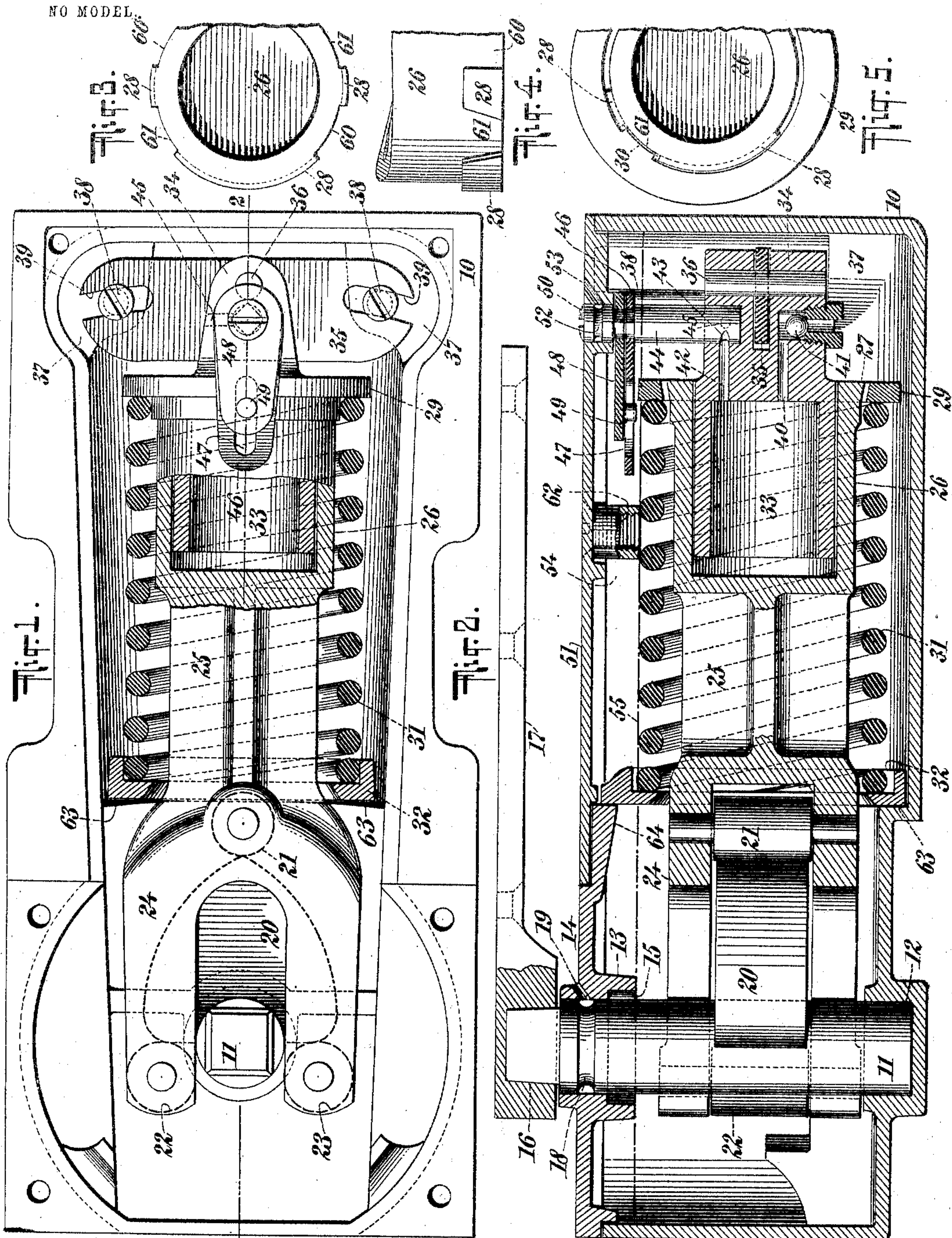


No. 777,393.

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

NO MODEL.

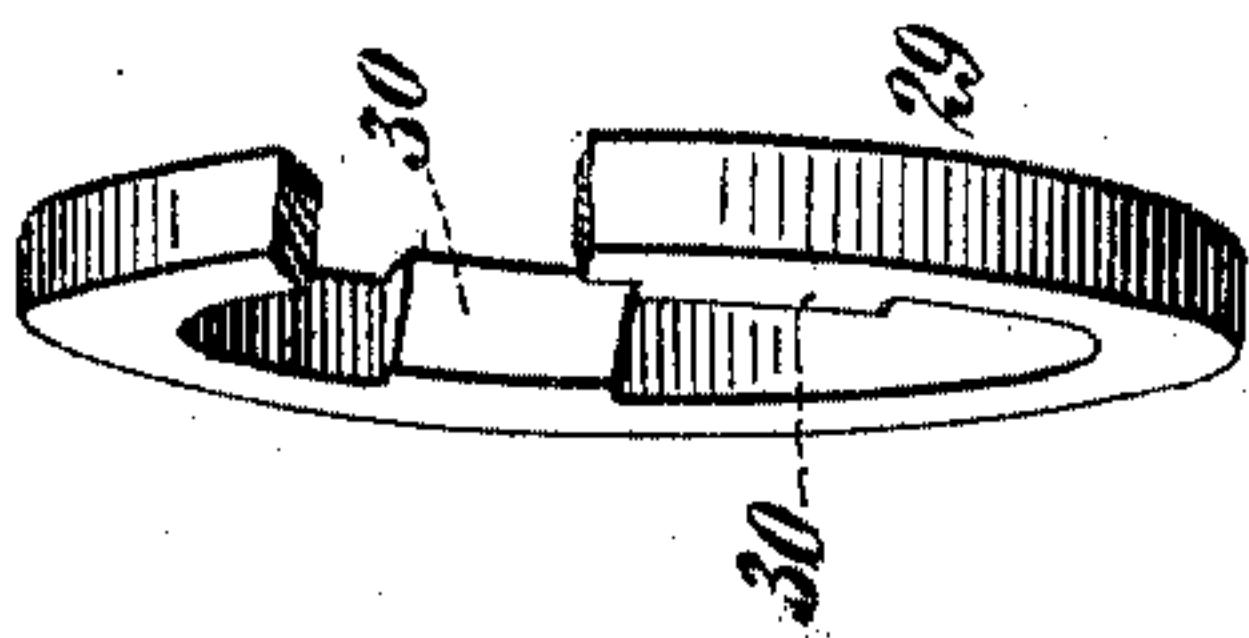


WITNESSES:

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Fig. 6.



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DOOR CHECK AND CLOSER.

SPECIFICATION forming part of Letters Patent No. 777,393, dated December 13, 1904.

Application filed June 1, 1903. Serial No. 159,488. (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 double-acting doors and in the preferred construction embody therewith means for checking the closing movement of the door.

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 top view, partly in section and partly broken away, of a double-acting spring-hinge constructed in accordance with and embodying the invention, the cover-plates for the inclosing casing being omitted. Fig. 2 is a central vertical longitudinal section of same on the dotted line 2 2 of Fig. 1. Fig. 3 is an end view, partly broken away, of the outer end of a cylinder forming a part of the operative mechanism of the hinge. Fig. 4 is a top view of a part of same. Fig. 5 is an end view, partly broken away, of the aforesaid cylinder with a cooperating locking-ring thereon; and Fig. 6 is a perspective view, partly broken away, of the locking-ring.

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 at its lower portion forms an annular chamber 15 around said spindle. 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 side 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 cam 20 of heart shape and normally extending longitudinally of the casing 10, as shown in the drawings, wherein it will be seen that the point of the cam 20 engages a roller 21 and that the broad outer end of the cam adjacent to its outer rounded corners is engaged by the rollers 22 23, these rollers 21 22 23 being carried by the yoke 24, comprising upper and lower members, inclosing at its upper and lower faces the said cam 20, and which members are slotted longitudinally or bifurcated to permit of said yoke 24 having a longitudinal sliding movement on the spindle 11.

The yoke is formed integrally with a rod 25, which is integral, preferably, with the cylinder 26, the cylinder 26, rod 25, and yoke 24 being thus by preference in one integral casting. The cylinder 26 at its outer end is formed with the beveled shoulder 27, upon

which are formed the correspondingly-beveled ribs 28 and which is adapted to receive the locking-ring 29, the latter bearing on its inner surface the inwardly-projecting inclined ribs 30. The ring 29 may be slipped upon the end of the cylinder 26 when the ribs 30 on the said ring are in line with the spaces 60 between the ribs 28 on the said cylinder, and then by turning said ring to carry its ribs 30 into line with the wedge-spaces 61 and drawing said ring outwardly said ring will be unable to slip off from said cylinder. A reverse movement of the ring 29 will result in its removal from the cylinder. The ring 29 may thus be securely applied upon the cylinder 26 after the closing-spring has been placed upon the rod 25 and cylinder 26. The ring 29 is engaged by the outer end of the spring 31, which is of usual character and held under compression between said ring 29 and a stop collar or plate 32, the latter bearing against rigid parts of the structure.

The cylinder 26 is adapted to be reciprocated upon the hollow piston 33, which has a rearwardly-extending lug 34, slotted horizontally to receive the plate 35, to which, by means of a pivot-pin 36, said lug 34 is secured and which plate is at its ends fastened upon supports or lugs 37, Fig. 1, by means of screws 38, passing through arc slots 39 in said plate 35, and by means of annular shoulders bearing upon the upper surface of said plate at opposite sides of said slots to clamp said plate upon said lugs or supports 37. The slots 39 are of arc form, so as to permit of the lateral adjustment of the plate 35, piston 33, cylinder 26, rod 25, and yoke 24 on the arc of a circle, whose center is represented by the pivot 11, for the purpose of assuring the full closing of the door and the maintaining of the door in proper position when closed. The heads of the screws 38 will be exposed through the cover-plate 51 for the cylinder end of the casing, so that they may be easily reached by a screw-driver. The screws 38 are separated from each other by a space a little greater than the thickness of the door to which the hinge may be applied.

The adjustment of the plate 35 is effected by loosening the screws 38 and moving the plate 35 a slight distance laterally in one direction or the other, as required, and then retightening the screws 38. The purpose of adjusting the plate 35 or, as results, the adjustment of the operative structure within the casing 10 is to overcome any defects in hanging the door and to compel the door notwithstanding such defects to normally stand in true closed position within its frame. At times, due to irregularities in the door or the door-casing or the securing of the shoe 17 to the lower edge of the door or the embedding of the casing 10 in the floor below the door or the trueness of the polygonal upper end of the spindle 11, as well as from other causes,

the door may not close entirely and with proper satisfaction, and on any such occasion in order to compel the door when closed to firmly stand in a proper position the plate 35 will be adjusted laterally to effect such result, the adjustment of said plate being to, through the spindle 11, hold the door in its proper closed position. Since the screws 38 are separated from each other a slightly-greater distance than the thickness of a door, the said screws after the door is hung may be loosened and the plate 35 moved in its adjustment by the movement of the door (through the spindle 11, yoke 24, rod 25, cylinder 26, piston 33, and lug 34) without removing the cover-plate 51 from the casing 10, whereupon the screws 38 will be retightened, and in this regard it will be evident that there is a great convenience in exposing the tops of the screws 38 through closely-fitting holes in said plate 51. It may here be remarked that in the practical use of the hinge a finishing-plate is fastened over the cover-plates 14 51 in a well-known manner, and I do not deem it necessary to illustrate in this application said finishing-plate. The adjustment of the parts of the hinge is attended to before the finishing-plate is applied over the plates 14 51.

The lug 34 of the piston 33 contains an inlet-port 40 for the passage of the usual checking liquid to the interior of the piston and cylinder, this port 40 being closed during the closing movement of the door by a ball-valve 41, so that the liquid may at such time be compelled to find its escape outward through a restricted passage formed by the port 42 in the lug 34, the tapered groove 43, formed in the pin 44, and the port 45 leading from said groove 43 to the general chamber of the casing 10. The pin 44 is seated in the lug 34 and may be turned axially to bring the deeper or a more shallow part of the groove 43 into communication with the port 45, and thereby regulate the escape of the liquid from the piston and cylinder to secure the proper checking effect upon the door.

The pin 44 has secured upon its upper end a crank-arm 46, containing the longitudinal slot 47, and above this arm 46 is arranged a crank-arm 48, carrying a pin 49 within said slot 47, so that said crank-arms may have a sliding connection with each other. The crank-arm 48 is secured to a pin 50, having a slotted head, so that it may be turned axially by means of a screw-driver or other suitable instrument and through the crank-arms 46 48 turn the pin 44 to regulate the outlet for liquid from the piston and cylinder.

The pin 50 is freely mounted within a closely-fitting sleeve depending from the cover-plate 51, and within this sleeve the said pin is provided with the annular groove 52 to receive a soft packing material to be forced into the same through an aperture 53, formed in said plate 51. I provide the pin 50, crank-arm 48,

pin 49, and slotted crank-arm 46 as suitable means for adjusting the regulating-pin 44 notwithstanding the fact that the pin 44, with the piston and lug 34, may be shifted laterally to one side or the other in their adjustment with the plate 35, the means I have provided permitting of the lateral adjustment of the piston and pin 44, since the pin 44 and pin 50 are connected together by a sliding connection not requiring that the pins 50 44 shall be in vertical line with each other. Except for the provision of laterally adjusting the piston 33 and parts connected therewith the pin 44 could extend upwardly in one integral piece through the cover-plate 51; but in view of the desirability of being able to adjust the interior mechanism without removing the cover-plate 51 a sliding connection must be provided between the pins 50 44.

The cover-plates 14 51 will be cemented around their edges so as to form a liquid-tight joint intermediate said plates and the casing 10, and the cover-plate 51 will be 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 62, which does not extend to the bottom of said sleeve 54, whereby an air-chamber is formed within said sleeve below said screw to prevent the leakage of the checking liquid upwardly around said screw. The air-chamber 15 around the spindle 11 is also provided to prevent the leakage of the liquid upwardly around the said spindle. The sleeves 13 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, which will prevent the checking liquid from rising unduly within the casing 10, and thereby aid in avoiding leakage through any of the joints at the upper part of the casing.

In the employment of the spring-hinge the parts within the casing 10 will be in the position represented in the drawings when the door is in closed position. The hinge is a double-acting hinge, and therefore it will permit the door to be opened in either direction. Upon the opening of the door toward the left the heart-shaped cam 20 will be turned toward the left and press against the roller 22, (leaving the roller 23,) and thereby move the yoke 24, rod 25, and cylinder 26 inwardly toward the spindle 11, the point of the cam 20 during this movement leaving the roller 21, which will at such time ride against one side edge of said cam, while the other side edge of said cam is moving against the roller 22, the cam 20 thus maintaining a firm connection with the yoke 24 and the piston 26 compressing the spring 31 against the stop 32. The movement of the piston 26 toward the spindle 11 operates to draw the checking liquid through the port 40 into the interior of the piston 33, this

piston and the cylinder 26 being at all times filled with the liquid. Upon the release of the door the spring 31 will force the piston 26, rod 25, and yoke 24 in an outwardly direction from the spindle 11, and at such time the pressure exerted by the roller 22 against the cam 20 will cause a reverse rotation of the spindle 11 and effect the closing of the door, the parts regaining the position in which they are shown in Fig. 1 at the time the door reaches its closed position. During the closing movement of the door a part of the liquid then within the piston 33 and cylinder 26 will be forced outwardly through the restricted port 42, with the result of checking the action of the door and compelling it to close gently. During the closing of the door the pressure of the liquid will close the ball-valve 41 against its seat, and hence during such action of the door the liquid is compelled to find its escape through the restricted and regulatable port 42. When the door is pushed open toward the right, the cam 20 will turn from the roller 22 and against the roller 23 and will move its right-hand edge against said roller 23 and present its left-hand edge to the roller 21. The action of the mechanism of the hinge is the same whether the door is opened in one direction or the other, the only change being that the cam 20 will turn in the direction in which the door is moved, but will at all times have a corresponding influence on the yoke 24 and parts connected therewith.

It has been explained hereinbefore how the regulating-pin 44 may be turned or operated and how the entire interior mechanism of the hinge may be shifted laterally by means of the screws 38 and plate 35.

The locking-ring constitutes a novel feature of the hinge; but the invention is not in every instance limited to such ring, because said ring 29 simply furnishes one efficient means for engaging one end of the spring 31 with the yoke 24, while the other end of said spring has its bearing against the stop 32. It will be observed, Fig. 2, that the stop 32 bears against the shoulder 63 of the casing 10 and the lip 64 of the cover-plate 14 and that, Fig. 1, the said shoulder has a curved face to receive the stop 32, this construction being desirable, so that during any radial shifting of the connected mechanism (this including the yoke, rod, cylinder, piston, and spring) the said stop may assume a position in line with the spring and parallel with the locking-ring 29.

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

1. The exterior casing, the spindle mounted therein for connection with the door, the heart-shaped cam 20 carried by said spindle, the yoke 24 comprising upper and lower members inclosing at its upper and lower faces the said cam 20 and which members are slotted longitudinally to permit said yoke to be moved longitudinally on said spindle, and the rollers

21, 22, 23 directly carried by said yoke for co-operation with said cam, said roller 21 normally being at the point of said cam, and said rollers 22, 23 normally being in engagement with the broad outer end of said cam adjacent to its rounded corners, combined with the closing-spring connected, at one end, with said yoke, and a stop for the other end of said spring; substantially as set forth.

2. The door check and closer comprising the exterior casing, the spindle therein for connection with the door, and the yoke, rod, cylinder, piston and spring in one connected mechanism extending horizontally within said casing and at right angles to said spindle, said cylinder being adapted to move upon the exterior surfaces of said piston, which is normally stationary, combined with means for moving said yoke, rod and cylinder in one direction from said spindle, and means connected with said piston for adjusting the same and said connected mechanism laterally on the arc of a circle whose center is said spindle; substantially as set forth.

3. The door check and closer comprising the exterior casing, the spindle therein for connection with the door, and the yoke, rod, cylinder, piston and spring in one connected mechanism extending horizontally within said casing and at right angles to said spindle, said cylinder being adapted to move upon the exterior surfaces of said piston, which is normally stationary, combined with means for moving said yoke, rod and cylinder in one direction from said spindle, the transverse plate 35 connected with said piston and having the slots in its end portions, supports for said end portions of said plate, and the screws 38 for securing said plate at said slots and thereby fastening said mechanism at its outer end, said screws being separated from each other by about the thickness of a door for convenience in adjusting said plate and the parts connected with it; substantially as set forth.

4. A door check and closer comprising the exterior casing, the spindle therein for connection with the door, the cam carried by said spindle, and the yoke, rod and cylinder in one integral piece for coöperation with said cam and to be moved in one direction by it, combined with the door-closing spring, detachable means connected with said cylinder for engaging one end of said spring, the stop for the other end of said spring, and the piston secured to said casing for coöperation with said cylinder; substantially as set forth.

5. The spring-hinge comprising the exterior casing, the spindle mounted therein for connection with the door, the cam carried by said spindle, the yoke, rod and cylinder for coöperation with said cam, the closing-spring at one end connected with said yoke, and the stop for the other end of said spring, combined with the piston for coöperation with said cylinder, means for adjusting said piston, cyl-

inder, rod and yoke as one connected mechanism laterally on the arc of a circle whose center is said spindle, a free inlet for liquid to said cylinder, a restricted outlet for the liquid therefrom, the rotary pin for regulating said outlet, and means for operating said pin from the exterior of the casing and having a sliding connection therewith within said casing; substantially as set forth.

6. The spring-hinge comprising the exterior casing, the spindle mounted therein for connection with the door, the cam carried by said spindle, the yoke, rod and cylinder for coöperation with said cam, the closing-spring at one end connected with said yoke, and the stop for the other end of said spring, combined with the piston for coöperation with said cylinder, a free inlet for liquid to said cylinder, a restricted outlet for the liquid therefrom, the rotary pin for regulating said outlet and having the crank-arm for turning it, and the rotary pin in the cover-plate of the casing and having the crank-arm on its lower end, said crank-arms engaging each other at their outer portions by a pin-and-slot connection; substantially as set forth.

7. The spring-hinge comprising the inclosing casing having a cover secured in a liquid-tight manner, the spindle seated within said casing and at its upper end projecting upward through the same for connection with the door, the cam on said spindle, and the yoke, rod, cylinder, piston and spring for coöperation with said spindle and cam, said cover having a depending sleeve 54 for the introduction of the liquid into said casing and to prevent the liquid from attaining an undue level within said casing; substantially as set forth.

8. The spring-hinge comprising the casing, the spindle mounted therein and having the cam, the yoke, rod and cylinder for coöperation with said cam, and the ribbed locking-ring on said cylinder, the latter being inclined and ribbed at its outer end to receive and enter into locking engagement with said ring, combined with the spring engaged at one end by said ring, and the stop for the other end of said spring; substantially as set forth.

9. The spring-hinge comprising the inclosing casing having the cover-plates 14, 15, the plate 14 having the lip 64, and said casing having the rounded shoulder 63, combined with the spindle 11 mounted within said casing and at its exposed end adapted for connection with the door, the cam carried by said spindle, the yoke, rod, cylinder, piston and spring for coöperation with said cam, and the stop 32 for said spring, said stop having a bearing against said lip 64 and shoulder 63; substantially as set forth.

10. The spring-hinge comprising the inclosing casing having the cover-plate, the latter having the depending sleeve 54 constituting an orifice for supplying the checking liquid to said casing, and the plug for said sleeve, said

plug being less in length than said sleeve so
as to leave an air-chamber below it within
said sleeve, combined with the actuating-spin-
dle mounted within said casing for connection
5 with the door, and the closing-spring, cylin-
der, piston and connections for coöperation
with said spindle; 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.