

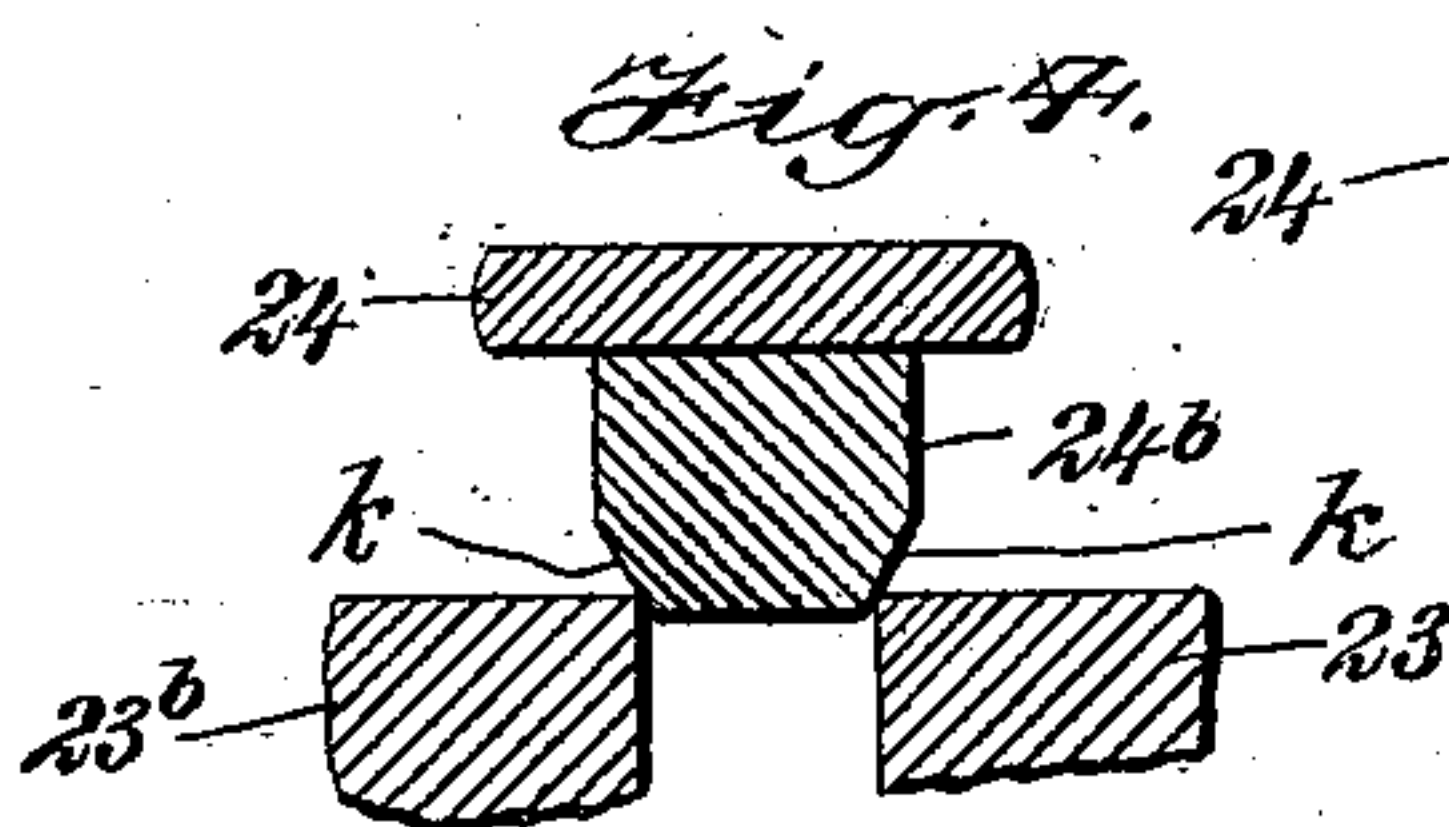
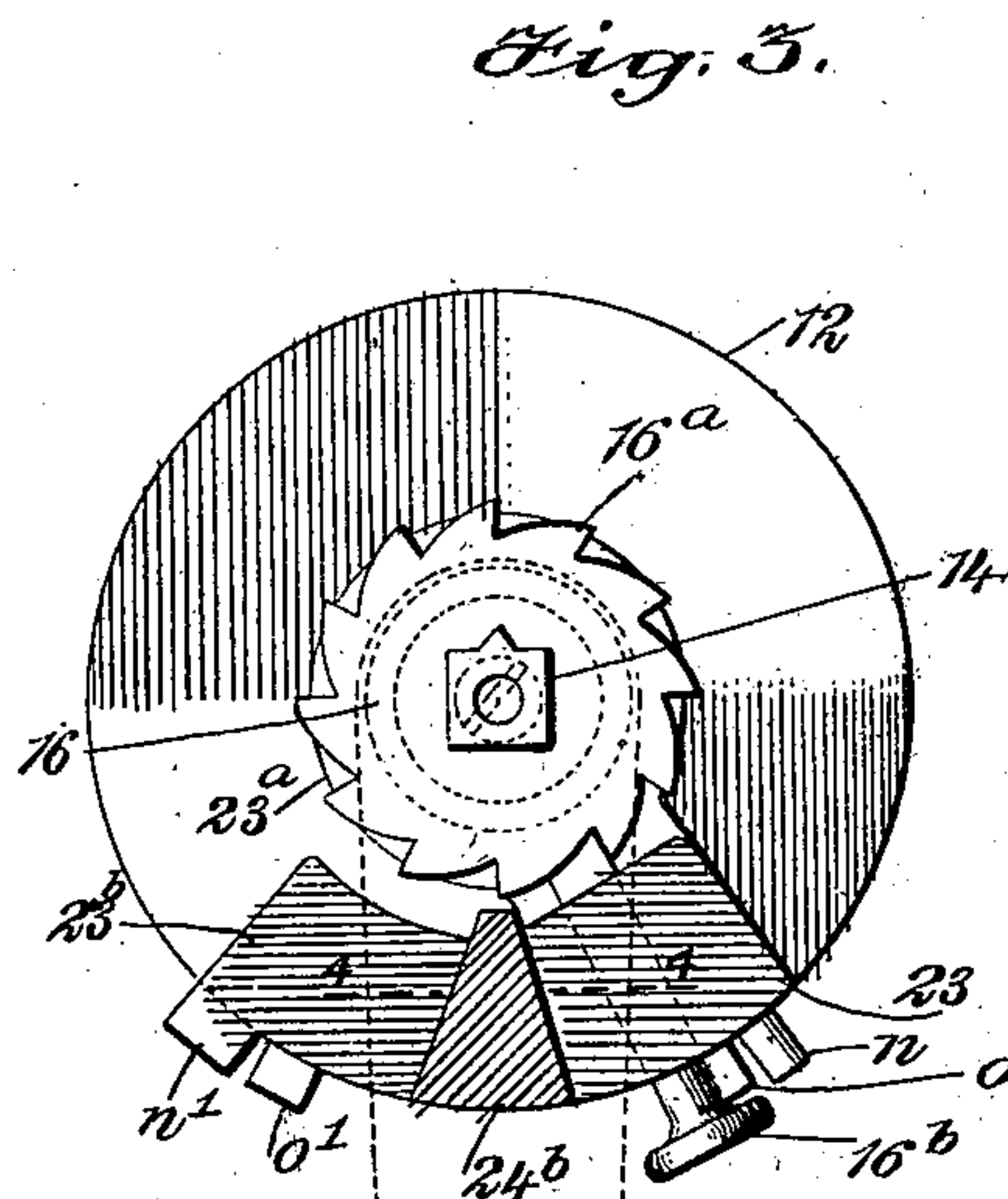
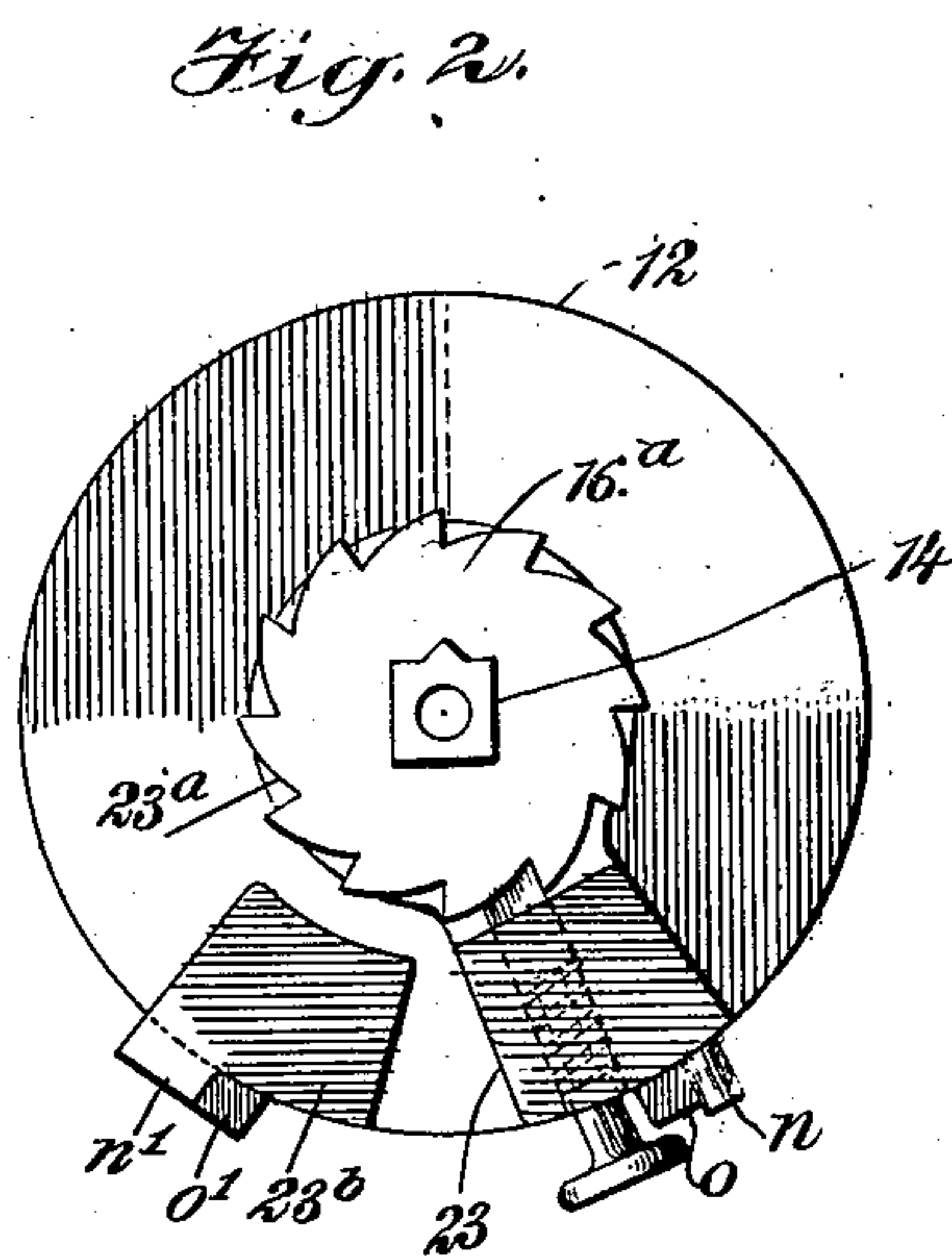
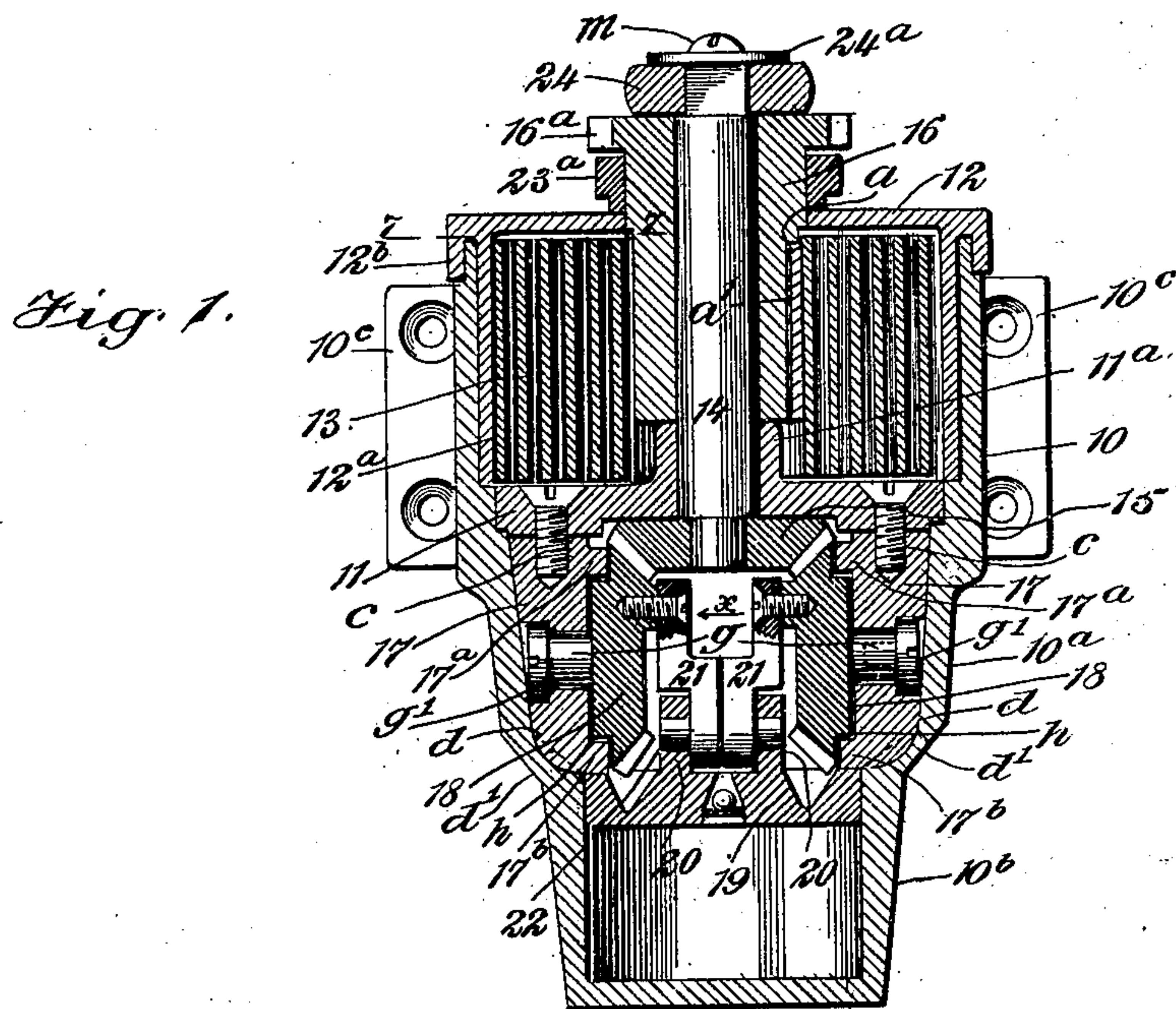
No. 724,325.

PATENTED MAR. 31, 1903.

J. L. PEARL.
DOOR CHECK AND CLOSER.
APPLICATION FILED AUG. 6, 1902.

NO MODEL.

2 SHEETS—SHEET 1.



WITNESSES:
Geo. M. Taylor.
Wm. L. Patton

INVENTOR
Joseph L. Pearl
BY *Mum*
ATTORNEYS.

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2 SHEETS—SHEET 2.

Fig. 5.

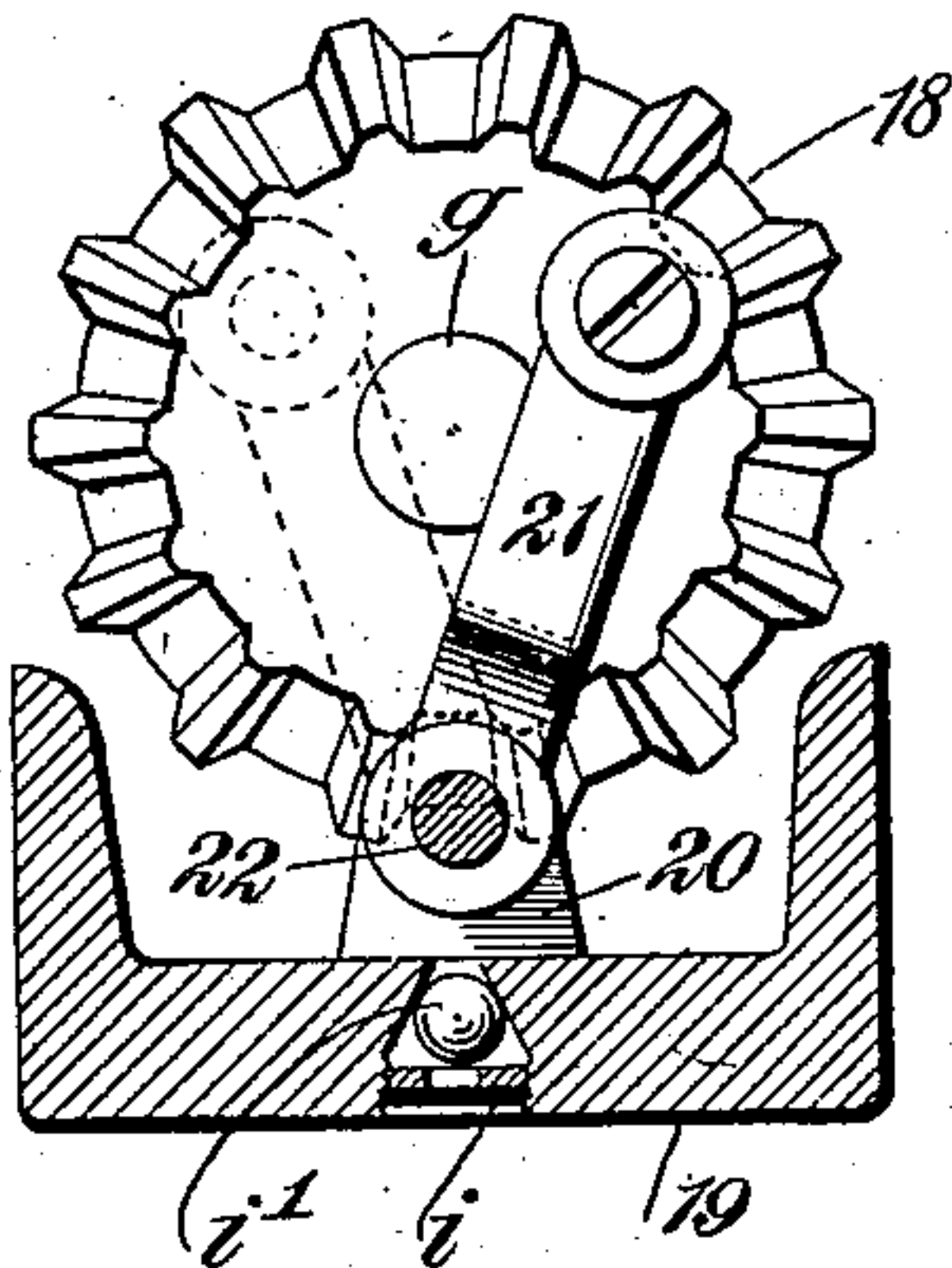


Fig. 6.

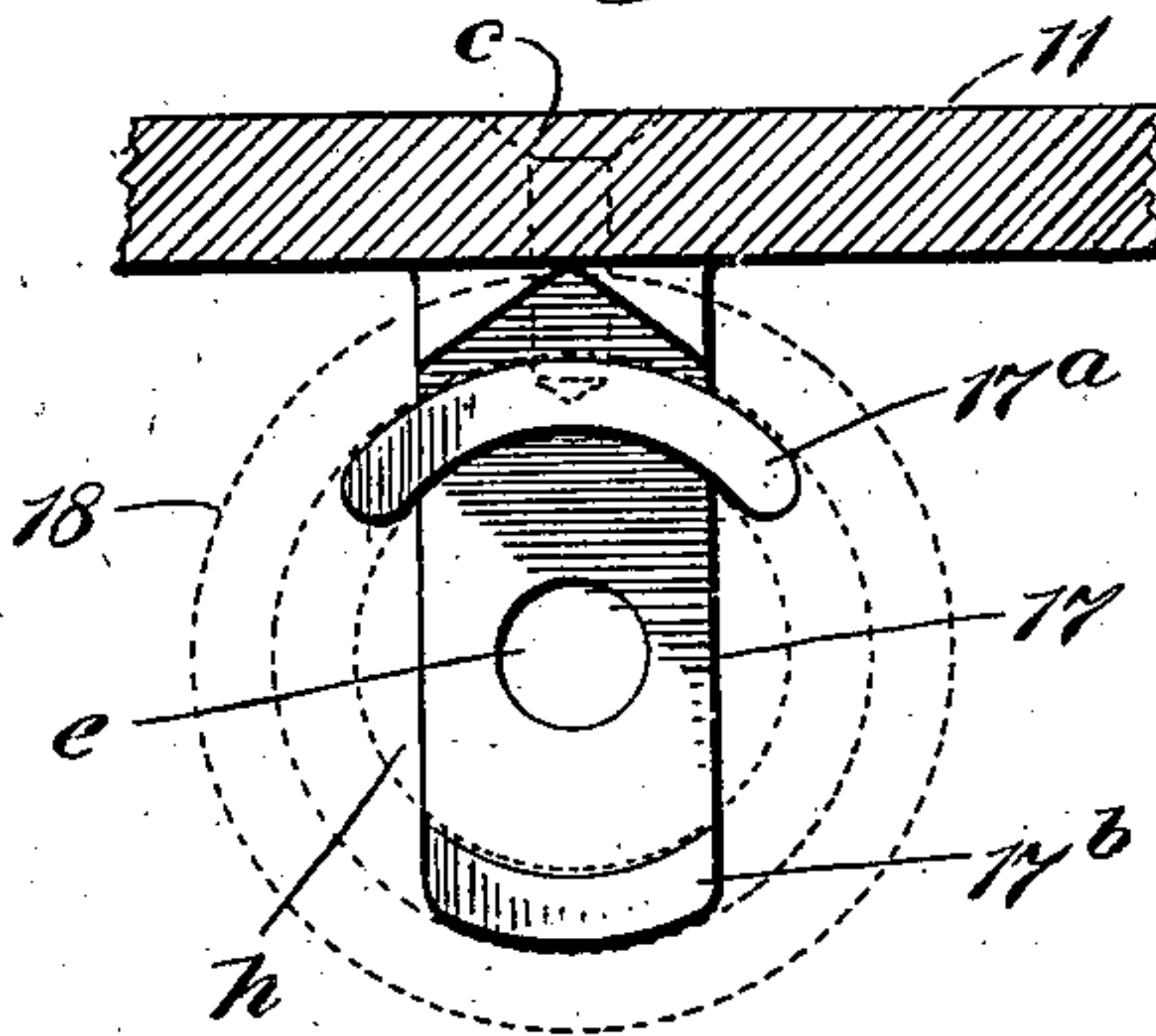


Fig. 8.

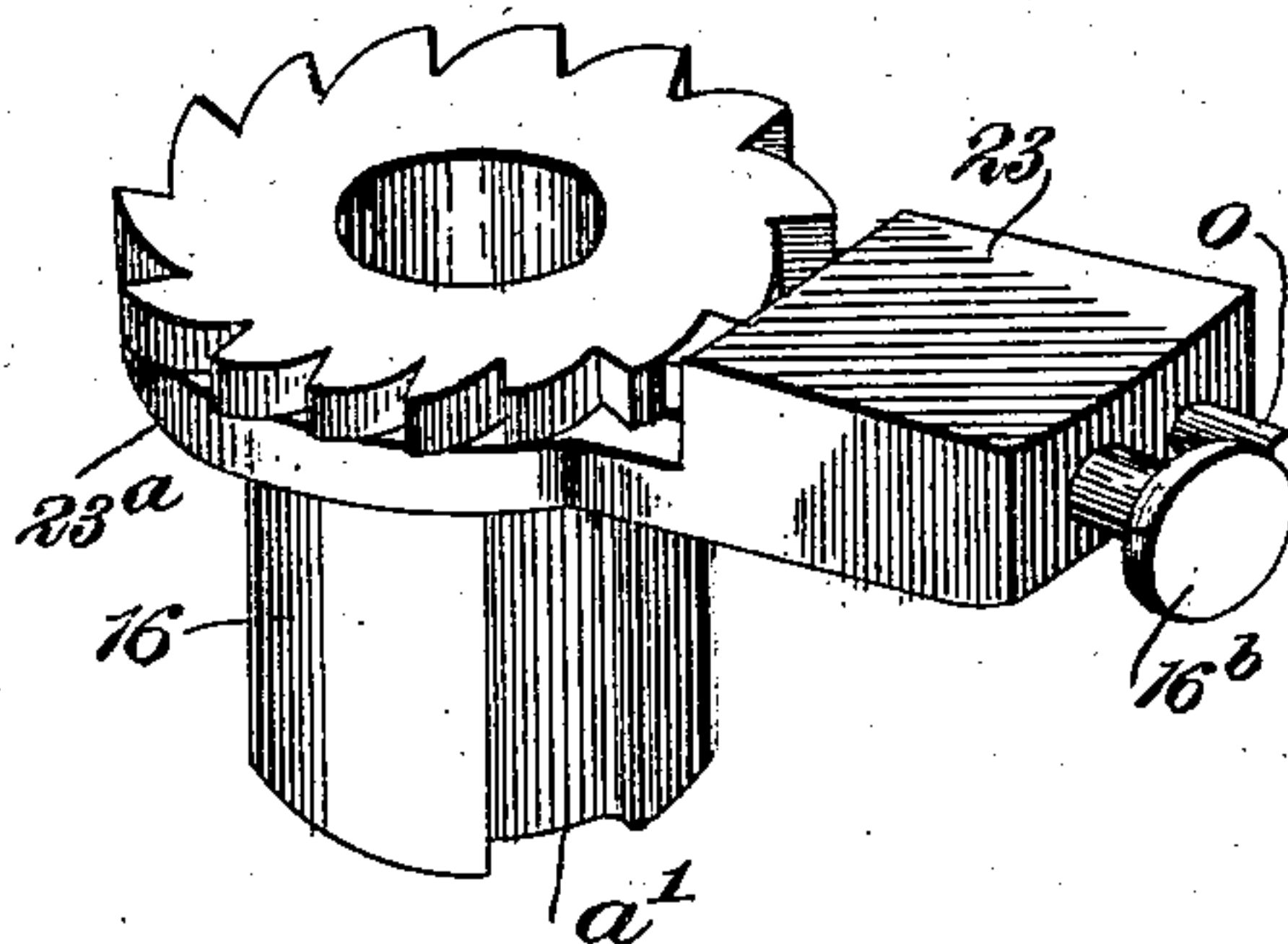
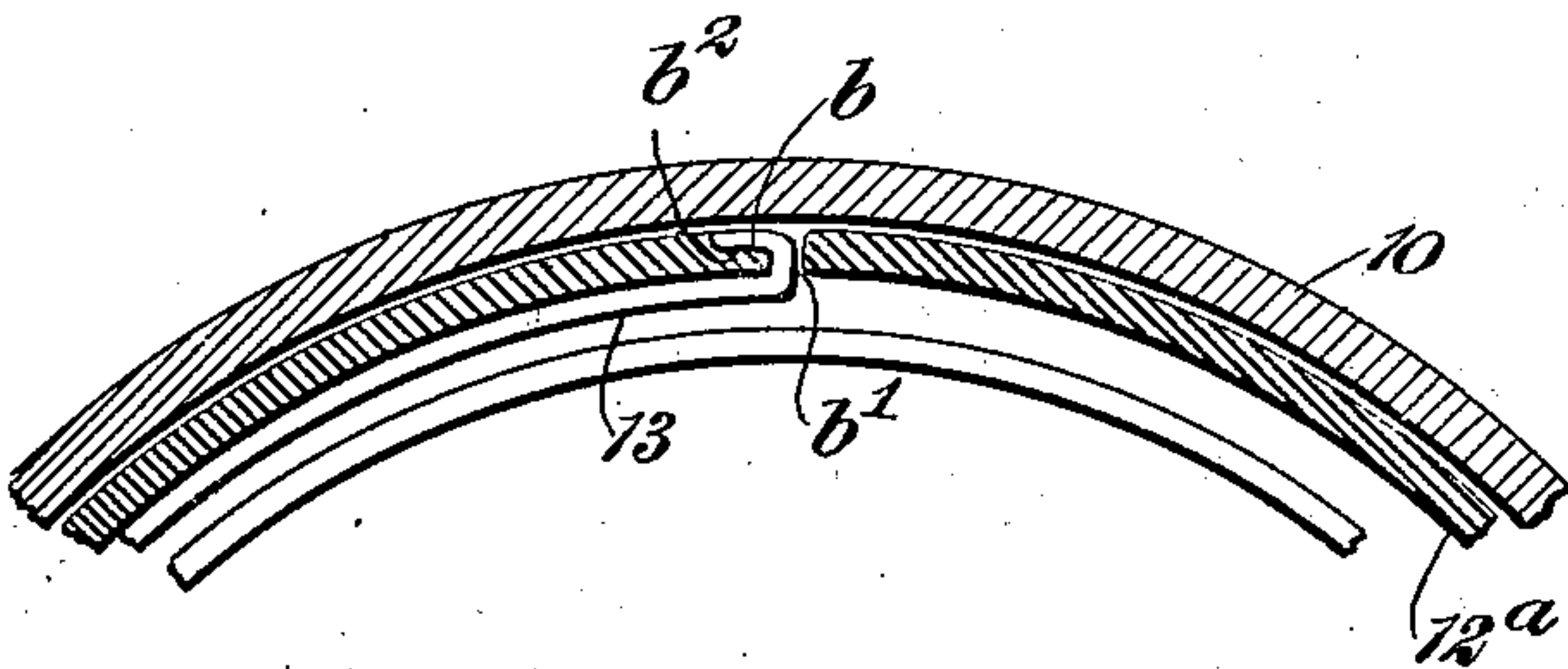


Fig. 7.



WITNESSES:

Geo. M. Maylor.

Wm. I. Patton

INVENTOR

Joseph L. Pearl

BY

M. M. M.

ATTORNEYS.

UNITED STATES PATENT OFFICE.

JOSEPH LOUIS PEARL, OF NEW YORK, N. Y.

DOOR CHECK AND CLOSER.

SPECIFICATION forming part of Letters Patent No. 724,325, dated March 31, 1903.

Application filed August 6, 1902. Serial No. 118,621. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH LOUIS PEARL, a citizen of the United States, and a resident of the city of New York, borough of Manhattan, in the county and State of New York, have invented certain new and useful Improvements in Door Checks and Closers, of which the following is a full, clear, and exact description.

This invention relates to door checks and closers of the class employing liquid as a cushioning medium for graduating the closure of a swinging door.

The object of my invention is to provide simple, novel, specific details of improvement for a device of the class indicated which afford increased strength to the working parts, render the adjustment of the motor-spring more convenient and reliable, and provide novel means for regulating the spring of an arm connecting the spring mechanism with a door-casement, so that the spring will always be in adjustment for efficient service.

This invention consists in the novel construction and combination of parts, as is hereinafter described, and defined in the appended claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a sectional front view taken through the vertical axis of a door check and closer embodying features of the invention. Fig. 2 is a partly-sectional plan view of the device shown in Fig. 1 with the lever connection removed. Fig. 3 is a view similar to Fig. 2, but showing the lever in part by dotted lines and also showing in section a driving-block that is a fixture on the lowermost side of the lever. Fig. 4 is an enlarged sectional elevation in part of two adjustable presser-blocks and of the driving-block therefor substantially on the line 4-4 in Fig. 3. Fig. 5 is an inner side view of a bevel gear-wheel, a dash-pot piston, the latter being in section, and a bent pitman-bar pivoted on the gear-wheel and dash-pot, a similar bar that is to connect a like gear-wheel with the dash-pot appearing in dotted lines. Fig. 6 is an inner side view of a hanger-block seen in the direction of the arrow x in Fig. 1, whereon one of the bevel-gears shown in said figure is piv-

oted, the wheel being indicated by dotted lines, said block having novel details of construction. Fig. 7 is an enlarged fragmentary plan view of details relating to novel means for connecting one end of a helical motor-spring with the spring-holding casing, and Fig. 8 is a perspective view of a ratchet-gear that holds a motor-spring for the door-closer wrapped upon a sleeve shown depending from the ratchet-gear and a presser-block having a perforated laterally-projected flange that loosely engages with the sleeve.

The features claimed as new are designed to improve the construction and operation of a door check and closer device of a class wherein a helical spring is employed as a motive agent to close the door and wherein a liquid medium is used to graduate the force of the motor-spring when the door is nearly closed by the retarded passage of the liquid through a valve-controlled orifice in a dash-pot piston that coacts with the spring-motor device to produce a door closer and check for the door.

To enable a clear understanding of the novel details, I have shown them as coöperative elements in a door closer and check of well-known construction, and said details will be described together with others not presented as new, which are improved in service by the new elements, and the latter will be clearly pointed out in the description and claims.

In this type of combined door-closer and door-check a casing for the reception and support of the working details is employed, which is mainly cylindrical, but is twice contracted in diameter at different points in its length, thus providing three communicating chambers 10 10^a 10^b, as clearly shown in Fig. 1. A diaphragm-wall 11 separates the uppermost chamber 10 from the central chamber 10^a, and is therein held stationary by any preferred means. The upper chamber 10 is provided with a closing-bonnet 12, from which depends a circular flange 12^a, provided as a means for supporting the outer turns of a helical spring 13. A short depending flange 12^b is formed exteriorly of and concentric with the flange 12^a and is spaced therefrom by an annular channel wherein the upper edge of the upper cylindrical-chamber 10 is received when

the bonnet 12 is placed in position thereon, and thus adapted for rotatable movement. Centrally in the diaphragm-wall 11 the lower portion of the spring-actuating shaft 14 is held to turn in a circular vertical perforation therein, said shaft having a bevel-gear 15 secured on its lower end that projects below the wall 11, as shown in Fig. 1. A sleeve 16 is loosely mounted upon the portion of the shaft 14 that extends above the wall 11 and may seat upon the upper end of the hub 11^a, that projects up into the chamber 10 from the diaphragm-wall. Upon the sleeve 16 or the portion thereof that is within the chamber 10 the inner extremity of the motor-spring 13 is held, preferably by securing a rib *a* or other projection on the inner surface of the spring-coil that encircles the sleeve and bedding said rib or an equivalent thereof in a recess *a'*, formed in the outer surface of the sleeve, as indicated in Fig. 1, this engagement of parts being obviously effected by presenting the upper end of the rib *a* at the lower end of the recess *a'* and sliding the spring upwardly upon the sleeve. The other end of the spring 13 is formed into a hook *b*, and said hook engages within a slot *b'*, formed longitudinally in the wall of the flange 12^a, and to insure the easy and proper insertion and engagement of said hook a lateral recess *b*² is formed in the outer surface of the depending flange 12^a, which extends from the edge of the slot *b'*, so that the hook *b* can only be introduced when the end thereof is entered within the recess *b*², which will prevent the spring from being wrongly connected with the bonnet 12.

At opposite points in the central chamber 10^a two hanger-blocks 17 of like form and dimensions are held supported vertically therein by the screw-bolts *c*, that are seated in perforations in the bottom wall 11 and screw into tapped perforations in the upper ends of the hanger-blocks, whereby the latter are held in contact with the side wall of the chamber 10^a, and they are also bedded at their lower ends in kerfs *d*, formed in the offsets *d'*, that define the lower extremity of the central chamber 10^a, as indicated by dotted lines in Fig. 1.

The hanger-blocks 17 are suitably spaced apart on their inner faces that are mainly parallel with each other, with the exception that near the upper and lower ends of each hanger-block the flanges 17^a 17^b respectively project therefrom. The flanges 17^a 17^b on a hanger-block 17 are curved similarly, their inner faces being essentially arcs of the same circle, and these curved flanges are concentric with a perforation *e*, formed transversely in a hanger-block 17, near its vertical center.

Two bevel-gears 18, preferably of equal size to mesh with that of the bevel-gear 15, are respectively journaled in the perforations *e* in the hanger-blocks 17, and are held to rotate in said perforations by screws *g'*, the heads of which have greater diameter than

the journals *g* and are seated in the counter-bored outer ends of the perforations wherein the journals rotate.

The bevel-gears 18 are each provided with a short hub *h*, that is circular on its periphery, each hub rotatably engaging between respective pairs of the curved flanges 17^a 17^b, and it will be seen that said flanges afford reliable supporting-bearings for the bevel-gears, relieving the journals *g* from strain while the door-check is in service.

The lowermost chamber 10^b is closed at its lower end by an integral bottom wall and is bored out to render its inner surface truly cylindrical for the reception of the piston-block 19, that is fitted to slide liquid-tight therein.

From the upper surface of the piston-block 19 two spaced ears 20 project near the center of the block, and between said ears the lapped lower ends of two similar pitman-bars 21 are pivoted thereto by means of a transverse journal-pin 22, the upper ends of the pitman-bars being separated, so as to have contact with the inner surfaces of the bevel-gears 18, upon which they are pivoted, and as indicated in Fig. 5 by full and dotted lines. These pitman-bars have inclination in opposite directions, so as to avoid a dead-center and adapt the gears, which run in opposite directions, to transmit reciprocatory motion to the piston-block 19 by means of the pitman-bars.

In a perforation in the piston-block 19 a valve-seat *i* is formed or secured, wherein a ball-valve *i'* is held, and under liquid pressure from the upper side of the piston-block, the valve controlling the passage of liquid through the piston-block, this feature being well known.

The shaft 14 and sleeve 16 extend up through the bonnet 12, and upon the latter a presser-block 23 is loosely mounted by provision of a ring-flange 23^a, which projects at one side of the block and receives the cylindrical body of the sleeve, as shown in Figs. 1 and 8.

Upon the upper end of the sleeve 16 a ratchet-gear 16^a is formed or secured, which gear seats upon the flange 23^a connected therewith, and upon the ratchet-gear the end of the lever 24 is imposed, said end having a suitable perforation to receive the squared upper end of the shaft 14, that projects above the ratchet-gear and is perforated and threaded to receive a set-screw *m*, which holds a washer 24^a, clamped upon the lever-body, so as to secure it in place on the end of the shaft.

The lever 24 (shown partially by dotted lines in Fig. 3) is a common adjunct for several styles of door checks and closers, said lever in complete form extending toward the casement of a door to be shackled thereto, the casing of the door-check device—such, for example, as the section 10 of the casing for the improvement—being provided with lateral flanges 10^c, adapted to receive screws

which fasten the casing upon the upper portion of a door swinging in the door-casement, whereon the lever 24 is shackled.

As explained, the presser-block 23 is projected laterally from the sleeve 16, and for its effective operation it is afforded clearance from the ratchet-gear 16^a, but is connectible therewith by means of the dog 16^b, held to slide in a perforation in the body of the block, said dog having a button-head on its outer end to permit convenient manual adjustment of the dog, so that the latter may be interlocked at its inner end with a tooth of the ratchet-gear. Upon the bonnet 12 another presser-block 23^b is formed or secured, so that it is positioned near the peripheral edge of the bonnet, and from the outer edges of the presser-blocks 23 23^b abutment-wings *n* and *n'* are respectively projected.

On the exterior of the casing-section 10^a two lugs *o o'* are formed, which project upward far enough to be engaged by the sides of the wings *n n'*, avoiding contact with the bonnet 12.

As the bonnet 12 is connected with the outer end of the helical spring 13 and the inner end of the latter is attached to the sleeve 16, held adjustably connected with the presser-block 23, it will be seen that the contact of the wings on the blocks 23 23^b with the lugs *o o'* will define the closest degree of approach that will be had by the blocks 23 23^b when the spring 13 is wound up to exert proper force for closure of the door after it has been manually opened, and this should permit a proper space to intervene the presser-blocks for the reception of the driver-block 24^b, formed or affixed upon the lower side of the lever 24.

As shown in Fig. 4, the driver-block 24^b is sloped at the free corners on its sides at the bottom of the same, these opposite slopes or bevels *k* giving blunt wedge form to the lower end of the driver-block, which adapts it for insertion between the presser-blocks 23 23^a.

The width of the driver-block 24^b is sufficient to slightly space each presser-block from the respective lugs *o o'*, this freedom facilitating the starting of the device without jar for closure of the door that has been opened and released for reversed movement by the door-closer device.

It will be seen that upon opening the door having the improved door-closing and door-checking device, by the action of the gearing connected by the shaft 14 with the lever 24, the helical spring 13 will be wound to give it maximum tension, so that the release of the door will permit the force of the spring to be exerted for its closure.

The bevel-gear connection between the shaft 14 and the dash-pot piston-block 19 adapts the action of opening the door to raise the piston-block to the upper end of the dash-pot that is within the lowermost casing-section 10^b.

Upon the release of the opened door the

spring 13 will instantly begin to rotate the shaft 14 and by rotative movement of the bevel-gearing 15 18, that move the pitman-bars 21, press the piston-block 19 toward the bottom of the dash-pot, which will obviously cushion the descent of the piston-block and correspondingly check the abrupt closure of the door.

It is to be understood that the liquid serving to cushion the descent of the piston-block 19 may for the proper operation of the mechanism be permitted to escape upwardly from below said block through a crevice between the periphery of the piston-block and inner surface of the dash-pot, which is a common construction, or any preferred form of check-valve may be employed for such a purpose. As this is not a feature of the invention and any available means for transfer of the oil may be utilized, it is not thought necessary to show or specifically describe the same.

It may be mentioned that the novel features consist, essentially, in the peculiar construction and arrangement of the hanger-blocks, their engagement with hubs on the bevel-gears that are journaled thereon, the bending of the two pitman-bars, and their lapped engagement at their lower ends, so as to be rockably held on the piston-block by a pivot-bolt.

Other features of novelty comprise the peculiar hooked connection of the outer end of the helical motor-spring with the bonnet of the casing, which prevents a wrong connection of said spring with the bonnet.

The details of novel construction also comprise the special construction of and the combination of the presser-blocks with the casing of the device and also the provision of the driving-block that may be utilized to press upon the lever in either direction, depending upon the direction of swing had by the door on which the improved door closer and check is placed.

Having fully described my invention, I claim as new and desire to secure by Letters Patent—

1. In a door closer and check, the combination with a casing, and a diaphragm-wall therein, of two like hanger-blocks hung from said wall, and two bevel-gears pivoted in the blocks, said gears having hub projections which receive peripheral support from projections on the blocks.

2. The combination with a casing having a diaphragm-wall therein and a dash-pot, of two like hanger-blocks held depending from the diaphragm-wall and contacting oppositely with the casing, the hanger-blocks having projections from their inner faces, said projections having opposed concave sides, two bevel-gears pivoted in the blocks, said gears having hub projections that are circular on their peripheries, and that engage between the projections on the hanger-blocks receiving support therefrom, a third bevel-gear meshing with the other gears, means to rotate

all the gears, a plunger in the dash-pot, and connections between the plunger and certain of the gears.

3. The combination with a cylindrical casing having sections of different diameters, and a diaphragm-wall held transversely at the bottom of the upper casing-section, of two hanger-blocks held on the lower side of the diaphragm-wall at opposite points, and bedded at their lower ends in grooves formed in an offset at the upper edge of the lower casing-section, two bevel-gears having journal ends held to rotate in perforations in the hanger-blocks, each bevel-gear having a circular-edged hub, the hanger-blocks having two curved flanges projected from each one, these flanges loosely embracing a respective hub to support the bevel-gear, and a third bevel-gear meshing with the other bevel-gears, means to rotate all the gears, a plunger and connections between the first-mentioned gears and the plunger.

4. In a door check and closer, the combination with a casing having a dash-pot chamber at its lower end, and a plunger-block having spaced ears on its upper end, of two bevel-gears held to rotate oppositely in the casing above the piston-block, two pitman-bars pivoted at their upper ends on respective bevel-gears, and bent intermediately of their ends, so as to lap said ends which are inserted between the ears and pivoted thereon by a transverse pin, a bevel-gear meshing with the oppositely-rotatable gears, and means to rotate all the gears.

5. In a door check and closer, the combination with an upper end of a casing, and a bonnet held to turn thereon, having two depending flanges differing in length and spaced

apart to receive the upper edge of said casing between them, the longer inner flange being vertically slotted and recessed on its outer side at one side of the vertical slot, of a helical motor-spring, having a detent-hook formed on its outer end, which hook occupies the slot and recess when introduced therein from the lower end of the slot, the provision of the recess insuring a correct connection of the spring with the rotatable bonnet.

6. In a door check and closer, the combination with a casing, a rotatable bonnet held on the upper end of said casing, and an upright shaft rotatable in the bonnet and casing, of a ratchet-gear on the upper end of the shaft, a lever secured on the shaft above the ratchet-gear, a presser-block held to rock on the shaft, a dog on said presser-block adapted to engage the ratchet-gear, a similar presser-block fast on the bonnet, abutments on the presser-blocks, ears on the casing which may contact with the presser-blocks, and a driving-block depending from the lever and adapted to space apart the presser-blocks.

7. In a door check and closer the combination with the casing having a dash-pot, of a spring-controlled shaft provided with a pinion, a pair of pinions meshing with opposite sides of the pinion on the shaft, a plunger in the dash-pot and pitman-bars connected with the said pair of pinions and with the plunger.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOSEPH LOUIS PEARL.

Witnesses:

JOHN S. FREELAND,
HENRY HUSTED.