

Feb. 12, 1952

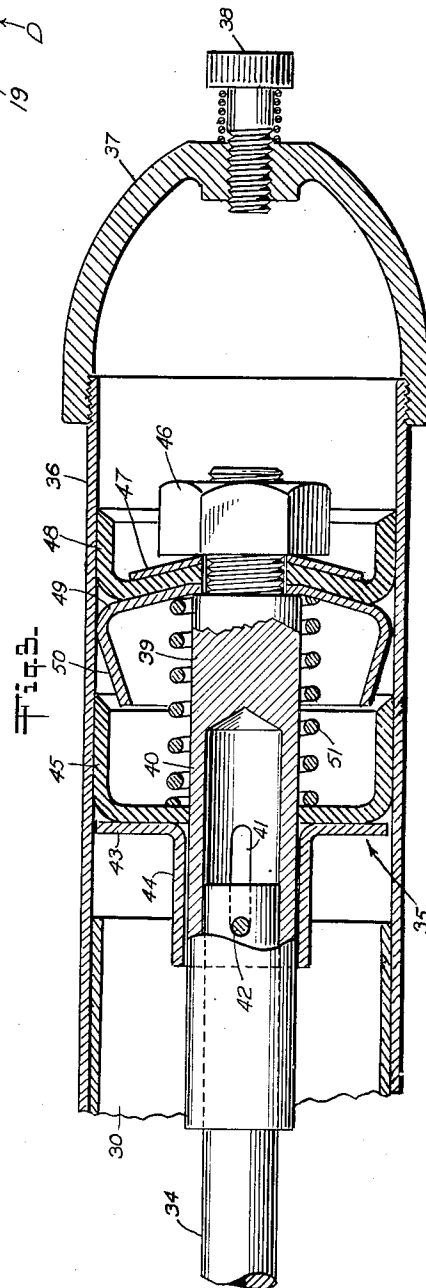
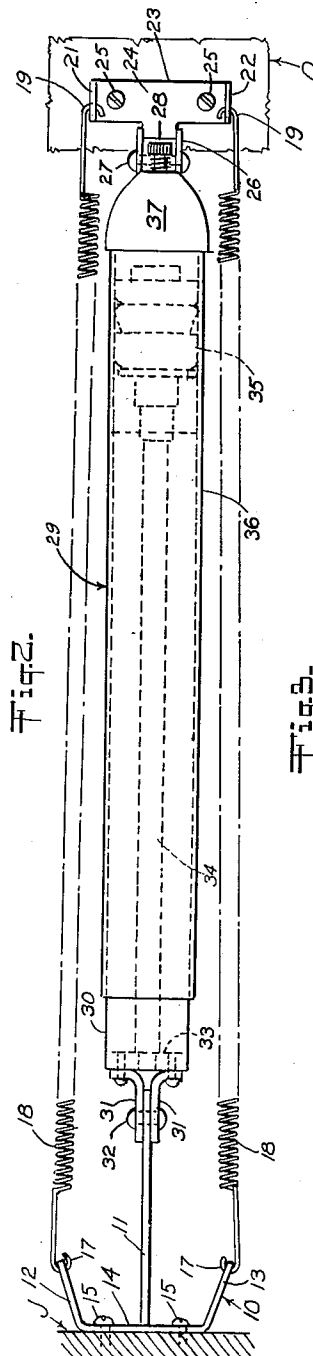
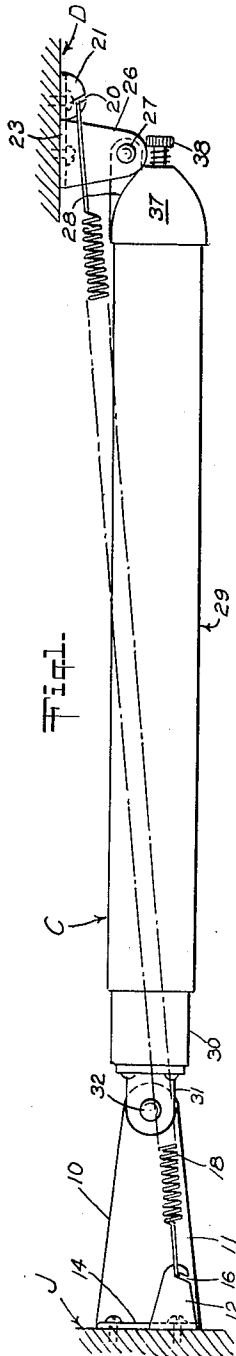
H. A. SIMPSON

2,585,413

DOOR CLOSER

Filed July 5, 1947

2 SHEETS—SHEET 1



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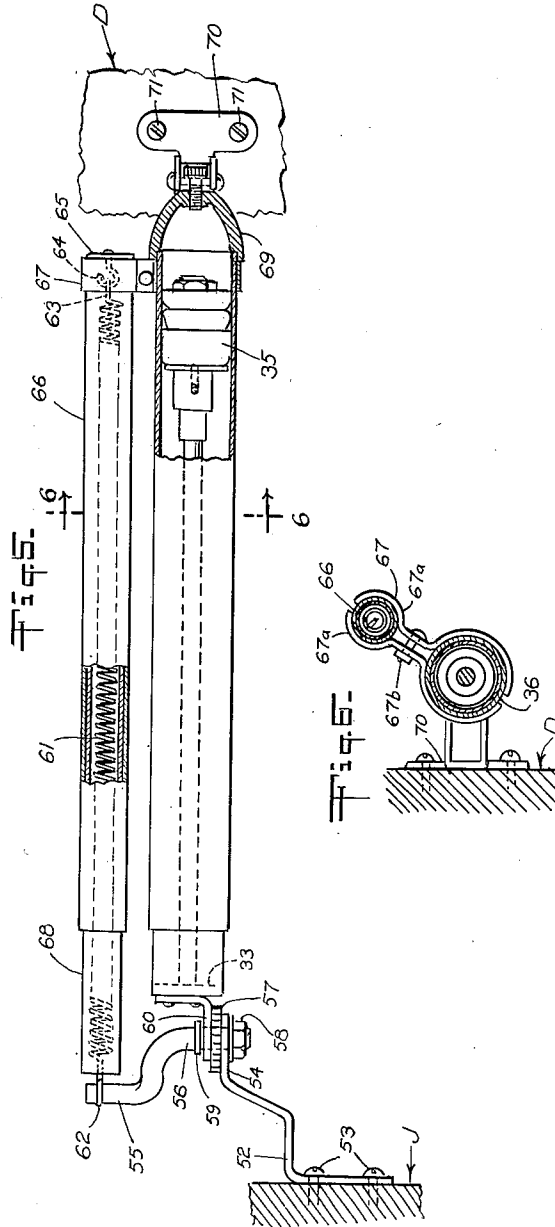
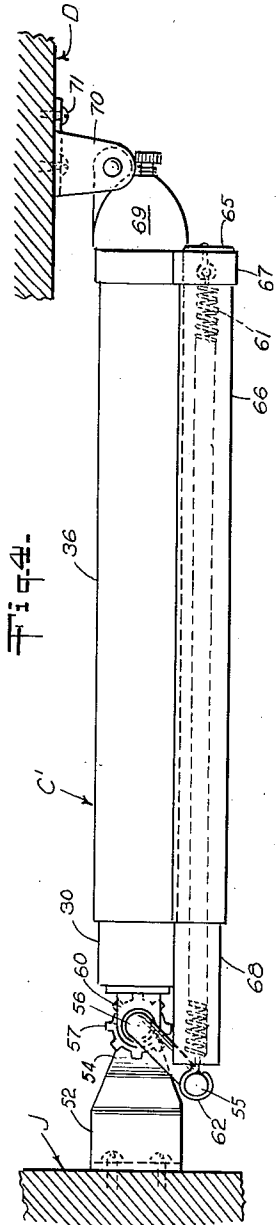
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2 SHEETS--SHEET 2



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2,585,413

DOOR CLOSER

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Application July 5, 1947, Serial No. 759,062

3 Claims. (Cl. 16-66)

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This invention relates to door closers, and more particularly to door closers of the type having an extension spring for drawing a door to closed position, and including telescoping check means designed to utilize a cushion of air to prevent slamming of the door.

One object of this invention is to provide a door closer of the above nature having springs so mounted as to exert an increasing force for latching the door when the door is in a nearly-closed position.

Another object is to provide a device of the above nature having twin extension springs symmetrically disposed about a check means, thereby avoiding eccentric forces in the check means due to placing of the springs.

Another object is to provide a device of the above nature in which the point of application of the spring force is readily adjustable, whereby the spring characteristics will be variable according to the effect desired.

A further object is to provide a device of the above nature in which the spring mechanism is readily replaceable with others whereby different weights and sizes of doors may be accommodated.

A further object is to provide a device of the above nature which will be simple in construction, inexpensive to manufacture, easy to install and manipulate, compact, ornamental in appearance, and very efficient and durable in use.

With these and other objects in view, there have been illustrated on the accompanying drawings two forms in which the invention may conveniently be embodied in practice.

In the drawings,

Fig. 1 shows a plan view of one form of door closer illustrating how it is attached to a door and a door jamb.

Fig. 2 is an elevation of the same, showing the internal brake mechanism in dotted lines.

Fig. 3 is a longitudinal sectional view, on an enlarged scale, showing details of the brake mechanism.

Fig. 4 is a plan view of a second form of door closer.

Fig. 5 is an elevation of the same, partly broken away to show the internal brake mechanism.

Fig. 6 is a cross-sectional view taken on the line 6-6 of Fig. 5.

Referring now to Figs. 1, 2, and 3 of the drawing, in which like reference characters denote corresponding parts throughout the several views, the letter C indicates a door closer, the letter D indicates a swingable door, and the letter J indicates a door jamb. An E-shaped bracket 10

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mounts the door closer C on the jamb J, and includes a central horizontal arm 11, an upper inclined arm 12, and a lower inclined arm 13. A vertical apertured base 14 connects the arms 11, 12, 13, and is secured to the jamb J by screws 15. The inclined bracket arms 12, 13 are provided with inclined slots 16, adapted to hold hooked ends 17 of twin coiled extension springs 18.

The opposite ends 19 of the spring 18 are also hooked and are held in inclined slots 20 formed in an upper ear 21 and a lower ear 22 of a door bracket 23, which is provided with a T-shaped base 24 secured to the door D by screws 25. The twin springs 18 are thus connected to the jamb J and the door D in such a manner as to urge the door into closed position.

In order to prevent slamming of the door, the base 24 is provided with a pair of parallel horizontal apertured arms 26 connected by a pin 27 to a lug 28 at one end of an extensible check means 29.

An inner guide tube 30 telescoped within the other end of the check means 29 is provided with spaced lugs 31 connected to the central arm 11 of the mounting bracket 10 by means of a pivot 32, so that the check means 29 is connected to the jamb J and the door D for extension and swinging movement, as occasioned by the movement of the door.

The base 33 of the guide tube 30 serves as a mounting for one end of a piston rod 34 extending concentrically in said tube.

The opposite end of the piston rod carries a brake member 35 coacting with an outer telescoping cylinder 36 and a domed end cap 37 to produce a checking force in the closing of the door D. The domed end cap 37 is provided with a loose screw 38 therein to serve as an adjustable bleed valve to control the operation of the brake.

The brake member 35 comprises a rod extension 39, including an integral sleeve portion 40 slidably embracing the end of the rod 34. The rod extension 39 is retained for limited sliding movement upon the rod 34 by diametrically opposed slots 41 in the sleeve portion 40, which receive a cross pin 42 fixed in the end of the piston rod 34.

A rigid backing washer 43 is secured in fixed relation with the rod 34 by a tubular portion 44 mounted on the ends of the cross pin 42 on the slidable sleeve portion 40. The backing washer supports a flexible brake cup 45, such as leather, of a diameter to fit within the cylinder 36.

A nut 46 is threaded on the outer end of the rod extension 39 and serves to hold thereon a

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retaining washer 47, a flexible compression cup 48 and a rigid expander cone 49 having a frusto-conical peripheral surface 50. A coiled restoring spring 51 is disposed between the brake cup 45 and the expander cone 49 to normally urge said cup and cone apart.

Operation

In the operation of the first form of the invention shown in Figs. 1, 2, and 3, the door closer C will be secured to the door jamb J and the door D in such a manner that the opening movement of the door will result in the extension of the twin springs 18 and of the telescopic check means 29.

It will be noted that the arms 12, 13 of the mounting bracket 10 will secure the spring ends at a point in proximity to the jamb J, whereby the mechanical advantage of the door will be increased as the door opens. Thus, spring "build-up" or increase in tension due to extension of the springs, will be compensated for. In fact, the parts are so proportioned as to produce a small over-compensation of the spring "build-up," so that increased force will be exerted by the springs as the door approaches closed position, thereby assuring that the door will positively be latched.

When the door D starts to close under the influence of the extension springs, or because of other forces exerted thereon, the piston rod 34 will move inwardly in the outer cylinder 36 (to the right in Fig. 3), and as soon as air pressure is picked up by the compression cup 48, the rod extension 39, with the expander cone 49 thereon, will be retarded against the force of the spring 51, thereby pressing the frusto-conical surface 50 into the brake cup 45. The cup 45, being flexible, will be expanded by the cone 49, not only at its edge, but also at the root of its cylindrical portion, due to a tendency of the cup to flatten under pressure.

Accordingly, the air pressure against the compression cup 48 will cause the cup 45 to act as a frictional brake against the cylinder wall, and only a minor and incidental part of the direct checking force will be provided by said air pressure itself.

The bleed valve will serve, as in the more conventional air check door closures, to control the speed at which the air is released, and hence the speed of the closing movement.

Second form

Referring now to Figs. 4, 5, and 6, a second form of the invention is shown, wherein a single extension spring is used. In this form, a door closer C is mounted upon a door jamb J by means of a W-shaped mounting bracket 52 secured to the jamb by screws 53.

The bracket 52 includes an apertured horizontal arm 54 which supports a substantially Z-shaped adjustable anchor arm 55 having an offset portion 56. Integral with the offset portion 56 is a toothed adjusting disk 57, which together with a nut 58 threaded upon said offset portion 56, serves to clamp tightly upon the arm 54.

An integral flange 59 is formed on the offset portion 56, and the flange 59 and the toothed disk 57 serve to confine an angle bracket 60 for swinging movement on said offset portion 56.

A coiled extension spring 61 is secured by end eyes 62 and 63 to the anchor arm 55 and a hook 64, respectively.

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The hook 64 is mounted in an end wall 65 of an outer spring shielding tube 66 securely mounted upon the outer cylinder 36 by means of a double "dumbbell" clamp 67 which comprises a pair of concave members 67a held together by a securing bolt 67b.

An inner spring shielding tube 68 telescopes within the outer tube 66, said tubes serving as means for concealing the extension spring 61 and protecting it from dust.

An end cap 69 similar to the cap 37 closes the end of the outer cylinder 36, and is pivotally secured in a door bracket 70 mounted upon the door D as by screws 71.

In the second form of the invention shown in Figs. 4, 5, and 6, the brake means 35 operates in the same way as the brake mechanism of the first form.

In order to secure spring operation of the desired characteristics, the Z-shaped anchor arm 55 may be rotated in the bracket arm 54 to adjust the position of the spring eye 62 to the desired point. In adjusting the anchor arm 55, the teeth of the disk 57 may be gripped by a wrench or other tool, and the nut 58, when tightened, will clamp the bracket arm 54 to hold the anchor arm 55 against rotation.

Thus, the bracket 55 may be released from the position shown in Fig. 4 and fixed in any angular position which is required to secure the proper spring effect when the door closer is applied to doors having opposite swing, or to the outside of doors having either right-hand or left-hand swing.

The brake mechanism herein disclosed is claimed in my copending application, Serial Number 64,851, filed December 11, 1948, patented May 15, 1951, Number 2,552,821, which has the same effective filing date as the present application.

While there have been disclosed in this specification two forms in which the invention may be embodied, it is to be understood that these forms are shown for the purpose of illustration only, and that the invention is not to be limited to the specific disclosures, but may be modified and embodied in various other forms without departing from its spirit. In short, the invention includes all the modifications and embodiments coming within the scope of the following claims.

Having thus fully described the invention, what is claimed as new, and for which it is desired to secure Letter Patent, is:

1. In a door closer, extensible check means, brackets adapted to connect the ends of said check means to a door and to a door jamb respectively, the bracket at one end of said check means being provided with an upstanding adjustable anchor arm, the other end of said check means having a hook and means for securing the hook thereto, an extension spring having its respective ends secured to said anchor arm and to said hook, said anchor arm comprising an offset portion rotatably received in its respective bracket, means swingably attaching said one end of said check means to said offset portion, said offset portion being provided with means for adjustably clamping said portion against rotation, whereby the direction of the effective force of said extension spring may be varied.

2. In a door closer, extensible check means, brackets adapted to connect the ends of said check means to a door and a door jamb respectively, the bracket at one end of said check means

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being provided with an upstanding anchor arm, the other end of said check means having a hook, an extension spring having its respective ends secured to said anchor arm and to said hook, said anchor arm comprising an offset portion rotatably received in its respective bracket, means for swingably attaching said one end of said check means to said offset portion, said offset portion being provided with means for adjustably clamping said offset portion against rotation, whereby the direction of the effective force of said extension spring may be varied, said check means including a cylinder having a closed end, a friction brake element therein, resilient means urging said brake element to inactive condition, and a compression cup in said cylinder responsive to the force of said extension spring for actuating said brake element whereby telescoping movement of said parts will be retarded.

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3. The door closer as defined in claim 2, wherein said cylinder comprises two telescopic sections.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
678,790	Nushawg et al.	July 16, 1901
1,062,575	Gibbs	May 20, 1913
1,169,538	Heber	Jan. 25, 1916
1,431,355	Andrews	Oct. 10, 1922
1,482,917	Durno	Feb. 5, 1924
1,528,195	Bush	Mar. 3, 1925
1,983,999	Seyforth	Dec. 11, 1934