

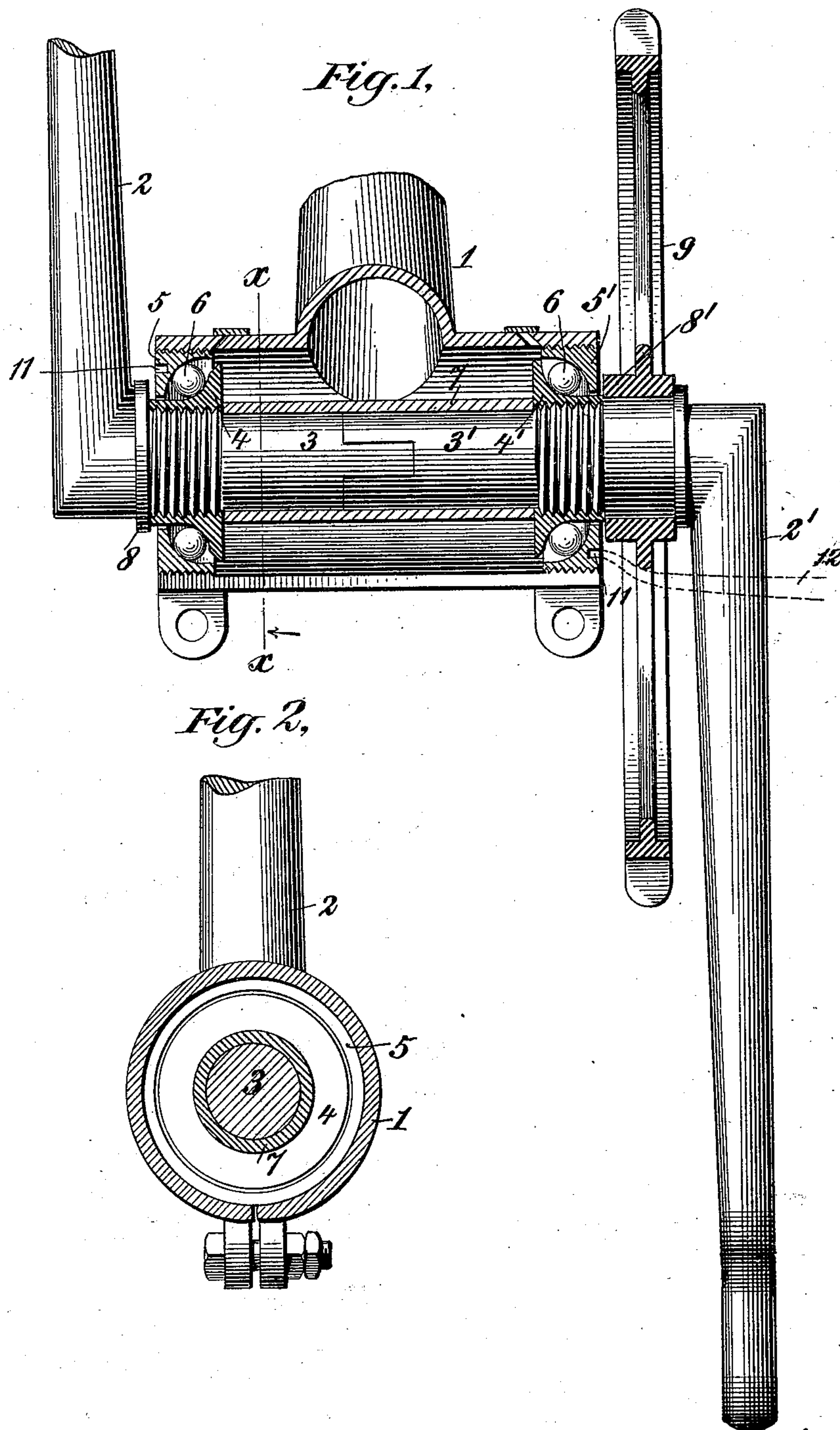
(No Model.)

2 Sheets—Sheet 1.

W. E. GARD.
CRANK.

No. 546,520.

Patented Sept. 17, 1895.



Witnesses:

D. H. Raymond
H. A. Case

Inventor:
William E. Gard
By E. M. Marble & Sons.
His Attorneys

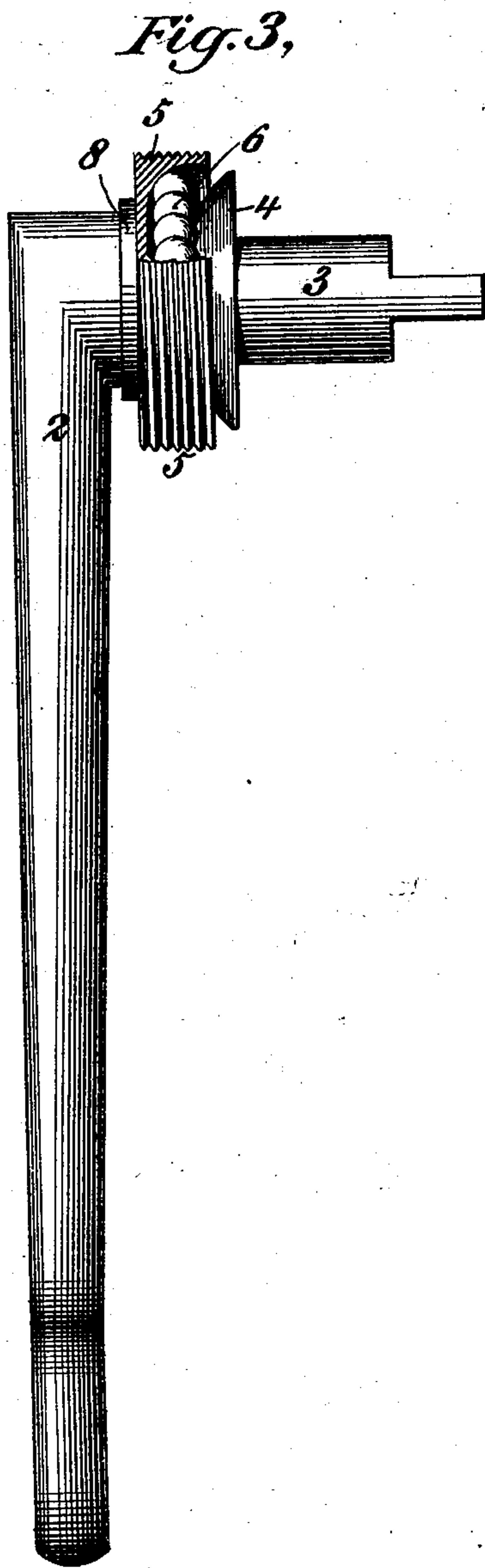
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2 Sheets—Sheet 2.

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CRANK.

No. 546,520.

Patented Sept. 17, 1895.



Witnesses:-

O. H. Hayward
H. A. Lane

Inventor:-

William E. Gard

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His Attorneys

UNITED STATES PATENT OFFICE.

WILLIAM E. GARD, OF BROOKLYN, NEW YORK.

CRANK.

SPECIFICATION forming part of Letters Patent No. 546,520, dated September 17, 1895.

Application filed July 13, 1895. Serial No. 555,829. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM E. GARD, a citizen of the United States, residing at Brooklyn, in the county of Kings and State of New York, have invented certain new and useful improvements in Cranks; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to cranks, and particularly to two-part cranks for bicycles and other vehicles, and is an improvement upon the crank disclosed in a patent granted to me on July 16, 1895, No. 542,885.

My invention consists in the novel means employed for retaining the bearing-cones of the ball-bearings in which the crank-shaft runs in proper relation when the parts of the crank are drawn out of the crank-bracket, so that the balls are held between said cones, and in the novel means employed for drawing apart the sections of the crank-shaft.

The objects of my invention are, first, to provide means for retaining in proper relation the bearing-cones of a two-part crank-shaft, so that when either section of the crank-shaft is removed from the crank-bracket the balls will be retained between the bearing-cones; second, to provide means for drawing the sections of the crank-shaft apart, and, third, to make the crank strong, durable, simple, easily put together and taken apart, and inexpensive.

In the drawings, Figure 1 is a longitudinal section of the crank-bracket and of the bearing-cones and the sleeve which incloses the ends of the crank-shaft sections. Fig. 2 is a transverse section of the crank-bracket and shaft, taken on the lines xx of Fig. 1; and Fig. 3 is an elevation of one of the crank-sections, with the bearing-cones thereon, removed from the crank-bracket, showing how the bearing-balls are held between the cones when the crank-sections are removed from the crank-bracket.

In the drawings, 1 is the crank-bracket, which is of ordinary construction.

2 and 2' are the crank-arms, which are secured to the crank-shaft sections 3 and 3', which together form the crank-shaft. The ends of these sections 3 and 3' are provided

with suitable interlocking tongues, forming, substantially, a mortise-and-tenon joint, so that the shaft-sections are caused to revolve together.

Bearing-cones 4 and 4' are secured to the shaft-sections 3 and 3'. These cones face outwardly. Other bearing-cones 5 and 5' screw into the ends of the crank-bracket 1 and face inwardly. Between the cones 4 and 5 and 4' and 5' are placed the bearing-balls 6. A sleeve 7 surrounds and fits closely to the crank-shaft sections 3 and 3', stiffening the joint between said shaft-sections and preventing any possible wobbling at the joint. For this purpose the sleeve need extend but little beyond the joint in the shaft; but I prefer to have the sleeve extend the whole distance from cone 4 to cone 4', so that it serves to prevent any unscrewing of the cones. The sleeve 7 may be shorter, however, and lock-nuts may be used to hold the cones in place.

So far as thus described my crank is the same as the crank shown and described in my above-mentioned patent. My invention differs from the crank of my former patent, however, in that there are on the crank-shaft section collars or shoulders 8 and 8', outside of but in close proximity to, so as to be adapted to engage with the outside bearing-cones 5 and 5', respectively. As shown in the drawings, the boss of the sprocket-wheel 9 constitutes the shoulder 8'. With this construction, when either outside cone 5 or 5' is unscrewed it comes in contact with the shoulder 8 or 8' upon the crank-shaft, and so draws its crank-shaft section out of the crank-bracket and away from the other section of the crank-shaft, thus making it very easy to remove either section of the crank-shaft; also, as the cones 5 and 5' can be unscrewed only a very little before they come in contact with their corresponding shoulders 8 or 8' on the crank-shaft the cones cannot be moved so far from the corresponding inner cones as to leave space sufficient to permit the escape of the bearing-balls 6. Therefore when either crank-section is removed from the crank-bracket in this manner the bearing-balls remain within the crank-bearing and cannot be lost. This facilitates the cleaning of the crank-bearings, as the sections of the crank-shaft may be removed one after the other and plunged into kerosene.

oil or other fluid, which will dissolve the gummed oil and other substances with which the bearing is clogged, and this may be done without the necessity of separating the bearing-cones and without removing the balls from the bearing. If, however, it is desired to remove the balls from the bearing, or to remove the bearing-cones from the crank-shaft, this may be done by unscrewing the inside cones 4 and 4', which is now possible, since the sleeve 7 will either remain in the crank-bracket when the shaft-sections are drawn apart or may be readily removed from the end of the crank-shaft section.

To facilitate the screwing up and unscrewing of the crank-cones 5 and 5', there are provided in the ends of these cones depressions 11, into which may be placed the end of a pin or key 12, (shown in dotted lines in Fig. 1,) long enough to engage with the crank-arm 2 or a spoke of the sprocket-wheel 9, so that when the crank is revolved the bearing-cone must revolve with it. By this means a wrench for adjusting the bearing-cones may be entirely dispensed with.

The method of assembling the parts of my crank and of separating or putting together the two sections of the crank is as follows: The collar 8 and sprocket-wheel 9, the central boss of which forms the second collar 8', are secured to the crank-shaft sections 2 and 2' in any suitable manner. The outside cones 5 and 5' are then placed upon the crank-shaft sections and pushed home, after which the inside cones 4 and 4' are screwed onto the shaft-sections, the bearing-balls 10 being placed between the bearing-cones before the inside cones 4 and 4' are screwed home. The cones 4 and 4' should be so placed upon the crank-shaft sections that when these sections are together the sleeve 7 will just be in contact with the cones 4 and 4', adjustment of the bearings being effected not by the cones 4 and 4' but by the cones 5 and 5'. After the parts of the bearing have been assembled in this manner the sleeve 7 is placed over one of the shaft-sections and the two shaft-sections are placed within the crank-bracket, their ends interlocking. A pin 12 is then placed within the recess 11 in the cone 5, and the crank-arm 2 is turned until it engages with this pin, after which it will cause the cone 5 to rotate and will screw the same into the crank-bracket 1. The cone 5 is screwed home until the bearing is sufficiently tight. In a similar manner the cone 5' is screwed home, and as these cones 5 and 5' are screwed into the ends of the

crank-bracket the crank-shaft sections are drawn together.

To separate the crank-sections the pin 12 is placed within a recess in one of the cones 5 or 5' and the crank-shaft revolved in such a direction as to cause this cone to be unscrewed. It will be noted that either crank-section may be removed from the crank-bracket without disturbing the other section.

As explained in my former patent, when pressure is applied to the pedals the pressure upon the oblique surface of bearings thereby produced forces the sections of the crank-shaft together and prevents any possible looseness thereof.

Having thus completely described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a crank, the combination, with two crank arms and two crank shaft sections secured each to one of said crank arms and having ends adapted to interlock, of independent bearing cones mounted upon said crank sections and facing toward the crank arms, other bearing cones suitably supported and adapted to engage with said first named cones and facing toward the center of the crank shaft, bearing balls inclosed between said cones, and collars or shoulders upon said shaft sections, outside of but in close proximity to and adapted to engage with said last named cones, whereby the bearing balls are at all times retained between the bearing cones, substantially as described.

2. In a crank, the combination, with two crank arms and two crank shaft sections secured each to one of said crank arms and having ends adapted to interlock, of independent bearing cones mounted upon said crank sections and facing toward the crank arms, other bearing cones screwing into the crank bracket and adapted to engage with said first named cones, and facing toward the center of the crank shaft, and collars or shoulders upon said shaft sections, outside of but in close proximity to and adapted to engage with said last named bearing cones, whereby, when said cones are screwed into or out of the crank bracket the shaft sections are drawn together or pulled apart, substantially as described.

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

WILLIAM E. GARD.

Witnesses:

HARRY M. MARBLE,
H. A. CASE.