

No. 647,499.

Patented Apr. 17, 1900.

R. M. KEATING.

DIVIDED CRANK SHAFT FOR BICYCLES, &c.

(Application filed Sept. 9, 1896.)

(No Model.)

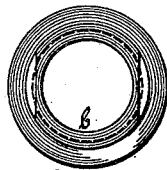


Fig. 1.

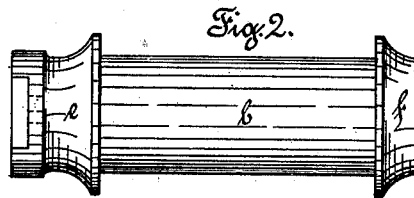


Fig. 2.

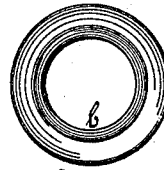


Fig. 3.

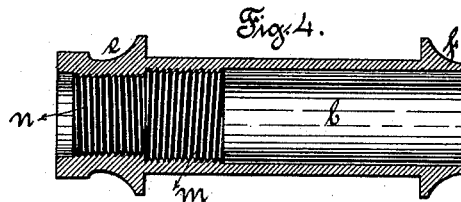


Fig. 4.

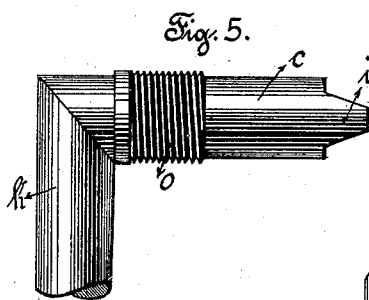


Fig. 5.

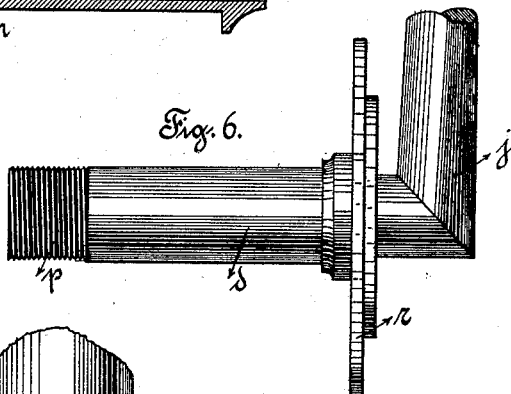


Fig. 6.

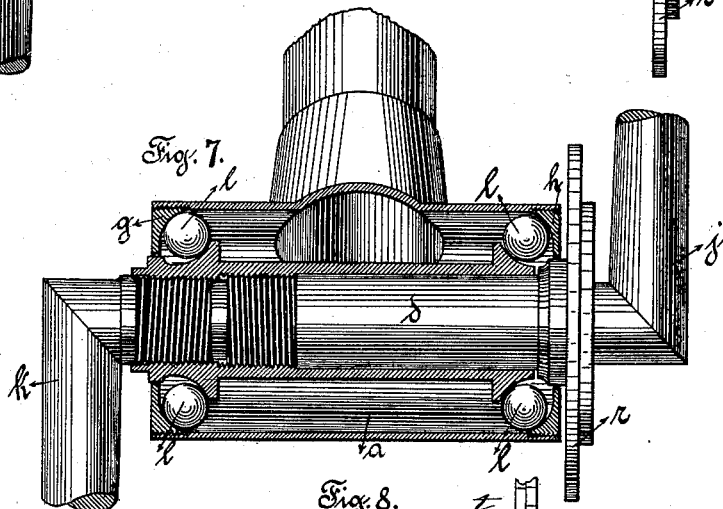


Fig. 7.

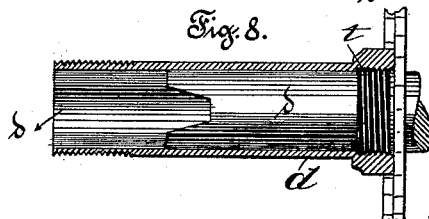


Fig. 8.

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DIVIDED CRANK-SHAFT FOR BICYCLES, &c.

SPECIFICATION forming part of Letters Patent No. 647,499, dated April 17, 1900.

Application filed September 9, 1896. Serial No. 605,314. (No model.)

To all whom it may concern:

Be it known that I, ROBERT M. KEATING, a citizen of the United States of America, residing in Springfield, in the county of Hampden and State of Massachusetts, have invented new and useful Improvements in Divided Crank-Shafts for Bicycles and other Like Vehicles, of which the following is a specification, reference being had to the accompanying drawings and letters of reference marked thereon.

In the drawings like letters of reference indicate like parts.

Figures 1, 2, and 3 are end and side views, respectively, of the cone-provided shell or sleeve. Fig. 4 is a transverse sectional view of said sleeve or shell. Fig. 5 is a side view of one shaft-section. Fig. 6 is a side view of the other shaft-section. Fig. 7 is a sectional view of the hanger or bracket with the several parts in position, the shaft-section being shown in full lines; and Fig. 8 is a sectional view of the shaft-section having a recess in its end for the reception of the end portion of the other shaft.

In detail, *a* indicates the bracket; *b*, the cone-provided shell or sleeve; *c*, male shaft-section; *d*, female shaft-section; *e* and *f*, cones upon the sleeve *b*; *g* and *h*, cone-rings mounted in the ends of the bracket; *i*, wedge-shaped part upon the end of the shaft-section *c*; *j* and *k*, crank-arms, and *l* balls.

The construction and operation of my device are as follows: The bracket *a* is provided at each end with cone-rings *g* and *h*. The sleeve or shell *b* is provided with the cone-bearings *e* and *f* and is interiorly threaded, as shown in Fig. 4, with right and left hand threads *m* and *n*, and the portion of the sleeve *b* at the left, as shown in Figs. 2 and 4, is projected a sufficient distance to pass through the cone-ring *g*, so that it may be engaged by a wrench. The shaft-section *c* is exteriorly threaded, as shown at *o* in Fig. 5, to engage the thread *n* in the sleeve, and the end portion is provided with an interlocking part *i*.

The shaft-section *d* (comprising, as shown in Fig. 8, an outer part *d* and inner part *d'*) is recessed in its end portion to receive the end portion of the shaft-section *c*, and the end portion of the shaft-section *d* is exteriorly

threaded, as shown at *p*, to engage the thread *m* upon the interior of the sleeve *b*.

A circular plate *r* is mounted upon the shaft-section *d*, to which plate the sprocket-wheel is secured.

The most convenient manner of constructing the female shaft-section *d* is to construct it in two parts, as shown in Fig. 8, the central part being of the same diameter as the male shaft-section *c* and being formed at its end to interlock with it and being provided with a thread *t* and a tubular part having an opening to just receive the shaft-sections and maintain them in perfect alinement and provided at its end portion with an interior thread to engage the thread *t*. When completed, the two parts may be permanently secured together, and in the subsequent attaching or detaching of the shaft-sections it is entirely unnecessary to separate these two parts or to disturb the permanent connection between them. If preferred, however, these two parts may be made integral.

It will be seen that the particular shape of the interlocking parts of the shaft-sections to prevent rotation of one without the other is immaterial and that these shapes may be altered as desired.

To separate and detach the shaft-sections, a wrench is placed upon the flattened or squared portion of the projecting end of the sleeve *b* and the sleeve is turned in a direction to unscrew the shaft-sections, or, if preferred, the sleeve is held from rotation by the wrench and the shaft-sections may be rotated, in either event causing the shaft-sections to be separated longitudinally until each is released from its threaded connection in the sleeve, when the sections may both be drawn outwardly and entirely detached, leaving, however, the sleeve or cone-bearing shell *b* in position in the bracket, and in order to detach the shell or sleeve *b* from the bracket either one of the cone-rings *g* or *h* is removed from the bracket, thus allowing the removal of the sleeve or shell and the balls. To reassemble, of course the reverse method of procedure is followed.

It will readily be seen that in order to relieve the parts from undue lateral strain it is advisable that the shaft-section *d* should fit ac-

curately in the opening provided for it in the sleeve or shell *b* and that the entering portion of the shaft-section *c* should fit accurately within the opening provided for it in the shaft-section *d*.

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

1. The combination of a bracket having
10 cone-rings mounted therein, a shell *b* provided with cones at the end portions thereof to form runways for balls between the cones on the shell and the cone-rings in the bracket, said shell *b* being interiorly threaded adjacent to
15 one end thereof in opposite directions, the opening in the shell being of less diameter at the end where threaded than the remainder, a shaft-section *c* having an exterior thread to fit the thread at the end of the opening in the
20 shell *b*, and a shaft-section *d* having an exterior thread at its end to fit the interior thread adjacent to the end thread in the shell, the

body of the shaft-section *d* being constructed to fit the unthreaded opening in the shell, the two shaft-sections being shaped to interlock 25 at their ends and the body of the section *c* back of the interlocking part being arranged to enter an opening to receive it in the opposite shaft-section, substantially as shown.

2. The combination, of a bracket, cone-rings 30 mounted therein, cones suitably mounted and arranged to register with the bracket-cones, balls therebetween, two shaft-sections arranged to interlock and prevent rotation of one without the other; means to unite said 35 sections, one shaft-section being formed of two parts, an inner part *d'* and an exterior part *d* fixed upon the inner part and projecting from the end to receive the body of the opposite section, substantially as shown.

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