

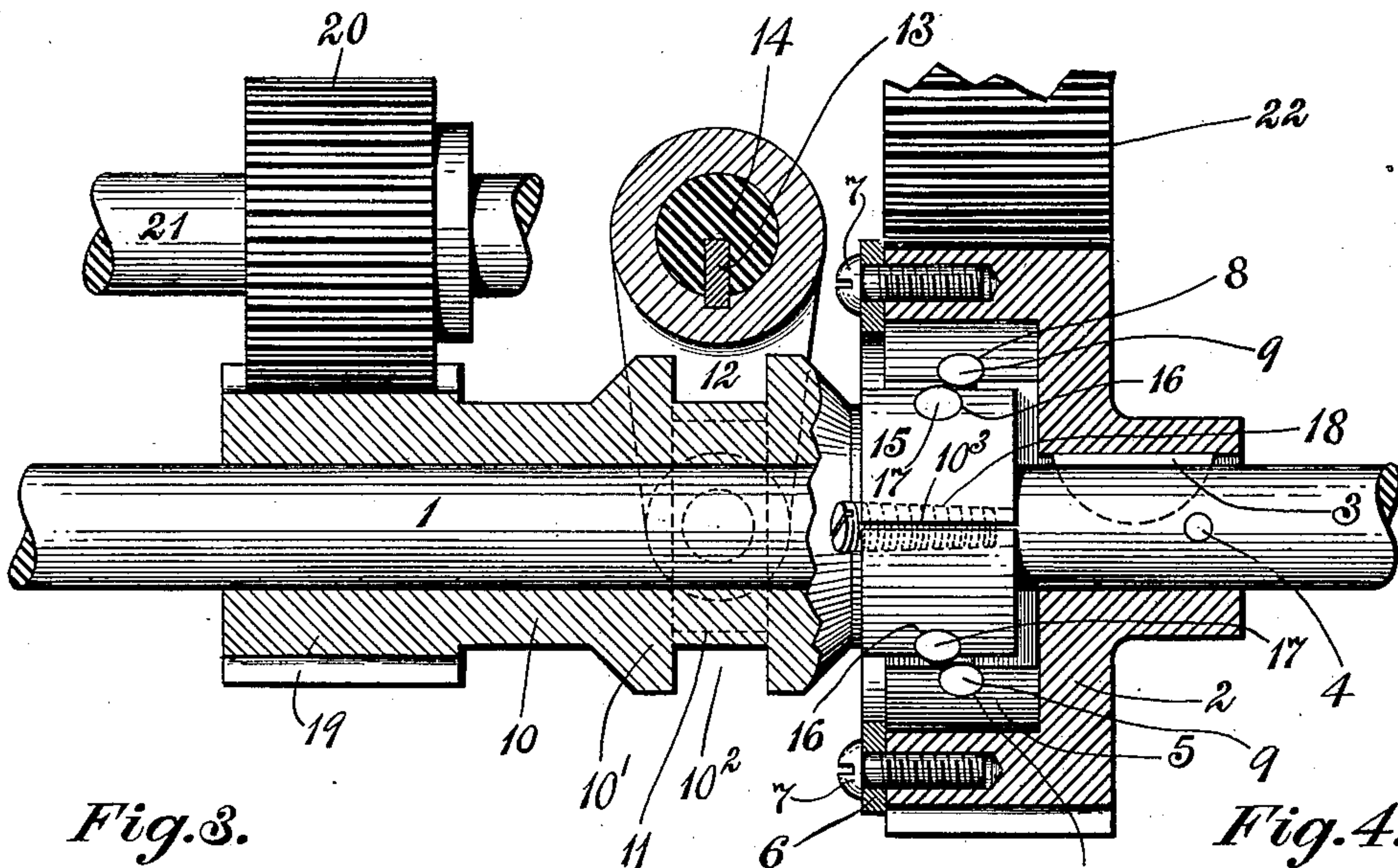
No. 859,023.

PATENTED JULY 2, 1907.

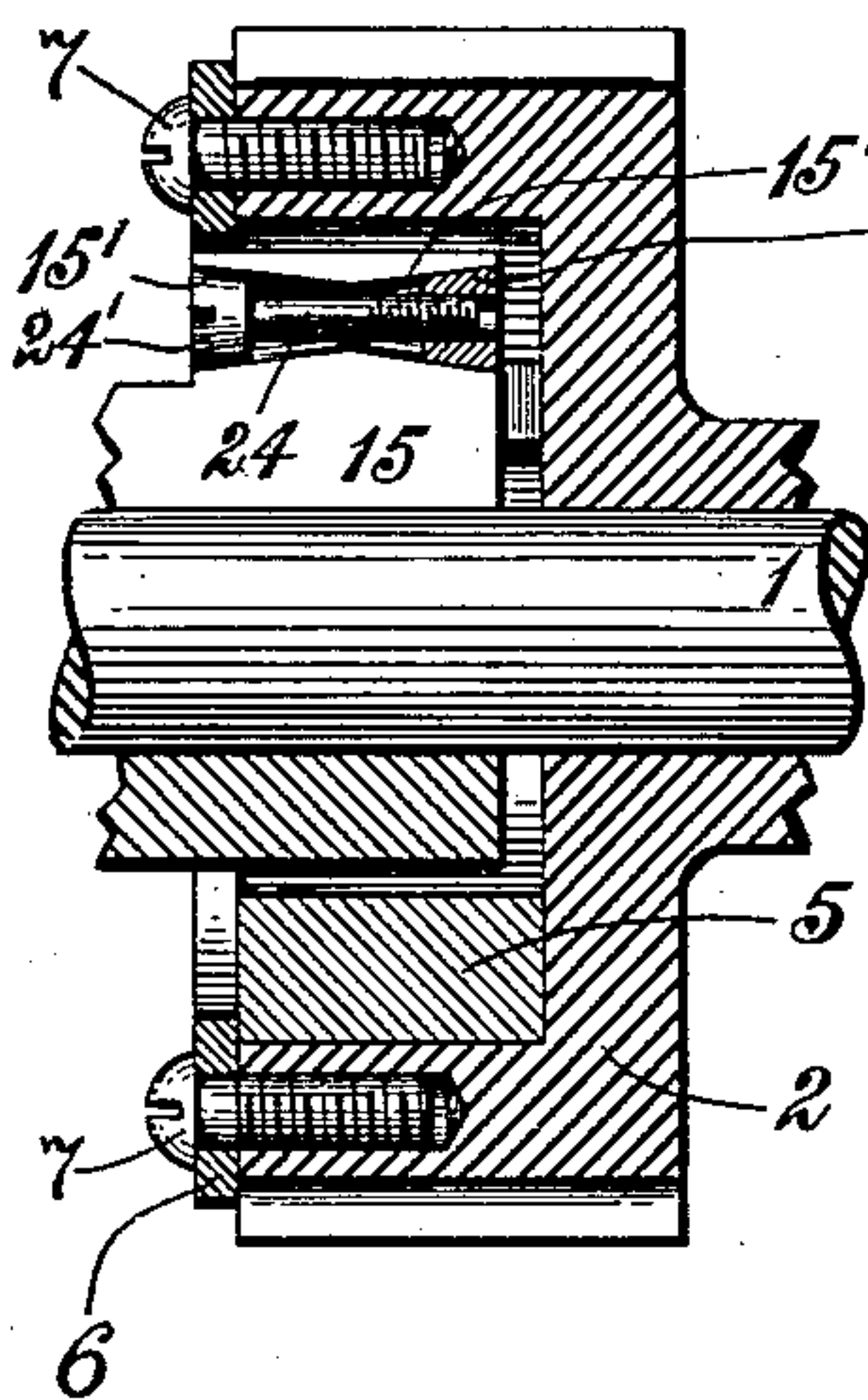
C. W. SPONSEL.  
CLUTCH.

APPLICATION FILED OCT. 18, 1906.

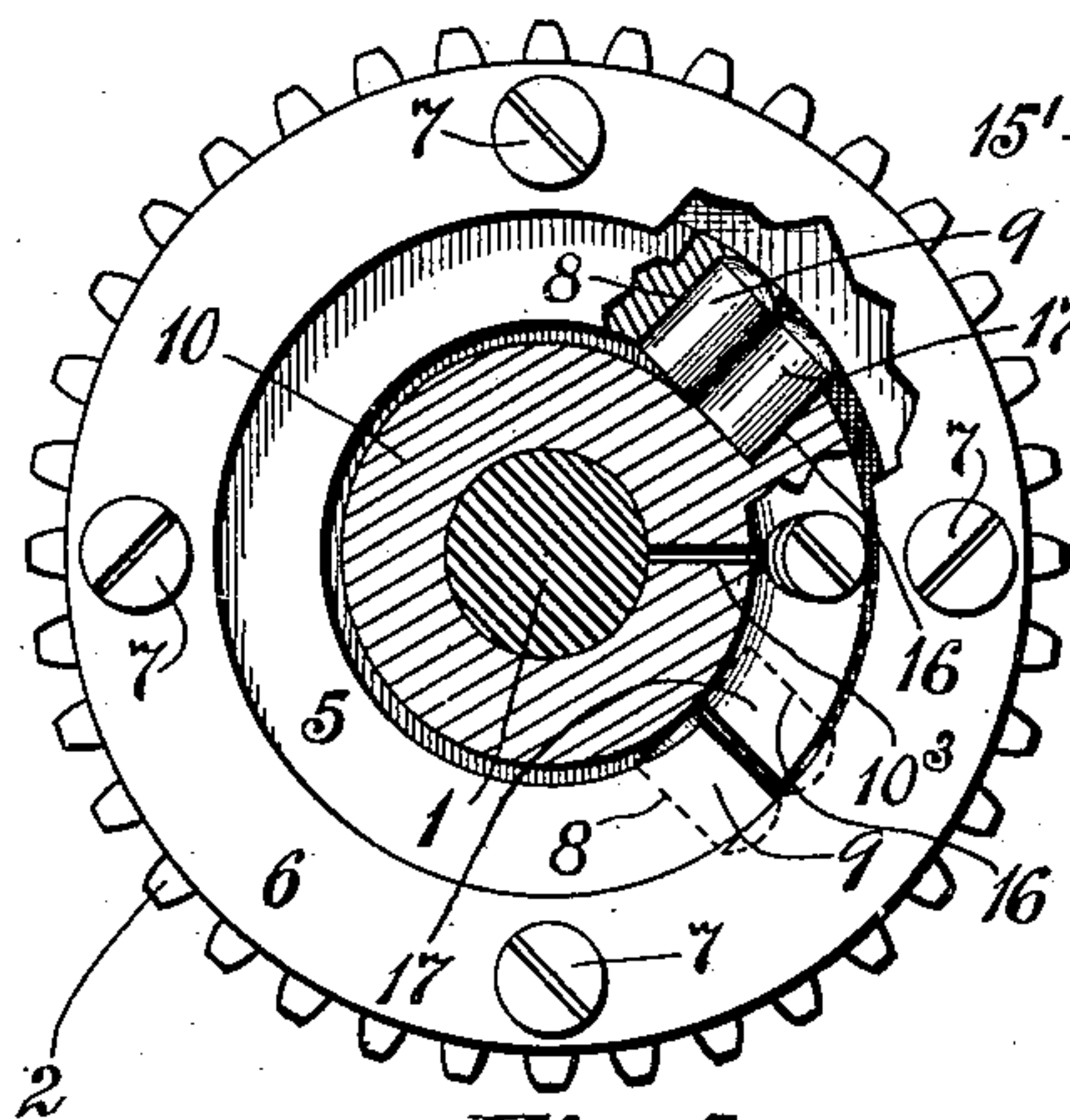
*Fig. 1.*



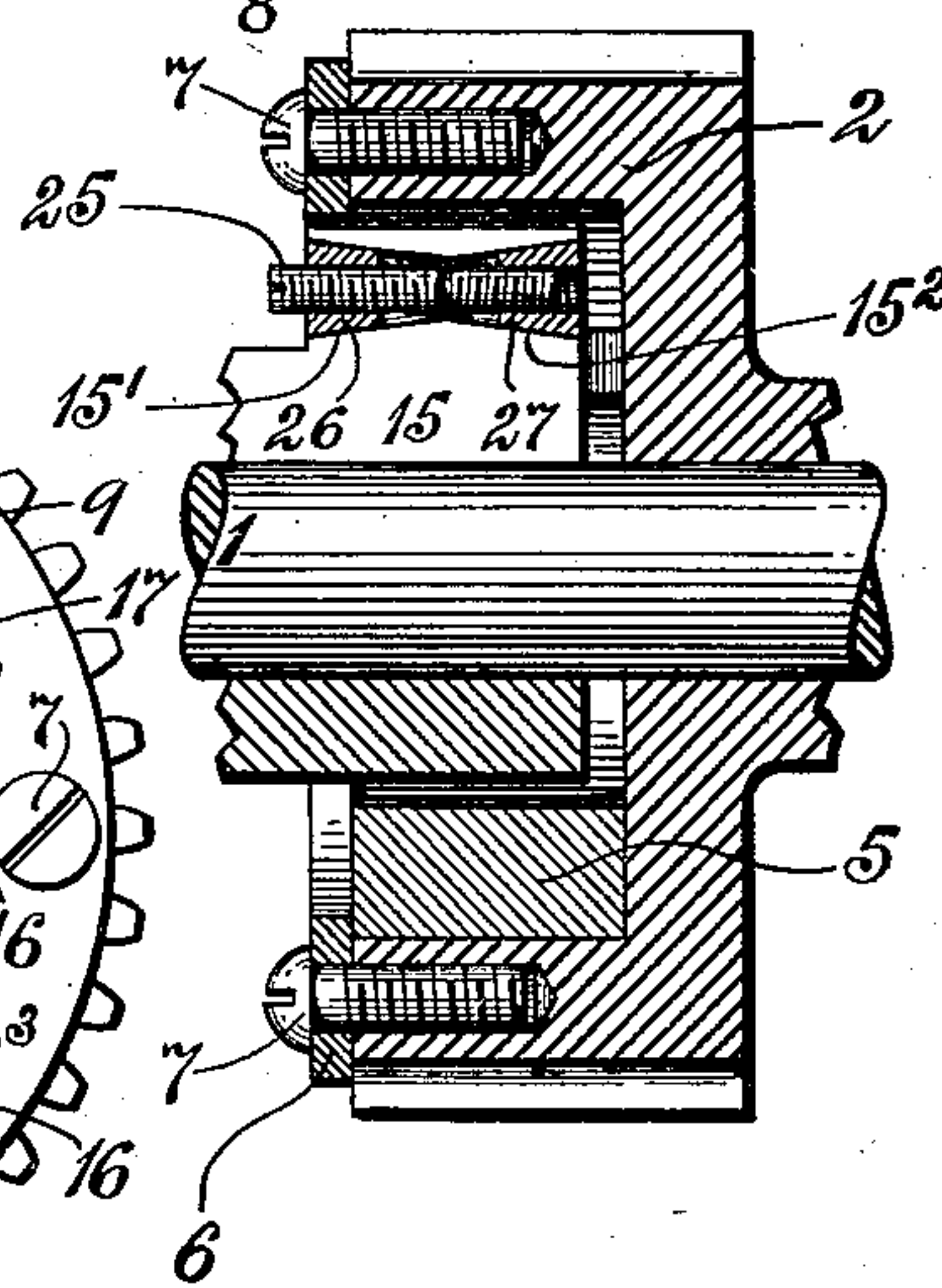
*Fig. 3.*



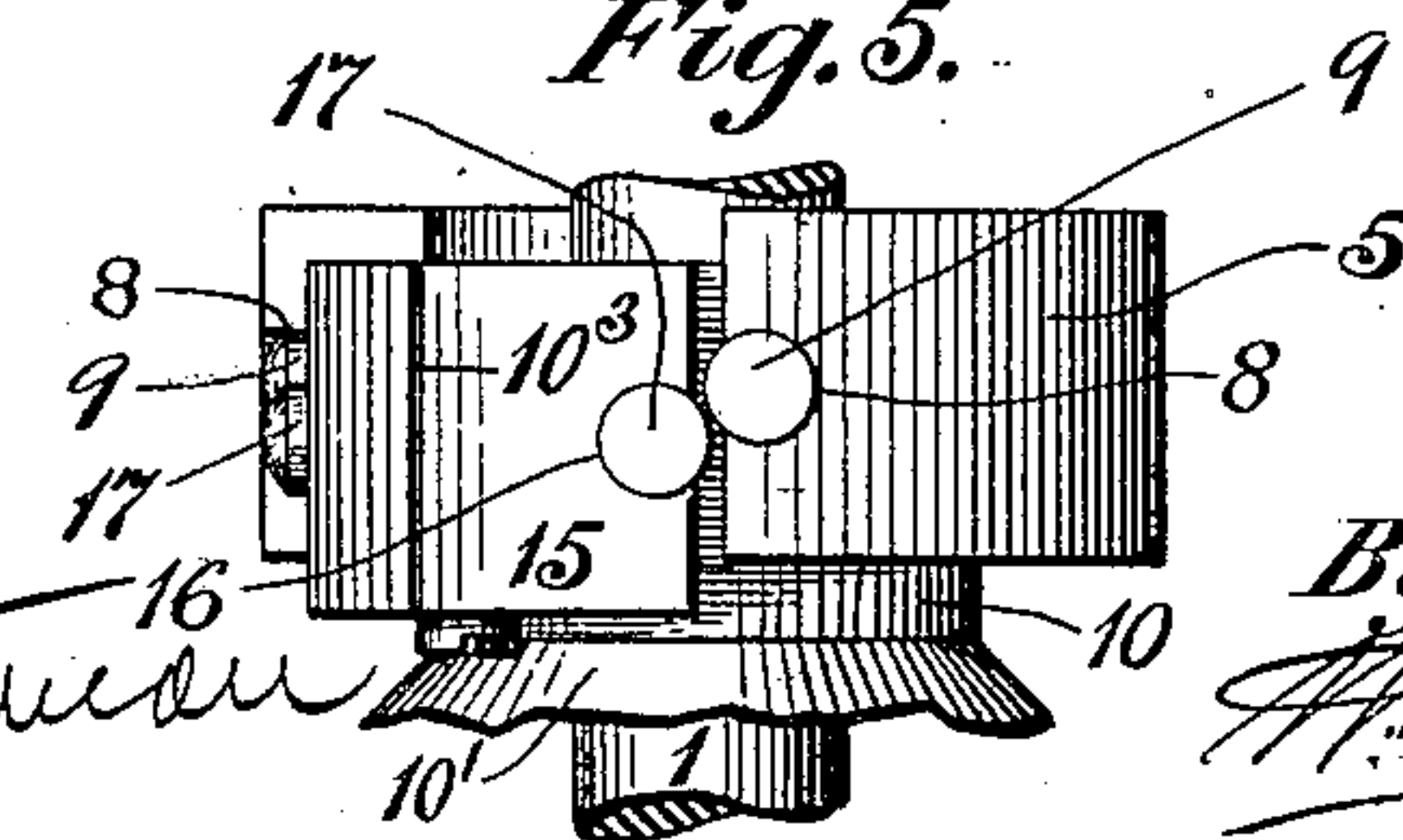
*Fig. 2.*



*Fig. 4.*



*Fig. 5.*



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# UNITED STATES PATENT OFFICE.

CHARLES W. SPONSEL, OF HARTFORD, CONNECTICUT.

## CLUTCH.

No. 859,023.

Specification of Letters Patent.

Patented July 2, 1907.

Application filed October 18, 1906. Serial No. 339,473.

*To all whom it may concern:*

Be it known that I, CHARLES W. SPONSEL, a citizen of the United States, residing at Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Clutches, of which the following is a specification.

This invention relates to clutches adapted for general application in the engagement of shafts, gear-wheels, pulleys, etc.

10 Primarily the object of the invention is the provision of a clutch-device of few parts, and one which will have great gripping-action, so that the elements to be united may be locked together without liability of slippage.

15 A further object of the invention is the provision of a clutch of the "friction" variety, comprising among other things a split-ring, an element movable with relation to said split-ring, and means for actuating one of said members to cause engagement of the driving and 20 driven parts.

A further object of the invention is the provision in connection with a clutch of the class described, of means for taking up wear or lost motion, whereby chattering and looseness in the action of the actuating parts 25 may be entirely obviated.

Further objects of the invention will appear in the detailed description.

In the accompanying drawings, Figure 1 is a view partially in elevation and partially in section of a 30 clutch embodying the features of the invention; Fig. 2 is a transverse section partially in elevation, Fig. 3 is a longitudinal vertical section of the improved clutch showing one form of device which may be employed for taking up wear or lost-motion; Fig. 4 is a similar 35 view of a further modification; and Fig. 5 is a detail view showing the manner in which the clutch operates.

Like numerals designate similar parts throughout the several views.

Referring to the drawings, the numeral 1 indicates a 40 shaft, and 2 a chambered gear-wheel connected to said shaft by a key 3 and a pin 4. Within the chambered gear-wheel is mounted an expansion-ring 5, said ring being retained against longitudinal displacement by an annulus 6 secured to the element 2 by screws, and said 45 annulus overlapping the inner end-wall of said expansion-ring. Seats or sockets 8 are formed in the opposing edges of the expansion-ring 5, and in each of these sockets is inserted a hardened-steel plug or roller 9, each seat or socket being so disposed that when the roller is inserted 50 therein by vertical movement it will be prevented from displacement laterally, as illustrated in Fig. 5. While shown as preferably in the nature of an anti-friction-roller, it is to be distinctly understood that the plugs may be fixed in their seats if desired without 55 departure from the invention, and also that other hard-

ened-wear surfaces may be substituted for the rollers or plugs.

Fitted for sliding movement upon the shaft 4 is a sleeve 10 having an enlarged portion 10' provided with a groove 10<sup>2</sup> for the reception of pins or shoes 11 carried 60 by an arm 12, the hub of which is splined at 13 to a rock-shaft 14, which may be actuated either automatically or manually by any desired means. At one end the sleeve 10 is split at 10<sup>3</sup> and is provided with a wing 15, having sockets 16 at each end in which are located 65 plugs or rollers 17, adapted to engage when the sleeve is moved toward the right, the complementary plugs or rollers 9 of the expansion-ring 5.

Devices are employed for adjusting the split-wing 15 to take up any wear of the plugs or rollers 9 and 17, 70 and these devices may be of any desired kind without departure from the invention. In Fig. 1 a taper-screw 18 is threaded into seats on the meeting walls of the wing 15, and by adjusting this screw said wing may be 75 expanded to take up wear.

At the inner end of the sleeve 10 a gear-wheel 19, or other element from which it is desired to transmit power, is mounted, and this element engages with a second element 20, shown as a gear-wheel, although it may be a pulley, friction-gear, or other device, se- 80 cured to a driving-shaft 21. (See Fig. 1). For driving the element 2, keyed to the shaft 4, as stated, a gear 22 or other device may be employed, as also illustrated in Fig. 1.

Referring now to Fig. 3, the split-wing 15 is shown 85 provided with reversely-beveled surfaces 15', 15<sup>2</sup> at its opposing edges, and between these surfaces is mounted at one end an externally-tapered nut 23, actuated by a screw 24, having a tapered-head 24', and it will be obvious that by the adjustment of said screw, 90 this tapered-head and taper-nut will expand the wing to take up wear or lost motion of the parts when necessary. In Fig. 4 the wing 15 is shown provided with like tapered surfaces 15', 15<sup>2</sup>, and a right-and-left-hand screw 25 engages externally-tapered nuts 26 and 95 27 by which means the same result is achieved.

As stated and to be emphasized the invention is not limited to any of the exact devices illustrated or described for taking up the wear of parts, and includes in its scope other devices for accomplishing a like result. 100

In the operation of my invention when it is desired to clutch the shaft 1 and elements to be driven thereby, the sleeve 10 is moved end-wise by the rock-shaft 14 and arm 12 until the plugs or rollers 17 of wing 15 comes to a dead center opposite the plugs or rollers 9, thus ex- 105 panding the ring 5 between the ends of which said wing moves, and forcing said ring with great power against the inner-wall of the chamber in the gear or other element keyed to said shaft. In this movement of the sleeve the anti-friction plugs or rollers pass each 110



other with a toggle-like action, and as they are preferably rotatable in their seats or sockets practically little or no wear of their peripheries will take place. When the shaft is clutched to the sleeve in the manner described the driven-shaft 21 will of course be actuated by the elements of any desired kind carried by said shaft and said sleeve. Upon the reverse movement of the sleeve 10 the plugs or rollers will pass each other, as illustrated in Figs. 1 and 5, and the split-ring 5 will immediately contract and release the clutch-engagement.

Changes may be made in many elements of the invention, and either the sleeve may be moved with relation to the element 2 keyed to the shaft 1 or the reverse arrangement may be employed.

Having thus described my invention what I claim is:

1. The combination with clutch-elements one movable with relation to the other, of anti-friction and wear-resisting devices carried by each of said elements, and means for reciprocating said anti-friction-devices, and for bringing them to a dead-center when engaged, to thereby cause a locking-engagement of the clutch.

2. The combination with a shaft having a chambered element, an expansion-ring secured within the chamber of said element, a sleeve loose on said shaft, anti-friction-devices carried by the sleeve, and anti-friction-devices carried by the expansion-ring, said devices being brought to a dead-center with those of the sleeve, and thereby locking the parts with a toggle-like action.

3. The combination with a shaft having a chambered element secured thereto, of an expansion-ring secured within the chamber of said element; anti-friction devices carried by the expansion-ring a sleeve loose on said shaft; anti-friction-devices on said sleeve; means for reciprocating the sleeve; and means for transmitting power from said sleeve, and thereby bringing the anti-friction-devices to a dead-center.

4. The combination with a shaft having a chambered element secured thereto, of an expansion-ring secured within the chamber of said element; anti-friction-devices carried by the expansion-ring, a sleeve loose on said shaft, anti-friction-devices, on the end of the sleeve; means for reciprocating the sleeve; means for transmitting power from the sleeve; and a device for taking up wear or lost-motion between the anti-friction devices carried by the sleeve and the anti-friction-devices carried by said split-ring.

5. The combination with a shaft, and with means for

driving the same, said means being chambered, of a split-ring located in the chamber; anti-friction-plugs or rollers situated in the opposing-edges of the split-ring; a sleeve having a split-portion at its end; anti-friction-plugs or rollers carried by said split-portion; means for taking up wear or lost-motion between the anti-friction-rollers; and means for reciprocating the sleeve.

6. The combination with a shaft, and with means for driving the same, said means being chambered, of a split-ring located in said chamber; anti-friction-devices situated in the opposing edges of the split-ring; a sleeve having a split-portion at its end; anti-friction-devices carried by said split-portion; and means for reciprocating the sleeve.

7. The combination with a shaft, and with a chambered-element carried thereby, of a split-ring also carried within the chamber of said element; a shaft having a split-wing disposed between the opposing ends of said split-ring; anti-friction-devices carried by the wing and ring; and means for causing the engagement of said anti-friction-devices, and thereby expanding the ring.

8. The combination with a shaft, and with a chambered element carried thereby, of a split-ring located within the chamber of said element; a device carried by said element, and adapted to prevent longitudinal movement of said split-ring; anti-friction-devices carried by said split-ring; a movable device; means for actuating said movable-device; and anti-friction-devices carried by said movable-device, and adapted to engage the complementary anti-friction-devices of the split-ring, thereby to expand said split-ring and cause a clutch-engagement.

9. The combination with a shaft, and with an expansion device, of cylindrical plugs or rollers carried by said expansion-device; an element surrounding the shaft, and carrying said expansion-device; a movable element; and anti-friction-plugs or rollers mounted in the movable element, and adapted to engage the plugs or rollers of said expansion-device.

10. A clutch comprising a pair of elements, one of which is chambered; means for moving one of said elements with relation to the other; an expansion-ring located within the chambered element; plugs or rollers mounted in the opposing edges of said expansion-ring; and complementary plugs or rollers carried by the pair of elements, said plugs or rollers being brought to a dead-center, substantially as set forth.

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

CHARLES W. SPONSEL.

Witnesses:

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LOUIS F. K. WHITMAN.