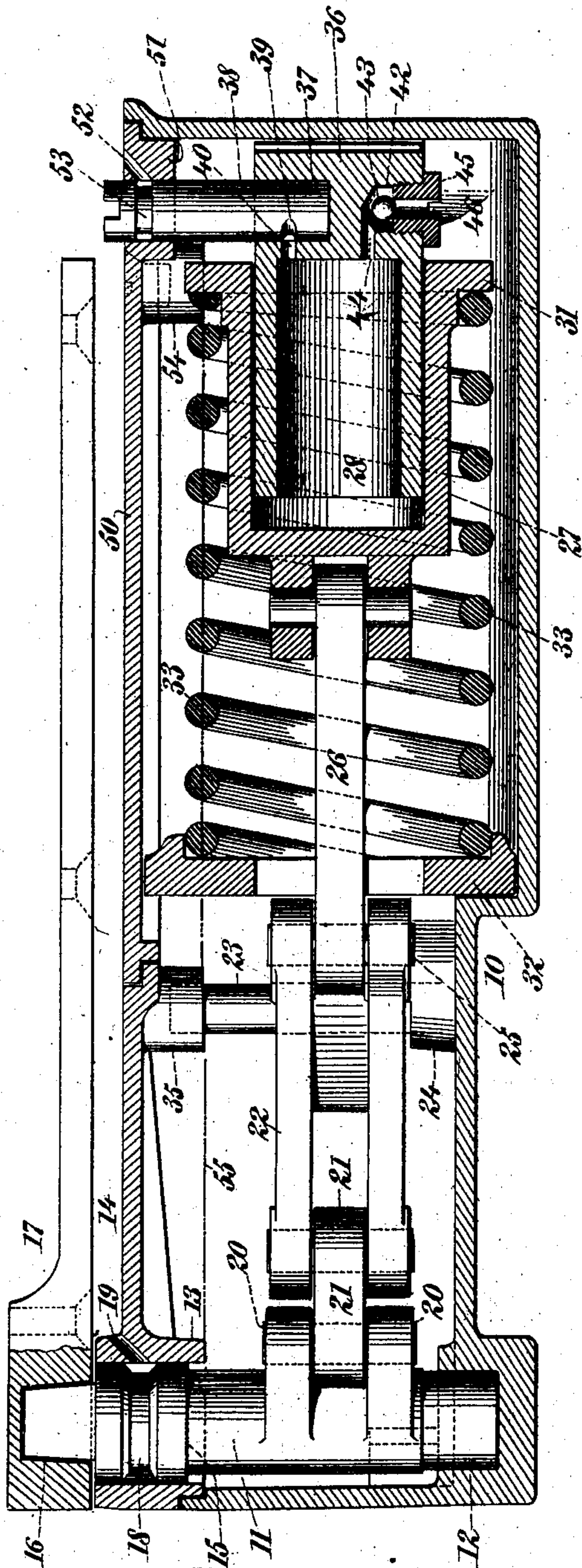


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J. BARDSLEY.
DOOR CHECK AND CLOSER.
APPLICATION FILED JUNE 1, 1903.

NO. MODEL.



WITNESSES:

Gustave Dittus
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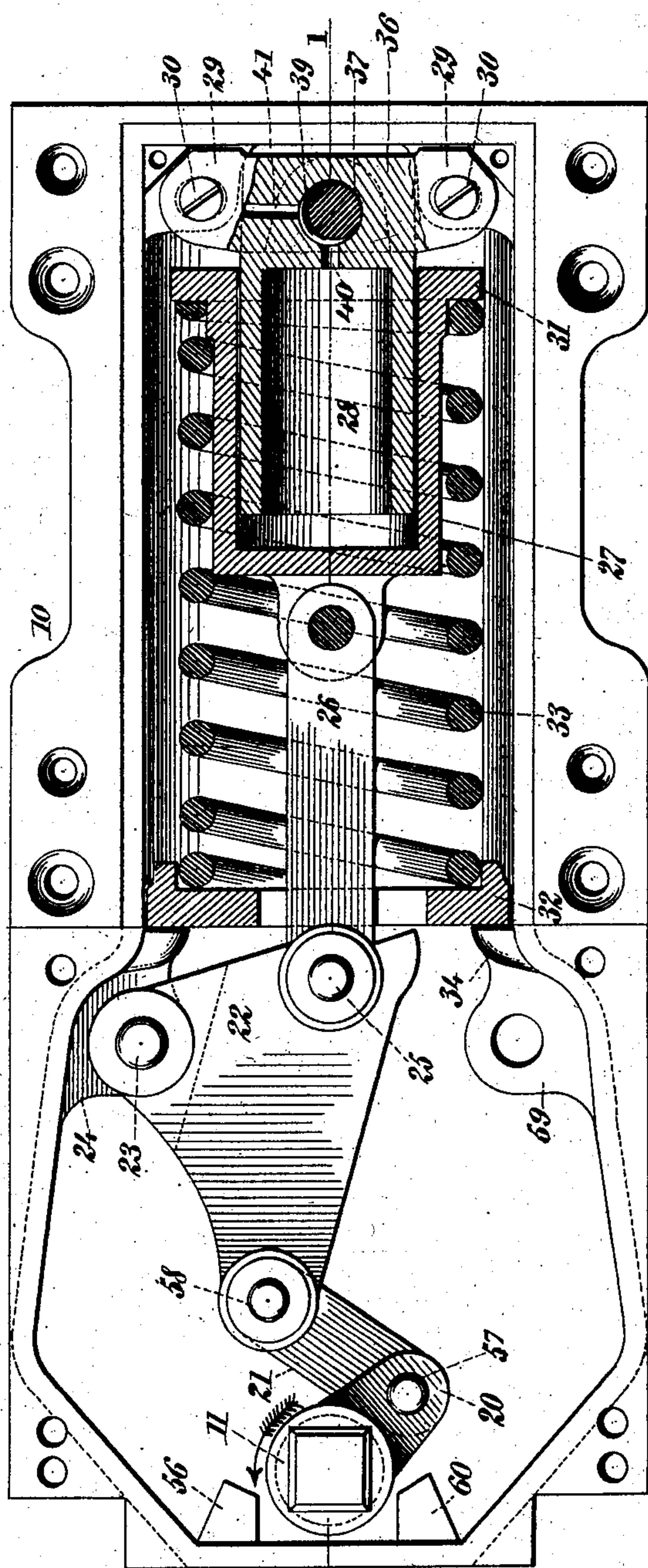


Fig. 2.

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DOOR CHECK AND CLOSER.

SPECIFICATION forming part of Letters Patent No. 753,838, dated March 8, 1904.

Application filed June 1, 1903. Serial No. 159,487. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH BARDSLEY, a citizen of the United States, and a resident of Montclair, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Door Checks and Closers, of which the following is a specification.

The invention relates to improvements in 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 invention pertains more especially to hinges for doors which are mounted at their lower end upon an actuating spindle or pivot and held at their upper end by means of a pin or stud projecting downwardly into a socket carried by the upper edge of the door.

In accordance with my present invention I provide a novel construction of spring-hinge for the lower edge of the door and in the preferred construction embody therewith means for checking the closing movement of the door.

The more essential features of the invention sought to be protected hereby reside in the novel construction and arrangement of crank-and-lever mechanism connected with the actuating-spindle and closing-spring whereby in a highly efficient manner the door is kept under proper control and may when opened beyond a predetermined point be held in its open position by means of the said spring, which prior to the door reaching such predetermined position exerts its force to close the door, the closing-spring thus being adapted to close the door and also under proper conditions to hold the door in an open position.

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 on the dotted line 1 1 of Fig. 2 of a spring hinge and check constructed in accordance with and embodying the invention; and Fig. 2 is a top view, partly in horizontal section, of same, the cover-plates for the inclosing casing being omitted.

In the drawings, 10 designates a suitable inclosing casing to be embedded within the floor

below the door and contain the operative mechanism of the hinge and check, this casing when in use being closed at its upper end by suitable cover-plates fastened to the laterally-projecting flanges at the upper edges of the casing in a well-known manner. Within one end of the casing 10 is mounted the vertical actuating spindle or pivot 11, the lower end of this spindle or pivot being freely held within a socket 12, while the upper portion of said spindle or pivot finds a bearing within the vertical sleeve 13, formed integrally with the cover-plate 14. This sleeve 13 constitutes a hub for the upper portion of the spindle or pivot 11 and extends downwardly below the annular shoulder 15 formed thereon. The upper extremity of the spindle or pivot 11 is polygonal in cross-section and is adapted to enter a correspondingly-formed recess 16 in a shoe 17 of known construction to be carried by the lower edge of a door. Intermediate the upper and lower ends of the sleeve or hub 13 the spindle 11 is formed with an annular groove 18, and the said sleeve 13 above the main level of the cover-plate 14 is provided with a downwardly and inwardly inclined aperture 19, leading to said groove 18, the purpose of the groove 18 being to receive a suitable soft packing material to be forced into it through the aperture 19, said material filling said groove 18 and engaging the inner walls of the sleeve 13, and serving to prevent any escape of the checking liquid upward around the said spindle 11.

The spindle or pivot 11 is formed with the crank-arms 20, initially extending at an angle to the longitudinal center of the inclosing casing 10 and between which is pivotally secured one end of a link 21, whose other end is pivotally secured between the upper and lower members of the crank-plate 22, the latter by preference being substantially triangular in outline when viewed from above and being secured by the pin 23 upon a lug 24, formed at one side of the center of the casing 10. The crank-plate 22 is also pivotally secured, by means of a pin 25, to the link 26, which extends into the cylindrical end of the casing 10 and is pivotally connected with the cylinder 27, which is adapted to have a recip-

roccating movement upon the stationary hollow piston 28, the latter at its outer end being formed with the ears 29, through which pass screws 30 for securing said piston-head rigidly, though detachably, in position.

The outer end of the cylinder 27 is formed with the laterally-projecting annular flange 31, between which and a stop-collar 32 is arranged under compression the coiled closing-spring 33, the tension of the latter being normally exerted to force the cylinder 27 toward the outward position, in which it is shown, and influence the action of the pivoted parts intermediate said cylinder and the spindle or pivot 11. The collar 32 bears against suitable shoulders 34, formed on the casing 10, and is held in position by the pressure of the spring 33.

The pin 23 extends upwardly above the crank-plate 22 and is held at its upper end within a depending sleeve 35, formed integrally with the cover-plate 14.

The piston 28 is made hollow to receive a portion of the checking liquid, and in its outer cross-head 36 is formed a socket 37 for the lower end of a regulating-pin 38, which is formed with a tapered groove 39, disposed within said socket 37 and communicating with a port 40 and also with a port 41, these ports 40 41 being formed in the cross-head 36 and establishing through the socket 37 and groove 39 a passage from the interior of the piston and cylinder to the general chamber of the casing 10, this passage being capable of being regulated as to its area by the turning of the pin 38 to move the shallow or deeper portions of the groove 39 into communication with the said ports 40 41. The upper end of the pin 38 is exposed, as shown in Fig. 1, so that said pin may be conveniently adjusted by means of a screw-driver or other suitable instrument. The passage formed by the port 40, groove 39, and port 41 is the outlet-passage for the liquid from within the cylinder during the closing of the door, this being a restricted and regulatable passage, so that the door in its closing action may be properly checked and controlled. The cross-head 36 is also formed with a chamber 42, containing a ball-valve 43 and communicating by a port 44 with the interior of the piston and cylinder, as shown in Fig. 1, and into the lower end of the chamber 42 is applied a screw-plug 45, containing a port 46, leading into the valve-chamber 42. The upper or inner end of the screw-plug 45 forms a valve-seat for the ball-valve 43, and said plug confines said ball-valve within the chamber 42. During the closing of the door the ball 43 will close the port 46, so that the liquid must find its escape outwardly through the port 40, groove 39, and port 41. During the opening of the door the suction created by the moving cylinder 27 will freely draw the liquid from the general chamber of the casing upwardly through the port

46, chamber 42, and port 44, so that the requisite amount of such liquid shall enter the piston and cylinder. It may here be remarked that the liquid will entirely cover the cylinder 27 and at all times completely fill the interior of the piston 28 and said cylinder.

The casing 10 is closed at its upper end by means of the cover-plates 14 50, the latter having a depending sleeve or thickened portion 51, containing an aperture to receive the upper end of the regulating-pin 38 and also containing an aperture 52, leading downwardly to the annular groove 53 in the said pin, the purpose of said groove being to receive a soft packing material to be forced into it through said aperture 52. The plate 50 is also formed with a depending sleeve 54, containing an aperture through which the checking liquid will be introduced into the casing 10 and which will normally be kept closed by a screw-plug in a manner well understood in this art. The sleeves 13, 35, and 54 extend downwardly to about the same horizontal plane, this being the level denoted by the line 55 for the checking liquid within the casing 10, above which level is confined a layer of air, the cover-plates 14 50 being cemented in position.

The parts of the door-closing hinge and check are represented in the drawings as being in their normal at-rest position for a left-hand door with the door closed. During the opening of the door the actuating-spindle 11 will be rotated in the direction of the arrow represented in Fig. 2, and upon being rotated or turned axially it will carry with it the crank-arms 20 and through the link or rod 21 cause the crank-plate 22 to turn on its pivot-pin 23, and thereby through the pin 25 draw the link 26 and cylinder 27 in a direction toward the said spindle 11, the movement of the cylinder 27 compressing the spring 33 and causing the checking liquid to flow inwardly into the piston 28 through the port 44. Upon the release of the door the spring 33 will impart a reverse motion to the spindle 11, crank-arms 20, link 21, plate 22, link 26, and cylinder 27, with the result of closing the door under the checking action of the liquid then escaping through the passage formed by the port 40, groove 39, and port 41. During the opening of the door the crank-arms 20 will turn in a direction toward the stop-lug 56, Fig. 2, and the door may be continued in its opening movement until said crank-arms become arrested by the contact of the lower arm 20 with said lug 56. Upon the opening of the door and the movement of the crank-arms 20 toward the stop-lug 56 the spring 33 will act as a closing-spring until the door has passed slightly beyond a right-angular position, at which time the spring 33 will operate to press the door to a further open position and hold the door open, this being due to the pivot 57 passing outwardly beyond a line extending from the center of the spindle 11 to the center of the

pivot 58, connecting the link 21 with the crank-plate 22. The closing-spring 33 may therefore be utilized not only for the closing the door, but for holding the door open.

5 The arrangement of the crank-arms 20, link 21, and crank-plate 22 presented in the drawings is advantageous in many respects, among which it may be mentioned that with such
10 arrangement of said parts I secure upon the opening of the door a direct and rather quick action upon the spring and also a nearly direct longitudinal movement of the link 26 and cylinder 27. The construction presented
15 also results in the door being very securely held in its closed position. During the opening of the door the force of the spring 33 gradually decreases, and when the door has reached its right-angular position the spring 33 exerts but little force to close the same, while when
20 the door is moved slightly beyond its right-angular position the line through the pivots 11 57 58 is reached, and then when the door is pushed slightly farther open the said spring 33 operates to continue the opening
25 movement of the door and to hold it open.

The closing hinge and spring, hereinbefore described, is intended more especially for a single-acting door and is shown in the drawings as being arranged for a left-hand door;
30 but the parts of the apparatus may be easily adapted for a right-hand door, the change required in arranging the apparatus for a right-hand door being mainly to turn the crank-plate 22 upside down and secure it upon the
35 lug 59 instead of upon the lug 24. This reversal of the crank-plate 22 will necessitate its being detached from the link 26 and link 21; but said plate may be conveniently again connected with the said link 26 and link 21 by
40 means of the pins 25 and 58. When the parts of the hinge are arranged for a right-hand door, the crank-arms 20 will of course be moved to the other side of the central longitudinal line of the hinge from that shown in
45 Fig. 2, and then upon the opening of the right-hand door the lug 60 will serve as a stop for said arms in the same manner that the lug 56 serves as a stop for said arms when the parts of the hinge are arranged for a left-hand
50 door.

I do not, of course, limit my invention to the employment of two crank-arms 20 nor to the crank-plate 22, having the upper and lower members; but it is advantageous to employ
55 the two crank-arms 20 and the bell-crank 22, having the upper and lower members, because with such construction a very durable, efficient, and reliable hinge is produced. The upper and lower corresponding members of
60 the crank-plate 22 are preferably in one integral piece and are united at that portion thereof through which the pin 23 passes.

The main features of novelty sought to be protected by the present application reside
65 in the connections intermediate the spindle

11 and cylinder 27, and these features I desire to claim broadly. Such other features of novelty as may be illustrated in the drawings and not claimed herein are made the subject of a separate application for Letters Patent of even
70 date herewith, these additional features referring more especially to the top plates 14 50, the means for preventing leakage upwardly around the actuating-spindle 11 and regulating-pin 38, and to the means for maintaining
75 an air-cushion above the line 55 for the level of the checking liquid.

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

1. In a door-closer, the inclosing casing, the
80 actuating-spindle mounted therein for connection with the door and having a crank-arm 20 initially extending at an angle to the longitudinal center of said casing, combined with the
85 bell-crank lever 22 pivotally mounted within said casing on a pin 23 at one side of the center of said casing, the link 21 secured at one end to said crank-arm by a pivot-pin 57 and at the other end by a pivot-pin 58 to one arm of
90 said bell-crank lever, and the confined spring connected with the other arm of said bell-crank lever, said other arm being about in line with the longitudinal center of said casing, and the whole being arranged substantially as shown
95 and described.

2. In a door-closer, the inclosing casing, the
actuating-spindle mounted therein for connection with the door and having the crank-arm
20 initially extending at an angle to the longitudinal center of said casing, combined with
100 the bell-crank lever 22 pivotally mounted within said casing on a pin 23 at one side of the center of said casing, the link 21 secured at one end by a pivot-pin 57 to said crank-arm and at its other end by a pivot-pin 58 to one
105 arm of said bell-crank lever, the longitudinal rod 26 connected to the other arm of said lever, the spring encompassing said rod, means engaging one end of said spring with said rod, and a stop for the other end of said spring;
110 substantially as and for the purposes set forth.

3. The actuating-spindle for connection with the door and having the crank-arm 20, combined with the bell-crank lever 22 comprising the upper and lower united members,
115 the link 21 connecting one arm of said lever with said crank-arm, and the confined spring connected with the other arm of said lever; substantially as set forth.

4. In a door-closer, the inclosing casing, the
120 actuating-spindle mounted therein for connection with the door and having the upper and lower crank-arms 20 initially extending at an angle to the longitudinal center of said casing, combined with the bell-crank lever 22 composed of upper and lower corresponding members
125 pivotally mounted within said casing on a pin 23 at one side of the center of said casing, the link 21 secured at one end by a pivot-pin 57 between and to said crank-arms 20 and
130

at its other end by a pivot-pin 58 between and to the upper and lower members of one arm of said bell-crank lever, the longitudinal rod 26 pivotally connected to the other arm of said lever, the spring encompassing said rod, means engaging one end of said spring with said rod, and a stop for the other end of said spring; substantially as and for the purposes set forth.

5. In a door-closer, the inclosing casing having a lug 24 at one side of its center, the cover-plate 14 for said casing and having a depending sleeve 35 above said lug 24, the actuating-spindle mounted within said casing for connection with the door and having a crank-arm 20 initially extending at an angle to the longitudinal center of said casing, combined with the bell-crank lever 22 pivotally mounted within said casing on a pin 23 held at its ends in said lug 24 and sleeve 35, the link 21 secured at one end to said crank-arm by a pivot-pin 57 and at the other end by a pivot-pin 58 to one arm of said bell-crank lever, and the confined spring connected with the other arm of said bell-crank lever, said other arm being about in line with the longitudinal center of said casing, and the whole being arranged substantially as shown and described.

6. In a door closer and check, the inclosing casing having a cover-plate and adapted to hold a checking liquid, and the actuating-spindle mounted in said casing for connection with the door and having the crank-arm 20 initially extending at an angle to the longitudinal center of said casing, combined with the bell-crank lever 22 pivotally mounted within said casing on a pin 23 at one side of the center of said

casing, the link 21 connected at one end by a pivot-pin 57 to said crank-arm and at the other end by a pivot-pin 58 to one arm of said bell-crank lever, the rod connected to the other arm of said bell-crank lever, the cylinder connected with said rod, the confined spring engaged at one end by said cylinder, and the piston for said cylinder; substantially as set forth.

7. In a door closer and check, the inclosing casing having a cover-plate and adapted to hold a checking liquid, and the actuating-spindle mounted in said casing and adapted for connection with the door, combined with the cylinder, the confined spring engaged at one end by said cylinder, power-transmitting means connecting said cylinder and spindle, the piston entering said cylinder and having the head 36, means for securing said head, the restricted outlet-port through said head, the valve-chamber 42 within said head and containing the ball-valve 43, the port 44 connecting said chamber with said cylinder and piston, and the screw-plug 45 at its inner end forming a valve-seat for said ball-valve and containing the port 46 and screwed into the outer end of said chamber, for confining said ball-valve and establishing communication between said chamber and the general chamber of the inclosing casing; substantially as set forth.

Signed at New York, in the county of New York and State of New York, this 29th day of May, A. D. 1903.

JOSEPH BARDSLEY.

Witnesses:

CHAS. C. GILL,
ARTHUR MARION.