May 20, 1930. H. J. LEBHERZ 1,759,649

PNEUMATIC DOOR CLOSER

Filed Aug. 11, 1928

FIG. 1

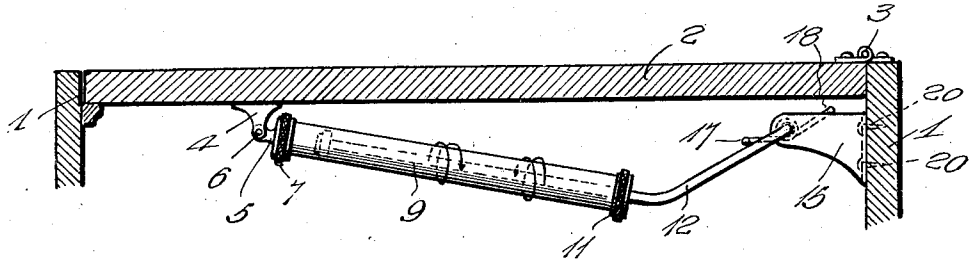


FIG. 2

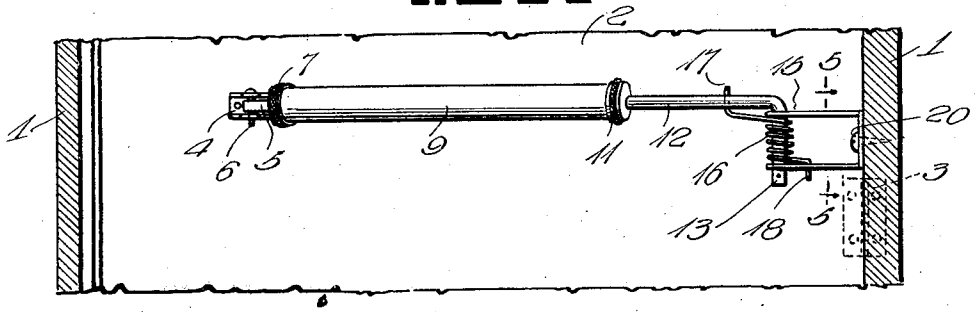


FIG. 3

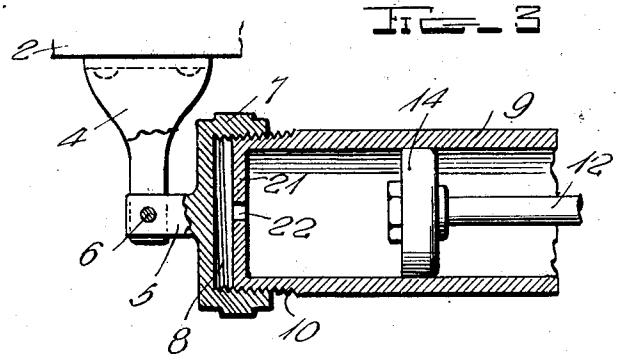


FIG. 5

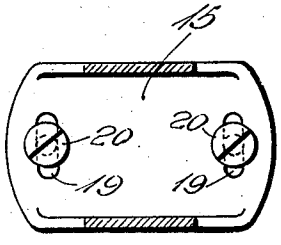
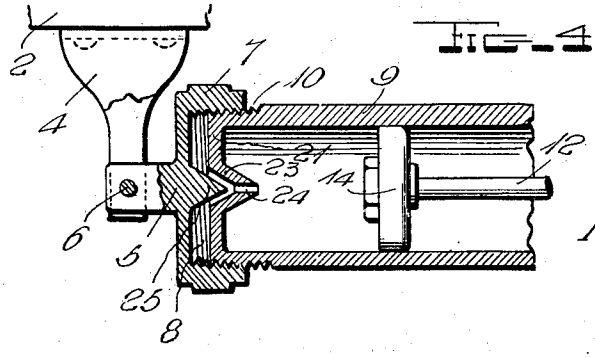


FIG. 4



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UNITED STATES PATENT OFFICE

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PNEUMATIC DOOR CLOSER

Application filed August 11, 1928. Serial No. 299,064.

My invention relates broadly to door closers and more particularly to a construction of pneumatic door device for cushioning the closing of doors.

One of the objects of my invention is to provide a construction of pneumatic door closer of extremely simple construction and which is capable of manufacture at relatively small expense on a quantity production scale.

Another object of my invention is to provide a simplified construction of pneumatic door closer wherein the pneumatic cylinder may be rotated about a longitudinal axis to selectively adjust the rate of passage of air from the cylinder to regulate the movement of the door.

Still another object of my invention is to provide a construction of cylinder for pneumatic door closers where the cylinder operatively receives a reciprocatory piston which connects to the door jamb to which the door is hinged, the end of the cylinder being screw threaded to engage a screw threaded socket member which is pivotally mounted upon the door, the cylinder being rotatably adjustable in the socket member for controlling the passage of air from the cylinder.

A further object of my invention is to provide a construction of exteriorly screw threaded pneumatic cylinder for door closers wherein the end of the cylinder engages a pivotally mounted socket member in a manner whereby the rate of passage of air from the cylinder may be regulated by the selection of the position of the cylinder in the pivotally mounted socket for permitting simple adjustment of the door closer after the installation thereof on a door.

A still further object of my invention is to provide a construction of bracket mounting for a door closer by which adjustment may be made to properly align the door closer in position between a door jamb and the hinged door.

Other and further objects of my invention reside in the construction of the silent door closer set forth in the following specification and shown in the accompanying drawings:

Figure 1 is a plan view showing the pneumatic door closer of my invention mounted in position with respect to a hinged door and door jamb; Fig. 2 is a front elevation showing the arrangement of the pneumatic door closer installed with respect to a door; Fig. 3 is a fragmentary cross-sectional view taken through the end of the pneumatic cylinder and showing the construction of screw threaded socket which receives the screw threaded end of the pneumatic cylinder for permitting the requisite adjustment in rate of passage of air from the cylinder; Fig. 4 is a cross-sectional view of a modified form of air passage for a silent door closer; and Fig. 5 is a cross-sectional view taken through the bracket mounting of the door closer on line 5—5 of Fig. 2.

The pneumatic door closer of my present invention is extremely simple in its construction and may be manufactured relatively inexpensively on a quantity production basis.

The door closer consists of a cylinder with a piston member longitudinally operative therein, the piston member having a rod connected therethrough, which rod engages a bracket secured to the jamb to which the door is hinged. Spring means are provided for normally urging the door closer to a position in which the door is closed with respect to the door jamb. The end of the cylinder is screw threaded to engage internal screw threads carried by a socket member, which socket member is arranged to be pivotally connected to a door, the door being hinged to the door jamb on which the bracket mounting for the door closer is located. The end of the cylinder is suitably apertured to permit passage of air into or out of the cylinder at a predetermined rate for regulating the movement of the door with respect to the door jamb. The bracket member may be moved to a position for properly aligning the door closer by means of the arcuate shaped slots through which the securing screws of the bracket are passed.

By revolving the cylinder as represented by the arrows in Fig. 1, proper adjustment may be obtained for controlling the rate of movement of the door under the influence of the door closer.

Referring to the drawing in more detail,

reference character 1 designates the door jamb to which a door 2 is hinged as represented at 3. A mounting device 4 is secured to the door 2 to which a socket member 5 is pivotally connected as shown at 6. The portion 7 of the socket member 5 is provided with internal screw threads 8 which are cut on a taper to receive the screw threaded end 10 of the cylinder 9. The screw threads 10 are cut on a taper to conform with the taper alignment of the internal screw threads 8 in the socket member 5. The opposite end of the cylinder 9 is provided with a screw threaded cap 11 through which the piston rod 12 passes. The end of the piston rod 12 has a downwardly extending portion 13 thereon which passes through the bracket member 15. A spiral spring 16 has one end thereof engaged with bracket 15 as represented at 18 and the other arm thereof engaged as represented at 17 with the piston rod 12. The bracket 15 is provided with arcuate slots 19 in one wall thereof through which screw devices 20 pass for securing the bracket to the door jamb 1. By providing the arcuate shaped slots 19 the screws 20 may be loosened and the bracket member moved to the required angle for receiving the end of the piston rod 12. The piston rod 12 carries piston 14 thereon which is operative in the cylinder 9. Spring 16 through connections 17 and 18 operates to constantly urge piston rod 12 to a position away from the door 2, thereby maintaining the door in closed position with respect to the door jamb. In order to provide for the passage of air into or out of the cylinder 9 the end wall of the cylinder at 21 is apertured as shown at 22. By revolving cylinder 9 the tapered screw threads 10 are adjusted in the tapered screw threads 8 to a position toward or away from the extreme inner wall of the socket member 5, thereby changing the area for the passage of air into or out of the cylinder. When the cylinder 9 is screwed into a position substantially within the socket member 5 the rate of movement of air into or out of the cylinder 9 is exceedingly small. If the cylinder 9 is revolved to a position out of the screw threads 8 a freer movement for the passage of air into or out of the cylinder is obtained by virtue of the smaller number of engaging threads at 8 and 10. It will be understood that I depend upon the leakage or entrance of air between the threads 8 and 10 to control the rate of movement of the door.

In Fig. 4 I have shown a modified form of air passage for the end of the pneumatic cylinder. The end wall 21 is provided with an inwardly projecting conical wall 23 at the center thereof with a central aperture 24 disposed at the apex of the wall 23. The socket member 5 is provided with a conical shaped central portion 25 adapted to cooperate with the conical shaped portion 23 of wall 21 to serve in the manner of a needle valve for controlling the passage of air through the port 24. By revolving the cylinder 9 the surface of the conical portion 25 of the socket member 5 engages the inwardly projecting wall 23, thereby decreasing the passage of air into or out of the cylinder 9 and slowing down the movement of the door. However, as cylinder 9 is revolved to move the cylinder out of the socket member 5 the area of the air passage is increased thereby increasing the rate of movement of the door.

While I have described my invention in certain preferred embodiments I desire that it be understood that modifications may be made and that no limitations upon my invention are intended other than are imposed by the scope of the appended claims.

What I claim as new and desire to secure by Letters Patent of the United States is as follows:

1. A door closer comprising a rotatable cylinder, a piston and piston rod operative in said cylinder, a socket member having internal screw threads cut therein on a taper, the end of said cylinder being screw threaded on a taper corresponding to the taper of the internal screw threads in said socket member, the end wall of said cylinder being ported to permit the passage of air into or out of said cylinder for leakage through the threaded connection between the end of said cylinder with said socket member, the rate of leakage of the air being predetermined by rotation of said cylinder to a selected position with respect to said socket member.

2. In a door closer a pneumatic cylinder, a piston and piston rod operative therein, means for pivotally connecting one end of said piston rod with a door jamb, one end of said cylinder being screw threaded, a socket member pivotally connected to a door hinged to the door jamb and having internal screw threads therein engaging the screw threads on the end of the cylinder, an inwardly extending projection formed on the interior wall of said socket member in alignment with the central axis of said cylinder and a correspondingly formed depression in the end wall of said cylinder terminating in a port, said projection entering said depression in selected amounts as said cylinder is rotated into or out of said socket member for controlling the passage of air into or out of said cylinder at a predetermined rate.

3. A door closer comprising, a pneumatic cylinder, a piston and piston rod operative therein, the end of said cylinder being externally screw threaded and provided with a central conical shaped inward projection terminating in a port, a socket member having internal screw threads cut therein to engage the external screw threads on the end of the cylinder, a central inwardly projecting conical member integrally connected to said socket member and arranged to extend into the

conical shaped inward projection in said cylinder in selected amounts for predetermining the passage of air into or out of said cylinder and regulating the movement of the piston in said cylinder.

In testimony whereof I affix my signature.

HARRY J. LEBHERZ.