

No. 655,107.

Patented July 31, 1900.

F. H. OGDEN.

DOOR CHECK.

(Application filed Oct. 16, 1899.)

(No Model.)

2 Sheets—Sheet 1.

Fig. 2.

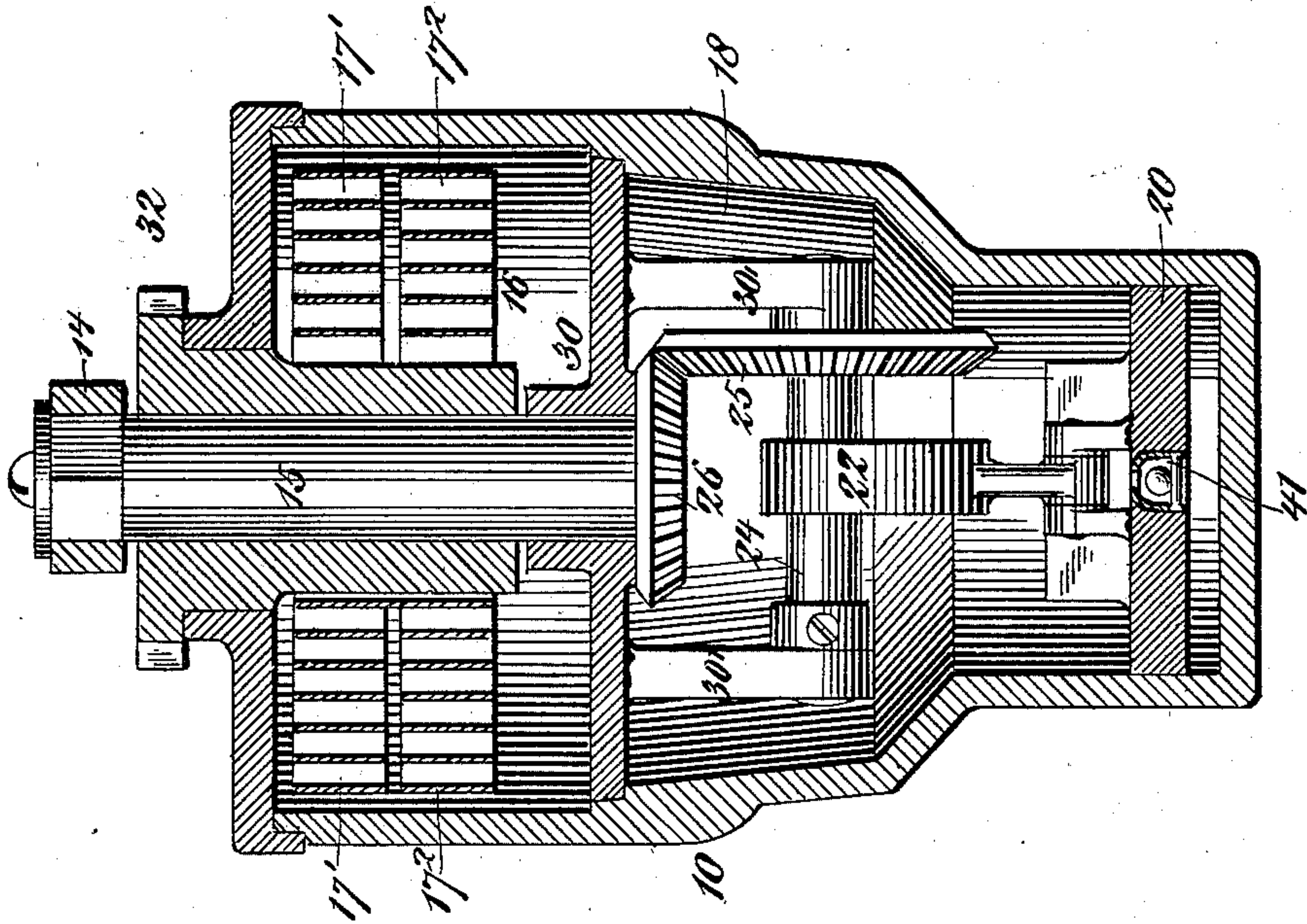
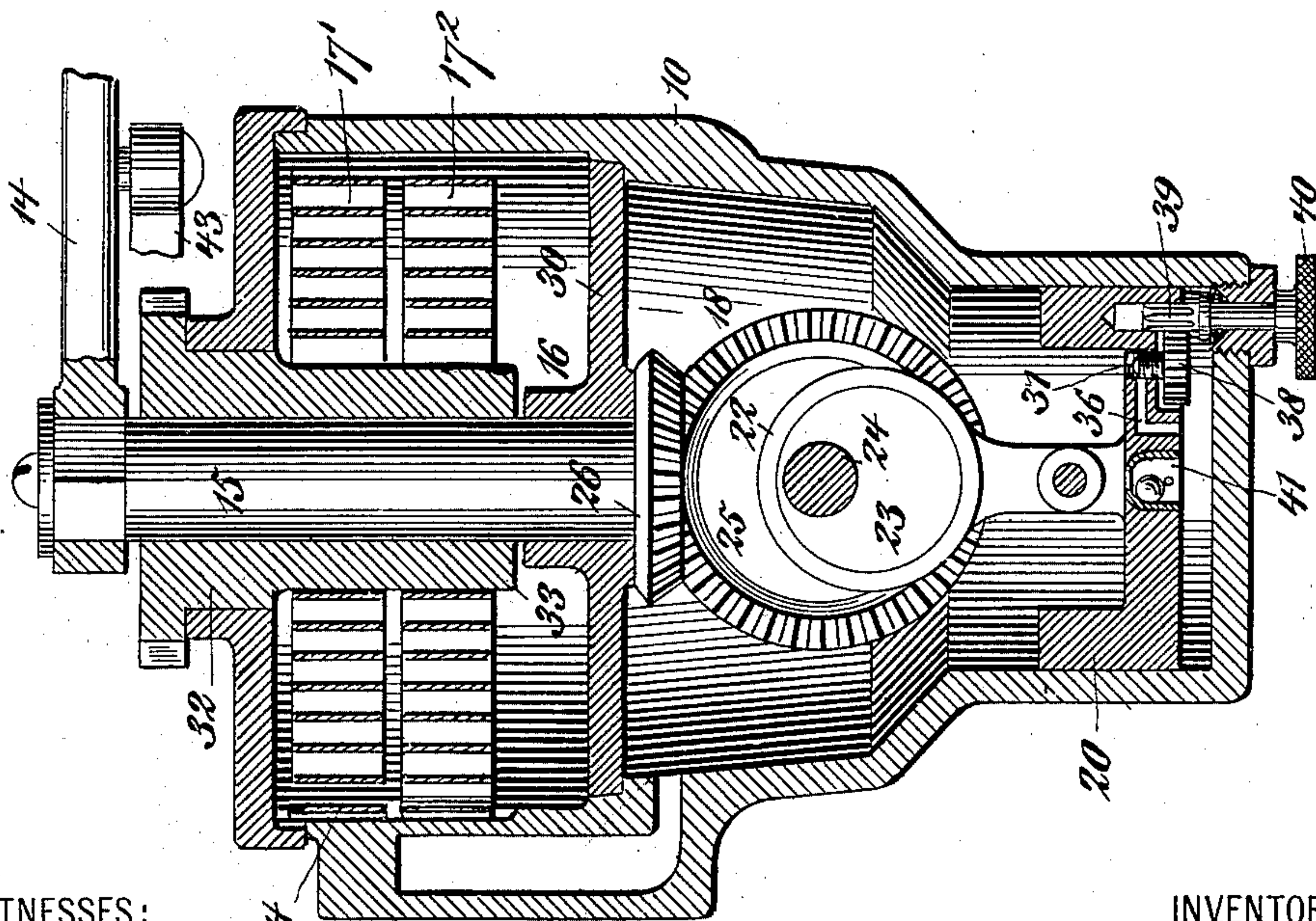


Fig. 1.



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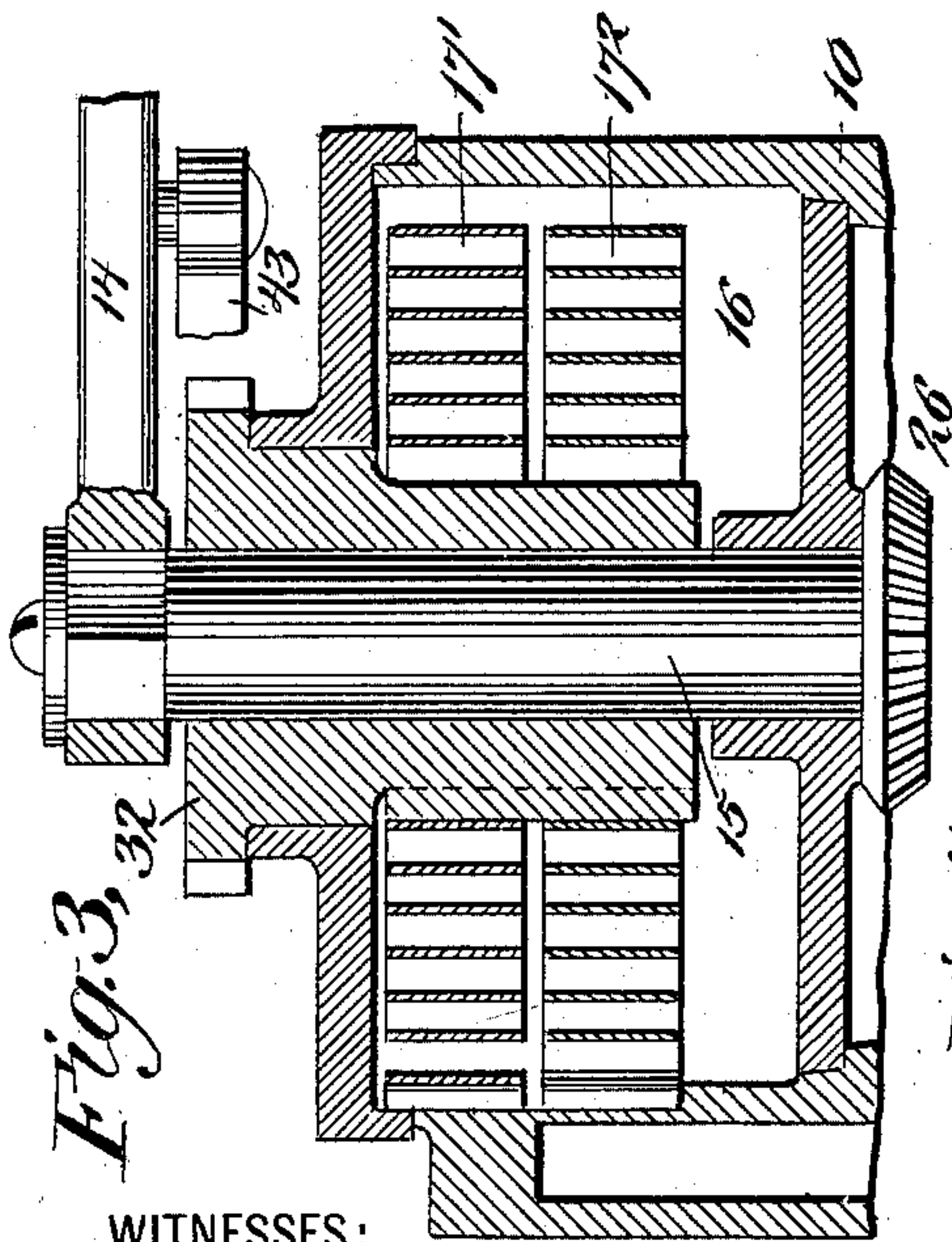
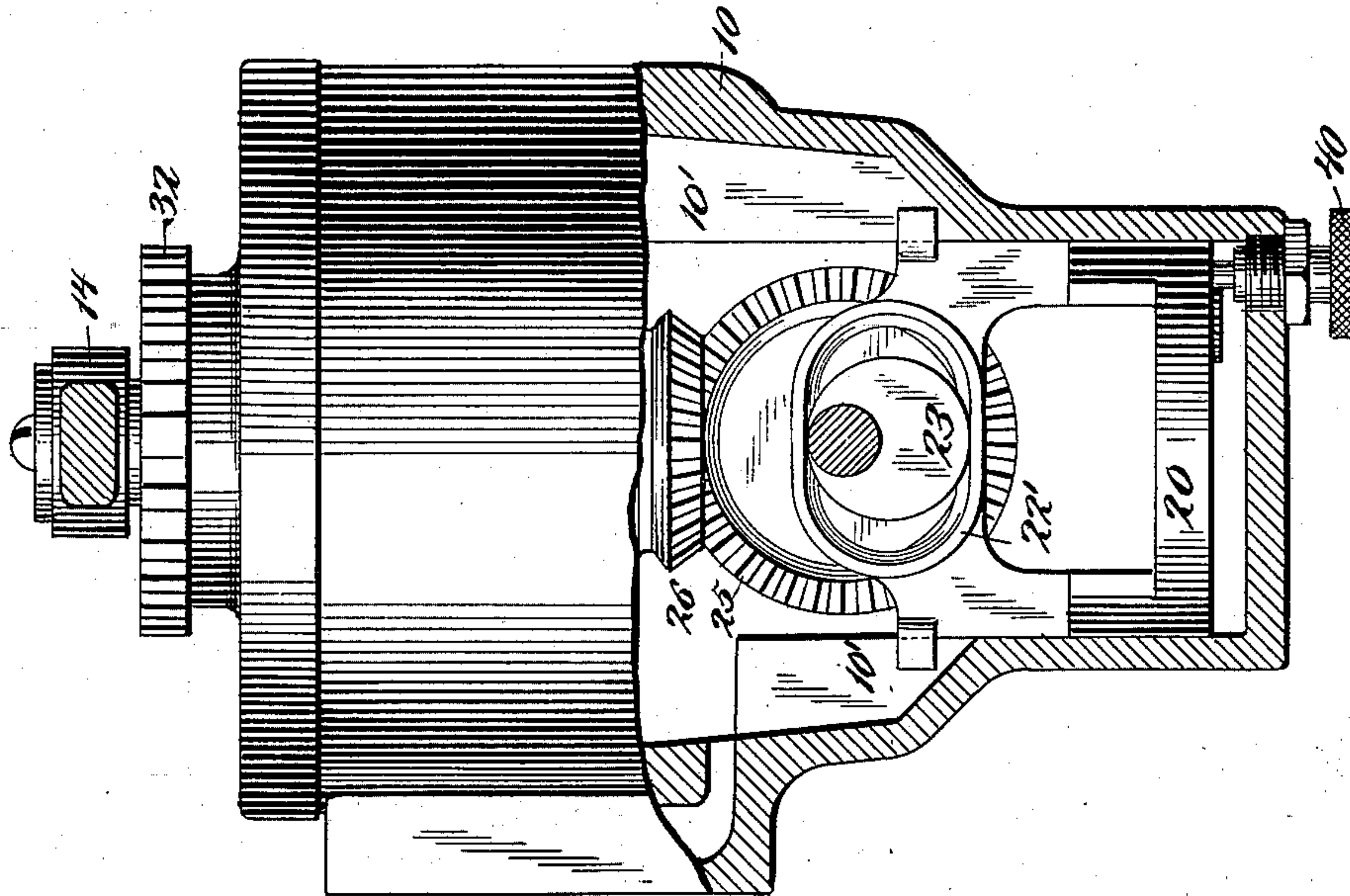
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2 Sheets—Sheet 2.

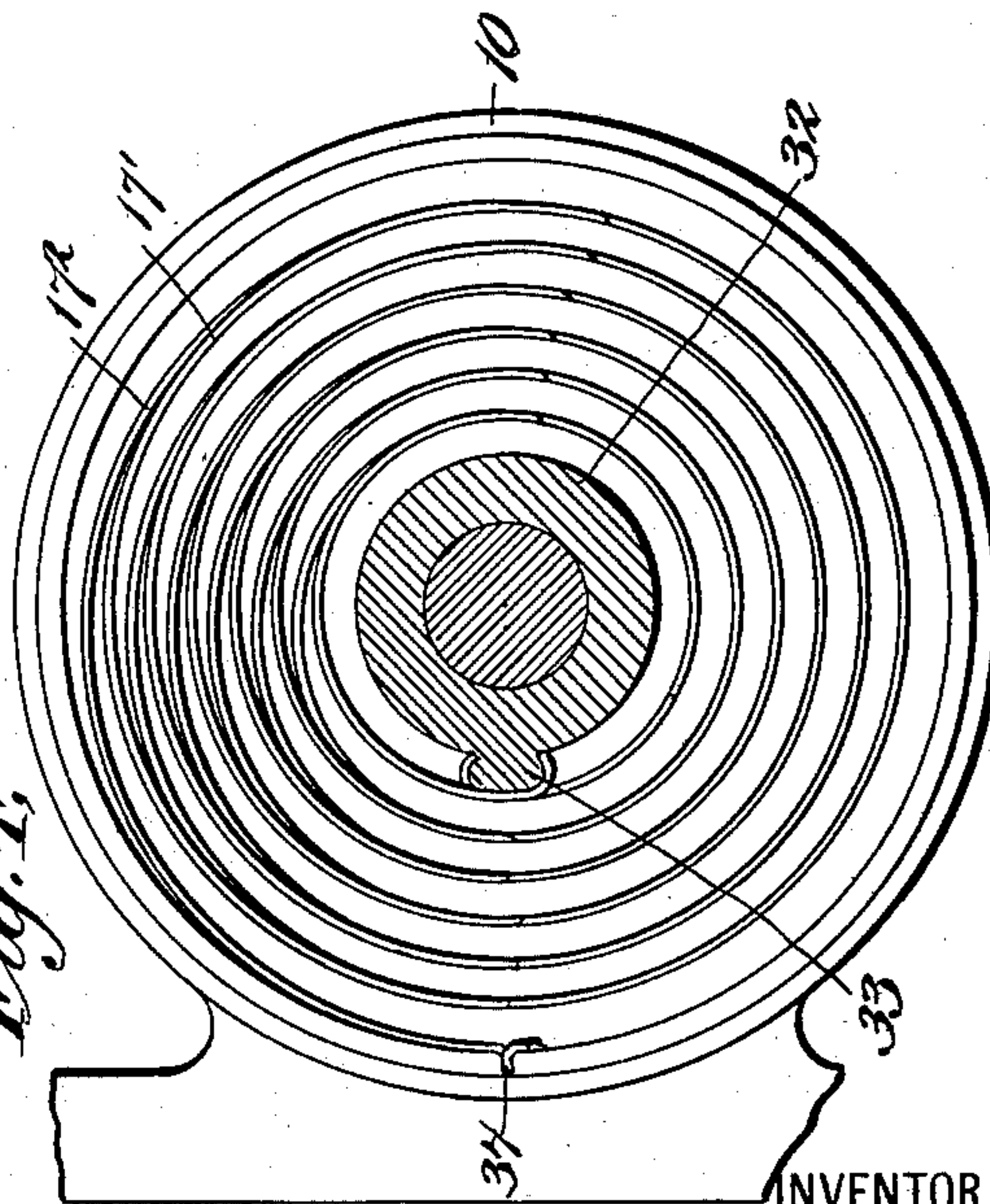
Fig. 3,



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Fig. 4,



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UNITED STATES PATENT OFFICE.

FREDERICK H. OGDEN, OF NEWARK, NEW JERSEY, ASSIGNOR OF ONE-HALF TO HENRY ILL, OF SAME PLACE.

DOOR-CHECK.

SPECIFICATION forming part of Letters Patent No. 655,107, dated July 31, 1900.

Application filed October 16, 1899. Serial No. 733,705. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK H. OGDEN, a citizen of the United States, residing at Newark, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Door Checks and Closers; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in door-checks.

My invention consists in the novel means employed for operating the piston of the door-check, whereby the check may be applied either to a right-hand door or to a left-hand door without opening the check and whereby the check offers no resistance other than that of spring tension to swinging the door wide open and instantly begins to retard the motion of the door from whatever position the door may start to close, thereby avoiding shock to the mechanism of the check and strain to the door and hinges.

The objects of my invention are to avoid the necessity of opening the check to change it from adjustment for a right-hand door to adjustment for a left-hand door, or vice versa, to prevent the check from offering resistance to swinging the door wide open, and to prevent undue and sudden strain to the mechanism of the check and to the door and its hinges. These objects are attained in the door-check herein described, and illustrated in the drawings which accompany and form a part of this specification, in which the same reference-numerals indicate the same or corresponding parts, and in which—

Figure 1 shows a central vertical section of my improved door-check, taken on a plane at right angles to the eccentric-shaft. Fig. 2 shows a central vertical section of the door-check, taken on a plane at right angles to that of Fig. 1. Figs. 3 and 4 are detail views showing the arrangement of the springs, Fig. 3 being a vertical section, and Fig. 4 a top view showing half of the upper spring broken away; and Fig. 5 is an elevation and partial section of the check, showing the use of a

yoke instead of an eccentric-strap for transmitting motion to the piston.

In the drawings, 10 is the main casing of the check.

15 is a central shaft or spindle, to which is attached a lever 14, which is one of the two hinged levers by which the spindles of door-checks are customarily connected to a door-frame.

The casing 10 is divided internally into an upper or spring chamber 16, within which are the springs 17¹ and 17², and a lower chamber 18, in the upper portion of which are gears, a cam-shaft, and a cam or eccentric and eccentric-strap or equivalent device for operating the piston. The lower portion of the chamber 18, the working cylinder proper, contains a vertically-movable piston 20.

In the form of check shown in Figs. 1 and 2 motion is communicated from the spindle 15 to the piston 20 by the following means: A cam-shaft 24 is rotatably mounted in lugs 30¹, depending from a plate 30, separating the chambers 16 and 18, and is at right angles to the axis of spindle 15. Upon the lower end of spindle 15 is a bevel-gear 26, and upon the shaft 24 is a larger gear 25, intermeshing with gear 26. Upon shaft 24 is an eccentric 23, the eccentric-strap 22 of which is pivotally connected to lugs on the piston 20.

In the form of check shown in Fig. 5 the eccentric or cam 23¹ lies within a yoke 22¹, rigidly connected to the piston 20 and guided by ribs 10¹, projecting from the casing 10. This construction is the substantial equivalent of that shown in Figs. 1 and 2.

In the piston is a check-valve 41, which opens when the piston moves upward, permitting free passage of liquid from above the piston to below the same. The piston is also provided with a leakage-passage 36, arranged to be partly or completely closed by a screw valve-plug 37, upon the end of which is a spur-wheel 38, adapted to mesh with a pinion-rod 39, which passes through the bottom of the casing of the check and has upon its end a milled head 40. By rotating this milled head when the piston is at the lower end of the cylinder the valve 37 may be opened or closed, as desired.

When the length of the toggle-levers by which the check is operated is correct or is that which is usual, the eccentric or cam is on its dead-center when the door is in its closed position. Therefore in whichever direction the spindle 15 and the shaft 24 be rotated the piston will be raised. As hereinafter described, under certain conditions the length of one of the toggle-levers may be changed from this normal adjustment in order that the checking action of the piston may cease slightly before the door is closed; but in any case, whether the check be attached to a right-hand door or to a left-hand door, the piston will be raised when the door is opened.

In most liquid checks heretofore used when the door is swung wide open and is as nearly as possible back against the wall the motion of the piston is reversed before the door reaches the limit of its swing. The door-check, therefore, may and frequently does actually resist the movement of the door through the last few degrees of its swing. This is objectionable, both because of the resistance thus offered and because when the door is released after having been opened widely it is permitted to move without restraint for a considerable distance, and thereby to acquire considerable momentum before the checking action begins. The result is that when the check does begin to act a sudden and severe strain is imposed upon the mechanism of the check and upon the door and its hinges, with the result that the mechanism of the check is often broken or injured, and the hinges are often strained or their screws torn from the wood. The premature reversal of the motion of the piston is due to the fact that the toggle-levers by which the check is operated as the door swings multiply the angular movement of the door, so causing the spindle of the check to rotate through a greater angle than that through which the door swings, so that if the door be opened widely the spindle of the check may be rotated through an angle greater than one hundred and eighty degrees. In this check, however, the spindle is connected to the horizontal shaft carrying the eccentric by reducing-gearing, and the eccentric being arranged to swing through about one hundred and eighty degrees before the motion of the piston is reversed (unless in the meantime the motion of the spindle 15 be also reversed) no such reversal of motion of the piston as will check the further opening of the door or permit the door to close without restraint for a considerable distance may take place. The restraining action of the check begins immediately when the closing of the door begins and before the door has acquired momentum, and this restraining action continues until the door has closed completely or almost completely. The action of the check is therefore very easy and uniform, and no sudden strains

are imposed either upon its mechanism or upon the door and its hinges.

In former checks it has been customary to employ but a single spring, and in order to adapt the check for use on a left-hand door when it is already adjusted for a right-hand door, or vice versa, it has been necessary to remove the cover to the spring-chamber and reverse the spring. In my check, however, I employ two springs 17' and 17², which are oppositely placed. One end of each of these springs engages a side of a groove 34 in the side of the chamber 16, and the other end of each spring engages a lug 33, projecting from the bushing 32, which surrounds the spindle 15. This bushing is provided at the top with a flanged head having ratchet-teeth adapted to be engaged by a pawl 43 on the lever 14, as is customary. It will be seen that with this arrangement in whichever direction the bushing 32 is rotated one of the springs 17' or 17² is brought under tension, while the end of the other spring remains stationary, the bushing 32 slipping idly past it.

The operation of my check is as follows: When the door is opened, no matter whether the spindle 15 be rotated to the right or to the left, the piston is caused to rise, the check-valve 41 permitting the free passage of the fluid from above the piston to below it, and at the same time one of the springs is wound up. When the door is released and begins to close again under the action of that spring which is under tension, the piston moves downward, the check-valve 41 closing, and the door can close only as rapidly as is permitted by the escape of fluid from the space beneath the piston through the leakage-opening 36. When the door has almost closed, the eccentric has almost reached its dead-center, and therefore the check at such point offers comparatively little resistance to the closing of the door, thus permitting the spring to overcome the friction of the lock of the door. If desired, the check may be so adjusted that when the door is closed the eccentric is not precisely at its dead-center, but has passed the dead-center slightly. In such case the piston begins to move upward just before the door is completely closed, thus entirely stopping the checking action and leaving the entire force of the spring available to overcome the friction of the lock. This adjustment may be made by adjusting the length of the adjustable toggle-lever by which the check is connected to the door-frame, one of the toggle-levers being customarily adjustable.

In order to adapt this check from adjustment for a right-hand door to adjustment for a left-hand door, or vice versa, it is necessary merely to reverse the pawl 43 and to rotate the bushing 32 by means of a key in the customary manner in the direction in which said bushing will be rotated when the door is opened to the extent which is necessary in

order to place the spring under the desired initial tension.

I do not limit myself to the use of two oppositely-arranged springs, as shown in the accompanying drawings, but may use instead a single spring, as has been customary heretofore, the spring being reversed when it is desired to adapt the check for a door opening in a different direction from that for which the check is already adjusted.

I regard the construction shown in Figs. 1 and 2, in which an eccentric and eccentric-strap are employed, and the construction shown in Fig. 5, in which an eccentric cam and yoke are employed for operating the piston, as equivalent constructions, and in the following claims employ the term "cam" to include both the cam proper, such as shown in Fig. 5, and the eccentric shown in Figs. 1 and 2, it being well recognized that an eccentric is as truly a cam as it is a crank.

Having thus completely described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a door-check, the combination, with a vertical working cylinder, a vertically-movable piston therein, and a vertical spindle mounted to be rotated, and connections between the door and spindle to rotate the latter when the door swings, of mechanism driven from said spindle to transmit the motion thereof to the piston, said mechanism comprising a cam, reducing-gearing to trans-

mit motion from the spindle to the cam, and a connection between the cam and the piston, the arrangement and proportion of said parts being such that the cam will be at a dead-center when the piston is at either limit of its travel, whereby the piston has a substantially-continuous motion in one direction during the opening or closing movement of the door.

2. In a door-check, the combination, with a vertical working cylinder, a vertically-movable piston therein, a vertical spindle mounted to be rotated, and connections between the door and spindle to rotate the latter when the door swings, of a shaft arranged at right angles to the axes of the cylinder and spindle, reducing-gearing connecting the spindle and shaft, an eccentric on the shaft, and a device connected to the piston and movable by the eccentric to transmit movement from the latter to the piston, the arrangement and proportion of said parts being such that the eccentric will be at a dead-center when the piston is at either limit of its travel, whereby the piston has a substantially-continuous motion in one direction during the opening or closing movement of the door.

In testimony whereof I have hereunto affixed my signature in the presence of two witnesses.

FREDERICK H. OGDEN.

Witnesses:

E. M. MARBLE,

H. M. MARBLE.