Feb. 13, 1962 H. W. FALK 3,020,581

DOOR CHECK

Filed Feb. 2, 1956

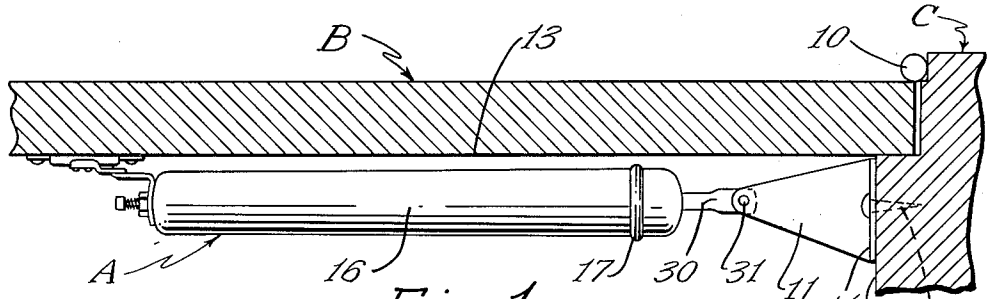



Fig. 1

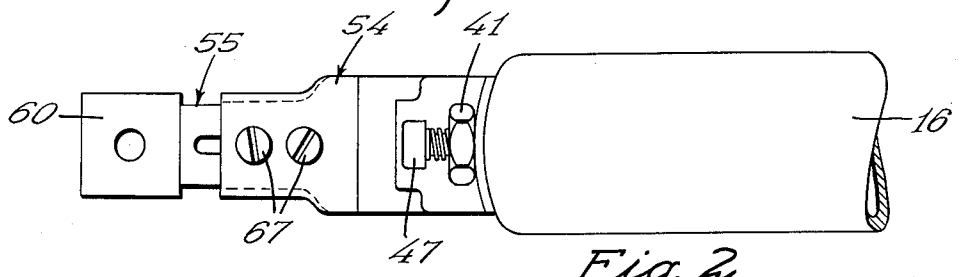



Fig. 2

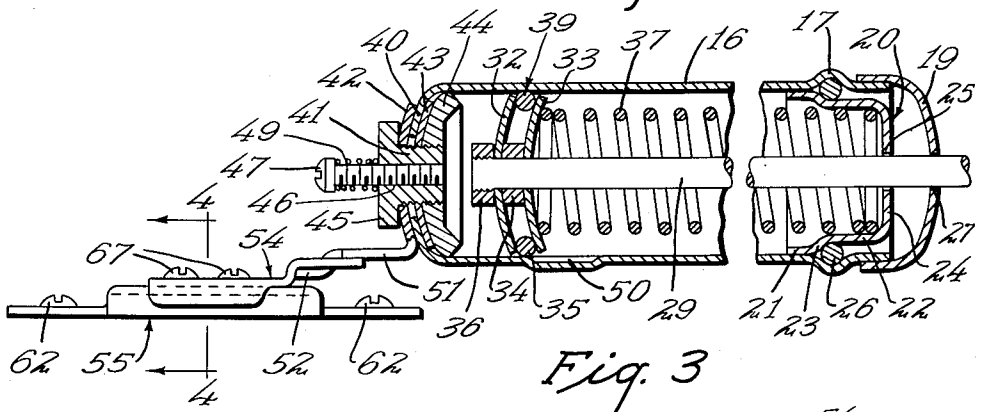



Fig. 3

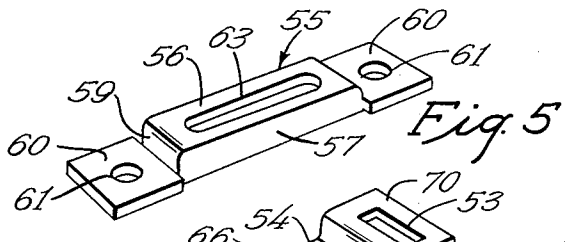



Fig. 5

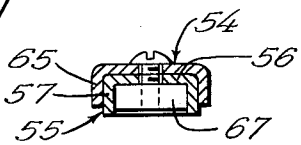



Fig. 4

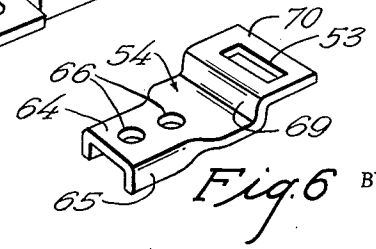



Fig. 6

INVENTOR

Harold W. Falk

BY Robert M. Dunning

ATTORNEY

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# DOOR CHECK

Harold W. Falk, Minneapolis, Minn., assignor to Wright Products, Inc., St. Paul Park, Minn., a corporation of Minnesota

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1 Claim. (Cl. 16—66)

This invention relates to an improvement in door checks and deals particularly with an adjustable device capable of securely closing a door.

In the manufacture of door checks it has been common practice to provide some means of accelerating the closing movement of the door as it nears fully closed position. This arrangement is provided to compensate for increased friction between the door and its frame as the door swings closed. The arrangement also is designed to compensate for any compression of air between the door being closed and an inner door.

One of the difficulties involved with structures which have been previously produced lies in the fact that it is difficult to adjust the length of increased movement before the door becomes entirely closed. Door checks of the type in question are often used for closing combination screen and storm doors. As the door check is constructed to pull a storm door closed, the increased speed of travel of the door should start while the door is open several inches in order to overcome the compression of air between the storm door and the main door and also to take care of the increased weight of the door. If the same check with the same adjustment is used for closing a relatively light screen door, the same increased force as the door swings closed will cause the screen door to slam against its frame. Accordingly, an adjustment of the length of the increased movement of the door is of considerable importance.

An object of the present invention resides in the provision of a door check including a cylinder and a piston movable within the cylinder and in providing a by-pass in the cylinder past which the piston moves as it nears one extreme position. The door is pulled closed by a spring acting against the piston and the speed of movement is retarded by restricting the flow of air from the end of the cylinder toward which the piston moves as the door swings closed. As the piston nears extreme position, and passes the by-pass groove in the cylinder wall, air is permitted to by-pass the piston to increase the speed of travel of the piston to its extreme position.

This by-pass which permits an increase in the speed of movement of the piston is not in itself novel. However, in the past, this type of arrangement has had the disadvantage that the groove was in fixed relation to the end of the piston and as a result the increase in the closing speed of the door was started when the door was closed to a predetermined position. As a result, if the by-pass were properly located to pull a heavy imperforate door into closed postion, it would have too great an effect upon a relatively light screen door. Accordingly, I combine with the by-pass in the cylinder an adjustment in the position of the cylinder when the door is closed so as to vary the time at which the piston reaches the by-pass. In other words by adjusting the position of the cylinder on the door the piston may be arranged to reach the by-pass while the door is still at a considerable angle from closed position or may be positioned so that the by-pass is inoperative until the door is virtually closed. As a result the check may be readily adjusted for any desired condition of operation.

A feature of the present invention resides in the provision of a door check embodying a means for increasing the speed of movement of the door as it approaches closed position combined with a means for adjusting the time at



which the speed increasing means is brought into operation.

These and other objects and novel features of my invention will be more fully and clearly set forth in the following specification and claim.

In the drawing forming a part of the specification:

FIGURE 1 is a top plan view of a door check connecting a door and its frame.

FIGURE 2 is a side elevational view on an enlarged scale of the end of the door check that is adjustably connected to the door.

FIGURE 3 is a longitudinal section through the door check and its adjustable mounting.

FIGURE 4 is a cross-sectional view through the mounting bracket, the location of the section being indicated by line 4—4 of FIGURE 3.

FIGURE 5 is a perspective view of one portion of the adjustable mounting bracket.

FIGURE 6 is a perspective view of the other portion of the adjustable mounting bracket.

The door check is indicated in general by the letter A and is designed to connect a door such as B to the door frame C. The details of construction of the door and its frame are not of importance in the present invention. A hinge 10 is illustrated between the door B and the frame C to pivotally connect these elements.

A bracket 11 is secured to the parting strip 12 of the frame C at a point opposite from the inner surface 13 of the door B. This bracket 11 is provided with flanges 14 which are arranged in surface contact with the parting strip 12 and attached thereto by screws 15.

The door check A includes an elongated cylinder 16 having an outwardly bulged rib 17 in the wall thereof near one end of the cylinder. A closure 19 is placed onto the end of the cylinder or is secured thereto in any suitable manner. An inner cap 20 is provided within the cylinder, the inner cap including an end portion 21 which fits snugly within the cylinder 16 and with a reduced portion 22 connected to the end portion 21 by an offset 23. The cap 20 also includes an end portion 24 having an aperture 25 extending axially thereof.

A sealing ring 26 within the outwardly bulged portion 17 engages the offset 23 of the inner cap 20 and limits the outward movement of this inner cap. The outer cap 19 is provided with an axial aperture 27 which is aligned with the first described aperture 25. A piston rod 29 extends through the apertures 25 and 27 of the end caps 20 and 19 respectively and is provided with a flat end 30 pivotally secured at 31 to the bracket 11. The opposite end of the piston rod 29 supports a pair of opposed concave washers 32 and 33 which are held apart by a spacing member 34 encircling the rod 29. A sealing member 35 is interposed between the discs 32 and 33 to project beyond the margin thereof. A nut 36 is threaded onto the rod 29 to hold these parts assembled.

A spring 37 is interposed between the disk 33 and the end 24 of the inner cap 20. This spring 37 is a compression spring and tends to urge the piston indicated in general by the numeral 39 to the left as illustrated in the figures. The movement of the piston is regulated by the flow of air through an end of the cylinder 16 in a manner which will be described.

The end of the cylinder 16 opposite that supporting the end cap 19 is formed or rolled inwardly to provide an inwardly extending flange 40. A bushing 41 having external threads extends through a pair of clamping discs 42 and 43 and these are pressed against the flange 40 between a nut 44 and the head 45 of the bushing 41. The bushing 41 is provided with an axial internally threaded passage 46 extending therethrough. A bolt or machine screw 47 is threaded into the aperture 46. A spring 49 between the head of the screw 47 and the head

45 of the bushing 41 holds the screw 47 in adjusted position. The screw 47 fits loosely enough in the bushing 41 so that air may leak past the threads. The speed with which the air may escape from the interior of the cylinder would depend upon the extent to which the screw 47 is threaded into the bushing 41.

A groove 50 is provided in the inner wall of the cylinder 16, extending longitudinally of the cylinder. This groove 50 provides a by-pass for air to flow about the piston. When the piston goes to a position over the groove 50, the air may by-pass around the piston permitting the full force of the spring 37 to act against the piston. Therefore, as the door closes, it goes slowly as determined by the position of the screw 47 until the piston partially bridges the groove 50. At this point the damping action of the air compressed to the left of the piston is suddenly removed so that the spring can pull the door quickly into closed position. The washer 42 is attached to a flange 51 extending parallel to the axis of the cylinder. A tongue of reduced width indicated at 52 extends downwardly and forwardly from the extremity of the flange 51. This tongue 52 is designed to extend through a transverse slot 53 in a bracket member 54 forming a part of the connection between the cylinder and the door. The bracket 54 cooperates with a second bracket 55 as illustrated in FIGURE 5 of the drawing.

The bracket member 55 includes an inverted channel-shaped body 56 having longitudinal parallel sides 57 and generally parallel ends 59. Mounting flanges 60 extend from opposite ends of the channel-shaped body 56 and are apertured as indicated at 61 to accommodate screws or bolts 62 which hold the bracket member 55 in surface contact with the door B. An elongated slot 63 is provided in the base portion of the channel-shaped body 56. The bracket member 54 is formed to provide a channel-shaped extremity 64, the sides 65 of which extend on opposite sides of flanges 57 of the bracket member 55. Opposed apertures 66 are provided in the base of the channel shaped part 64 to accommodate bolts 67 which extend through the aperture 66 and the slot 63. The nuts of bolts 67 are mounted within the channel-shaped body 56 of the bracket member 55 and are held from rotation by engagement within the flanged sides 57. The bolts 67 hold the bracket member 54 in an adjusted relation to the bracket member 55.

The bracket member 54 is provided with an offset 69 connecting the channel-shaped end 64 with a parallel flange 70 through which the slot 53 extends. The tongue 52 projecting from an end of the cylinder 16 may hook through the slot 53 to hold the cylinder securely connected to the bracket 54.

It will be seen that by loosening the bolts 67, the connected end of the cylinder 16 may be moved longitudinally of the bracket 55 and the two parts of the bracket may be tightened in adjusted position. As the piston rod 29 is connected to the door frame, movement of the cylinder 16 to the left from the adjusted position illustrated will cause the piston 39 to move nearer the end of its stroke before bridging the groove 50. In other words, by moving the bracket 54 to its extreme left-hand position and securing the bracket parts from movement, the piston 39 may move even entirely to the end of its stroke without uncovering the groove 50. By moving



the bracket parts to the opposite extreme position, the groove 50 will be uncovered while the door is still at a considerable angle from closed position thereby asserting a considerably greater closing force than in the other adjusted position described.

Thus, it will be seen that not only does the door check embody a means of accelerating the door closing operas the door approaches closed position but further the door angle at which the acceleration starts may be varied. When the check is used to close a light screen door, the bracket parts may be placed in an adjustable position where little if any acceleration is employed at the end of the closing stroke. On the other hand if the check is used for closing a heavier door such as a storm door, the bracket parts may be adjusted to accelerate the closing action from a point where the door is still at a substantial angle from closed position.

In accordance with patent statutes, I have described the principles of construction and operation of my door check, and while I have endeavored to set forth the best embodiment thereof, I desire to have it understood that obvious changes may be made within the scope of the following claim without departing from the spirit of my invention.

I claim:

A door check including a cylinder, a piston slidably supported within said cylinder, a piston rod connected to said piston and extending through one end of said cylinder, bracket means secured to said piston rod and adapted to be secured to a door frame, a member secured to the other end of said cylinder and fixed in relation thereto, a first bracket member pivotally secured to said first named member and extending longitudinally with respect to said cylinder, a second bracket member having a surface adapted to be secured to a door and extending parallel to said first bracket and overlapping the same, one of said bracket members having an aperture therethrough and the other of said bracket members having a longitudinal slot therein, and means extending through said aperture and slot for securing said two bracket members in adjusted overlapping relation, said first bracket member having and end lying on a plane parallel to said surface of said second bracket member, said end of said first bracket member having a transverse slot therethrough, and said first named member including a tongue having an offset end extending through said slot and providing the pivotal connection between said first named member and said first bracket member.

**References Cited** in the file of this patent

UNITED STATES PATENTS

| | | |
|---|---|---|
| 758,419 | Cooke | Apr. 26, 1904 |
| 1,165,230 | Degen | Dec. 21, 1915 |
| 1,601,372 | Ranson | Sept. 28, 1926 |
| 1,916,571 | Hoffman | July 4, 1933 |
| 2,183,640 | Cornwell | Dec. 19, 1939 |
| 2,646,589 | Quinn | July 28, 1953 |
| 2,812,533 | Falk | Nov. 12, 1957 |

FOREIGN PATENTS

| | | |
|---|---|---|
| 54,448 | Germany | Nov. 18, 1890 |
| 163,160 | Germany | Sept. 18, 1905 |