No. 744,552. PATENTED NOV. 17, 1903.

T. L. HOW & E. T. WINKLER.

DOOR OPENER OR CLOSER.

APPLICATION FILED NOV. 29, 1902.

NO MODEL. 2 SHEETS—SHEET 1.

Fig. 1.

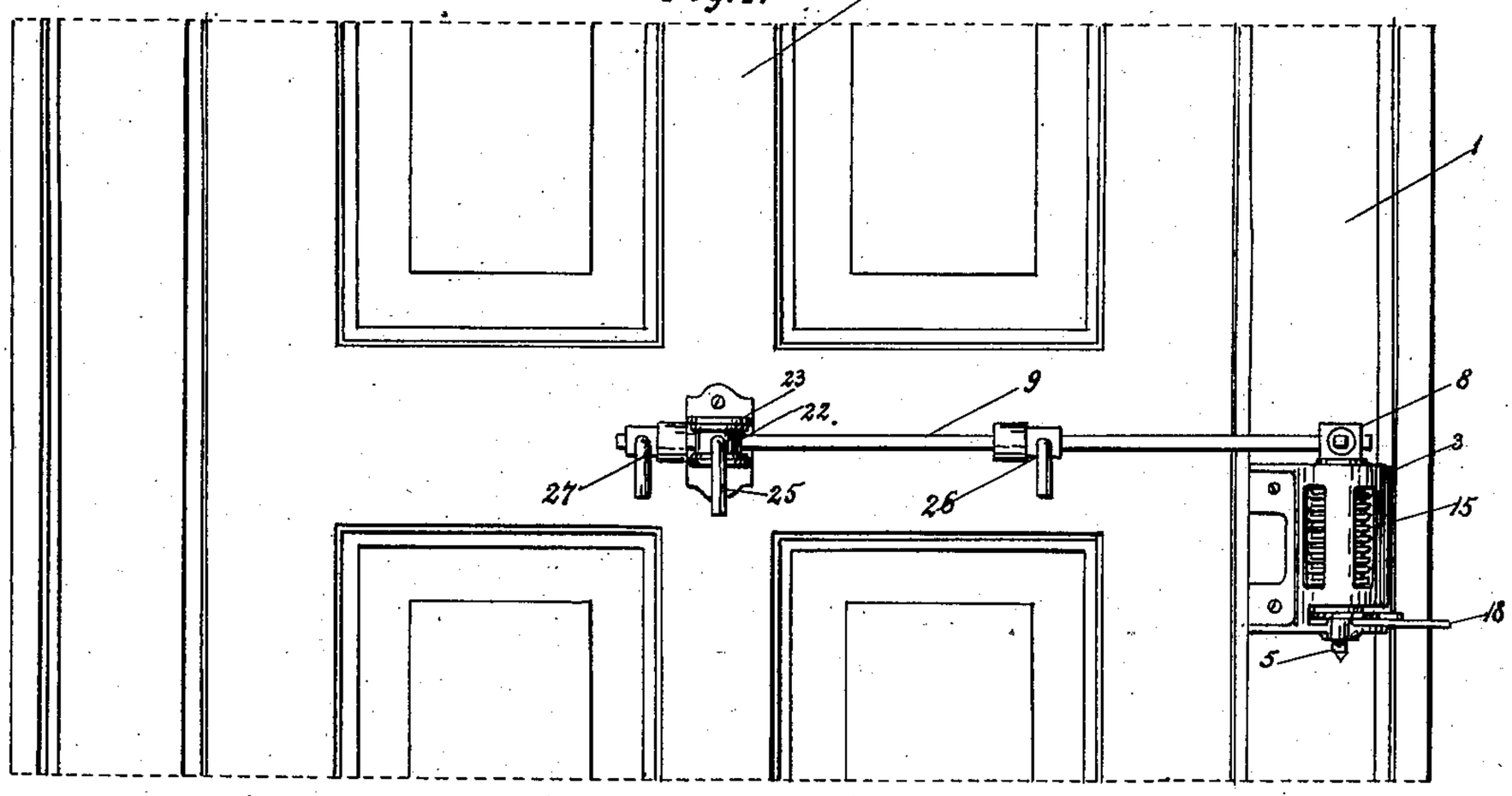
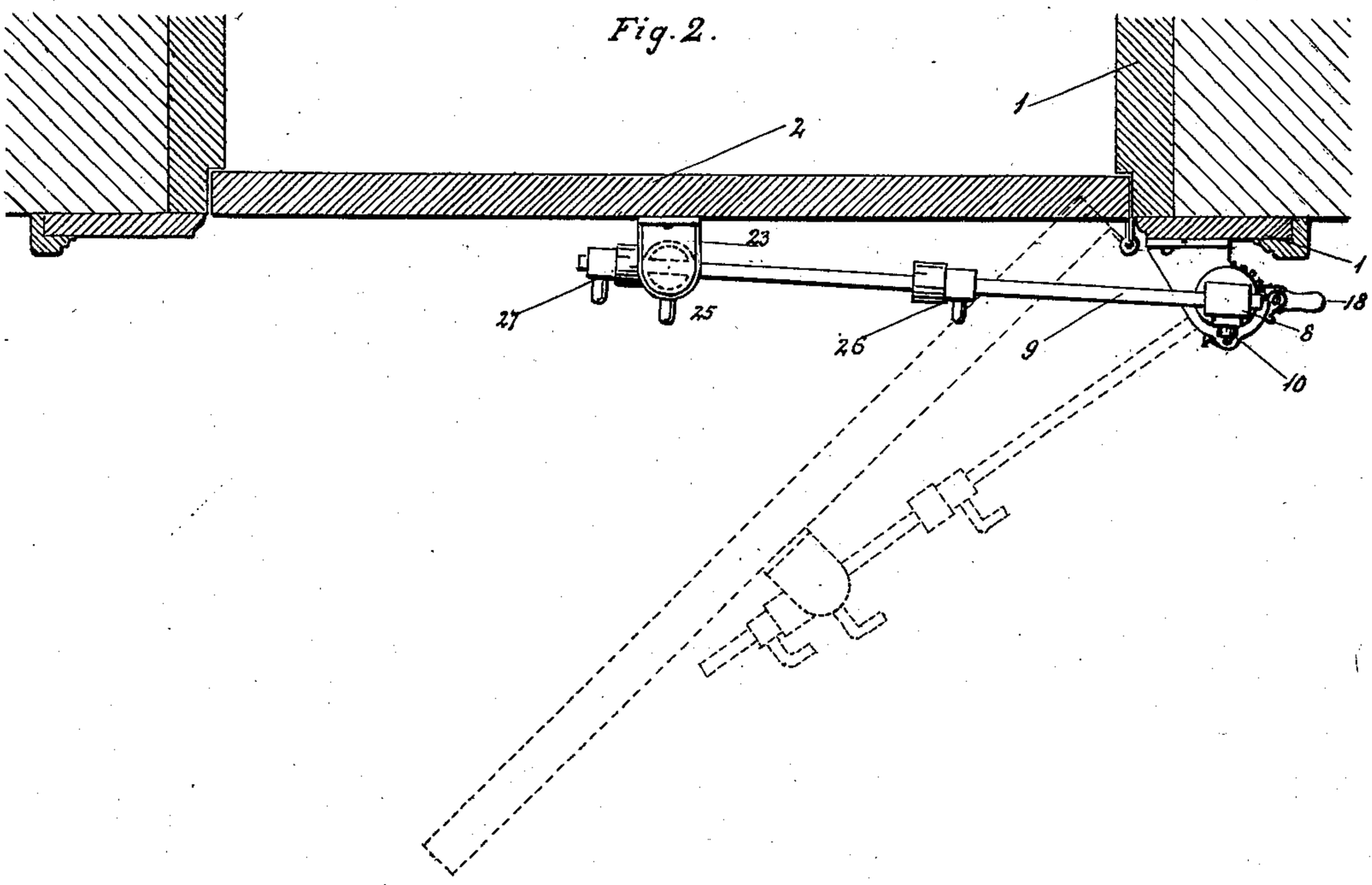


Fig. 2.



WITNESSES:

M. F. McCulloch

A. L. Brown.

INVENTORS

T. L. How

E. T. Winkler

BY Harry A. Knight

ATTORNEY.

No. 744,552. PATENTED NOV. 17, 1903.

T. L. HOW & E. T. WINKLER.

DOOR OPENER OR CLOSER.

APPLICATION FILED NOV. 29, 1902.

NO MODEL. 2 SHEETS—SHEET 2.

Fig. 3.

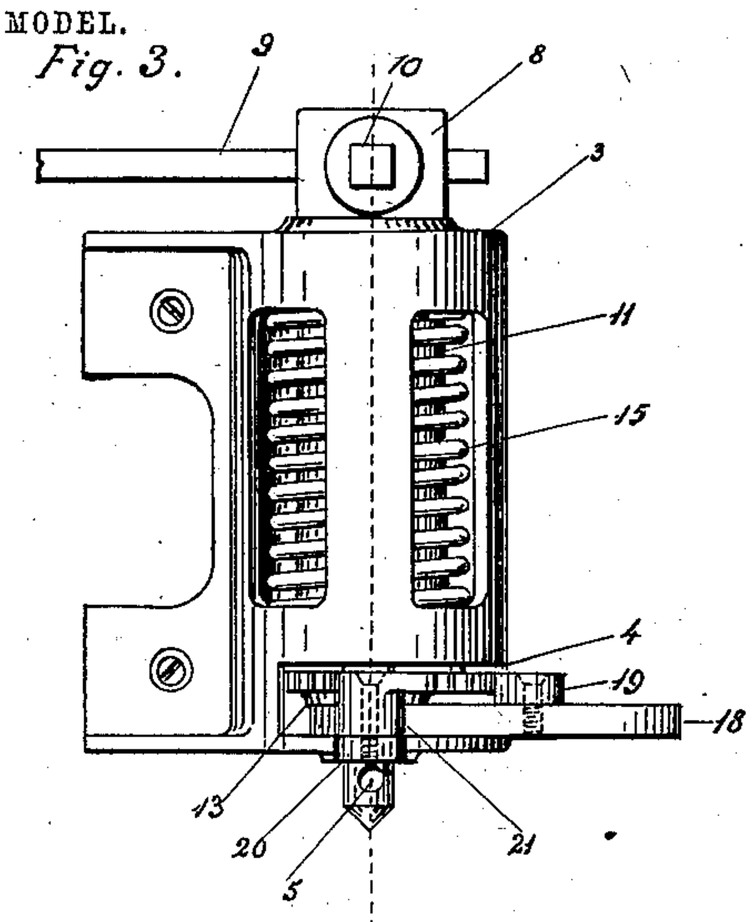


Fig. 4.

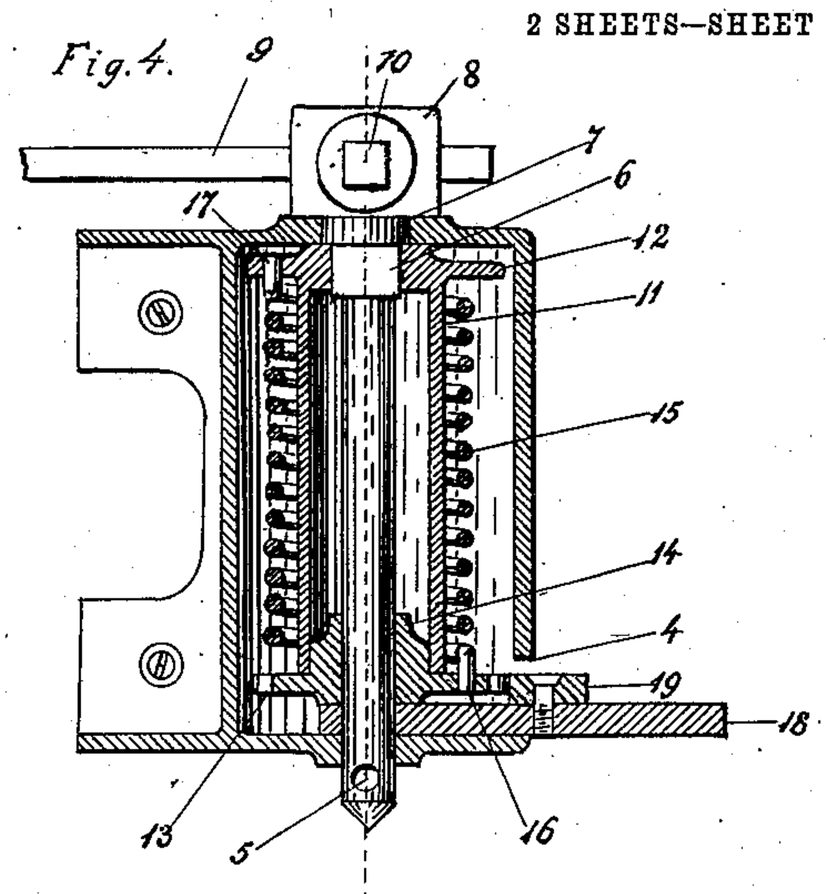


Fig. 5.

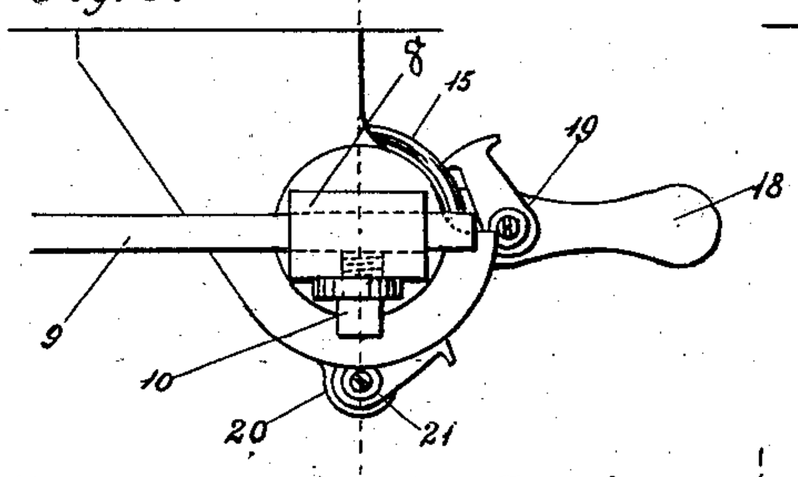


Fig. 6.

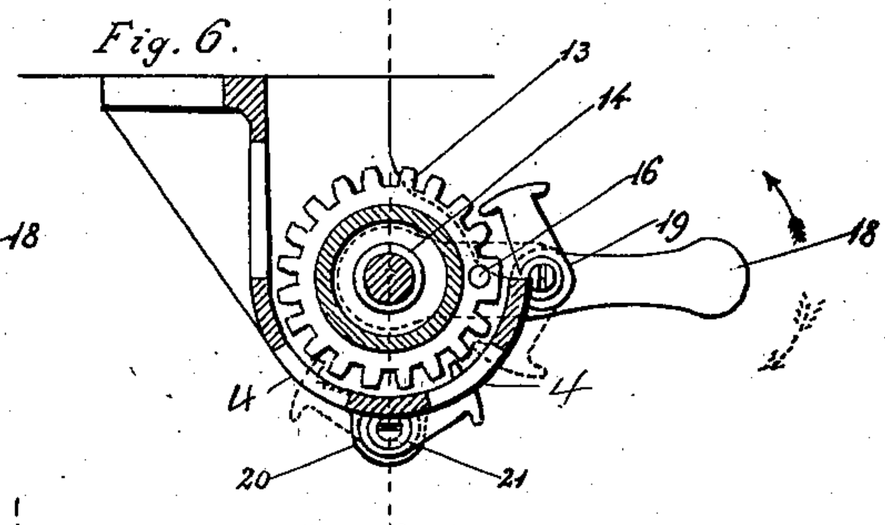


Fig. 7.

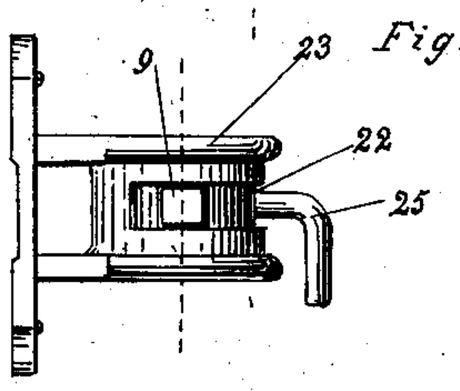


Fig. 8.

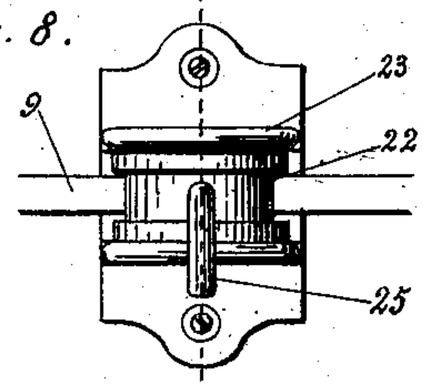


Fig. 9.

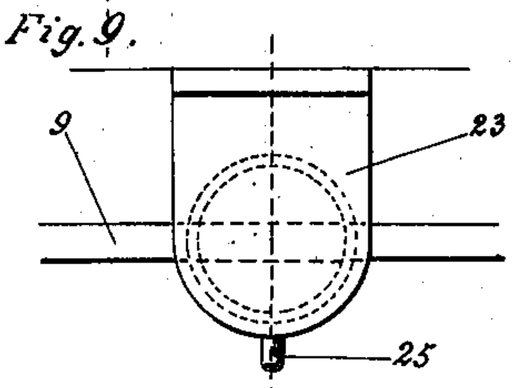


Fig. 10.

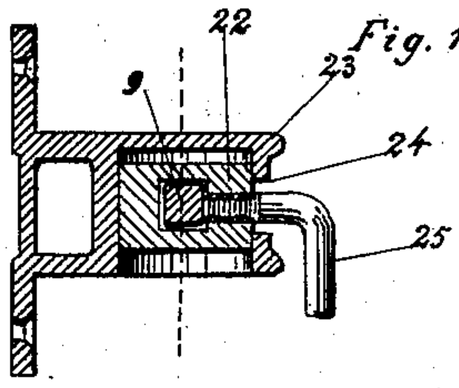


Fig. 11.

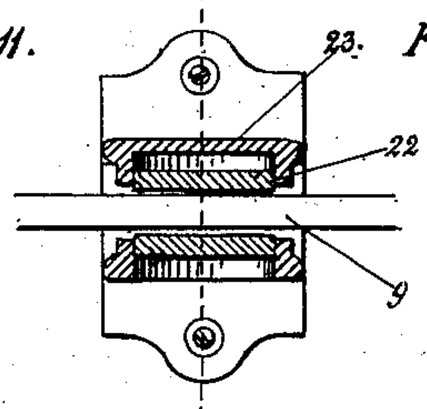
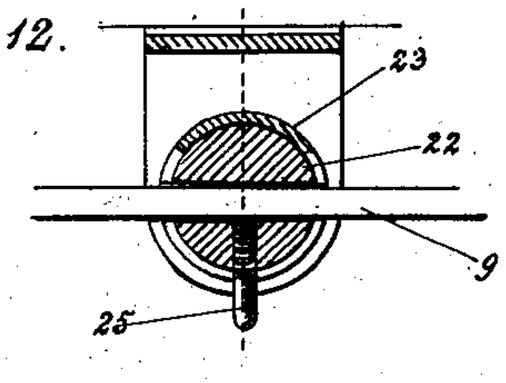


Fig. 12.



WITNESSES:

M. F. McCulloch

A. L. Brown.

INVENTORS.

T. L. How

E. T. Winkler

BY Harry E. Knight

ATTORNEY.

No. 744,552. Patented November 17, 1903.

UNITED STATES PATENT OFFICE.

THOMAS L. HOW AND EHREGOTT T. WINKLER, OF KANSAS CITY, MISSOURI.

DOOR OPENER OR CLOSER.

SPECIFICATION forming part of Letters Patent No. 744,552, dated November 17, 1903.

Application filed November 29, 1902. Serial No. 133,294. (No model.)

To all whom it may concern:

Be it known that we, THOMAS L. HOW and EHREGOTT T. WINKLER, citizens of the United States, residing at Kansas City, in the county of Jackson and State of Missouri, have invented certain new and useful Improvements in Door Openers or Closers; and we do 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, reference being had to the accompanying drawings, and to the figures of reference marked thereon, which form a part of this specification.

Our present invention relates to door-springs, and more particularly to that class of door-springs known as "lever" door-springs.

The object of our invention is to provide an improved spring which can be so adjusted as to close or open the door to which the same is applied and which is capable also of adjustment to retain the door at any intermediate point in its rotation, whether the spring is set to open or to close the same or whether the spring is untensioned.

Further objects of our invention are to provide many improved details of structure fully described herein and shown in the accompanying drawings, in which like reference-numerals refer to like parts, and in which—

Figure 1 is a view of our improved lever door-spring, showing a portion of a door to which the same is applied. Fig. 2 is a top view of the same, showing in dotted lines our device adjusted to retain the door at an angle of forty-five degrees to the door-sill when the spring is set to close the door. Fig. 3 is a detail view of the spring-casing and the parts carried thereby. Fig. 4 is a vertical section of the same. Fig. 5 is a top plan view of the same. Fig. 6 is a horizontal section of the same. Figs. 7 and 8 are detail elevations of the slotted bracket which carries the perforated rotary collar through which the lever passes. Fig. 9 is a top view of the same. Figs. 10, 11, and 12 are detail sectional views of the same.

Referring now more in detail to the drawings, 1 represents the door-jamb, and 2 the door, to which our spring is to be attached. Securely screwed to the door-jamb 1 is a semi-circular casing 3, open in the rear thereof, having a perforated top and bottom and being also provided with a peripheral slot 4 of suitable length at the base thereof.

5 is a spindle, the lower end of which passes through the perforation in the bottom of the casing 3. The spindle 5 is provided with a squared shoulder 6 and an annular flange 7 above said shoulder 6. (See Fig. 4.) The flange 7 fits loosely in the perforation in the top of the casing 3. At the top of the spindle 5 is a perforated head 8, (see Fig. 5, dotted lines,) adapted to receive the lever 9, which may be secured against movement in the head 8 by the set-screw 10. Keyed at its upper end onto the squared shoulder 6 of the spindle 5 is a drum 11, having an annular flange 12 (shown in section, Fig. 4) at its upper end and seating at its lower end on a ratchet-wheel 13, loosely mounted upon the spindle 5 near the bottom of the casing 3. The ratchet-wheel 13 is provided with a thickened central portion or hub 14, which fits loosely in the mouth of the drum 11 and acts as a guide to hold said drum 11 in place. Surrounding the drum 11 is a spiral spring 15, the lower end of which is secured in perforation 16 in the ratchet-wheel 13 and the upper end of which is secured in a like perforation 17 in the flange 12 of the drum 11.

The ratchet-wheel 13 is capable of revolution independently of the drum 11, and the latter is capable of revolution only with the spindle 5. Pivoted on the spindle 5 between the wheel 13 and the bottom of the casing 3 and independently movable on said spindle 5 is a lever 18, carrying a pawl 19, (see Fig. 6,) adapted to engage the teeth of the wheel 13 either at a point where the casing 3 is open or to engage the same at a point diametrically opposite on its pivotal swing, at which point it engages said teeth through the slot 4.

20 is a projection or bracket cast on the bottom of the casing 3. Pivoted to the bracket 20 is a dog 21, which engages the teeth of the wheel 13 on either side of its pivotal point through the slot 4.

The outer end of the lever 9 passes through a collar 22, sustained by the lever within a bracket 23, screwed to the door 2. The lever 9 passes through a slot 24 in the bracket 23, such slot being of suitable length to permit

partial rotation of the collar 22. The lever 9 may be secured against movement through the collar 22 by a set-screw 25, seated in a suitable perforation in the collar 22 and impinging against the lever 9.

26 and 27 are a pair of stops slidably mounted on the lever 9. The stop 26 is positioned between the bracket 3 and the bracket 23, and the stop 27 is positioned on the lever 9 between the bracket 23 and the outer end of the lever. Each stop is provided with a perforated rubber disk on its side adjacent the bracket 23.

The use of our improved device is as follows: The casing 3 having been secured to the door-jamb 1 and the slotted bracket 23 having been secured to the door 2, the lever 9 is passed through collar 22 in bracket 23, through head 8, and then secured in adjustment by set-screw 10. Having connected the casing 3 and bracket 23 by adjustment of the lever 9 and it being desired to set the spring to close the door whenever the same is opened, the door is first closed. Then the pawl 9 and dog 21 are set as shown in dotted lines. (See Fig. 6.) The pawl 19 being in engagement with the ratchet-wheel 13, the dog 21 is drawn out of engagement therewith, and the lever 18 is thrown forward in the direction of the dotted arrow (see Fig. 6) and the operation repeated until the spring 15 has reached the desired degree of contraction, the dog 21 being intermittently inserted to prevent expansion of the spring. Upon opening the door the spring 15, which has been partially contracted by this operation, is sufficiently further contracted to, owing to the tendency of the contracted spring to expand, return the door to its closed position upon the same being released.

If it is desired to adjust the spring so that the door will be held open and if closed returned to its open position, the door is first opened. Then the pawl 19 and the dog 21 are set as shown in dotted lines, (see Fig. 6,) and the lever 18 and dog 21 are operated in the same manner as already described, but in the direction of the full-line arrow, which operation causes expansion of the spring 15 to the desired degree. Upon closing the door the spring 15 will be sufficiently further expanded to open the door again when the same is released, owing to the tendency of the spring 15 to contract when the same has been expanded. If pawl 19 and dog 21 are thrown out of engagement with the teeth of the ratchet 13, the spring 15 will then be untensioned, and any movement of the door will revolve the drum 11 and through spring 15 produce a like movement in the ratchet 13, which always revolves with spring 15 unless dogged.

The change of angle between the door 2 and the lever 9 upon being opened or closed is compensated for by the oscillating collar 22 and the slot 24 in the bracket 23.

If it is desired to prevent the door closing beyond a certain point in the rotation of the door when the spring 15 is tensioned to close the door, the stop 27 may be adjusted as, for example, shown in dotted lines, Fig. 2. If it is desired to prevent the door opening beyond a certain intermediate point, the stop 26 may be adjusted in like manner. Inasmuch as the lever 9 in opening or closing the door slides through the collar 22, it is evident that the set-screw 25 may be tightened and the door thereby locked against movement.

Our invention is applicable to swinging windows as well as doors, and we do not restrict ourselves to the exact details of structure herein shown and described, as many changes may be made without departing from the spirit of our invention.

Having thus described our invention, the following is what we claim as new therein and desire to secure by Letters Patent:

1. In an apparatus of the character described, the combination with the spring suitably connected to a door or the like, of means for expanding the spring to throw the door in one direction and contracting the spring to throw the door in the other direction, and means for holding the spring in either its expanded or its contracted condition.

2. The combination with the lever, of a spring connected at one end with the lever, a ratchet-wheel connected to the other end of the spring, a second lever, a reversible pawl carried by the second lever and adapted to engage with the ratchet to expand or contract the spring, and means for holding the spring either in its contracted or its expanded condition.

3. In an apparatus of the character described, the combination with a rotatably-mounted spindle, a spring rigidly connected to said spindle, and means adapted to contract or expand said spring, of a lever rigidly secured at its inner end to said spindle, a bracket at the outer end of said lever and a rotary connection between said lever and bracket.

4. In an apparatus of the character described, the combination with a rotatably-mounted spindle, a drum keyed to said spindle, a spring mounted on the drum and having one of its ends secured thereto, a ratchet-wheel loosely mounted on said spindle and engaging the other end of said spring and means for rotating the ratchet-wheel in either direction, of suitable connection between the spindle and the door to be operated.

5. In an apparatus of the character described, the combination with a rotatably-mounted spindle, a drum keyed to said spindle, a spring mounted on the drum and having one of its ends secured thereto, a ratchet-wheel, loosely mounted on the spindle and engaging the other end of said spring, a lever pivoted to the spindle, and a reversible pawl pivoted to the lever and adapted to engage the ratchet-wheel, of a suitable connection between the spindle and the door to be operated.

6. In an apparatus of the character de-

scribed, the combination with a casing, a spindle rotatably mounted in said casing, a drum keyed to the spindle, a spring mounted on the drum and having one of its ends secured thereto, a ratchet-wheel loosely mounted on the spindle and engaging the other end of the spring, a lever pivoted to the spindle, a reversible pawl pivoted to the lever and engaging the ratchet-wheel, a reversible dog pivoted to the casing and engaging the ratchet-wheel, and a perforated head at the top of said spindle, of a lever adapted to be connected to the door to be operated and engaging the perforation in the head, and a set-screw seated in the perforated head and impinging the lever.

7. In an apparatus of the character described, the combination with a door-lever, of a spindle adapted to be rigidly secured to said lever, of a drum keyed to said spindle, a spring mounted on the drum and having one of its ends secured thereto, of a ratchet-wheel loosely mounted on the spindle and having a thickened central portion or hub adapted to fit loosely in the mouth of said drum, said ratchet-wheel engaging the other end of said spring, and means adapted to rotate said ratchet-wheel.

8. In a door opening and closing apparatus, the combination of a perforated oscillating collar, means securing the collar to the door, a lever passing through the collar, a set-screw seated in the collar impinging said lever, with means operating the lever.

9. In a door opening and closing apparatus, the combination of a perforated oscillating collar, means securing the collar to the door, a lever passing through the collar, a set-screw seated in the collar impinging the lever, with a spring adapted to operate said lever and means releasing the spring tension.

In testimony whereof we affix our signatures in presence of two witnesses.

THOMAS L. HOW.
EHREGOTT T. WINKLER.

Witnesses:
A. M. EVANS,
E. G. CLARKSON.