

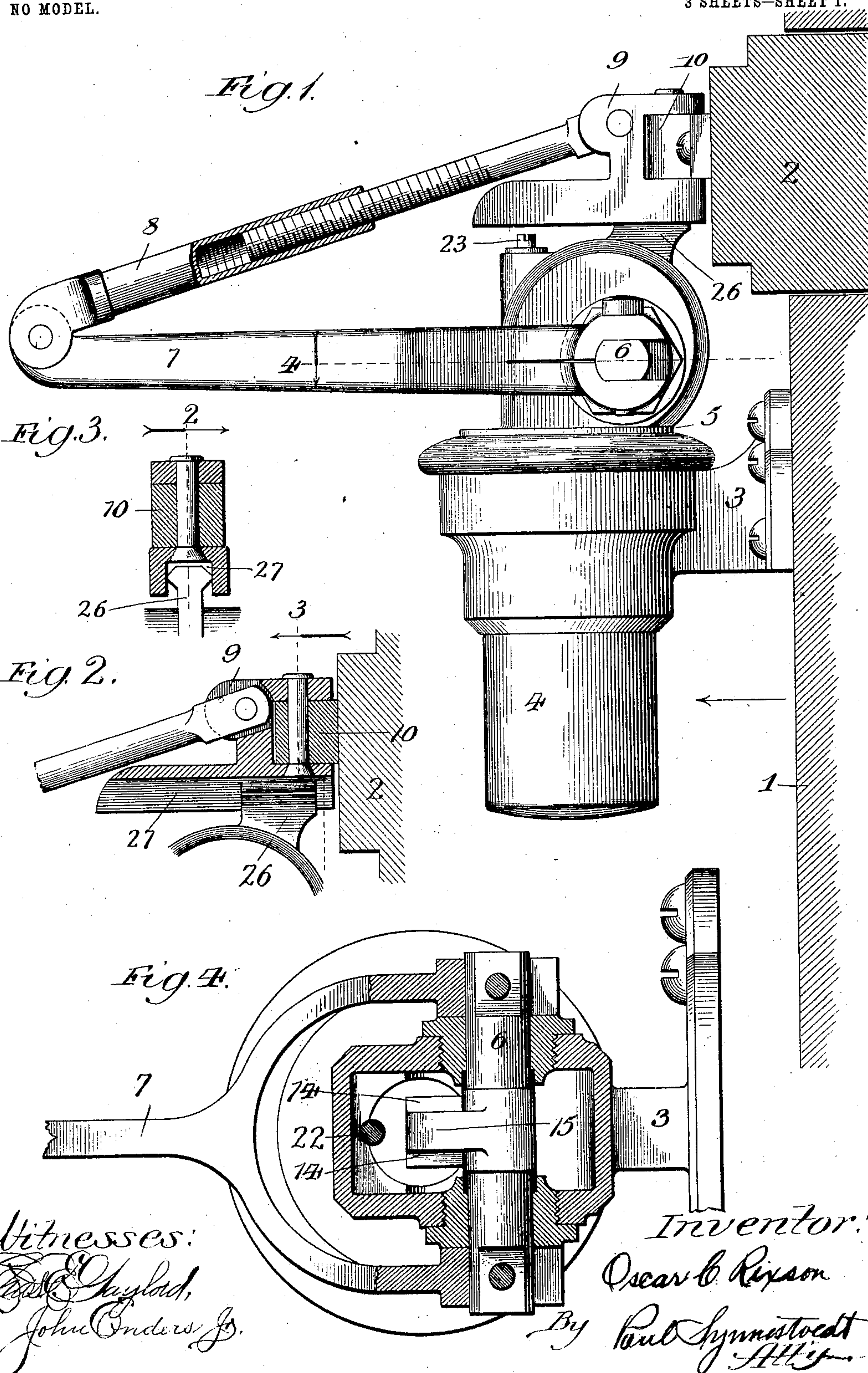
No. 735,822.

PATENTED AUG. 11, 1903.

O. C. RIXSON.  
DOOR CHECK AND SPRING.  
APPLICATION FILED OCT. 15, 1900.

NO MODEL.

3 SHEETS—SHEET 1.





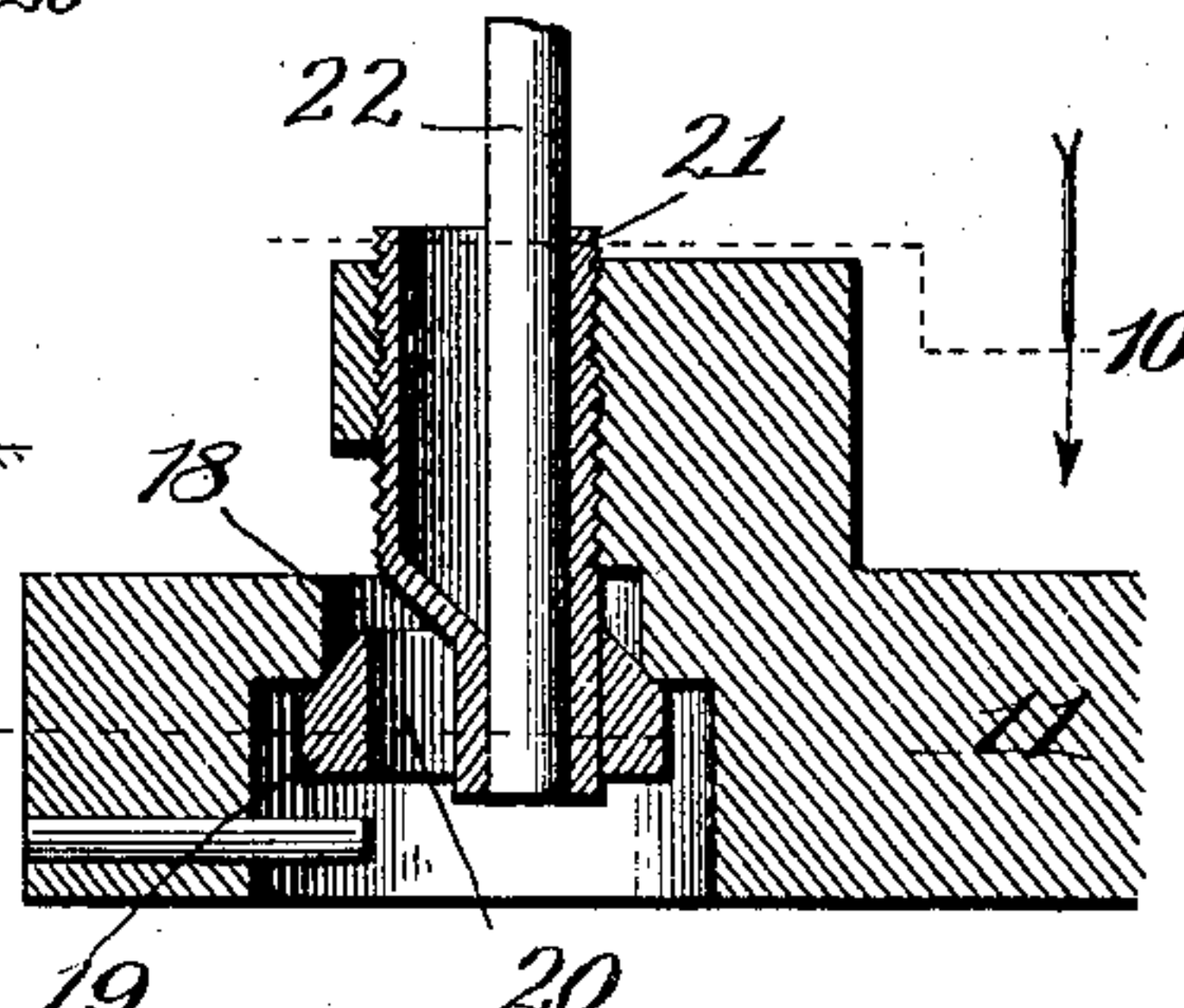
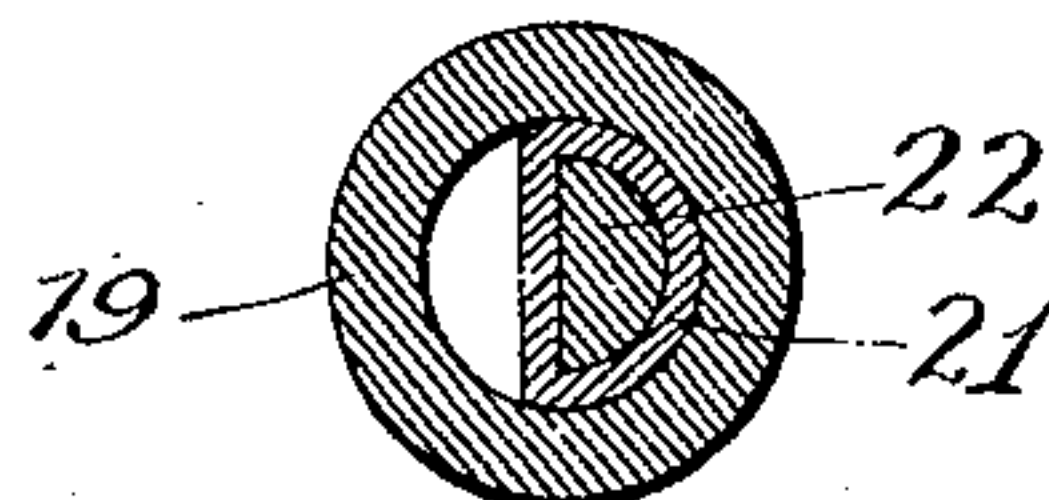
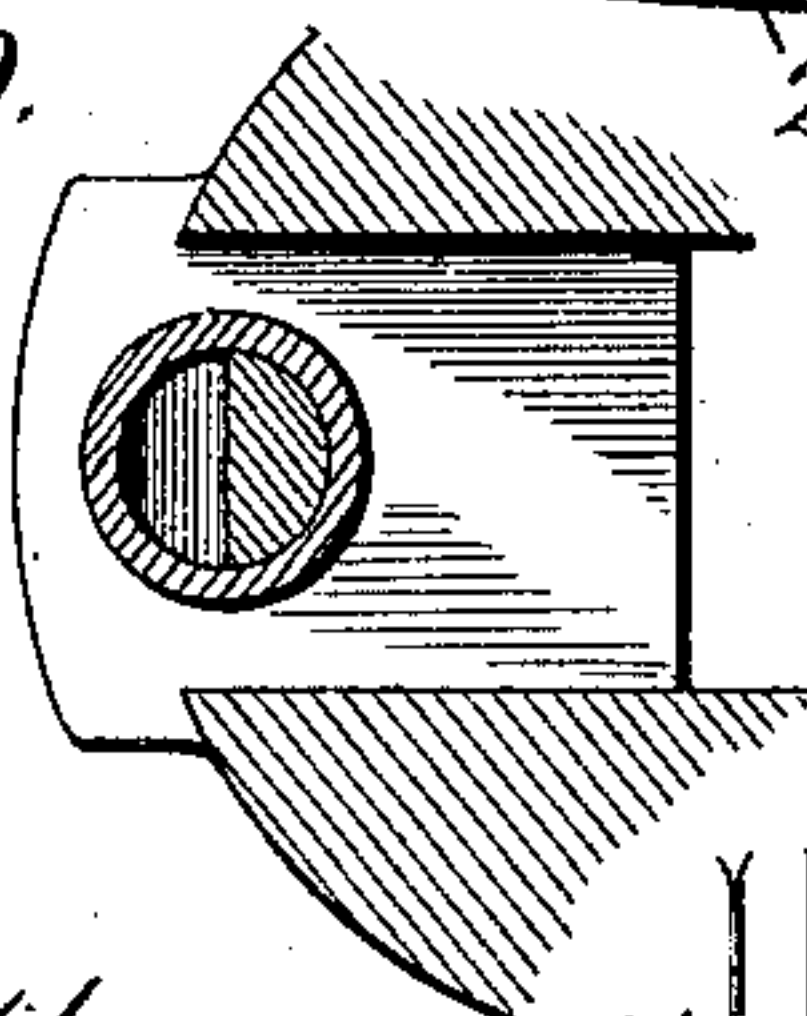
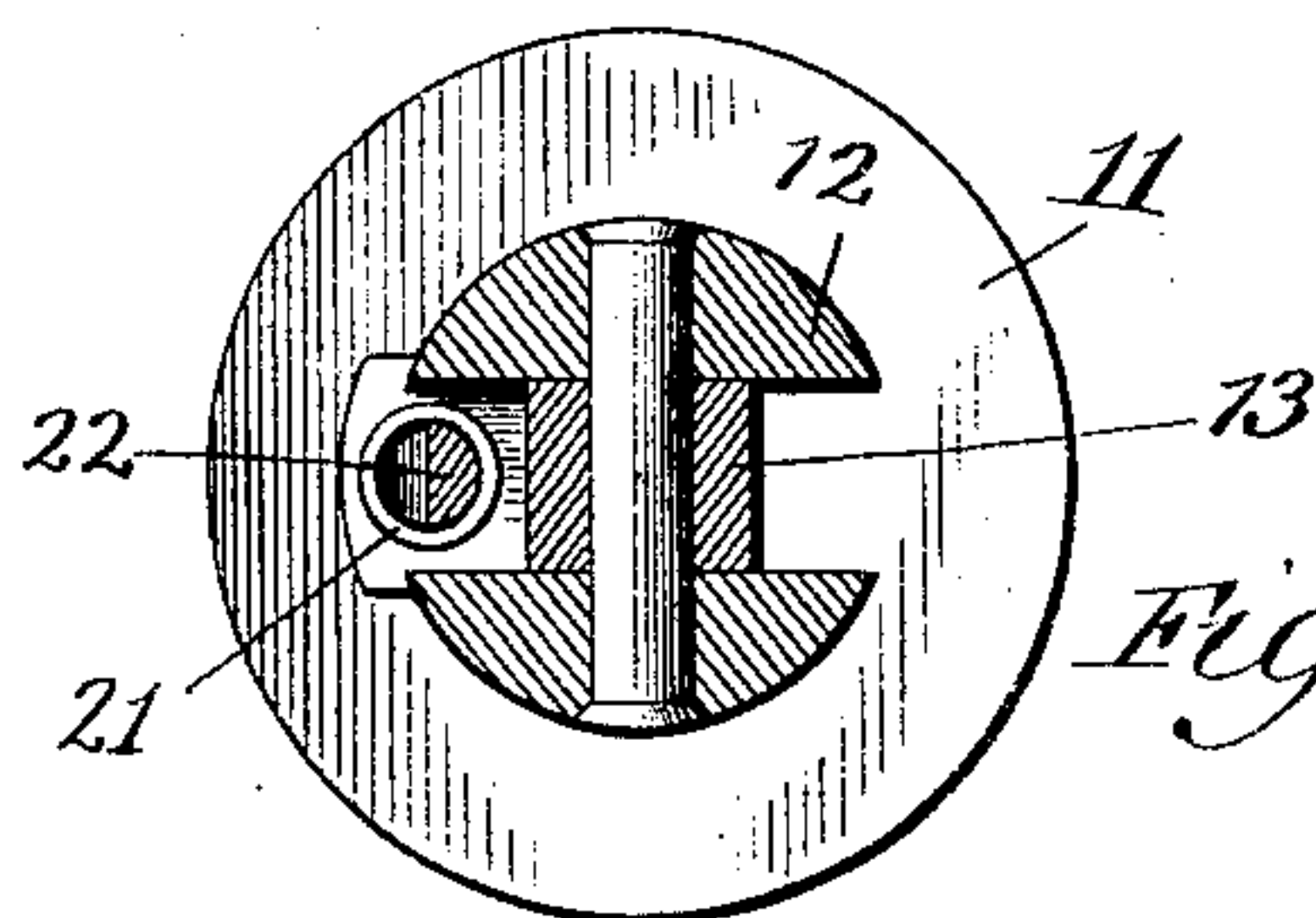
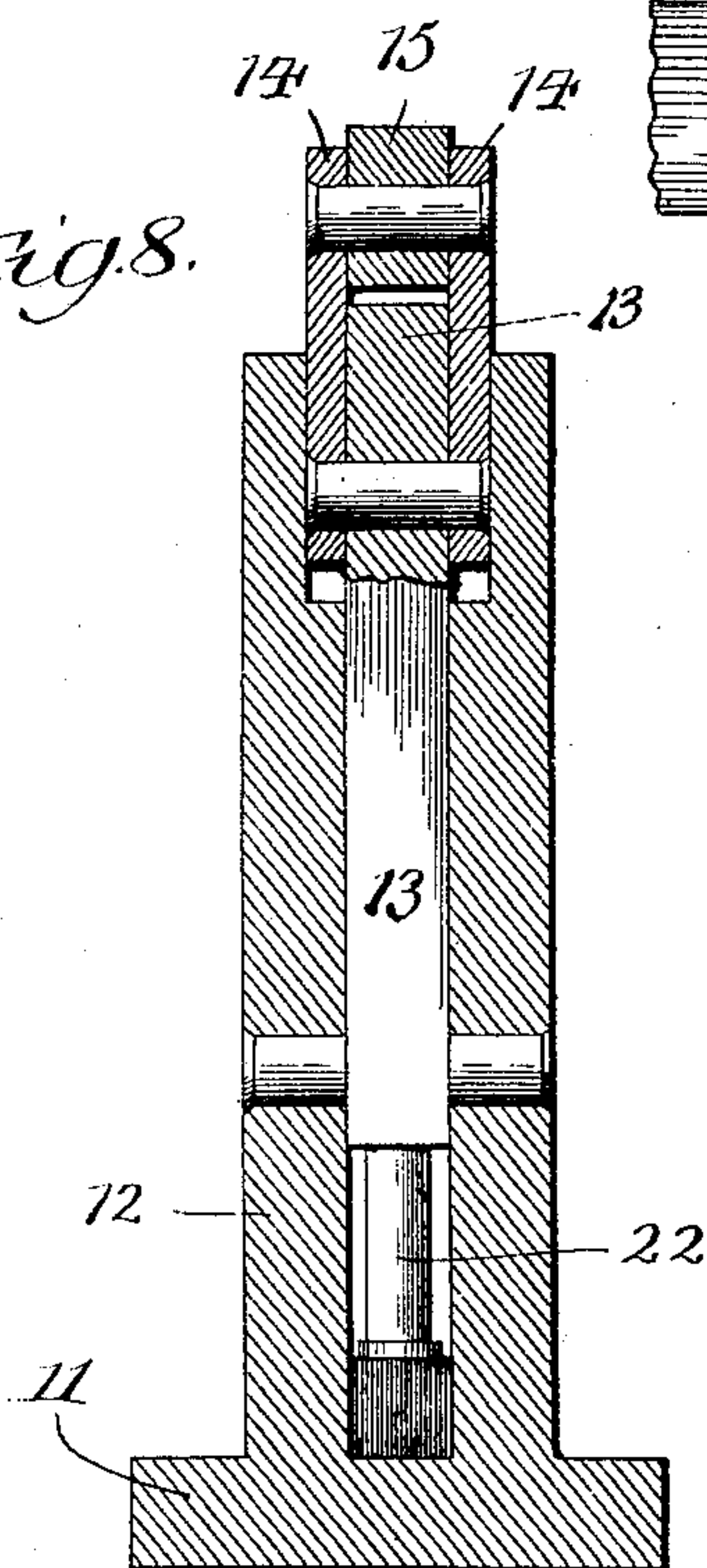
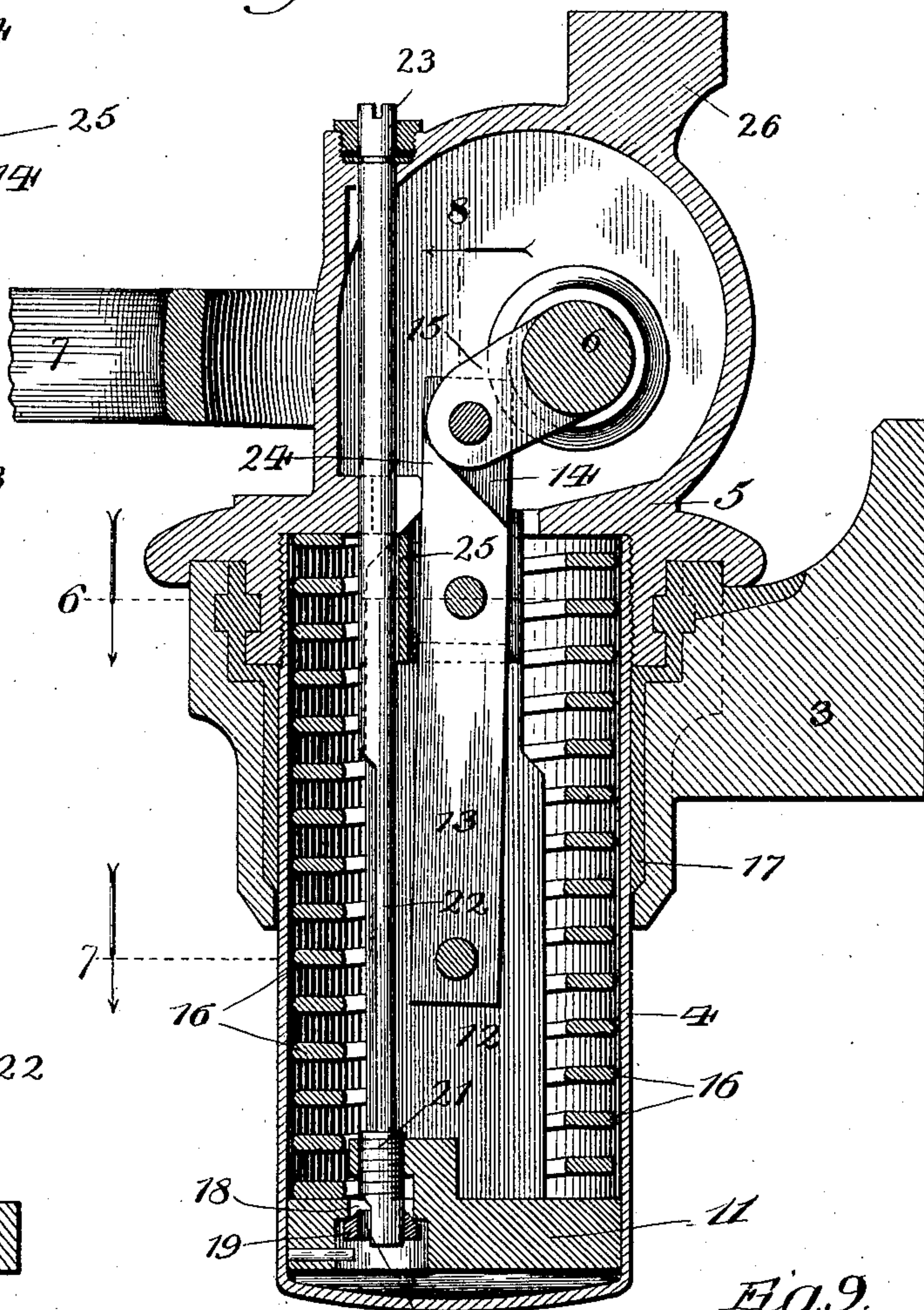
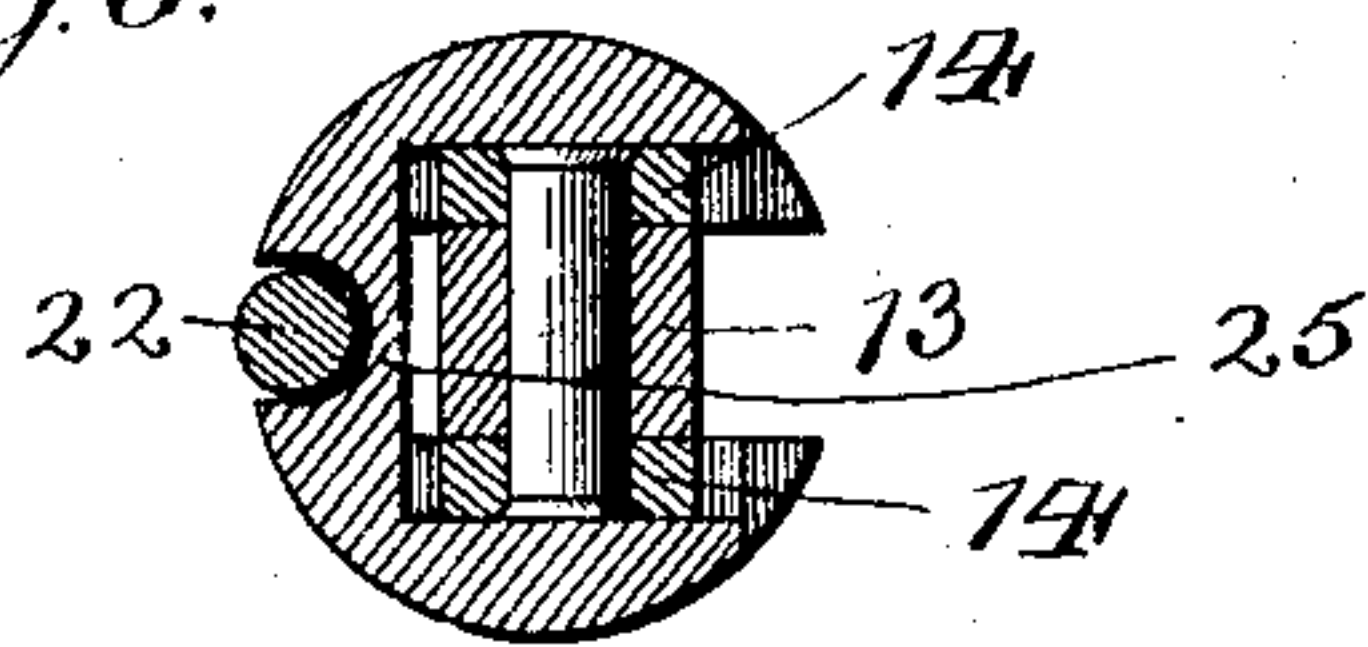
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3 SHEETS—SHEET 2.



Witnesses:

East. Chayford,  
John Enders. J.

*Inventor:*

Oscar B. Rixson

By Paul Symonstvedt Att'y.



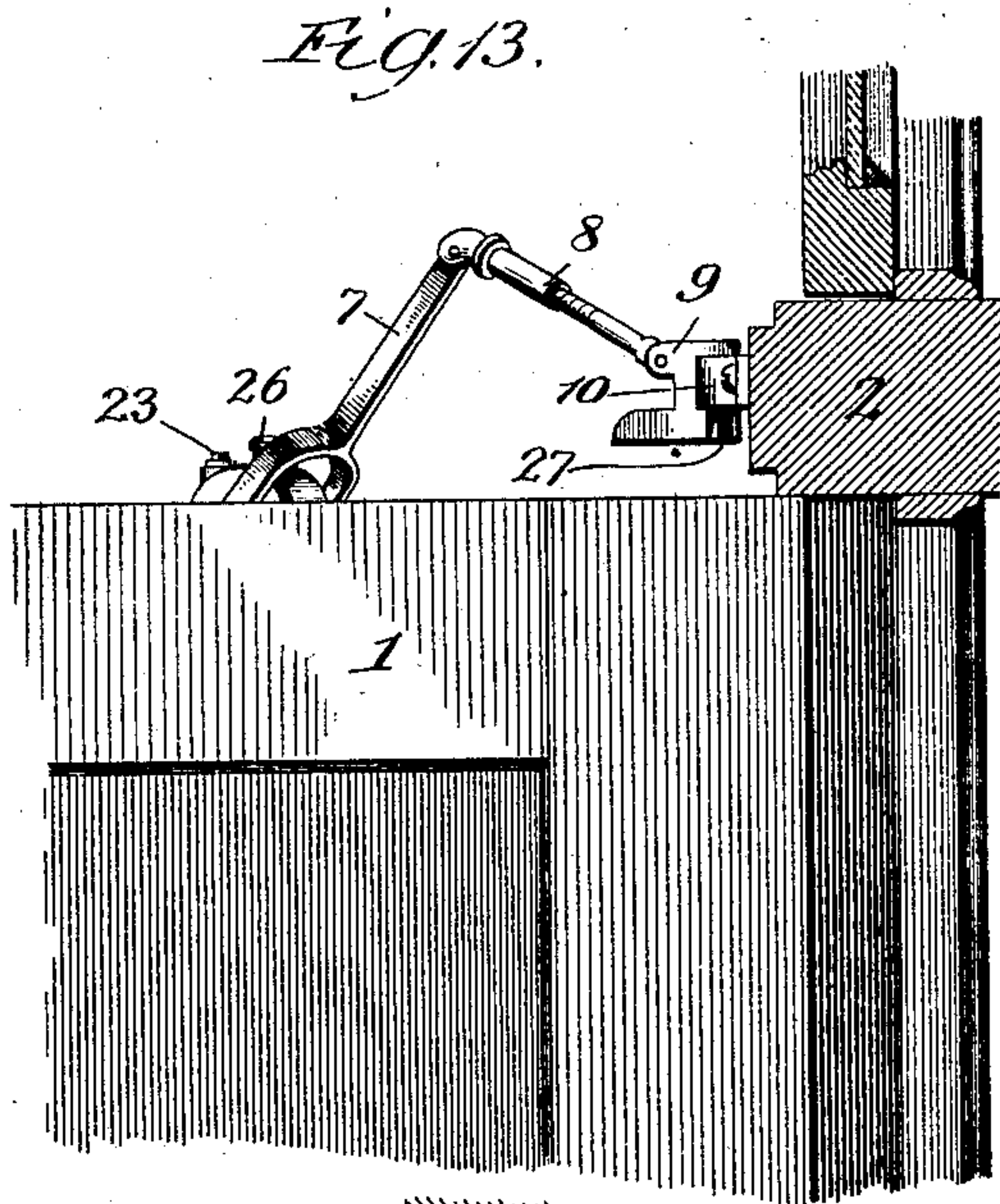
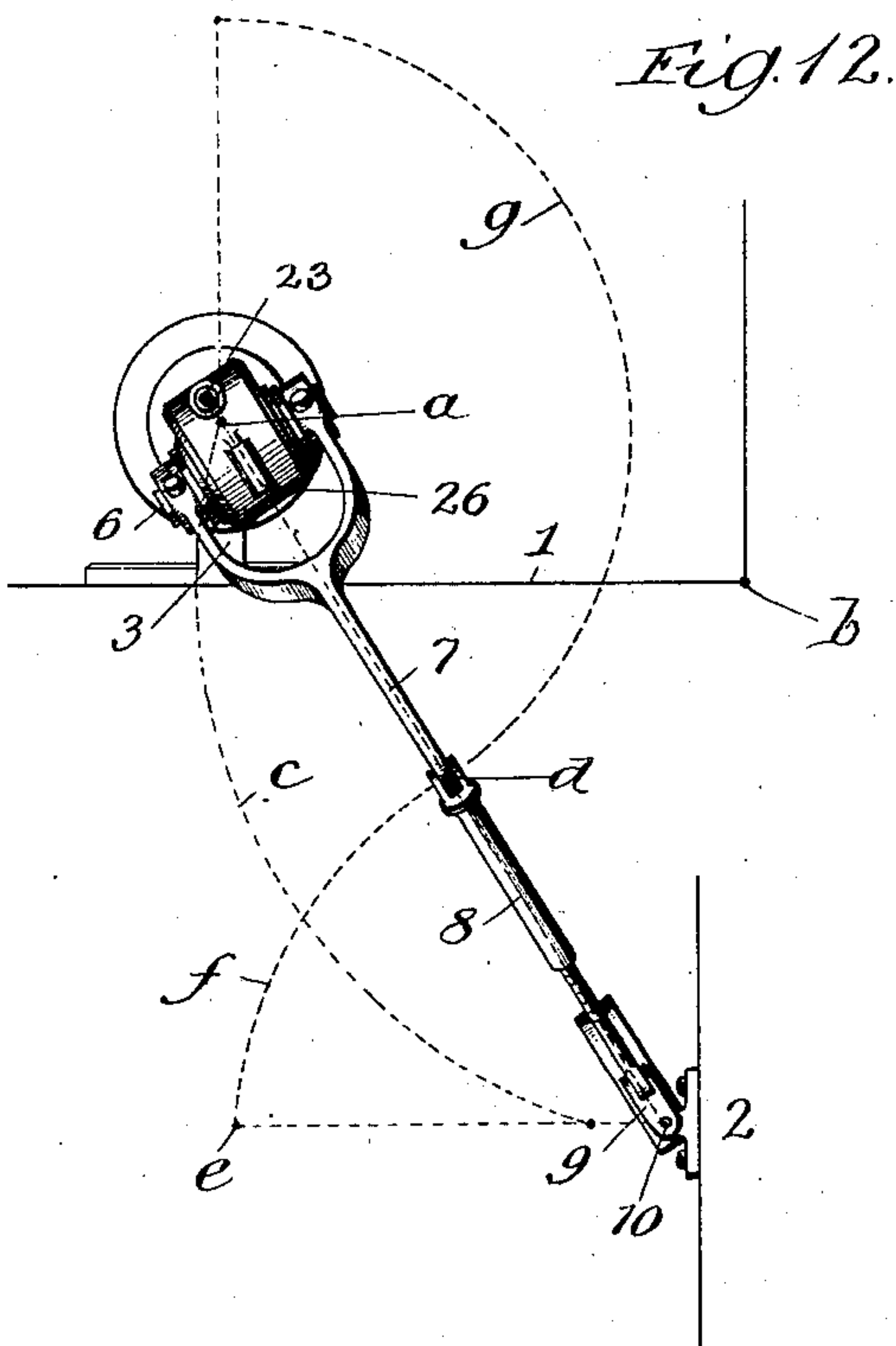
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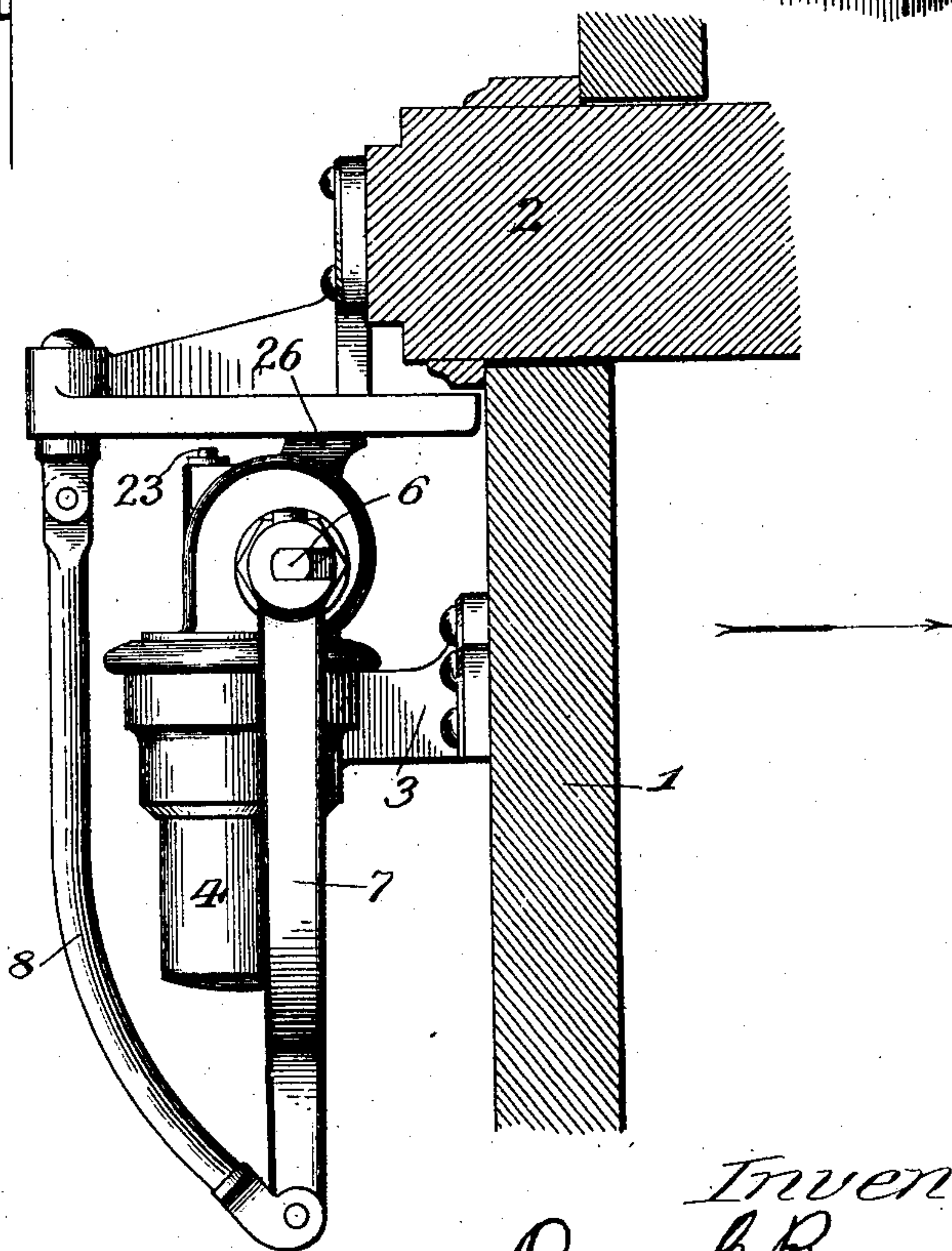
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NO MODEL.

3 SHEETS—SHEET 3.



*Fig. 14.*



Witnesses:  
E. E. Chubb  
John Anders Jr.

Inventor:  
Oscar C. Rixson  
By Paul Synnestrød



# UNITED STATES PATENT OFFICE.

OSCAR C. RIXSON, OF OAKPARK, ILLINOIS, ASSIGNOR TO THE OSCAR C. RIXSON CO., OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

## DOOR CHECK AND SPRING.

SPECIFICATION forming part of Letters Patent No. 735,822, dated August 11, 1903.

Application filed October 15, 1900. Serial No. 33,071. (No model.)

*To all whom it may concern:*

Be it known that I, OSCAR C. RIXSON, a citizen of the United States of America, residing at Oakpark, Cook county, Illinois, have invented certain new and useful Improvements in Door Checks and Springs, of which the following, taken in connection with the accompanying drawings, is a specification.

The first of the objects of my present invention is the provision of a door check and spring which although of large power will be light in weight and cheap to construct and which will also be reliable and efficient in its operation.

Another object of this invention is to reduce the leakage in the checking-cylinder to a minimum.

Another object is to provide novel means to reduce the spring breakage as much as possible and also to so dispose the spring and other actuating or moving parts that in case any breakage does occur the spring will still continue to exert the necessary force to operate the door.

Another object is to provide a device of this class which will operate equally well on both right and left hand doors without the necessity of any change in the mechanism whatever.

Another object of this invention is to so arrange the checking-valve and the stem controlling the same that no stuffing or packing will be necessary around said stem, while it will at the same time be easily accessible for adjustment when occasion requires.

Another object of this invention is to connect the checking-piston with the rocker-shaft to which the movable arm is secured by a connection capable of flexure, preferably a link, so disposed that the pull on the piston and also the checking-push upon the piston will be transmitted between the rocker-shaft and piston by the same connections.

The above, as well as such other objects as may hereinafter appear, I attain by means of a construction which I have illustrated in preferred form in the accompanying drawings, in which—

Figure 1 shows a side elevation of an apparatus embodying my invention. Fig. 2 is a sectional view of a portion of the same, show-

ing the point of anchorage of one of the movable arms to the transom-bar. Fig. 3 is a sectional view on the line 3 3 of Fig. 2. Fig. 4 is a sectional view on the line 4 4 of Fig. 1. Fig. 5 is a vertical section showing the interior of the checking-cylinder and the mechanism connected therewith. Fig. 6 is a sectional view on the line 6 6 of Fig. 5. Fig. 7 is a sectional view on the line 7 7 of Fig. 5. Fig. 8 is a vertical section on the line 8 8 of Fig. 5, intended to show the connection between the checking-piston and the rocker-shaft. Fig. 9 is a sectional view showing the construction of the checking-valve on an enlarged scale. Fig. 10 is a horizontal section showing a portion of the valve arrangement of Fig. 8. Fig. 11 is a section taken on the line 11 11 of Fig. 9. Fig. 12 is a diagrammatic view showing the movements of the several parts. Fig. 13 is a view showing the position of the parts with the door open at a right angle, and Fig. 14 shows a modification of my invention for a door which opens outwardly.

Referring now more particularly to Figs. 1 and 5, it will be seen that to a door 1 I attach a bracket 3, carrying a cylinder 4, provided at its upper end with a cap 5, within which is mounted a rocker-shaft 6, upon the outer ends of which is secured a forked arm 7, the other end of which is attached, by means of a connection 8 or second arm, preferably extensible, to a cross-head 9, pivotally mounted upon a part 10, which affords an anchorage for the connection 8 to the transom-bar 2.

The cylinder 4 is rotatable relative to the bracket 3 and arranged vertically with respect thereto, and within the cylinder is a checking-piston 11, carried by a piston-stem 12, to which is secured a link 13, pivotally connected to a pair of links 14, which are pivoted to the rocker-arm of the rocker-shaft 6. Between the upper side of the piston 11 and the under side of the cap 5 is a coil-spring 16, preferably of flattened wire. (Clearly shown in Fig. 5.) The spring-pressure between the cap 5 and the piston 11 tends to force the piston downward against the checking fluid, which is stored in the cylinder 4, in the lower part thereof, underneath the piston 11 and between the same and the lower end of the cylinder, which is preferably of one piece of



pressed steel, the bottom and side walls being integral—*i. e.*, without any cap or screw-thread connection at that end—so that there will be no chance for the checking fluid to leak out. Through the piston 11 there is a passage 18, controlled by a checking-valve 19, which being longitudinally slidable relative to the part 21 opens when the door is opened by the action of the fluid to permit the free passage of the fluid, and closes through the action of the fluid, and by means of the restricted opening 20 throttles the passage of the checking fluid when the door is being closed by the pressure of the spring.

The extent of the opening of the passage 20 is determined by the position of the part 21, which is adapted to be turned by means of the stem 22, which extends upwardly, as shown in Fig. 5, and projects into position at 23, where it can be conveniently reached in order to make the necessary adjustments in the valve and does not require to be packed against leakage. In order that the part 21 may turn readily with the part 22, it is made of irregular shape, and the part 22 is formed to correspond—as, for example, the half-cylindrical shape clearly indicated in Fig. 11.

From the drawings it will be seen that the connection or arm 8, where it is anchored to the transom-bar 2, is pivotally connected to the cross-head 9, and the cross-head is pivotally connected to the anchor-piece 10, thus giving a capacity for universal movement at this point. It will also be evident that the arm 7 is capable of moving or swinging vertically upon the rocker-shaft 6, which latter extends horizontally through the cap 5 upon the upper end of the cylinder 4, and the cylinder 4, which is securely fastened to the cap 5 and in some respects may properly be regarded as a part thereof, is movable rotatably upon a horizontal plane within the bracket 3, the latter permitting a horizontal swinging movement of the arm 7 as well as and coincidentally with a vertical movement thereof. The centers of the connections to the door and the transom-bar are placed one above the other, as shown in the drawings. The objects of these provisions can now be more clearly seen by reference to Figs. 12 and 13.

In Fig. 12, in dotted lines, are shown the different lines of travel of some of the several parts. For example, the door is shown open at a right-angle position, the connection 8 and the arm 7 forming practically a single-jointed arm flexed upwardly, but in a vertical plane, between the transom-bar 2 and the point *a*. In this position the movement of the door about its hinge-center *b* will have brought the center *a* to the position shown in Fig. 12, and the point *a* will have traveled in a line indicated by the dotted line *c*, and in the meanwhile the point *d*, which is the pivotal point of attachment between the connection 8 and the arm 7, will have traveled from *e* to *d* through a line *f*. In order to reach the posi-

tion shown in Fig. 12, the arm 7 and the connection 8, it is to be observed, will, strictly speaking, have traveled not in a horizontal plane nor in a vertical plane, but in a plane the resultant of these two planes. This movement I have indicated by a dotted line *g*. With the door open at a right angle, as indicated in Fig. 12, the parts looked at from a side position would appear about as shown in Fig. 13. After the door is further opened, of course, the point of attachment between the arm 7 and connection 8 begins to descend until when the door is fully opened it is practically in a straight line between the anchor-point on the transom-bar and the center of rotation of the mechanism on the door.

Returning now to Fig. 5, it will be seen that when the arm 7 is moved upwardly it lifts the piston 11 and compresses the spring 16, the fluid being allowed to pass freely through the passage 18 by the opening of the valve 19. When now the door is released, the spring 16 will push the piston 11 downward against the resistance of the checking fluid beneath, which has now to escape upward through the restricted passage 20, and the piston will consequently be checked by the action of the fluid.

In order to do away with the necessity of having both a piston-rod and chain connection to the checking-piston and spring, I arrange a novel construction of link mechanism, in which I provide a link 13, pivotally connected to the piston at the lower end and connected pivotally at the upper end to a pair of links 14, which are pivotally attached to the rocker-arm 15. The link 13 is provided with an inclined end, which by the projection 24 prevents the toggle formed by the link 14 and the link 13 from bending at the center toward the right when the link 13 is acting as a strut to push downward upon the piston 11. The links 13 and 14 are prevented from moving in the other direction by the part 25, which acts as a guide to hold it in line. The necessity for having the connection between the arm 15 and the piston made in link shape or in two pivotally-movable sections is that when the arm 15 rises to compress the spring it travels through considerable of an arc, and the link 14 acts as one of the links of a chain, winding up, as it were, upon the shaft 6, and thus permitting the necessary movement of the same.

As a bearing for the cylinder 4 within the bracket 3 I provide, preferably, a soft-metal antifriction-seat 17; but any suitable substitute could be used that might be preferred—as, for example, a row of balls mounted in suitable cones.

Upon the upper part of the cap 5 there is a projection 26, adapted to enter a guideway 27, (see Fig. 3 especially,) to hold the parts in line when the door is near closed position, as clearly indicated in Fig. 2.

In some cases the doors open outwardly and it is desired to put the checking mechanism



upon the inside to protect it better from the weather. For such conditions I have provided a modification of my device, (shown in Fig. 14,) in which the arm 7 extends downwardly instead of outwardly at right angles, and the link or connection 8 also extends downwardly, as shown in said Fig. 14. The operation of this mechanism is substantially the same as that which I have already described, and need not, therefore, be here further discussed.

From the above it will be seen that my device will work either on a right or left hand door without any change whatever. The connection to the transom-bar being right over the center of the check it will turn equally well in either direction and in each case exert an upward pull upon the piston when the door is opened and a downward push when the door closes. The checking-cylinder being made with its lower end closed or integral with the sides and placed in a vertical position the checking-fluid remains at all times in the bottom and does not come in contact with any screw-thread or other cap connections. This reduces leakage to a minimum.

By the novel arrangement of parts which I employ I am enabled to use a form of spring not so liable to breakage as is the volute spring commonly employed and of which if it does break the parts cannot become misplaced, but will continue to work even in such condition.

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

1. A door-closing device comprising an actuating-spring, an arm connected thereto to vertically compress the spring when the door is opened, being mounted to swing both vertically and horizontally, and provided with operative connections attached to the transom-bar of the door.

2. A door-closing device comprising an actuating-spring, an arm connected thereto mounted to swing both vertically and horizontally and compress said spring when the door is open, and provided with an adjustable connecting-link attached to the transom-bar of the door, whereby to regulate the compression of the spring.

3. A door-closing device comprising, in combination with an actuator, a jointed arm capable of vertical flexure attached to the actuator and pivoted to the transom-bar of the door for a horizontal movement as the door is opened, substantially as described.

4. In a door-closing device the combination with an actuator of a jointed arm capable of vertical flexure, and pivoted to the transom-bar of the door so as to swing horizontally, one link of said jointed arm being adjustable.

5. A door-closing mechanism comprising a bracket, a spring supported on the bracket, a jointed arm connected to the spring and to

the transom-bar of the door, said arm being pivotally mounted to swing horizontally and be flexed vertically as the door is opened, substantially as described.

6. A door-closing mechanism comprising a bracket, an arm, a cylinder rotatably mounted on said bracket, a spring in said cylinder, said arm being provided with connections attached to the transom-bar of the door and to the spring, whereby the movement of the arm compresses the spring, said connections to the transom-bar and to the spring being constructed to permit the arm to move horizontally and to swing vertically at the same time.

7. A door-closing mechanism comprising a bracket, a cylinder rotatably mounted thereon, a checking-piston and spring within said cylinder, an arm extending out from said cylinder having its opposite end connected by a link to the transom-bar of the door, and connections between the arm and the spring to compress the spring by movement of the arm as the door is opened, said connection being constructed to permit both vertical and horizontal swinging of said arm.

8. A door-closing mechanism comprising a bracket, a cylinder rotatably mounted therein and containing actuating means, and connections between said actuating means and a part of the door, to operate the former when the door is opened.

9. A door-closing mechanism comprising a bracket, a cylinder mounted in said bracket in vertical position, and rotatable therein, a spring and checking-piston in said cylinder, a rocking shaft connected with said piston and means for actuating the rocking shaft.

10. In combination, a bracket, a vertical cylinder rotatably mounted on said bracket, a spring within said cylinder, a rocking shaft in the upper end of the cylinder, connections between said shaft and spring, and a jointed arm connected to said rocking shaft and pivotally attached to the transom-bar of the door.

11. A door-closing mechanism comprising a bracket, a vertical cylinder rotatably mounted on said bracket, a spring contained in said cylinder, an arm provided with connections to the transom-bar of the door and to said spring, whereby movement of the arm will compress the spring, the connections to the transom-bar and to the spring constructed to allow the arm to move horizontally and to swing vertically, simultaneously as the door is moved.

12. In a door-closing device a spring and checking-piston inclosed by a cylinder, connections between said piston and spring, and a rocking shaft, a forked arm attached to the opposite ends of the rocking shaft and connections between the other end of the arm and the transom-bar attached to the latter by universal joint.

13. A door-closing device having a spring, an arm capable of moving horizontally and swinging upwardly to compress the spring



when the door is opened, and provided with connections attached to the transom-bar of the door, a guideway, 27, and a projection, 26, engaging said guideway, substantially as described.

14. A door-closing mechanism comprising a bracket on the door, a cylinder mounted for horizontal rotation therein containing an actuating-spring, a jointed arm connected to the transom-bar of the door by universal joint, and connections between the arm and the spring adapted to compress the latter as the door is swung open.

15. In a door-closing mechanism the combination with a vertically-mounted rotatable

cylinder containing an actuating-spring and means for checking the recoil of the spring, of a crank and rock-shaft connected with the spring, a vertically-swinging and horizontally-movable arm on the rock-shaft connected by a pivoted link to the transom-bar of the door, substantially as described.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

OSCAR C. RIXSON.

In presence of—

PAUL SYNNESTVEDT,  
PAUL CARPENTER.