

(No Model.)

2 Sheets—Sheet 1.

D. T WINTER.

AUTOMATIC DOOR CLOSER.

No. 334,834.

Patented Jan. 26, 1886.

FIG. 1.

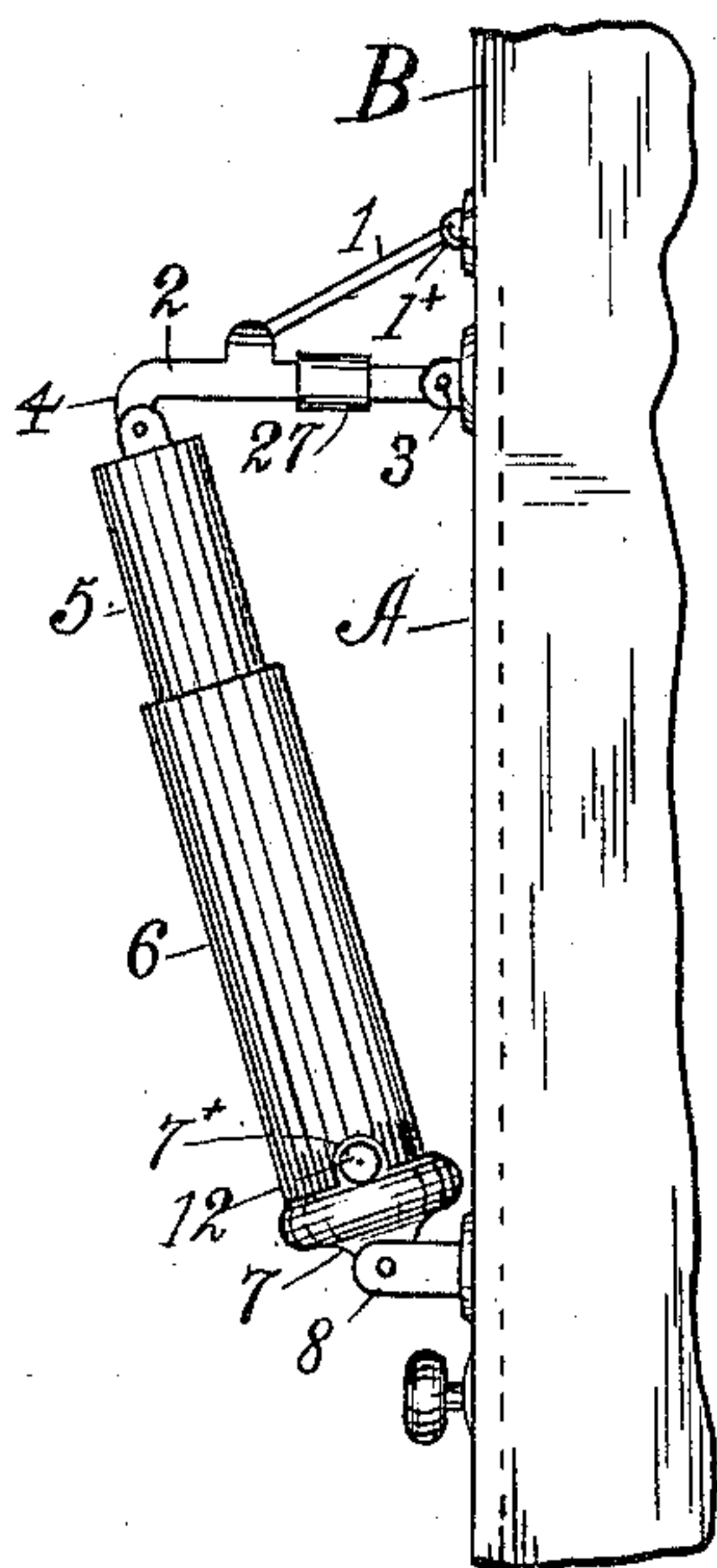


FIG. 2.

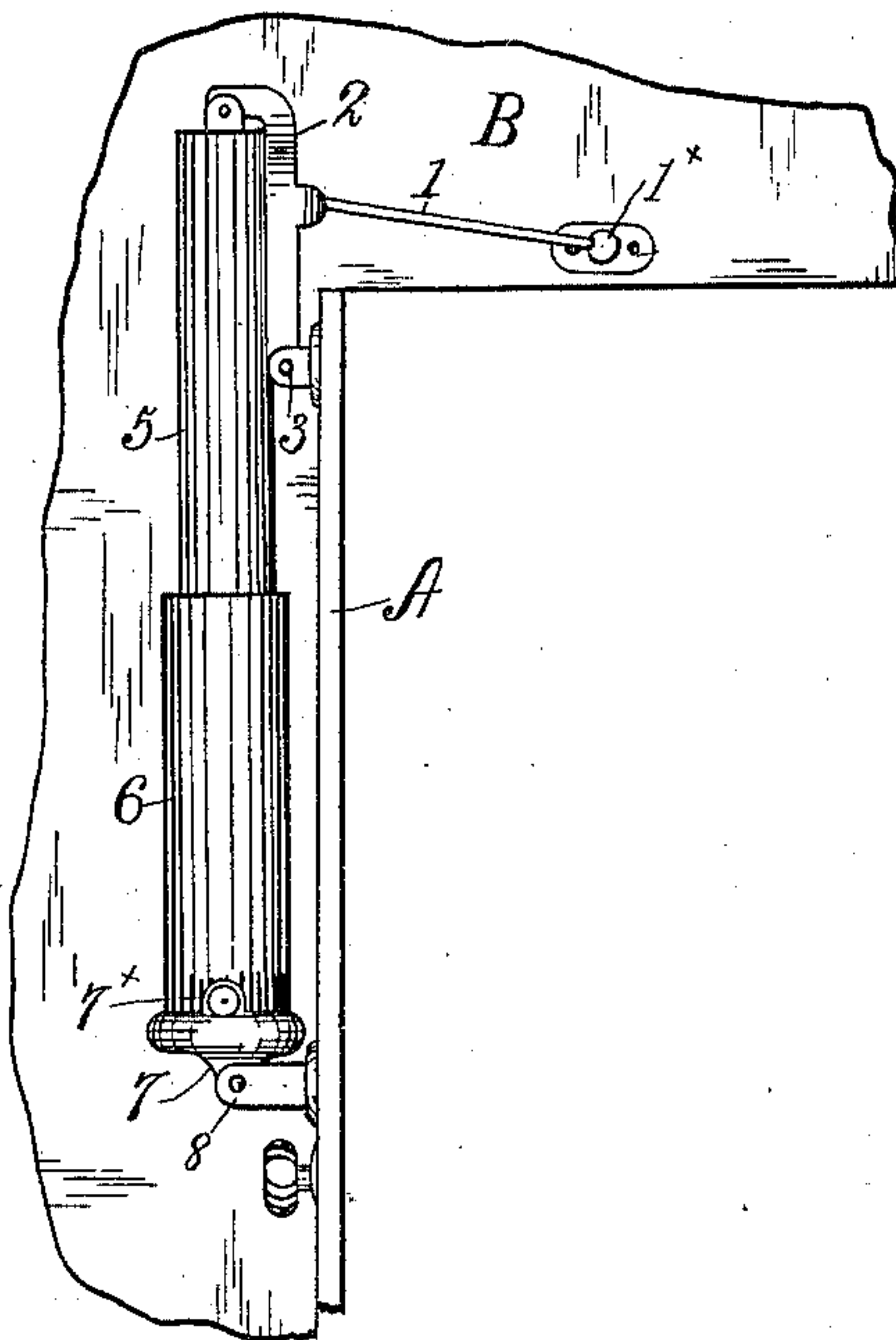


FIG. 3.

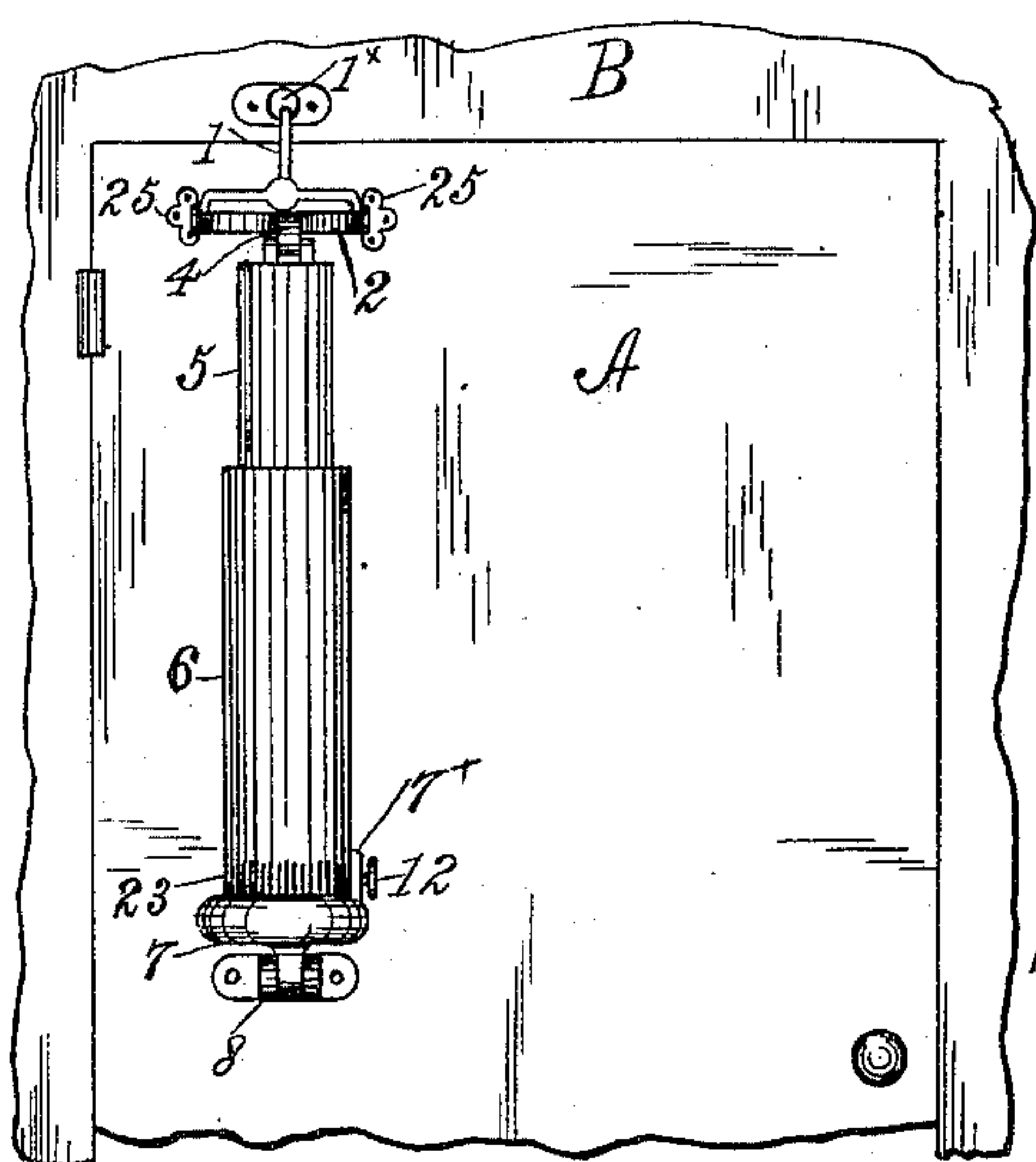


FIG. 5.

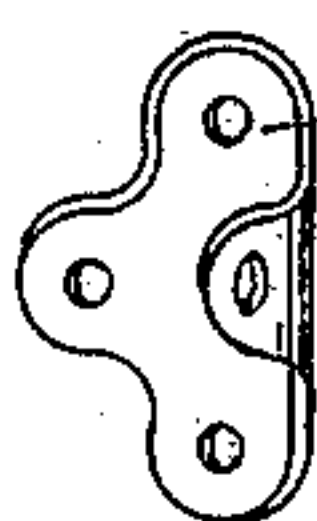


FIG. 4.



FIG. 8.

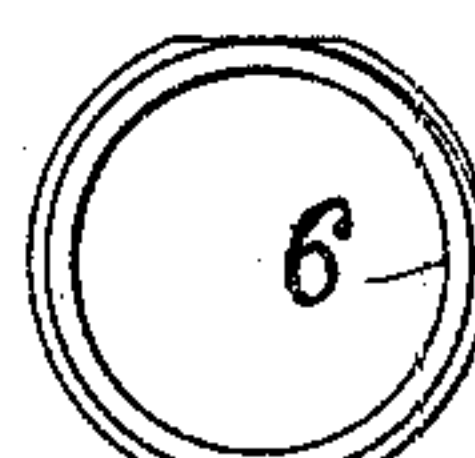


FIG. 6.

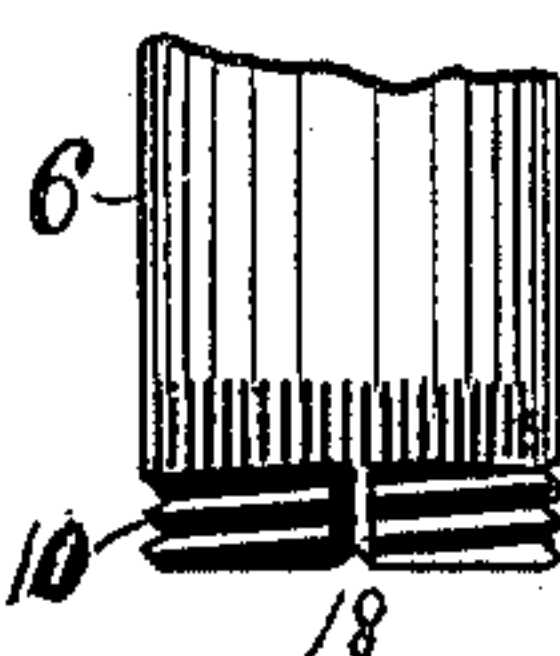


FIG. 9.

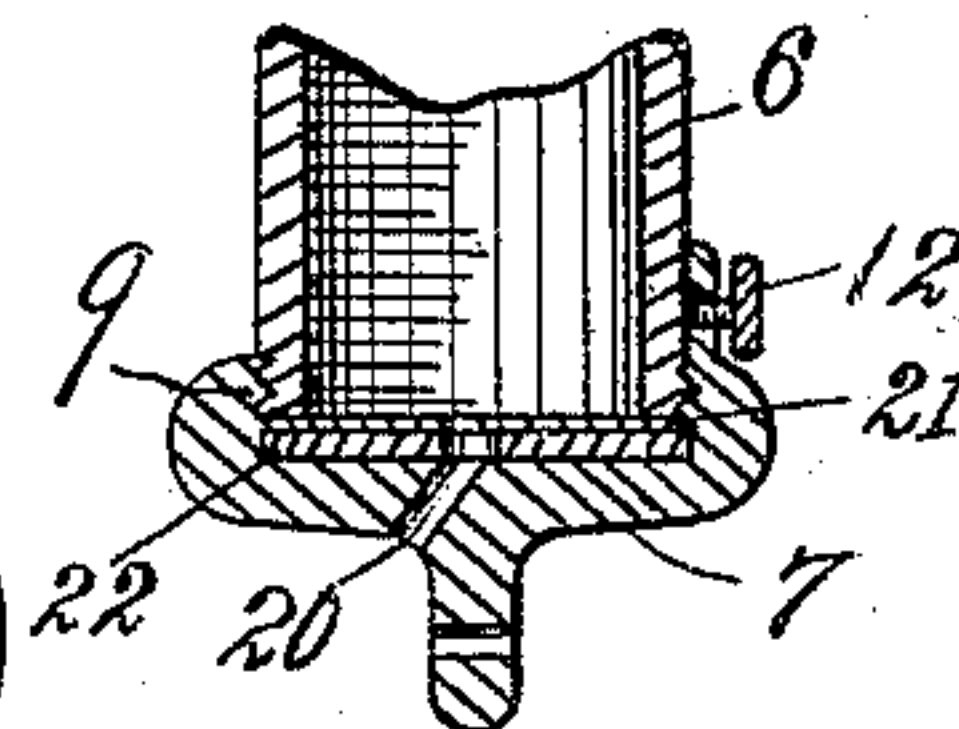


FIG. 7.

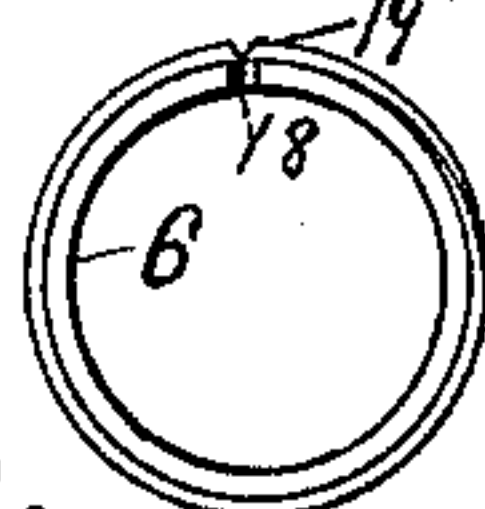
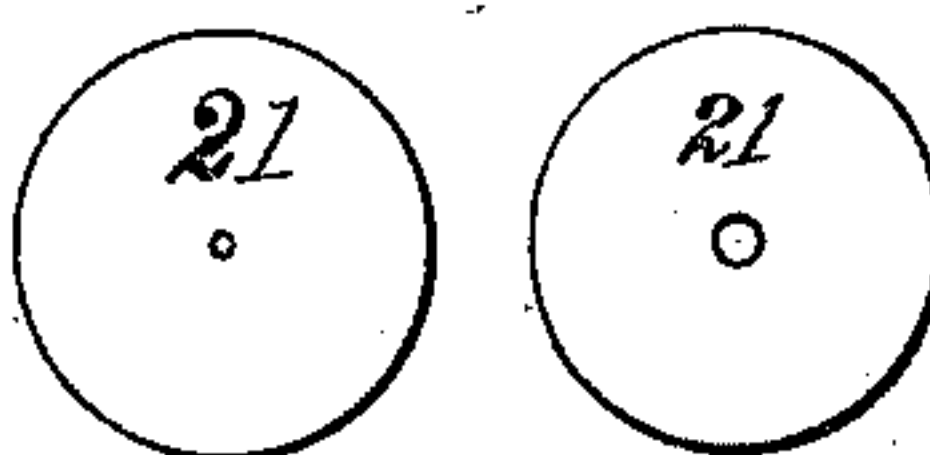


FIG. 10.



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(No Model.)

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FIG. 11.

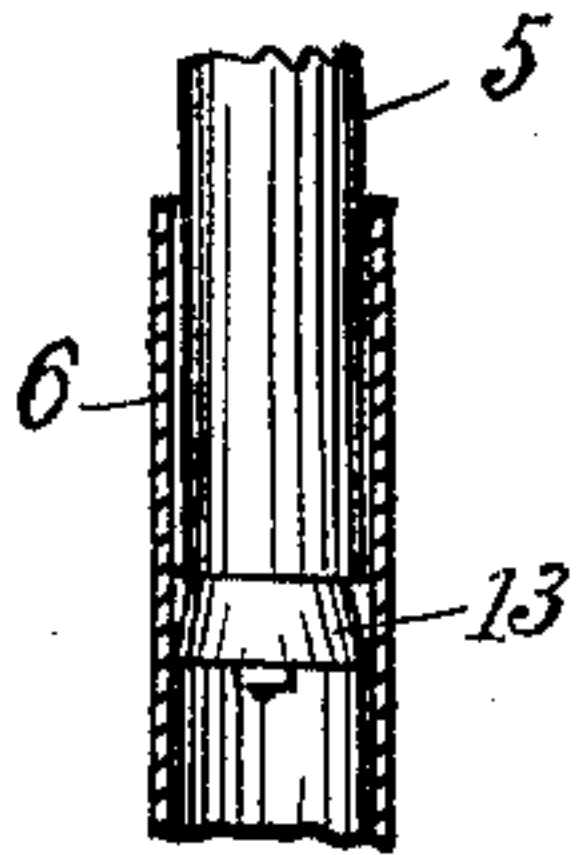


FIG. 12.

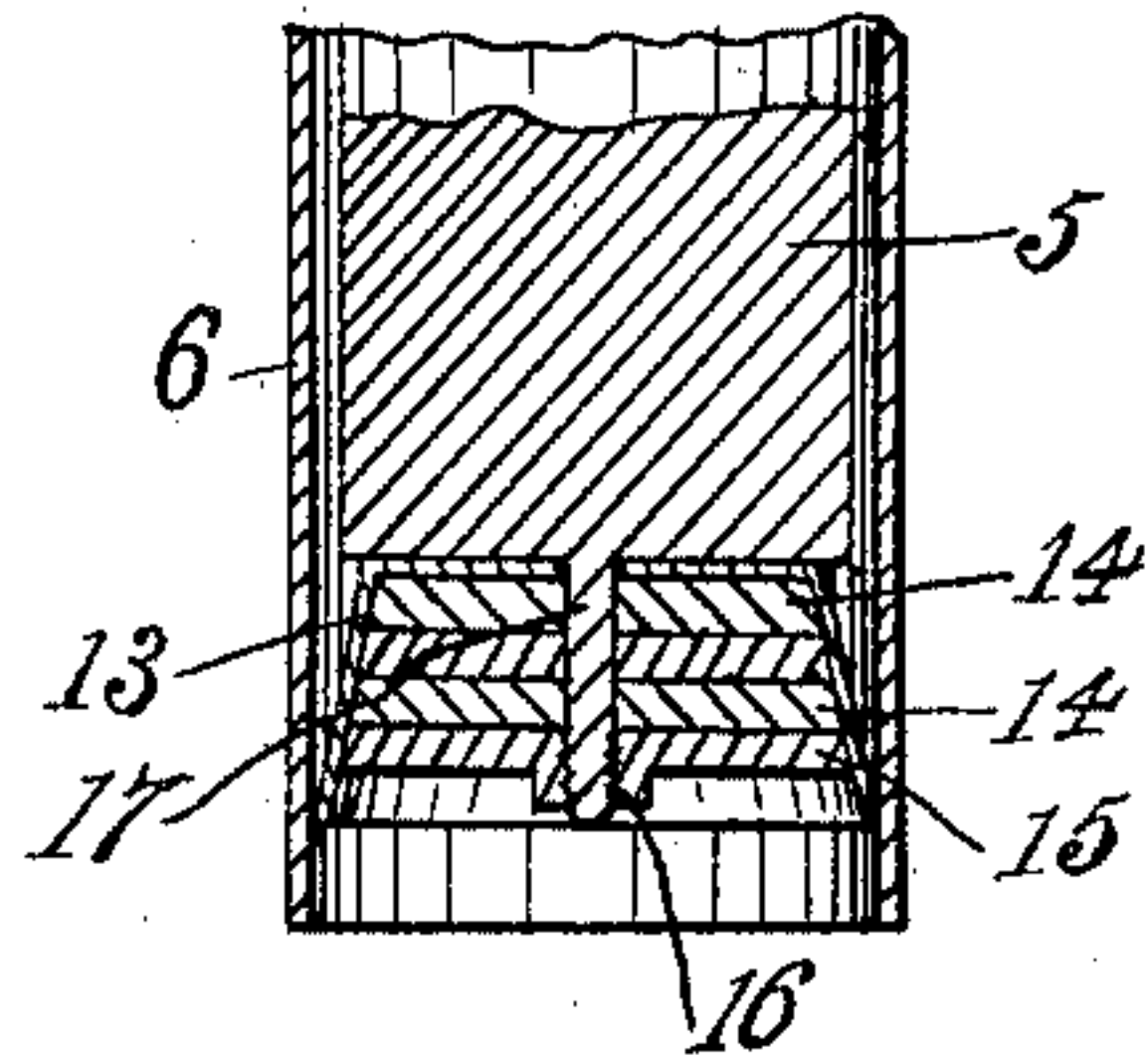


FIG. 13.

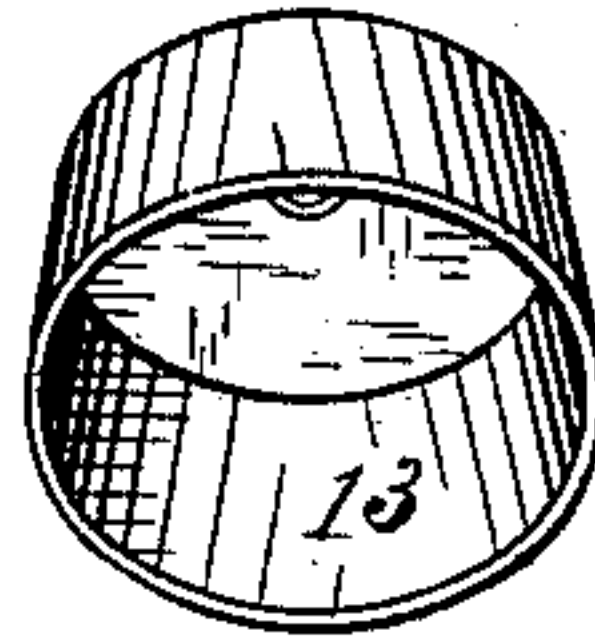


FIG. 14.

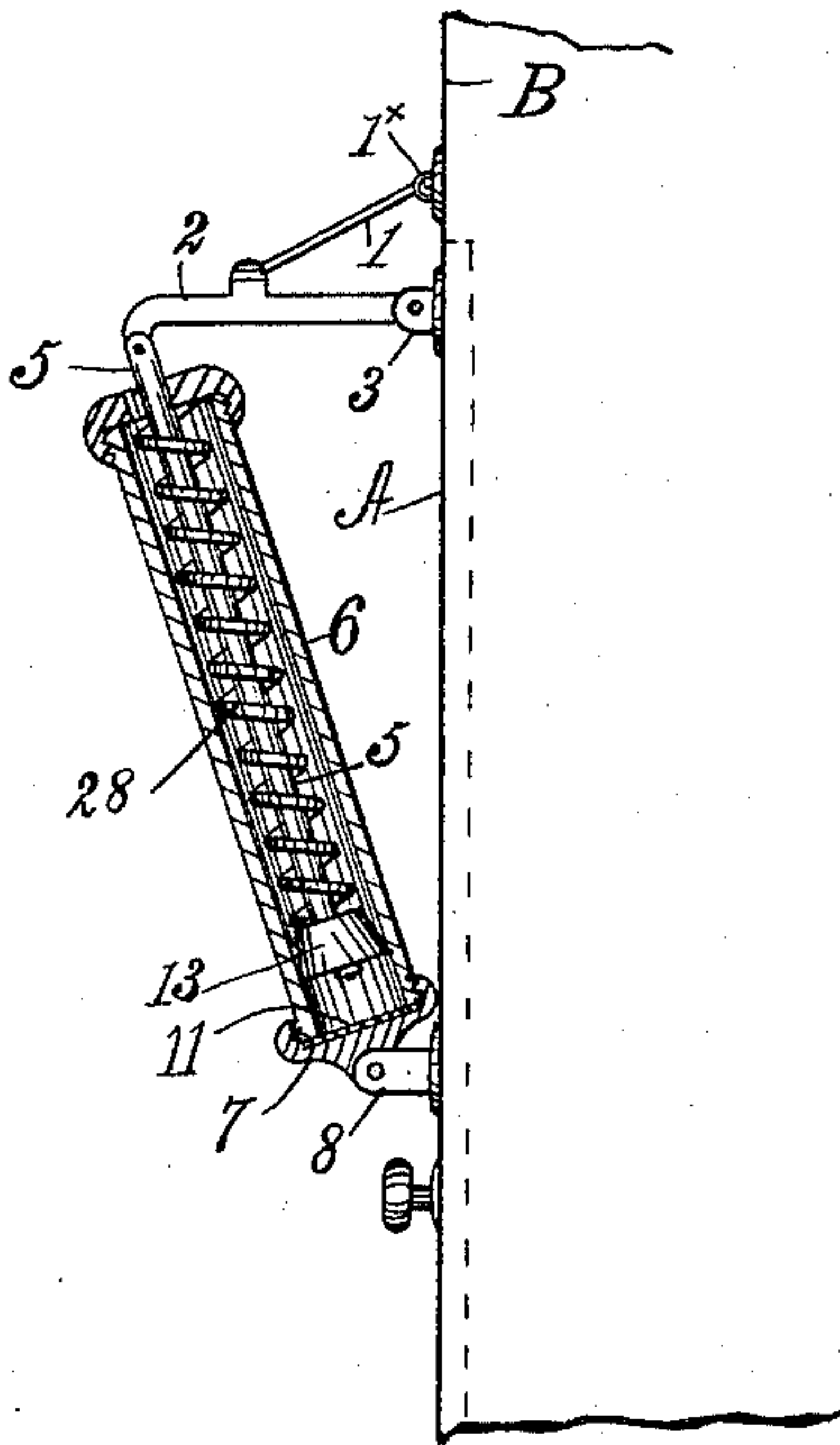
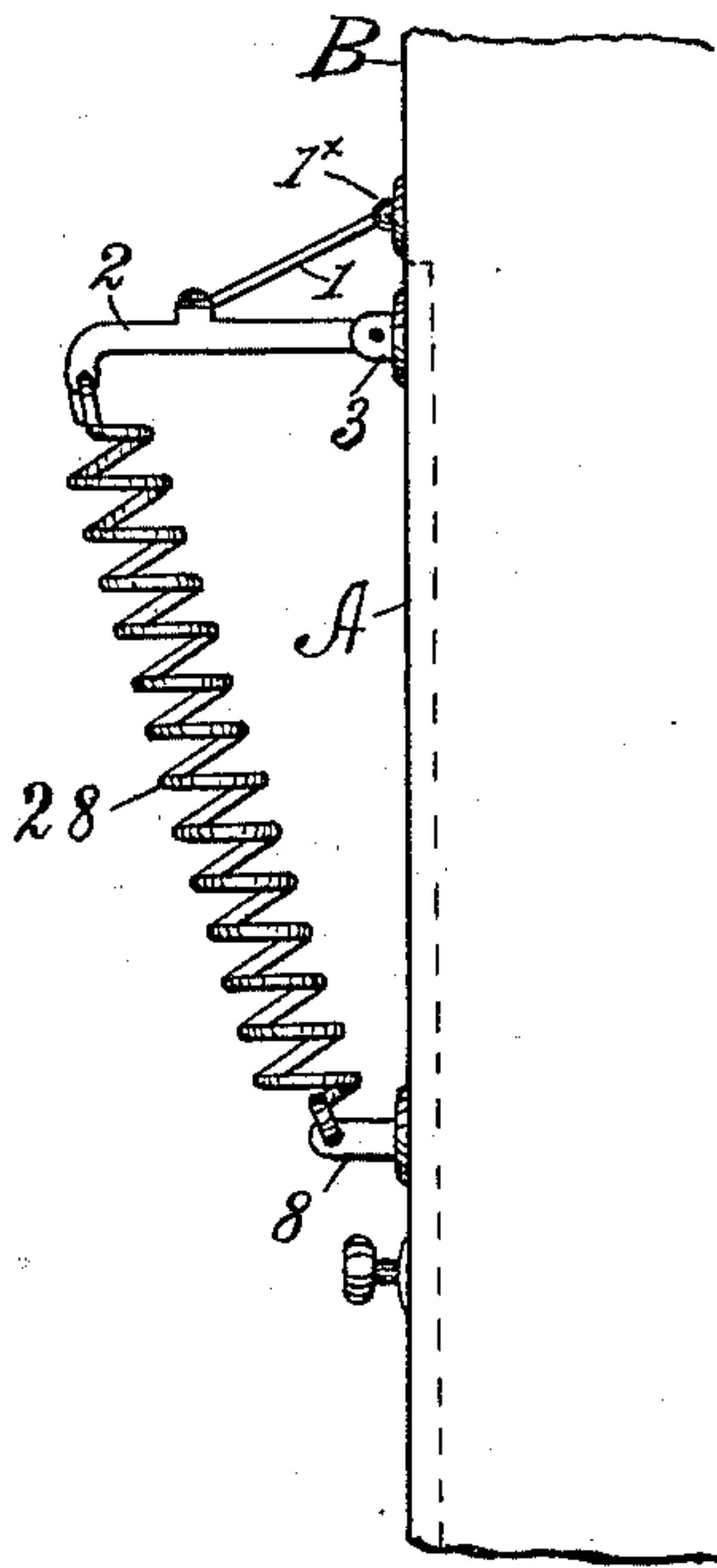


FIG. 15.



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UNITED STATES PATENT OFFICE.

DAVID T. WINTER, OF PEABODY, MASSACHUSETTS, ASSIGNOR TO HELENA
W. WINTER, OF SAME PLACE.

AUTOMATIC DOOR-CLOSER.

SPECIFICATION forming part of Letters Patent No. 334,834, dated January 26, 1886.

Application filed April 10, 1885. Serial No. 161,798. (No model.)

To all whom it may concern:

Be it known that I, DAVID T. WINTER, of Peabody, in the county of Essex and State of Massachusetts, have invented certain new and useful Improvements in Automatic Door Closers and Checks; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

My invention relates to a special construction and arrangement of devices, in which I employ a novel feature of a rising-and-falling lever connected at one end to the door, and also connected near its other end to a rod movably secured to the stationary door-frame. The particulars of the invention will appear from the following description.

Figure 1 represents one form of my invention, in which the lever and rod are used with a weight-piston and an upright hinged air-cylinder, showing the position of the parts when the door is closed. Fig. 2 shows the same devices in the more upright position they assume when the door is open; Fig. 3, a front view, the door being closed; Fig. 4, an enlarged view of the lever detached; Fig. 5, one of the ears for the lever-journal detached; Fig. 6, the bottom of the air-cylinder, its cap being removed; Fig. 7, an end view of the same; Fig. 8, a slight variation from Fig. 7; Fig. 9, a partial vertical section showing a disk-valve; Fig. 10, views of disks with central holes of different sizes; Figs. 11, 12, and 13, detail views of a cap-valve. Fig. 14 shows a coiled spring and cylinder, instead of a piston and cylinder; Fig. 15, a view in which the weight is dispensed with and in which a spring is substituted for the weight and cylinder.

Referring to Figs. 1, 2, and 3, A represents part of a door, and B a part of the door-frame. A rigid-rod, 1, is hung to the frame above the door by a ball or equivalent joint, 1*, which will permit this rod to be turned in any direction. On this rod is hung or connected by a ball or equivalent joint a lever or lever-brace, 2, and which is hinged or centered at its inner end or ends, 3, to the door, and at its outer

end, 4, it is provided with a weight, 5, the force of which, as it descends from the raised position shown in Fig. 2 to its lowered position in Fig. 1, exerts a constantly-increasing power upon the door until the latter closes, this being due to the steadily-increasing leverage power of the weight as the lever-brace 2 moves downward from its nearly-vertical to a nearly-horizontal position. From the above it will be seen that the weight on lever 2, when used as a mere door-closer, (independently of any door-check,) may be of any form, either cylindrical, ball form, or otherwise; but in most cases I prefer to utilize this lever and weight and their rising-and-falling movements for checking as well as closing, and for this the cylindrical form is the better one, the same serving as a piston fitting or working in an air-cylinder, 6, the weight itself not fitting too tightly in such cylinder. The cylinder is provided at its lower end with a cap, 7, presently to be described, and which is hinged or pivoted at 8 to the door or to any suitable projection thereon, so that the air-cylinder and the weight may both, during the movements of the door, be permitted a range of motion (incident to the movements of the lever 2) from a substantially-vertical position when the door is open, as in Fig. 1, to the inclined position when the door is shut, as in Fig. 2, the extent of this inclined position being limited and determined by the lever 2 when in its lower or horizontal position. The cylinder 6 is open at its top, and the air within it serves as a cushion for the gravitating weight. There is no hole or valve in the side of this air-cylinder 6 for the escape of air during the operation of the devices; but for the regulation and control of the amount of air in the cylinder, according to the size of the weight, and to the size and weight of the door, I provide the following means: The cap 7 screws upon the cylinder, and is provided with a very low or half thread, 9, while the cylinder itself has a full thread, 10, (or the full thread may be on the cap, and the low thread on the cylinder.) A leather or rubber washer, 11, is placed within the end of the cap, and by turning the cylinder into its cap to the extent desired, until the proper escape of air has been obtained to suit any particular

case, the requisite amount of air in the cylinder is secured, and the set-screw 12 in the cap being tightened up, this amount of air in the cylinder is preserved until a new adjustment may be wanted. This affords a simple and perfect regulator; or, a cup-valve, 13, of rubber or leather, may be made on the end of the weight. (See Figs. 11, 12, and 13.) This allows the air to come into the cylinder; but when it is under pressure it cups and holds the air against the cylinder, thus allowing the air to force past its sides when the weight is pulled out, but holding it down when pressed down. I make this cup nearly solid by filling in its cup part with leather washers of graduated diameters, (shown at 14,) and instead of using oil for lubricating I use black-lead, thus making a perfectly dry plunger or cup, and which will not congeal in cold weather, like oil, and work stiff, but will work as freely when cold as when warm, and allow a quick action for closing the door in cold weather. An iron washer, 15, and nut 16, which may be made all in one piece and fitting on a threaded projection, 17, on the lower end of the weight, serve to secure the cup and leather washers to place. A file-cut, 18, may be made in the bottom edge of the cylinder, and also up across its screw-threads, and by turning or screwing the cylinder more or less into its cap 7, as desired, the escape of air through this file-cut may be controlled or stopped. An outlet, 20, may be made at any convenient point through the cap 7, and a thin metal washer, 21, having a small puncture therein of less size than such outlet 20, may be inserted in the cap, preferably with a leather or rubber perforated washer, 22; and in order to regulate the escape of air a set or series of these metal washers 21, each having a puncture of different size, may be provided, and by removing the cap one of these may be readily substituted for another having a larger or smaller puncture. The outer surface of the tube or cylinder 6 may, near its lower end, be milled or made with small teeth, as at 23, and the set-screw 12 in the cap 7, or in an ear, 7*, on such cap, may be so applied that its inner end shall engage with the milled or roughened part 23. By tightening this screw, the cap is kept in its proper position relatively to the cylinder, so as not to be shifted through friction or jarrings. The weight or piston 5 may be of any size and weight desired, adapted to the size and weight of the door and to the power required to close it. The lever or lever-brace 2 may be made in a single piece, as shown in Fig. 4, having two arms or stems, 24, and journals on their inner ends, 3, adapted for the ears 25, which are secured to the door. In a raised cross-piece, 26, of this lever the outer end of rod 1 is, as heretofore stated, connected by a ball or other suitable joint, the length of rod 1 being such that this lever 2 is prevented from dropping below about a horizontal plane when the door is closed. In some cases I place a rubber or elastic band, 27, around the arms of lever 2,

so that when the door is thrown open this band receives the first concussion or pressure of the weight as the latter assumes its vertical or nearly vertical position, and thus crowds itself against this band, and which it does because of the weight crowding the rubber into the space between the arms. The elastic band thus pressed against also serves another purpose—namely, it gives a back pressure against the weight, and imparts to it automatically an initial start on its backward or falling movement to cause the open door to close again.

The adjustments having been made and the parts being in the position shown in Fig. 1, with the door closed, then upon opening the door the action is as follows, viz: As the door opens the rod 1 will rise in its arc of motion and carry the lever 2 upward with it, and if the opening be continued, this lever will rise to a vertical or perpendicular position, as seen in Fig. 2, carrying the weight with it. Thus the maximum power of the weight is exerted when down, as in Fig. 1, and its minimum or zero power when at its highest point. When the weight serves as a piston as well as a weight, its rising causes the cylinder 6, as the door is opened, to turn on the hinge 8, and gradually also to assume a vertical position, as shown in Fig. 2, the cylinder 6 being long enough to permit the rising and falling of the weight within it without disconnecting them. The rod 1 also rises high enough to keep clear of the opening door, and offer no obstruction to its movements. The weight being hung to a projection, 4, on the lever has thus, even when raised to its highest point, a small leverage, sufficient to start itself, by gravity, very slowly in commencing its motion for closing the door. This gradually draws down the lever, which, moving outward more and more away from the door, carries the weight farther outward, constantly increasing its leverage, thereby giving a steadily-increasing force until the lever and weight shall have moved out to their farthest point beyond the door, as in Fig. 1, when the door will be closed. The air-cushion within the cylinder meets and resists, or rather prevents, the slamming of the door, and the latter may, therefore, as the air escapes, shut slowly and noiselessly. The devices on the door fold or lie close to it when the door is quite open, and hang outward from it when the door is closed.

In Fig. 14 I show a spring, 28, instead of a weight, within the air-cylinder, and which is used in connection with the air-cushion, the connections with the lever 2 and with the door being the same as above described. In Fig. 15 I show the spring connected direct to the lever and to the door, the cylinder and air-cushion being dispensed with. In both these Figs. 14 and 15 the upper end swings outward with the falling of the lever or inward with its rising, precisely as in the other figures, the lever movement being the same in all.

I am aware spring-cushions and air-cush-

ions have been used in door-checks, and therefore make no claim for them, broadly; but

What I do claim is as follows, viz:

1. In a door-closer, the combination of a
5 weighted lever, 2, fulcrumed on the door with
a rigid rod, 1, connected by a ball or equivalent joint at one of its ends to such lever and
at its other end by a similar joint to the door-
frame, above the door, the combination operating
10 to raise the lever toward a vertical position
when the door is opened and to substantially a
horizontal position when the door is closed,
substantially as set forth.

2. In combination with the rod 1 on the
15 frame above the door and arranged to rise and
fall, the weighted lever 2 on the door, also arranged
to rise and fall with such rod, and the
elastic band 27 on this lever, as and for the
purpose set forth.

20 3. In combination with the lever 2 and rod
1, connected together and arranged to rise and
fall with the opening and closing of the door,
an elastic or yielding connection applied to the
outer end of such lever and to the door at a
25 point below such lever, all as set forth.

4. In combination, the lever 2, rod 1, both
arranged to rise and fall, as set forth, an upright
weight attached at its upper end to the
outer end of the lever, and an upright tubular
30 cylinder, 6, hinged to the door, and in which

the weight is free to rise and fall, substantially
as shown and described.

5. In combination, an upright air-cylinder
pivoted at its lower end on the door and having
an adjustable air-outlet at its lower end, a
35 piston-weight working vertically, or nearly so,
in said cylinder, bracket or lever 2, connected
to such weight, and rod 1, connected to such
lever and to the door-frame, this lever and rod
being arranged to rise and fall, all substantially
40 as set forth.

6. In a door check and closer, in combination
with the upright air-cylinder having a
file-cut in its bottom edge, as set forth, the
weighted piston, and the hinge screw-cap 7 on
45 the bottom of the cylinder, the low or half
thread, as set forth, and a washer, 22, of leather
or rubber, the combination serving for adjusting
and regulating the amount of air admissible
to the cylinder.

7. In a door check and closer, the combination
50 of the rod 1, lever 2, vertical cylinder
pivoted at its lower end upon the door, and
the vertical weight adapted to rise and fall in
such cylinder, and provided at its lower end
55 with a cup-valve, all substantially as set forth.

DAVID THOS. WINTER.

Witnesses:

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GEO. HOLMAN.