

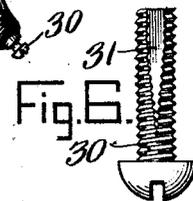
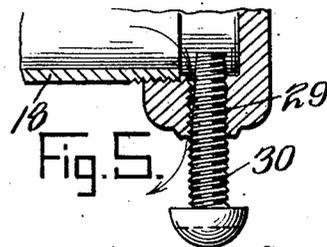
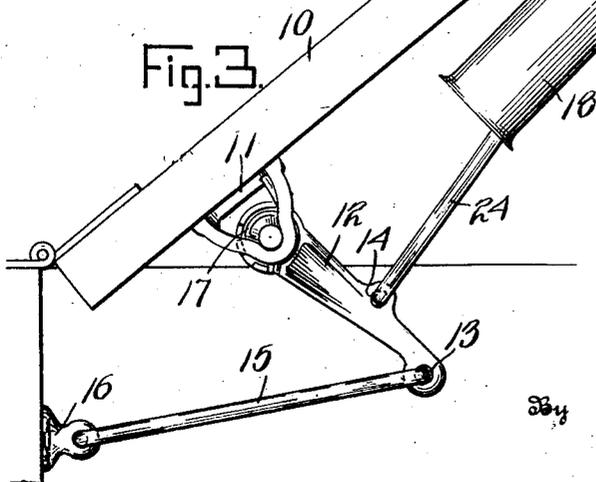
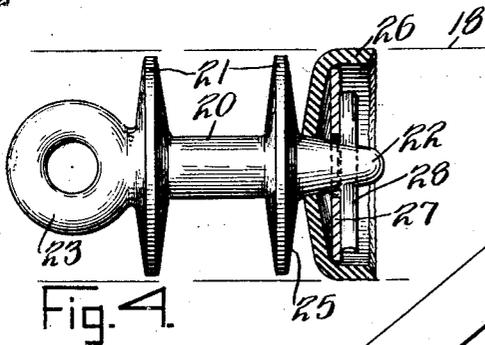
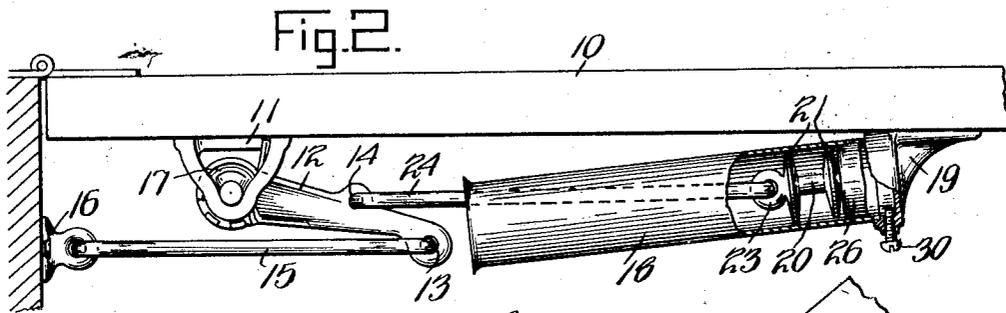
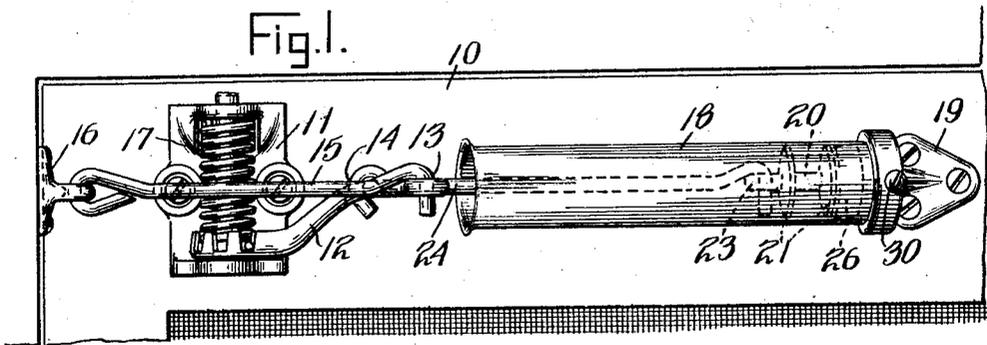
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M. W. OTTO

1,705,334

AUTOMATIC DOOR CLOSER

Filed May 6, 1927



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384
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UNITED STATES PATENT OFFICE.

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AUTOMATIC DOOR CLOSER.

Application filed May 6, 1927. Serial No. 189,339.

My invention relates to automatic door closers, particularly to a device of this character wherein spring power is employed for closing the door and pneumatic means for cushioning the closing operation.

The object of the invention is to provide a neat, durable, dependable and inexpensive device of this character, all as will be hereinafter more particularly described and claimed.

Referring to the accompanying drawings which are made a part hereof and on which similar reference characters indicate similar parts,

Figure 1 is a side elevation illustrating one application of my invention,

Figure 2, a top plan view,

Figure 3, a similar view with the door in a partly open position,

Figure 4, a detail of the piston,

Figure 5, a detail illustrating the method of controlling the escape of air from the pneumatic chamber, and

Figure 6, a view of the screw shown in Fig. 5 and at right angles to said figure.

In the drawings reference character 10 indicates a screen or other door of light construction upon which is mounted a spring hinge 11 provided with an arm 12 having an opening 13 at its outer end and an intermediate opening 14 on its inner edge. A link 15 has one end pivoted in a fastening element 16 upon the door frame and has its other end extending through the perforation 13 in the arm 12. By this construction, when the door 10 is swung outwardly the arm 12 will be held stationary by the link 15 thus effecting a twisting of the spring 17 of the spring hinge 11 and when the door is released it will be caused to close under the action of such spring.

In order to prevent the slamming of the door, I provide pneumatic means for cushioning the action of the spring hinge which in the present instance comprises a cylinder 18 supported by means of a bracket 19 in which it is threaded or otherwise secured. A piston is provided for reciprocation within the cylinder 18 and said piston comprises a spool, as shown in Fig. 4, having a central axis 20 provided with longitudinally spaced disks 21, said axis terminating in a tapered or conical boss 22 extending from the center of one of said disks and being provided

with a ring 23 at its opposite end centrally of the disk.

The disks 21 of the piston spool are a sufficient distance apart to insure the proper guiding and bearing of the piston within the cylinder.

A link 24 connects the ring 23 and the arm 12 of the spring hinge so that as the door and cylinder 18 thereon are moved relative to such arm, the spool will be reciprocated in the cylinder 18. The side of the disk 25 adjacent the tapered or conical boss 22 is preferably convex to form a seat for a piston leather or cup washer 26.

The piston leather 26 is provided with a central perforation of a size to fit loosely on the small outer end of the tapered or conical boss and to fit tightly about the inner end of the boss, such piston leather being retained by a loose washer 27 held in place by cotter pin 28 extending transversely through the boss 22. This construction is very simple and the piston leather is prevented from slipping off the boss and yet no threads, nuts, expanders or the like are used. The tapered or conical boss permits the leather cup to reach an air tight position when pressed against the convex face 25 of the disk 21 and the forward travel of the piston with the closing of the door favors and maintains this air tight position of the leather cup. Also, on account of the free movement of the leather cup, its center and bottom are forced forward which causes a positive and full expansion of the sides of the leather cup outwardly against the inner cylinder wall which forms an excellent air cushion or compression chamber within the end of the cylinder.

The return or backward travel of the piston on the opening of the door, moves the center of the cup leather backward to the position shown in Fig. 4 permitting the flange or periphery of the leather cup to contract or relax practically eliminating friction, suction and wear on the same.

In order to control the cushioning action of the piston, I preferably provide an opening 29 in the portion of the bracket 19 at the bottom of the cylinder 18 and control such passage by means of a screw 30 having a tapered flattened side 31 so that by longitudinal movement of the screw the passage of air through the opening 29 may be controlled as desired.

One very important feature of my invention is due to the particular arrangement of the parts which permits the door to be opened as freely with my device applied as it was before, or, in other words, through an angle of 180° on doors of medium thickness and using medium size hinges. Also, my device may be installed on right and left hand doors without changing any parts, it being only necessary to invert the device as it functions equally well in either position all of the parts working on a common center.

The device may be rendered inoperative by merely disconnecting the end of the link 15 from the opening 13 in the arm 12. This permits the removal and replacement of the screen door without altering the adjustments or the application of tools in my device.

It will be obvious to those skilled in the art that various changes may be made in my device without departing from the spirit of my invention, and I, therefore, do not limit myself to what is shown in the drawings and described in the specification, but only as set forth in the appended claims.

Having thus fully described my said invention, what I claim as new and desire to secure by Letters Patent, is:

1. A piston comprising an elongated body; a pair of transversely arranged members mounted in longitudinally spaced relation on said body and adapted to cooperate with a cylinder wall for maintaining said body in axial relation relative to the cylinder, the side of one of said members remote from the other member being of a convex shape, said body having a tapered extension adjacent said convex portion, and an oppositely disposed cup shaped gasket longitudinally slidable on said tapered extension and adapted when moved in one direction to be moved along the tapered extension against said convex surface and against the cylinder wall to prevent the passage of air by the piston, substantially as set forth.

2. A piston comprising a central axis, spaced disks carried by said axis, said axis

terminating in a tapered boss at the outer side of one of said disks, a cup shaped piston packing slidably mounted on said tapered boss and having a central opening of a size corresponding to the base portion of the boss, the side of said disk adjacent said packing being convex whereby when the piston is moved in one direction the packing will be moved along the boss to seating position thereon and into tight engagement with the cylinder wall to prevent the passage of air by said piston, and when moved in the opposite direction said packing will be moved along the boss to non-seating position and out of engagement with the cylinder wall to permit the passage of air by the piston, substantially as set forth.

3. A device of the class described, comprising a cylinder, a piston in said cylinder adapted to be moved longitudinally for compressing air for cushioning the movement of the piston in one direction, said piston comprising a pair of transversely arranged members disposed in longitudinally spaced relation, one of the members having a convex outer side, a tapered extension extending longitudinally from said convex side, a cup shaped gasket loosely mounted on said tapered extension and adapted when the piston is moved in one direction to move away from the cylinder wall and the convex side to permit air to pass around the periphery of the gasket and around the projection through the center of the gasket, but adapted when the piston is moved in the opposite direction to be forced by the air against said convex outer side until the central perforation in the gasket is closed by the tapered boss, and such gasket is outwardly expanded into snug engagement with the cylinder wall, substantially as set forth.

In witness whereof, I have hereunto set my hand at Aurora, Illinois, this fourth day of May, A. D. nineteen hundred and twenty-seven.

MILLER W. OTTO.