

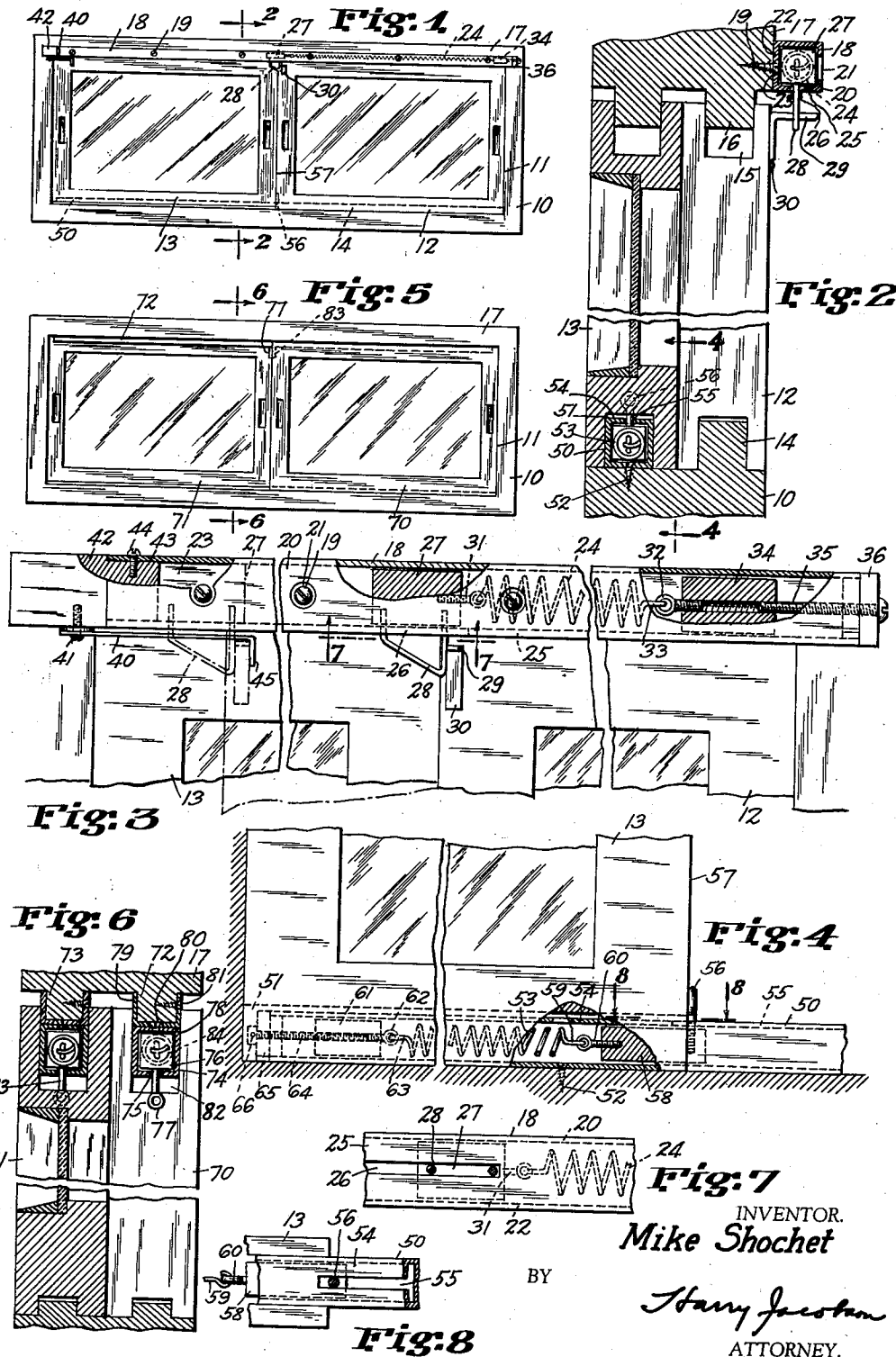
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SLIDING DOOR FOR SHOWCASES

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SLIDING DOOR FOR SHOWCASES

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11 Claims. (Cl. 312-138)

This invention relates to doors for refrigerator show cases and the like and particularly, to the means for closing a door automatically after the door has been opened and released. This invention is an improvement of my co-pending application Serial No. 731,013, filed June 18th, 1934.

The present invention contemplates the provision of simple and inexpensive means designed for quick and easy attachment to show cases now in general use for closing the door automatically, and also designed for easy installation in new show cases and when so used, being concealed from view or replacing the track upon which such doors run.

My invention further contemplates the provision of a tension spring for closing the door as well as means for adjusting the tension upon the spring so as to control the effective closing force exerted thereby.

The various objects of the invention will be clear from the description which follows, and from the drawing, in which,

Fig. 1 is a rear elevation of a show case having a door opening closed by a pair of sliding doors and to which my invention has been applied.

Fig. 2 is a vertical section of the same, taken on the line 2-2 of Fig. 1.

Fig. 3 is a rear fragmentary elevational view of the same on an enlarged scale showing in dash-dot lines the means for holding the door open when desired.

Fig. 4 is a vertical section, taken on the line 4-4 of Fig. 2.

Fig. 5 is a rear elevational view of a modified form of my invention wherein my invention is used to replace or in connection with the tracks upon which the show case doors operate.

Fig. 6 is a vertical section of the same, taken on the line 6-6 of Fig. 5.

Fig. 7 is a fragmentary horizontal section, taken on the line 7-7 of Fig. 3 and showing particularly, the slotted spring-holding tube and the means actuated by the door for extending the spring.

Fig. 8 is a similar view of the same, taken on the line 8-8 of Fig. 4.

In the practical embodiment of my invention which I have shown by way of example, the show case 10 of any of the usual types, is provided with a door opening 11 in which are arranged the doors 12 and 13, each extending a little over half way across the opening. Said doors overlap to some extent at their adjacent inner ends in the customary manner. The door 12 is suitably grooved along its lower edge to run on the lower track 14 and is also grooved along its upper edge as at 15 to receive the upper track 16. Similarly, the door 13 is grooved at its upper and lower edges to run on its tracks. Since the door grooves and the tracks therefor are well known

in the art, being so designed that each door may be removed from its tracks when desired and lifted out of the show case, a detailed description thereof is deemed unnecessary, except to say that the upper groove 15 is deeper than the lower groove and deeper than its upper track whereby the door when lifted is freed of the lower track and may then be tilted out of the door opening by drawing the lower edge of the door rearwardly.

In Figs. 1 and 2, I have shown one form of my invention applied to the door 12, and a different arrangement of said invention applied to the door 13. It will be understood, however, that the form shown in connection with the door 12, wherein the door closing means is secured to the frame 17 of the door, may also be applied to the door 13. It will also be understood that if desired, the form of my invention wherein the door closing mechanism replaces the lower track for the door 13 may be also used to replace the track 14 of the door 12 if desired instead of being attached to the frame 17 as shown.

In either case, it will be seen that the closing mechanisms for the doors 12 and 13 may be identical in construction and similar in arrangement instead of being somewhat different from each other as illustrated.

Referring now to the closing mechanism for operating the door 12, as is shown at the upper part of Figs. 1, 2, and 3, the metallic tube 18 is secured to the door frame by any suitable means such as for example, the screws 19. The tube 18 as shown is preferably made of square cross-section, the front wall 20 thereof being provided with a series of spaced holes 21 and the rear face 22 being provided with preferably countersunk holes 23 aligned with the respective holes 21. The screws 19 may thereby be passed through the holes 21 and through the aligned holes 23 to secure the tube to the door frame 17. Said tube 18 is preferably open at both ends and contains the extensible spring 24. The bottom wall 25 of the tube is slotted for the left half or more of its length as viewed in Fig. 3 as by means of the elongated slot 26.

Slidably fitted within the tube 18 is the slide member 27 which carries the projecting lug in the form of a loop 28. Said lug or loop as shown in Fig. 3 may be made economically of round wire, being suitably secured to the slide member 27 and passing through the slot 26 into the path of the leg 29 of the angle member or bracket 30 which is secured to the upper left corner of the door 12 as viewed in Figs. 1 and 3. One end of the spring 24 is secured to the slide 27 by any suitable means such as the hook 31. The other end of the spring is adjustably fixed to the tube 18 in any suitable manner as by means of the screw eye 32, about which the end 33 of the

spring is hooked, and which is threaded into the slidable adjusting nut 34. The adjusting screw 35 also enters the nut 34 and being under the pull of the spring 24, serves to hold the closing plug 36 at the right end of the tube 18.

It will be seen that as the door 12 is opened by movement toward the left, the bracket 30 engages the member 28 and moves said member together with the slide 27 toward the left, thereby stretching or extending the spring 24, since the end 33 of the spring is fixed. When the door is released, the spring 24 contracts and pulls the slide 27 and the member 28 toward the right and back into their initial positions.

The member 28, however, since it engages the bracket 30, moves said bracket and the door to which the bracket is attached, back toward the right into the closed positions thereof.

In order to hold the door temporarily in its open position, a suitable latch is provided. As shown, said latch consists of a swingable arm 40, pivotally secured as by means of the screw 41 to the closing plug 42, which has a reduced extension 43 entering the left end of the tube. A screw as 44 serves to secure the closing plug to the tube. At its right end, the latch 40 is provided with a depending arm 45, whereby when the bracket 30 reaches the dash-dot line position shown in Fig. 3, said latch may be swung about its pivot to engage the arm 29 of the bracket and temporarily to prevent the door from moving into its closed position under the tension of the spring 24. When the latch 40 is swung about its pivot toward the left, the bracket 30 is released and the spring 24 then becomes operative to close the door automatically.

In that form of my invention shown in connection with the door 13, (Figs. 2, 4, and 8), the tube 50 replaces the lower track 14. Said tube is therefore designed to enter the groove 51 customarily provided in the lower edge of the door. The screws 52 serve to secure the tube 50 to the door frame in its proper position to serve as a track and also to serve as a retaining means for the spring 53, which is arranged within the tube. The upper wall 54 of the tube is slotted as at 55, and through the slot extends the projecting member 56 shown in the form of a screw eye. Said member 56 is arranged to engage the right edge 57 of the door 13 as viewed in Fig. 4 and moves with the slide 58. The right end 59 of the spring 53 is suitably secured to the slide 58 by any suitable means such as the screw eye 60.

At its left end, the spring is secured to a device for adjusting the tension exerted by the spring, which device is similar to that hereinbefore described in connection with the spring 24.

As shown, the adjusting device comprises the nut 61 into which is threaded the screw eye 62, about which screw eye is hooked the left end 63 of the spring. The adjusting screw 64 passes through the closing plug 65 which engages and closes the left end of the tube 50 and which is similar to the plug 42, said screw being in threaded engagement with the nut 61. Suitable radially disposed holes 66 are made in the head of the screw 64 for the removable reception of a screw-operating pin to rotate the screw and thereby to adjust the longitudinal position of the nut 61 and to increase or decrease the tension on the spring 53.

It will be understood that the spring is normally in its retracted position illustrated in Fig. 4, in which position the member 56 by its engagement with the inner edge 57 of the door 13

maintains said door in its closed position. When the door is, however, moved toward the right, said edge 57 engages and moves the member 56 and the slide 58 toward the right, thereby extending the spring and increasing the tension thereon so that when the door 13 is released, the spring in its contracting movement, draws the member 56 and the slide 58 toward the left, thereby closing the door 13.

In that form of my invention shown in Fig. 6, the door-closing means is associated with the upper track of each of the doors 70 and 71. This form of my invention is particularly suitable for use in new installations to replace the upper door tracks entirely or to supplement said tracks. As shown, the door frame 71 is provided with comparatively low upper tracks as 72 for the door 70, and tracks 73 for the door 71. The door closing devices being identical for each of the doors, a description of one will suffice for both.

The spring-holding tube 74, which is similar to the tubes 50 and 18, is slotted in the same manner as the tube 18 for a little over half of its length as at 75. Inserted at one end of the tube is the slide 76 which is similar to the slides 27 and 58 and to which is connected one end of the spring 84. Projecting from the slide is the door-engaging member 77 arranged to engage the inner end edge of the door 70. The other end of the spring is adjustably fixed relatively to the tube by means of the adjusting screw or similar adjusting means fully described hereinbefore in connection with the screws 35 and 64 and the disclosures of Figs. 3 and 4. To secure the tube 74 to the track 72, the upper wall 78 of said tube is first fastened at spaced intervals to the series of spaced narrow U-shaped clips 79 as by means of the screws 80. Said clips are then secured to the track part 72 or to the door frame as by means of suitable screws 81. It will be understood that the sizes of the tubes 74 and 50 are such that they enter the grooves 82 and 51, respectively, customarily made in the doors for the reception of the guiding door tracks.

The door-closing means illustrated in connection with the door 71 is identical with that described in connection with the door 70, being, however, reversed end to end in position so that the member 83 corresponding to the member 77 is arranged to engage the inner end edge of the door 71 to extend the spring on the opening of said door, whereupon release of the door permits the spring to contract and to cause the member 83 in its movement to close the door 71.

It will be seen from the above that I have provided a simple door-closing mechanism designed for rapid and inexpensive installation to automatically close the sliding doors of a refrigerator show case or other similar doors and to normally maintain said doors closed, and thereby to protect the contents of the refrigerator against spoilage and contamination resulting from open doors, and that I have also provided a similar means well adapted to be installed in show cases to replace or to be associated with the tracks thereof, and designed to meet the severe requirements of practical use.

While I have shown and described certain specific embodiments of my invention, I do not wish to be understood as limiting myself thereto but intend to claim my invention as broadly as may be permitted by the state of the prior art and the scope of the appended claims.

I claim:

1. Door closing means for the slidable doors of 75

a show case, comprising a tube having a flat wall whereby the tube may be secured to a flat surface, said tube having a longitudinal slot therein, an extensible and contractable spring within the tube, a member secured to one end of the spring and projecting through the slot, and means for adjustably securing the other end of the spring to the end of the tube including a screw engaging said end of the tube and a movable threaded member in threaded engagement with the screw and operatively connected to said other end of the spring.

2. Means for closing a show case door slidable within a frame comprising a longitudinally slotted tube securable to the frame, a spring in the tube, means for fixing one end of the spring relatively to the tube, and means for moving the other end of the spring to extend the spring on opening movement of the door, including a member secured to said other end of the spring and projecting through the slot of the tube and arranged to be moved by the door when the door is opened and to move the door under the influence of the spring when the door is released after being opened.

3. In a self-closing door mechanism for the sliding door of a show case, a slotted tube, means for fixing the tube in position adjacent a door, a tension spring in the tube, a member secured to one end of the spring and projecting through the slot of the tube and into the path of movement of the door, and means for adjustably and removably fixing the other end of the spring to the tube, said member being movable against the action of the spring in a direction to extend the spring on opening movement of the door.

4. In a self-closing door mechanism for the sliding door of a show case, a tube having a slot therein extending partway of the length of said tube, a flat wall on the tube whereby the tube is securable to a flat surface, an elongated coil spring within the tube, means for securing one end of the spring to one end of the tube, and means secured to the other end of the spring and movable therewith and normally in operative engagement with the door to change the length of the spring and thereby to stress the spring on opening movement of the door.

5. In mechanism for closing the slidable door of a show case on the opening and release of said door, an elongated coil spring arranged with its axis in the direction of movement of the door, a tube enclosing and supporting the spring, said tube having a longitudinal slot therein, means for adjustably fixing one end of the spring relatively to the tube, and means carried by the other extreme end of the spring and projecting through the slot into the path of opening movement of the door, said means being movable independently of the movement of the door.

6. Combined door closing and guide means for a slidable door having an edge groove therein and slidable in a show case frame comprising a guide track entering the edge groove of the door and carried by the frame, said guide track comprising a tube having flat opposed side walls and having connecting walls joining the side walls, one of the connecting walls having a longitudinal slot therein, a coil spring within the tube and fixed at one of its ends relatively to the tube, and a member carried by the other end of the spring

and projecting through the slot and engaging the inner end edge of the door.

7. In a show case having an opening closed by a pair of slidable doors, a tube carried by the show case adjacent an edge of the opening and arranged with its axis parallel to the direction of opening movement of a door, said tube having a longitudinal slot therein, a single coil spring within the tube, means for holding one end of the spring against movement relatively to the tube, a member carried by the spring and extending through the slot, and a member carried by the door and in constant engagement with the first-mentioned member to stress the spring on opening movement of the door and to move the door into closed position automatically when the door is released.

8. Door closing means, comprising an elongated tube having a flat wall whereby the tube may be secured to a flat surface, said tube having a longitudinal slot therein, extending from one end of the tube part way of the length of the tube, a spring within the tube, a spring-operating member secured to one end of the spring and projecting through the slot, and means for adjustably securing the other end of the spring to the other end of the tube including a screw engaging said other end of the tube and a movable internally threaded member engaging the screw and operatively connected to said other end of the spring.

9. In a self-closing door mechanism for the sliding door of a show case, an elongated coil spring, a slotted tube square in cross-section and open at both ends for receiving and concealing the spring, a removable plug entering one end of the tube and closing said end, a closing member for the other end of the tube, a spring-adjusting screw passing through said member, a nut secured to that end of the spring nearest the screw and in threaded engagement with the screw, a member slidable within the tube and secured to the other end of the spring, and a projecting lug extending from the slidable member and through the slot of the tube and arranged in position for movement longitudinally of the tube to extend and tension the spring on opening movement of the door.

10. In mechanism for closing the slidable door of a show case on the opening and release of said door, a single elongated coil spring arranged with its axis in the direction of movement of the door, means for enclosing and concealing the coil spring, means for adjusting one end of the spring relatively to the enclosing and concealing means, and means carried by the other end of the coil spring and interposed in the path of opening movement of the door to stress the spring and to change the length of the spring when the door is opened, and to move the door into closed position under the influence of the spring after the spring has been stressed and the door has been released.

11. In a door closing and guide means adapted for use in a show case, a slidable door having an edge groove therein, a relatively fixed guide track for the door, said guide track comprising a tube loosely fitted into the groove of the door, a spring arranged within the tube, and means carried by the spring and engageable by the door for stressing the spring on opening movement of the door.

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