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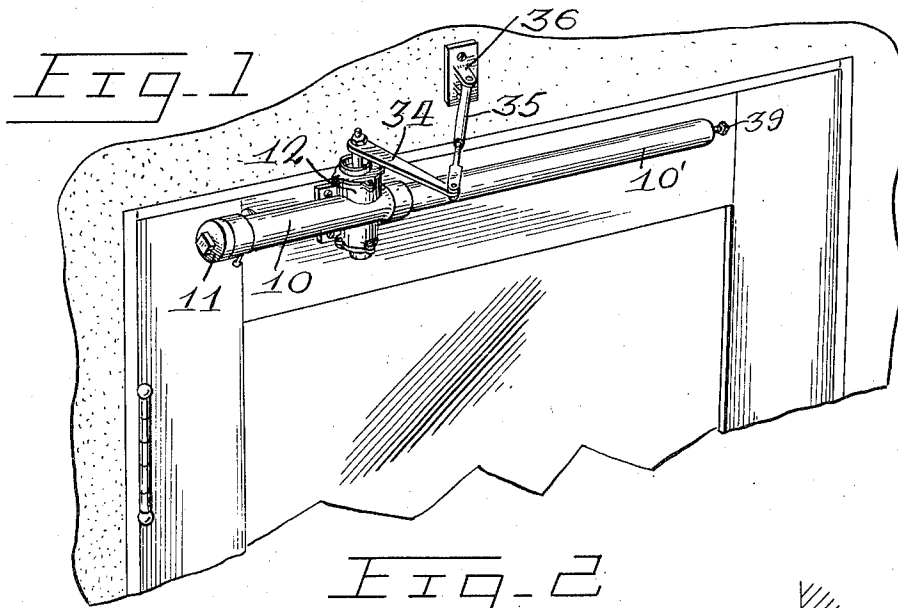
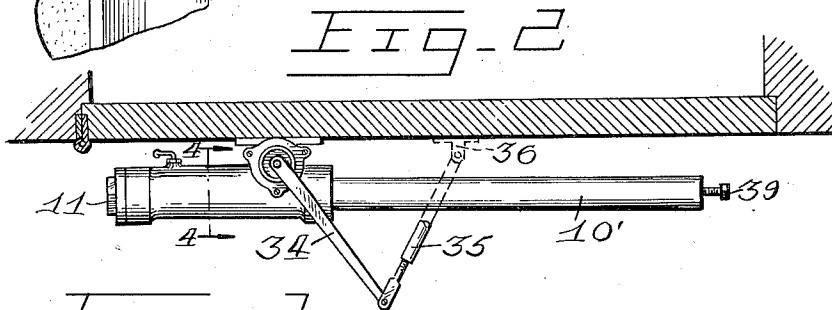
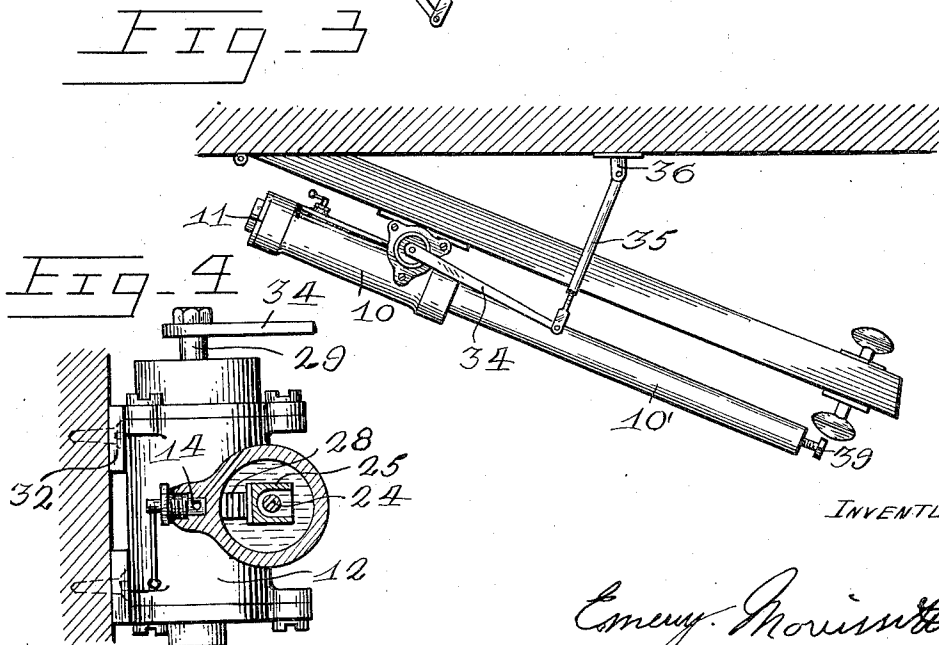
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2,059,385

DOOR CHECK AND CLOSER

Filed Dec. 30, 1935

2 Sheets-Sheet 1



INVENTOR

Emerg. Novists

Nov. 3, 1936.

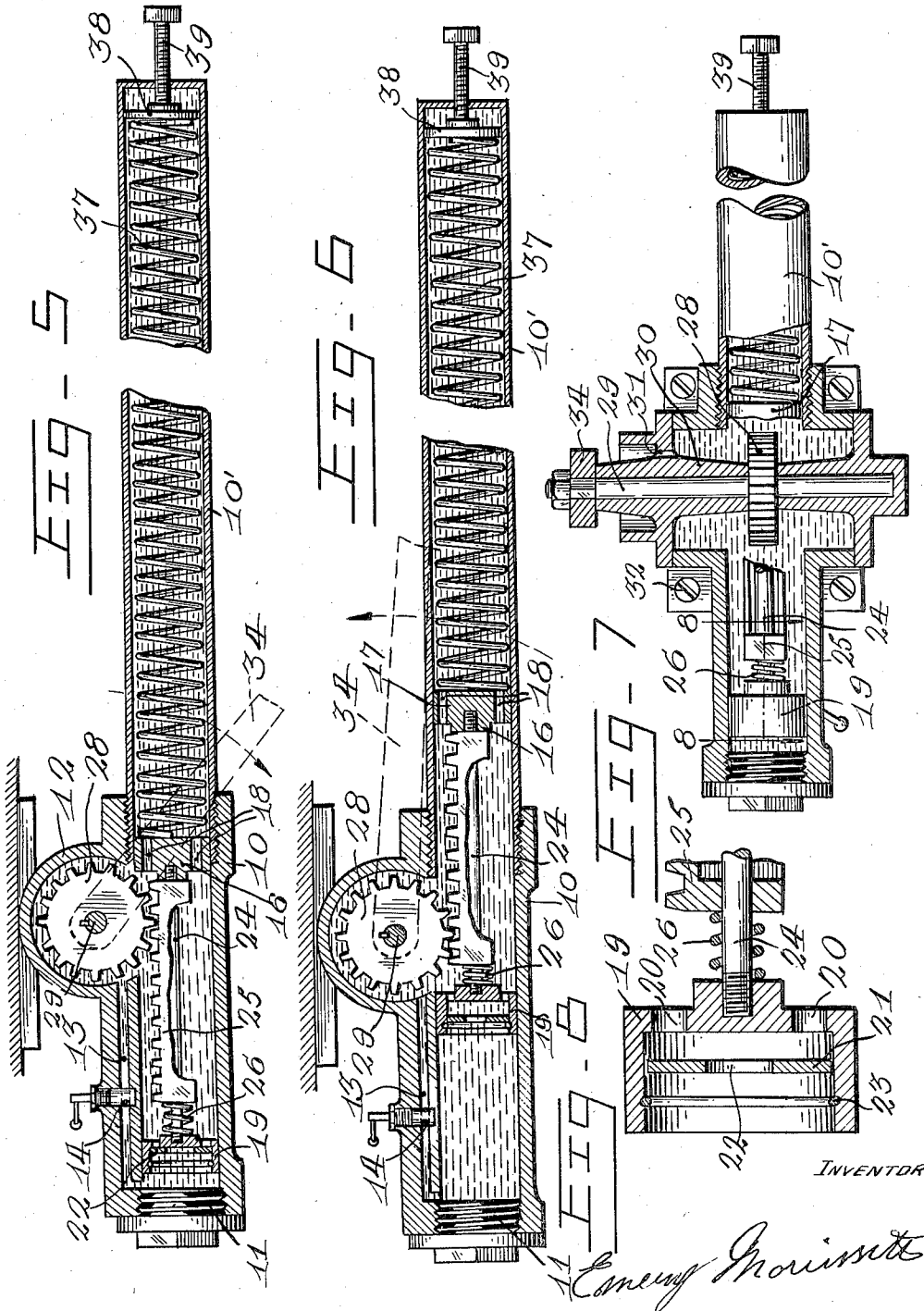
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UNITED STATES PATENT OFFICE

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DOOR CHECK AND CLOSER

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8 Claims. (Cl. 16—62)

The present invention relates to improvements in door checks and closers.

An object of the invention is the provision of a door check and closer which will efficiently close a door without slamming or banging.

A further object of the invention is the provision of a door check and closer which will overcome latch resistance without producing an accelerated noisy movement.

Another object of the invention is the provision of a door check and closer having means for cushioning the final latching movement as well manual thrust movement of the door.

A still further object of the invention is the provision of a door check and closer of the aforesaid character which is relatively simple and durable in construction; and positive and uniform in operation.

Other objects and advantages of the invention will become apparent as the description progresses.

In the accompanying drawings forming part of this specification and in which like numerals designate corresponding parts:—

Figure 1 is a perspective view of the device attached to a door in closed position.

Figure 2 is a top plan view of the same.

Figure 3 is a similar view showing the door in open position.

Figure 4 is an enlarged section on line 4—4 of Figure 2.

Figure 5 is a longitudinal section with the door in completely closed position.

Figure 6 is a similar view with the door in open position.

Figure 7 is a vertical longitudinal section through the device, and

Figure 8 is a fragmentary section through the piston.

Referring to the drawings, wherein for the purpose of illustration is shown a preferred embodiment of the device, 10 designates an elongated cylinder having an opening at one end which for convenience of description will be termed the front end, normally closed by a screw plug 11. Intermediate its end the cylinder 10 is formed with a laterally projecting casing 12 having communicative connection with the cylinder. At the front end portion the cylinder is formed with a channel 13 providing a by-pass connection between the forward end of the cylinder and the interior of the casing 12. A valve 14, adjustable by an exterior knob, controls the passage of fluid through the channel.

Within the forward portion of the cylinder

10 is mounted a reciprocatory piston 16 embodying, at the rear end, a head 17 provided with passages 18 therethrough. At the front end the piston embodies a head 19 having off-center openings 20 and formed to provide a socket in which is fitted a valve disk 21. The disk 21 is formed with a central aperture 22 and is restrained from moving outwardly of the socket by a ring 23. A longitudinal centrally disposed stem 24 is threadedly connected to each piston head and rigidly joins them to form the piston assembly. On the stem is mounted an elongated longitudinally slidable rack 25 yieldingly urged against the rear head by a coiled compression spring 26 arranged on the stem between the forward end of the rack and the front head of the piston.

The teeth of the rack 25 mesh with the teeth of a gear 28 fixed on a shaft 29 journaled in elongated bearings 30 disposed in the casing 12. In the top of the casing 12 is formed a filling opening 31 through which fluid, such as oil, is introduced into the cylinder and casing structure. At the inner side of the casing are formed lugs 32 by means of which the casing is attached to a door.

To the outwardly projecting end portion of the shaft 29 is fixed one extremity of a lever 34. The opposite end of the lever is pivotally connected with the outer extremity of an arm 35 connected, through the medium of a pivot bracket 36, with the frame above the door. The arm 35 is preferably longitudinally adjustable to enable convenient connection of the device.

In an extension 10' of the cylinder 10 is positioned a coiled compression spring 37 interposed between the rear head of the piston and the rear end of the cylinder. A disk 38 slidably adjustable by a screw 39 enables variation of the compressive action of the spring. As shown in Figures 5 and 6 the compression spring is in alignment with the piston and tends to force the same towards the front of the cylinder and acts to yieldingly swing the door to a closed position.

When the door is swung from its closed position, as shown at Figures 1 and 2, to an open position the gear 28 is rotated and, by its engagement with the rack 25, slides the piston to retracted or rearward position against the action of the spring 37. As the piston is retracted the rack is disposed against the rear end of the piston and the valve disk is moved to a forward position by the fluid so that the

fluid may freely pass through the front as well as the rear head of the piston. Upon release of the door in open position it is automatically swung to closed position by the action of the spring 37 which moves the piston forwardly so that the rack in mesh with the gear 28, causes rotation of the latter to effect closure. During the forward movement of the piston the valve disk 21 is forced against the inner portion of the front head closing the apertures therein. Thus, the front head forms a closed plunger which forces the fluid through the restricted channel and control valve 14 to check the closing movement so that the door swings to closed position at a regulated retarded speed.

As the door is forced against the resistance of the spring projected door latch an accelerated movement and slamming of the door is avoided by the spring 26 which cushions the final closure action. Furthermore, the cushioning spring 26 operates to prevent injury to the mechanism if the door is manually pushed during its closing movement.

It is to be understood that the form of the invention herein shown and described is to be taken as a preferred example of the same and that various changes as to the shape, size and arrangement of parts may be resorted to without departing from the spirit of the invention or the scope of the subjoined claims.

Having thus described my invention, I claim:—

1. In a door check and closer, a cylinder, a piston mounted in the cylinder, means yieldingly urging the piston to a closed position, means for checking closing movement of the piston, a rack slidably mounted on the piston engageable with a rotatable gear, and cushioning means disposed at one end of the rack.

2. In a door check and closer, a cylinder, a piston in the cylinder, spring means for effecting closing movement of the piston, a gear engaging rack slidably mounted on the piston, and a cushioning member at one end of the rack adapted to cushion the movement upon accelerated action of the door.

3. In a device of the character described, the

combination with a cylinder, a piston within the cylinder, and a rack mounted to slide longitudinally on the piston, of a resilient cushioning member yieldingly urging the rack toward one end of the piston and adapted to cushion reverse movement thereof.

4. In a device of the character described, a cylinder, a piston in the cylinder, a spring in alignment and adapted to actuate the piston through its closing movement, fluid means for checking the closing movement, a rack mounted to slide longitudinally on the piston and a spring normally urging the rack toward one end of the piston and adapted to cushion reverse movement of the rack.

5. In a door check and closer, including a cylinder and a piston in the cylinder, a rack mounted on and adapted to slide longitudinally on the piston, and a spring acting against the rack tending to slide the same in one direction and to cushion movement of the rack in the opposite direction.

6. In a door check and closer, including a cylinder, a piston in the cylinder, and means for actuating the piston through closing movement in one direction and opening movement in the opposite direction, a rack mounted to slide longitudinally on the piston, and a spring mounted so as to cushion movement of the rack in one direction.

7. In a door check and closer, including a cylinder, a piston in the cylinder, a rack mounted to slide longitudinally on the piston, means for moving the piston forwardly, a gear engaging the rack for moving the piston rearwardly, and a spring adapted to cushion forward movement of the rack on the piston.

8. In a device of the character described, the combination with a cylinder, of a double headed piston in the cylinder, a stem extending between the piston heads, a rack slidably mounted on the stem, and a spring adapted to yieldingly urge the rack toward one end of the stem and to cushion movement of the rack in the opposite direction.

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