

No. 780,850.

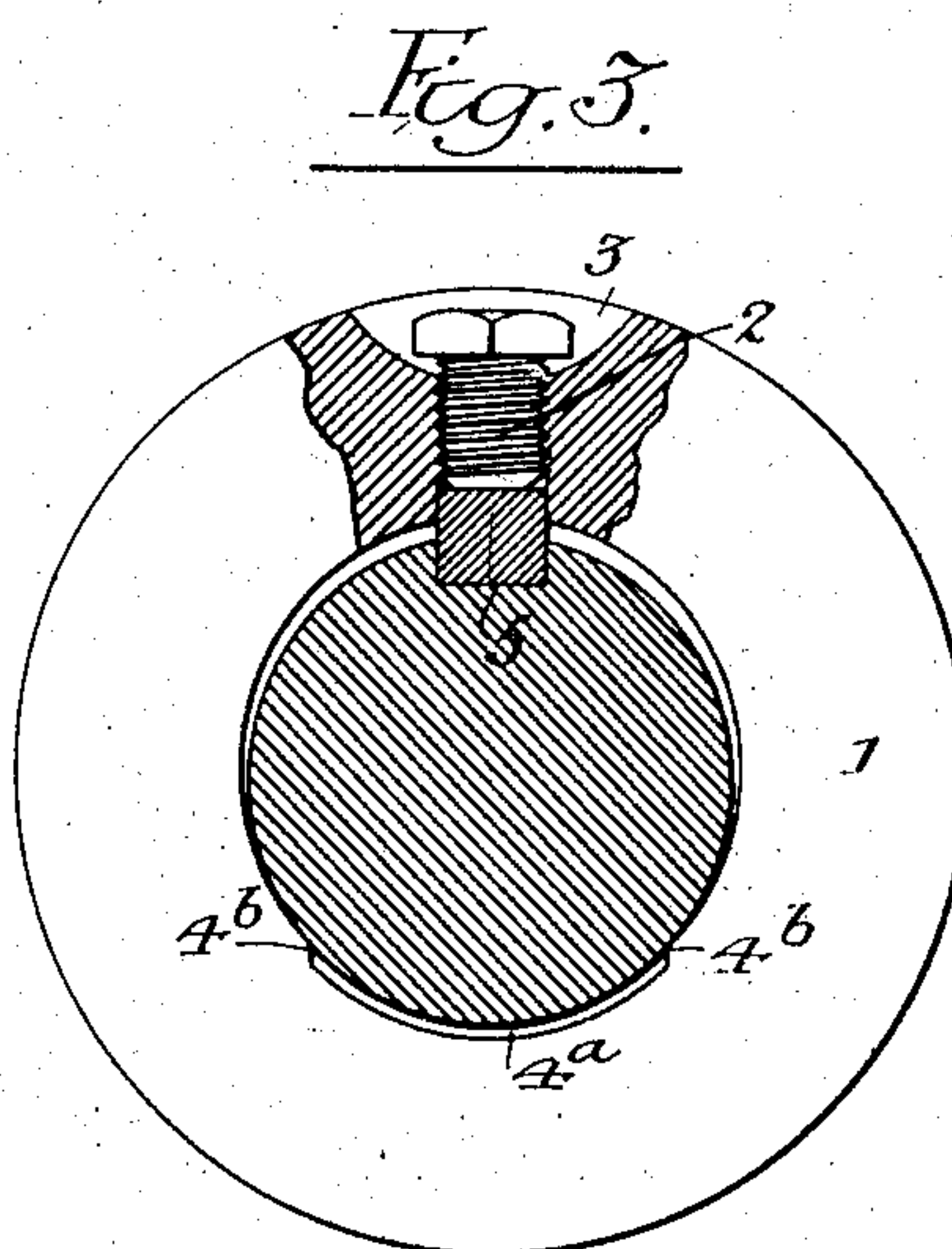
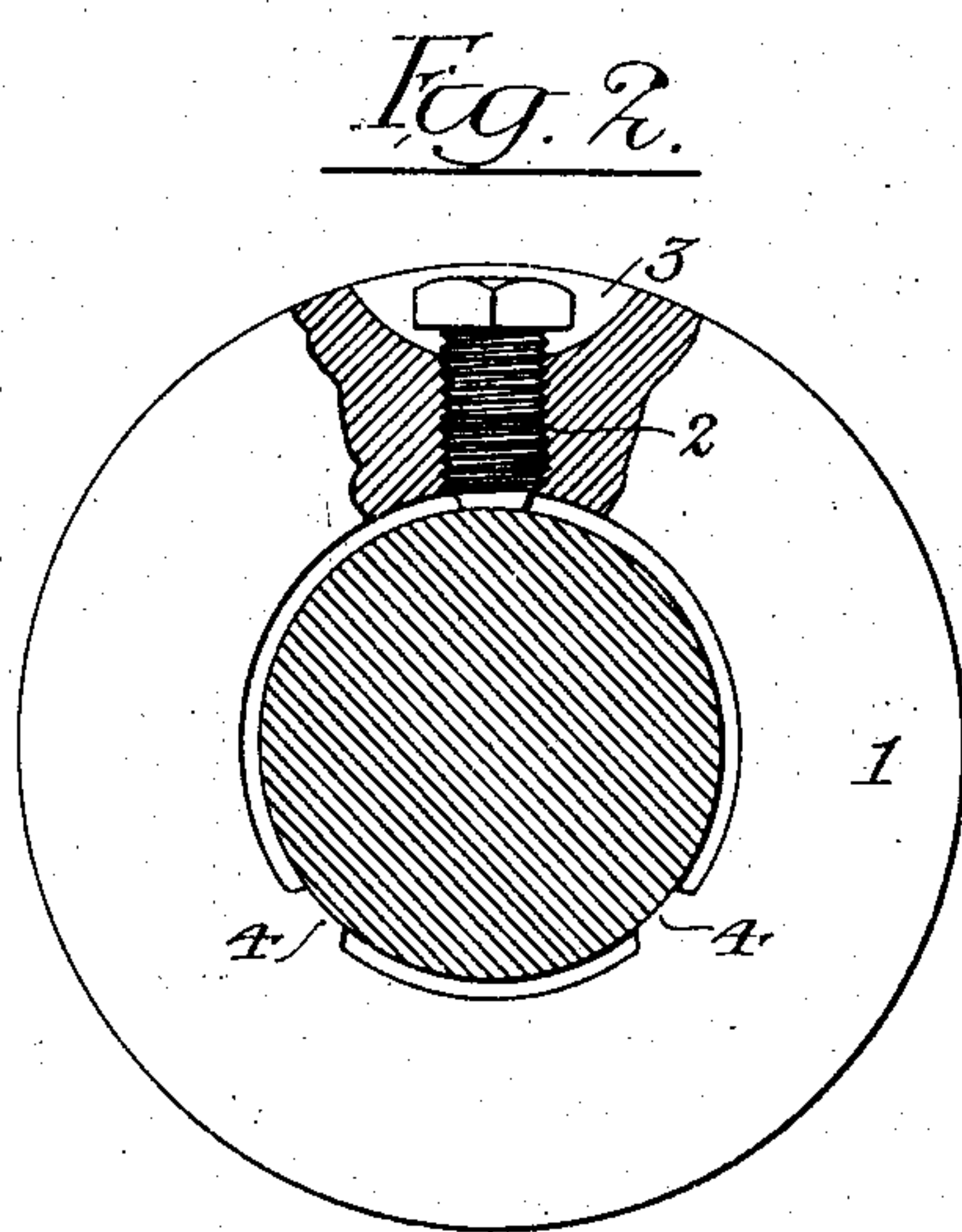
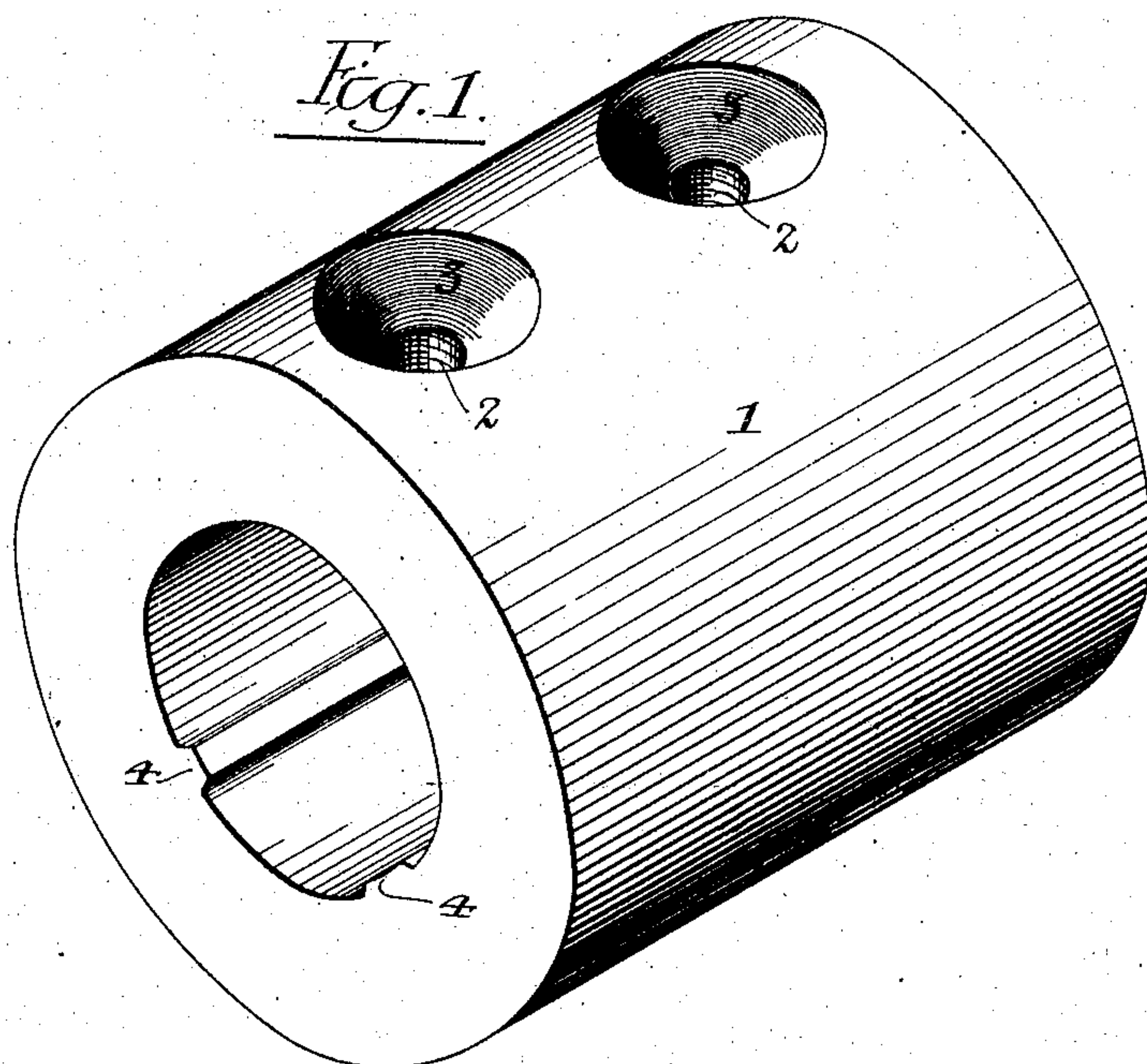
PATENTED JAN. 24, 1905.

L. N. D. WILLIAMS.

ANNULUS.

APPLICATION FILED JULY 24, 1903. RENEWED DEC. 23, 1904.

2 SHEETS—SHEET 1.



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2 SHEETS—SHEET 2.

Fig. 4.

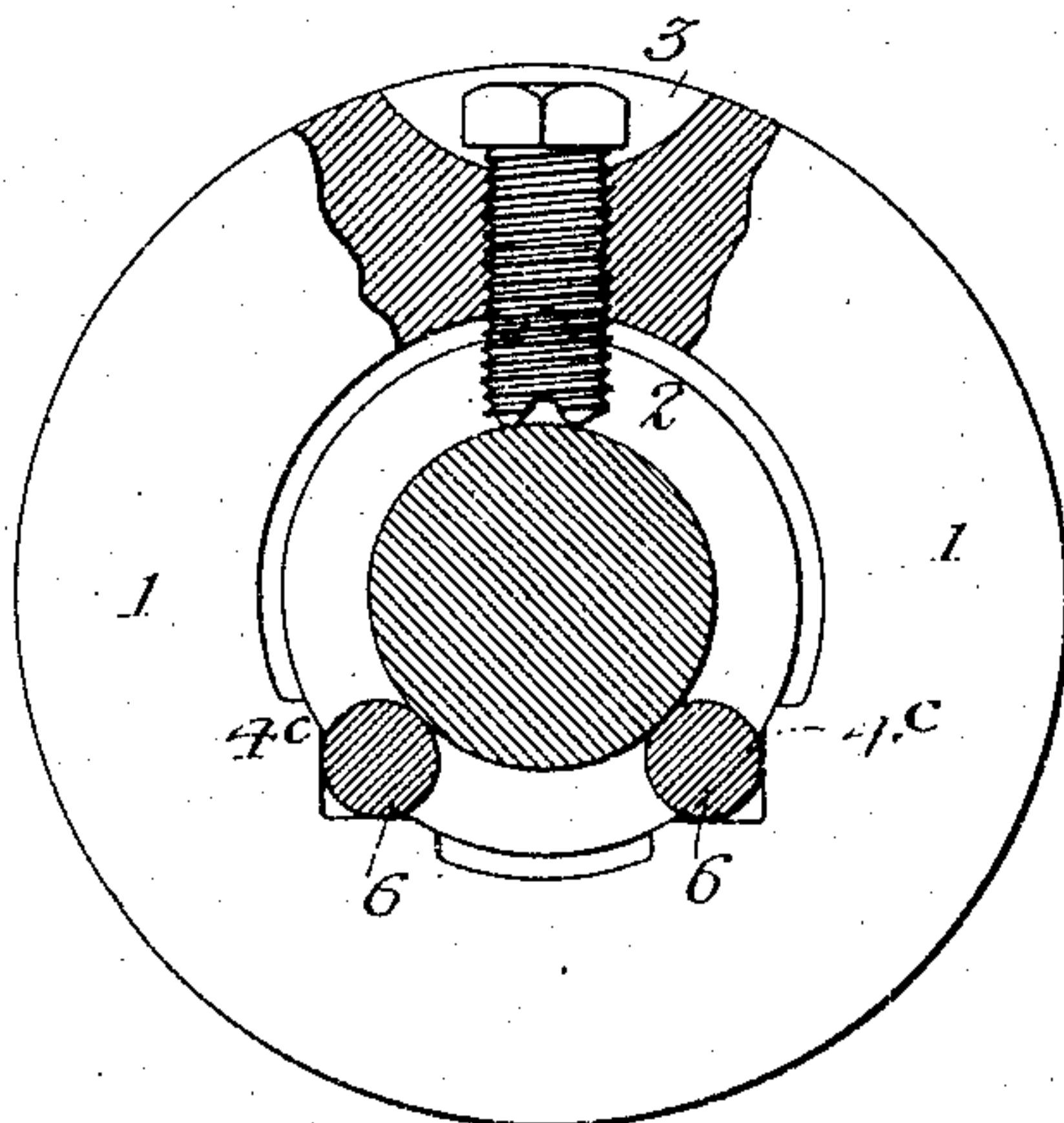
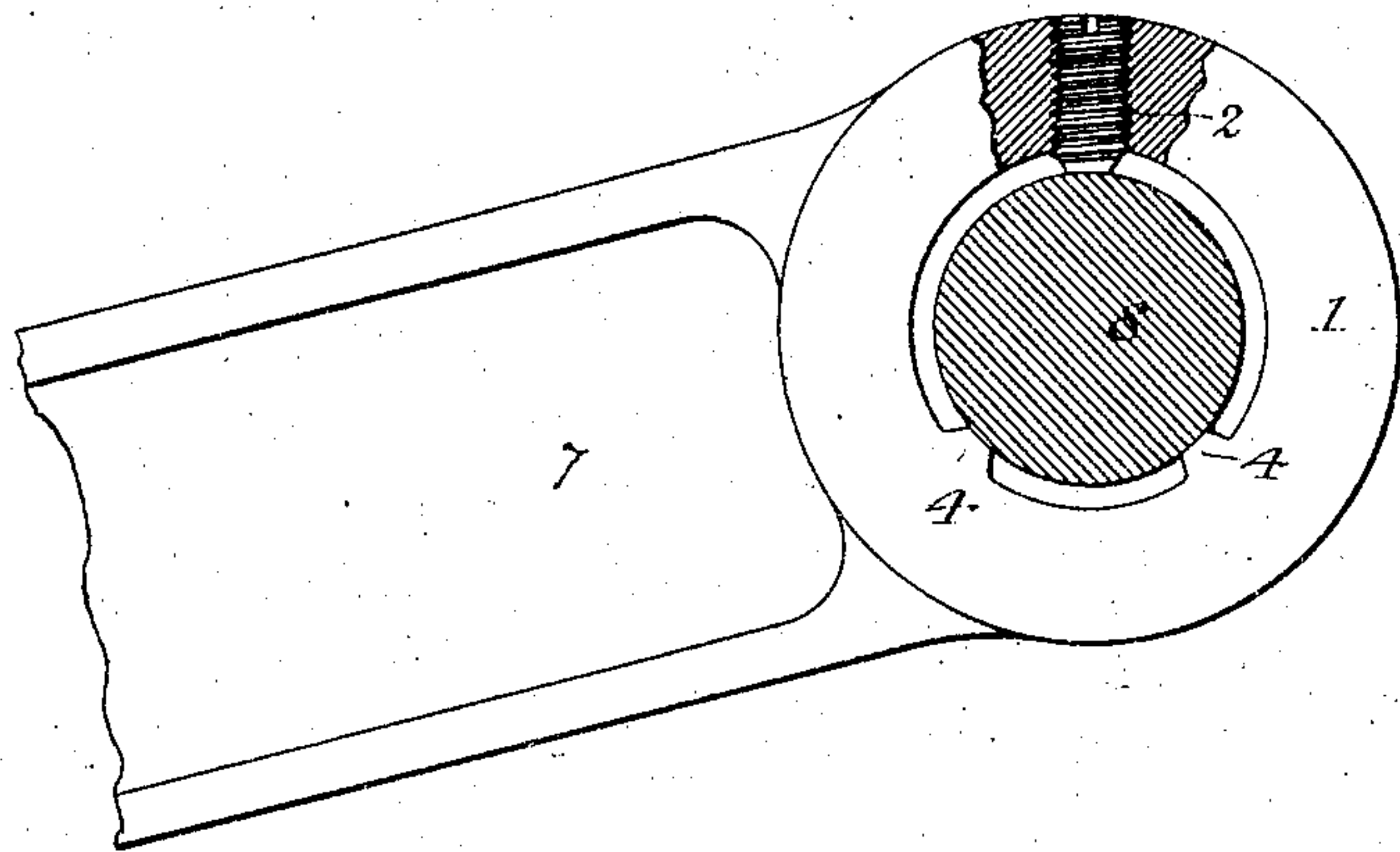


Fig. 5.



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UNITED STATES PATENT OFFICE.

LOUIS N. D. WILLIAMS, OF OGONTZ, PENNSYLVANIA, ASSIGNOR OF ONE-HALF TO ROBERT W. SCOTT, OF PHILADELPHIA, PENNSYLVANIA.

ANNULUS.

SPECIFICATION forming part of Letters Patent No. 780,850, dated January 24, 1905.

Application filed July 24, 1903. Renewed December 23, 1904. Serial No. 238,149.

To all whom it may concern:

Be it known that I, LOUIS N. D. WILLIAMS, a citizen of the United States, residing in Ogontz, Pennsylvania, have invented an Improved Annulus, of which the following is a specification.

My invention relates to the construction of an annulus, such as is used in engineering and machine construction—as a shaft-collar, a shaft-coupling, a pulley or lever hub, a shaft-bearing, or the like—the object of my invention being to so construct such an annulus that the same will run true with the shaft or will hold the shaft true in its bearing even though the bore is not the same as the diameter of the shaft. This object I attain in the manner hereinafter set forth, reference being had to the accompanying drawings, in which—

Figure 1 is a perspective view of an annulus constructed in accordance with my invention and designed for use as a shaft-coupling. Fig. 2 is an end view of the same, partly in section, and illustrating one of the shafts in place therein. Fig. 3 is an end view illustrating another form of annulus made in accordance with my invention. Fig. 4 is a view illustrating the manner in which the annulus may be adapted for coupling two shafts of different diameters, and Fig. 5 is a view illustrating the application of my invention to an annulus intended for a shaft bearing, support, or housing.

An ordinary circular shaft-collar with a plain bore if large enough to slip readily over the shaft will not run true when the retaining-screw is set up, the tendency being to create two pivot-points, one represented by the point of the set-screw and the other by a point in the bore directly opposite to said set-screw, and consequently it is necessary in order to secure desirable truth in devices of this class to exercise great care in the boring thereof, constant resort being had to measuring devices for the purpose of securing and maintaining uniform size of bore. My invention obviates the necessity of such exactness in manufacture. In fact, I am enabled to produce an annulus which will run perfectly true with its shaft without the necessity of resort-

ing to boring or other operation requiring exact measurements.

Referring first to Fig. 1, which represents an annulus constructed in accordance with my invention and intended for a shaft-coupling, 1 represents the annulus, which has at one side threaded openings 2, intended for the reception of set-screws, these openings being countersunk, as at 3, for the reception of the heads of the screws. On the opposite side of the bore of the annulus are two inwardly-projecting ribs 4, located, by preference, about ninety degrees apart, the distance between the inner face of each of these ribs and the opposite face of the bore being slightly greater than the diameter of the shaft to which the annulus is to be applied—that is to say, the bore of the annulus is of sufficiently greater diameter than the shaft to permit said annulus to be readily slipped over the shaft. For instance, if said shaft is two inches in diameter the distance between the inner face of each rib and a point in the bore diametrically opposite the same may be about two and one-sixteenth inches.

The inner faces of the ribs may be trued up by a single cut of the tool in a slotting or shaping machine or by successive cuts of a tool or tools carried by a rotating and advancing boring-bar, and the annulus can then be placed upon a mandrel of the exact size of the shaft upon which it is ultimately to be secured, the annulus being secured to the mandrel by means of one or more set-screws similar to those whereby it will be secured to its shaft or shafts, the head of each set-screw being contained in its respective countersunk recess 3 and being below the line of the finished periphery. The annulus is now turned and both ends faced, if necessary. Consequently it must run true with the mandrel, and hence must run with equal truth with the shaft or shafts to which it is ultimately applied. The ribs 4 4 being separated from each other and located within the limits of one-half of the circumference of the bore of the annulus must act in the same manner as a V-block to properly center a shaft bearing upon them. Hence pressure imparted to the other side of the shaft and tending to force it toward said ribs—

as, for instance, pressure exerted by the set-screw 2, forming a third and adjustable point of contact for the shaft, or by a pair of diagonally-disposed screws used as a substitute for
 5 or in addition to the single central screw—will render it impossible for either annulus or shaft to rock upon the bearing-points. Hence there is no liability of the set screw or screws working loose.

10 The annulus, if short, can be used as a shaft collar or bearing; but when used as a shaft-coupling it possesses many advantages not possessed by a coupling bored to size in the ordinary way. In the first place, where the
 15 shafts meet it is necessary that they should be so coupled as to be in perfect alinement, and unless the bore of the coupling is an absolute fit such proper alinement is impossible and even where a good fit is secured the bur
 20 formed upon the shaft by the tightening of the set-screw prevents the removal of the coupling. If, on the other hand, the bore is large enough to readily slip over the ends of the shafts, the clamping will be effected at
 25 two points only, as before explained, and under these conditions the periphery of the coupling cannot be true and the ends of the shaft cannot be in true alinement.

A coupling-annulus constructed in accordance with my invention will hold upon the
 30 shafts quite as securely as, if not better than, a coupling of the compression type, and by resorting to the fixed and laterally-separated bearing-points and to pressure devices tending to force the shaft onto the same the truth
 35 of the bearing is at all times and under all conditions positively maintained without the necessity of a close fit between the bore of the coupling and the periphery of the shaft.
 40 Hence burs formed upon said periphery cannot interfere with the ready removal of the coupling.

Another advantage of a coupling of this character is that either of the coupled lengths
 45 of shafting may be uncoupled by simply removing the retaining-screws from that end of the annulus, the released end of the shaft being then free from contact with the coupling, and in this way many advantages of a clutch
 50 can be secured.

In Fig. 3 I have shown an annulus constructed in accordance with my invention and in which instead of forming inwardly-projecting ribs 4 in the bore I recess the latter,
 55 as shown at 4^a, on the side opposite that which receives the clamp-screw, thus providing two separated points of bearing 4^b, which serve the same purpose as the inwardly-projecting ribs 4. (Shown in Figs. 1 and 2.) In this
 60 case also the set-screw 2 instead of acting directly upon the shaft acts upon a key 5, seated partly in a groove in the shaft and partly in a groove in the annulus and serving to lock the two together for joint rotation. A
 65 suitable wedge-key might, if desired, be used

in place of a set-screw to secure the annulus upon the shaft.

Fig. 4 illustrates an annulus constructed in accordance with my invention and used as a
 70 reduction-coupling—that is to say, as a coupling for shafts of different diameters. In this case the shaft of larger diameter rests upon the inner faces of the ribs 4^c, which are centrally recessed for the reception of pins or
 75 short sections of rod 6, having their axes parallel with the axis of the annulus, these rods providing the desired separated points of support for the shaft of smaller diameter.

In Fig. 6 I have shown an annulus which is secured to or forms part of the frame 7 of a
 80 machine, and consequently provides a bearing for the reception and support of a rod or shaft 8, the same advantages of construction and use applying to a fixed bearing of this character as to an annulus intended to be se-
 85 cured to and rotate with a shaft.

In all cases two of the points of contact for the shaft should be fixed, and the adjustable means for imparting pressure to the shaft
 90 should be so disposed as to press the shaft onto said fixed points of contact, and the latter should also be disposed within one-half of the circumference of the shaft, for in that
 95 case the shaft will properly seat itself upon these points of bearing whether the latter are or are not bored true, whereas if the points of bearing comprise more than one-half of the circumference of the shaft true boring is
 100 as essential as though the annulus fitted the shaft throughout its entire circumference.

The essential features of my invention being as thus described, it will be evident that the invention can, without departing from its spirit, be embodied in many other forms of
 105 device than those which I have selected for illustration.

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

1. An annulus having a bore of sufficiently greater diameter than that of the shaft to
 110 which it is applied to permit the annulus to be readily slipped over the shaft, and having three separated points of contact for said shaft, two of said points of contact being integrally fixed and the third being adjustable
 115 and bearing upon the shaft at a point intermediate the fixed points of contact so as to press the shaft upon the said fixed contact-points, substantially as specified.

2. An annulus having a bore of sufficiently greater diameter than that of the shaft to
 120 which it is applied to permit the annulus to be readily slipped over the shaft, and having three separated points of contact for said shaft, two of said points of contact being
 125 fixed and located within less than one half of the circumference of the shaft, and the third point of contact being adjustable and bearing upon the shaft at a point intermediate the
 130 fixed points of contact so as to press the shaft

upon the said fixed contact-points, substantially as described.

3. An annulus having a bore of sufficiently greater diameter than that of the shaft to
5 which it is applied to permit the annulus to be readily slipped over the shaft, and having two fixed and separated points of contact for said shaft located within less than one half of the circumference of the shaft, and adjustable
10 means for imparting pressure to the other

half of the shaft so as to cause the latter to seat itself upon said fixed contact-points, substantially as specified.

In testimony whereof I have signed my name to this specification in the presence of two sub- 15 scribing witnesses.

LOUIS N. D. WILLIAMS.

Witnesses:

WILLIAM BUCKLEY,
LORETTO A. CORUTTO.