July 30, 1940. J. J. JONES 2,209,733

DOOR CHECK

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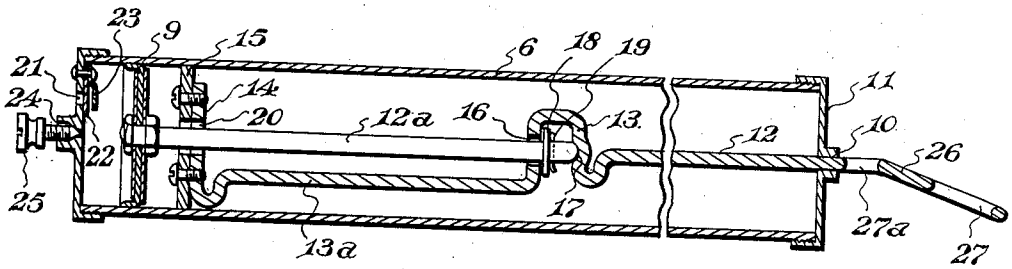


Fig. 1

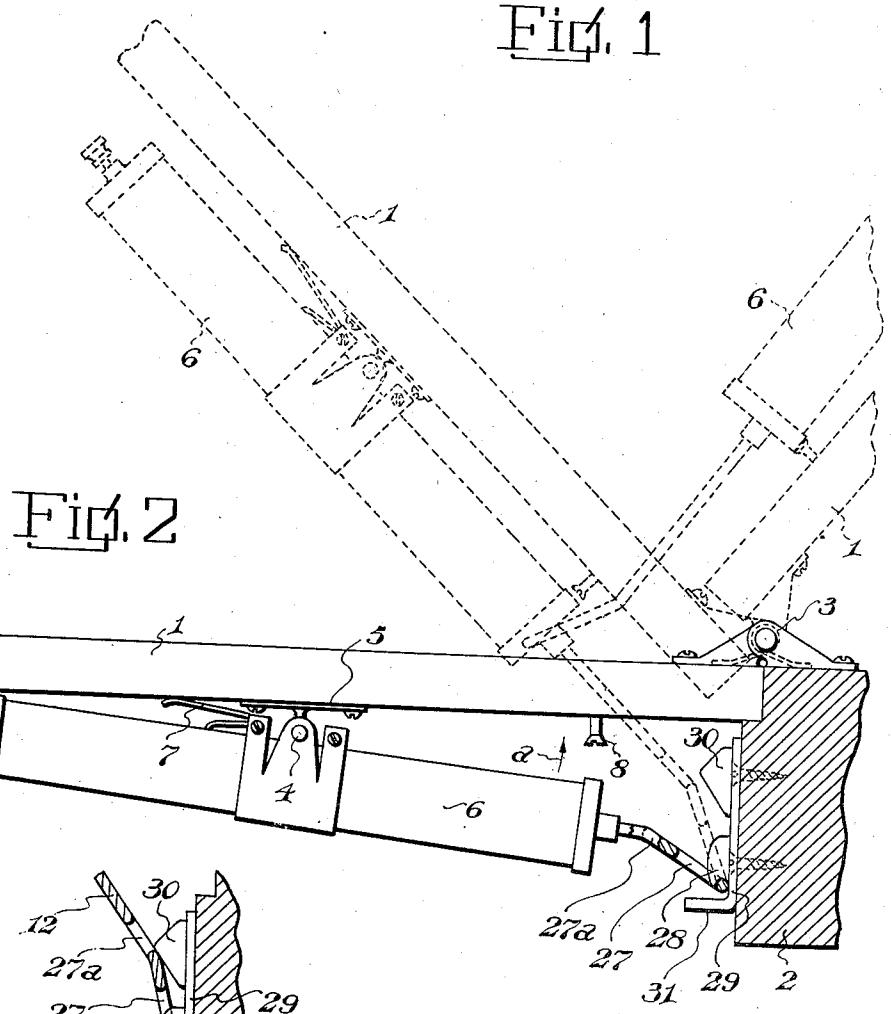


Fig. 2

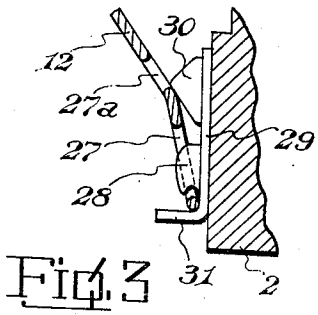


Fig. 3

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DOOR CHECK

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7 Claims. (Cl. 16—84)

The invention relates to door checks, particularly adapted for use in connection with spring closed doors, for instance screens, and has for its object to provide a check comprising a cylinder having a piston therein and a rod extending through one end of the cylinder and terminating in an apertured portion adapted to engage a hook on the door frame when the door is closed, and also when the door is partially opened and to disengage from the hook after the piston is moved in the cylinder and when the door approaches its open position. Also to provide means adjacent the hook for guiding the eye onto the hook as the door approaches closed position, and at the same time moving the piston rod and piston longitudinally in the cylinder for a door checking operation.

A further object is to form the piston rod within the cylinder from connected sections, thereby allowing the piston section to have a limited floating movement in relation to the other section, thereby obviating wear on the piston or cup incident to side pressure which is the common difficulty with devices at present constructed.

A further object is to pivotally mount the cylinder on the door for movement in a horizontal plane, and to provide spring means for normally urging one end of the cylinder towards an adjustable stop carried by the door, thereby allowing the eye of the piston to be accurately adjusted for cooperation with the hook carried by the frame.

A further object is to provide a knock-off lug adjacent the hook for engaging the outer end of the piston as the door approaches open position for disengaging the rod from the hook.

A further object is to form the piston rod from flat material and with a bend therein for a floating connection of the cup carried section of the rod and a guide disc to the rear of the cup and carried by the flat section of the rod and through which the cup carried section extends, and has lateral play.

With the above and other objects in view the invention resides in the combination and arrangement of parts as hereinafter set forth, shown in the drawing, described and claimed, it being understood that changes in the precise embodiment of the invention may be made within the scope of what is claimed without departing from the spirit of the invention.

In the drawing:

Figure 1 is a horizontal sectional view through the door check cylinder.

Figure 2 is a top plan view of the door check and a door, showing, in dotted lines, the various positions of the check during the opening and closing operations.

Figure 3 is a horizontal sectional view through one end of the piston rod and a portion of the door frame, showing the piston rod end in checking position when the door is approaching closed position.

Referring to the drawing, the numeral 1 designates a conventional form of door and which door is connected to the side of a door frame 2 by means of conventional spring hinges 3, and which spring hinges normally urge the door 1 towards closed position.

Rockably mounted at 4 on a plate 5 carried by the inner side of the door 1 is a cylinder 6, which, during the operation of the device, rocks in a horizontal plane. Interposed between the cylinder 6 and the door 1, to the outside of the pivotal point 4, is a leaf spring 7 which normally urges the inner end of the cylinder inwardly in the direction of the arrow *a* and towards the adjustable stop 8 carried by the door. It will be noted that the adjustable stop is in the form of a screw which may be screwed inwardly or outwardly, however any other form may be used.

In checks as at present constructed their piston rods are formed in one piece, consequently the pistons 9 and bearings 10 in the cap 11 wear to such an extent the checks are inefficient. To overcome this objection applicant's piston rod 12 is formed from a flat or round material and is provided with a U-shaped bend 13 intermediate its ends. The rear end 13*a* of the section 12 terminates in a transverse portion 14 to which is connected a fibre guide washer 15, which engages the inner periphery of the cylinder 6. It will be noted that it makes no difference whether wear takes place on the sides of the washer 15 or not. The other section 12*a* of the piston rod extends through an enlarged aperture 16 in one of the arms of the U-shaped portion 13 and has a bearing engagement at 17 in the other arm and also a washer 18 and cotter key 19 for connecting the piston rod sections together.

It will be noted that there is a slight floating connection of the piston rod sections in relation to each other. The piston rod section 12*a* extends rearwardly through enlarged apertures 20 in the arm 14 and guide washer 15, and has connected to its rear end the cup shaped piston 9; therefore it will be seen that lateral strain will not be imparted to the cup 9 which causes wear on opposite sides thereof as it is reciprocated

from time to time during the door opening and closing operations. When the piston 9 moves forwardly air is sucked into the rear end of the cylinder through a port 21 and past the flap valve 22 which is limited in its opening position by the stop 23. Port 21 is sufficiently large to admit sufficient air to prevent the formation of a vacuum within the cylinder, which would render the door hard to open. On the reverse movement of the piston 9, when the door is approaching closed position, the flap valve 22 is closed and the air in the rear end of the cylinder is compressed and bled to the atmosphere through the exhaust port 24, which exhaust port may be regulated in size by the adjusting screw 25.

The forward or outer end of the flat portion 12 of the piston rod terminates in an acutely angled portion 26 having a hook receiving aperture 27 in the outer end thereof. When the door is in closed position, as shown in Figure 2, the hook 28 carried by the door frame bracket 29 is disposed within the aperture 27. As the door is swung open on its hinges it will be noted that the piston rod 12 will be pulled outwardly from the cylinder thereby intaking air through the port 21. As the door continues its movement towards open position the knock-off lug 30, carried by the plate 29, will engage the acutely angled portion 26 and positively disengage the rod from the hook 28, thereby allowing the door to swing a maximum distance towards open position. It will be noted that the knock-off lug 30 is V-shaped and that it rides into the aperture 27a in the rod during the opening and closing operation. The stop screw 8 is adjusted inwardly or outwardly for limiting the inward movement of the inner end of the cylinder so the hook 28 will be received in the aperture 27.

When the door is released and is moved towards closed position by its spring hinges 3, the outer end of the piston rod will engage the flange 31 carried by the plate 29, and will be guided inwardly as clearly shown in Figure 3 where the hook 28 will be received in the aperture 27. The further closing operation of the door will cause a longitudinal outward movement of the piston 9 in the cylinder for checking the closing of the door so the door will not slam.

By forming the piston rod section 12 flat, it is obvious a wide bearing surface may be obtained at 10, however it is to be understood that applicant may use a round rod if desired without departing from the spirit of the invention.

From the above it will be seen that a door check is provided of the disconnecting type, simple in construction, positive in its operations and one wherein the wear on the piston and piston rod bearing is reduced to a minimum.

The invention having been set forth what is claimed as new and useful is:

1. The combination with a door check comprising a cylinder, a piston reciprocally mounted within said cylinder, of a piston rod connected to said piston and to a stationary member adjacent a door, said piston rod being formed from a plurality of sections having limited floating connections within the cylinder.

2. The combination with a door check cylinder carried by a hinged door hingedly connected to a door frame, a piston reciprocally mounted within said cylinder, a piston rod within the cylinder and connected to the door frame, said piston rod being formed from a plurality of sections having limited floating connections.

3. A device as set forth in claim 2 wherein the portion of the piston rod connected to the door frame terminates in a guide disc adjacent the piston and the other section of said piston rod extending through an enlarged aperture in the guide disc.

4. A device as set forth in claim 2 wherein the portion of the piston rod connected to the door frame is provided with a transverse U-shaped portion forming spaced arms, one end of the other section of the piston rod extending through an enlarged aperture in one of the arms of the U-shaped portion and having a bearing against the other arm of the U-shaped portion, said last named piston rod section extending rearwardly and connected to the piston, said first mentioned portion of the piston rod being disposed to one side of the piston carried portion and a guide disc carried by the portion of the rod to one side of the piston carried portion and through an enlarged aperture of which the piston carried portion extends.

5. A door check comprising a cylinder hingedly connected for lateral movement to a door, a door frame to which said door is hingedly connected, said cylinder extending towards the door frame, spring means for normally forcing the outer end of the cylinder towards the door, a piston within the cylinder, a piston rod connected to said piston and extending towards the door frame, a hook carried by the door frame and adapted to be received in an eye of the piston rod when the door is in closed position and a knock-off lug adjacent the hook and positioned to engage the piston rod for disengaging the eye from the hook when the door is moved to open position.

6. A device as set forth in claim 5 including a guide lug carried by the door frame and positioned to engage the end of the piston rod when the door is moved to closed position and guide the eye onto the hook.

7. A device as set forth in claim 5 wherein the outer end of the piston rod is at an obtuse angle to the other portions thereof and the knock-off lug positioned to engage the point of angling of said portions.

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