

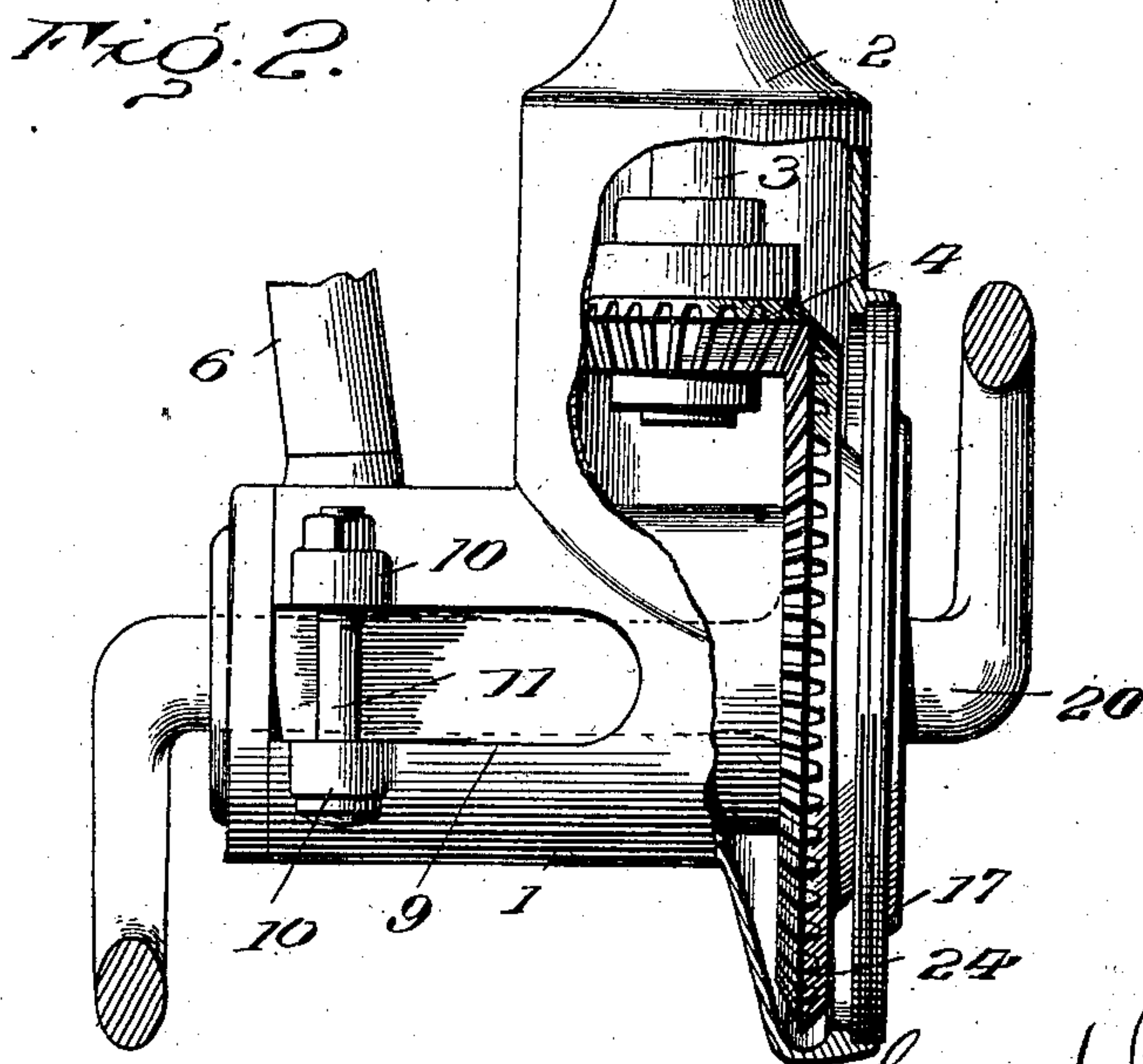
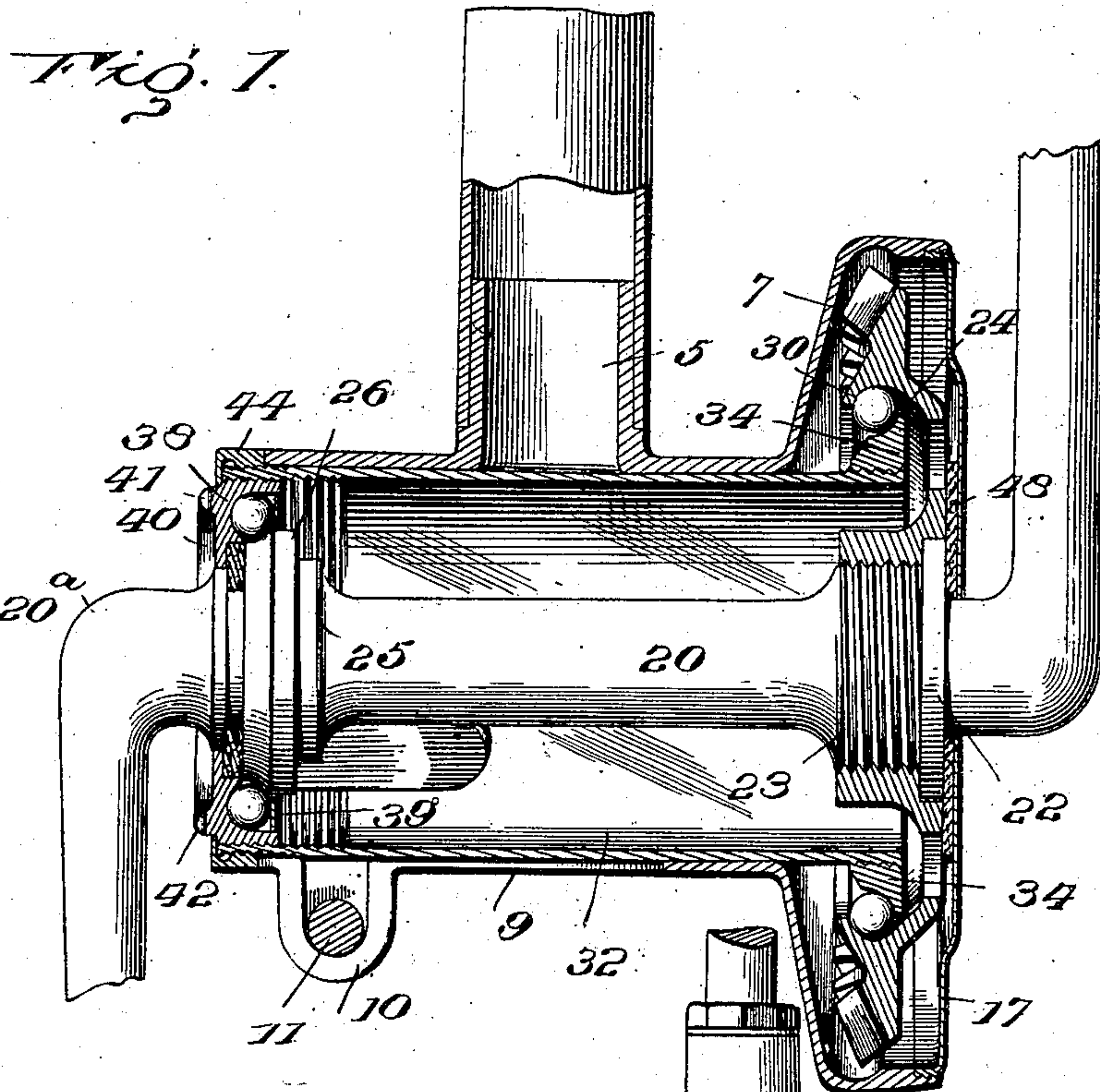
No. 725,547.

PATENTED APR. 14, 1903.

C. J. DORFF.  
BEARING FOR BICYCLES.  
APPLICATION FILED JAN. 16, 1903.

NO MODEL.

2 SHEETS—SHEET 1.



Witnesses

*For Invention*  
*J. Stewart Rice*

*By*

*Conrad J. Dorff*  
*Thos. E. Robertson*

Inventor

Attorney

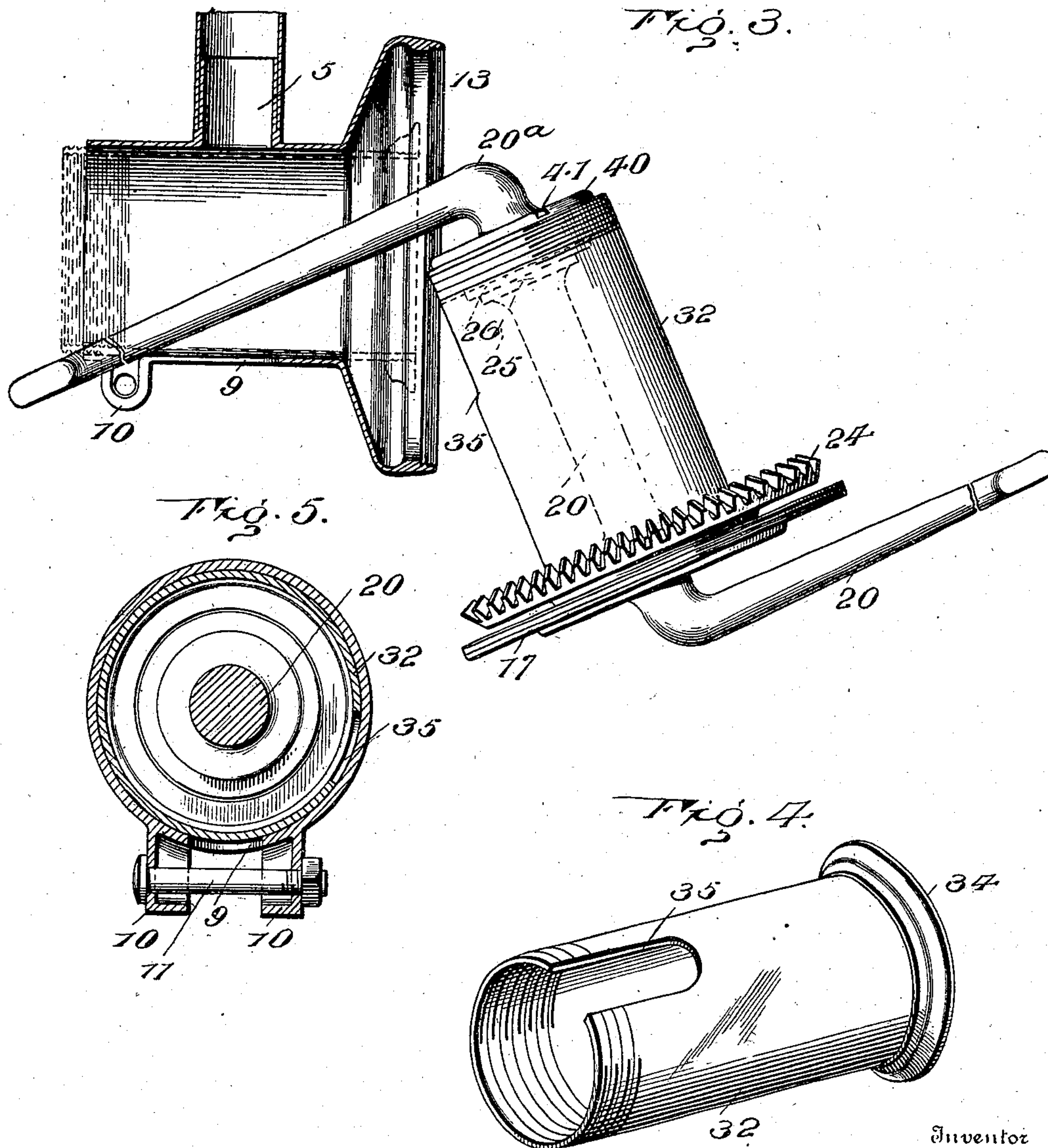
No. 725,547.

PATENTED APR. 14, 1903

C. J. DORFF.  
BEARING FOR BICYCLES.  
APPLICATION FILED JAN. 16, 1903.

NO MODEL.

2 SHEETS—SHEET 2.



Witnesses

*for Inve.*  
*J. Stewart Rice.*

By

*Conrad J. Dorff*  
*Thos. E. Robertson*

Inventor

Attorney



# UNITED STATES PATENT OFFICE.

CONRAD J. DORFF, OF CHICAGO, ILLINOIS, ASSIGNOR OF FORTY-NINE ONE-HUNDREDTHS TO PETER J. SCHARBACH, OF SAN FRANCISCO, CALIFORNIA.

## BEARING FOR BICYCLES.

SPECIFICATION forming part of Letters Patent No. 725,547, dated April 14, 1903.

Application filed January 16, 1903. Serial No. 139,360. (No model.)

*To all whom it may concern:*

Be it known that I, CONRAD J. DORFF, a citizen of the United States of America, and a resident of Chicago, Illinois, have invented certain new and useful Improvements in Bearings for Bicycles, of which the following is a specification.

This invention relates to improvements in bicycles, and more particularly to the bearing formed in the crank-hanger, and has for its object a simpler, and consequently a better, bearing than those now in use. In its preferable embodiment it is applied to a chainless wheel and is so arranged that the whole bearing, including a one-piece crank-shaft, may be withdrawn from the crank-hanger casing.

With this general statement it may be said that the invention consists in the improvement as hereinafter more particularly described and then definitely pointed out by the claims at the end hereof.

In the accompanying drawings, which clearly show my improvement, Figure 1 is a vertical section, taken lengthwise of the crank-shaft, of a crank-hanger with my improved bearing therein. Fig. 2 is a bottom plan view of the same with parts broken away. Fig. 3 is a sectional view similar to that shown in Fig. 1, but with the crank-hanger and its bevel-gear partly withdrawn. Fig. 4 is a perspective view of a barrel and its connected cone. Fig. 5 is a vertical cross-section from the crank-hanger at the point where its lugs are tightened.

Referring now to the details of the drawings by numerals, 1 designates the crank-hanger or bracket, which is formed in the usual or any preferred way with a housing 2 for the rotatable side shaft 3 and its bevel-gear 4, all as clearly shown in Fig. 2. The crank-hanger is also provided with the usual tubular portions 5 and 6, by which the hanger is brazed or otherwise secured to the tubular framing. One end of the crank-hanger or bracket 1 is formed with an enlarged housing 7 for containing the large bevel-gear, and the under side of the opposite end of the hanger is formed with a slot 9, on opposite sides of the open end of which project, pref-

erably integral, lugs 10, through which is adapted to pass any form of securing-bolt 11, by which the lugs may be drawn together and the parts within the hanger thus firmly secured by pinching the same within the walls of the hanger. The only other characteristic about the hanger proper is that the open housing 7 is screw-threaded internally, as indicated at 13. This open end is preferably closed by a gear-cover 17, which is arranged to screw tightly within the opening 15 and has a central aperture through which the crank-shaft projects and rotates.

The crank-shaft 20 is made in one integral piece, and while I have of course claimed nothing new in a one-piece crank-shaft *per se* I believe it is new in combination with the other features hereinafter claimed. The crank-shaft is provided at one end with an integral collar 22 and a screw-threaded portion 23, and a bevel-gear 24 screws on said portion 23 and abuts against said collar 22, which thus prevents any further movement toward the crank on that side of the shaft. Near the opposite end of the crank-shaft is formed the integral collar 25, similar to the collar 22, and a cone 26, of ordinary or any approved form, is secured on the shaft against the collar 25. The collar 25 is of course sufficiently small in diameter to permit the bevel-gear 24 to be slipped over it, so that said gear may be put on or off, as occasion may require.

The bevel-gear, which has been described as being secured to the one-piece crank-shaft 20, is peculiarly formed, in that it has a ball-race 30 facing in the opposite direction to which the teeth of the gear point for a purpose to be hereinafter described.

Fitting closely within the crank-hanger proper, 9, is a barrel 32, on one end of which is secured, by screwing or otherwise, a cone 34, and the opposite end of this barrel is screw-threaded both externally and internally, as clearly shown in the perspective view in Fig. 4. This barrel is also provided with a slot 35, for a purpose to be hereinafter described. Coacting with the interior thread of said barrel 32 is a cone 38, which may, if desired, be arranged with a ball-retainer 39 of the usual or any form, and the exterior of this



cone is formed with an annular ring 40, which is formed with two indentations 41 and 42, by which the cone may be turned with a suitable tool. Fitting on the exterior thread of the barrel 32 is a locking-ring 44, which will act as hereinafter described.

My crank-hanger may be put together in several ways, which may be briefly described as follows: Assuming that the bevel-gear 24 and the cone 26 had been already properly screwed onto the crank-shaft 20, the barrel 32 is placed over the crank opposite the bevel-gear, and as said barrel is slotted at 35 it permits the crank to pass into said slot, which allows the corner 20<sup>a</sup> of the crank-shaft and the enlarged cone 26 to pass into and through the barrel. The bevel-gear 24 is then held in a horizontal position, and the barrel is then dropped so as to rest therein, said barrel being now over the crank-shaft 20 and concentric thereto. A suitable number of balls is now dropped through the race formed by the cone 34 and the ball-race 30. When sufficient balls are placed therein, the cone 38 is placed over the crank around the point 20<sup>a</sup> and is screwed into the barrel 32. This cone of course has its balls contained therein, and as it is secured into position its balls bear onto the cone 26, and thus cause the barrel 32 to be lifted until the balls at the opposite end of the barrel are held between the cone 34 and the ball-race 30. After the cone 38 has been screwed in its position, just described, the bearing may be turned into any position desired without fear of the balls dropping out. The bearing as a whole may be now inserted through the crank-hanger by first inserting the crank opposite the bevel-gear 24, and as said crank is permitted to pass through the slot 9 it is easy to insert the barrel 32, with its connected parts, in position. After the barrel is in position the locking-ring 44 is screwed onto the barrel, and this holds the barrel in its proper position in the casing. In order to prevent the barrel turning within the casing, however, it is best to clench or bind the same by means of the bolt 11 and its nut.

Instead of securing the parts in position, as just described, the barrel 32 may be first placed in position with its slot 35 coinciding with the slot 9 and then the other parts placed therein, as just described.

After the parts have been placed in position in either of the ways just described the gear-cover 17 is screwed into its threaded opening 15, a disk or packing 48 having been first placed against the bevel-gear 24.

Of course it will be obvious from the foregoing description that the parts may be taken out either as an entirety by simply loosening the bolt 10 and taking off the locking-ring 44, in which case the balls will not be dropped

out, as the parts will come out, as shown in dotted lines in Fig. 3, or the parts may be removed, as shown in full lines in the same figure; but in this case care will have to be taken to catch the balls as they drop out of the race between the cone of the barrel and the race within the bevel-gear 24.

I am fully aware that one-piece crank-shafts have been used in quite a number of instances and that it has heretofore been proposed to use a barrel or cylinder within a crank-hanger, which barrel is held in place by a locking-ring, and with which barrel contacts a bevel-gear having a ball-race arranged substantially like that shown in my drawings, and I therefore do not claim either of these devices separately. I regard, however, the device shown in my drawings as essentially different from anything heretofore proposed, as the special construction herein described permits me to use a one-piece crank-shaft with the structure just described as being old.

What I claim as new is—

1. In a crank-hanger bearing, an outer casing having a housing for a gear-wheel, a barrel snugly fitting said casing, said outer casing and barrel each having a slot running longitudinally thereof, a one-piece crank-shaft within said barrel having a gear-wheel thereon, said gear-wheel and said barrel having a ball-race formed between them, a cone screwing into the opposite end of said barrel and thereby holding the gear-wheel and crank-shaft to said barrel; and a locking-ring screwed on the free end of the barrel for adjusting the barrel in its proper lateral position; substantially as described.

2. In a crank-hanger bearing, an outer casing having a housing for a gear-wheel, a barrel snugly fitting said outer casing and having a cone secured to one end, a one-piece crank-shaft within said barrel, a gear-wheel secured to said shaft and having a ball-race between it and the cone on said barrel, a cone screwing into the free end of the barrel and thereby tightening the bearing and holding the balls in position, a ring screwed onto the outer end of said barrel and adjusting the barrel and its connected gear-wheel in the proper lateral position; and lugs projecting from said casing having a bolt passing there-through; said barrel and said casing being slotted to permit the crank passing through the same and the slot in the casing being between its lugs, substantially as described.

Signed by me at Chicago, Illinois, this 20th day of December, 1902.

CONRAD J. DORFF.

Witnesses:

ROBERT BURNS,  
JOHN ENDERS, Jr.