

May 14, 1940.

B. F. STANNARD

2,200,865

CLOSURE CONTROLLING DEVICE

Filed Sept. 3, 1938

3 Sheets-Sheet 1

Fig. 2.

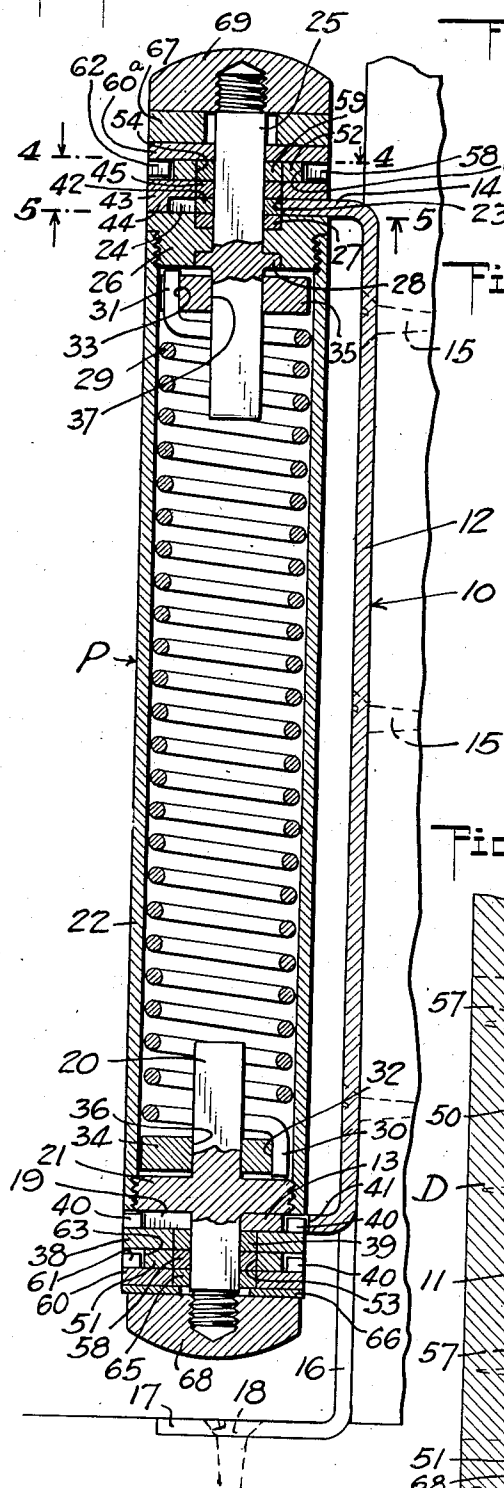
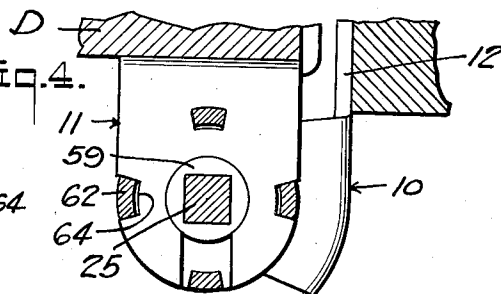


Fig. 1.

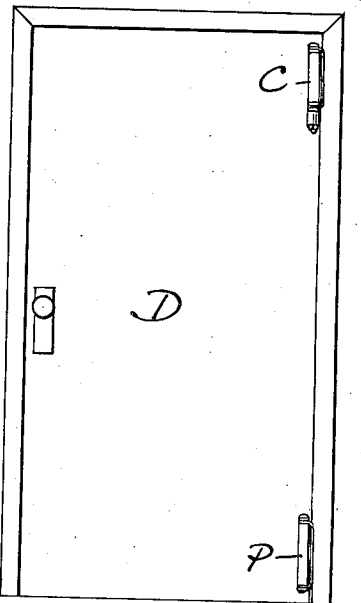


Fig. 3.

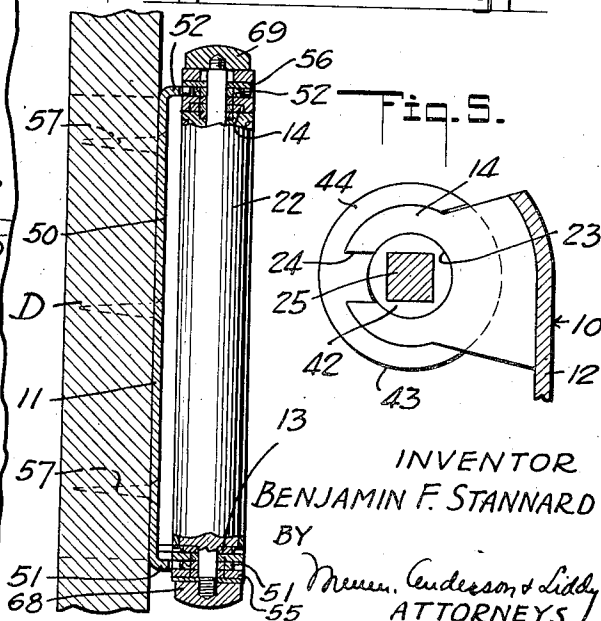


Fig. 5.

INVENTOR
BENJAMIN F. STANNARD
BY
Merrill Anderson & Liddy
ATTORNEYS

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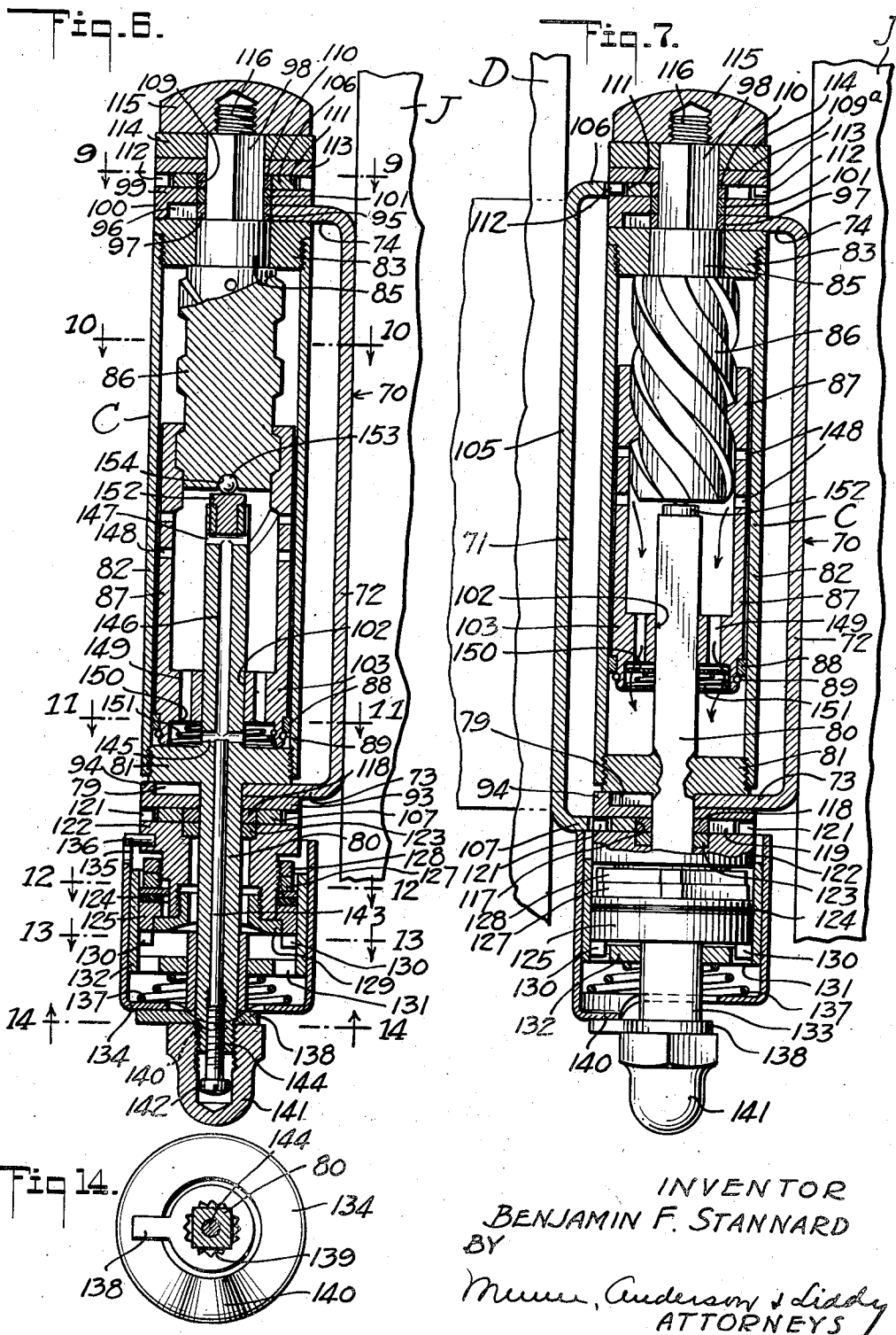
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3 Sheets-Sheet 2



UNITED STATES PATENT OFFICE

2,200,865

CLOSURE CONTROLLING DEVICE

Benjamin F. Stannard, Los Angeles, Calif., assignor of forty per cent to A. B. Leavelle, Los Angeles, Calif.

Application September 3, 1938, Serial No. 228,424

25 Claims. (Cl. 16—54)

This invention relates to closure controlling devices of the general character embodied in my U. S. Patent No. 2,118,950, dated May 31, 1938, and my co-pending application Serial No. 121,752, dated January 22, 1937.

An object of my present invention is to provide a closure controlling device embodying a power unit and a checking unit which in their applied positions on a door co-act to hingedly mount the door and to effectively and positively control the movements of the door in such manner that the door can be opened with but negligible resistance being offered by the units, yet it will smoothly and silently close automatically when released, irrespective of the weight of the door or of resistance offered by wind or drafts.

Another object of the invention is to provide a closure controlling device the power and checking mechanisms of which are arranged in separate hinge forming units, to materially simplify the construction, installation and adjustment of the device, and to enable ample power to be provided in a compact structure, to close the door, as well as to enable maximum strength to be provided by a compact checking mechanism to insure long life thereof in checking the closing movement of the door.

A further object of the invention is to provide a closure controlling device including a holding mechanism by which the closure can be releasably held in various open positions, the holding mechanism being readily adjusted to hold doors of various weights against closing movement, yet to yield to an attempt to force the closure from an open position, so as to positively prevent damage to the device and the closure.

Another object of the invention is to provide a closure controlling device in which the holding mechanism is automatically operable and adjustable to hold the closure in any preselected open position in response to movement of the closure to such position, yet instantaneously releases the closure upon a simple manipulation thereof, all while permitting the holding device to be manually actuated to hold the closure in any open position desired.

With these and other objects in view, the invention resides in the combinations and arrangements of elements as set forth in the following specification and particularly pointed out in the appended claims.

In the accompanying drawings,

Figure 1 is a view in side elevation showing the closure controlling device applied to a door;

Figure 2 is a vertical central sectional view of the power unit embodied in the invention;

Figure 3 is a view of the power unit partly in side elevation and partly in section as viewed from a position at ninety degrees from Figure 2;

Figures 4 and 5 are transverse sectional views taken respectively on the lines 4—4 and 5—5 of Figure 2;

Figure 6 is a vertical central sectional view of the checking unit embodied in the invention;

Figure 7 is a view similar to Figure 6, and showing the position occupied by the parts of the checking unit when the door is opened ninety degrees from its closed position;

Figure 8 is a plan view of the checking unit;

Figures 9 to 14, inclusive, are transverse sectional views taken, respectively, on the lines 9—9, 10—10, 11—11, 12—12, 13—13 and 14—14 of Figure 6, and looking in the direction of the respective arrows.

Referring specifically to the drawings, the invention, in its broad aspect, comprises a power unit P and a checking unit C, each of which, in addition to its respective power and checking function, provides a hinge for the closure with which the invention is associated.

The power unit P, illustrated in Figures 1 to 5, inclusive, preferably provides the lower hinge for a closure such as a door D illustrated in Figure 1, and comprises hinge members 10 and 11 constructed of sheet metal, the member 10 including a flat attaching plate 12 from the ends of which project circular heads 13 and 14. The plate 12 is provided with suitable openings for screws 15 to secure the member to a door jamb J. From the lower end of the plate 12 projects a foot 16 having a horizontal attaching portion 17 adapted to receive a screw 18 to anchor the member to the floor within the closure opening.

The head 13 is provided with a radial slot 19 through which projects a hinge pin 20 of square or other non-circular cross section, for co-action with the walls of the slot in preventing rotation of the pin relative to the hinge member 10. The pin 20 is fixed to or formed integral with a plug 21 threaded into one end of a housing 22.

The other head 14 is provided with a circular opening 23 from which extends a radial slot 24, the opening freely receiving a second hinge pin 25 of square or other non-circular cross section. The pin 25 is rotatably mounted in a second plug 26 by means of washers 27 and 28, the latter washer being fixed by brazing or otherwise to the pin. The plug 26 is threaded into the other end of the housing 22 so as to co-act with the

plug 21 in enclosing a coil spring 29, the ends 30 and 31 of which are bent to project axially of the spring into notches 32 and 33 in connector disks 34 and 35 having square openings 36 and 37 slidably receiving the inner ends of the respective hinge pins 20 and 25 so as to connect the spring thereto.

A locking disk 38 is provided with a circular opening rotatably receiving a washer 39 having a square opening slidably receiving the outer end of the pin 20. The disk 38 is further provided with lugs 40 adapted to enter openings 41 in the head 13 so as to co-act therewith in preventing displacement of the pin 20 from the slot 19 of the head.

The opening 23 of the head 14 receives a circular washer 42 having a square opening slidably receiving the hinge pin 25. A locking disk 43 is provided with an arcuate flange 44 extending through an angle exceeding one hundred eighty degrees and co-acting with the head 14 as shown in Figure 5 to reinforce the latter and to maintain the pin 20 rotatably mounted in the head by means of a washer 45 (Figure 2) fitted in a circular opening in the disk and having a square opening slidably receiving the pin 20.

The hinge member 11 includes a flat attaching portion 50, from the ends of which project heads 51 and 52 having circular openings 53 and 54 from which extend radial slots 55 and 56, respectively, receiving the hinge pins 20 and 25. The portion 50 is provided with suitable openings to receive screws 57 for attaching the member 11 to the door D.

Washers 58 and 59 having square openings slidably receiving the hinge pins 20 and 25 are seated in the circular openings 53 and 54 of the heads to prevent lateral displacement of the member 11 from the member 10.

Locking disks 60 and 60a have lugs 61 and 62 adapted to project into openings 63 and 64 in the heads 51 and 52, the disk 60a being provided with a square opening receiving the pin 25, and the disk 60 having a circular opening receiving a washer 65 provided with a square opening slidably receiving the hinge pin 20. Washers 66 and 67 and nuts 68 and 69 are applied to the respective pins 29 and 25, as shown in Figures 2 and 3, so as to hingedly connect the members 10 and 11.

By initially loading the spring 29 a predetermined amount, depending on the weight of the door D, opening movement of the door will further load the spring so that the torsion thereof will tend to close the door. Furthermore, by the provision of the hinged connection between the members 10 and 11, as above described, the member 11 can be applied to and removed from the member 10 in a direction transverse of the common axis of the hinge pins 20 and 25, so as to permit the members to remain permanently attached to the jamb and door, respectively.

The checking unit C, as shown in Figures 6 to 14, inclusive, comprises hinge members 70 and 71, the member 70 including a flat attaching plate 72 from the ends of which project heads 73 and 74. The plate 72 is provided with suitable openings for screws 75 to secure the member to a door jamb J.

The head 73 is provided with a radial slot 79 through which projects a hinge pin 80 of square or other non-circular cross section having formed thereon intermediate its ends a plug 81 threaded externally into one end of a cylinder or housing 82, the other end of which is closed by an externally threaded plug 83 in which is journaled a

hinge pin 85 formed on an actuating member characterized by a worm screw 86 threaded into a cup-shaped piston 87 working in the cylinder 82 and having a packing ring 88 secured in place by a spring ring 89.

The slot 79 of the head 73 co-acts with the lower portion of the pin 80 to secure the pin to the hinge member 70 against rotation relatively thereto, and in order to confine the pin against displacement from the slot, a locking disk 93 has a square opening receiving the pin and is provided with an arcuate flange 94 exceeding one hundred and eighty degrees and co-acting with the head 73 in the same manner as the disk 43 co-acts with the head 14 of the power unit P as illustrated in Figure 5.

The other head 74 is provided with a circular opening 95 from which extends a radial slot 96, the opening 95 rotatably receiving a washer 97 having a square opening receiving the square portion 98 of the hinge pin 85. A locking disk 99 of a construction similar to the locking disk 93 has an arcuate flange 100 exceeding one hundred eighty degrees, and is provided with a circular opening receiving a washer 101 having a square opening receiving the pin portion 98 so that the disks 93 and 99 will co-act to separably connect the cylinder and piston unit, including the cylinder 82 and piston 87 against lateral displacement from the hinge member 70, with the piston confined against rotation relative to the hinge member by the sliding co-action between the square stud portion of the hinge pin 80 projecting into the housing 82 and through a square opening 102 in the head 103 of the piston, and with the worm screw mounted for rotation relative to the hinge member.

The hinge member 71 comprises a flat attaching portion 105 from the ends of which project heads 106 and 107, the portion 105 having openings receiving screws 108 to secure the member 71 to a door D. The head 106 is provided with a circular opening 109 rotatably receiving a washer 110 having a square opening receiving the square portion 98 of the hinge pin 85.

The head 106 is further provided with a radial slot 109a extending from the opening 109, and with openings 111 receiving lugs 112 on a connector disk 113 having a square opening also receiving the square portion 98 of the hinge pin 85. A washer 114 is mounted on the portion 98 and co-acts with a nut 115 on the threaded shank 116 of such portion to prevent axial displacement of the connector disk and thus releasably lock the hinge pin 85 to the hinge member 71 for rotation with the door D.

The other head 107 of the hinge member 71 is provided with a circular opening 117 rotatably receiving a washer 118, and having a radial slot 119 through which the hinge pin 80 is adapted to pass. The head 107 is further provided with openings 120 receiving lugs 121 on a connector 122 through which freely extends the pin 80, maintained centrally of the connector by a washer 123 receiving the pin and rotatably seated in the connector, whereby to mount the latter on the pin for rotation with the door D.

Mounted on the connector 122 is a friction clutch composed of a friction ring 124 confined with more or less pressure between a bearing ring 125 and a washer 126 against which the variable pressure is imposed by nuts 127 and 128 threaded on the connector 122. The nuts 127 and 128 force the ring 125 against a stop 129 which

is threaded into the connector 122 and enables the clutch unit to be assembled.

The bearing ring 125 is provided with lugs 130 adapted to be received in openings 131 in a second connector 132 slidably mounted on a square sleeve 133 on the square hinge pin 80. An actuating element 134 in the form of a cup freely receives the connector 132 and is provided with a slot 135 receiving a pin 136 projecting from the connector 122 to provide a splined connection therebetween.

A conical spring 137 is interposed between the connector 132 and the element 134, and the latter normally gravitates against an arm 138 having a broadened opening 139 receiving the square hinge pin 80 to provide for rotary adjustment of the arm on the pin so that the arm is rendered co-actable with a cam 140 on the element 135 to effect automatic engagement of the latter with the lugs 130 of the bearing ring 125 when the door D is moved to a preselected open position, all for the purpose of causing the friction ring 124 to yieldingly maintain the door in such open position against the action of the spring 29 of the power unit P as will be later fully described in the operation of the invention.

The arm 138 is confined in place by a cap nut 141 threaded on the end of the pin 80 and enclosing the head 142 of a valve pin 143 threadedly mounted at 144 in a central bore in the hinge pin 80 and adjustably controlling a diametric passage 145 in the latter arranged to communicate with the cylinder 82 at one side of the piston head 103. By means of a longitudinal passage 146 and a second diametric passage 147 arranged to communicate interiorly of the piston at the other side of the piston head 103, liquid in the cylinder can by-pass from one side of the piston to the other under the control of the valve pin 143. The skirt of the piston is provided with a series of by-pass ports 148 to facilitate such circulation of liquid.

Other ports 149 extend through the head 103 and are controlled by a valve plate 150 normally urged by a spring 151 to close the ports during movement of the piston as is effected during closing movement of the door D, and to open the ports during the reverse movement of the piston which is effected during opening movement of the door. At the inner end of the hinge pin 80 is a hardened seat 152 against which impinges a thrust ball bearing 156 seating in a pocket 154 in the worm screw 86 and minimizing the friction between the latter and hinge pin during the operation of the invention, which is as follows:

With the power unit P and the checking unit C applied to the door D, let it be assumed that the door is closed, so that the piston 86 will occupy the position shown in Figure 6, and the spring 29 will have been initially loaded to the torsion required for the weight and size of the door.

It will be understood that all unoccupied space in the cylinder 82 is filled with a suitable liquid such as oil or glycerine, whereby upon opening the door, rotation of the worm screw 86 with the door will cause its threads to co-act with the nut 87 in advancing the piston in the cylinder towards the position shown in Figure 7, during which movement the spring 29 will be further wound, and the valve 150 will be forced open by the pressure of the liquid so as to permit the latter to flow freely through the ports 149 from one side of the piston to the other, thus offering no appreciable resistance to the opening movement of the door.

However, upon releasing the door, the valve 150 will immediately close, thus forcing the liquid to by-pass through the passages 145, 146 and 147, in order for the piston to be reversely moved by the spring, and the door to close. The closing movement of the door will thus be checked to an extent determined by the position of adjustment of the valve 143 and can be easily regulated as desired.

With the arm 138 adjusted rotatively on the hinge pin 80 to be engaged when the door is opened to a preselected open position such as the ninety degree position shown in Figure 7, the connector 132 will be engaged with the lugs 130 so as to operatively connect the hinge members 70 and 71 yieldingly through the medium of the clutch ring 124, which will thus automatically maintain the door open.

However, upon manually moving the door towards closed position an amount sufficient to entirely clear the arm 138 from the cam, and then slightly moving the door reversely, the connector 132 will become disengaged from the lugs 130 by gravity, to disrupt the operative connection between the hinge members as formed by the clutch ring 124, thus permitting the door to close under the action of the spring 29. It will be clear that by a suitable rotative adjustment of the arm 138 to a new position, the door can be retained open automatically in any preselected adjusted position so as to fully accommodate doors whose locations enable them to swing open through different angles.

Irrespective of the position of adjustment of the arm 138, the door can be releasably retained in any desired open position merely by a manual operation of raising the sleeve 134 until the connector has been raised sufficiently through the spring 137 to engage the lugs 130. It will be noted that the spring 137 functions during the automatic operation of the door holder to prevent any damage to its parts should the position of the door at which the arm 138 is engaged by the cam 140 correspond to a position in which the lugs 130 do not register with the openings 131 in the connector ring 132, the spring functioning when registration is effected, to advance the connector ring until the lugs 130 are received in the openings 131.

Should it be desired to hold the door open in any position other than that in which automatic operation of the sleeve 134 is effected, then it is only necessary to raise the sleeve 134 as the door is held in the open position desired, whereby upon a release of the sleeve the door will be yieldingly held in such open position, yet can be moved should an excessive force be applied to the door, thus positively preventing damage to the holding mechanism from this source.

What is claimed is:

1. In a closure hinge, a pair of hinge members; a housing defining a fluid chamber; plugs closing the ends of the chamber; a hinge pin on one plug fixed to one hinge member; a worm screw in the chamber having a hinge pin forming portion journaled in the other plug and fixed to the other hinge member; a piston in the chamber slidably mounted on the hinge pin for actuation by the worm screw in response to relative hinging movement of the hinge members; means by which relative hinging movement of the hinge members in one direction will permit unrestricted movement of the piston; means by which relative hinging movement of the hinge members in the other direction will retard movement of the

piston; and anti-friction means between said hinge pin and worm screw on which the end thrust of the latter is imposed.

2. In a closure hinge, a pair of hinge members; 5
5. a housing defining a fluid chamber; plugs closing the ends of the chamber; a hinge pin on one plug fixed to one hinge member; a worm screw in the chamber having a hinge pin forming portion journaled in the other plug and fixed to the other 10
10. hinge member; a piston in the chamber slidably mounted on the hinge pin for actuation by the worm screw in response to relative hinging movement of the hinge members; means by which the relative hinging movement of the hinge members 15
15. in one direction will permit unrestricted movement of the piston; means by which relative hinging movement of the hinge members in the other direction will retard movement of the piston; the worm screw having a pocket in its inner 20
20. end; a ball bearing mounted in said pocket; and a seat on the inner end of the hinge pin against which the ball bearing works in response to the thrust of the worm screw and piston.
3. In a closure hinge, a pair of hinge members; 25
25. a housing defining a fluid chamber; plugs closing the ends of the chamber; a hinge pin on one plug fixed to one hinge member; a worm screw in the chamber having a hinge pin forming portion journaled in the other plug and fixed to the 30
30. other hinge member; a piston in the chamber slidably mounted on the hinge pin for actuation by the worm screw in response to relative hinging movement of the hinge members; check valve means carried by the piston and operable 35
35. in response to relative hinging movement of the hinge members in one direction, to permit movement of the piston unrestricted by the fluid; said hinge pin having a by-pass for the flow of fluid from one side of the piston to the other; and a 40
40. valve in the hinge pin adjustable from exteriorly of the chamber to control the flow of fluid through the by-pass in order to vary the extent to which movement of the piston is retarded by the fluid in response to the relative movement of the hinge 45
45. members in the reverse direction.
4. In a closure hinge, a pair of hinge members; a housing defining a fluid chamber; plugs closing the ends of the chamber; a hinge pin on one plug fixed to one hinge member; a worm screw 50
50. in the chamber having a hinge pin forming portion journaled in the other plug and fixed to the other hinge member; a piston in the chamber slidably mounted on the hinge pin for actuation by the worm screw in response to relative hinging 55
55. movement of the hinge members; check valve means carried by the piston and operable in response to relative hinging movement of the hinge members in one direction, to permit movement of the piston unrestricted by the fluid; said hinge 60
60. pin having a longitudinal passage and transverse passages communicating with the ends thereof, and respectively with the chamber at opposite sides of the piston; the hinge pin having a bore from one end thereof to the passages; and an ad- 65
65. justable valve in said bore co-actable with the passages to control the flow of fluid therethrough in order to vary the extent to which movement of the piston is retarded by the fluid in response to relative hinging movement of the hinge members 70
70. in the reverse direction.
5. In a closure hinge, a hinge member having an attaching portion and laterally projecting heads provided with slots from their outer edges; an operating unit disposed between said heads 75
75. and provided with hinge pins adapted to be ap-

plied to and removed from said slots in a direction laterally of the hinge members; and means including locking members having openings receiving said hinge pins and means co-actable with said heads to lock the hinge pins in the slots against lateral displacement. 5

6. In a closure hinge, a hinge member having an attaching portion and laterally projecting heads provided with slots from their outer edges; an operating unit disposed between said heads and provided with hinge pins adapted to be applied to and removed from said slots in a direction laterally of the hinge members; and means including locking disks receiving said hinge pins and having arcuate flanges exceeding one hundred and eighty degrees for co-action with said heads in locking the hinge pins thereto against lateral displacement. 10

7. In a closure hinge, a hinge member having an attaching portion and laterally projecting heads provided with slots from their outer edges; an operating unit disposed between said heads and provided with hinge pins adapted to be applied to and removed from said slots in a direction laterally of the hinge members; a second hinge member having an attaching portion and laterally projecting heads provided with slots from their outer edges for receiving the hinge pins; the heads of the second said hinge member having openings; other locking members having lugs entering said openings to prevent lateral displacement of the hinge pins from said slots of the second said hinge member; and means on the hinge pins co-acting with the second said locking members to prevent displacement of the latter axially of the hinge pins. 15

8. In a closure hinge, a hinge member having an attaching portion and laterally projecting heads provided with slots from their outer edges; an operating unit disposed between said heads and provided with hinge pins adapted to be applied to and removed from said slots in a direction laterally of the hinge members; said heads having openings; locking members having openings receiving the hinge pins, and provided with lugs adapted to enter the openings of the heads to lock the hinge pins to the hinge member against lateral displacement from the slots; and means co-actable with said locking members to prevent displacement thereof axially from the hinge pins. 20

9. In a hinge door check of the type which includes a pair of hingedly connected members; a friction clutch; means for operatively connecting the hinge members through the medium of said clutch; and means for actuating the first means to cause said clutch to retain the hinge members in a preselected position of relative adjustment automatically in response to adjustment of the hinge members to such preselected position. 25

10. In a hinge door check of the type which includes a pair of hingedly connected members; a friction clutch; means for operatively connecting the hinge members through the medium of said clutch; means for actuating the first means to cause said clutch to retain the hinge members in a preselected position of relative adjustment automatically in response to adjustment of the hinge members to such preselected position; and means by which the last means can be adjusted to vary the preselected position at which said last means will automatically act. 30

11. In a hinge door check of the type which includes a pair of hingedly connected members; a 35

friction clutch; means for operatively connecting the hinge members through the medium of said clutch; means for actuating the first means to cause said clutch to retain the hinge members in a preselected position of relative adjustment automatically in response to adjustment of the hinge members to such preselected position; and means by which said operative connecting means can be manually actuated to retain the hinge members in other than the preselected adjusted position, irrespective of the automatic actuating means.

12. In a hinge door check of the type which includes a pair of hingedly connected members; a friction clutch; means for operatively connecting the hinge members through the medium of said clutch, including a cam carried by one hinge member; and an arm movable with the other hinge member about the hinging axis of the members for co-action with the cam in engaging the clutch automatically so as to retain the hinge members in a preselected position of relative adjustment.

13. In a hinge door check of the type which includes a pair of hingedly connected members; a friction clutch; means for operatively connecting the hinge members through the medium of said clutch, including a cam carried by one hinge member; an arm movable with the other hinge member about the hinging axis of the members for co-action with the cam in engaging the clutch automatically so as to retain the hinge members in a preselected position of relative adjustment; and means by which said arm can be adjusted rotatively of the other hinge member to vary the preselected position at which the arm will co-act with the cam as aforesaid.

14. In a hinge door check of the type which includes a pair of hingedly connected members; a clutch carried by one hinge member; means carried by the other hinge member, for operatively connecting the hinge members through the medium of said clutch and normally urged to a position in which said clutch will be inactive; and means operable automatically in response to relative adjustment of the hinge members to a preselected position, to operatively connect the hinge members through the medium of the clutch, whereby to retain the hinge members in the preselected position.

15. In a hinge door check of the type which includes a pair of hingedly connected members; a friction clutch carried by one hinge member; a jaw clutch, one jaw of which is connected to the friction clutch, and the other jaw of which is normally disengaged from the first jaw; and means co-actable with said other jaw, to move the latter into engagement with the first jaw, in response to relative hinging movement of the hinge members to a preselected position, whereby to cause the friction clutch to yieldingly retain the hinge members in such position.

16. In a hinge door check of the type which includes a pair of hingedly connected members; a friction clutch carried by one hinge member; a jaw clutch, one jaw of which is connected to the friction clutch, and the other jaw of which is normally disengaged from the first jaw; a cam operatively associated with said other jaw; and an arm movable with said one hinge member for co-action with the cam in engaging said jaws when the hinge members are relatively adjusted to a preselected position, whereby to retain the hinge

members in the preselected position through the medium of said friction clutch.

17. In a hinge door check of the type which includes a pair of hingedly connected members; a friction clutch carried by one hinge member; a jaw clutch, one jaw of which is connected to the friction clutch, and the other jaw of which is connected to the other hinge member and is normally disengaged from the first jaw; a sleeve carried by said one hinge member and having a cam; a spring interposed between said other jaw and sleeve to provide a yieldable operative connection; and an arm movable with said one hinge member for co-action with the cam in moving said sleeve axially to a position in which said spring will move said other jaw into engagement with the first jaw in response to relative hinging movement of the hinge members to a preselected position, whereby to retain the hinge members in said position through the medium of the friction clutch.

18. In a hinge door check of the type which includes a pair of hingedly connected members; a friction clutch carried by one hinge member; a jaw clutch, one jaw of which is connected to the friction clutch, and the other jaw of which is connected to the other hinge member and is normally disengaged from the first jaw; a sleeve carried by said one hinge member and having a cam; a spring interposed between said other jaw and sleeve to provide a yieldable operative connection; and an arm movable with said one hinge member for co-action with the cam in moving said sleeve axially to a position in which said spring will move said other jaw into engagement with the first jaw in response to relative hinging movement of the hinge members to a preselected position, whereby to retain the hinge members in said position through the medium of the friction clutch, said sleeve being adapted for manual actuation to engage the jaw clutch at other than said preselected position of the hinge members.

19. In a closure hinge, a pair of hinge members; a housing defining a fluid chamber; hinge pins projecting from the ends of the housing, one of the hinge pins being fixed to the housing and to one of the hinge members, and the other being rotatably mounted in the housing and fixed to the other hinge member; one of said pins having a portion projecting into said chamber; a piston working in the chamber; means co-acting with the piston and hinge pins, to move the piston in one direction or the other according as relative hinging movement of the hinge members in one direction or the other is effected; check valve means for preventing circulation of fluid from one side of the piston to the other during relative hinging movement of the hinge members in one direction; and means defining a by-pass in said projecting portion of the respective hinge pin through which fluid can pass from one side of the piston to the other.

20. In a closure hinge, a pair of hinge members; a housing defining a fluid chamber; hinge pins projecting from the ends of the housing, one of the hinge pins being fixed to the housing and to one of the hinge members, and the other being rotatably mounted in the housing and fixed to the other hinge member; one of said pins having a portion projecting into said chamber; a piston working in the chamber; means co-acting with the piston and hinge pins, to move the piston in one direction or the other according as relative hinging movement of the hinge members

in one direction or the other is effected; check valve means for preventing circulation of fluid from one side of the piston to the other during relative hinging movement of the hinge members in one direction; means defining a by-pass in said projecting portion of the respective hinge pin through which fluid can pass from one side of the piston to the other; and valve means by which the flow of fluid can be controlled from exteriorly of the chamber.

21. In a closure hinge, a pair of hinge members; a housing defining a fluid chamber; hinge pins projecting from the ends of the housing, one of the hinge pins being fixed to the housing and to one of the hinge members, and the other being rotatably mounted in the housing and fixed to the other hinge member; one of said pins having a portion projecting into said chamber; a piston working in the chamber; means co-acting with the piston and hinge pins, to move the piston in one direction or the other according as relative hinging movement of the hinge members in one direction or the other is effected; check valve means for preventing circulation of fluid from one side of the piston to the other during relative hinging movement of the hinge members in one direction; said projecting portion of the respective hinge pin having a longitudinal passage and transverse passages communicating therewith, and respectively with the chamber at opposite sides of the piston; said hinge pin having a bore from its outer end and communicating with said passages; and a valve adjustable in said bore from exteriorly of the housing, to control the flow of fluid through the passages.

22. In a closure hinge, a pair of hinge members; a fluid containing housing having hinge pins projecting therefrom; means co-acting with the hinge pins and hinge members to hingedly connect the latter; a piston working in said housing; means co-acting with the piston and hinge pins to move the piston in one direction or the other according as relative hinging movement of the hinge members in one direction or the other is effected; check valve means by which circulation of fluid from one side of the piston to the other during relative hinging movement of the hinge members in one direction is prevented; and means in one of said hinge pins through which

fluid in the housing can by-pass from one side of the piston to the other.

23. In a closure hinge, a pair of hinge members; a fluid containing housing having hinge pins projecting therefrom; means co-acting with the hinge pins and hinge members to hingedly connect the latter; a piston working in said housing; means co-acting with the piston and hinge pins to move the piston in one direction or the other according as relative hinging movement of the hinge members in one direction or the other is effected; check valve means by which circulation of fluid from one side of the piston to the other during relative hinging movement of the hinge members in one direction is prevented; means in one of said hinge pins through which fluid in the housing can by-pass from one side of the piston to the other; and adjustable valve means mounted in said one of the hinge pins and operable from exteriorly of the housing to co-act with the last means in varying the flow of fluid therethrough.

24. In a hinge door check of the type which includes a pair of hingedly connected members; a clutch; means for operatively connecting the hinge members through the medium of said clutch; and means for actuating the first means to cause said clutch to retain the hinge members in a preselected position of relative adjustment automatically in response to adjustment of the hinge members to such preselected position.

25. In a closure hinge, a pair of hingedly connected members, one having a housing defining a fluid containing chamber; an actuating screw connected to the other hinge member for rotation thereby; a hollow piston working in said chamber and having a nut portion receiving said screw; a stud projecting from the housing into said chamber and into said piston, with a splined connection between the latter and stud, whereby to confine the piston against rotation relative to said housing; means co-acting with said actuating screw and piston to feed the latter on said stud in one direction or the other according as the hinge members are relatively rotated in one direction or the other; and means co-actable with fluid in the housing to retard movement of the piston in one direction.

BENJAMIN F. STANNARD.