

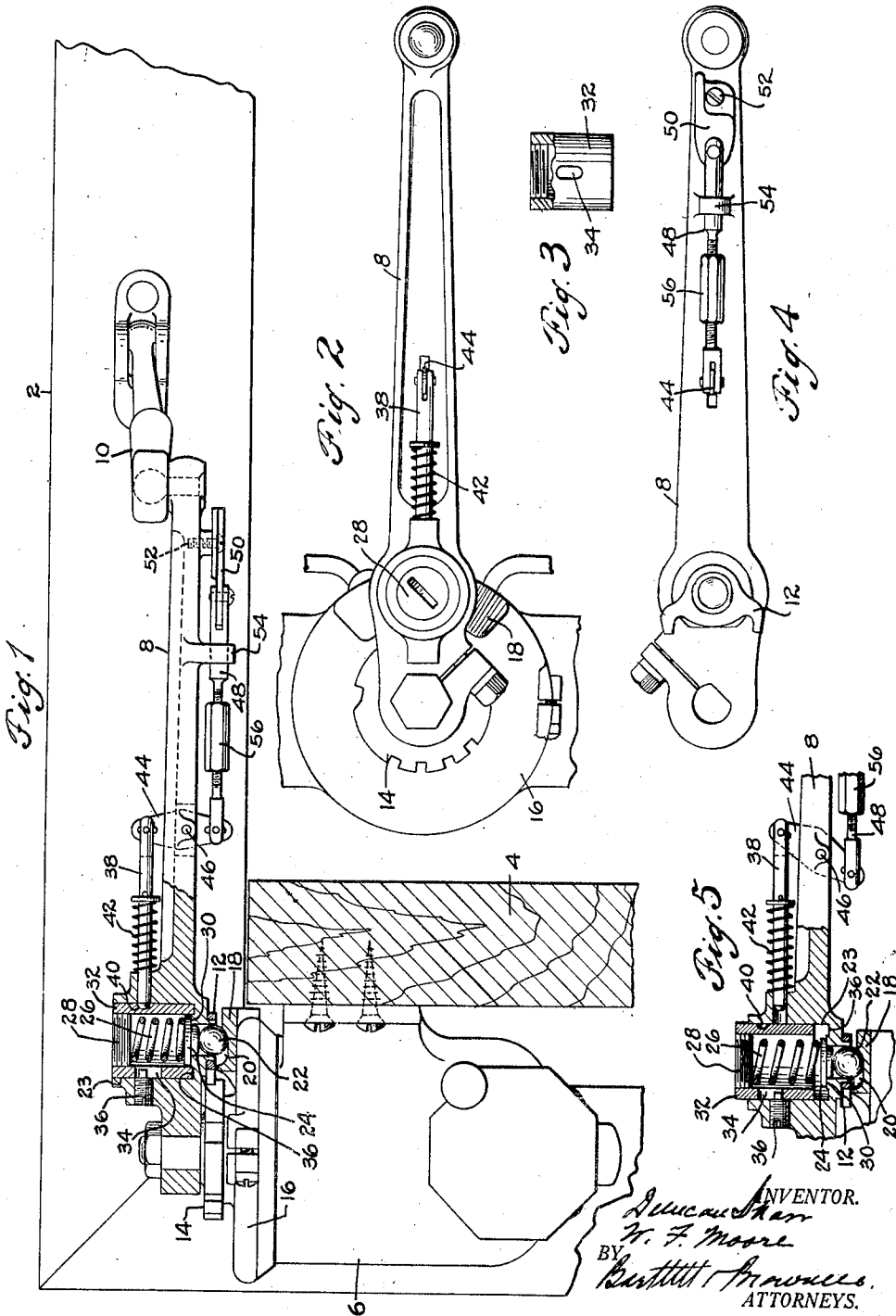
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DOOR CLOSER

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DOOR CLOSER.

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Our invention relates to door closers, and has special reference to such devices that are particularly adapted for use on safety doors whereby when the temperature of a room in which the device is installed reaches a predetermined degree, the door will be closed automatically.

An object of the invention is to provide a door closer of this character which is simple in construction and reliable in operation.

Another object of the invention is to provide a device of this character in which the parts thereof are conveniently arranged, and may be easily reset and adjusted.

The several features of the invention, whereby the above-mentioned and other objects may be attained, will be clearly understood from the following description and accompanying drawings, in which:

Figure 1 is a side elevation, partly in section, of a door closer embodying the features of the invention in their preferred form, shown applied to a door and door frame, the door being shown open;

Fig. 2 is a plan view of a portion of the door closer;

Fig. 3 is a detail sectional elevation of a component part of the door closer;

Fig. 4 is a detail inverted plan view of the spring actuated arm of the device; and

Fig. 5 is a view corresponding to a portion of Fig. 1, but showing certain parts in a different position.

The door closer illustrated in the drawings is shown applied to a door case or frame 2 and a door 4, the door being shown open. The door closer comprises the usual casing 6 which is secured to the door, and a spring actuated door closing arm 8 which is connected by a link 10 with the door frame. The spring actuated arm 8 carries a double detent or pawl 12 for engagement with the teeth on a ratchet wheel 14 connected to the door closing spring in the usual manner. A ring 16 is adjustably secured to the upper end of the casing 6 and carries a stop 18 having a pocket 20. This pocket 20 is adapted to receive a downwardly spring pressed detent 22 carried by the spring actuated arm 8, and when the detent is received in said pocket under the pressure of its spring it is adapted to hold the door open.

As shown, this detent comprises a steel ball which is received in the lower end of a vertical aperture 23 in the spring actuated arm 8 and is pressed downwardly when the ball is in said pocket by means of a plunger 24 mounted in said aperture, which in turn is acted upon by a coil spring 26 interposed between the upper end of the plunger and an abutment screw plug 28. The downwardly spring pressed plunger 24 is provided with a flange that engages a stop shoulder 30 in said vertical aperture so as to limit the downward movement of the plunger so that when the ball 22 rides out of its pocket and as it leaves the stop plate 18 it drops out of engagement with the lower end of the plunger, and thus is permitted to rotate freely during the completion of the closing movement of the door.

The device above described, including the detent ball 22, flanged plunger 24, coil spring 26 and adjustable abutment plug 28, may be and preferably are the same as the corresponding parts of the hold-back device described and claimed in the pending application of Wallace F. Moore, "Door closers", Serial No. 199,514, filed June 17, 1927.

In accordance with our invention, thermally controlled means is provided for relieving the tension of the detent spring 26 so as to render said spring and its associated detent plunger 24 inoperative to hold the detent ball 22 in its stop pocket and thus permit the spring actuated arm 8 to close the door, when the temperature in the room reaches a predetermined degree. To provide for this, the abutment plug 28 is screw-threaded into the upper end of a sleeve 32 which surrounds the coil spring 26 and is mounted for vertical movement in the aperture 23. The sleeve 32 with its plug 28 constitutes an abutment member for the upper end of spring 26. The upward movement of the sleeve 32 is limited by the engagement of one end wall of a slot 34 in the sleeve with the end of a stop screw 36 which extends into said slot and is screw-threaded through an aperture in the spring actuating arm 8. The slot 34 and screw 36 also hold the sleeve from turning movement. When the sleeve 32 is held down against an abutment shoulder 36 in the aperture 23, the coil spring 26 is main-

tained under tension so as to hold the detent ball 22 firmly seated in the pocket in the stop plate 18. Upon releasing the sleeve 32 so as to permit it to move to the limit of its upward movement, the tension of the spring 26 is relieved, whereupon the spring actuated arm 8 is free to close the door.

The sleeve 32 is held down so as to tension the spring 26 by means of a rod 38, one end of which is rounded over and is received in a correspondingly shaped recess or pocket 40 in the sleeve. The rod 38 is pressed outwardly so as to tend to disengage its end from the sleeve 32 by means of a spring 42 coiled about the rod and interposed between a washer on the rod and the boss through which the aperture 23 extends. The outer end of the rod 38 is pivotally connected with the upper end of a vertical lever 44 which extends through a slot in the spring actuated arm and is centrally pivoted on a pin 46 secured in the arm. The lower end of the lever 44 is connected by a link or rod 48 with one member of a two part fuse 50 the other member of which is secured by a screw 52 to the under side of the spring actuated arm 8. The rod 48 is supported and guided by means of an ear 54 on the under side of the arm 8 through which it extends, and is made in two sections that are connected by a turn-buckle 56 to permit its length to be varied. The fuse 50 is of a standard type in which the two parts thereof are joined by suitable fusible material.

With this construction it will be apparent that upon the fuse breaking when the temperature of the room reaches a predetermined degree, the coil spring 42 will immediately act to shift the holding rod 38 out of engagement with the abutment sleeve 32 and thus permit said sleeve to move upwardly so as to relieve the tension of the spring 26, and thus permit the spring actuated arm 8 to act immediately to close the door. The rounded end of the rod 38 and the wall of the correspondingly shaped recess 40 in which it is received, cooperate to shift the rod 38 out of engagement with the sleeve under the tension of the spring 26, and thus this spring assists the spring 42 to insure immediate disengagement of the holding rod 38 and release of the holding detent 22 when the fuse breaks. The stop screw 36, by limiting the upward movement of the sleeve 32, prevents dislodgment of the sleeve and associated parts from the spring actuated arm.

The location of the fuse 50 on the under side of the spring actuated arm 8 insures that the fusible link will be exposed to the surrounding atmosphere at a point near to the connecting door-way between two rooms when the door is open. The arrangement of the parts of the device on the spring actuated arm presents no unsightly appearance,

and the arm protects the parts from being accidentally struck. It will be apparent that the device will operate to pull the fusible link apart whether the door is open or closed so that there is no danger of the links becoming fused together again after the fuse is once broken.

To reset the device after a fuse has been thus broken merely necessitates the replacement of the fuse and the compression of the sleeve 32 so as to permit the end of the rod 38 to be received in the holding recess in the sleeve. The turn-buckle 56 permits the device to be adjusted to accommodate any variations in the length of the fuses.

As will be evident to those skilled in the art, our invention permits various modifications without departing from the spirit thereof or the scope of the appended claims.

What we claim is:

1. A hold-back device for door closers provided with a spring actuated door closing arm having, in combination, a stop member, a cooperating detent carried by said arm and adapted to engage said stop member when the door is open, a coil spring for maintaining said detent in holding engagement with said stop member to hold the door open when said spring is under tension, and an abutment member for maintaining said spring under tension comprising a sleeve surrounding said spring and movable in one direction to relieve the tension of said spring to permit said spring actuated arm to close the door, and thermally controlled means for holding said sleeve from movement in said direction.

2. A hold-back device for door closers provided with a spring actuated door closing arm having, in combination, a stop member, a cooperating detent carried by said arm and adapted to engage said stop member when the door is open, a coil spring for maintaining said detent in holding engagement with said stop member to hold the door open when said spring is under tension but permitting said spring actuated arm to close the door when the tension of the spring is relieved, an abutment member engaging the outer end of said coil spring and mounted for outward movement to relieve the tension of said spring, a rod having one end arranged in holding engagement with said abutment member to maintain said spring under tension, and thermally controlled means for holding said rod in holding engagement with said abutment member, said rod and said abutment member having cooperating engaging surfaces tending to shift said rod out of holding engagement with said abutment member under the tension of said detent spring when said thermally controlled means releases said rod.

3. A hold-back device for door closers

provided with a spring actuated door closing arm having, in combination, a stop member, a cooperating detent carried by said arm and adapted to engage said stop member when the door is open, a coil spring for maintaining said detent in holding engagement with said stop member to hold the door open when said spring is under tension, and means for maintaining said spring under tension comprising an abutment member engaging the outer end of said spring and mounted for outward movement to release the tension of said spring, a rod having one end arranged in holding engagement with said abutment member to maintain said spring under tension, a second spring tending to disengage said rod from said abutment member, and thermally controlled means for maintaining said rod in holding engagement with said abutment member.

4. A hold-back device for door closers provided with a spring actuated door closing arm having, in combination, a stop member, a cooperating detent carried by said arm and adapted to engage said stop member when the door is open, a spring for maintaining said detent in holding engagement with said stop member to hold the door open when said spring is under tension, an abutment member for maintaining said spring under tension and adapted to move outwardly to relieve the tension of said spring, and means for preventing said movement of said abutment member comprising a rod having one end arranged in holding engagement with said abutment member, a spring tending to shift said rod out of holding engagement with said abutment member, and thermally controlled means for holding said rod from said shift-

ing movement under the tension of said spring.

5. A hold-back device for door closers provided with a spring actuated door closing arm having, in combination, a stop member, a cooperating detent carried by said arm and adapted to engage said stop member when the door is open, a coil spring for maintaining said detent in holding engagement with said stop member to hold the door open when said spring is under tension, a sleeve surrounding said coil spring and mounted for limited axial movement in a direction away from said detent, a plug screw-threaded into the outer end of said sleeve and serving as an adjustable abutment for the outer end of said spring, means for holding said sleeve from outward movement to maintain said spring under tension comprising a rod mounted for longitudinal movement substantially transverse to the axis of said sleeve, said sleeve being provided with a recess for receiving one end of said rod, a spring coiled about said rod and tending to move the rod in a direction to disengage its said end from said sleeve, and means for maintaining said arm against the tension of its spring in holding engagement with said sleeve comprising a lever pivotally mounted on said arm, pivotal connection between one arm of said lever and the outer end of said rod, a fusible member having one end connected with said spring actuated arm, and a link connecting the other end of said fusible member with the other arm of said lever.

In testimony whereof, we have signed our names to this specification this 14th day of September, 1927.

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