Dec. 11, 1934. R. C. SEYFORTH 1,983,999

DOORCHECK

Filed Oct. 5, 1933 2 Sheets-Sheet 1

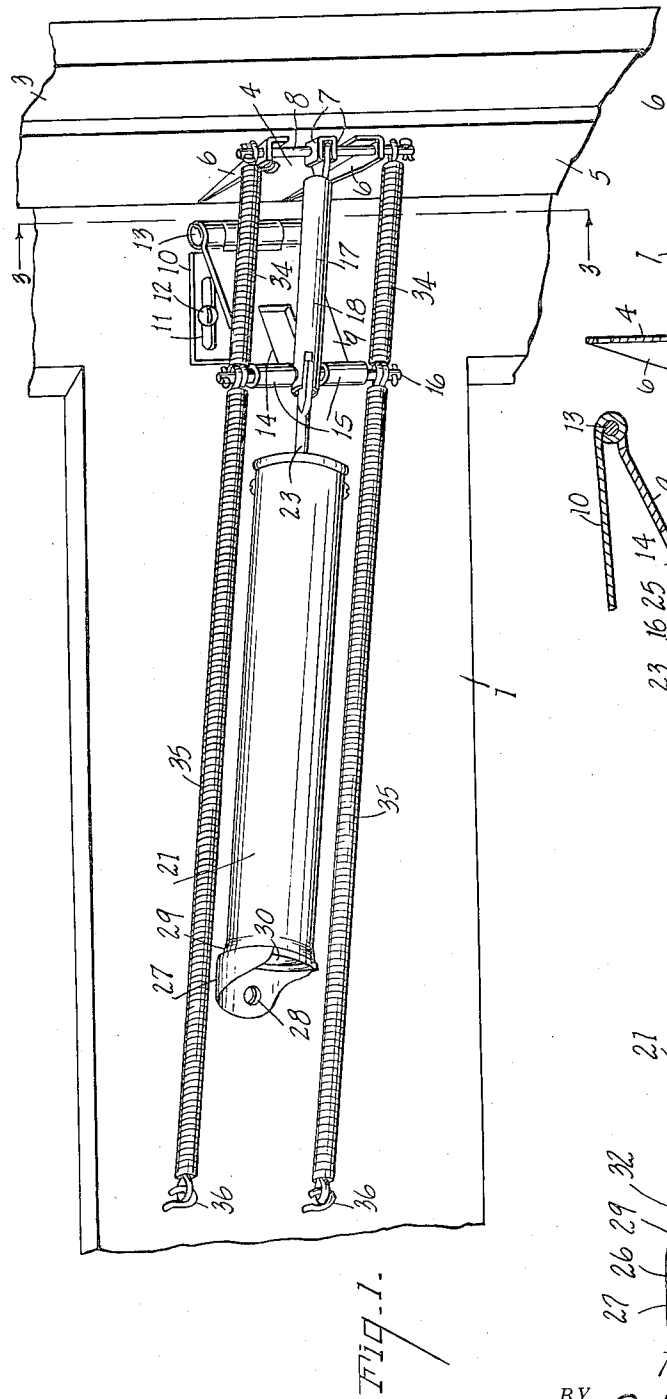


Fig. 1.

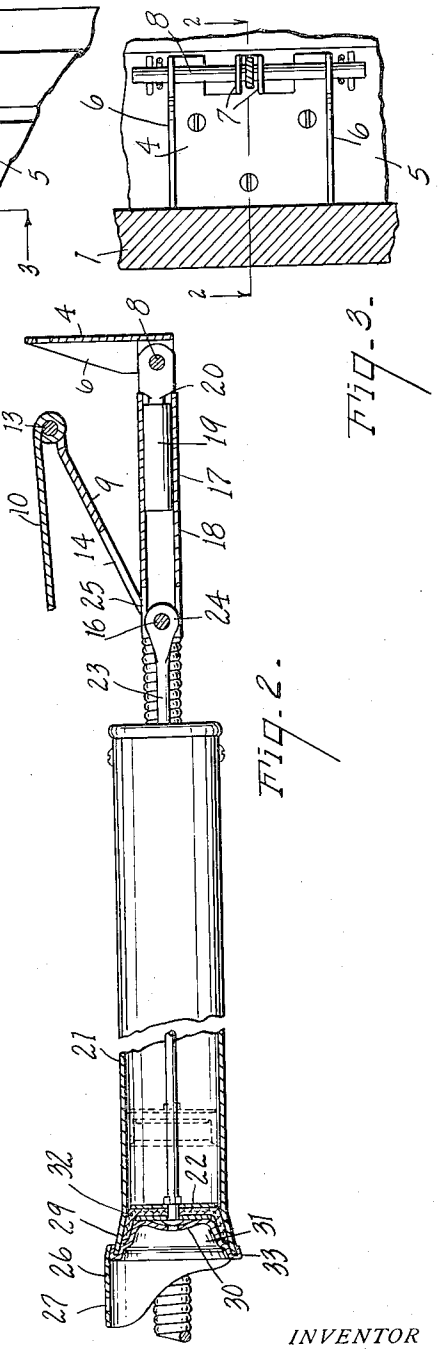


Fig. 2.

Fig. 3.

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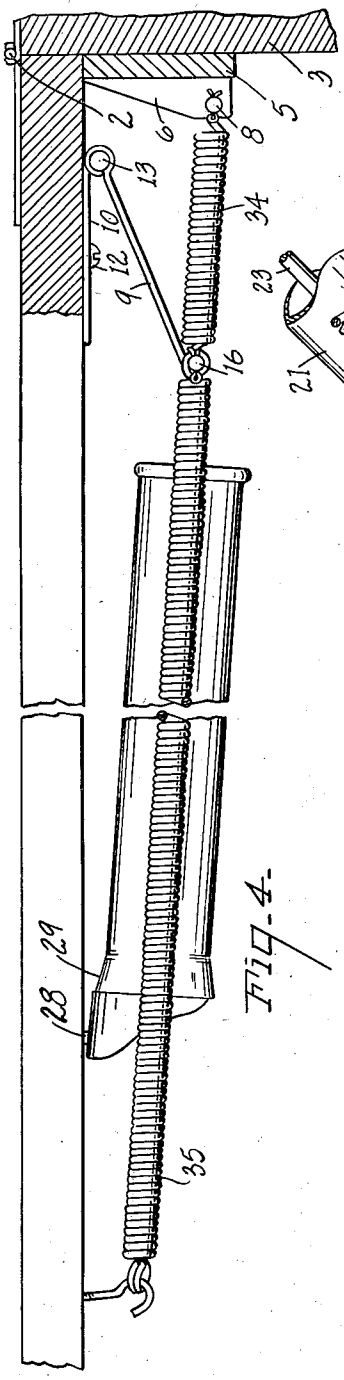


Fig. 4.

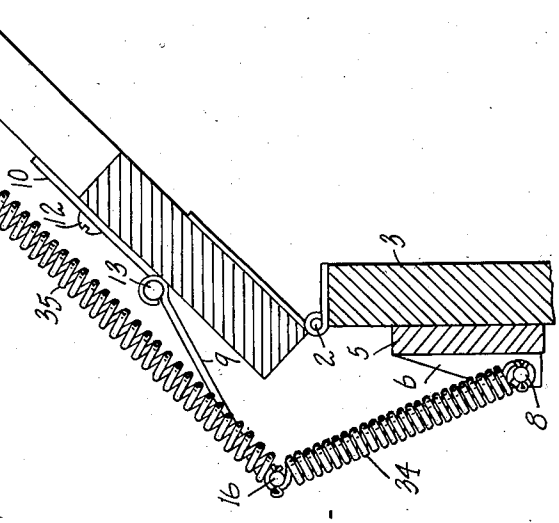


Fig. 5.

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UNITED STATES PATENT OFFICE

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DOORCHECK

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Application October 5, 1933, Serial No. 692,261

13 Claims. (Cl. 16—70)

The main objects of this invention are:

First, to provide a door closing control device which permits the door to be opened to any extent within the scope of swing of the door without affecting the operation of the device.

Second, to provide a door closing device having the above advantages and characteristics which is very simple and economical in its parts and easily installed.

Third, to provide a structure such as a dashpot adapted for use in the door closing combination above referred to or as a pump or the like having a cup-like plunger packing which is normally held in expanded position when the plunger is at the outer end of its stroke.

Objects pertaining to details and economies of my invention will definitely appear from the description to follow. The invention is defined in the claims.

A structure embodying the features of my invention is clearly illustrated in the accompanying drawings, in which:

Fig. 1 is a fragmentary perspective view of a door closing device embodying the features of my invention.

Fig. 2 is a fragmentary view mainly in longitudinal section on line 2—2 of Fig. 3.

Fig. 3 is a fragmentary view mainly in vertical section on line 3—3 of Fig. 1.

Fig. 4 is a top plan view of the door closing device, the door and its frame being shown in section with the door in closed position.

Fig. 5 is a view similar to Fig. 4, showing the door in open position.

In the embodiment of my invention illustrated in the drawings the numeral 1 indicates the door which is hinged to the door frame or casing 3 at 2. The door casing bracket 4 is designed to be secured to the door casing or frame as to the stop 5 and is preferably a stamping having horizontal side flanges 6 and intermediate ears 7. The ears and flanges are provided with alined openings to receive the pin 8.

A swinging arm 9 is provided having an attaching bracket or plate 10 provided with longitudinal slots 11 receiving the screws 12 by means of which the plate is adjustably secured to the door. The attaching plate or bracket and the arm have coacting hinge-like knuckles receiving the pivot 13 for the arm. At its outer end the arm 9 is provided with a longitudinal slot 14, and terminates in knuckles 15 receiving the pin 16.

An extensible compression link designated generally by the numeral 17 extends between the door frame bracket and the swinging end of the arm 9, this link or member 17 being formed of the tubular section 18 and a section 19 telescoping therein. The section 19 is pivotally engaged with the pin 8 between the ears 7 of the bracket while the section 18 is pivotally engaged with the pin 16 between the pivot knuckles 15 of the swinging arm 9. The section 19 of the link has shoulders or stops 20 with which the section 8 engages when the link is in its collapsed position.

A dashpot comprising a cylinder 21 with coacting plunger 22 provided with a plunger rod 23 is arranged in opposed relation to the compression link, the plunger rod 23 having a flattened head 24 engaging the pin 16. The tubular section of the compression link is slotted at 25 to receive this head and permit a toggle movement of these parts.

The cylinder 21 is provided with a flange 26 at its outer or head end, the flange having a hole 27 therein for receiving the attaching screw 28. The connection is such as to permit a swinging movement of the dashpot cylinder.

The cylinder has a flared portion 29 at its head or outer end, the head 30 having a flared rim portion 31 disposed concentrically within the cylinder and providing an annular outwardly flared recess or socket receiving the rim portion of the plunger packing 32, see Fig. 2. The head has a seam flange 33 at its outer end folded over the end of the cylinder and suitably soldered thereto to provide a tight joint. With this provision the packing is expanded into this recess when the plunger is at the end of its in-stroke, thereby normally maintaining the packing in expanded position so that when it is drawn into the cylinder on the in-stroke of the plunger an effective sealing contact is had with the cylinder walls, and this is maintained throughout the life of the packing. This insures a much more effective sealing engagement of the packing with the cylinder walls than is possible with the common construction in which the packing is normally held in collapsed position by the walls of the cylinder.

When it is in its outer position the plunger engages the head within the packing so that there is no strain on the packing. This avoids the necessity for stops on the plunger rod. This feature of my invention is highly desirable for use in pumps as well as dashpots.

Tension springs 34 are disposed on opposite sides of the compression member 17, these springs having eyes at their ends engaged with the ends of the pins 8 and 16. Tension springs 35 are ar-

ranged on opposite sides of the dashpots, the inner ends of these springs being provided with eyes engaged with the pin 16, while the outer ends are secured to the door as by means of hooks 36. These springs may be omitted if desired and other means applied to urge the door to closed position, for example, spring hinges may be employed.

In operation the arm 9 acts to hold the pin 16 to which the parts are connected as described away from the door and frame, regardless of how far the door is swung open, and under such conditions the tension springs act to close the door. The closing of the door is checked and timed by the dashpot. Fig. 5 illustrates the action of the arm 9 in holding the springs and other parts away from the door and door frame when the door is swung widely open. The extensible compression link coacts with the dashpot to transmit forces to the door frame.

The plunger packing is always held in expanded position when the plunger is at the end of its inner stroke. The plunger abuts the inner end of the flange cylinder head which serves as a stop thereby eliminating the necessity for a stop on the plunger rod and the packing is not deformed by coming in contact with the end of the cylinder.

I have illustrated and described my improvements in embodiments which I have found very practical. I have not attempted to illustrate or describe other embodiments or adaptations which I contemplate as it is believed this disclosure will enable those skilled in the art to embody or adapt my improvements as may be desired.

Having thus described my invention what I claim as new and desire to secure by Letters Patent is:

1. A device of the class described comprising in combination a door casing bracket having horizontal side flanges and intermediate spaced ears, a pin disposed through said flanges and ears, a door bracket provided with means for adjustably mounting upon a door, an arm slotted at its outer end pivotally mounted on said door bracket, a pin on the outer end of said arm, an expansible link comprising a pair of telescoping members, one engaged with said pin on said door casing bracket between said ears and the other with said pin on said arm within said slot thereof, tension springs connected to the ends of said pins, a dashpot cylinder adapted for attachment to a door, a plunger coacting therewith and provided with a plunger rod engaged with said pin on said arm centrally thereof, and tension springs adapted for attachment to a door and secured to the ends of said pin carried by said arm.

2. A device of the class described comprising in combination a door casing bracket, a pin on said bracket, a door bracket, an arm pivotally mounted on said door bracket, a pin on the outer end of said arm, an expansible link comprising a pair of telescoping members, one engaged with said pin on said door casing bracket and the other with said pin on said arm, tension springs connected to the ends of said pins, a dashpot cylinder adapted for attachment to a door, a plunger coacting therewith and provided with a plunger rod engaged with said pin on said arm, and tension springs adapted for attachment to a door and secured to the ends of said pin carried by said arm.

3. In a door closing device, the combination of a door frame bracket, a dashpot comprising a cylinder and coacting plunger provided with a plunger rod, the cylinder being adapted for attachment to a door, an arm provided with an attaching bracket on which the arm is pivotally mounted, the plunger rod being pivotally connected to the outer end of the arm, an extensible compression member pivotally connected to the outer end of the arm and to the frame bracket in opposed relation to the plunger rod, a pair of springs on opposite sides of the compression member connected to the outer end of the link and to the frame bracket, and a pair of springs on opposite sides of the dashpot connected to the outer end of the arm and adapted for connection to a door.

4. In a door closing device, the combination of a door frame bracket, a dashpot comprising a cylinder and coacting plunger provided with a plunger rod, the cylinder being adapted for attachment to a door, an arm provided with an attaching bracket on which the arm is pivotally mounted, the plunger rod being pivotally connected to the outer end of the arm, and an extensible compression member pivotally connected to the outer end of the arm and to the frame bracket in opposed relation to the plunger rod.

5. In a door closing device, the combination of a door frame bracket, a dashpot comprising a cylinder and coacting plunger provided with a plunger rod, the cylinder being adapted for attachment to a door, an arm provided with an attaching bracket on which the arm is pivotally mounted, the bracket being longitudinally slotted to receive attaching screws whereby it may be adjustably secured to a door, the plunger rod being pivotally connected to the outer end of the arm, and an extensible compression member pivotally connected to the outer end of the arm and to the frame bracket in opposed relation to the plunger rod.

6. A door closing device comprising in combination springs connecting the door to its frame and acting to close the door when released after opening, an arm hinged to the door and engaging said springs at its free end for holding them away from the door and its frame regardless of how wide the door is opened, a door closing check having a cylinder connected at its outer end to the door and provided with a plunger expanding chamber, a plunger rod pivoted to said arm, and an extensible compression link pivotally connected at one end to the door frame and at the other to said plunger rod and consisting of a tubular section and a section telescoped together.

7. A door closing device comprising in combination, tension springs connecting the door to its frame and acting to close the door when released after opening, an arm hinged to the door and engaging said springs at its free end for holding them away from the door and its frame regardless of how wide the door is opened, a door closing check connected at its outer end to the door and at its inner end to said arm, and an extensible compression link pivotally connected at one end to the door frame and at the other to the inner end of said check and consisting of a tubular section and a section telescoped together.

8. A device of the class described comprising in combination a door casing bracket, a door bracket, an arm pivotally mounted on said door bracket, an expansible link comprising a pair of telescoping members, one connected to said door casing bracket and the other to said arm, a tension spring connected to said casing bracket and arm, a dashpot cylinder adapted for attachment to a door, a plunger coacting therewith and provided

with a plunger rod connected to said arm, and a tension spring adapted for attachment to a door and connected to said arm.

9. In a door closing device, the combination of a door frame or casing bracket, an arm provided with means for pivotal attachment to a door, a dashpot comprising a cylinder and coacting plunger, one member of the dashpot being adapted for attachment to a door and the other being attached to the swinging end of said arm, an extensible compression member comprising telescoping sections, one section being pivotally connected to the swinging end of the arm and the other to said frame bracket in opposed relation to said dashpot, a spring connecting the swinging end of said arm to said door frame bracket, and a spring for connecting said arm to a door.

10. In a door closing device, the combination of a door frame or casing bracket, an arm provided with means for pivotal attachment to a door, a dashpot comprising a cylinder and coacting plunger, one member of the dashpot being adapted for attachment to a door and the other being attached to the swinging end of said arm, and an extensible compression member comprising telescoping sections, one section being pivotally connected to the swinging end of the arm and the other to said frame bracket in opposed relation to said dashpot.

11. The combination with a door frame and door, of a door closing device comprising a door closing spring, a dashpot, one member of which is connected to the door and the controlled element of which is connected at its inner end to a swinging arm pivotally mounted on the door, and a compression member pivotally connected to the swinging end of said arm and to the door frame and comprising a pair of telescopingly associated members.

12. The combination with a door frame and door, of a door closing device comprising a door closing spring, an arm pivotally mounted on the door, a dashpot, one member of which is connected to the door and the other to said arm, and an extensible compression member disposed in opposed relation to the dashpot and pivotally connected to the swinging end of said arm and to the door frame.

13. In a door closing device, the combination of a door frame bracket, an arm provided with means for pivotal attachment to a door, a dashpot comprising a cylinder flared at its outer end and adapted for attachment to a door, a coacting plunger provided with a cup-like packing, a plunger rod for said plunger connected to the outer end of said arm, and an extensible compression member for connecting the outer end of said swinging arm to a door frame disposed in opposed relation to said dashpot.

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