

A. C. DUNN
DOOR CONTROL APPARATUS
Filed Feb. 20, 1940

DOOR CONTROL APPARATUS

Fig. 1

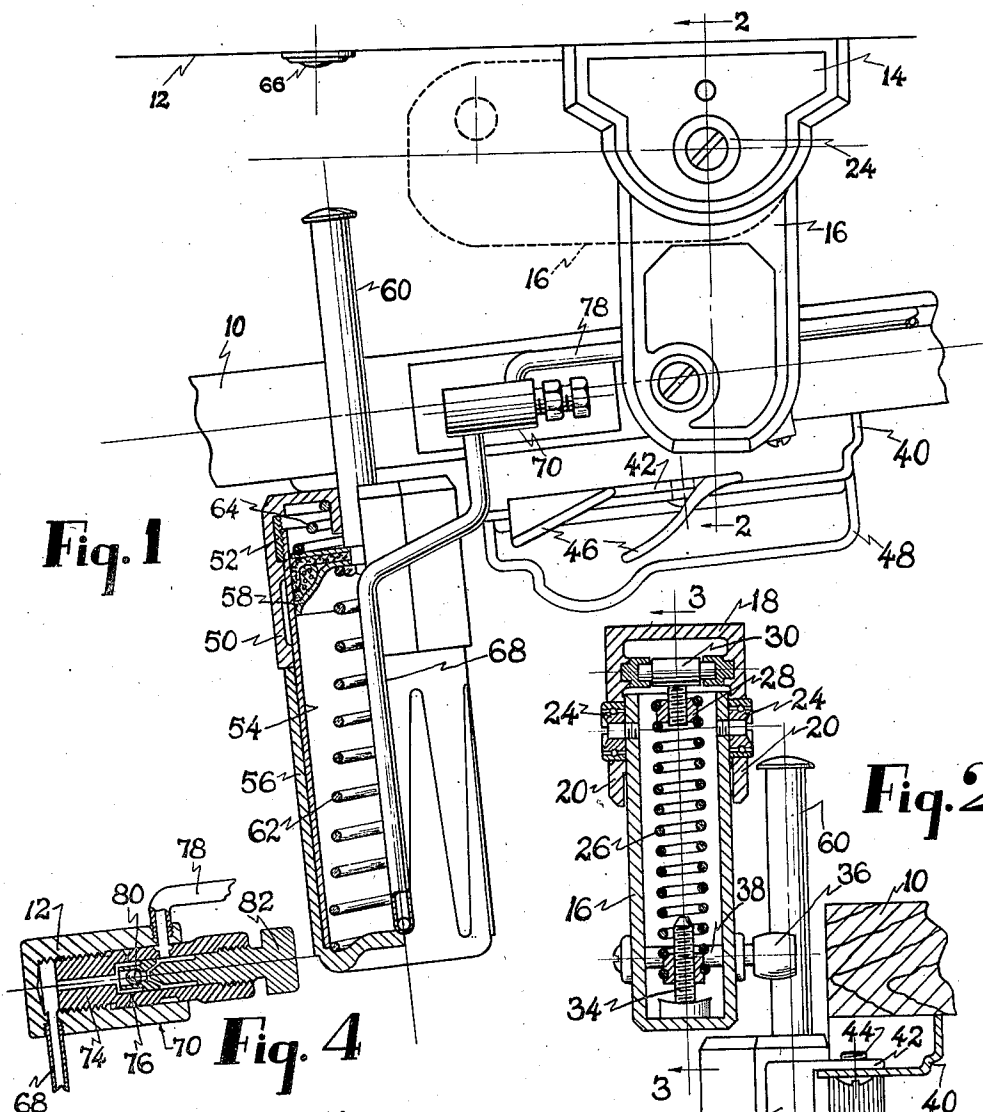
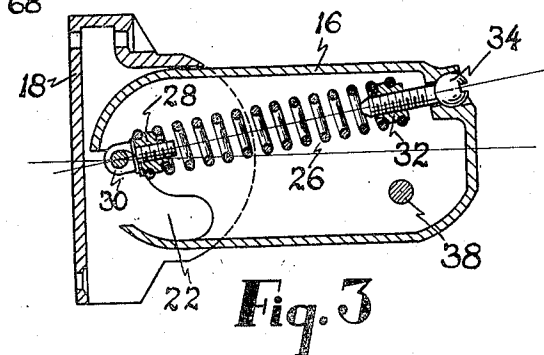


Fig. 2



INVENTOR.

BY

Andrew C. Dunn
Booth & MacLuff
ATTORNEYS

UNITED STATES PATENT OFFICE

2,304,556

DOOR CONTROL APPARATUS

Andrew C. Dunn, Chicago, Ill.

Application February 20, 1940, Serial No. 319,849

4 Claims. (Cl. 292—79)

This invention relates to door control apparatus and more particularly to apparatus which will insure closing of a door without slamming.

One of the objects of the invention is to provide a door control apparatus which insures complete closing of a door without interfering with free and full opening thereof. According to one important feature of the invention the door is closed by a spring actuated member engageable with the door during its final closing movement and swingable about an axis parallel to the pivotal axis of the door.

Another object of the invention is to provide a door control apparatus including a closing spring in which the spring is inclosed.

Still another object of the invention is to provide a door control apparatus in which slamming of the door is prevented. One feature of the invention relates to an arrangement by which the apparatus which prevents slamming may also serve to assist in the initial opening movement of the door.

The above and other objects and advantages of the invention including novel subcombinations and structural features will be apparent from the following description of the embodiment shown in the accompanying drawing, in which:

Figure 1 is a partial top plan view of a door equipped with control apparatus embodying the invention with parts shown in section;

Figure 2 is a partial section on the line 2—2 of Figure 1;

Figure 3 is a section on the line 3—3 of Figure 2; and

Figure 4 is a section through the bleed valve of Figure 1.

The apparatus is illustrated as controlling a door 10 pivotally mounted at one side and swingable toward and away from a door frame one side of which is indicated by the line 12. The door may be equipped with a check device which may, if desired, be arranged for power opening of the door as more particularly described and claimed in my co-pending application Serial No. 54,657 filed December 16, 1935, now U. S. Letters Patent No. 2,190,653, dated Feb. 20, 1940, of which this application is a continuation in part.

According to the present invention a spring device is secured to the door frame 12 and is formed by a two part casing including a supporting part 14 and a swingable casing part 16. The supporting part 14 includes a base portion 18 adapted to be screwed to the door frame, and upper and lower flange portions 20 providing between them

an opening at the outer edge and along one side of the supporting part. The casing part 16 is formed by a relatively flat casing having an opening in one end thereof at 22 and is pivoted to the flanges 20 by bearings shown at 24. A tension spring 26 is secured at one end to a block 28 carried by a post 30, which is pivoted in the supporting part 14 on the side of the pivotal axis 24 adjacent the base 18. The opposite end of the spring is secured to a block 32 in which a screw 34 is threaded. The screw 24 extends through one end of the casing part 16 and is formed with an enlarged ball-shaped head which rests in an opening in the casing. By adjusting the screw 34 which may easily be done from the exterior of the casing the tension of the spring 26 may be adjusted.

It will be noted that the spring is anchored at its opposite ends to the casing and supporting parts on opposite sides of the pivotal axis 24 so that as the casing part is pivoted the spring will cross the axis. This provides toggle action tending to urge the spring to one of its extreme positions shown in dotted lines in Figure 1.

The casing part 16 carries adjacent its outer end a roller 36 mounted on a post 38 which extends through the casing part. The roller forms a track follower adapted to engage a track portion on the door as will appear more fully hereinafter.

To the upper edge of the door adjacent the spring unit described above there is secured a supporting plate 40 substantially flush with the edge of the door. A track member is secured to this plate and is shown as being formed by a plate 42 fastened to the plate 40 by screws or the like 44, and having a pair of spaced flanges 46 between which the roller 36 is adapted to pass. The flanges 46, as best seen in Figure 2, extend above the door in line with the roller 36. The flanges are covered by a cover member 48 which is provided principally for the sake of appearance.

In closing the door from the position illustrated in Figure 1 the outermost flange 46 will engage the roller 36 and swing the casing part 16 in a clockwise direction. As soon as the spring 26 has been moved across center it will urge the casing 16 clockwise so that the roller 36 engages the other flange 46 to pull the door shut. When the door is shut the casing part 16 will occupy substantially the position shown in dotted lines in Figure 1, and will hold the door closed. When the door is opened the reverse of the above operation will be performed, the inner flange 46 press-

ing on the roller 36 to swing the casing part 16 counter-clockwise until the spring 26 again moves across center. At this time the roller will leave the flanges 46 and the remaining opening movement of the door may be effected in the usual manner.

In order to prevent the door from slamming there is provided, according to the invention, a cast cap member 50 connected to the supporting plate 40 and having its open end projecting rearwardly therefrom. A threaded sleeve 52 is cast in the cap member for connection to a cylinder 54, which is advantageously formed of sheet steel or the like. The outer portion of the cylinder 54 is covered by a cast body 56 which reinforces the cylinder and provides a more pleasing appearance therefor.

A piston 58 is slidable in the cylinder 54 and carries an elongated piston rod 60 projecting above and across the edge of the door 10, as seen in Figure 2. The piston is urged to its forward position, shown in Figure 1, by a spring 62 and may be provided with a small buffer spring 64 to limit its forward travel.

During closing of the door the end of the piston rod 60 engages a small buffer plate 66 secured to the door frame. As the door is closed the piston tends to compress air in the cylinder to resist further closing movement of the door, so that hard slamming thereof is prevented.

Slow closing of the door is accomplished by bleeding air from the rear end of the cylinder 54. For this purpose a pipe 68 is connected to the rear end of the door through a bleed valve 70 which is shown as inset into the top of the door. As seen in detail in Figure 4 the valve 70 includes an outer cup-shaped casing 72 into which a plug 74 is threaded. The plug 74 is formed with a plurality of small bleed passages 76 through which air may flow around between the plug and the casing either to atmosphere or out through a pipe 78. In order that the door may be opened easily a check valve 80 is provided in the plug 74 connecting the pipe 68 with the pipe 78 for admission of fluid from the latter to the former. The rate of air flow may be regulated by a valve 82 threaded into the plug 74.

According to one feature of the invention fluid such as air under pressure may be admitted through the pipe 78 to assist the initial opening of the door during the time when the spring device 16 is effective. For this purpose the pipe 78 may lead to a compressor or other suitable source of air under pressure through a control valve such, for example, as the valve disclosed in my application Serial No. 54,657 referred to above. When air is so admitted through the pipe 78 the valve 80 will open permitting the air to pass into the rear end of the cylinder 54 to urge the piston 58 forwardly therein. The piston through the piston rod 60 will exert a pressure tending to open the door against the action of the spring device 16. Thus the spring device may be made stiff enough to close the door and to hold it closed under substantially any conditions of air pressure or the like without imposing an undue burden on a person wishing to open the door. During closing of the door the pressure is, of course, removed from pipe 78 and it is preferably open to atmosphere so

that air may bleed therethrough as described above.

While one embodiment of the invention has been shown and described in detail it will be understood that this is for the purpose of illustration only and is not intended as a definition of the scope of the invention, reference being had for this purpose to the appended claims.

What is claimed is:

1. A cam device for a door closer comprising a supporting plate adapted to be secured to a door substantially flush with one edge thereof, a member carried by the supporting plate and formed with spaced curved flanges extending beyond the door edge, and a cover member secured to the supporting plate and extending beyond the edge of the plate substantially flush with the outer edges of the flanges.

2. A door closer for a door hinged in a door frame comprising a supporting part secured to the door frame adjacent one end of the door, a casing part pivoted to the supporting part on an axis parallel to the pivotal axis of the door and lying out of register with the door, a spring connecting said parts and swingable across the pivotal connection therebetween as the door is opened and closed, a track member secured to the door adjacent said end thereof and having a pair of spaced track portions projecting beyond the end of the door, and a track follower carried by and projecting laterally from the casing part and registering with the track portions to move between the track portions to trip the closer and to urge the door closed during the final closing and initial opening movements of the door.

3. A door closer for a door pivoted in a door frame comprising a pivotally movable spring-urged part mounted on the frame adjacent one end of the door and pivoted on an axis parallel to the door axis and out of register with the door, a follower projection on said part projecting laterally therefrom, and a track part including a supporting plate secured to the door substantially flush with said end thereof and a member carried by said plate and formed with spaced flanges extending beyond said door end and moving in a path intersecting the follower projection to receive the follower projection between them as the door is swung on its hinges, said flanges engaging the follower projection to trip the spring part and urge the door closed as the door is swung about its hinges.

4. A door closer for a door pivoted on a vertical pivot in a door frame comprising a closer part pivoted on the door frame adjacent but out of register with one end of the door, spring means in the closer part movable across the pivotal axis thereof to give it a snap action, a roller projecting laterally from the closer part toward but not crossing the end of the door, a track part secured to the door and having spaced curved flanges projecting beyond the end thereof and moving in a path to intersect the roller and receive the roller between them as the door is opened and closed, the flanges curving to provide an open track end facing toward the roller when the door is partially open and a track portion substantially parallel to the door end and cooperating with the roller to trip the closer part and to urge the door closed.

ANDREW C. DUNN.