

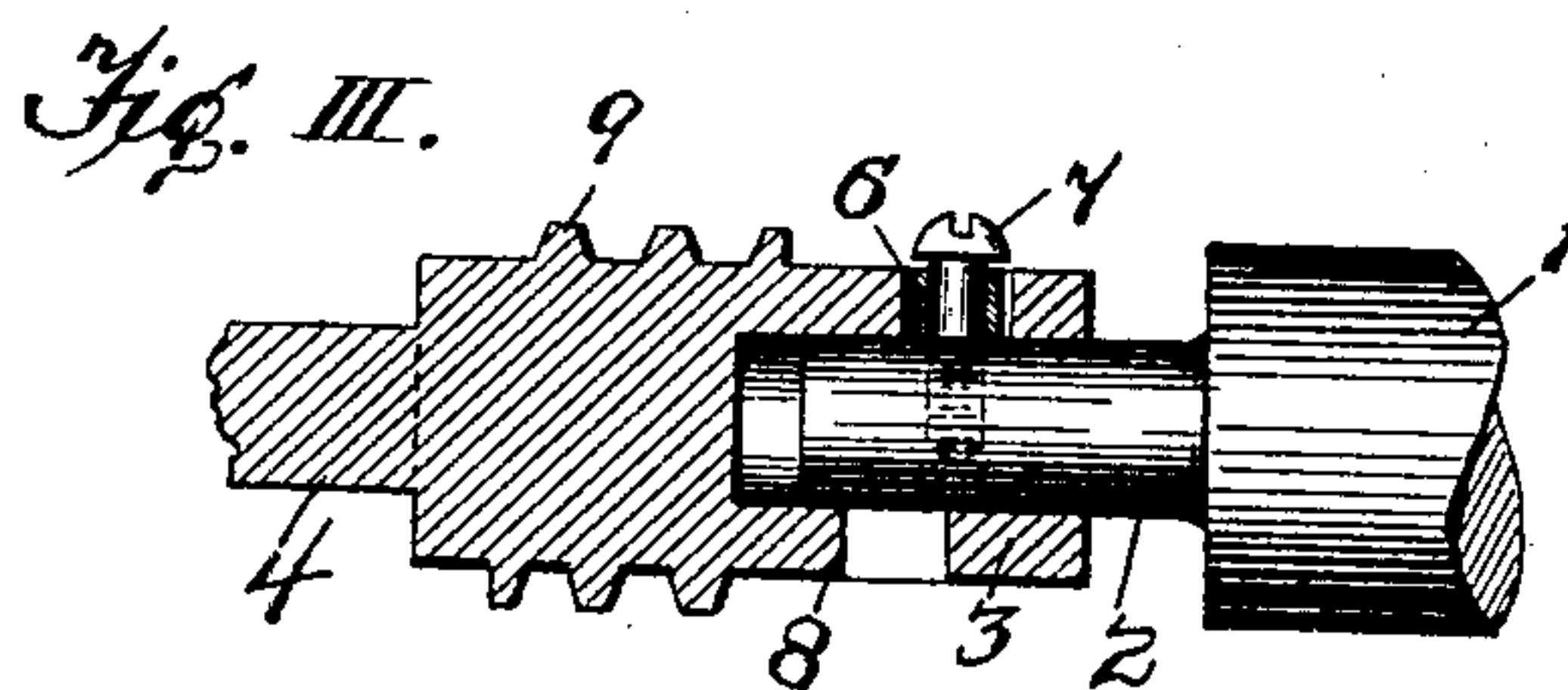
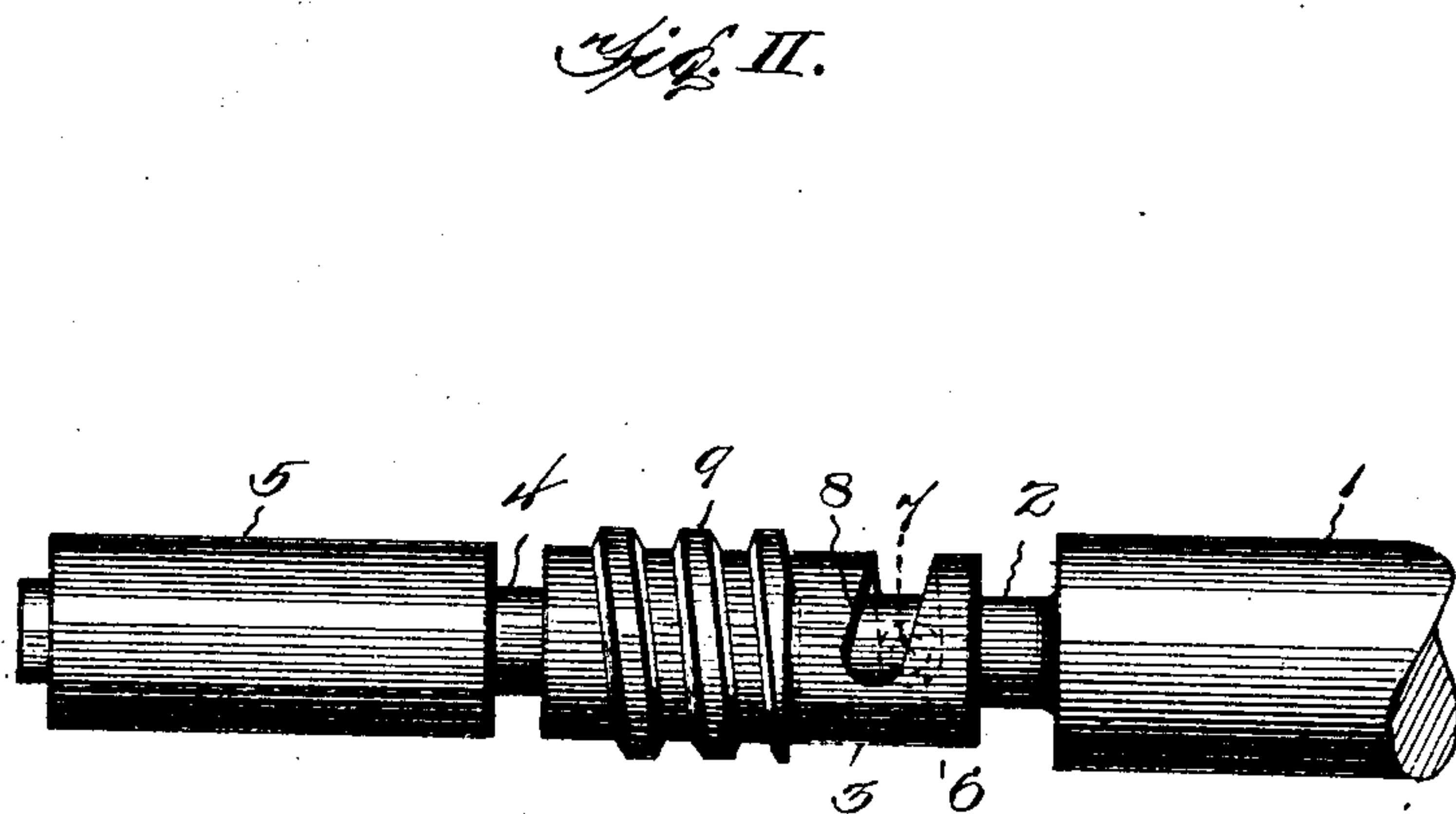
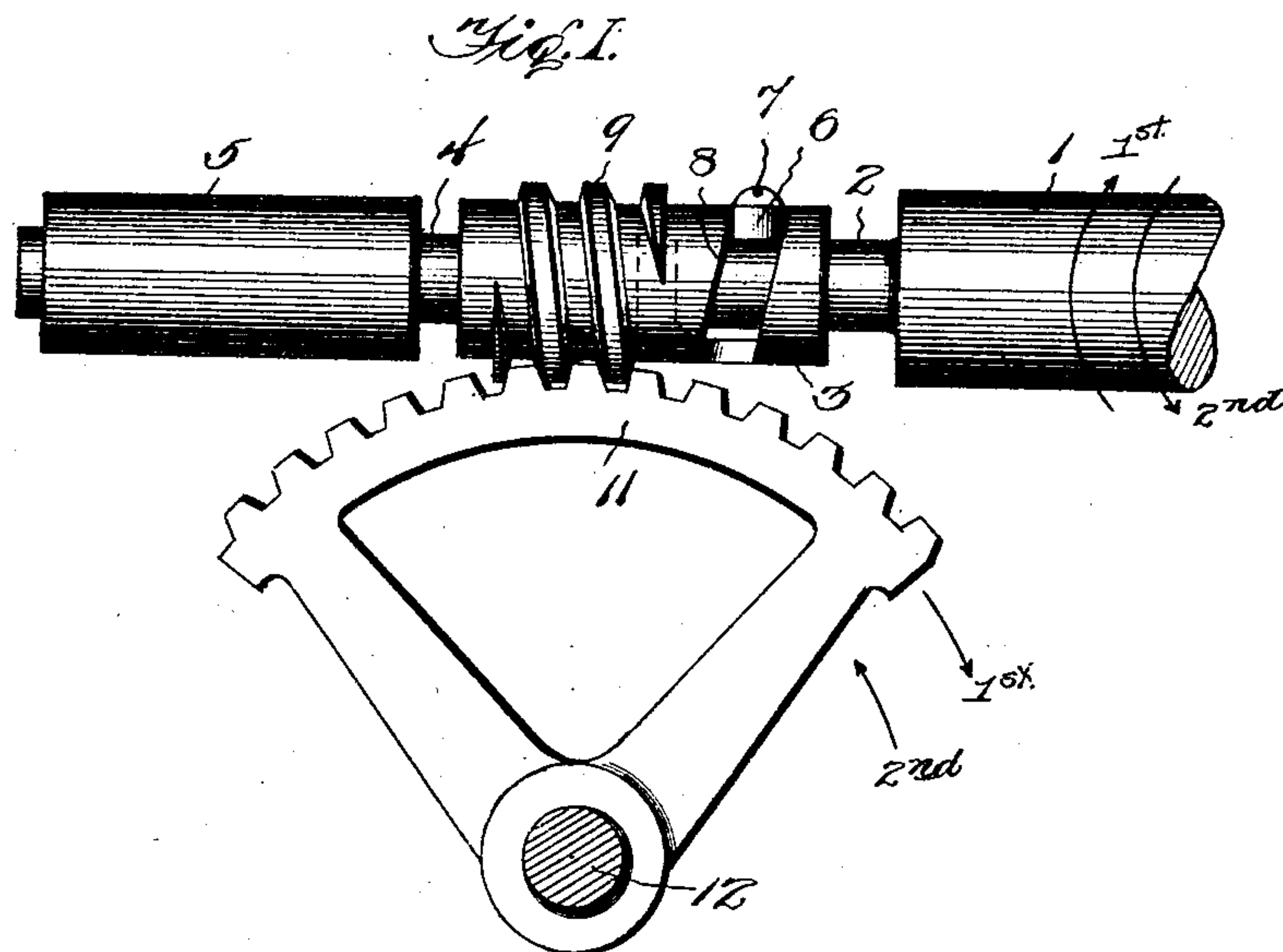
No. 771,188.

PATENTED SEPT. 27, 1904.

W. I. THOMSON.
POLE CHANGER.

APPLICATION FILED JAN. 2, 1903.

NO MODEL.



Witnesses
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UNITED STATES PATENT OFFICE.

WILLIAM I. THOMSON, OF NEWARK, NEW JERSEY, ASSIGNOR TO SAFETY CAR HEATING & LIGHTING COMPANY, A CORPORATION OF NEW JERSEY.

POLE-CHANGER.

SPECIFICATION forming part of Letters Patent No. 771,188, dated September 27, 1904.

Application filed January 2, 1903. Serial No. 137,410. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM I. THOMSON, of Newark, in the county of Essex, State of New Jersey, have invented certain new and useful
5 Improvements in Pole-Changers, of which the following is a complete specification, reference being had to the accompanying drawings.

The object of my invention is to produce
10 improvements in pole-changers for electric circuits by which the operation of the device is rendered positive and certain under all conditions.

In pole-changers in ordinary use, such as frictional pole-changers, the blade of the
15 switch is necessarily jammed into the contacts with a force as great as the force available to withdraw it, and the chance of failure of operation in attempting to separate the blade and contacts is consequently always present.
20 By my invention I employ positive means for actuating the switch in both directions in connection with a force always in excess of that required for operating the switch, and thus render its operation certain whenever re-
25 quired.

My invention relates not to the contact-making mechanism or members of a pole-changer, but to the mechanism for actuating the blade or movable member of a pole-changer of any
30 available type which embodies one or more movable contact-making members. For the reason last stated I illustrate my invention in the accompanying drawings in a substantially diagrammatic manner, only showing so much
35 of the mechanism in detail as enters into the distinctive features of my invention.

In the accompanying drawings, Figure I is a side elevation of a shaft, preferably an armature-shaft, and of a segment adapted directly or indirectly to actuate a pole-changer,
40 through a rock-shaft shown in section, to which the segment is attached; and Fig. II is a side elevation of the shaft shown in Fig. I detached. Fig. III is an elevation of a part
45 of the subject-matter of Fig. II partially in section.

Referring to the numerals on the drawings, 1 indicates the end of a dynamo or generator shaft or of a shaft connected therewith, which

is provided with a reduced end 2, that enters 50 the hollow end 3 of a worm-shaft 4. By means of a fixed bearing 5 the shaft 4 is carried in coaxial alinement with the shaft 1. The shafts 1 and 4 are in practice so assembled that they might revolve independently one of the other
55 except for the special means employed for uniting them and for imparting to the shaft 4 both a limited longitudinal movement, as well as a rotatory movement, through the rotatory movement of the shaft 1. Any means for
60 transmitting, through the rotation of the shaft 1, an initial longitudinal movement to the shaft 4, followed by rotative movement thereof, may be employed for accomplishing the object of the preferred mechanism illustrated; but the
65 said preferred mechanism consists of a roller 6, revolvably carried, as by a screw 7, screwing into the side of the reduced end 2 of the shaft 1 and working in a helical slot 8, formed in the wall of the hollow end 3 of the shaft 4. It is
70 obvious that through the employment of the means described rotation of the shaft 1 in one direction or the other will first impart longitudinal movement to the shaft 4 within its bearing 5 until the roller meets one end or the
75 other of the slot 8, the extent of such movement depending upon the length and pitch of the slot, and that thereafter the rotation of the shaft 4 will follow upon that of the shaft 1. The shaft 4 is designated a "worm-shaft" be-
80 cause it carries a worm 9, which is preferably cut or formed upon the end 3, which receives the end of the shaft 1 and which is enlarged both to enable it to receive the end of the shaft 1 as well as to accommodate the worm 9.
85

11 indicates a toothed segment which is fixed to a rock-shaft 12, by which it is held within operative reach of the worm 9, that intermittently actuates it in the following manner: Assuming the worm and segment to be in en-
90 gagement, as shown in Fig. 1, and the shaft 1 to be rotating in the direction of the arrow marked "1st," it is clear that without change of direction of movement the worm will continue to drive the segment until the end of the seg-
95 ment is reached and the teeth of the segment and the thread of the worm cease to engage. This, it may be observed, constitutes one move-

ment or throw of the rock-shaft 12. If now the direction of movement of the shaft 1 be reversed, the effect will be, first, to drive the worm 9 longitudinally into engagement with the teeth of the segment and then to impart reverse movement to the segment and to the rock-shaft 12. It is obvious that the alternate movements of the segment may be produced as often as the movement of shaft 1 is reversed, and since the shaft 1 is assumed to be that of a dynamo or is operated by the shaft of the dynamo it is upon a change in its direction of movement that operation of the pole-changer is required to be performed.

The rock-shaft is shown as representative of the contact-making mechanism of a pole-changer and may be designated as the "prime mover" thereof. A variety of types of such mechanism is in familiar use or knowledge in the art, and for that reason it is thought to be unnecessary to illustrate details which constitute no part of my present invention.

The operation of my device has been well outlined in the foregoing specification; but it may be also observed that there is no added friction to the running of the shaft 1 except that occasioned by the running of the shaft 4 in the bearing 5. Moreover, the prime mover or rock-shaft 12 is not actuated until the worm is in gear. Consequently no movement of the switch of the pole-changer is required until there is abundant power to operate it.

What I claim is—

1. In a pole-changer, the combination with a prime mover of the contact-making mechanism thereof and a shaft, of a member or members adapted to intermittently actuate the prime mover and having a constant connection with said shaft, and means for actuating the prime mover dependent upon direction of rotation of the shaft.

2. In a pole-changer, the combination with a prime mover of the contact-making mechanism thereof and a shaft, of a member having a constant connection with the said shaft, means for imparting rotative and endwise movements to said member through the rotation of the shaft, and intermittent actuating mechanism operatively connecting said member and the prime mover and adapted to intermittently

actuate the prime mover, said intermittent actuation being dependent upon the several movements of the member derived from the rotation of the shaft.

3. In a pole-changer, the combination with a prime mover of the contact-making mechanism thereof and a shaft in operative connection with an armature-shaft, of a member having a constant connection with the said shaft first named, means for imparting rotative and endwise movements to said member through the rotation of the armature-shaft, and intermittent actuating mechanism operatively connecting said member and the prime mover and adapted to intermittently actuate the prime mover, said intermittent actuation being dependent upon the said several movements of the said member.

4. In a pole-changer, the combination with a shaft, prime mover of the contact-making mechanism thereof and segment secured to the prime mover, of a worm adapted to intermittently actuate the segment, and means for transmitting to the worm, through the rotation of the shaft, an initial longitudinal movement followed by rotative movement thereof.

5. In a pole-changer, the combination with a shaft and coaxial worm-shaft and bearing, one shaft having a hollow for the reception of the other, of a coöperative helical slot and engaging member in or upon the respective shafts, a toothed segment adapted to intermittently engage the worm, and a rock-shaft constituting a prime mover to which the segment is fixed.

6. In a pole-changer, the combination with a shaft and a coaxial hollow worm-shaft and bearing, a helical slot in the worm-shaft, and a roller carried upon the first-named shaft and working in said slot, of a toothed segment adapted to intermittently engage the worm of the worm-shaft and a rock-shaft constituting a prime mover to which the segment is fixed.

In testimony of all which I have hereunto subscribed my name.

WILLIAM I. THOMSON.

Witnesses:

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ELMER E. ALLBER.