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1,482,917

J. H. DURNO

MOTION CHECKING DEVICE

Filed July 17, 1922

Fig. 1

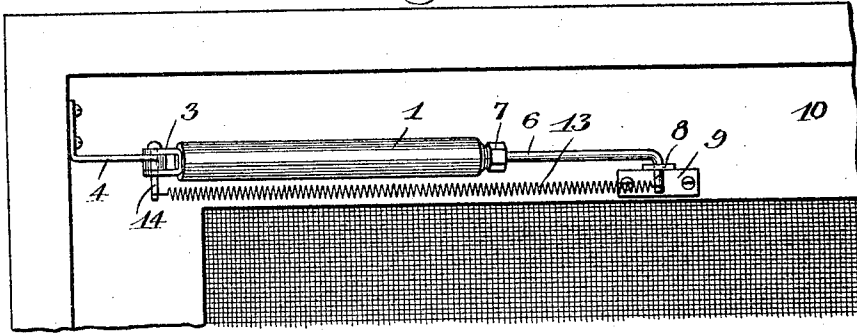


Fig. 2

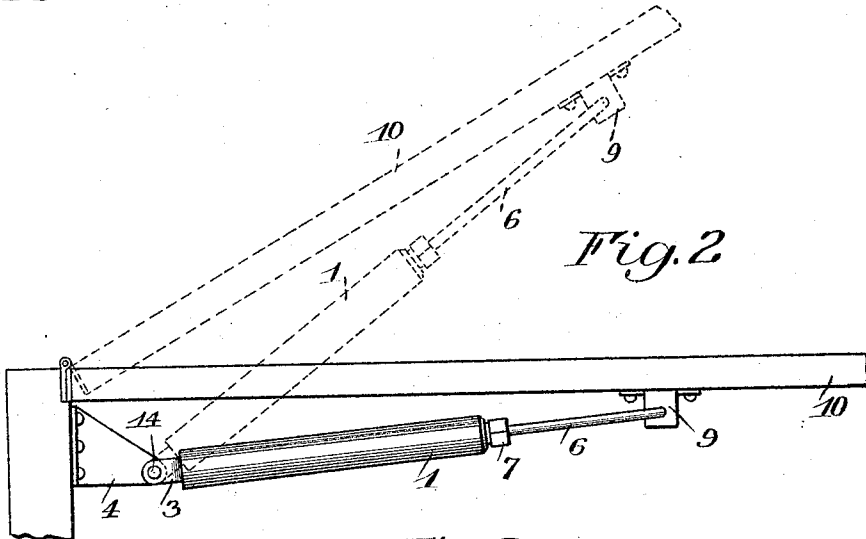


Fig. 3

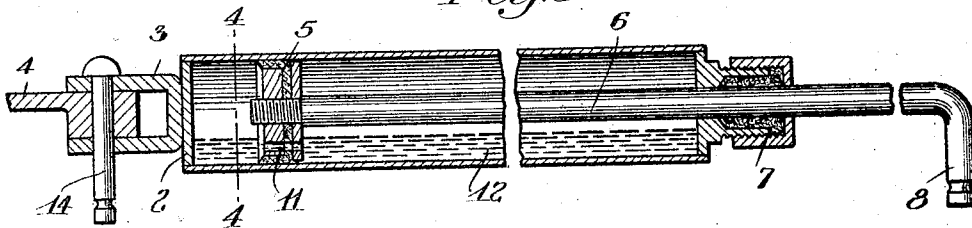
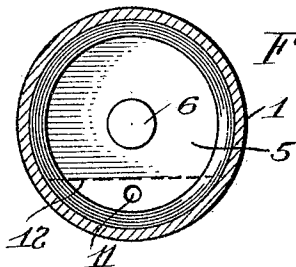


Fig. 4



INVENTOR.

John H. Durno

BY

Harold E. Stoenbrater,
his ATTORNEY

UNITED STATES PATENT OFFICE.

JOHN H. DURNO, OF ROCHESTER, NEW YORK.

MOTION-CHECKING DEVICE.

Application filed July 17, 1922. Serial No. 575,497.

To all whom it may concern:

Be it known that I, JOHN H. DURNO, a citizen of the United States of America, residing at Rochester, in the county of Monroe and State of New York, have invented certain new and useful Improvements in Motion-Checking Devices, of which the following is a specification.

My invention relates to a door check, or device for retarding or cushioning the movement of one element relatively to another, and it has for its purpose to afford a practical and economical construction that can be readily applied to a door or other similar part to be controlled.

A further purpose of the invention is to provide a construction involving but few parts, and which when once set up will continue indefinitely to function properly, eliminating likelihood of breakage or derangement of parts or the necessity of frequent adjustment.

Still an additional object of the invention is to provide a door check which depends for its operation upon the action of liquid, such as oil, and which at the same time requires no valves, and but a small amount of liquid.

The invention also includes certain other advantages and improvements, all of which will appear clearly from the following description in conjunction with the accompanying drawing, the novel features being pointed out in the claims following the description.

In the drawing:

Figure 1 is a front elevation showing the application of a preferred embodiment of the invention to a screen door and door frame;

Figure 2 is a plan view showing in full lines the position of the parts when the door is closed, and in dotted lines the position of the parts when the door is open;

Figure 3 is a longitudinal sectional view through the cylinder constituting part of the mechanism, and

Figure 4 is a transverse sectional view on line 4—4 of Figure 3.

In the structure which I am about to describe, the details and specific arrangement do not limit the broad features of the invention, and the illustrated embodiment is intended only by way of example of various possible practical adaptations of my improvement.

The structure shown comprises in general

a cylinder 1 having a closed end 2 which has fixedly secured thereto a yoke 3 by which the cylinder is pivotally mounted upon a stationary bracket or support 4 attached to the door frame. Movable within the cylinder 1 is a piston which may be of any desired construction, as indicated generally at 5, the piston being mounted on a piston-rod 6 which extends through a suitable stuffing-box 7 and has a bent end portion 8 that is attachable to a plate 9 carried by the door 10.

In the operation of the mechanism, the cylinder and piston-rod occupy a horizontal or approximately horizontal position, as shown, although one end may be tilted slightly with reference to the other without disturbing the proper functioning of the parts. In this operative position, the bent end portion 8 of the piston-rod extends downwardly and thus by its connection with the plate 9 serves to prevent rotation of the piston 5 within the cylinder. Said piston 5 is provided with a reduced opening 11 extending entirely therethrough and located preferably at a point beneath the center of the piston. I have illustrated the opening 11 as arranged near to the bottom of the piston, while 12 indicates a body of oil or other similar suitable liquid located in the bottom of the cylinder. I have found that excellent results are accomplished by having just enough liquid to approximately cover the opening 11, and while in some cases it may be desirable to slightly increase the amount of liquid to obtain greater checking action, for the average operation it is desirable to have as small a quantity of liquid as possible, and just enough to extend slightly above the top of the opening 11. 13 is a spring connecting the pivot pin 14 with the bent portion 8 of the piston-rod, and acting to draw the door to closed position after it has been opened.

By providing the stuffing-box 7, the cylinder 12 is made practically air-tight, and there is no opportunity for the air within the cylinder to escape. Under these conditions, as the piston is moved in one direction or the other along the cylinder, it acts first to compress the air imprisoned in front of it, and this compressed body of air acting downwardly upon the body of liquid at the bottom of the cylinder, holds said liquid evenly against the bottom of the cylinder and thereby causes the latter to move

through the opening 11. By employing liquid such as oil for the checking medium, I obtain a steady and efficient cushioning action, and by reducing the amount of liquid to a minimum, I reduce to a minimum the time required for the checking action. Thus the total time consumed in closing a door is considerably less than with known types of liquid checking devices where large bodies of liquid are required to pass through an opening, and at the same time I eliminate the disadvantages of checking devices which depend entirely upon air, while retaining the desirable quick action of the air, by utilizing it as the intermediary to force the liquid through the opening.

While I have described the invention with reference to a particular means, it is not limited or intended to be limited to this embodiment, but may be modified in various ways without departing from the fundamental spirit of the improvement or the scope of the following claims.

I claim:

1. The combination with a cylinder attachable to one of a pair of relatively movable elements and arranged in approximately horizontal position when in operation, of a piston movable in the cylinder and provided with a free opening near the bottom thereof, a piston-rod carrying said piston and attachable to the other of said pair of relatively movable elements, and a relatively small body of liquid in said cylinder, said opening in the piston permitting flow of said liquid in either direction through the piston whereby the liquid passes to opposite sides of the piston only through said opening.

2. The combination with a cylinder attachable to one of a pair of relatively movable elements and arranged in approximately horizontal position when in operation, of a piston movable in the cylinder and provided with a free opening near the bottom thereof, a piston-rod carrying said piston and attachable to the other of said pair of relatively movable elements, and a body of liquid arranged at the bottom of said cylinder and extending to a point approximately slightly above the top of said opening in the piston, said opening in the piston permitting flow of said liquid in either direction through the piston whereby the liquid passes to opposite sides of the piston only through said opening.

3. The combination with a cylinder attachable to one of a pair of relatively movable elements and arranged in approximately horizontal position when in operation, of a piston movable in the cylinder, a piston-rod carrying said piston and attach-

able to the other of said relatively movable elements, and a relatively small body of liquid in the bottom of said cylinder, the piston having a free opening beneath the level of said body of liquid, said opening in the piston permitting flow of said liquid in either direction through the piston whereby the liquid passes to opposite sides of the piston only through said opening.

4. The combination with a cylinder attachable to one of a pair of relatively movable elements and arranged in approximately horizontal position when in operation, of a piston movable in the cylinder and provided with a free opening beneath the center thereof, a piston-rod carrying said piston and attachable to the other of said pair of relatively movable elements, and a relatively small body of liquid movable back and forth through said opening along the bottom of the cylinder, said opening in the piston permitting flow of said liquid in either direction through the piston whereby the liquid passes to opposite sides of the piston only through said opening.

5. The combination with a cylinder attachable to one of a pair of relatively movable elements and arranged in approximately horizontal position when in operation, of a piston movable in the cylinder, a piston-rod carrying said piston and attachable to the other of said relatively movable elements, a stuffing-box through which said piston-rod passes affording a substantially air-tight cylinder, the piston having a free opening, and a body of liquid movable back and forth through said opening, said opening in the piston permitting flow of said liquid in either direction through the piston whereby the liquid passes to opposite sides of the piston only through said opening.

6. The combination with a cylinder attachable to one of a pair of relatively movable elements and arranged in approximately horizontal position when in operation, of a piston movable in the cylinder, a piston-rod carrying said piston and attachable to the other of said relatively movable elements, a stuffing-box through which said piston-rod passes affording a substantially air-tight cylinder, the piston having a free opening near the bottom thereof, and a relatively small body of liquid at the bottom of the cylinder movable back and forth through said opening, said opening in the piston permitting flow of said liquid in either direction through the piston whereby the liquid passes to opposite sides of the piston only through said opening.

In witness whereof, I have hereunto signed my name.

JOHN H. DURNO.