

W. K. HENRY.
DOOR CLOSER MECHANISM.
APPLICATION FILED FEB. 18, 1910.

962,142.

Patented June 21, 1910.

3 SHEETS—SHEET 1.

Fig. 1.

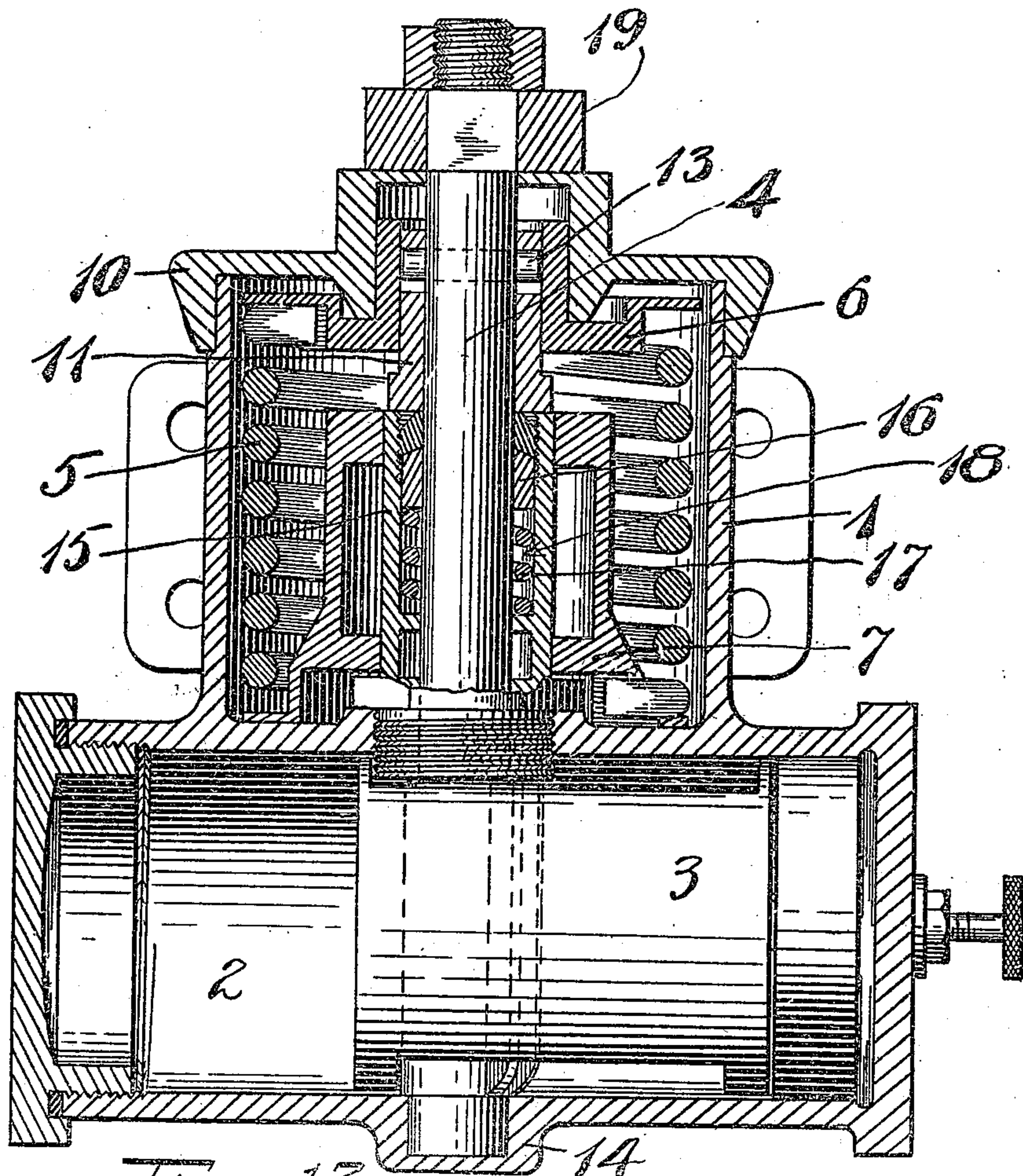


Fig. 13.

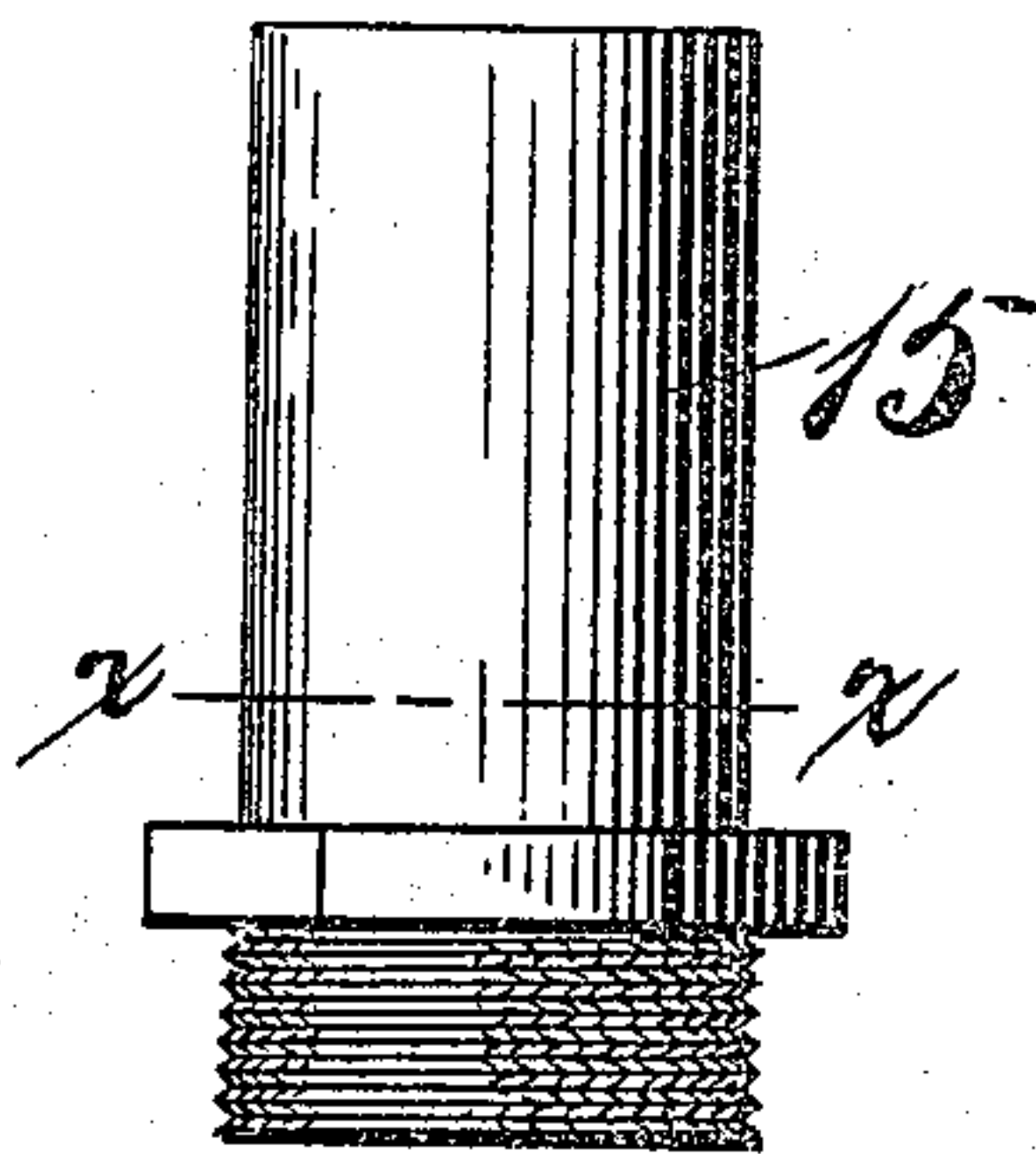
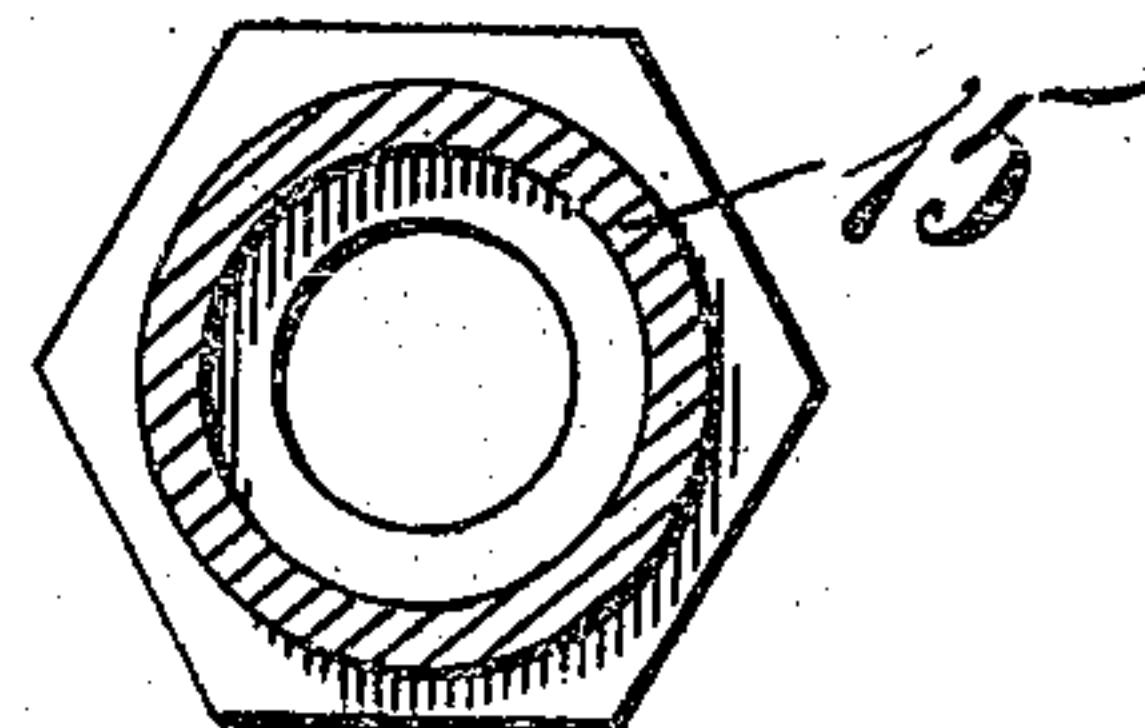


Fig. 14.



Witnesses:
Chas. A. Paul
Edw. M. Dammeyer

Inventor
W. K. HENRY
By [Signature] Attorney

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Fig. 2.

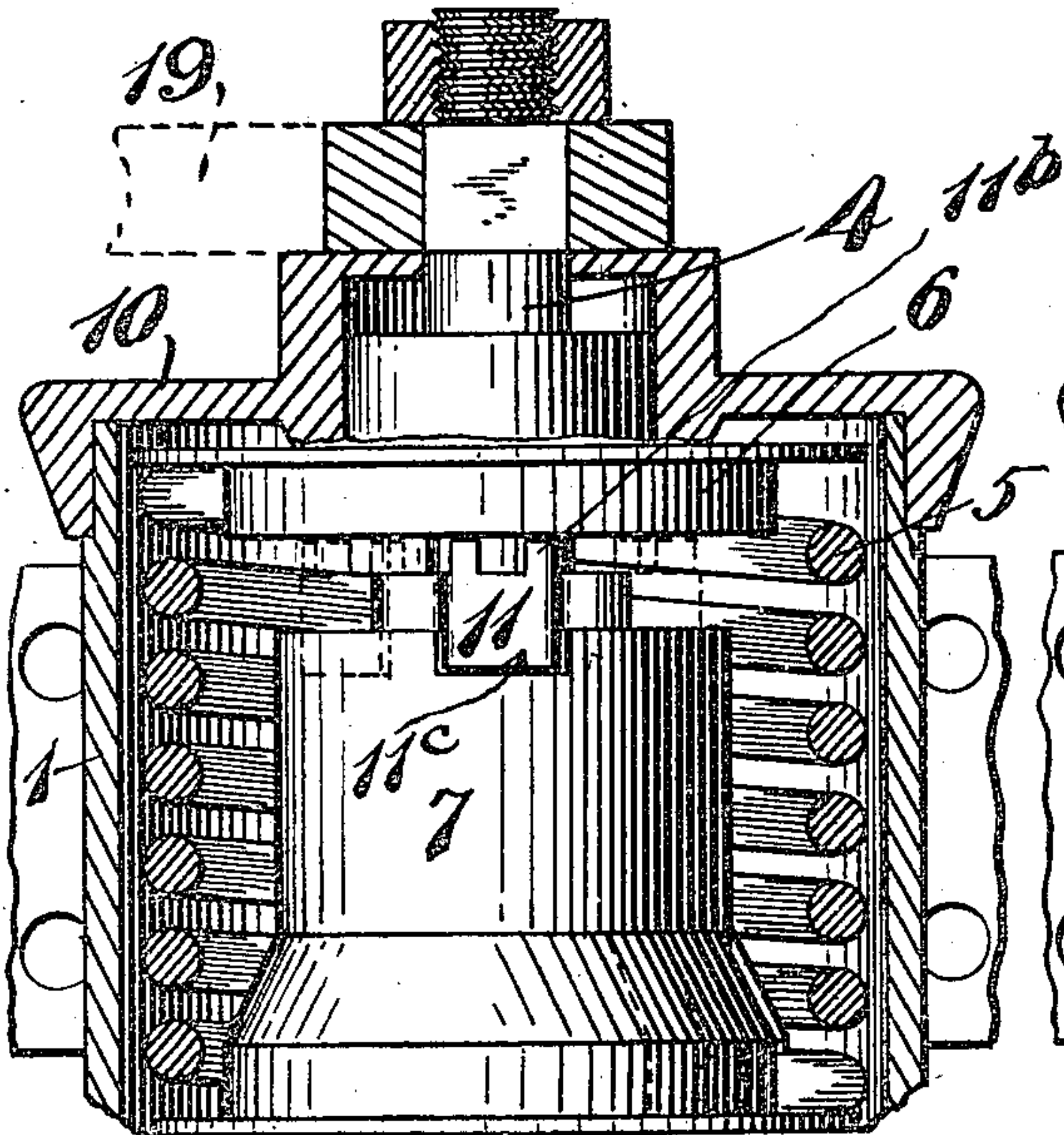


Fig. 3.

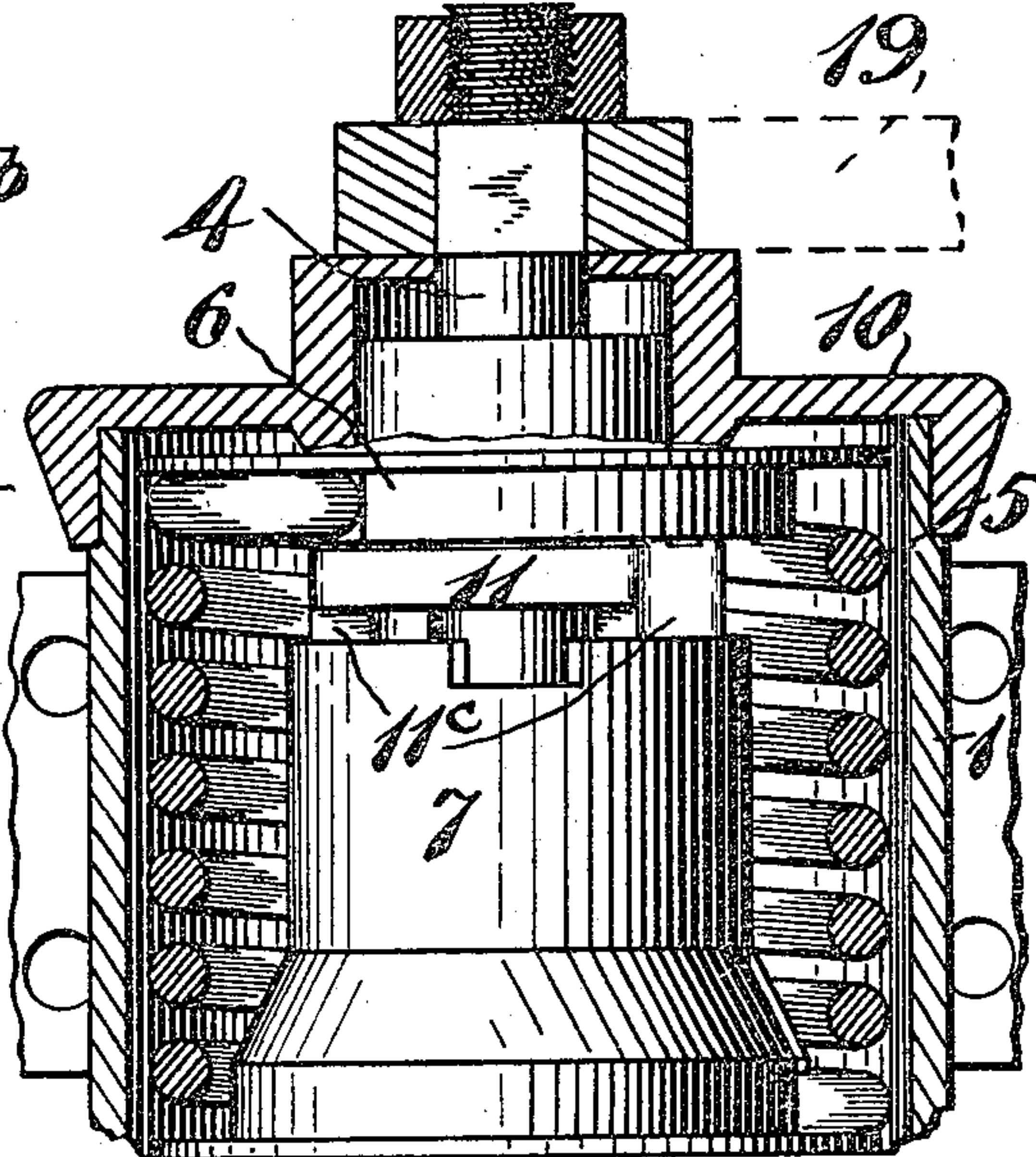


Fig. 4.

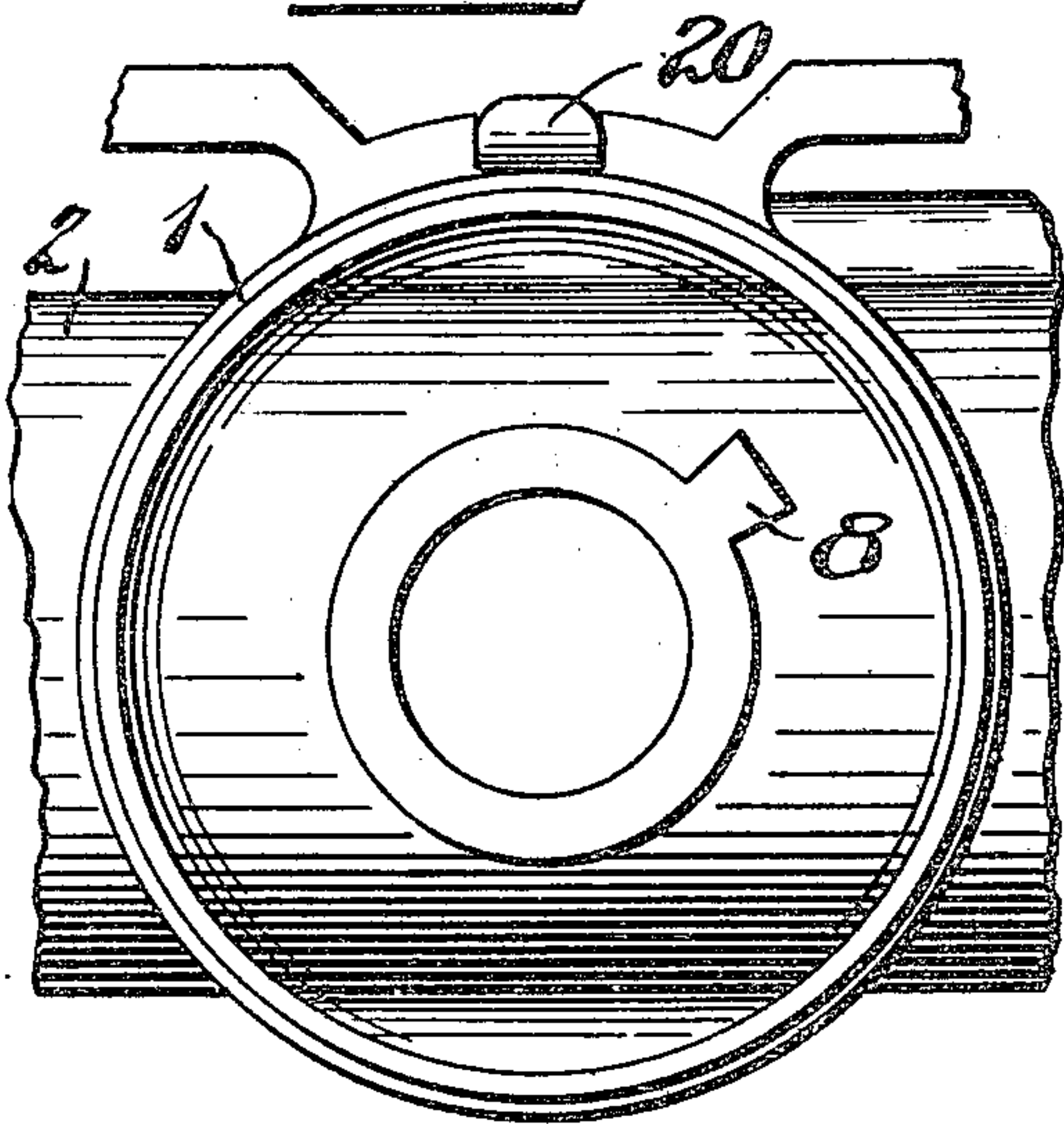
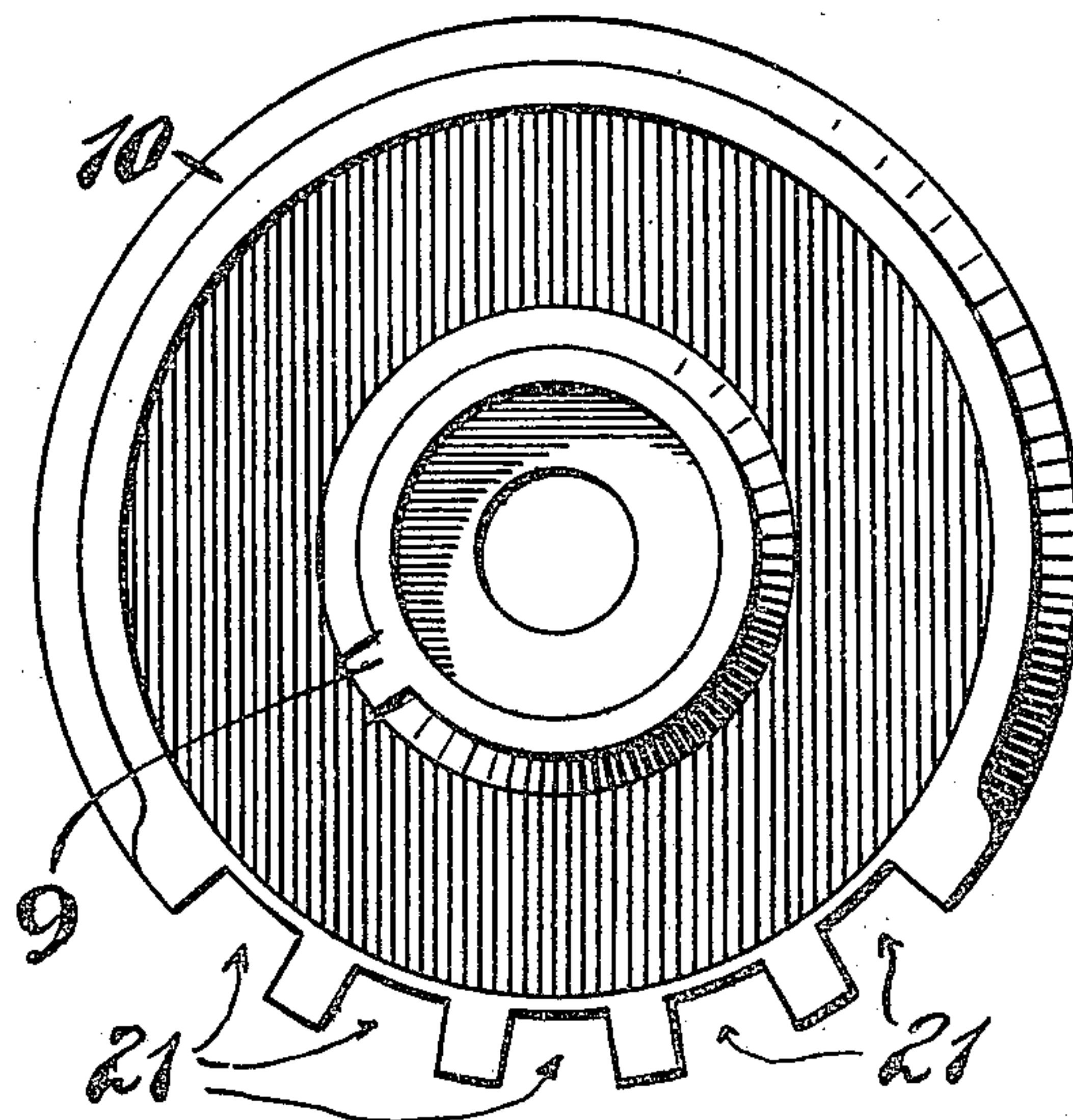


Fig. 5.



Witnesses:
Chas. M. Peard
Fred M. Dannerfelser

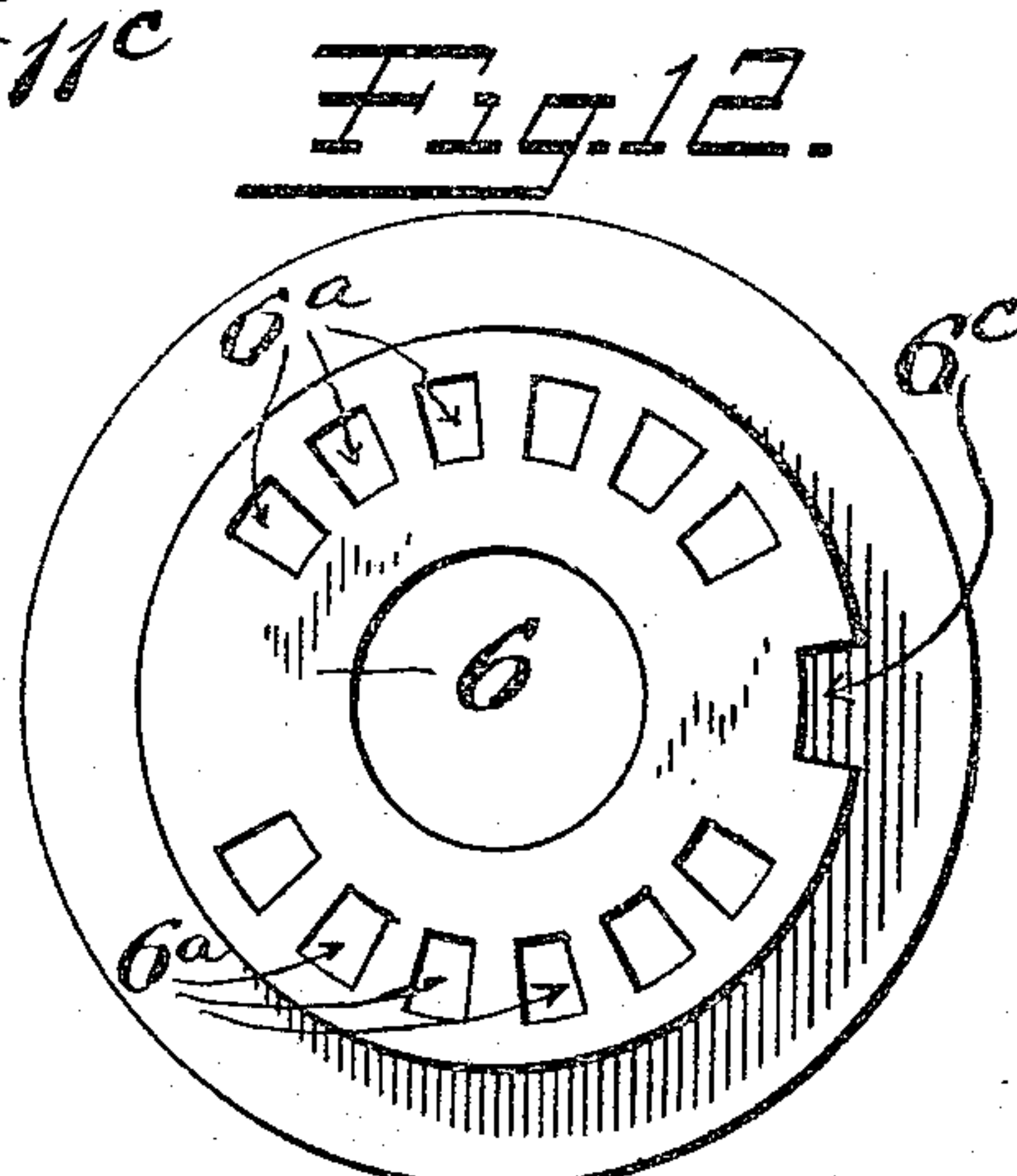
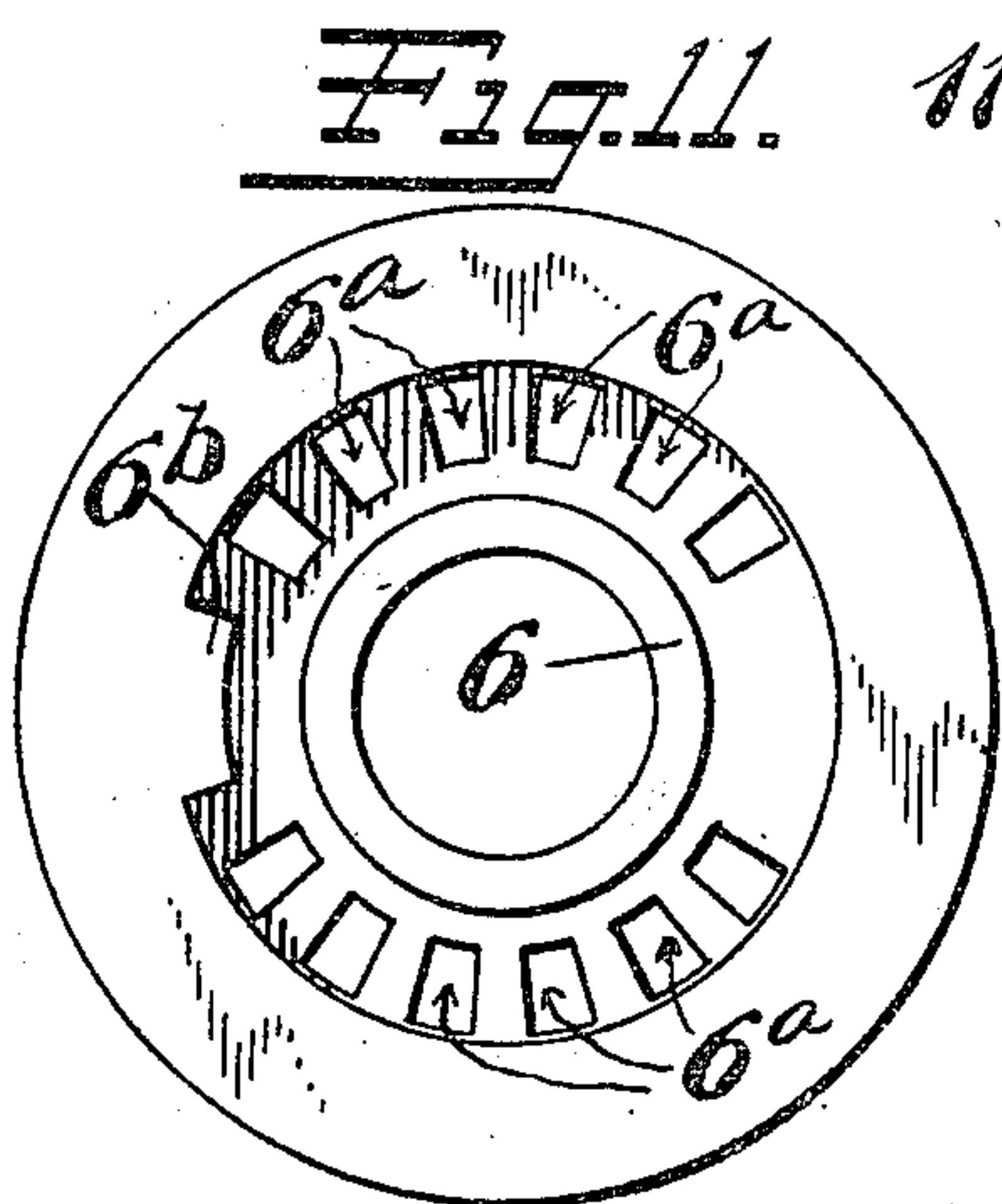
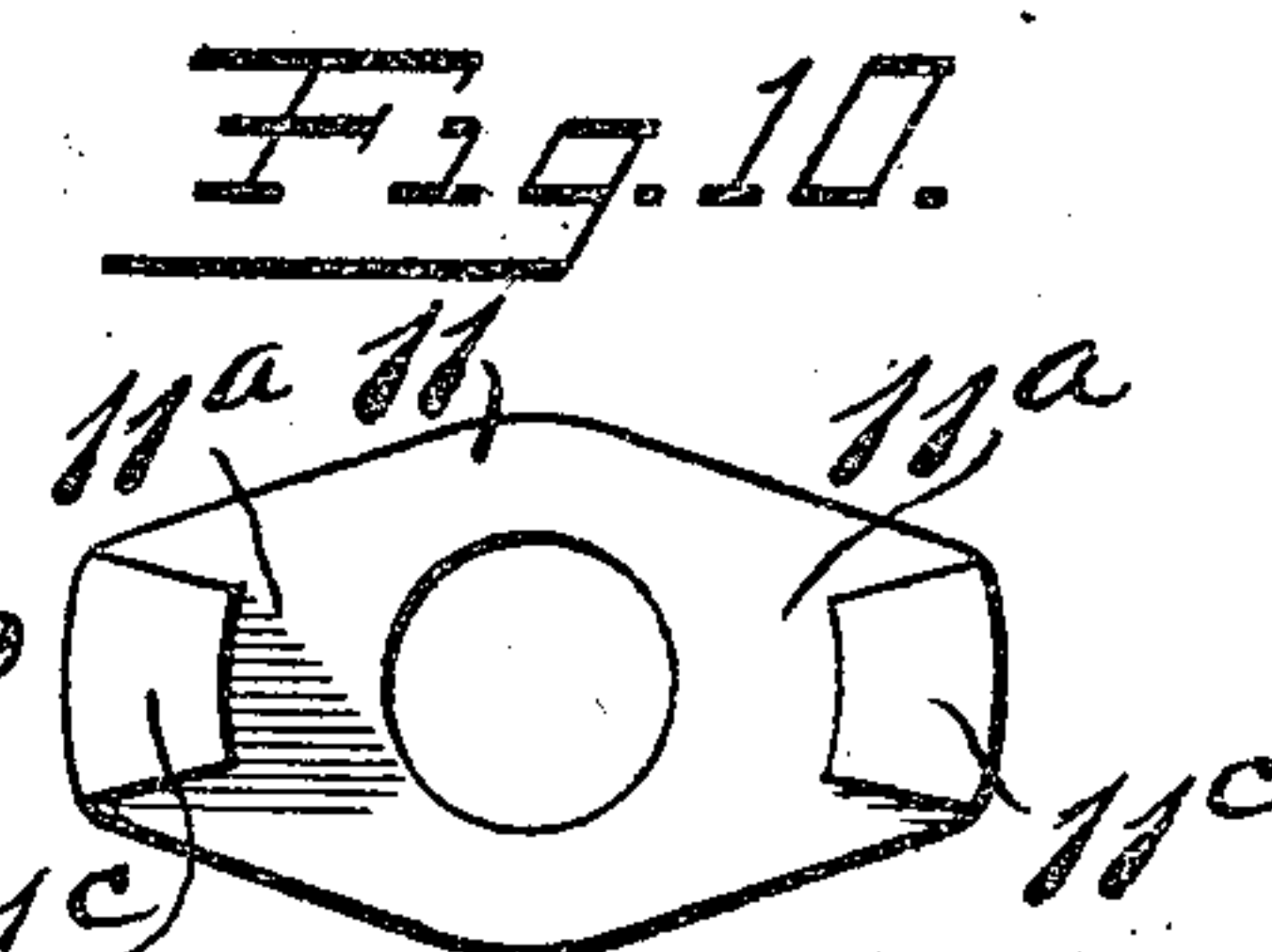
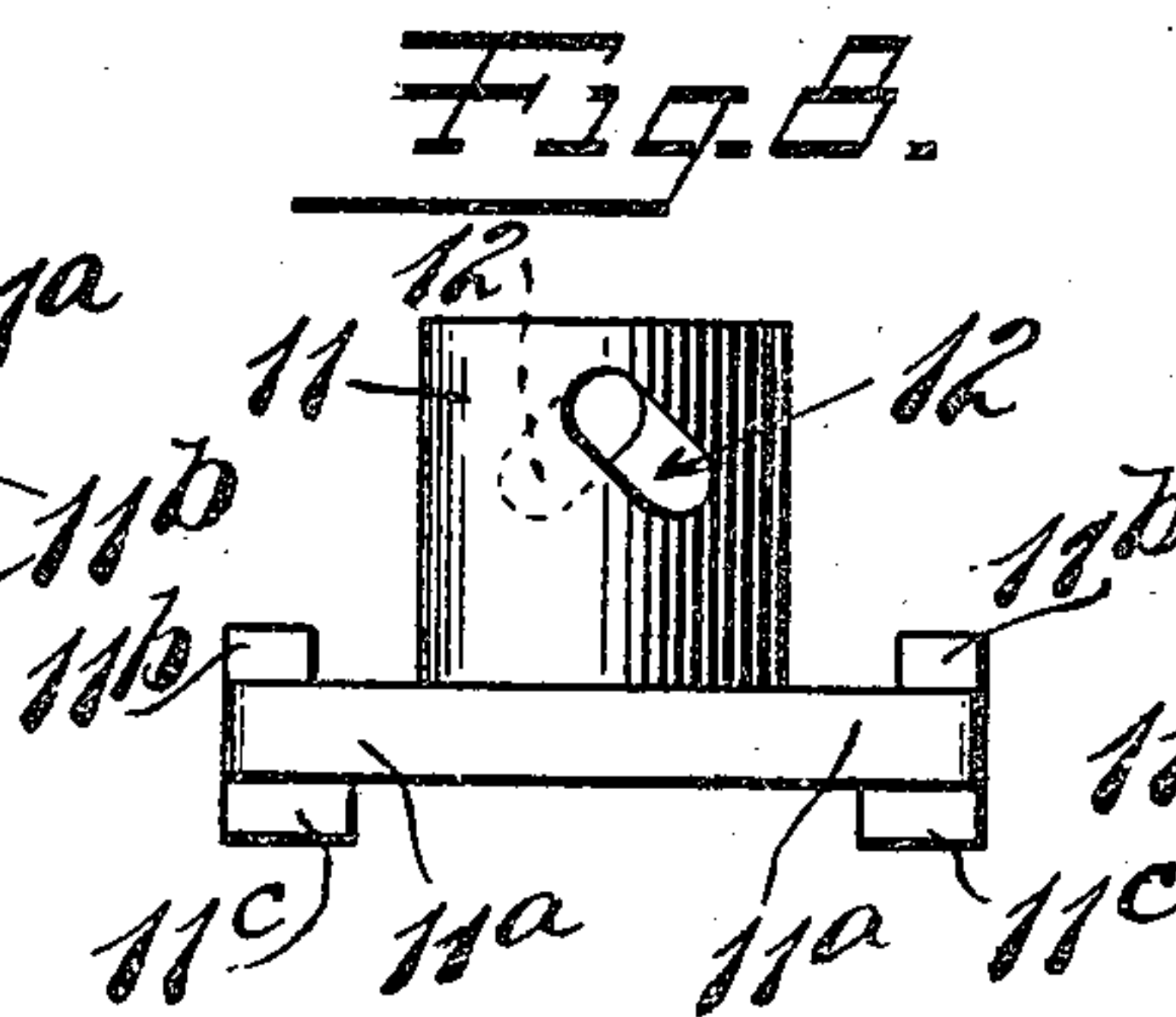
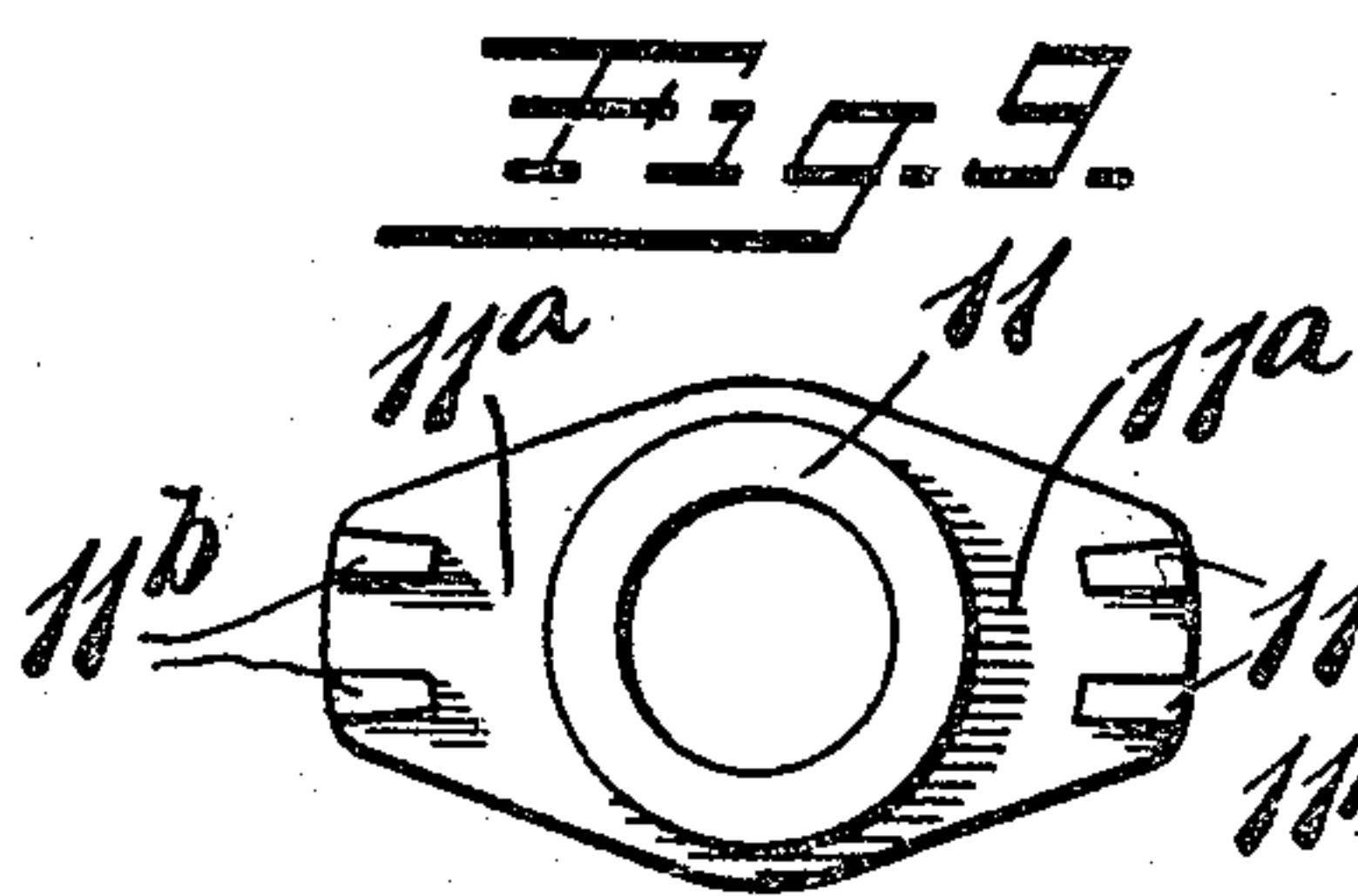
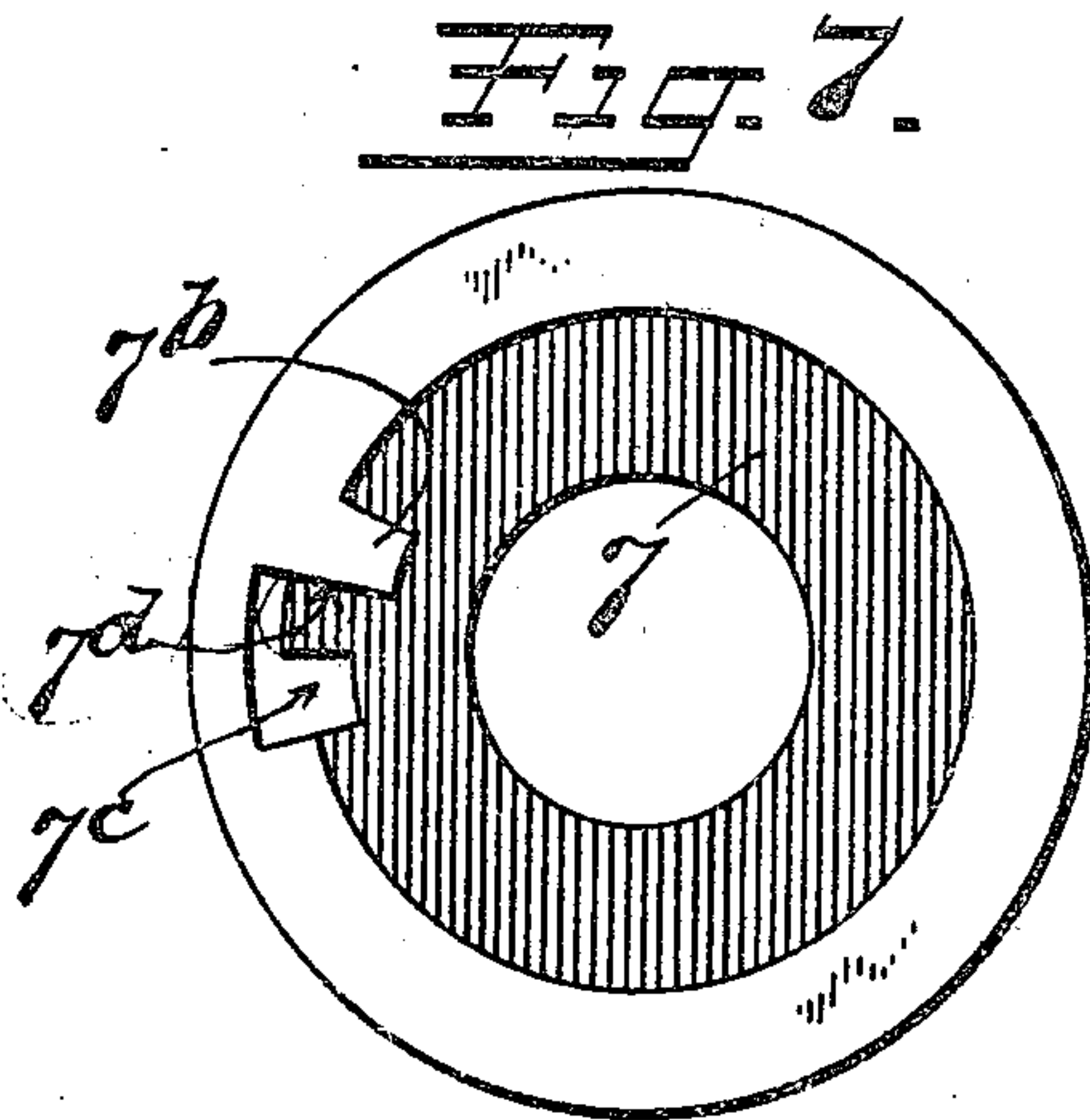
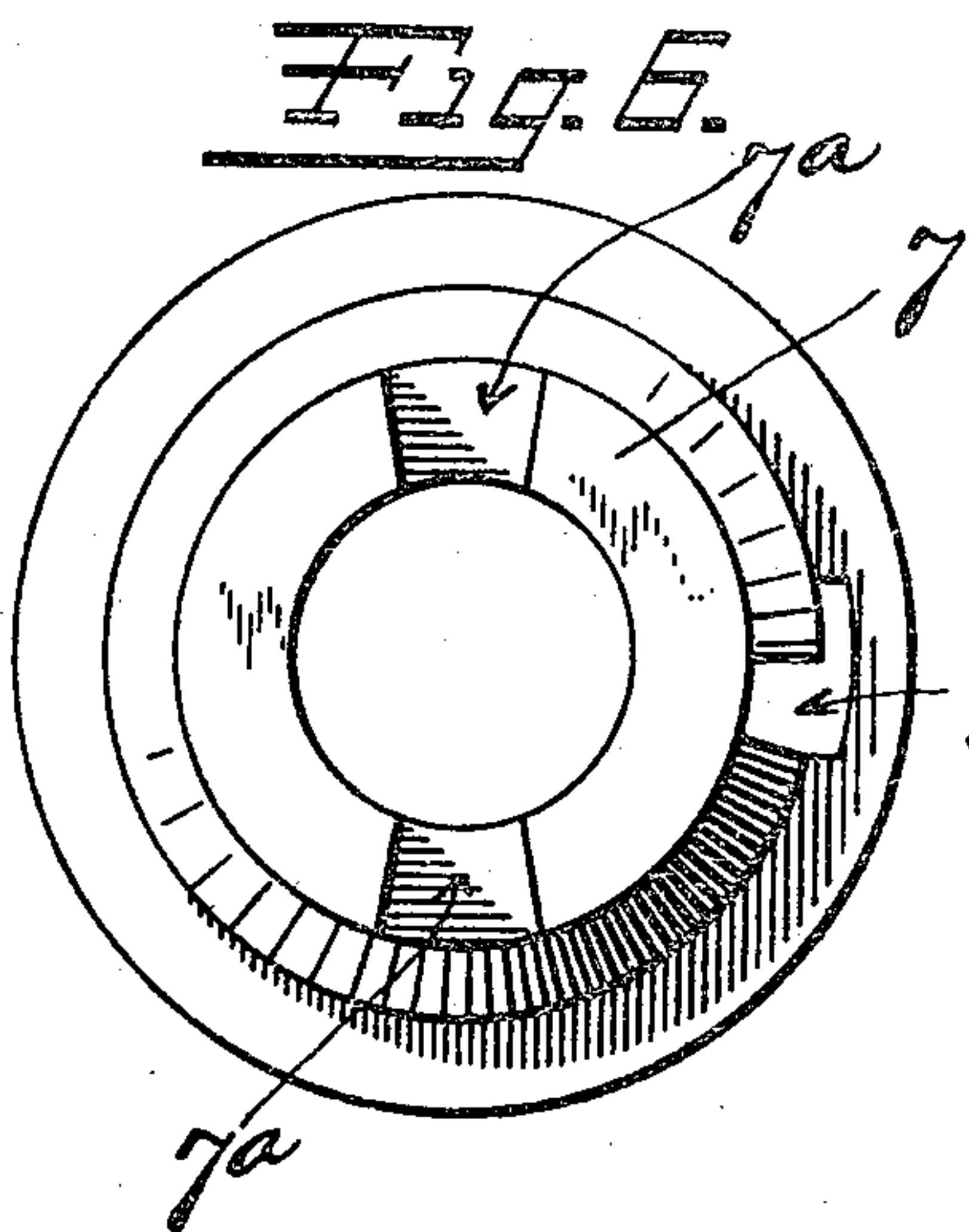
Inventor
W. K. HENRY
By His Attorneys
Benton & Son, Inc.

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3 SHEETS—SHEET 3.



Witnesses:
Chas. M. Reed
Eud. M. Dannenfels

Inventor
W. K. HENRY
By *Attorneys*
Robert G. Meehan

UNITED STATES PATENT OFFICE.

WILLIAM K. HENRY, OF NEW BRITAIN, CONNECTICUT, ASSIGNOR TO P. & F. CORBIN,
OF NEW BRITAIN, CONNECTICUT, A CORPORATION OF CONNECTICUT.

DOOR-CLOSER MECHANISM.

962,142.

Specification of Letters Patent. Patented June 21, 1910.

Application filed February 18, 1910. Serial No. 544,583.

To all whom it may concern:

Be it known that I, WILLIAM K. HENRY, a citizen of the United States, residing at New Britain, county of Hartford, State of Connecticut, have invented certain new and useful Improvements in Door-Closer Mechanism, of which the following is a full, clear, and exact description.

My invention relates to an improved door closer of a type particularly useful when combined with a liquid door check.

The object of the present invention is to provide certain improvements on the construction set forth in my copending application, Serial No. 544,584.

The main advantages of the present improved form relate to the provision of an improved clutch; also to cheapening the various details of construction without sacrifice of durability or effectiveness, as well as other advantages which from a reading of the following description will be readily apparent to the mechanic skilled in this art.

In the drawings: Figure 1 is a vertical section of my improved door closer combined with a liquid check; Fig. 2 is a detail view in section of the closer mechanism in one position; Fig. 3 is a similar view, the parts being in another position; Fig. 4 is a plan view of the closer case, the cap and contents being removed; Fig. 5 is a view of the under side of the cap; Fig. 6 is a view of the top of the lower dog detached; Fig. 7 is a view of the bottom of the lower dog detached; Fig. 8 is a side elevation of the clutch; Fig. 9 is a top view of the same; Fig. 10 is a bottom view of the same; Fig. 11 is a view of the top of the upper dog; Fig. 12 is a view of the bottom of the upper dog; Fig. 13 is a side elevation of a bushing; Fig. 14 is a section of the bushing on the line $x-x$ looking down.

1 represents the case for the closer mechanism.

2 represents the case for the check mechanism, the same, in this instance, being integrally formed with the case 1, both cases being cylindrical, the axes of the same being at right angles to each other.

3 is a piston movable to and fro in the cylinder 2, said piston being actuated by a rotatable spindle 4, the connections between said spindle and piston being of any desired construction, whereby the rotary movement of the spindle will be transformed into

a rectilinear movement of the checking piston 3. A suitable liquid is usually employed within the casing or cylinder 2 and suitable valves are likewise employed, whereby the liquid can flow from one end of the cylinder to the other with comparative freedom while the piston is traveling in one direction; said liquid checking the free movement of the piston in an opposite direction. It will be understood, of course, that the particular form of the check is immaterial.

Now turning to the closer mechanism, the closer spring operates upon the spindle 4 to restore it to a neutral position in which position it may be assumed the door (to which the closer is applied) is closed. The power for closing the door is secured through the medium of the closer spring 5 arranged in this instance, spirally within the case 1, the upper end being connected to what I will term the upper dog 6, the lower end being connected to what I will term the lower dog 7. Both of these dogs are rotatably mounted concentrically with the spindle 4 and a back-stop 8 is provided within the case 1, to check the rearward rotation of the lower dog beyond a certain point; another back-stop 9 being provided on the under side of the cap 10 to check the rearward rotation of the upper dog,—said closer spring 5 operating in a direction to turn both of said dogs back against the aforesaid stops.

11 is a clutch mounted on the spindle 4 and so connected therewith as to partake of limited rotary and longitudinal movement thereon, the connection between said parts being effected by means of a spiral. In this particular instance the spiral is formed by providing in the sleeve or hub of the clutch 11 a diagonal slot or slots 12—12, the ends of the pin 13 carried by the spindle 4, standing in said slots, whereby when the spindle 4 is rotated in the hub of said clutch, said spiral connection will cause said clutch to move longitudinally on the spindle, the rotative and longitudinal movement being limited in this particular instance by the length of the slots. The clutch 11 includes, as already stated, the hub portion, mounted upon the spindle 4. Projecting laterally from said hub portion are the extensions 11^a having clutch teeth 11^b on the upper side, and clutch teeth 11^c on the lower side thereof, any desired number of teeth being employed. The teeth 11^b are intended

ed to interlock with the upper dog when the clutch moves upwardly on the spindle 4, said teeth 11^b projecting into recesses or openings 6^a on the under side of the upper dog 6.

6^b is a stop shoulder on the upper side of the dog 6 designed to co-act with the back-stop 9 on the under side of the collar for the purpose described.

6^c is a notch in the side of the upper dog 6 in which the hooked upper end of the spring 5 is anchored.

The teeth 11^c on the lower side of the clutch extensions 11^a—11^a are arranged to engage in correspondingly shaped notches 7^a—7^a in the upper side of the lower dog, at such times as the clutch 11 is in its lower position.

7^b is a stop shoulder arranged to co-act with the back-stop 8 within the case 1. A clearance notch or recess 7^c in the side of the dog 7 permits the hooked lower end of the spring to be engaged with a holding shoulder 7^d for anchoring said spring to the lower dog.

As shown, the spindle 4 passes centrally through the case 1 and diametrically through the cylinder 2, the lower end of said shaft being preferably stepped at 14 in the bottom of the cylinder 2, said shaft being supported intermediate its length by a bearing bushing 15, which, as will be observed, is threaded into an opening in the bottom of the case 1. The upper end of said bushing projects well up into the case 1, indeed, preferably above the center line thereof, giving ample space for a packing within said bushing, the particular form of packing being immaterial, one form being conventionally illustrated at 16. The packing 16 is held to its seat by a spring 17 located in an air space 18 within the bushing 15. The spindle is thus not only firmly supported against lateral displacement, but the passage in the bushing 15 through which said spindle passes is of such relatively great length that all danger of liquid working up the side of the spindle and through the bushing into the interior of the closer chamber is eliminated. Indeed, an important feature of my invention comprises a construction which will admit of this abnormally long bushing. The bushing 15, in this particular instance, constitutes the center bearing for the dog 7, while the hub of the clutch 11 constitutes a center bearing for the upper dog. Any suitable means may be provided to hold these two dogs 6 and 7 in the proper spaced relation, the importance of which will later be seen. In this particular instance, the spring 5 tends to move said dogs apart and the bearings are so arranged that when all the parts are assembled said dogs will be maintained in said proper spaced relation.

The spacing of the dogs is such as to permit the clutch to have sufficient movement up and down to become entirely freed from one of the dogs before it can be employed to turn the other dog. As shown in Fig. 2, the clutch 11 is in driving engagement with the lower dog 7 and is out of driving engagement with the upper dog 6, whereas in Fig. 3 the conditions are reversed and the clutch is in position to drive the dog 6 and is disengaged (so far as driving connection is concerned) from the lower dog 7.

The spindle 4 is moved in the usual way by means of the usual lever arm 19 fixed thereto. The spring tension is varied by shifting the angular position of the cap 10 on the case 1. When the cap has been turned so as to impart to the spring 5 the desired tension, a suitable latch 20 is dropped into one of the notches 21 at the periphery of the cap, holding said cap against rotation. Any desired number of notches 21 may be employed, although in the drawings only a part of the periphery of said cap is provided with such notches inasmuch as it has been found that with the type of spring shown it requires only a partial turn of the cap to secure a substantial variation in tension.

As will now be seen, the lever arm 19 if moved in either direction away from the normal position will cause the winding up of the spring from one end or the other accordingly as the clutch 11 is connected with the upper or lower dog; that particular condition depending merely upon the direction of rotation of the spindle, since by the spiral connection between the spindle and the clutch, said clutch will be first shifted longitudinally from driving engagement with one dog into driving engagement with the other dog before rotary movement can be imparted to the latter. As soon as the clutch teeth become disengaged from the recesses in one of the dogs, continued rotation of the lever arm 19 will result in a corresponding rotation of the clutch 11 and the dog with which it is then interlocked.

All of the parts may be very economically produced and assembled and, by reason of the positive action of the various parts, including the clutch, the construction is very reliable and durable.

What I claim is:

1. In combination, in a door closing mechanism, a spindle arranged to turn in either direction, a clutch mounted thereon capable of limited rotary and longitudinal movement relatively thereto, a connection between said spindle and clutch whereby rotary movement of the former in the latter will impart longitudinal movement thereto, two independent dogs arranged for independent engagement and rotation by said clutch, a spring operatively connected with

both of said dogs and exerting a pull in opposite directions on said dogs, and a back-stop for checking the rearward movement of each of said dogs.

5 2. In combination, in a door closing mechanism, a spindle arranged to turn in either direction, a clutch mounted thereon capable of limited rotary and longitudinal movement relatively thereto, a connection between said spindle and clutch whereby rotary movement of the former in the latter will impart longitudinal movement thereto, two independent dogs arranged for independent engagement and rotation by said clutch, a spring operatively connected with both of said dogs and exerting a pull in opposite directions on said dogs, and a back-stop for checking the rearward movement of each of said dogs, one of said back-stops being adjustable.

20 3. In combination, in a door closing mechanism, a spindle arranged to turn in either direction, a clutch mounted thereon capable of limited rotary and longitudinal movement relatively thereto, a connection between said spindle and clutch whereby rotary movement of the former in the latter will impart longitudinal movement thereto,

two independent dogs arranged for independent engagement and rotation by said clutch, a spring operatively connected with both of said dogs and exerting a pull in opposite directions on said dogs, a back-stop for checking the rearward movement of each of said dogs, one of said back-stops being adjustable, said clutch being arranged to make driving engagement with either of said dogs in any position of adjustment of the latter.

4. In a door closing apparatus, a device rotatable in either direction, two spring-controlled independently rotatable dogs mounted concentrically with said device, and means for holding the same in spaced relation, a clutch arranged to make driving engagement with either one of said dogs, said clutch being concentrically mounted relatively to said device, and a spiral connection between the clutch and said device, whereby movement of the latter will shift said clutch longitudinally to move the same into driving engagement with the desired dog.

WILLIAM K. HENRY.

Witnesses:

R. C. MITCHELL,
CHAS. A. PEARD.