

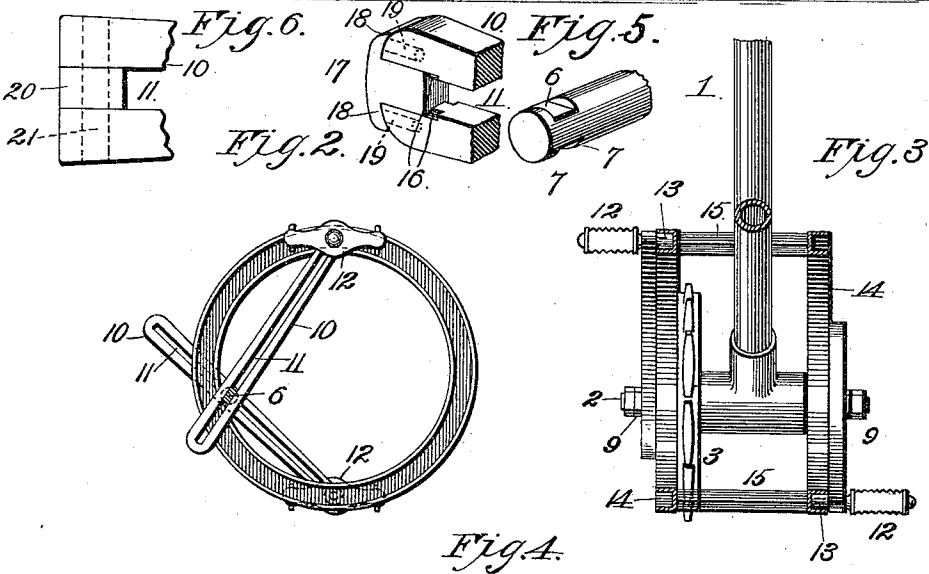
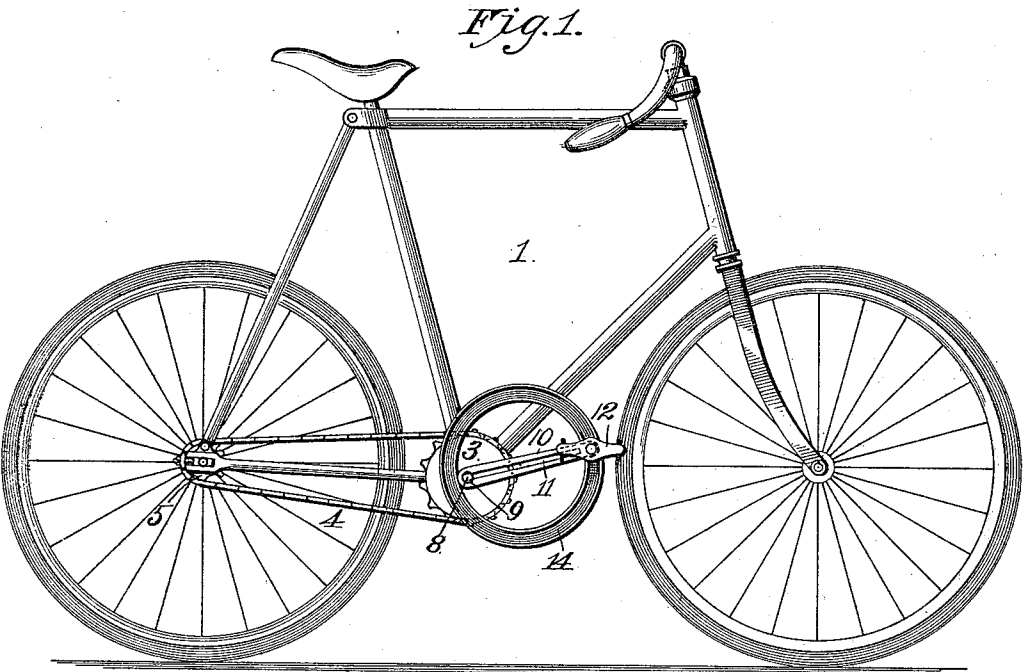
No. 607,532.

Patented July 19, 1898.

C. T. UMSTED.
POWER MECHANISM FOR BICYCLES.

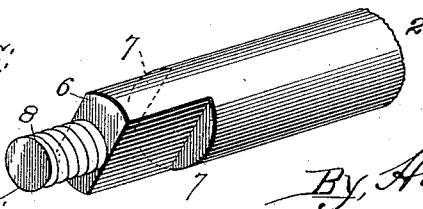
(Application filed Apr. 12, 1897.)

(No Model.)



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UNITED STATES PATENT OFFICE.

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POWER MECHANISM FOR BICYCLES.

SPECIFICATION forming part of Letters Patent No. 607,532, dated July 19, 1898.

Application filed April 12, 1897. Serial No. 631,829. (No model.)

To all whom it may concern:

Be it known that I, CLIFTON T. UMSTED, of Fort Scott, Bourbon county, Kansas, have invented certain new and useful Improvements in Power Mechanisms for Bicycles, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part thereof:

My invention relates to power mechanism particularly for use in connection with bicycles; and it consists, essentially, in the combination, with circular guideways or tracks arranged eccentrically of the crank shaft or axle, of cranks which slide upon the crank shaft or axle, and pedals fixed to said cranks in the customary manner and controlled in their movement by said guideways or frames.

The object of the invention is to produce a mechanism whereby a longer leverage is obtained upon the crank-shaft without increasing the diameter of the orbit of the pedals than can be obtained with the power mechanism of the customary construction.

The majority of bicycles at present in use, as is well known, are provided with six-and-one-half-inch cranks, the pedals of which describe an orbit thirteen inches in diameter, half of which stroke is forward and the other half rearward of the crank-axle, and as a result just six and one-half inches leverage is obtained upon the crank-shaft.

With my invention I may obtain from eleven to twelve inches, more or less, leverage upon the downstroke, and the leverage upon the upstroke, of course, where it is not needed, is correspondingly diminished—that is to say, where I get a leverage of eleven inches on the downstroke there will be only two inches of leverage upon the upstroke, the difference between the diameter of the circle described by the pedals and the eleven inches leverage obtained by the downstroke.

With these objects in view the invention consists in certain novel and peculiar features of construction and combinations of parts, as will be hereinafter described and claimed.

In order that the invention may be fully understood, I will proceed to describe it with reference to the accompanying drawings, in which—

Figure 1 represents in side elevation a bi-

cycle provided with a power mechanism embodying my invention. Fig. 2 represents my improved power mechanism on an enlarged scale, the crank-shaft being shown in section. Fig. 3 represents a vertical section of the same. Fig. 4 represents a detail perspective view of one end of the crank shaft or axle. Fig. 5 represents a perspective view of a slightly-different form of the same and of a portion of one of the pedal-cranks. Fig. 6 is a detail view of the inner end of one of the pedal-cranks.

In the said drawings, 1 designates a bicycle of the usual or any preferred construction, except in the particulars hereinafter mentioned.

2 designates a crank-shaft journaled in the hub in the customary manner.

3 designates the customary drive sprocket-wheel. 4 designates the chain connecting said sprocket-wheel and the smaller sprocket-wheel 5 on the axle of the rear wheel.

6 designates a flattened or rectangular portion at each end of the crank shaft or axle, and 7 shoulders formed inward thereof and also outward thereof, as shown in Fig. 5.

In Fig. 4 the reduced or flattened portion 6 is provided with a threaded extension 8, and said extension is engaged by a retaining-nut 9, which nut 9 performs the function of the outer shoulders 7. (Shown in Fig. 5.)

11 designates the cranks of the shaft or axle. By preference they will be twice as long as the customary cranks—that is to say, about thirteen inches—and they are slotted, as shown at 11, for nearly their entire length, and said slots are engaged snugly yet slidingly by the flattened portions 6 of the crank shaft or axle, as shown clearly in Fig. 2.

The cranks are of a width to fit snugly between the shoulders 7 of Fig. 5 or between the shoulders 7 and nut 9, as shown in the remaining figures. The former style, however, is preferable.

12 designates the pedals, which are mounted in the customary manner upon the outer ends of the cranks, and in this case are provided inward of said cranks with the antifriction-rollers 13, which fit snugly in the grooved and circular guideways 14. Said guideways are arranged eccentrically of the crank shaft or axle in substantially the position shown in

Fig. 1 and are by preference about thirteen inches in diameter. The pedals, of course, are set diametrically opposite each other in the customary manner. The said guideways or frames are preferably tied securely together by means of cross-bars 15 and are connected to the frame of the wheel by means of said cross-bars or in any other suitable or preferred manner.

Owing to the fact that it would be objectionable in most cases to use the style of crank-shaft shown clearly in Figs. 3 and 4, because the nuts 9 might possibly interfere with the free movement of the rider's limbs and catch or injure his apparel, I prefer to employ the style of axle and cranks shown in Figs. 4 and 5. In these figures the shaft is formed with a flattened portion with integral shoulders at each side, and the cranks, in order that they may be placed operatively thereon, are slotted clear through their inner ends and at such ends are beveled, as shown at 16. To close said opening, I employ a block 17, which dovetails into the beveled surfaces 16 of the cranks in order to prevent any lateral displacement of the block and is provided with shoulders 18, which bear against the ends of the cranks and through which extend screw bolts or pins 19 to prevent any longitudinal movement or displacement of said blocks. Again, the open end of the cranks may be closed by a block 20, secured in position by a pin 21, as shown in Fig. 6.

By the displacement or arrangement of the guideways shown and described it is obvious the rider not only obtains an immense leverage in the downstroke, and therefore an increase of speed, but he also gets a longer power stroke than is obtained with the customary gearing.

The power stroke begins immediately after the rising pedal passes forward of the vertical plane of the crank shaft or axle and before it reaches the vertical plane of its center of rotation—viz., the center of the guideways—and such power stroke continues until it reaches a point vertically below the axis of the said guideways, as will be readily understood. As the crank-shaft rotates in the customary direction it will be noted that the pedals describe a circle eccentric thereof, and when in their most advanced positions in their downward movement are farthest from the crank shaft or axle, and consequently at the greatest leverage point in the power stroke. As the pedals pass such point successively they begin to approach the crank shaft or

axle until they are directly rearward of it. At such point the least leverage is obtained. It is not needed, however, as the pedal is moving upward while the companion pedal, diametrically opposite, is moving downward upon its powerstroke. As the operations described take place the slotted cranks of course slide back and forth upon the flattened portions of the crank shaft or axle, as illustrated clearly in Fig. 2, and this without at any time increasing the diameter of the orbit described by a six-and-one-half-inch crank. It is evident, therefore, that an increase of speed proportionate to the increase of leverage and length of the power stroke may be obtained with a machine provided with my improved power mechanism over a machine of the ordinary type provided with the customary driving-gear—viz., pedals which rotate concentrically around the crank shaft or axle.

It is obvious, of course, that various changes may be made to accomplish this purpose without departing from the spirit and scope of the invention. For instance, the pedal may be made to slide instead of the crank and still rotate eccentrically around the axis of the crank-shaft in a guide-frame, as described.

From the above description it is apparent that I have produced a power mechanism for bicycles which embodies the features of advantage enumerated in the statement of invention and which is simple, strong, durable, and inexpensive of manufacture.

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

In a power mechanism for bicycles, the combination of a crank-shaft provided with flattened portions at its ends, cranks provided with longitudinal slots 11 fitting upon said flattened portions of the shaft; said slots extending clear through the inner ends of the cranks, blocks 17 dovetailed in and closing the inner ends of said slots and provided with shoulders 18 bearing against the corresponding ends of the cranks, circular grooved guideways arranged eccentrically around the shaft, and pedals mounted rotatably on the cranks and provided with rollers traveling in said guideways, substantially as shown and described.

In testimony whereof I affix my signature in the presence of two witnesses.

CLIFTON T. UMSTED.

Witnesses:

M. R. REMLEY,
G. Y. THORPE.