

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

962,143.

Patented June 21, 1910.

4 SHEETS—SHEET 1.

Fig. 1.

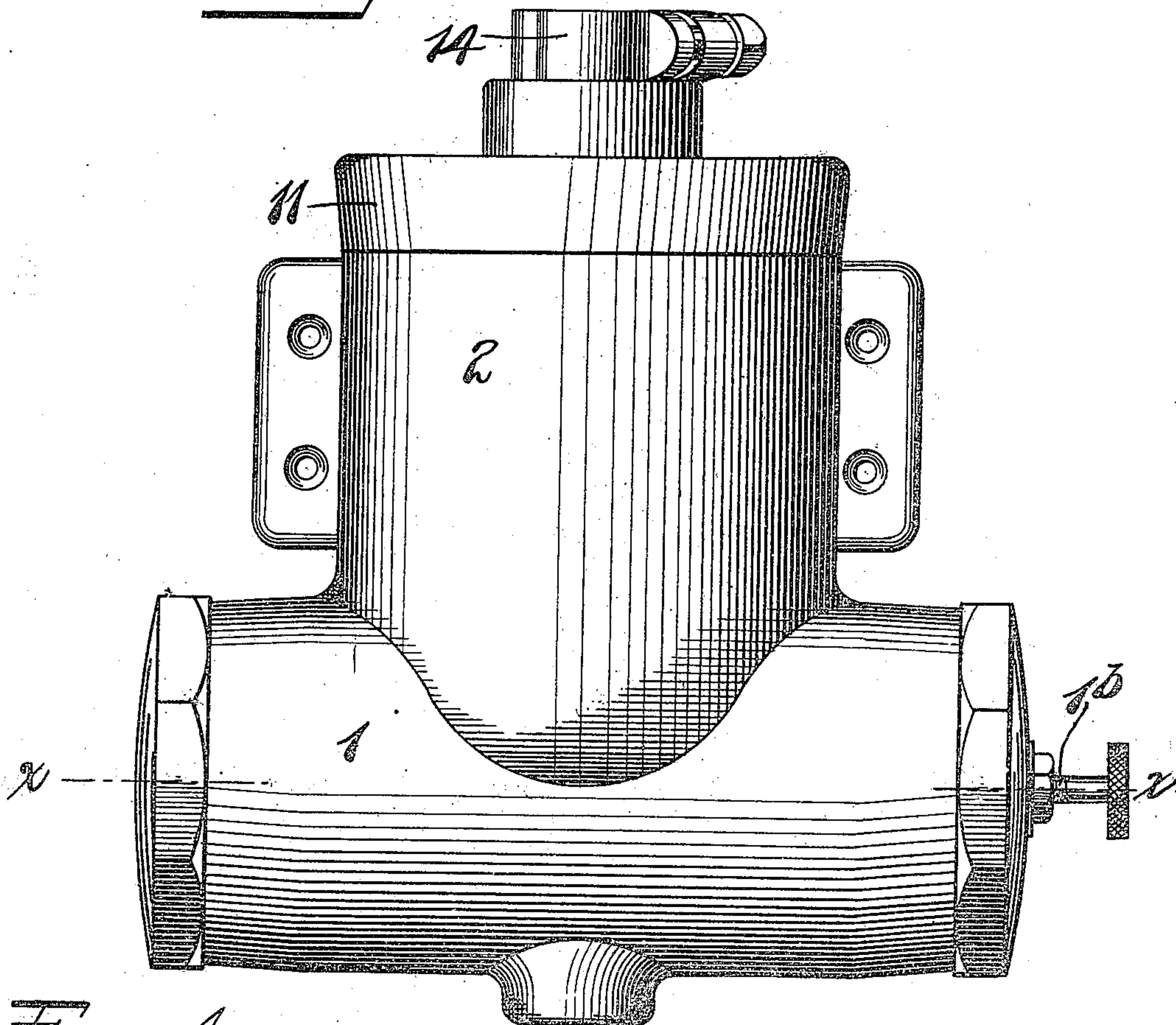


Fig. 4.

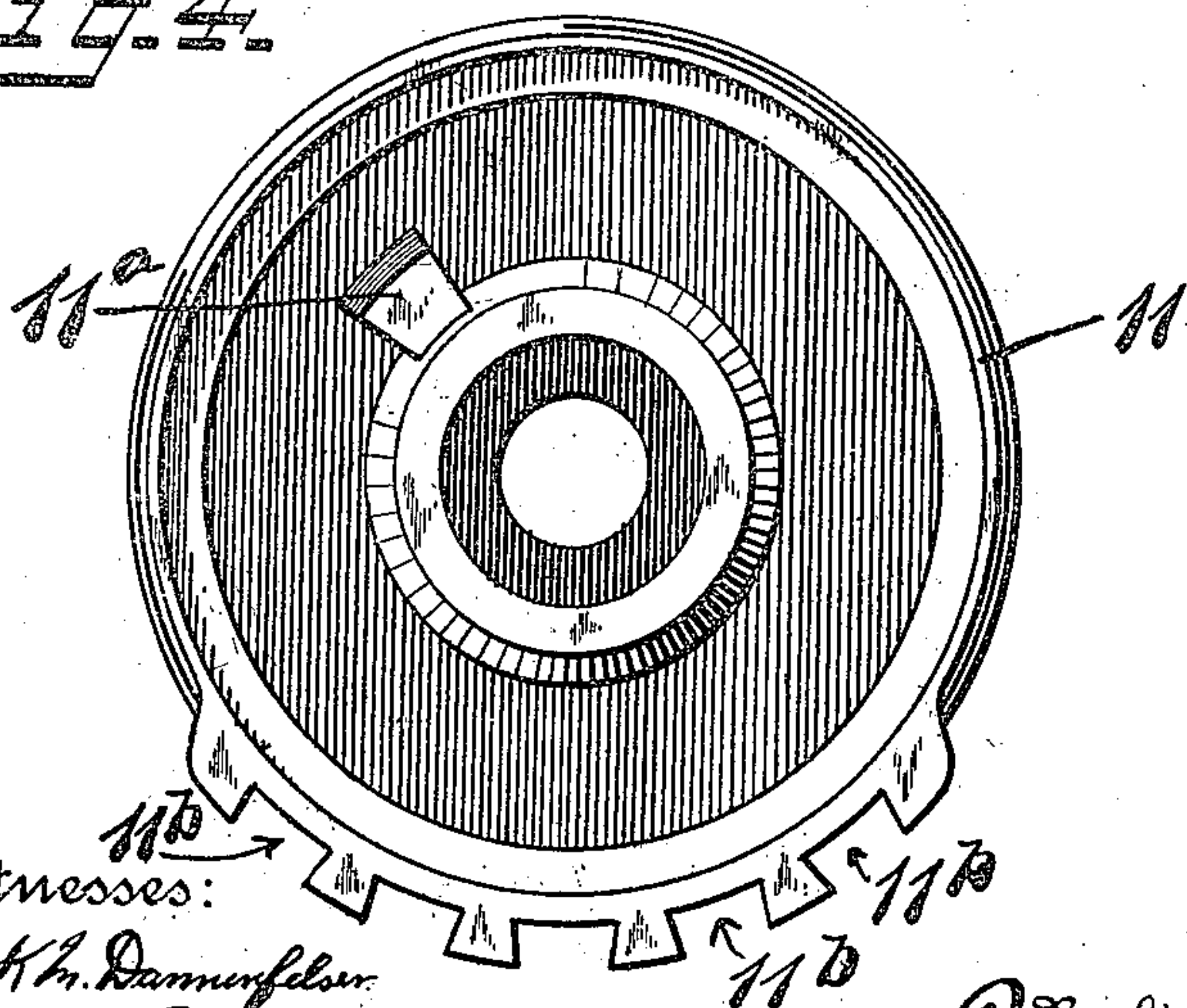
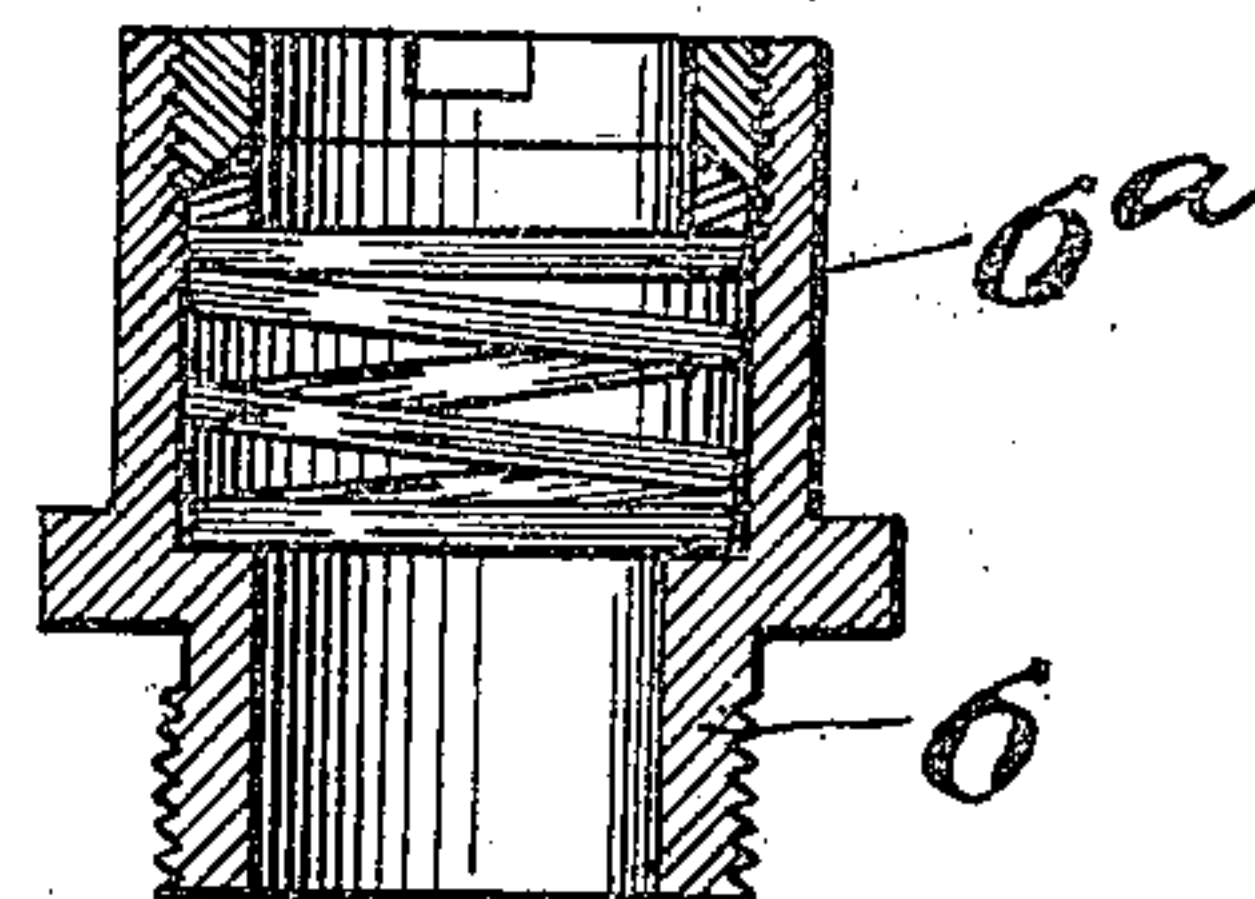


Fig. 5.



Witnesses:
Fred H. Dammelfeld
Chas. A. Reed

Inventor
W. K. HENRY.
By his Attorneys
Barrett, Barnes & Tuttle

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4 SHEETS--SHEET 2.

Fig. 2.

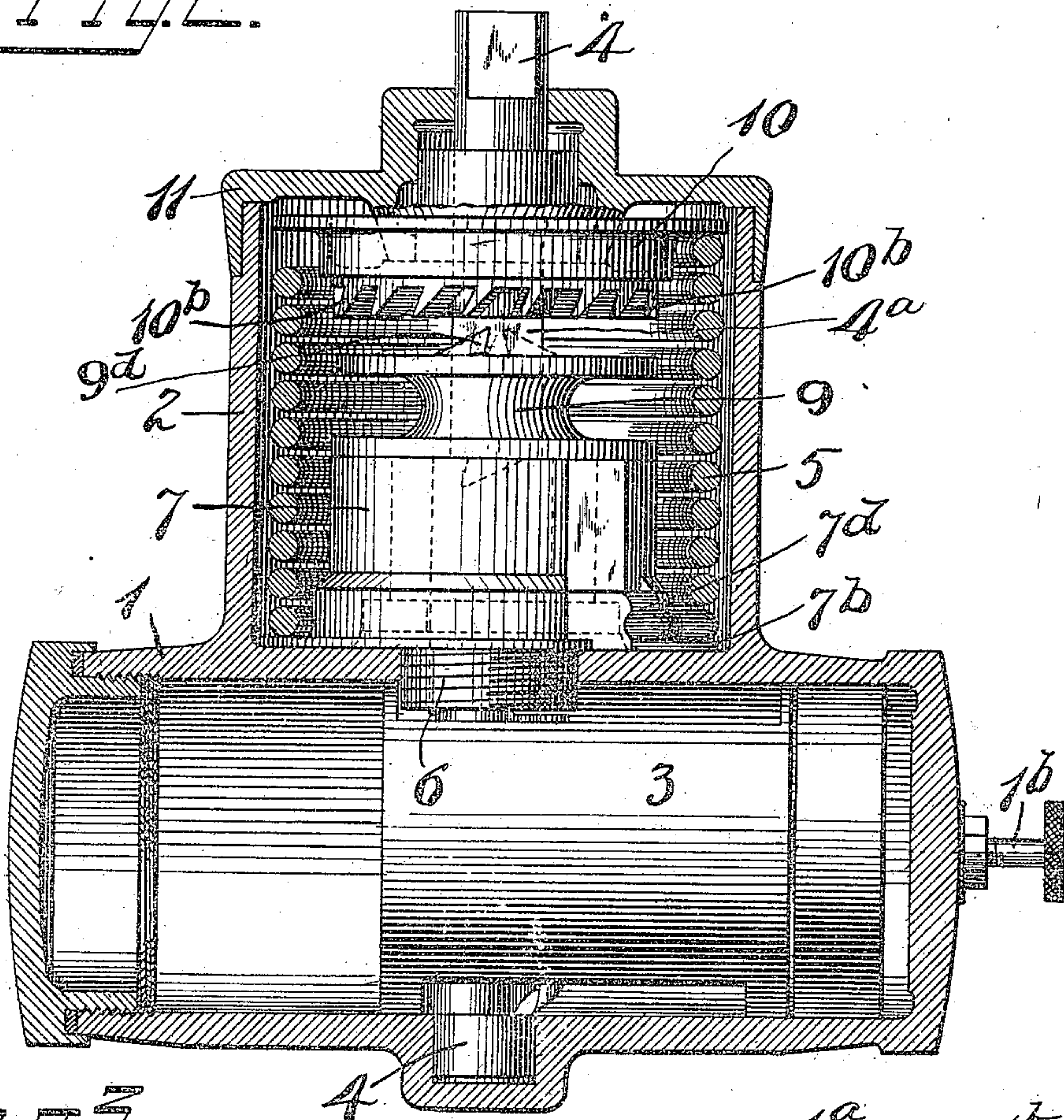
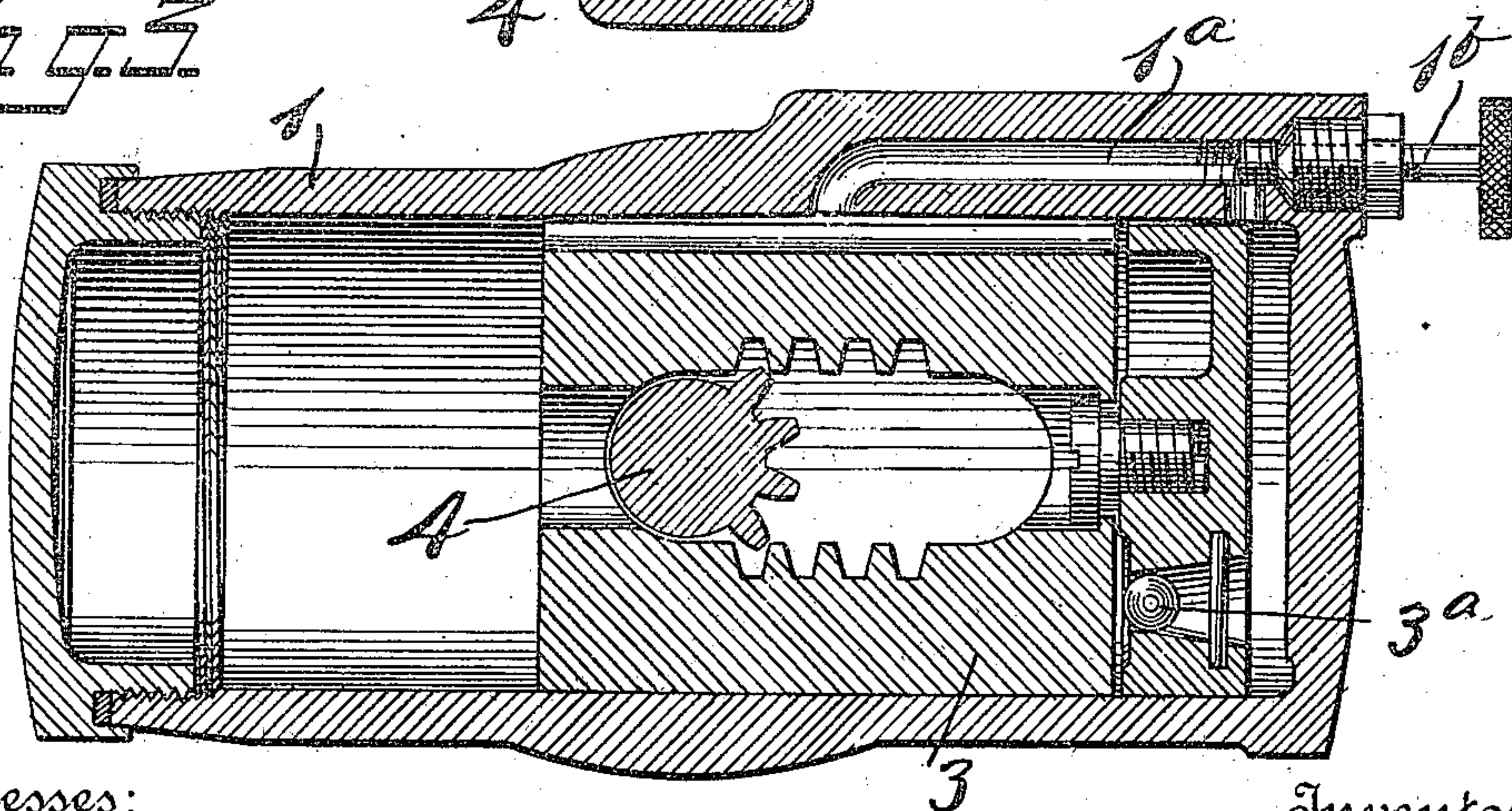


Fig. 3.



Witnesses:
Fred M. Dammunfelsen
Chas. A. Peard

Inventor
W. K. HENRY
By his Attorneys
Bartlett & Munnell

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4 SHEETS—SHEET 3.

Fig. 6.

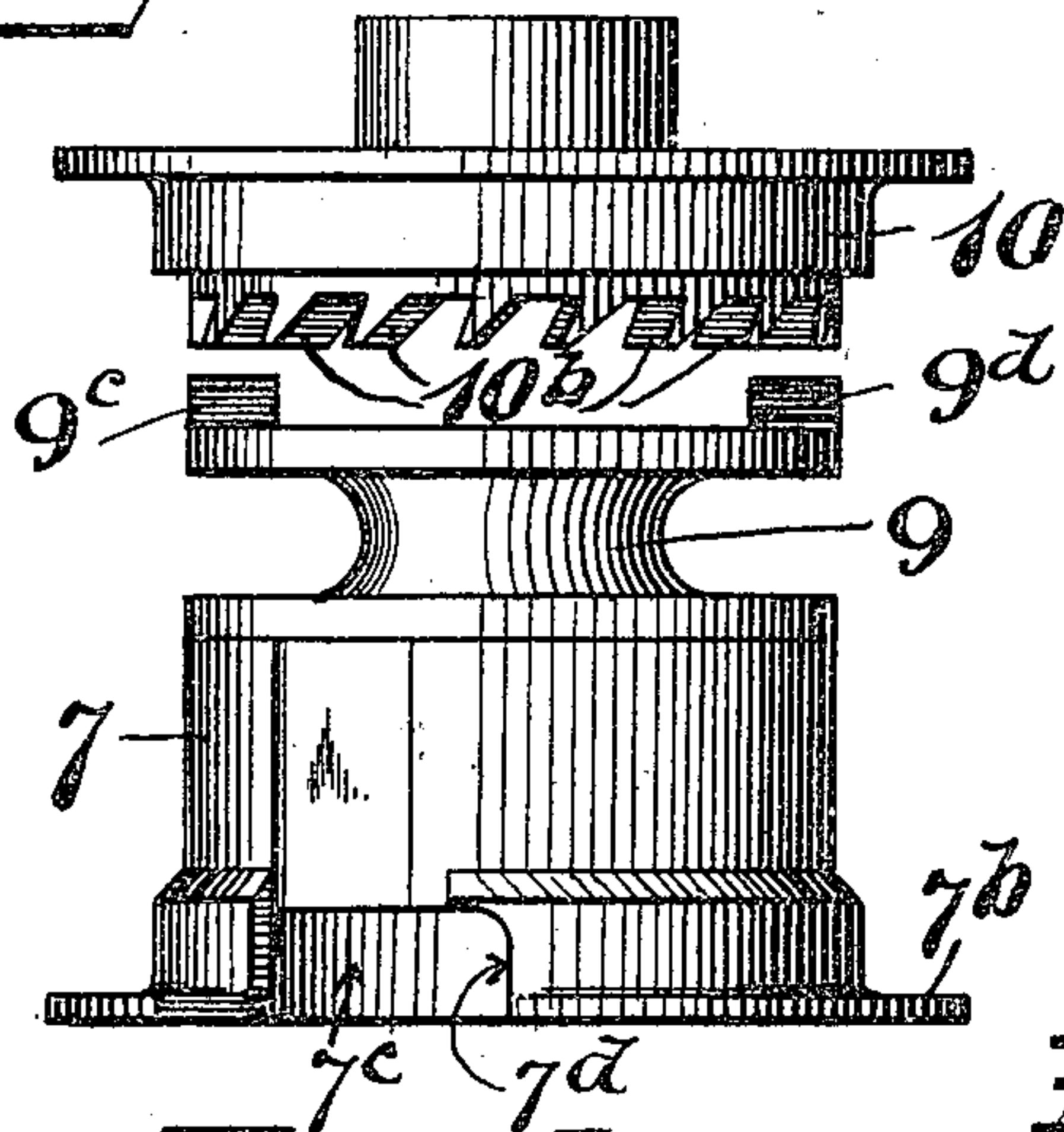


Fig. 7.

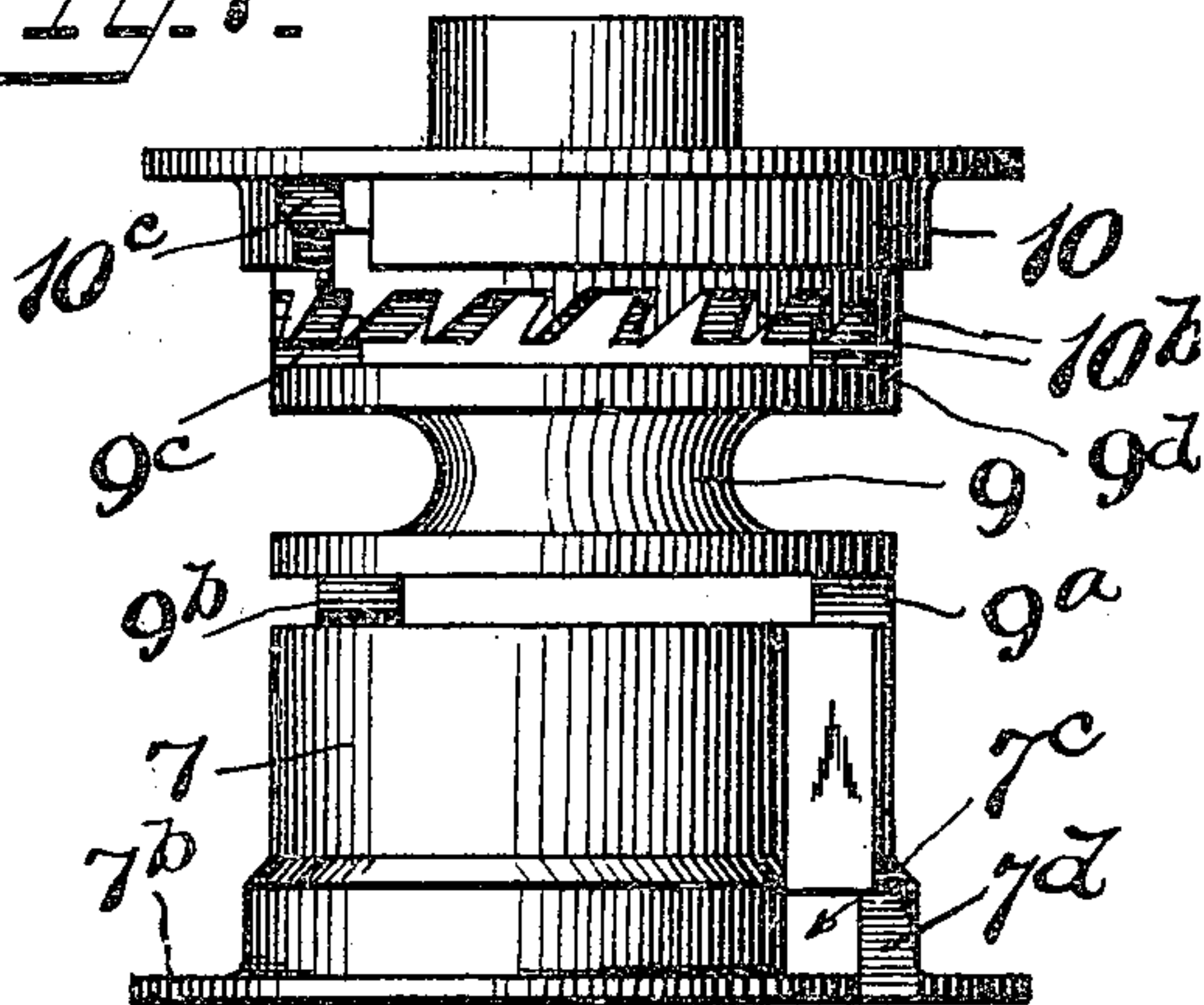


Fig. 10.

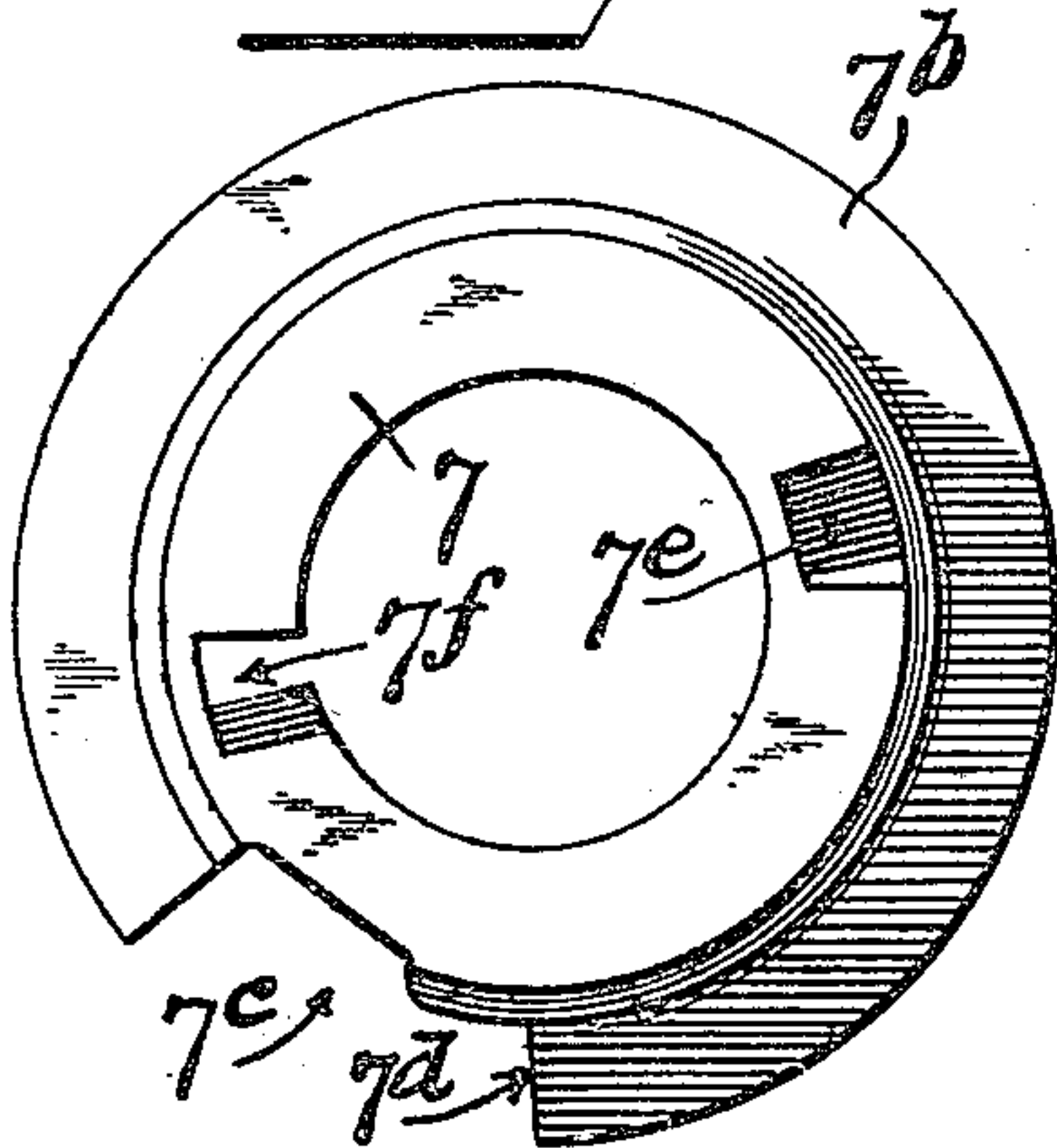


Fig. 8.

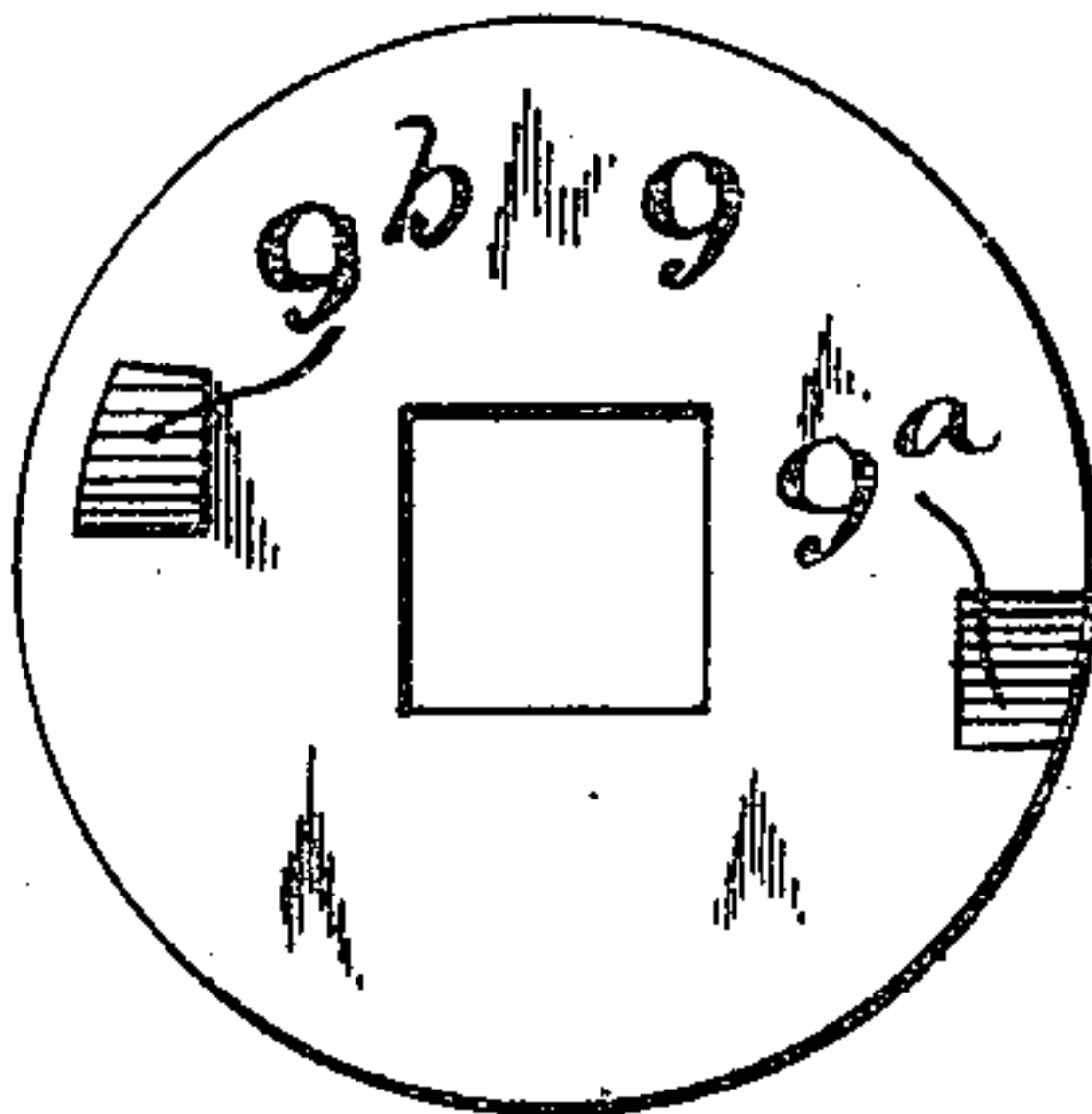


Fig. 12.

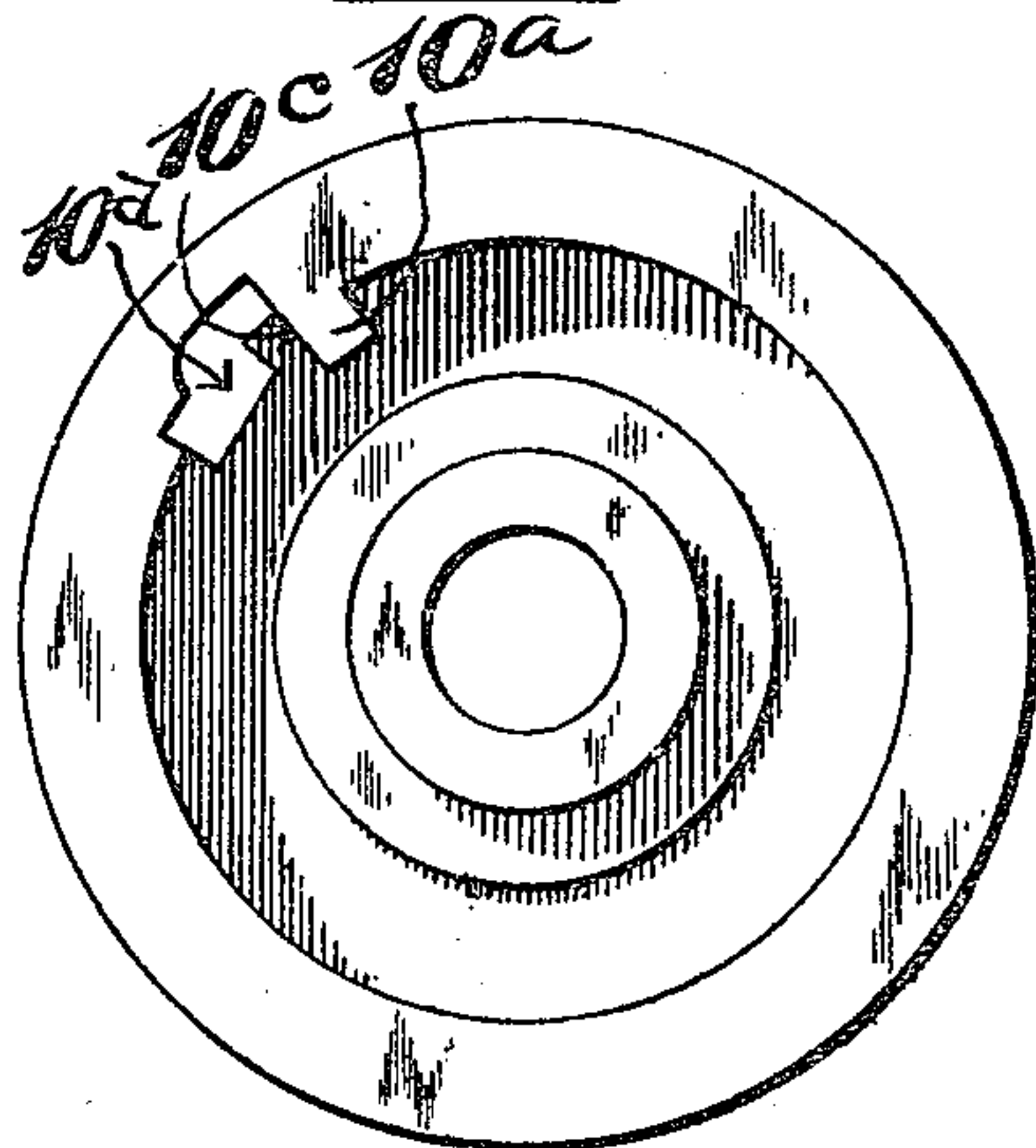


Fig. 9.

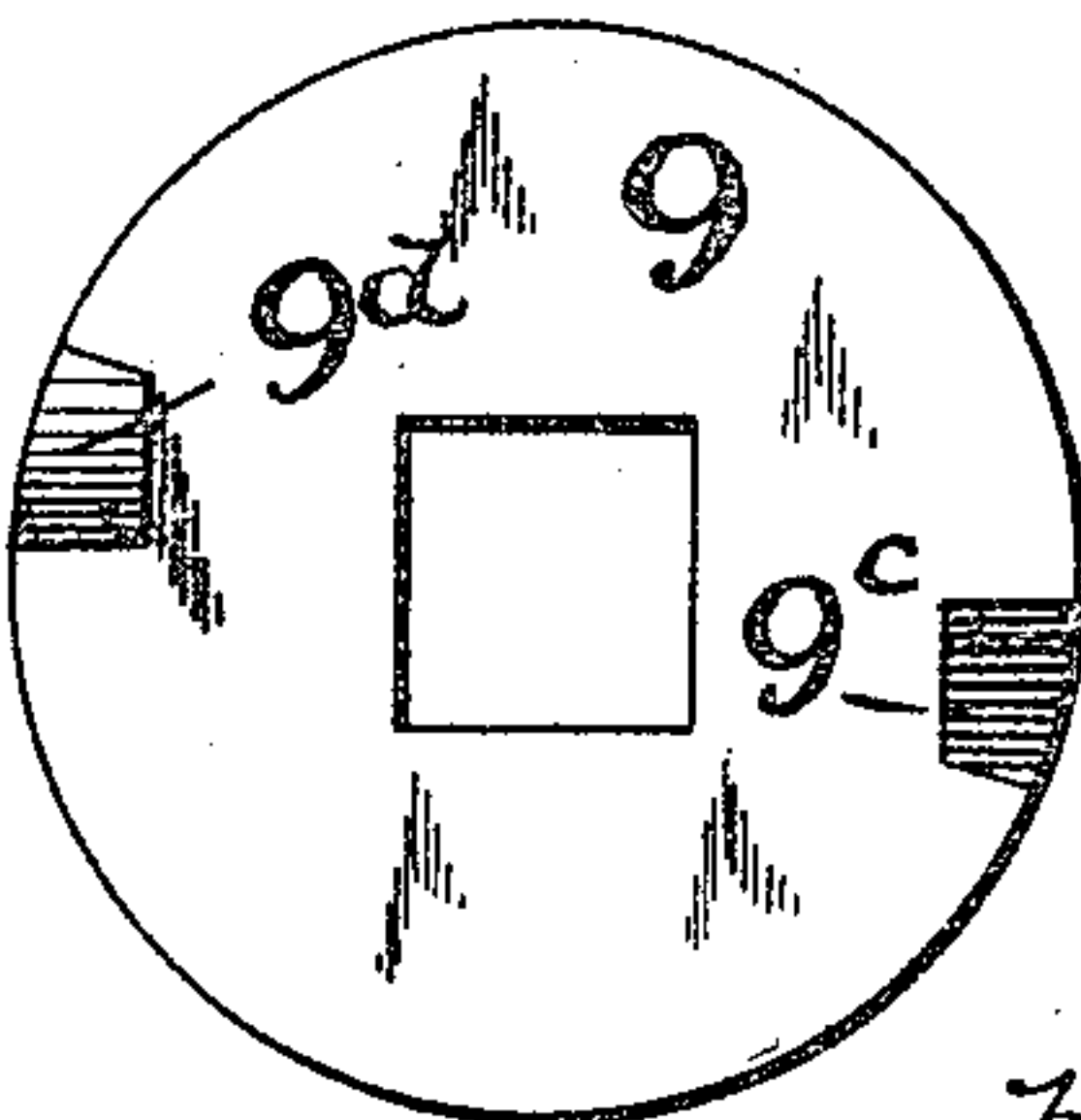


Fig. 11.

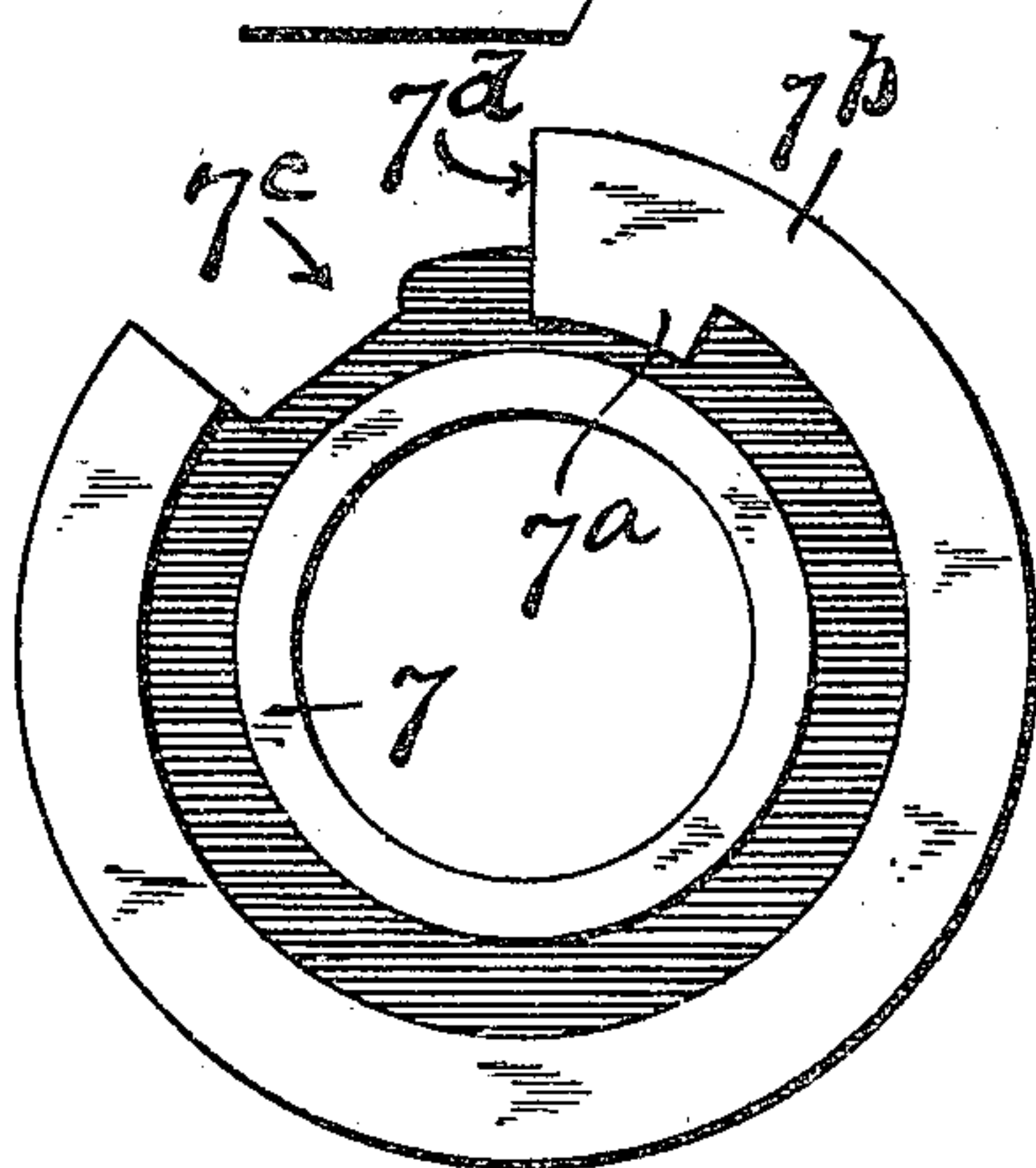
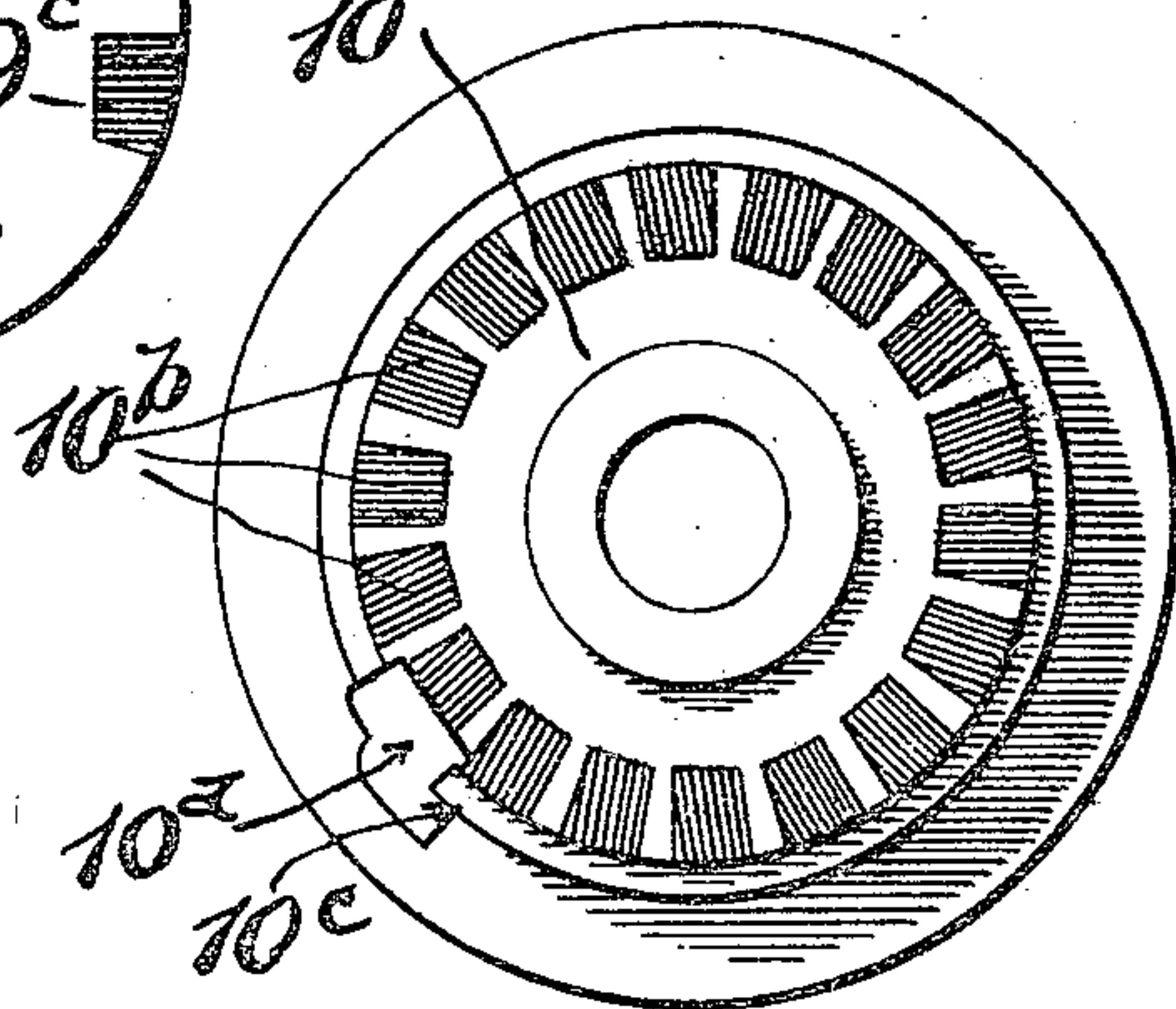


Fig. 13.



Witnesses:
Fred. K. M. Dammelfelver.
Chas. A. Pease

Inventor
W. K. HENRY.
By his Attorneys
Barnes, Brown & Fletcher

W. K. HENRY.
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4 SHEETS—SHEET 4.

Fig. 14.

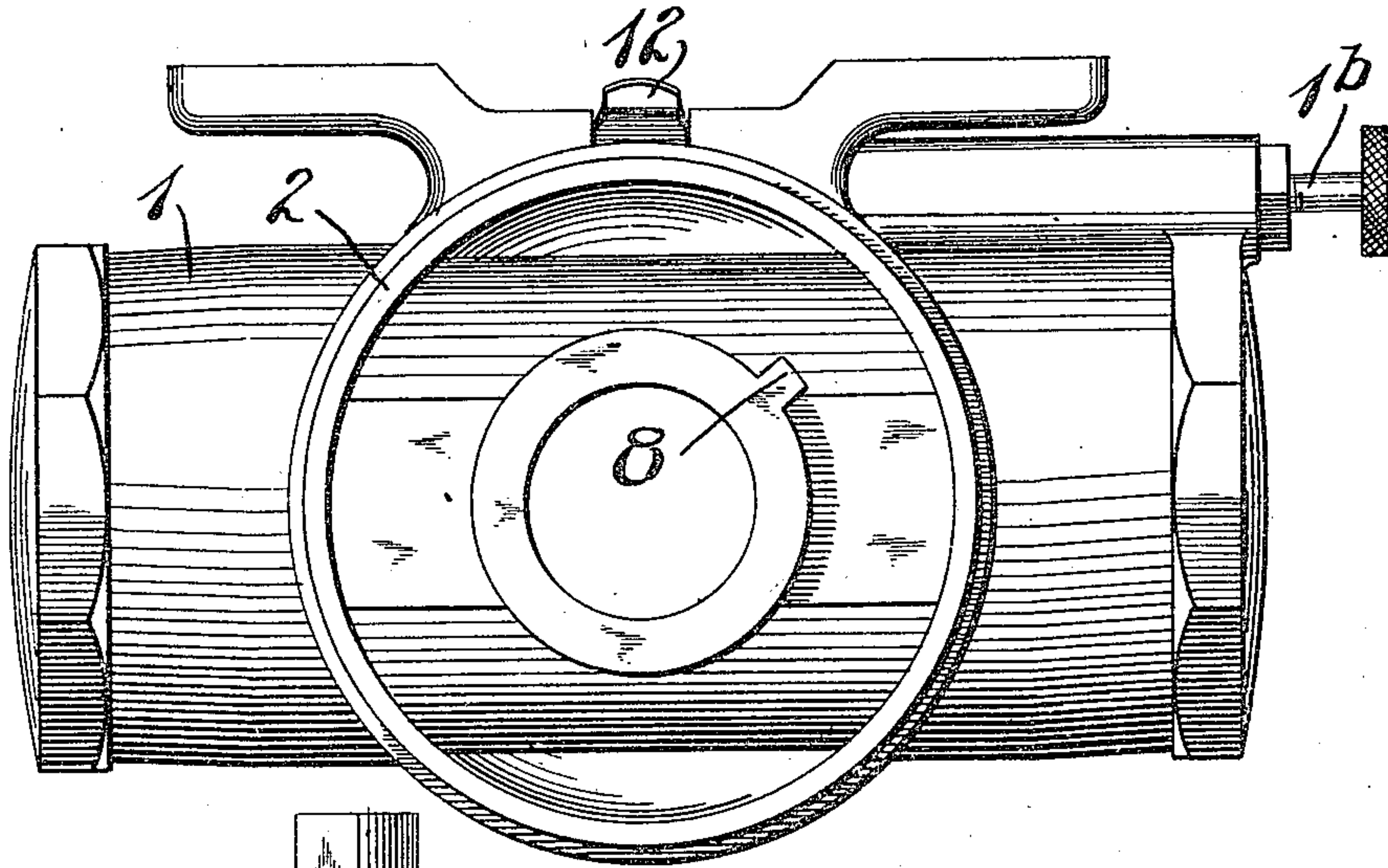
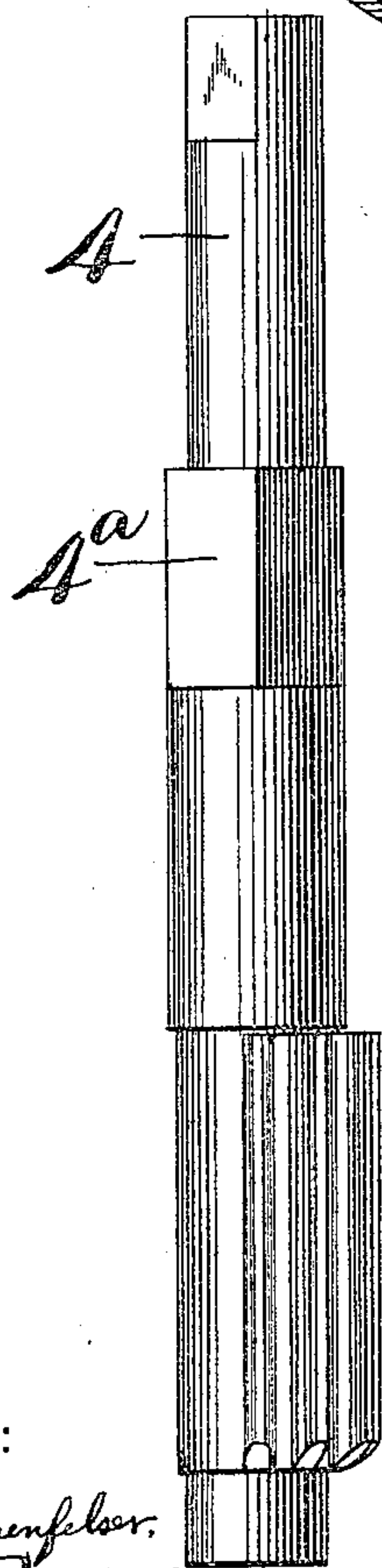


Fig. 15.



Witnesses:
Fred. R. M. Dammeyer,
Chas. A. Reed

Inventor
W. K. HENRY
By his Attorneys
Rauert, Bunnell & Muldrew

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-CONTROLLING MECHANISM.

962,143.

Specification of Letters Patent. Patented June 21, 1910.

Application filed February 18, 1910. Serial No. 544,584.

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-Controlling Mechanism, of which the following is a full, clear, and exact description.

My invention relates to improvements in door controlling mechanism, the object being to improve, simplify and cheapen the structure without sacrifice to durability and effectiveness. Incidentally, the structure embodies various advantages in adjustment, whereby the power may be varied and whereby the apparatus may be applied to a right or left hand door, without requiring any manual shifting of parts.

In the drawings, Figure 1 is a front elevation. Fig. 2 is a vertical transverse section of the parts shown in Fig. 1, certain parts being in elevation. Fig. 3 is a horizontal section on the line $x-x$, Fig. 1. Fig. 4 is a view of the under side of the cap removed. Fig. 5 is a detail view of a packing gland detached. Figs. 6 and 7 are detail views of certain parts shown in different positions. Fig. 8 is a plan view of the under side of a detail termed the clutch. Fig. 9 is a top plan view of the same detail. Fig. 10 is a top plan view of the lower dog. Fig. 11 is a view of the lower end of the same dog. Fig. 12 is a top plan view of the upper dog. Fig. 13 is a plan view of the lower end of the same dog, and, Fig. 14 is a plan view of the apparatus with the cover of the closer chamber and the closing mechanism removed. Fig. 15 is a side view of the spindle.

1 is the check case; 2 is the closer case. These parts are of conventional form and are preferably cast integrally and contain respectively the check mechanism and the closer mechanism. The check mechanism includes the reciprocating piston 3 arranged within the cylindrical bore of the case 1 and operated to and fro by the rotatable spindle 4, the latter being stepped in the case 1 above and below the piston 3. The particular mechanical movement employed in the operation of the check is set forth and more fully described in a companion application filed by me, serially numbered 544,585. The piston is so constructed that it will permit checking fluid to flow with desired freedom

through the same from one end of the cylinder to the other when said piston moves in one direction, a check valve 3^a preventing the fluid from passing through the piston in an opposite direction. When the piston is moving in the last mentioned direction the fluid flows from one end of the cylinder to the other through a by-pass 1^a controlled by valve 1^b.

The closer mechanism arranged within the case 2 includes a closer spring 5 cooperating with the spindle 4 to return it to the position in which the door is closed, suitable mechanism being arranged between the spring 5 and spindle 4 to enable the closing influence of the spring to be exerted in a direction to close the door, no matter whether the door be hung on the right or left hand.

Between the chamber in the check case 1 and the chamber in the closer case 2, there is a suitable gland 6 employed to prevent any fluid contained within the case 1 from working up into the case 2. This gland 6 may be of any suitable construction.

Rotatably mounted upon the hub 6^a of the gland is the lower dog 7. 8 is a stop on the case eccentric with respect to the shaft 4 and arranged in the path of an inwardly projecting shoulder 7^a on the dog 7, so that said dog can turn in either direction to an extent somewhat less than a complete circle. The dog 7 has, as shown, an upwardly projecting barrel-like portion and is provided with a laterally directed foot flange 7^b. This flange 7^b and a part of the barrel-like portion is cut away, as shown at 7^c, and at once provides a holding shoulder 7^d for the lower end of the closer spring 5. The upper end of the dog 7 is provided with two notches 7^e—7^f, both of said notches being preferably undercut or provided with beveled walls, one of said notches being preferably coincident with the outer periphery of the dog, the other being coincident with the inner bore of the dog.

9 is a clutch. This clutch is of circular outline and is arranged to slide, but not turn, on the shaft 4 directly above the dog 7. In the particular form shown, the cross-section of the spindle at this point is square and consequently the passage through the clutch 9 is of corresponding shape. The lower side of the clutch is provided with two

ratchet-like teeth 9^a—9^b, the same being arranged to coöperate respectively with the walls of the recesses 7^c—7^f in the lower dog in such a manner that when said clutch is
 5 rotated counter-clockwise (with reference to the shaft and looking down on the same), it will rise on the spindle 4, the inclines of the teeth 9^a—9^b riding up the rear walls of the notches 7^c—7^f, thus shifting the clutch
 10 9 from the elevation shown in Fig. 6 to the elevation shown in Fig. 7. A clockwise movement of said clutch 7 will permit said clutch to resume the elevation shown in Fig. 6 where the abrupt or undercut walls of the
 15 teeth 9^a—9^b will become locked with the lower dog 7 so that a continued rotation of the clutch 9 in a clockwise direction will rotate the dog 7 and wind up the spring 5 from its lower end.

20 10 is the upper dog mounted to rotate upon the spindle 4 above the squared portion 4^a, the length of said squared portion being sufficient to hold the dog 10 in such spaced relation to the lower dog 7 as to permit the clutch 9 to rotate freely of one dog
 25 while in engagement with the other, the upper dog merely resting upon the shoulder formed by reducing the squared portion 4^a of the spindle to the rounded bearing portion upon which the dog 10 is mounted.
 30 The dog 10 has on its upper side an inwardly projecting shoulder 10^a which is arranged to encounter a stop 11^a on the under side of the cap 11, whereby said upper dog
 35 10 may rotate in either direction to an extent somewhat less than one complete circle. The under side of the dog 10 is provided with a suitable number of ratchet-like teeth 10^b. In the form shown, a sufficient number of
 40 teeth 10^b are provided to form a circle although this number may of course be reduced. On the upper side of the clutch 9 are two teeth 9^c—9^d, arranged preferably on opposite sides and in such a plane as to
 45 co-act with the ratchet teeth 10^b on the under side of the dog 10.

10^c is a holding shoulder arranged to receive one end of the closer spring 5, said shoulder being formed in any convenient
 50 manner as by forming a recess or perforation 10^d in the side wall of the dog 10.

The cap 11 takes a suitable bearing upon the upper end of the closer case 2 and may be adjusted angularly thereon and locked
 55 at any desired position by means of a suitable latch. In the particular form shown, this latch is in the form of a spring 12 secured to the rear side of the case and arranged to drop into notches 11^b in the edge
 60 of the cap 11, any suitable number of notches being provided.

14 is a lever arm fixedly connected to the upper end of the spindle 4, the free end of said lever arm being connected to the door
 65 casing in the usual manner, the combined

check and closer being connected to the upper part of the door in the usual manner.

Operation: Assuming the parts are assembled as shown in Fig. 2, and the proper
 70 tension is applied to the spring 5, said tension of the spring will cause the upper dog 10 to back up against the stop 11^a on the cover and will cause the dog 7 to back up against the stop 8 within the case. A clockwise rotation of the spindle 4 will cause the
 75 teeth 9^a—9^b on the clutch to continue their engagement with the lower dog 7, whereby said dog would be rotated in the same direction and to the same extent as spindle 4, thereby winding up spring 5 from its
 80 lower end so that when the lever 14 is released, said spring 5 will restore the parts to the original position, operating in a direction to close the door. A counter-clockwise rotation of the spindle 4 and clutch 9
 85 will cause the latter to rise on the square part of said spindle until the teeth 9^a—9^b ride on top of the dog 7 and teeth 9^c—9^d encounter the teeth 10^b—10^b on the under side of the upper dog. Continued counter-
 90 clockwise rotation of spindle 4 and clutch 9 will now rotate the upper dog so as to wind up spring 5 from its upper end. When the lever 14 is now released, the spring will restore the parts to the normal position, closing the door.

It will thus be seen that by reason of the shifting clutch in the particular arrangement provided, the apparatus may be applied to a right or left hand door. Obviously, during the above operations, the
 100 checking apparatus is coöperating with the closer mechanism to retard the closing action of the spring 5 in the customary manner, it being unnecessary to describe herein the particular mechanical movement employed in the checking apparatus, since that
 105 is made the subject-matter of another application and since, broadly speaking, any suitable checking mechanism could be combined with the closer mechanism herein set forth.

The adjustment of the tension of the spring 5 is very simply effected in the present case by simply rotating the cover or
 115 cap 11 in a direction to wind up the spring, since the latter is anchored to the upper dog 10 and the upper dog is rotated by the cap 11 by reason of the stop engagement between the upper dog and said cap. It is obvious that when this adjustment of the spring is
 120 to be effected, the clutch 9 should be out of engagement with said upper dog 10, for example, it should be in the position shown in Fig. 2.

I am aware that many modifications may be made in the various details by way of
 125 providing means for stopping the dogs, anchoring the spring, shifting the clutch and winding up the spring, and I therefore decide to have it understood that in the accom-
 130

panying drawings I have endeavored merely to show one successful form of the apparatus adapted for the foregoing purpose.

What I claim is:

1. In combination in a door closing mechanism, a spindle arranged to turn in either direction, a clutch mounted thereon and arranged to be turned thereby and capable of longitudinal movement thereon, two coacting but independently rotatable dogs mounted concentrically with said spindle and above and below said clutch, a spring operatively connected with said dogs to rotate the same in opposite directions, stop mechanism to check the backward rotation of each of said dogs, and means to operatively connect said clutch with one or the other of said dogs at will, depending upon the direction of rotation of said spindle.
2. In combination in a door closing mechanism, a spindle arranged to turn in either direction, a clutch mounted to turn simultaneously therewith, two coacting but independently rotatable dogs mounted above and below said clutch, a spring operatively connected with said dogs to rotate the same in opposite directions, stop mechanism to check the backward rotation of each of said dogs, means to shift the clutch longitudinally to disengage the same from one dog and engage it with the other, depending upon the direction of rotation of said spindle.
3. In combination in a door closing mechanism, a spindle arranged to turn in either direction, a clutch mounted to turn simultaneously therewith, two coacting but independently rotatable dogs above and below said clutch, a spring operatively connected with said dogs to rotate the same in opposite directions, stop mechanism to check the backward rotation of each of said dogs, means to shift the clutch longitudinally to disengage the same from one dog and engage it with the other, depending upon the direction of rotation of said spindle, oppositely faced ratchet teeth on the upper and lower sides of said clutch, and coacting parts on said dogs whereby said teeth may interlock with said dogs alternately in driving engagement, said dogs being so spaced that an upper tooth does not operatively engage the upper dog when a lower tooth is in driving engagement with the lower dog, and vice versa.
4. In combination in a door closing mechanism, a spindle, two spring-controlled independently rotatable dogs mounted concentrically with said spindle, a clutch between said dogs with means for alternately engaging said clutch with one or the other of said dogs for driving the same, said dogs being so spaced that when said clutch is in one position it will engage for driving purposes the lower dog, and when in another position

it will engage for driving purposes said upper dog, and means for positively shifting said clutch into either of said positions, depending upon the direction of rotation of said spindle.

5. In combination in a door closing mechanism, a spindle arranged to turn in either direction, a clutch mounted thereon and arranged to be turned thereby and capable of longitudinal movement thereon, two coacting but independently rotatable dogs mounted concentrically with said spindle and above and below said clutch, a spring operatively connected with said dogs to rotate the same in opposite directions, stop mechanism to check the backward rotation of each of said dogs, and means to operatively connect said clutch with one or the other of said dogs at will, depending upon the direction of rotation of said spindle, the stop mechanism for one of said dogs being adjustable angularly with respect to the said spindle to vary the operative tension of the spring.

6. In combination in a door closer, a spindle, a clutch mounted thereon and driven thereby and arranged to move longitudinally on the spindle, two independently rotatable dogs arranged above and below the clutch, means for holding the same in spaced relation to permit said clutch to have limited longitudinal movement on said spindle between said dogs, a closer spring operatively connected with said dogs, and means to shift the clutch up and down on the spindle into driving engagement with one or the other of said dogs, said spindle having a normal position, said alternate shifting of said clutch depending upon the direction of rotation away from said normal position.

7. In combination in a door closer, a spindle, a clutch mounted thereon and driven thereby and arranged to move longitudinally on the spindle, two independently rotatable dogs arranged above and below the clutch, means for holding the same in spaced relation to permit said clutch to have limited longitudinal movement on said spindle between said dogs, a closer spring operatively connected with said dogs, and means to shift the clutch up and down on the spindle into driving engagement with one or the other of said dogs, said spindle having a normal position, said alternate shifting of said clutch depending upon the direction of rotation away from said normal position, said means for shifting said clutch also operating as means for securing driving connection between said clutch and dogs.

8. In combination in a door closing mechanism, a spindle arranged to turn in either direction, a support therefor, a clutch arranged to be rotated by said spindle, two independently rotatable dogs arranged above and below said clutch and in such spaced re-

lation to each other as to permit said clutch to make driving engagement with only one of said dogs at a time, means for effecting a relative shift of said parts in the line of the spindle to transfer the driving connection between said clutch and one of said dogs to the other dog, simultaneously disengaging the driving connection between said clutch and the first mentioned dog, a closer spring operatively connected with said dogs to rotate the same in opposite directions and stop mechanism to check the backward rotation of each dog, both of said dogs and said clutch being mounted concentrically to the spindle.

9. In combination in a door closing mechanism, a spindle arranged to turn in either

direction, a clutch mounted to turn simultaneously therewith, two coacting but independently rotatable dogs mounted above and below said clutch, a spring operatively connected with said dogs to rotate the same in opposite directions, stop mechanism to check the backward rotation of each of said dogs, means to secure a relative shifting movement between said clutch and dogs to disengage the clutch from one dog and engage it with the other, depending upon the direction of rotation of said spindle.

WILLIAM K. HENRY.

Witnesses:

R. C. MITCHELL,
CHAS. A. PEARDY.