

No. 693,588.

Patented Feb. 18, 1902.

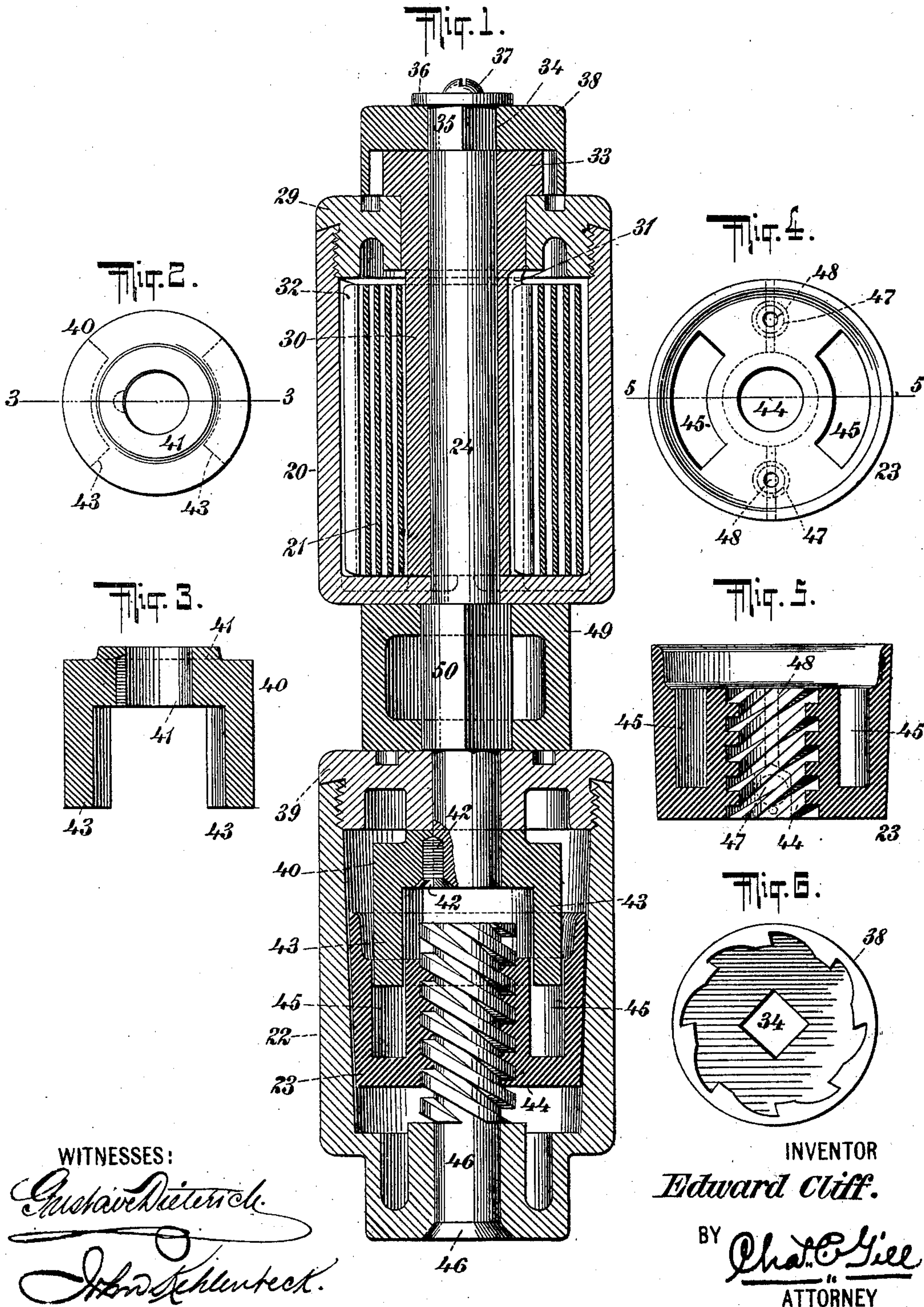
E. CLIFF.

COMBINED DOOR CHECK AND CLOSER.

(Application filed Aug. 20, 1901.)

(No Model.)

3 Sheets—Sheet 1.



WITNESSES:

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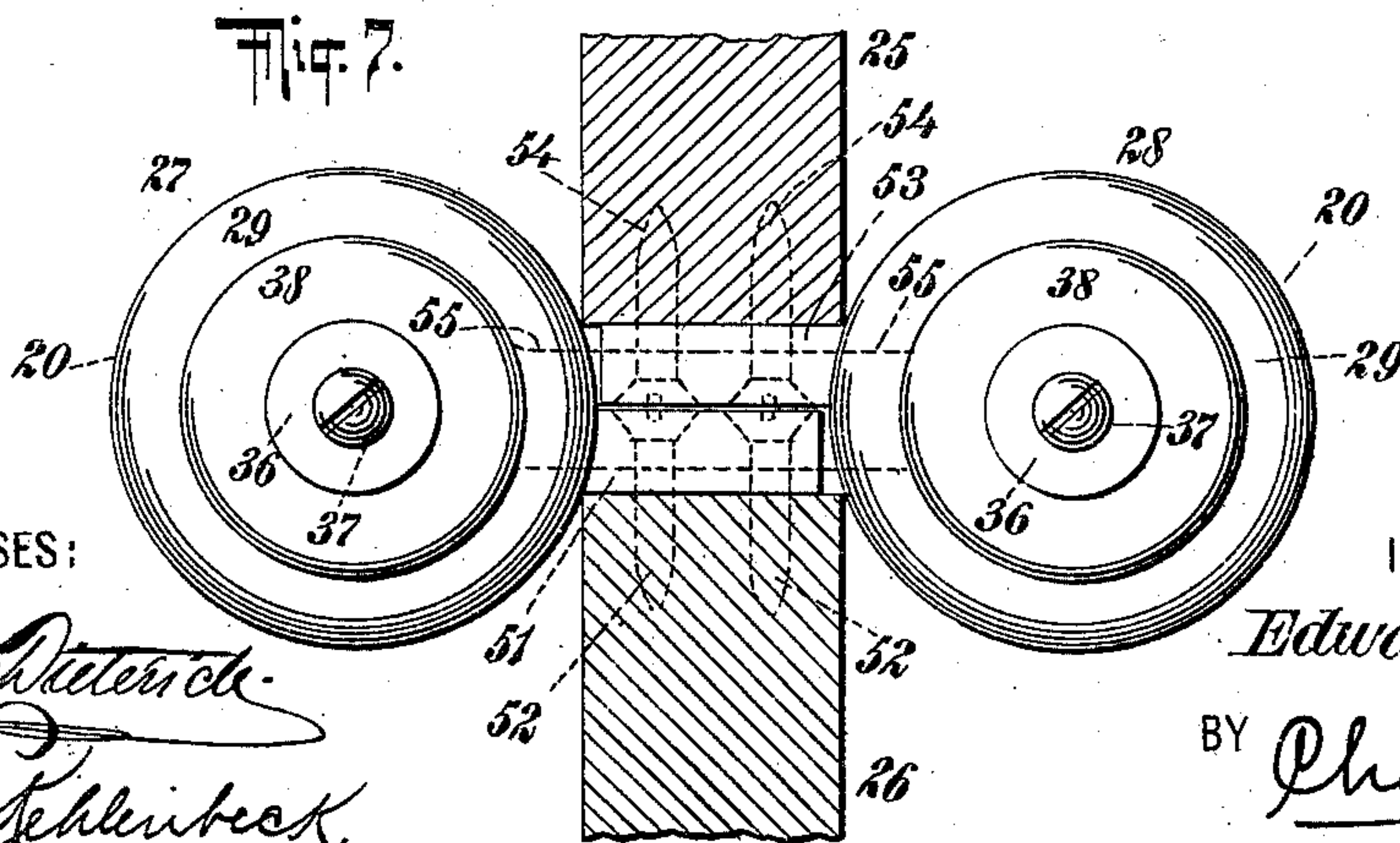
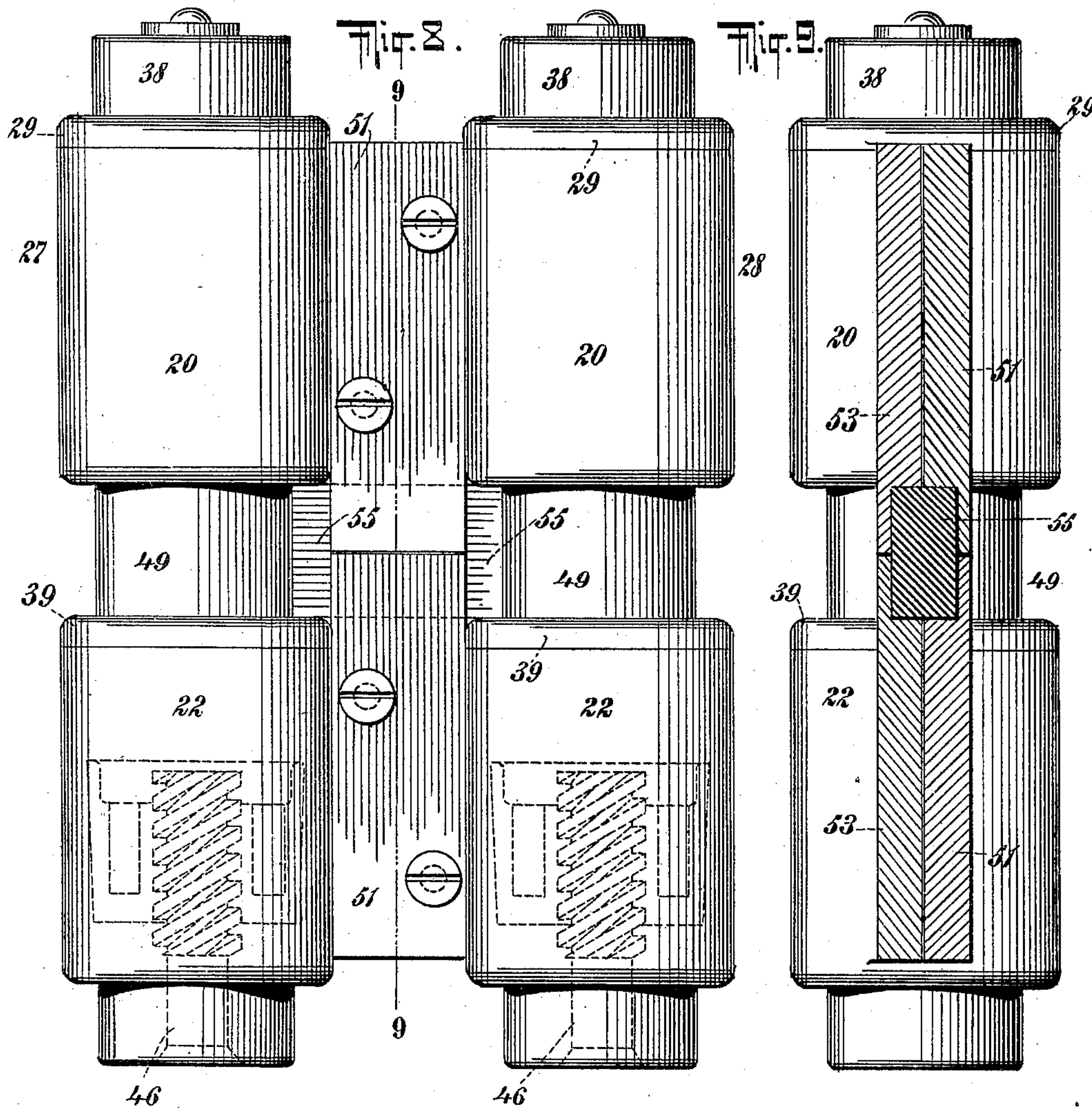
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COMBINED DOOR CHECK AND CLOSER.

(Application filed Aug. 20, 1901.)

(No Model.)

3 Sheets—Sheet 2.



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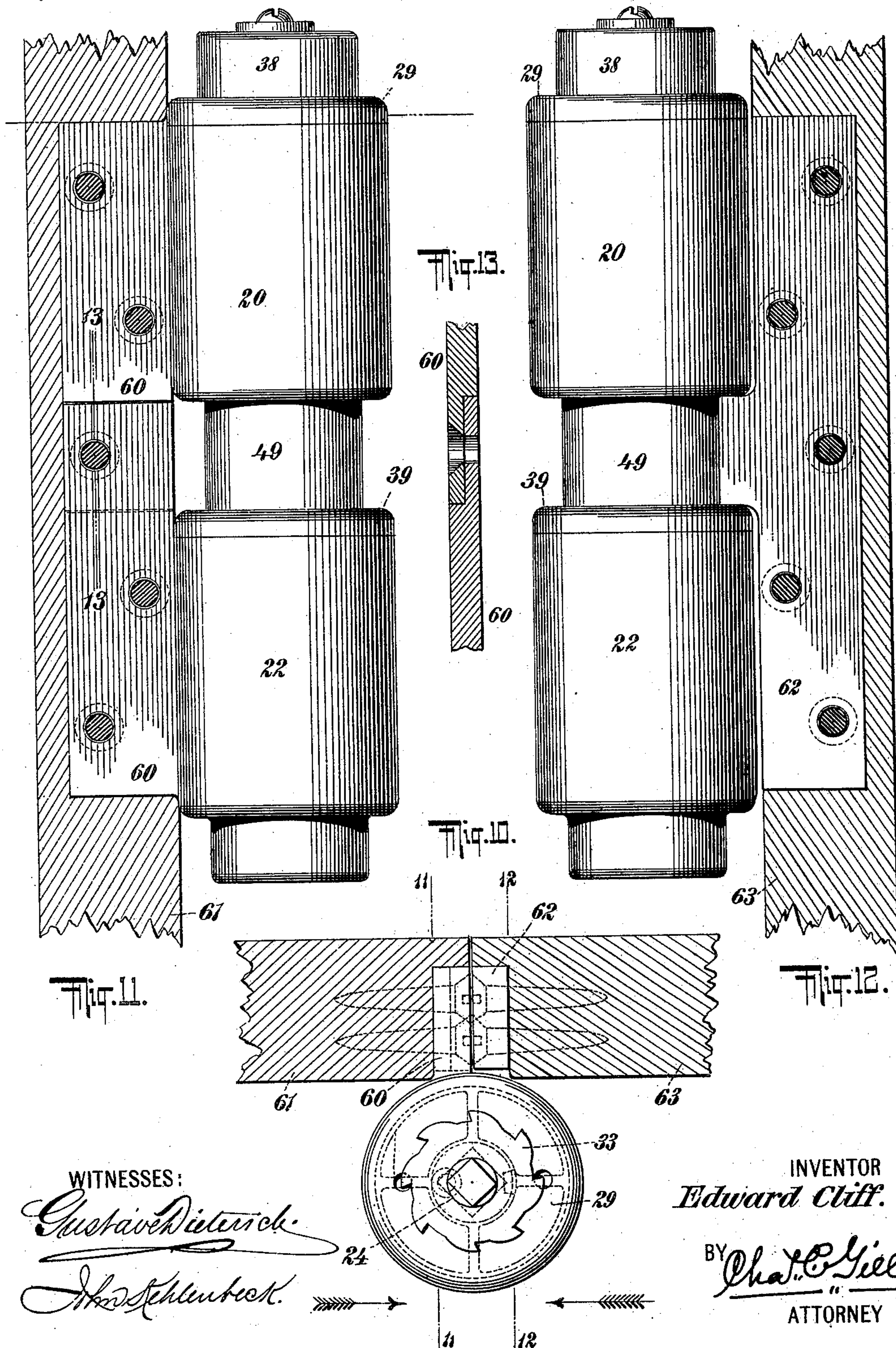
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E. CLIFF.
COMBINED DOOR CHECK AND CLOSER.

(Application filed Aug. 20, 1901.)

(No Model.)

3 Sheets—Sheet 3.



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UNITED STATES PATENT OFFICE.

EDWARD CLIFF, OF NEWARK, NEW JERSEY.

COMBINED DOOR CHECK AND CLOSER.

SPECIFICATION forming part of Letters Patent No. 693,588, dated February 18, 1902.

Application filed August 20, 1901. Serial No. 72,636. (No model.)

To all whom it may concern:

Be it known that I, EDWARD CLIFF, a citizen of the United States, and a resident of Newark, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in a Combined Door Check and Closer, of which the following is a specification.

The invention relates to improvements in combined door checks and closers; and it consists in the novel features, combinations, and arrangements of parts hereinafter described, and particularly pointed out in the claims.

The door check and closer of my invention may be applied to either right-hand doors or left-hand doors without change in its parts and may also be duplicated for application to double-acting doors.

The door check and closer made the subject hereof is intended for application to the adjoining edges of a door and its casing at a point intermediate the ordinary hinges by which the door is hung, the door check and closer being provided with leaves to be secured to the edge of the door and the adjacent edge of the door-casing in the same manner that the leaves of ordinary hinges are applied.

It is intended that the door check and closer shall be applied at a central point intermediate the two usual hinges of the door; but, if preferred, the door check and closer may be duplicated for a door and the two door checks and closers used as substitutes for the ordinary hinges, the door then being hung from the door checks and closers.

When the door check and closer is applied to a double-acting door, it will be duplicated at the opposite sides of the door, and the leaves of the two door checks and closers will be secured to the adjacent edges of the door and its casing, so that one of said door checks and closers will operate when the door is opened in one direction and the other of said door checks and closers will be brought into operation when the door is opened in the opposite direction.

The door check and closer in its simpler form will comprise a vertically-arranged casing containing the closing-spring, a vertically-arranged casing constituting a liquid-cylinder, a vertical spindle passing centrally

through said casings, a piston within the liquid-cylinder, a threaded stem within and rigid with the liquid-cylinder for effecting the vertical movement of the piston, a leaf connected with both of said casings and adapted to be secured to the door or its casing, and a leaf connected with the said spindle and adapted to be secured to the door or its casing. When the leaf connected with the said casings is secured to the frame of the door and the leaf connected with the spindle is secured to the edge of the door, the door when opened will turn the said spindle within the said casings, with the result of winding up the spring and elevating the piston, and when the door is closed the spindle will receive a reverse rotation and the piston will be caused to descend against the checking liquid. When the leaf connected with the casings forming the spring-chamber and liquid-cylinder is secured to the door and the leaf connected with the spindle is secured to the door-casing, the movement of the door in the opening direction will turn the said casings upon the said spindle and wind up the spring and elevate the piston, while when the door is moving to its closed position the said casings will receive a reverse rotation, the spring then acting as the closing-spring and the piston being compelled to descend against the checking liquid.

The invention will be fully understood from the detailed description hereinafter presented, reference being had to the accompanying drawings, in which—

Figure 1 is a central vertical longitudinal section through a door check and closer constructed in accordance with and embodying the invention. Fig. 2 is a detached top view of the guide for the piston. Fig. 3 is a central vertical section of same on the dotted line 3 3 of Fig. 2. Fig. 4 is a detached top view of the piston. Fig. 5 is a central vertical section of same on the dotted line 5 5 of Fig. 4. Fig. 6 is a detached bottom view of the top cap of the structure and utilized in connection with the means for regulating and controlling the tension of the closing-spring. Fig. 7 is a top view of the door check and closer illustrated as applied to a double-acting pantry-door, the door and its casing being indicated in section. Fig. 8 is a detached front elevation of the door check and closer

adapted for a double-acting door. Fig. 9 is a vertical section of same on the dotted line 9 9 of Fig. 8. Fig. 10 is a top view of the door check and closer shown applied to a single-acting door, the top cap of the structure being omitted and the door and its casing being shown in horizontal section. Fig. 11 is a vertical section of same on the dotted line 11 11 of Fig. 10, the section extending merely through the door-casing. Fig. 12 is a vertical section of same on the dotted line 12 12 of Fig. 10, the section extending merely through the door; and Fig. 13 is a vertical section through a portion of the leaves of the door check and closer on the dotted line 13 13 of Fig. 11.

When the door check and closer of my invention is applied to a double-acting door, it will comprise two connected sets of apparatus, each consisting of a casing 20, containing the closing-spring 21, a casing 22 to contain the liquid, a piston 23, and a central actuating-spindle 24, with cooperating devices hereinafter explained, and when the door check and closer is applied to a single-acting door it will comprise but one set of said apparatus.

The door check and closer as applied to a double-acting door is shown in Figs. 1 to 9, inclusive, and as applied to a single-acting door is illustrated in Figs. 10 to 13, inclusive, taken in connection with the detailed illustrations presented in Figs. 1 to 6, inclusive.

In the drawings, referring to Figs. 1 to 9, inclusive, 25 designates the door-casing and 26 a double-acting door, and 27 and 28 denote the door check and closer as applied to the double-acting door 26, the door-check and closer being duplicated at opposite sides of the said door, and the apparatus 27 being a duplicate of the apparatus designated by the numeral 28, and each apparatus being in itself a door check and closer embracing a part of my invention.

The detailed construction of the door check and closer (designated by either the numeral 27 or 28) is illustrated in Figs. 1 to 6, inclusive, and the said door check and closer comprises the cylindrical casing 20, containing the spring 21, the vertical casing 22, constituting a cylinder, the piston 23 within the casing 22, the spindle 24, and cooperating devices. The casing 20 is vertical and cylindrical, and through it the spindle 24 passes. The casing 20 is closed at its upper end by a screw-cap 29, having a central opening to receive and permit the axial rotation of the sleeve 30, which closely fits upon the spindle 24 and extends from above the cap 29 to the lower end of the casing 20, as shown in Fig. 1. The sleeve 30 contains a vertical recess 31 to receive the inner hooked end of the spring 21, and the inner vertical wall of the casing 20 contains a vertical recess 32 to receive the outer hooked end of the spring 21 in a well-known manner. The upper end of the sleeve 30 carries a ratchet-wheel 33, by

which, in connection with a suitable wrench, the sleeve 30 may be turned to wind or unwind the spring 21 for adjusting the tension of the latter. The sleeve 30 contains a smooth central bore, so that it may turn upon the spindle 24. Upon the upper end of the casing 20, above the cap 29, is applied the cap 38, which contains a polygonal central opening 34 to pass upon and engage the polygonal upper end 35 of the spindle 24, and said cap is detachably secured in position upon the said upper end of the spindle 24 by means of a washer 36 and screw 37. The cap 38, by reason of its engagement with the polygonal upper end of the spindle 24, is incapable of rotation except with said spindle. The inner vertical walls of the cap 38 are recessed to match the teeth of the ratchet-wheel 33, so that said cap may engage said ratchet-wheel and serve to lock the same to the actuating-spindle 24, whereby when the spindle 24 is turned axially the cap 38, ratchet-wheel 33, and sleeve 30 may rotate with it. The cap 38 is also utilized for holding the spring 21 at such adjustment as to its tension as may be imparted to it. In adjusting the tension of the spring 21 the cap 38 is moved upward from the spindle 24, and the ratchet-wheel 33 is turned, by means of a wrench, so as to wind or unwind through the sleeve 30 the spring 21, and when the spring 21 has reached its proper tension the cap 38 is restored to the ratchet-wheel 33 and spindle 24 and serves to lock said ratchet-wheel against rotation. The wrench for turning the ratchet-wheel 33 will simply be a thin hook-shaped wrench and less in thickness than the depth of the ratchet-wheel 33, so that when the wheel 33 has been turned to the proper extent the cap 38 may be partly restored to position without removing said wrench, the wrench being left in engagement with the ratchet-wheel 33 until the cap 38 has been moved downward upon the upper portion of said wheel and the lower part of the polygonal opening 34 has passed upon the upper polygonal end 35 of the spindle 24, whereupon the wrench may be removed from the ratchet-wheel 33 and the cap 38 pressed down upon the upper surface of the cap 29.

The casing 20 is designed to inclose the spring 21, sleeve 30, and upper portion of the spindle 24, and the interior of said casing 20 constitutes a spring-chamber, which is wholly independent of the liquid chamber or cylinder formed by the casing 22.

The casing 22 is cylindrical in outline and forms a vertical liquid chamber or cylinder having downwardly-converging or tapered inner walls and closed at its upper end by a screw-cap 39, substantially corresponding with the cap 29 on the upper end of the casing 20. The casing 22 is in vertical line with the casing 20, and the lower end of the spindle 24 passes through a central opening in the cap 39 and enters the liquid chamber or cylinder to a sufficient extent to receive

the upper or hub end of the guide 40 for the piston 23, as shown in Fig. 1.

The guide 40 comprises the hub 41, secured to the lower end of the spindle 24 by means of a screw 42, and the downwardly-depend-
ing legs 43 43, which in cross-section are preferably curved or on the arc of a circle, as denoted by the dotted lines in Fig. 2. The guide 40 is rigid with the spindle 24 and in-
dependent of the casing 22, and said guide 40 has no movement except with the spindle 24.

The piston 23 has tapered outer walls corresponding with the taper of the inner walls of the casing or cylinder 22, and said piston
23 contains the internally-threaded hub 44 and vertical sockets 45, said sockets 45 receiving the legs 43 of the guide 40 and said hub 44 being adapted to receive the threaded stem 46, whose lower end is rigidly secured
to the lower end of the casing 22 and whose upper end is centrally below the lower end of the spindle 24. The stem 46 is rigid with the casing 22, and the guide 40 is rigid with the
spindle 24, and hence when the casing 22 is turned axially the stem 46 will compel a ver-
tical movement of the piston 23 upon the legs 43 of the guide 40, and when the casing 22 is stationary and the spindle 24 in motion the
guide 40 will compel the rotation of the piston 23 upon the stem 46, with the result that said
piston will move vertically. When the door is in its closed position, the piston 23 will be
in its lower position, (shown in Fig. 1,) and as the door opens the piston 23 will ascend
upon the legs 43 of the guide 40. The casing or cylinder 22 will be supplied with a
suitable liquid, such as oil or a mixture of glycerine and alcohol, as customary in this
art, and the piston 23 will be provided with
ball-valves 47 and vertical ports 48 of known construction in this art for permitting a free
downflow of the liquid during the upward motion of the piston 23, while during the
downward motion of the piston 23 the ball-
valves 47 will close the ports 48 and compel
the liquid within the lower portion of the cylinder 22 to find its escape upward around
the outer walls of the piston. The descent
of the piston 23 during the closing of the
door is to retard the movement of the door,
and hence during the downward motion of
the piston 23 the balls 47 close the ports 48 in order that the flow of the liquid from be-
low the piston 23 may be restricted.

The casings 20 and 22 are separated from one another by means of a sleeve 49, which
has a polygonal bore to receive the polygonal portion 50 of the spindle 24, said sleeve 49 be-
ing thus keyed to said spindle and having no
rotation except with said spindle. The sleeve
49 is independent of the casings 20 and 22 and
may rotate with the spindle 24, while said cas-
ings 20 and 22 remain stationary, and the cas-
ings 20 and 22 may rotate around the spindle
24, while said spindle and the sleeve 49 remain
stationary.

Figs. 1 to 6, inclusive, illustrate all of the

details of the door check and closer, with the exception of the means for applying the same
to the door and its casing, and these means
will vary somewhat, in accordance with
whether the door check and closer is to be
applied to a single-acting door or to a double-
acting door. In Figs. 7, 8, and 9 I illustrate
the door check and closer as applied to a dou-
ble-acting door, there being in this instance
two sets of the apparatus 27 28, each being a
duplicate of the other. Upon reference to
Figs. 7, 8, and 9 it will be seen that the cas-
ings 20 and 22 of the apparatus numbered 27
are each provided with a leaf 51, these leaves
51 being cast with the casings 20 and 22 and
being provided with ordinary screw-holes for
the reception of the screws 52, by which the
said leaves 51 are securely fastened to the
edge of the door 26. The casings 20 and 22
of the apparatus numbered 28 are likewise
each provided with a leaf 53, these leaves 53
being cast integrally with the casings 20 and
22 of the apparatus 28 and corresponding ex-
actly with the leaves 51 of the casings 20 and
22 of the apparatus 27. The leaves 53 are pro-
vided with suitable screw-holes to receive the
screws 54, by which the said leaves 53 are se-
curely fastened to the door-casing 25.

The leaves 51 53 at their middle portions intermediate the casings 20 and 22, are re-
cessed, as shown in Fig. 9, to lap upon the
bar or leaf 55, which connects and is integral
with the sleeve 49 of the apparatus 27 and
the sleeve 49 of the apparatus 28 and is not
directly connected either with the door 26 or
door-casing 25.

The door check and closer, whether applied,
as shown in Fig. 7, in duplicate to a double-
acting door or singly, as shown in Fig. 10, to
a single-acting door, is the same in construc-
tion, with the exception of the arrangement
of the leaves 51 53 and bar 55, and in Figs.
10 to 13, inclusive, I illustrate the form of the
leaves for a single-acting door.

In Figs. 10 to 13, inclusive, the casings 20
and 22 are cast integrally with the leaves 60,
the same being lapped together at their ad-
joining edges to constitute one leaf, as shown
in Fig. 13, these leaves 60 being in separate
pieces, because of the fact that the casings 20
and 22 are in separate castings. When the
door check and closer is in condition to be
applied, the leaves 60 at their overlapping
edges will be secured together, and the said
leaves then constituting one leaf will be se-
cured by screws to the door-casing 61, as
shown in Fig. 10. The sleeve 49, for a sin-
gle-acting door, will be cast with the leaf 62,
as shown in Fig. 12, which will be secured to
the edge of the door 63, Fig. 10, by means of
suitable screws, the leaf 62 then being fas-
tened to the door, and the leaves 60 to the
door-casing.

When the door check and closer is applied
to a double-acting door, (reference being had
to Fig. 7,) the door 26 when opened in the di-
rection of the apparatus 27 will, operating

through the leaves 51, turn the casings 20 and 22 of the apparatus 27 upon the spindle 24 of said apparatus, said spindle 24 at such time being held stationary by reason of the fact
 5 that it is keyed with the transverse bar 55. The turning of the casings 20 22 will effect the winding of the spring 21 of the apparatus 27 and the ascent of the piston 23 upon the threaded stem 46, the liquid above said piston finding ready passage to the space below the piston. During this turning of the casing 22 (during the opening of the door) the stem 46 being rigid with said casing will have an axial motion and effect the ascent of
 10 the piston 23. When the door is released to close, the spring 21 will operate as a closing-spring, and the casings 20 22 will perform a reverse rotation upon the central spindle 24, with the result that the threaded stem 46 will
 15 cause the piston 23 to descend against the liquid in the lower end of said casing 22, said liquid then operating to check the action of the spring 21, but permitting the door to fully close. During the descent of the piston 23
 20 the ball-valves 47 will close the ports 48, and the upwardly-escaping liquid will be compelled to travel around the outer walls of the piston 23, the passage of the liquid being more and more restricted as the piston 23
 25 approaches its lower position. During the opening and closing of the door the piston 23 will be prevented from rotating with the casing 22 by reason of the engagement of said piston with the legs 43 of the guide 40, said
 30 guide remaining stationary at such time.

When the door 26 is opened in a reverse direction or toward the apparatus numbered 28, said door will, through the leaves 51, carry the apparatus 27 with it, and this will result
 35 in the movement of the bar 55 with the door, said bar 55 operating as a leaf and moving with the apparatus 27 without leaving its recess formed in the leaves 51, and during its movement turning the sleeve 49 and spindle
 40 24 of the apparatus 28, the casings 20 and 22 of said apparatus 28 at such time remaining stationary. The rotation of the spindle 24 of the apparatus 28 during such opening of the door results in the winding of the spring
 45 21 and through the rotation of the guide 40 the rotation of the piston 23 around the stem 46 and the consequent elevation of said piston. When the door is released to close, the spring 21 will act as a closing-spring, and the
 50 spindle 24 and guide 40 will perform a reverse rotation, causing the piston 23 to descend against the checking liquid.

With reference to the door check and closer shown in Figs. 10 to 13, inclusive, it has been
 55 described that the leaves 60 are secured to the door-casing 61 and the leaf 62 is fastened to the door 63, and under such condition when the door 63 is opened the leaf 62, acting through the sleeve 49, will turn the spindle 24 within
 60 the casings 20 22, with the result that the spindle 24 will wind up the spring 21, and through the guide 40 turn the piston 23 upon

the threaded stem 46, and thereby effect the ascent of said piston upon the legs 43. When the door 63 is released to close, the spring 21
 65 will effect the closing of the door and a reverse movement of the spindle 24, said spindle 24 and guide 40 then causing the piston 23 to perform a reverse rotation around the threaded stem 46 and to descend against the
 70 checking liquid. An important feature of the apparatus is that it may be applied to either right or left hand doors without change, and this characteristic may be understood if it is considered that the leaf 62 (in Fig. 10)
 75 is applied to the door-casing and the leaves 60 to the door, under which condition during the opening of the door the leaves 60 would turn the casings 20 22 upon the spindle 24 for the purpose of winding the spring 21 and
 80 effecting the ascent of the piston 23. Upon the release of the door the spring 21 will operate as a closing-spring for the door and the piston 23 will be moved downward against the checking liquid at the lower end of the
 85 casing 22. The door check and closer is thus applicable for either right-hand doors or left-hand doors, no change in the structure, such as a reversal of the spring, being required, since during the opening and closing of the
 90 door either the spindle 24 or the casings 20 and 22 may be relied upon for operating the spring 21 and piston 23.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. A door check and closer comprising the casing 20 affording a spring-chamber, the spring therein, the casing 22 affording a cylinder for the checking liquid, the piston within said cylinder, and the spindle operatively
 95 connected with said spring and said piston, combined with leaves for securing the opposing sections of the apparatus to the adjacent vertical portions of the door and its jamb with said spindle on the pivot-line of the door,
 100 whereby during the opening and closing of the door that section of the apparatus connected with the door will be compelled to rotate and thereby effect the movement of said piston; substantially as set forth.

2. A door check and closer comprising the casing 20 affording a spring-chamber, the spring within said chamber, the casing 22 affording a cylinder for the checking liquid, the threaded stem within and rigid with said cylinder,
 105 and the piston within said cylinder and having a threaded bore to engage said threaded stem, combined with the spindle extending into said casings and connected with said spring, the guide connected with said spindle
 110 and, by a sliding union, with said piston, and means for securing said casings and spindle to the door and door-casing respectively, said means comprising leaves extending from said casings and spindle and adapted for disposal
 115 intermediate the edges of the door and its casing or frame; substantially as set forth.

3. A door check and closer comprising the rotary casing 20 affording a spring-chamber,

the spring therein, the rotary casing 22 affording a cylinder for the checking liquid, the piston within said cylinder, and means operatively connecting said piston with said cylinder whereby during and due to the axial turning of said cylinder the said piston may be operated, combined with the spindle connected with said spring, and the leaves connected with said casings and spindle; substantially as set forth.

4. A door check and closer comprising the casing 20 affording a spring-chamber, the spring within said chamber, the casing 22 affording a cylinder for the checking liquid, the threaded stem within and rigid with said cylinder, and the piston within said cylinder and having a threaded bore to engage said threaded stem, combined with the spindle extending into said casings and connected with said spring, the guide connected with said spindle and, by a sliding union, with said piston, the sleeve connected with said spindle intermediate said casings, the leaf rigid with said sleeve, and the leaf rigid with said casings; substantially as set forth.

5. A door check and closer comprising the vertical casing 20 affording a spring-chamber, the spring therein, the vertical casing 22 affording a cylinder for the checking liquid, and the vertically-acting piston within said cylinder, combined with the spindle extending into said casings and connected with said spring, the leaves connected with said casings and spindle, and means operatively connecting said spindle with said piston whereby during and due to the axial turning of said spindle the said piston may be operated in a vertical direction; substantially as set forth.

6. A door check and closer comprising the casing 20 affording a spring-chamber, the spring within said chamber, the casing 22 affording a cylinder for the checking liquid, and the piston within said cylinder, combined with the spindle extending into said casings and connected with said spring, means operatively connecting said cylinder, piston and spindle whereby upon the axial turning of

either said cylinder or spindle said piston will be compelled to operate, and leaves secured to said casings and spindle and adapted for connection with the door and its casing; substantially as set forth.

7. A door check and closer for double-acting doors comprising the casings 20, 22, for each side of the door and respectively forming the spring-chambers and liquid-cylinders, the springs within said chambers, the pistons within said cylinders, and the spindles extended into said casings, the casings at one side of the door being capable of axial rotation upon their spindle, and the spindle at the other side of the door being capable of axial turning within its casings, which are stationary when in use, combined with means connected with the rotary cylinder for compelling the operation of its piston, means connected with the rotary spindle for compelling the operation of its piston, the securing-leaves connected with said casings at each side of the door, and the leaf 55 connecting said spindles and being independent of said securing-leaves and said casings; substantially as set forth.

8. A door check and closer comprising an apparatus affording a spring-chamber and liquid-cylinder, the spring within said chamber, and the piston within said cylinder, combined with the spindle operatively connected with said piston, the sleeve on said spindle within said spring-chamber and to which said spring is connected, the recessed wheel on the upper end of said sleeve, the removable cap keyed upon the upper end of said spindle and adapted to cover and engage said recessed wheel, and means for connecting said spindle and said apparatus to the door and door-casing respectively; substantially as set forth.

Signed at New York, in the county of New York and State of New York, this 15th day of August, A. D. 1901.

EDWARD CLIFF.

Witnesses:

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GUNDER GUNDERSON.