

Feb. 4, 1958

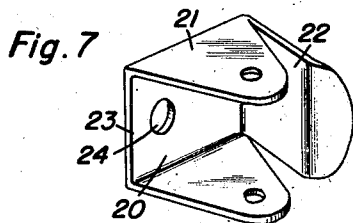
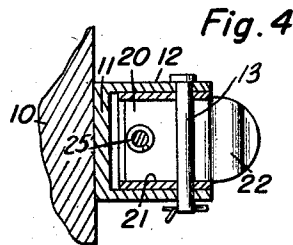
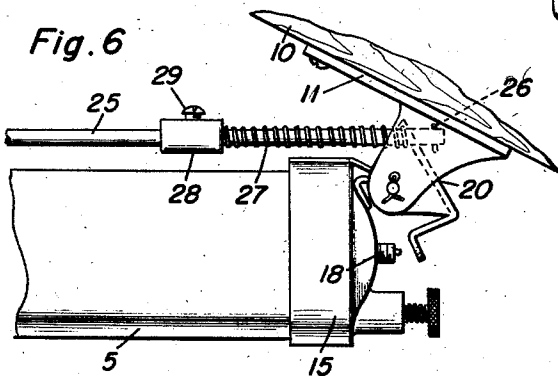
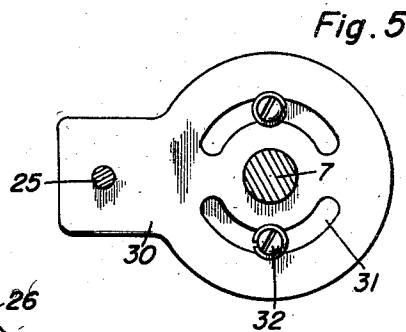
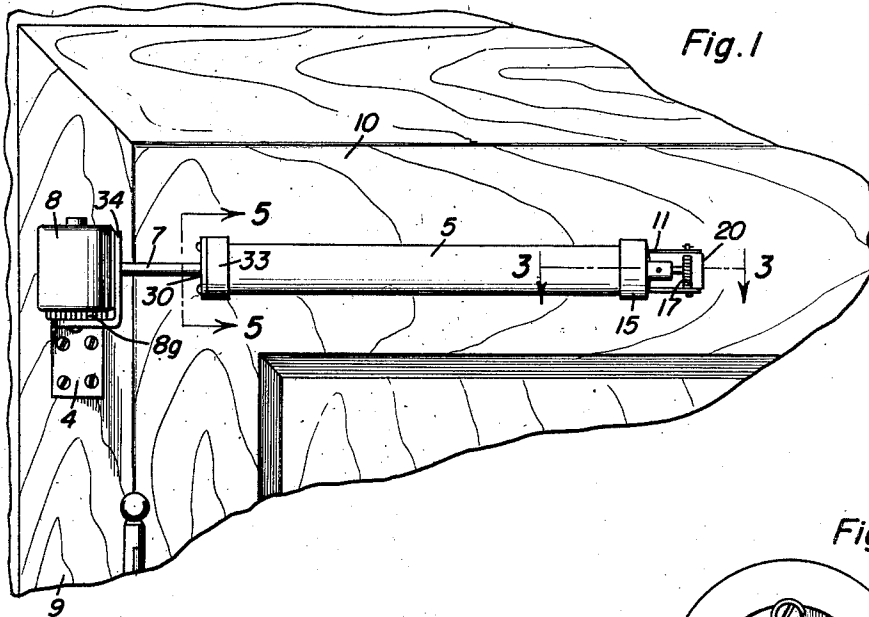
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PNEUMATIC DOOR CHECK AND CLOSER

Filed Dec. 27, 1954

2 Sheets-Sheet 1



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PNEUMATIC DOOR CHECK AND CLOSER

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2 Sheets-Sheet 2

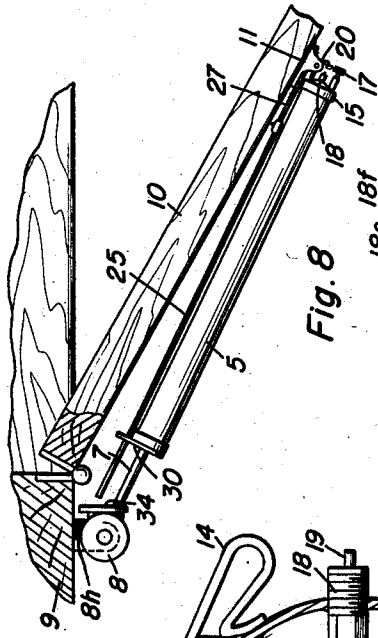
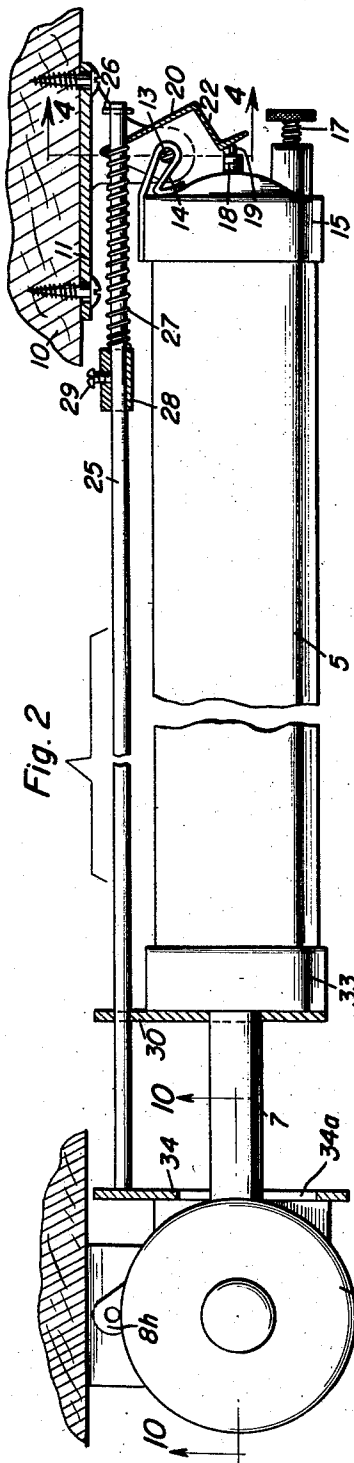


Fig. 8

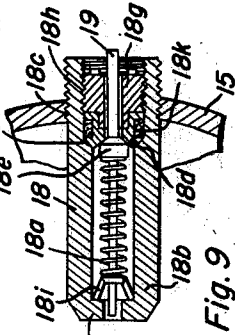


Fig. 9

Fig. 3

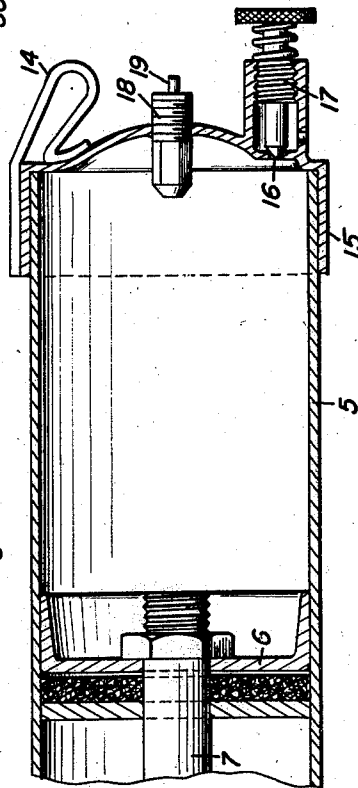
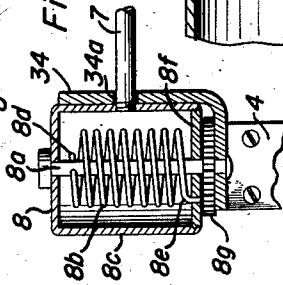


Fig. 10



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1

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PNEUMATIC DOOR CHECK AND CLOSER

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4 Claims. (Cl. 16—84)

The present invention relates to new and useful improvements in door closers of a type provided with a spring-actuated pneumatic cylinder to close the door gradually in a dash-pot action. The objectionable feature in a device of this character is the difficulty of properly adjusting the tension of the spring to close the door without slamming as it approaches its closed position due to decrease in tension of the spring as the door reaches this point.

Accordingly, it is an object of the present invention to provide a pressure release valve for the air cylinder and which is actuated by the movement of the door as it approaches its closed position to release air pressure in the cylinder and permit the spring to complete its door closing function.

Another object is to provide a device of this character which is simple and practical in construction, efficient and reliable in operation, relatively inexpensive to manufacture and otherwise well adapted for the purpose for which the same is intended.

These together with other objects and advantages which will become subsequently apparent reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming a part hereof, wherein like numerals refer to like parts throughout the drawings, and in which:

Figure 1 is a side elevational view of the door closer in position on a door;

Figure 2 is an enlarged top plan view with parts shown in section and showing the door in closed position;

Figure 3 is an enlarged fragmentary sectional view taken on a line 3—3 of Figure 1;

Figure 4 is an enlarged fragmentary sectional view taken on a line 4—4 of Figure 2;

Figure 5 is an enlarged transverse sectional view taken on a line 5—5 of Figure 1;

Figure 6 is an enlarged fragmentary top plan view showing the valve actuating means during initial door closing movement;

Figure 7 is an enlarged perspective view of the pivoted valve actuating lever;

Figure 8 is a top plan view showing the door in open position;

Figure 9 is an enlarged longitudinal sectional view of the pressure release valve, and

Figure 10 is a fragmentary view in vertical section taken on the line 10—10 of Figure 2.

Referring now to the drawings in detail, wherein for the purpose of illustration I have disclosed a preferred embodiment of my invention, the numeral 5 designates the air cylinder of a door closer of a conventional type and which includes a piston 6 working therein and provided with a piston rod 7 and which is actuated by a spring mechanism 8 which is attached to a door frame 9 by a bracket 4 adjacent the hinged edge of a door 10.

For illustration purposes, the spring mechanism 8 is

2

shown as comprising an upright pin 8a rising from and rotatably settable in the bracket 4 to tension a coil spring 8b surrounding the pin 8a within a barrel 8c rotatable on the pin 8a. The piston rod 7 is threaded into one side of the barrel 8c and the spring 8b is suitably connected at one end 8d to the pin 8a and has its other end 8e anchored in the closure plate 8f threaded in the lower end of the barrel 8c, the arrangement being such that the barrel 8c will be rotated to wind up the spring 8b when the door 10 is opened whereby the spring 8b will unwind and close the door 10 when the latter is released. A conventional ratchet wheel 8g fixed on the pin 8a and rotated on the bracket 4, together with a pivoted pawl 8h on the bracket 4 holds the pin 8a in rotatably set position.

A bracket 11 is attached to the door and includes a pair of spaced-apart parallel apertured ears 12 in which a pin 13 is supported and to which the front end of the cylinder is pivoted by means of a strap or metal loop 14 which is welded or otherwise suitably secured to a cap 15 on the adjacent end of the cylinder. The cap is also provided with an air vent 16 controlled by a thumb screw 17 to control escape of air from the cylinder in a dash-pot action.

A spring loaded valve 18 is also mounted in the cap 15 and is closed by a coil spring 18a and the valve includes a stem 19 which projects outwardly therefrom. As shown, the valve 18 comprises a casing 18b threaded, as at 18c, through the cap 15 and contains a conical seat 18d for a head 18e on the stem 19. The seat 18d is held against a shoulder 18f in the casing 18b by a tubular screw plug 18g threaded, as at 18h, in said casing and through which the stem 19 extends. The spring 18a to seat said head 18e is interposed on the stem 19 between the head 18e and a wing collar 18i slidable on the stem 19 and bearing against one end 18j of the casing 18b. The seat 18d is provided with a sealing gasket 18k countersunk therein. A lever 20 is constructed with a pair of spaced-apart parallel apertured ears 21 for pivotally mounting the lever on pin 13 between the pair of ears 12 and the front end portion 22 of the lever is swingable into and out of engagement with the valve stem 19 to press the latter inwardly in a valve opening movement.

The rear end portion 23 of the lever is provided with an opening 24 in which the front end of a rod 25 is slidable in parallelism to the cylinder 5. A cross pin 26 at the outer end of the rod retains the rod from being withdrawn from the lever and a coil spring 27 is tensionally retained against the lever by a collar 28 which is secured in longitudinally adjusted position on the rod by a set screw 29. The rear portion of rod 25 is slidable in a guide plate 30 which is supported on the piston rod 7 and plate 30 is formed with a pair of arcuate slots 31 in which clamp screws 32 are positioned and with the screws threaded into the rear cap 33 of the cylinder to permit adjustment of the position of rod 25 to prevent binding thereof in the opening 24 of lever 20. The attaching bracket 4 of the spring mechanism 8 is formed with a stop plate 34 in the path of rearward movement of the rear end of rod 25 and which is slotted, as at 34a to permit swinging of the piston rod 7 relative thereto.

In the operation of the device, the spring loaded valve 18 is free to be opened by the suction stroke of piston 6 during opening movement of the door and which causes an outward sliding movement of the cylinder 5 relative to piston 6. During this door opening movement the rear end of rod 25 is released from stop plate 34 and spring 27 slides the rod rearwardly and engages cross pin 26 with the rear end portion 23 of lever 20 to swing the front end portion 22 thereof forwardly away from valve stem 19.

During initial closing movement of the door by the spring mechanism 8, the spring 27 maintains the rod 25 and lever 20 stationary and the closing movement of the

door is retarded by the dash-pot action of the piston and which may be regulated by the thumb screw 17 controlling the air vent 16. As the door approaches its closed position the tension of the spring mechanism becomes less and frequently is ineffective to overcome air pressure remaining in the cylinder to latch the door. Accordingly, the rod 25 is arranged so that its rear end strikes stop plate 34 as the door approaches its closed position to push the rod forwardly and swing lever 20 to engage and open spring loaded valve 18 and thus quickly release the air pressure in the cylinder and enable the spring mechanism 8 to effectively continue its door closing movement.

From the foregoing, the construction and operation of the device will be readily understood and further explanation is believed to be unnecessary. However, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction shown and described, and accordingly all suitable modifications and equivalents may be resorted to, falling within the scope of the appended claims.

What is claimed as new is as follows:

1. In a door check and closer, the combination of pneumatic means adapted for attaching to a door and door frame for closing the door in a dash-pot action, a spring loaded valve for relieving pressure in the pneumatic means, a rod slidably carried by the pneumatic means and including a rear end movable into engagement with a relatively stationary structure upon a predetermined closing movement of the door to slide the rod forwardly, and lever means actuated by the rod and engaging the valve to open the same.

2. In a door check and closer, the combination of pneumatic means adapted for attaching to a door and door frame for closing the door in a dash-pot action, a spring loaded valve for relieving pressure in the pneumatic means, a rod slidably carried by the pneumatic means and including a rear end movable into engagement with a relatively stationary structure upon a predetermined closing movement of the door to slide the rod forwardly, and a lever pivoted on said pneumatic means and having one end in the path of forward movement of the rod and

having its other end engaging the valve to open the same.

3. In a door check and closer, the combination of an air cylinder adapted for attaching to a door and door frame and including a spring actuated piston and piston rod, said cylinder having a vent for retarding closing movement of the door by said spring mechanism in a dash-pot action, a spring loaded valve at the front end of the cylinder, a pivoted lever arranged for actuating the valve to open the latter, and a rod slidably carried by the cylinder and having a front end portion connected to the lever, and said rod having a rear end portion engaged by a relatively stationary part of the closer upon a predetermined closing movement of the door to actuate the lever to open the valve and release air pressure in the cylinder.

4. In a door check and closer, the combination of an air cylinder adapted for attaching to a door and door frame and including a piston and piston rod, and spring mechanism coacting with said piston rod to close the door to which the cylinder is attached, said cylinder having a vent for retarding closing movement of the door by said spring mechanism in a dash-pot action, a spring loaded valve at the front end of the cylinder, pivot means for attaching the cylinder to a door, a lever pivotally supported on said first-named pivot means and having a free end portion positioned for actuating the valve to open the latter, a rod slidably supported on the cylinder parallel thereto, means loosely connecting the front end of the rod with the lever, a coil spring on the rod tensionally bearing against the lever to slide the rod rearwardly to maintain the lever inactive when the door is open, and stationary means in the path of rearward movement of the rod and engageable by the rod upon a predetermined closing movement of the door to actuate the lever in a valve opening movement to release air pressure in the cylinder.

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