Nov. 19, 1929. C. ROSENTHAL ET AL 1,736,175

DOOR CHECK

Filed March 3, 1928

Fig. 1.

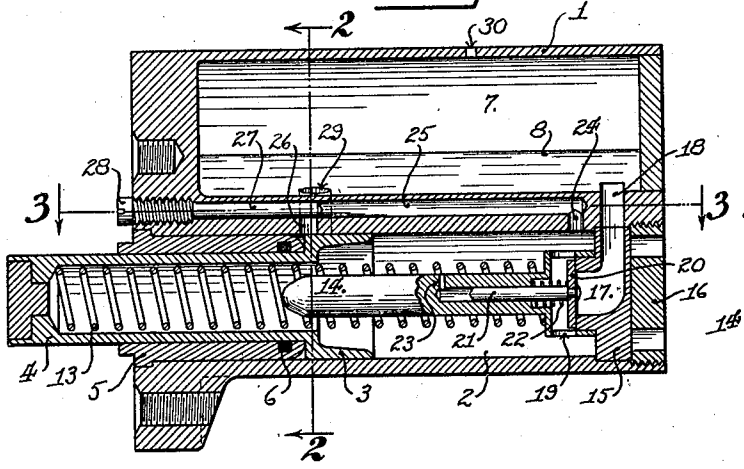
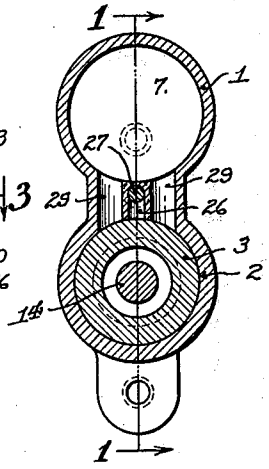


Fig. 2.



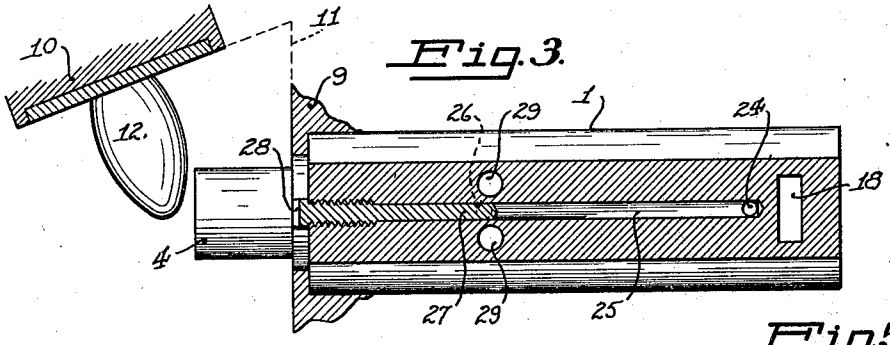


Fig. 3.

Fig. 5.

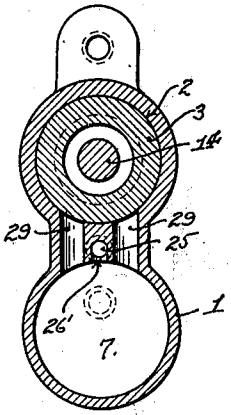
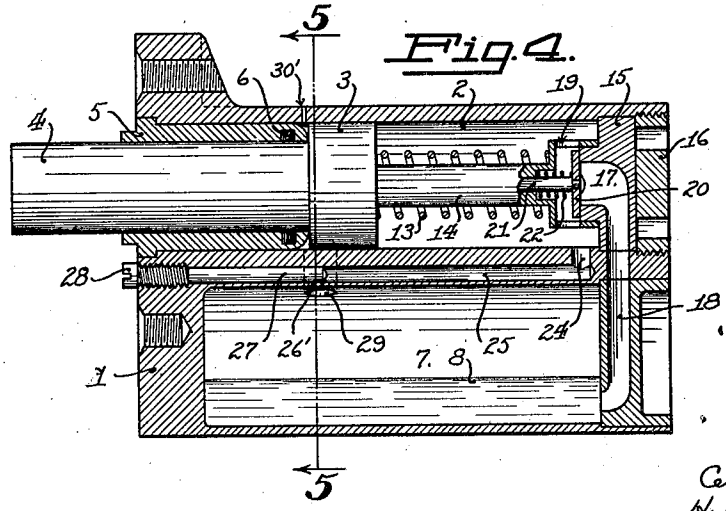


Fig. 4.



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UNITED STATES PATENT OFFICE

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DOORCHECK

Application filed March 3, 1928. Serial No. 258,821.

The present invention relates to that class of door checks in which the restricted circulation of a confined fluid serves as a yielding resistance to the closing of a door, and constitutes an improvement upon the device forming the subject matter of our pending application for United States Patent Serial No. 200,584, filed June 22nd, 1927.

Our present invention is preferably embodied in a yielding resistance member comprising a cylinder, a reciprocable piston, and a confined circulating body of liquid, said resistance member being positioned in the door frame or casing, and a presser member secured to the door for operating said piston upon the closing of the door. Obviously, however, the positions of the two members may be reversed. The cylinder and piston assembly is so constructed that it can be mortised into the door frame or the rear stile of the door, as the case may be, and thus concealed from view.

The object of our invention in general is to provide a simple and effective device for checking the closing of a door without otherwise affecting its movement. More particularly our object is to provide such a device which will operate satisfactorily without attention over a long period of time, and in which there will be no leakage of the retarding liquid.

Other objects and advantages of the invention will become apparent from the following description, which should be read with the understanding that the construction, form, and arrangement of the several parts may be varied, within the limits of the claims hereto appended, without departing from the spirit of the invention as set forth in said claims.

With this in view our inventon will now be described fully with reference to the accompanying drawings, wherein:—

Fig. 1 is a vertical central section of one embodiment of our invention.

Fig. 2 is a transverse section on the line 2—2 of Fig. 1.

Fig. 3 is a horizontal section on the line 3—3 of Fig. 1, showing also the presser member.

Fig. 4 is a vertical section of a second embodiment of the invention.

Fig. 5 is a transverse section on the line 5—5 of Fig. 4.

In the drawings, the reference numeral 1 designates a shell, in which is formed a cylinder 2. A piston 3, operable in said cylinder, has a stem 4 which extends forwarly through a guide sleeve or bushing 5 closing the forward end of the cylinder. Suitable packing is indicated at 6. The shell 1 also encloses a reservoir 7 in which a supply of suitable liquid 8 is contained.

The shell 1 is preferably mortised into either the door or its frame, as shown in Fig. 3, in which 9 indicates, for example, a portion of the door frame and 10 is a portion of the door, the hinged relation of the two being indicated by the dotted lines 11. The piston stem 4 normally projects, as shown, and is adapted to be engaged and forced inwardly, when the door is closed, by a presser member 12 secured to the rear edge of said door. A spring 13, Fig. 1, forces the piston 4 outwardly when the door is opened. In order the provide the greatest possible length for said spring, the stem 4 is hollow, as shown, and one end portion of the spring rests within it. The other end portion surrounds a fixed pin 14 and is guided thereby to prevent buckling.

The pin 14 is secured to a ported plug 15 which closes the rear end of the cylinder 2, and is held in position by a screw plug 16. The port 17 of the plug 15 communicates with the reservoir 7 by a channel 18, and with the cylinder 2 through apertures 19. A valve 20 normally closes said port 17, said valve being carried upon a stem 21 slidably mounted within the pin 14 and held to its seat by a spring 22. A vent 23 is provided for the inner end of the valve stem guide way.

The cylinder 2 has a port 24 at its rear end, which communicates with a passage 25 extending forwardly through the shell between said cylinder and the reservoir. The forward end of the cylinder also has a port 26 communicating with the passage 25, and an adjustable needle valve 27 is provided in said passage between said cylinder ports. The needle

valve is regulated by a screw stem having a head 28 extending through the front of the shell. The forward end of the cylinder also communicates with the reservoir 7 by ports 29, Figs. 1 and 2, and said reservoir is vented to the atmosphere by a port 30, Fig. 1, in its top.

It will now be seen that when the piston 3 is forced rearwardly, i. e. toward the right, as seen in Fig. 1, upon the closing of the door, the liquid which fills the cylinder 2 behind said piston, is compelled to pass through the port 24, passage 25, past the regulating valve 27, and through the port 26 into the forward end of said cylinder. The valve 20 is held closed both by its spring 22 and by the pressure of the liquid. The forward end of the cylinder having less volumetric capacity than the rear end, the excess liquid rises through the free ports 29 into the reservoir 7. By regulating the valve 27, the desired restrictive or checking effect can be obtained.

When the door is opened, however, and the piston is moved forwardly by its spring 13, the valve 20 opens and allows the liquid to flow freely from the reservoir 7 into the rear end of the cylinder through the ports 17 and 18. The liquid in the forward end of the cylinder is forced upward, without resistance, through the ports 29 into the reservoir. Thus there is no resistance to the forward movement of the piston, the reservoir 7 forming, in effect, a free return conduit for the liquid.

It is to be noted that the liquid at all times fills both ends of the cylinder, thereby lubricating and sealing the piston and its stem and the valve 20. It is also to be noted that the liquid in front of the piston is never under pressure, on account of the ports 29 and vent 30, so that leakage around the stem 4 is easily prevented by simple packing as shown at 6.

The form of device shown in Figs. 4 and 5 is similar to that described above, except that the reservoir 7 is positioned below the cylinder 2. The regulatable passage 25 in this case may discharge directly into the reservoir through a port 26′, and the vent 30′ is placed in the forward end of the cylinder. The operation is exactly the same as described above, except that there is normally little or no liquid in the forward end of the cylinder, and therefore still less chance of leakage around the stem 4.

In both forms of the device the reservoir 7 contains a reserve supply of liquid which automatically replaces the very slight leakage or evaporation that may occur, so that, when once adjusted to provide the desired degree of checking effect, the device will operate for a very long time without further attention. There are no moving parts except the piston and stem and the valve 20, which are all automatically lubricated by the liquid, and these parts can be made of ample size to last almost indefinitely without wear.

We claim:—

1. A door check comprising a cylinder adapted to contain a fluid; a piston operable in said cylinder to circulate said fluid; a restrictive conduit connecting the end portions of said cylinder; a second conduit outside said cylinder connecting its end portions; said second conduit being vented to the atmosphere and a valve in said second conduit adapting it for free fluid flow in one direction only.

2. A door check comprising a cylinder having a closed end and adapted to contain a fluid; a hollow piston operable in said cylinder to circulate said fluid; a stud extending from the closed end of said cylinder and adapted to be received within said hollow piston; a spring within said piston and surrounding said stud for moving said piston in one direction; a conduit connecting the end portions of said cylinder and adapted for restricted fluid flow; a second conduit extending from the base of said stud to the opposite end portion of the cylinder; and a valve in the base of said stud for closing said second conduit to fluid flow in one direction.

3. A door check comprising a casing having greater height than width and adapted for insertion in the meeting face of one member of a hinge-connected door and door frame assembly, said casing having a horizontally disposed cylinder and a reservoir separate therefrom and substantially in vertical alignment therewith, said reservoir having ports communicating with the end portions of said cylinder and forming a fluid passage between said end portions; means in one of said ports for restricting the fluid flow in one direction only; a piston operable in said cylinder; a stem connected with said piston and extending through the outer end of said cylinder; a presser member carried by the meeting face of the other member of said assembly and adapted for separable contact with said stem to move said piston in one direction; and means for moving said piston in the other direction.

In testimony whereof we have signed our names to this specification.

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