may also be employed. In this latter construction the crank springs from the face of the yoke 15 and passes directly outward through the slot in the driving-arm or sprocket-wheel, the roller-stud in this case being mounted on that part of the crank which is situated at the outside of the driving-arm or sprocket-wheel. The advantage of the construction seen in the principal views is that it permits the stud-roller 23 to be set in nearer to the yoke, if desired. This invention is not limited, however, to any particular position of the stud-roller with respect to the center about which the crank turns.

It will be noted that in the construction of this invention the cranks, the driving-shaft, the sprocket-wheel, and the driving-arm are all carried by the bearing-cylinder 7 and that this cylinder is secured adjustably in the hanger.

Having thus described my invention, I claim—

1. In a crank mechanism for velocipedes, the combination with a crank-hanger, of a bearing-cylinder mounted adjustably therein and provided with eccentrically-arranged bearings for the driving-shaft, cranks having each a ring-like yoke mounted to turn on the said bearing-cylinder, a shaft mounted in said bearing-cylinder, slotted driving-arms on said shaft, and roller-studs on the respective cranks and engaging the slots in the respective driving-arms.

2. In a crank mechanism for velocipedes, the combination with an open-ended, cylindrical crank-hanger forming a part of the frame, said hanger being provided with means for contracting it diametrically, of a bearing-cylinder adapted to fit into said hanger, said cylinder having reduced, screw-threaded extremities and eccentrically-arranged ball-bearings for the driving-shaft, the said shaft, the slotted driving-arms thereon, the cranks, having ring-like yokes with bearings on the respective ends of said cylinder, and the roller-studs, carried by the respective cranks and engaging the slots in the respective driving-arms.

3. The combination with a tubular crank-hanger, of a cylinder extending through and rotative in said hanger, said cylinder being reduced and screw-threaded at its projecting ends to receive the cranks, the said cranks mounted rotatively on the ends of said cylinder, the driving-shaft extending through and mounted eccentrically in said cylinder, slotted driving-arms on the shaft, roller-studs on the respective cranks engaging slots in the respective driving-arms, and means for securing said cylinder in position in the hanger.

4. In a crank mechanism, the tubular crank-hanger 1, having rabbets 6 at its ends, the cylinder 7, extending through the hanger and having reduced, screw-threaded, projecting extremities 9, means for securing said cylinder in the hanger, the beveled ring-cones 17 and 18, screwed onto the reduced end of the cylinder, the dust-guard 19, in the rabbeted end of the hanger, the crank 14, having a ring-like yoke 15, fitting into the rabbeted

hanger over said ring-cones and having in it a V-groove to receive the balls, the said balls, the driving-shaft mounted eccentrically in said cylinder, the slotted driving-arms on the shaft, and roller-studs on the cranks engaging the slots in said arms, substantially as set forth.

In witness whereof I have hereunto signed my name, this 21st day of August, 1900, in the presence of two subscribing witnesses.

JEHU C. MOORE.

Witnesses:
HENRY CONNETT,
PETER A. ROSS.