March 13, 1928. 1,662,395

L. C. NORTON

SCREEN DOOR CLOSER

Filed May 15, 1926

Fig. 1.

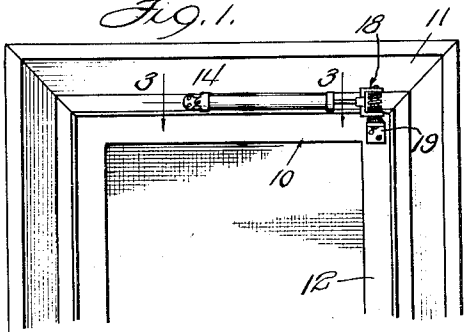



Fig. 2.

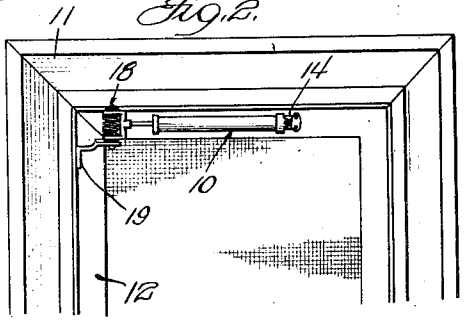



Fig. 3.

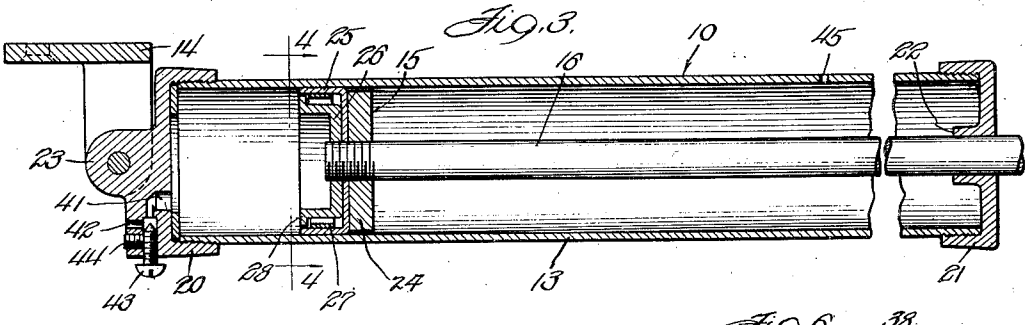



Fig. 4.

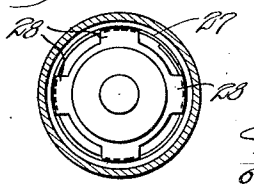



Fig. 6.

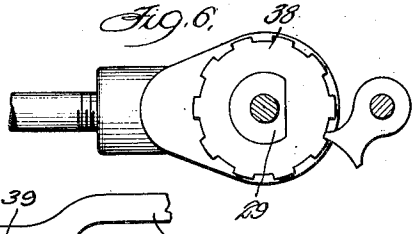



Fig. 5.

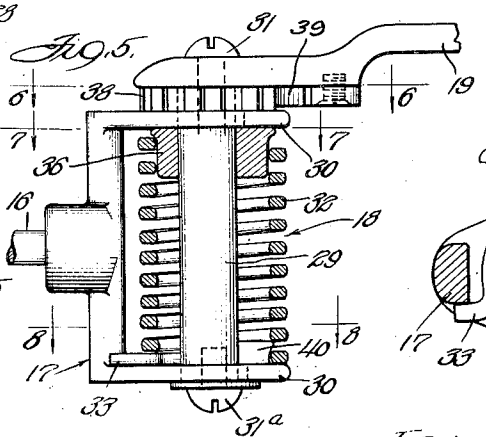



Fig. 7.

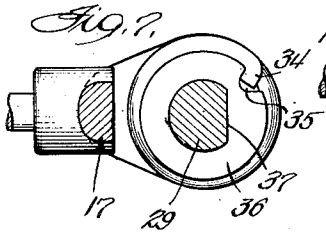
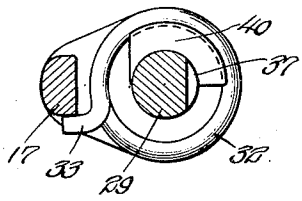



Fig. 8.




Inventor:
Lewis C. Norton

By Jones, Addington, Ames & Nichols
Attys.

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# UNITED STATES PATENT OFFICE.

LEWIS C. NORTON, OF CHICAGO, ILLINOIS, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE YALE & TOWNE MANUFACTURING COMPANY, OF STAMFORD, CONNECTICUT, A CORPORATION OF CONNECTICUT.

## SCREEN-DOOR CLOSER.

Application filed May 15, 1926. Serial No. 109,251.

My invention relates to door checks and closers and relates particularly to door checks and closers adapted for use on doors of light construction such as screen doors and the like.

While this invention is described in connection with a screen door nevertheless it is not to be limited to this use, since a device of this character is applicable to doors of any construction.

Doors of an auxiliary character are lightly constructed and are usually positioned adjacent to a main door and within the same frame. In such an instance the space available for the mounting of a device of this kind is limited and, therefore, various conditions are presented to which this device must be adapted.

One of the objects of this invention is to provide a door checking and closing means of a design which may be installed in various positions.

A further object of this invention is to provide a device in which the pivot will be located on the axis of the piston cylinder.

A further object of this invention is to provide an improved piston construction.

A further object of this invention is to provide an improved spring centering construction.

A further object of this invention is to provide an improved construction in which the speed of closing the door can be regulated.

Further objects and advantages will be apparent from the following description and the accompanying drawing illustrating a preferred embodiment of my invention, in which drawings:

Figure 1 is a front view of a screen door and frame showing the device mounted thereon;

Fig. 2 is a view similar to Fig. 1 showing the device mounted in a different manner;

Fig. 3 is a transverse sectional view of the device taken on the line 3—3 of Fig. 1;

Fig. 4 is a section on the line 4—4 of Fig. 3;

Fig. 5 is a vertical section of the spring-closing means;

Fig. 6 is a top plan section on the line 6—6 of Fig. 5;

Fig. 7 is a top plan section on the line 7—7 of Fig. 5; and

Fig. 8 is a top plan section on the line 8—8 of Fig. 5.

Referring now to the drawings, and particularly to Figs. 1 and 2 thereof, the door check and closer 10 which operates between the door jamb 11 and the door 12, comprises a cylindrical casing 13 pivoted at one end to a bracket 14, and a piston 15 mounted on one end of a piston rod 16, the other end of said rod having a forked projection 17 which engages a spring actuating means 18, which latter is mounted on a bracket 19.

The casing 13 is closed at each end by threaded closures or caps 20 and 21, cap 21 adapted to provide a bearing 22 for the piston rod 16 and cap 20 adapted to provide a pivot connection 23 which is secured to bracket 14.

The piston disposed within the casing 13 and mounted on the piston rod 16 comprises an annular ring 24 of a substantially smaller diameter than that of the casing 13, a flanged leather washer 25 which snugly fits the casing, and a clamping member 26 which holds the washer 25 against the ring 24. An annular spring 27 is provided to bear against the flange portion of the washer 25 in order that a close contact shall exist between the wall of the casing and the washer. A plurality of lugs 28 are disposed on the outer periphery of the clamping member 26 for positioning the spring 27. It will be apparent that this piston so constructed will be positive in action and will not be made reliant upon the resistance of the created pressure within the casing to produce the aforesaid close contact.

The spring actuating means 18 comprise a shaft 29 loosely mounted in the arms 30 of the forked projection 17, said shaft extending through said projection and secured at its upper end to the bracket 19 by means of a screw 31, and at its lower end by a washer and screw 31a. A coil spring 32 is disposed between the arms 30 of the forked projection 17, one end of said spring being formed into a hook 33 for engagement therewith and the other end being formed into a hook 34 to engage a slot 35 in a ring 36. The shaft 29 has a flat surface 37 and, as the ring 36 has an aperture conforming to the contour thereof, a fixed relation exists. Fixedly mounted on shaft 29 and disposed between the bracket 19 and arm 30 is a

ratchet 38 which engages a pawl 39 mounted on said bracket 19. This pawl 39 prevents the ratchet 38 from rotating and also acts as an adjusting means for securing the proper tension on the spring.

The operation of the spring actuating means consists in rotating the piston rod 16 and its forked projection 17 around the shaft 29 as a center, and since one end of the coil spring is fixed to the ring 36, which in turn is fixed to the stationary shaft 29, and the other end has a fixed relation to the rotatable forked projection 17, the coil spring is wound and caused to have a greater action on the door.

A novel feature of my invention resides in the centering of the spring 32. When the spring is wound, as is the case when the door is opened, the diameter of the spring decreases and as the lower end of the spring is more materially affected, a mutilated collar 40 is provided which is cast integrally with the lower arm 30. This effectively centers the spring as the ring 36 and the collar 40 have the same radial dimensions. Also, by reason of the collar being mutilated, a compensation for the variance in the diameter of the spring is effected.

As shown in Fig. 5, adjacent portions of adjacent coils of the spring 32 are flattened and spaced slightly from each other whereby the coils of the spring may be subjected to a considerable amount of torsion before adjacent coils come in contact, and whereby a relatively large number of coils may be accommodated between the arms 30 of the yoke.

It will also be apparent that the bracket 19, together with its associated parts—ratchet 38, pawl 39 and shaft 29—may be inserted into the lower end of the forked projection 17 and operate similarly and as effectively. Being interchangeable in this manner, various conditions in the mounting of the device can be readily taken care of.

Figures 1 and 2 show two different ways in which the door closer may be mounted. In Fig. 1 the door is hinged on the right-hand side and swings toward the side on which the closer is mounted. In Fig. 2 the door is hinged on the left-hand side and swings away from the side on which the closer is mounted.

Referring first to Fig. 1, in this arrangement the bracket 19 is mounted on the door and extends upwardly to bring the casing 13 above the upper edge of the door. The bracket 14 is secured to the door jamb above the door. In this construction when the door is opened the piston is drawn outwardly from the cylinder or casing 13 and the tension in the torsion spring 32 is increased. When the door is released to allow it to close, the torsion in the spring acts to swing the door to closed position, forcing the piston inwardly to the left in the casing 13, the air to the left of the piston forming a cushion to prevent slamming the door,

In the construction shown in Fig. 2 the bracket 19 is secured to the inside of the door jamb and the bracket 14 is secured to the upper edge of the door. When the door is opened the piston rod is drawn outwardly with respect to the casing 13 and the tension in the torsion spring is increased. When the door is released to permit it to close, the tension in the spring 32 acts to swing the piston rod 16 to move the door to closed position, the piston rod being pushed inwardly with respect to the casing 13 and the air in the cylinder acting as a cushion. The arrangement of the ratchet 38, pawl 39 and shaft 29 in Fig. 2, is reversed with respect to the arrangement shown in Fig. 1, to enable the spring tension in the torsion spring to act as desired.

The speed of the closing of the door is regulated by a valve construction comprising an aperture 41 in the cap 20, in communication with the casing 13 and a restricted opening 42. A screw 43 having a tapered end to serve as a valve is inserted into the cap 20 to restrict the communication thus provided through the openings 41 and 42 to the casing. As has been hereinbefore set forth, when the door is closed the piston 15 moves laterally in the casing 13 against the pressure of the air therein. The air escaping through the openings 40 and 41 allows for this movement, and the regulation of the amount of air to escape determines the speed of the closing of the door. When the proper speed has been determined, a brass screw 44 is screwed tightly against the shank of the screw 43 until the head is twisted off, thereby providing against tampering or a later misadjustment thereof. While the screw 44 bears on the screw 43 with sufficient force to make it unlikely that it will be tampered with by anyone unfamiliar with its use, nevertheless, because of the soft material of which the screw 44 is formed, the screw 45 may still be adjusted, if desired, by one familar with the adjustment of the door check as the screw 44 acts somewhat as a friction drag on the rotation of the screw 43 to hold it securely in adjusted position but permitting adjustment by the use of sufficient force.

An aperture 45 is provided in the casing 13, and centrally thereof to facilitate the initial opening or closing of the door. As the piston in its position shown in Fig. 3 moves to the right, the escape of the air allows the door to be more easily opened until the piston passes the aperture, after which the air therein is compressed and forms a cushion to retard the movement of the door. A similar action exists upon the closing of the door when the piston moves to the left, the initial movement, until the aper-

ture 45 is passed, being substantially faster than the final movement.

While but a single embodiment of this invention is herein shown and described, it is to be understood that this invention is not to be limited to the exact structure or the details thereof, since various other forms will be apparent to one skilled in the art and consequently it is to be limited only by the scope of the appended claims and the prior art.

I claim:

1. A door check and closer comprising a cylinder, a closure mounted on each end of said cylinder, a hinge member having means whereby it may be secured to a door construction and having a pivotal connection with one of said closures, said pivotal connection being in axial alignment with said cylinder, a piston within said cylinder for retarding the movement of said door, a piston rod secured to said piston and extending through the other closure, a bracket having means whereby it may be secured to a door construction and having a pivotal connection with said piston rod and spring actuating means acting between said bracket and piston rod for exerting a swinging action on said rod for closing the door.

2. A door check and closer comprising a cylinder, a piston within said cylinder for retarding the movement of the door, a rod secured to said piston, means for exerting a swinging action on said rod for closing said door, said piston comprising a ring of a substantially smaller diameter than that of said casing and mounted on said rod, a clamping member, a flexible flanged washer disposed between said ring and said clamping member, and resilient means for pressing the flange of said washer outwardly against the wall of said cylinder.

3. A door check and closer comprising a cylinder, a piston within said cylinder for retarding movement of the door, a rod secured to said piston, means for exerting a swinging action on said rod for closing said door, said piston comprising a ring of a substantially smaller diameter than that of said casing and mounted on said rod, a clamping member having a plurality of projecting lugs on its outer periphery, a flexible flanged washer disposed between said ring and said clamping member, and an annular spring member for pressing the flange of said washer outwardly against the wall of said cylinder and held in position by said lugs of said clamping member.

4. A door check and closer comprising a cylinder, a piston within said cylinder for retarding the movement of the door, a rod secured to said piston having a forked projection, and means for exerting a swinging action on said rod for closing said door, said means comprising a fixed shaft journalled in said forked projection, and a spring, one end of said spring being secured to said forked projection and the other end of said spring being secured to said fixed shaft, and a bracket on which said shaft is mounted having a flat base portion offset from the axis of said shaft whereby it may either be secured to a part of the door frame lying in a vertical plane parallel to the door or to a part of the door frame lying in a vertical plane perpendicular to the door, said shaft being insertable into said forked projection from either side thereof, whereby the spring action may be reversed when required for different mountings of the bracket.

5. A door check and closer construction comprising a cylinder, a piston operating in said cylinder, a piston rod secured to said piston, a yoke secured to said piston rod, a pin oscillatably mounted in said yoke, an arm, means for securing said arm to said pin in various positions of rotatable adjustment, and a coil torsion spring surrounding said pin and secured to said pin and to said yoke for effecting relative angular movement between said piston and said arm, adjacent coils of said spring being spaced slightly apart and flattened whereby the coils may be subjected to a considerable amount of torsion before adjacent coils come in contact with each other, and whereby a relatively large number of coils may be accommodated between the arms of said yoke.

In witness whereof, I have hereunto subscribed my name.

LEWIS C. NORTON.