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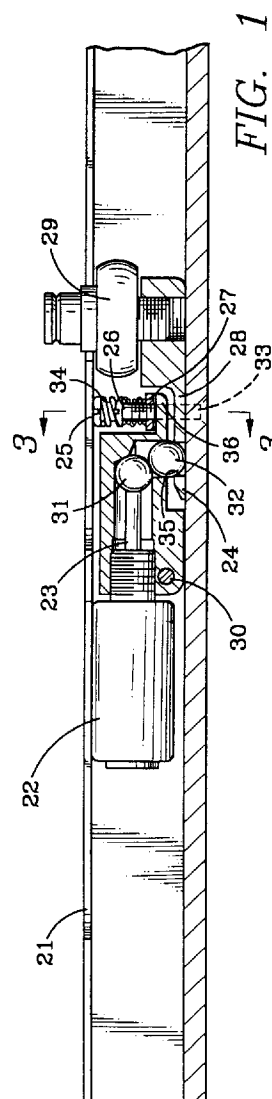
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(54) **A door hold-open device having manual or automatic release.**

(57) A door hold-open device having manual and automatic release capabilities, includes a straight linear track (21) having a substantially U-shaped cross-section and acting as a guide for a roller assembly (29), the roller assembly having a provision (28) for engaging a door catch assembly and for attachment to a door control arm; a door catch assembly (31, 32) fixed within the track and having a power-actuated plunger-driven member (23) for engaging and for releasing the roller assembly; and further provision for manually over-riding the power actuated plunger-driven member to release a door.



This invention relates generally to a door hold-open device for use with a door closer and more particularly to a door hold-open device which is intended to release upon power failure or upon application of over-riding release force by manual means.

Hold-open devices for doors are needed for many purposes. However, it is often also desirable to deactivate the hold-open device, so that the door may freely open and close without being held in a hold-open position. In case of fire, for example, it may be desirable to deactivate hold-open devices to prevent spread of the fire. During times of high traffic, in a school or theatre, it is necessary to provide a hold-open device for doors, while such may be undesirable at other times.

Door closers having hold-open features are well known due to their convenience and efficiency in permitting high volume pedestrian traffic during peak traffic periods while providing safety and security at other times. It is sometimes necessary to have automatic release of the hold-open mechanism, particularly in the case of fire. Fusible links have been used for this purpose, but they require high temperature to release and, by then, it may be too late to contain the fire. Thus, it is preferred to use a smoke detector as a means for detecting fire or other dangerous condition and as a trigger for the automatic release of the hold-open mechanism.

Because of the critical nature of the device and its operation, it is important that it be well integrated and well protected. Some earlier devices have included many different parts that could become displaced or disconnected without warning. These required excessive labour for installation, inspection, adjustment, and maintenance in order to be made reasonably reliable for their desired function. Some are not well adapted for installation on either side of a door frame and may become functionally impaired if the mounting is faulty. In order to ensure a safe, long lived, properly operating, relatively inexpensive to manufacture, easily installed, and easily serviced device; it is desirable to reduce the complexity, weight, and bulk of the mechanism below those of earlier hold-open devices.

According to the present invention, there is provided a door hold-open device having manual and automatic release capabilities, comprising a track having a substantially U-shaped cross-section and acting as a guide for a roller assembly, said roller assembly having means for engaging a door catch means and provision for attachment to a door control arm, and said door catch means being fixed within said track, characterised in that said door catch means further comprises a power-actuated plunger-driven means for engaging and for releasing said roller assembly and means for manually over-riding said power actuated plunger-driven means for engaging said roller assembly to release a door.

For a better understanding of the invention and to show how the same may be carried into effect, reference will now be made, by way of example, to the accompanying drawings, in which:-

Figure 1 is an elevational view partly in section illustrating a door hold-open device;

Figure 2 is a plan view of the device shown in Figure 1;

Figure 3 is an elevational view partly in section taken at line 3-3 of Figure 2 illustrating a latch power adjustment feature of a door catch device; and

Figure 4 is an exploded view of the door catch device and roller assembly slide as shown in Figures 1 to 3.

Figures 1 and 2 show elevation and plan views of the hold-open device together with an illustration of how it operates. The hold-open device consists, basically, of a substantially straight track 21, a roller assembly slide 29, and a door catch mechanism. Figure 4 shows an exploded view of the roller assembly slide 28 and 29 in a latched position relative to the door catch mechanism. The door catch assembly consists of a housing 24 which is mounted within track 21 by means of pivot pin 30 through a rearward end of housing 24. A longitudinal cavity in housing 24 is threaded at the rearward end of the housing to receive a power actuator 22 which may be either an electrical solenoid or an air cylinder. Projecting from actuator 22 and into the longitudinal cavity of housing 24 is a plunger 23 which, in operation, is driven by actuator 22. The longitudinal cavity within housing 24 is diverted near a forward end of the housing to open onto the bottom surface of the "U" shaped channel forming track 21. A latch member consisting of retaining ball 31 and locking ball 32 is disposed within the cavity of housing 24. When plunger 23 is driven forward it drives retaining ball 31 forward also and forces locking ball 32 downward against the lower surface of track 21. If the door is open so that roller assembly 29 is moved to its leftward limit so that slide latch 28 is under housing 24 with latching or locking hole 35 aligned with the lateral exit of the housing cavity, locking ball 32 will act to hold the door open by preventing rightward movement of roller assembly 29.

Since the door catch assembly is pivotally mounted within track 21 by pivot pin 30, it is necessary to provide a bias sufficiently powerful to prevent the door catch from pivoting upward to allow escape of slide latch 28 in response to only normal door closer force. It is, however, desired that the hold-open device can be overridden by pulling the door to reinforce the closer action. Adjustable bias force is provided through spring adjusting mounting screws 33, power springs 34, spring retaining nuts 25, and spring retainer clip 27. Spring adjusting mounting screws 33 extend upward through the bottom of track 21 and through loose holes in spring retainer clip 27. Power springs 34 sit atop spring retainer clip 27 surrounding

spring adjusting mounting screws 33 and are held in place by spring retaining nuts 25. Compression of power springs 34 against spring retainer clip 27 by spring retaining nuts 25 provides a bias which resists lifting of spring retainer clip 27. This bias is transferred to the forward edge of housing 24 through power adjusting ledge 36 by means of power adjustment screw 26 which is threaded through spring retainer clip 27 and bears against power adjusting ledge 36. Screw retaining spring 37 is interposed between power adjustment screw 26 and spring retainer clip 27 to prevent unintentional turning of the screw due to vibration or accidental bumping.

In operation, the hold-open device is activated by electric or pneumatic power applied to actuator 22. It automatically releases upon electrical failure or loss of air pressure. It also allows for manual override of the hold-open feature without interruption of the electric or pneumatic power. The door catch assembly is also designed to allow adjustment of hold-open force to require greater or lesser manual override effort for closing the door when actuator 22 is powered.

In summary, the door catch mechanism is mounted in track 21 by means of pivot pin 30 and is biased in its operating position by means of spring adjusting mounting screws 33, spring retaining nuts 25, power springs 34, and spring retainer clip 27. When actuator 22 is energized by air or electric power, plunger 23 moves forward pushing retainer ball 31 against locking ball 32, thereby forcing locking ball 32 to press tightly against the bottom of track 21. As the door is opened, roller assembly 29 and slide latch 28, to which roller assembly 29 is connected, move leftward so that the beveled leading edge of slide latch 28 under-rides housing 24 and forces locking ball 32 upward. This causes housing 24 to pivot around pivot pin 30 while slide latch 28 continues to move leftward until locking ball 32 is aligned with locking hole 35 of slide latch 28. The door catch mechanism then pivots back to its original position and captures slide latch 28 in the hold-open position.

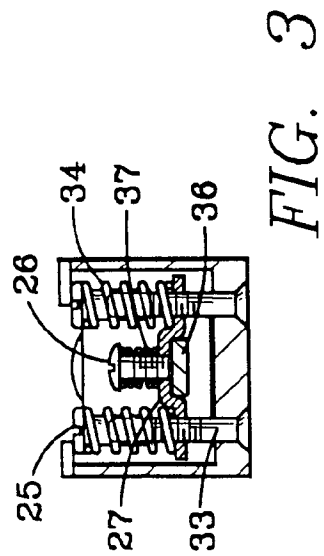
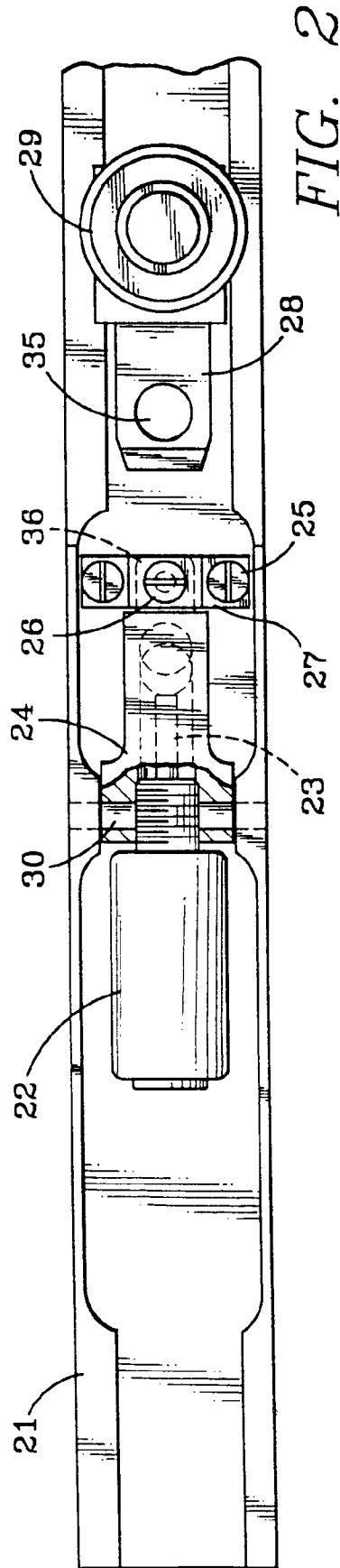
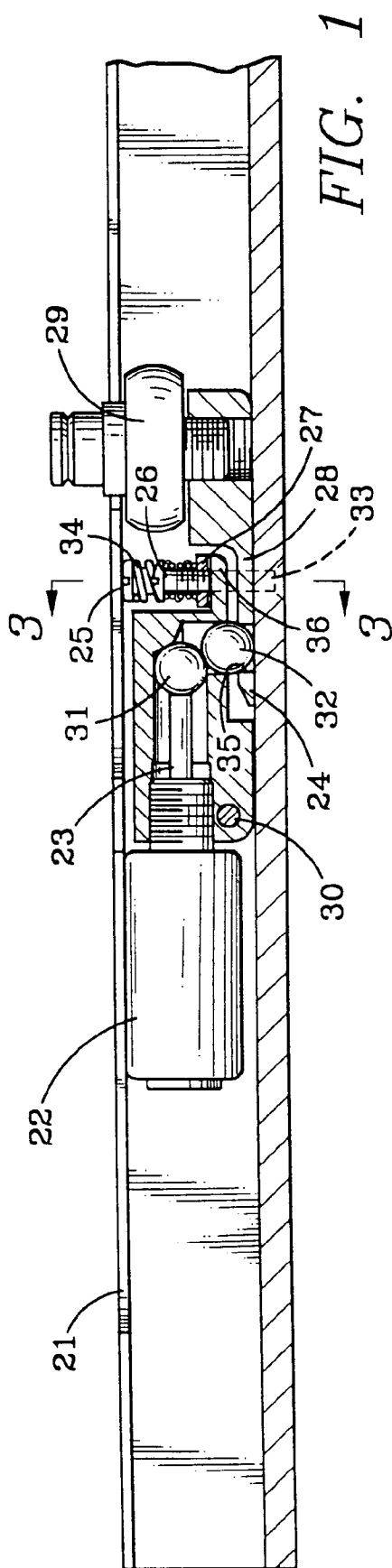
To manually release the door, it is necessary to pull the door with sufficient force to overcome the latching function. When this is done roller assembly 29 and slide latch 28 move in the rightward direction again causing the door catch mechanism to pivot to allow locking ball 32 to slip over the edge of hole 35 in slide latch 28. The same result, of course, is obtained by deenergizing actuator 22 by interrupting either the electrical or air supply. When this is done, plunger 23 moves rearward to release retaining ball 31 and locking ball 32 so that slide latch 28 and roller assembly 29 move rightward without the necessity for pivoting of the door catch mechanism under the influence of the door closer.

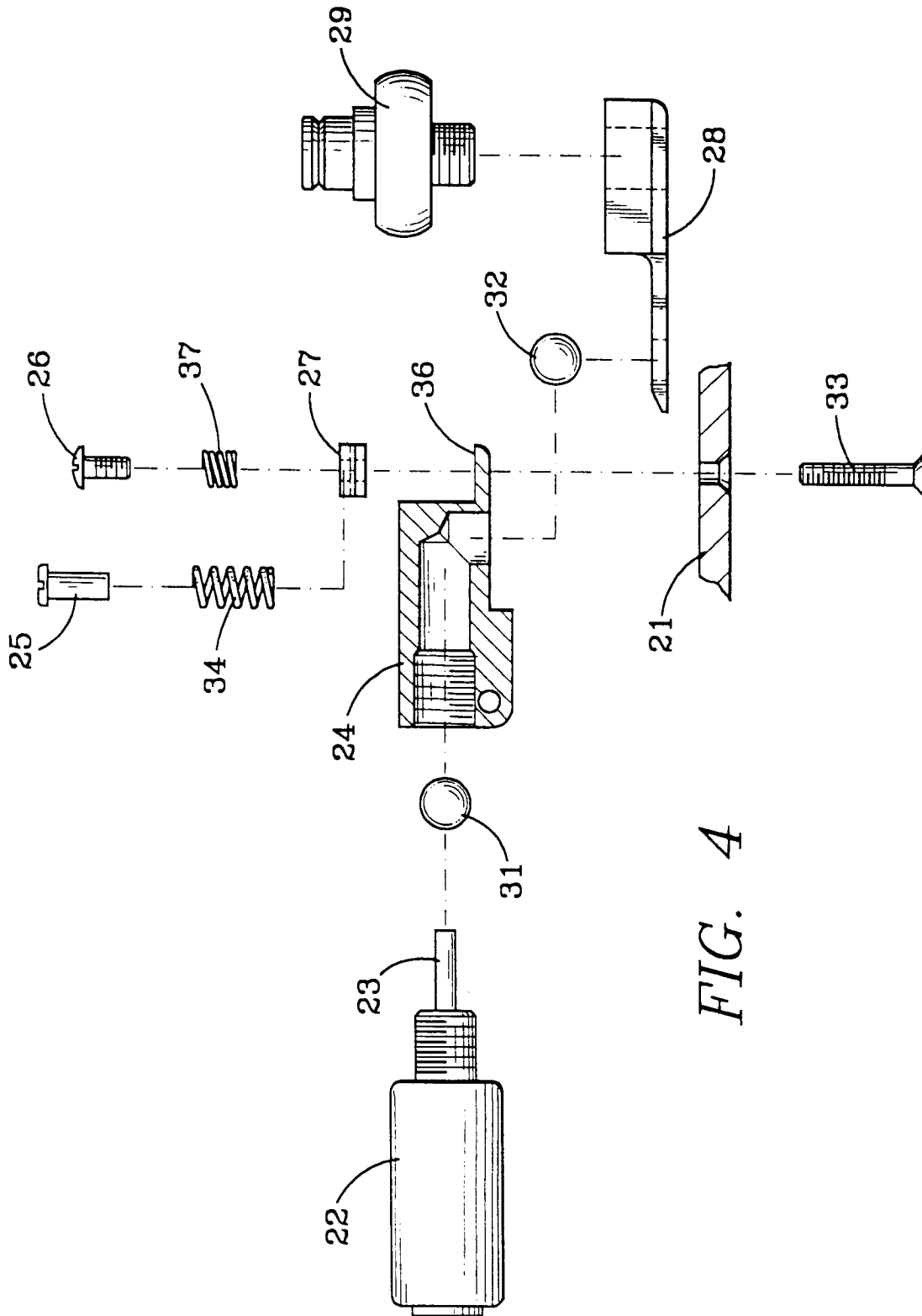
Depending on the strength of the door closer, wind conditions, or wear and tear due to aging of the installation, it may become necessary to adjust the

hold-open power of the device. In this case, it is only necessary to supply power to actuator 22 and place the door in the held-open position. Power adjustment screw 26 can then be turned clockwise to lift spring retainer clip 27, thereby compressing power springs 34 and increasing downward pressure on power adjustment ledge 36 and thereby increasing hold-open force. By turning power adjustment screw 26 counter-clockwise, the opposite effect is achieved and hold-open force is decreased. Screw retaining spring 37 prevents unintentional movement of power adjustment screw 26.

## Claims

1. A door hold-open device having manual and automatic release capabilities, comprising a track (21) having a substantially U-shaped cross-section and acting as a guide for a roller assembly (29), said roller assembly (29) having means (28) for engaging a door catch means (24, 30) and provision for attachment to a door control arm, and said door catch means being fixed within said track, characterised in that said door catch means further comprises a power-actuated plunger-driven means (22, 23) for engaging and for releasing said roller assembly (28, 29) and means (27) for manually over-riding said power actuated plunger-driven means for engaging said roller assembly (28, 29) to release a door.
2. A device according to claim 1, wherein the means on said roller assembly (29) for engaging a door catch comprises a bevel on an extended leading edge (28) of said assembly for under-riding a forward edge (24) of said door catch and a detent (35) in said extended leading edge for receiving a biased member (33) projecting from said forward edge of said door catch means.
3. A device according to claim 1 or 2, wherein the door catch means comprises a power-actuated plunger (23) extending into a longitudinal cavity of a door catch housing (24), said housing being pivotally attached to said track at a rearward edge such that a forward edge of said door catch housing is free to lift when being under-ridden by a beveled leading edge (28) of said roller assembly (29), said cavity being laterally diverted near the forward edge of the door catch housing to permit projection of a biased member (32) for engagement with a detent (35) on said roller assembly, at least one biased member for projection from said cavity; and means (31) for biasing the forward edge of said door catch housing to oppose lifting of said housing by the leading edge of the roller assembly.







European Patent  
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# EUROPEAN SEARCH REPORT

Application Number

DOCUMENTS CONSIDERED TO BE RELEVANT			EP 95302186.2
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl. 6)
A	DE - A - 2 837 943 (Mac. GREGOR INTERNATIONAL S.A.) * Fig; claim 1 * --	1-3	E 05 F 15/00 E 05 F 15/10 E 05 C 17/00
A	DE - A - 2 531 314 (RIXSON-FIREMARK) * Totality * --	1, 2	
A	CH - A - 671 802 (PROTOR AG) * Abstract; page 3, right column, lines 21-40 * ----	1	
			TECHNICAL FIELDS SEARCHED (Int. Cl. 6)
			E 05 C E 05 F
The present search report has been drawn up for all claims			
Place of search VIENNA		Date of completion of the search 30-06-1995	Examiner RIEMANN
<p><b>CATEGORY OF CITED DOCUMENTS</b></p> <p>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document</p> <p>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons ----- &amp; : member of the same patent family, corresponding document</p>			

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