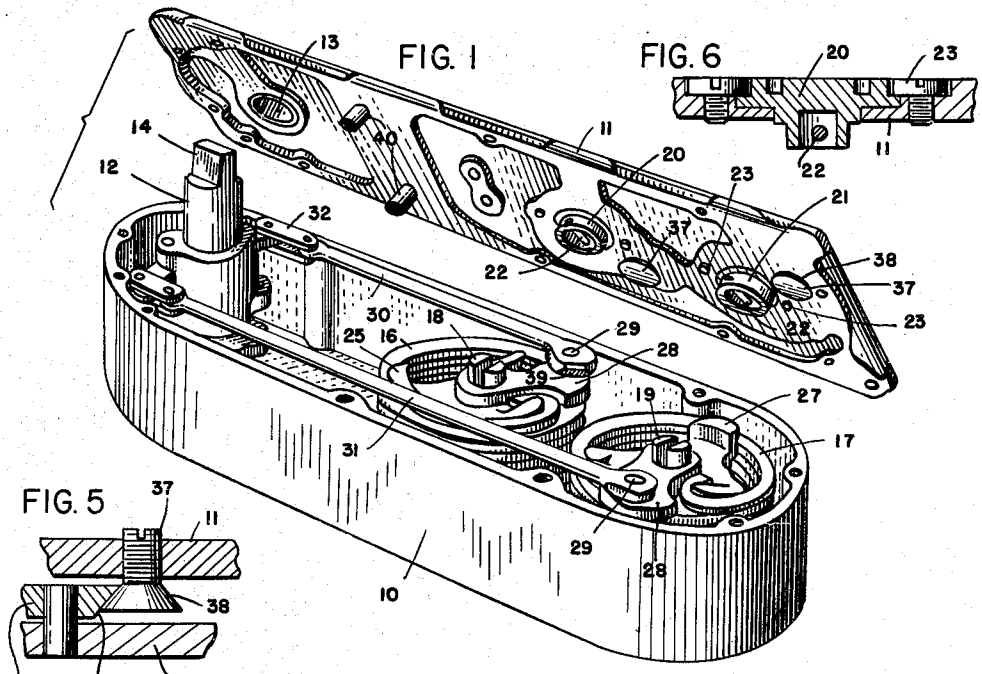
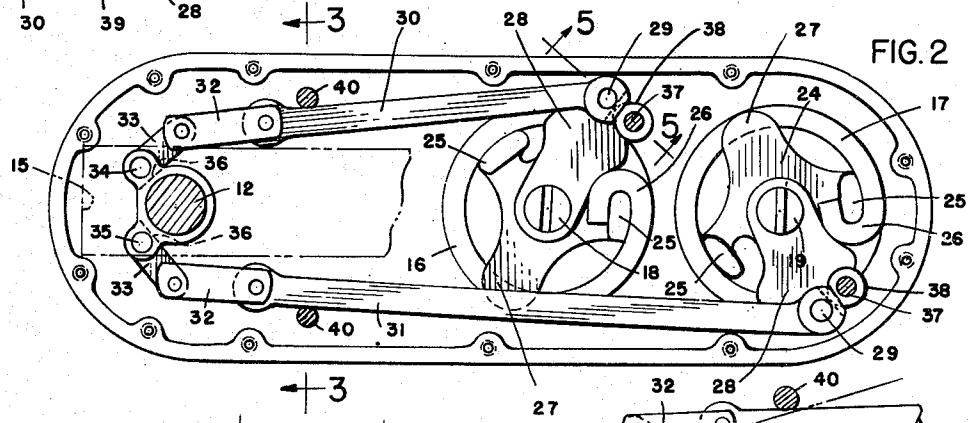
May 1, 1951 S. G. BARTOSZEK 2,550,756

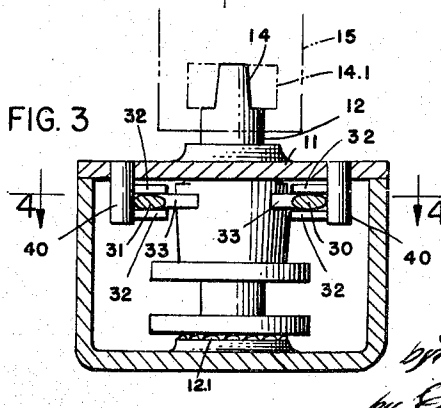
DOOR CLOSER

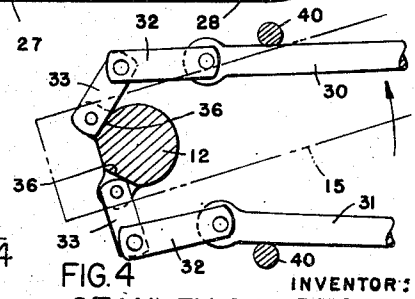
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DOOR CLOSER

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3 Claims. (Cl. 16—185)

1

This invention relates to closers for double acting doors.

The main object of this invention is to improve the operation of mechanism of the general type represented by the patent of Oscar C. Rixson, No. 1,025,309, granted May 7, 1912, and whereby the closed position at which a double acting door comes to rest may be accurately controlled by the adjustment of the door-closing mechanism itself.

The invention is particularly advantageous for use on double acting single doors and batteries of double acting doors in assuring accurate planar alignment of the doors in their closed position, which is especially important in regard to doors made entirely of heavy plates of tempered glass.

A specific embodiment of this invention is illustrated in the accompanying drawings in which:

Figure 1 is a perspective view showing the type of door closer that is embedded in the floor below the door, with the cover of the housing being shown as lifted and tilted to show some of the parts in relation to others.

Fig. 2 is a plan view of the same with the cover removed, the door being represented by broken lines showing its relation to the spindle of the door closing mechanism which serves as one of the hinges upon which the door swings, some of the parts being shown in section taken on the plane of the bottom of the cover.

Fig. 3 is a sectional elevation taken on the line 3—3 of Fig. 2 with the cover of the housing in place.

Fig. 4 is a fragmentary detail, in plan, of a portion of the linkage that connects the spindle with the operating springs.

Fig. 5 is a sectional detail taken on the line 5—5 of Fig. 2, showing stop means adjustable from above for limiting the movement of the door under the action of one of the torsion springs.

Fig. 6 is a fragmentary detail showing the means for rotating the spring spindle and locking it for adjusting the tension of the torsion spring.

In the form shown in the drawings, the housing 10 is in the form of a cast iron tank which may be filled with a liquid lubricant and checking medium. This tank is closed by means of a cover 11. The door spindle 12 is seated in a ball bearing 12.1 on the bottom of the housing 10 and extends through a bushing 13 lining a bearing aperture in the cover 11. The upper end of the spindle is flattened at 14 to receive an arm 14.1, Fig. 3, by means of which the spindle is affixed to the door which is shown by broken lines 15 in Figs. 2, 3 and 4.

A pair of oppositely wound helical torsion springs 16 and 17 are carried by and affixed to bottom fittings, not shown, which are fast against relative rotation on spaced vertical spindles 18

2

and 19 which are mounted in the housing 10. These spindles are journaled in the bottom of the housing and are slotted at their upper ends and extend into cap members 20 and 21 that are rotatably mounted in the cover member 11 and provided with cross pins 22 to engage the slots in these spindles, whereby the spindles may be rotated to tension the springs and are locked in adjusted positions by means of lock screws 23 whose heads engage peripheral notches in the cap members.

Each of the spindles 18 and 19 has a spring-top fitting 24 near its upper end which fitting is loosely mounted on the spindle 18 or 19, as the case may be. These top fittings 24 are identical in shape and each comprises a hub portion bored to receive the spindle 18 or 19 and having integral laterally extending arm portions 27 and 28 that rest upon the top convolution of the spring 16 or 17. Each fitting 24 has a pair of lugs 25. One of these lugs is positioned and shaped to receive the hooked end of a clockwise wound helical spring and the other is positioned and shaped to receive the hooked end of a counter-clockwise wound spring. The arms 28 carry pivot studs 29 which respectively engage the main links 30 and 31 of a pair of linkages that connect the springs with the spindle 12 so as to rotate the spindle in respectively opposite directions and return the door to its closed position when swung toward either side from its closed position.

In addition to the main links 30 and 31, each of these linkages comprises a pair of toggle links 32 and 33 connecting the main links 30 and 31 with arms 34 and 35 respectively, which extend at an angle to each other at opposite sides of the spindle 12. The arms 34 and 35 are slotted to receive the links 33 and have shoulders 36 against which the links 33 bear when the respective linkages are under tension. It will be understood that both linkages are under tension and occupy the positions in which they are shown in Fig. 2 only when the door 15 is in its closed position.

The construction defined up to this point, except as to non-essential structural details, is disclosed in Rixson Patent, No. 1,025,309. The present invention resides in improvements added thereto and hereinafter defined, which improvements provide greater precision in the operation of the mechanism and have particular reference to perfecting its capability for easy adjustment from the exterior of its closed casing so as to assure proper alinement of pairs of double two-way swinging doors in their normal closed positions.

In my improved structure shown in the drawing, movement of the links 30 and 31 under the action of their respective springs 16 and 17 toward the right of Fig. 2 is limited by adjustable stop members which, in the form shown, comprise screw studs 37 threaded through the cover

plate 11 and having conical heads 38 that coact with beveled surfaces 39 on the adjacent ends of the links 30 and 31. These stops are adjusted by turning the studs 37 to raise or lower the heads 38 in relation to the beveled surfaces 39 (see Fig. 5) so that the door normally comes to rest in the position in which it is shown in Fig. 2 when both of the linkages are under tension.

In order that the door may be freely swung in either direction away from its normal closed position, except for the resistance of one of the torsion springs 16 and 17, the toggles, consisting of the links 32 and 33, are provided. In the normal position of Fig. 2, the toggle links 32 are pulled by the springs into alignment with the main links 30 and 31 of their respective linkages and the toggle links 33 act in the nature of extensions of the arm 34 and arm 35 due to their abutment with the shoulders 36 on the spindle 12. When, however, the door is swung toward one side of its central or closed position, the linkage on that side will be under tension and will yield against the resistance of the respective spring 16 or 17. The toggle portion of the linkage on the opposite side will buckle freely to permit such swinging of the door, but the respective main link will be held against its respective limit stop 38. The return of the door to its middle or closed position is checked by dashpots connected to the spindle 12 but these are omitted from the drawing as they form no part of the present invention.

It has been found that the structure hereinbefore described may sometimes permit the door to come to rest in a position slightly out of the exact central position in which it is shown in the drawings, due to the fact that when the toggle of one of the linkages buckles as the door swings outward it may cause the long link to turn slightly on its pivot 29 shifting the point of contact between its beveled end surface 39 and the stop 38. This effect is not very noticeable in the case of a single double acting door, but with double acting double doors, especially when consisting entirely of glass, it is essential that they always come to rest edge to edge in exact planar alignment with each other and this is accomplished by the present invention.

I have found that if stop pins 40 are placed in the position shown in Fig. 2 so as to prevent the links 30 and 31 from swinging outward beyond a position where they will be in straight alignment with their respective toggle links 32, when the door is in its middle position, that such deviation from the exact central position in which the door is intended to come to rest will never occur and the door will always come to rest with both links 30 and 31 in proper alignment with their respective toggle links 32 and with their beveled end surfaces 39 in proper engagement with their respective stops 38.

Although but one specific embodiment of this invention is herein shown and described, it will be understood that numerous details of the structure shown may be altered or omitted without departing from the spirit of the invention as defined by the following claims.

I claim:

1. In a door closer, a spindle, a pair of angularly spaced radial arms on said spindle, a pair of linkages one of which is connected to each arm, individual spring means acting through said linkages on said arms respectively for rotating said spindle in opposite directions, each said linkage comprising a main link connected to its respective said spring and a pair of toggle links connecting such main link to its respective said arm, adjustable stop means positioned to engage said main links for limiting the longitudinal movement of said main links under the pull of their springs, and guide means to limit lateral movement of said main links by thrust on their respective toggle links while said main links are engaged with said stop means.

2. In a door closer, a spindle, a pair of angularly spaced radial arms on said spindle, a pair of linkages one of which is connected to each arm, individual spring means acting through said linkages on said arms respectively for rotating said spindle in opposite directions, each said linkage comprising a main link connected to its respective said spring and a pair of toggle links connecting such main link to its respective said arm, adjustable stop means positioned to engage said main links for limiting the longitudinal movement of said main links under the pull of their springs, and guide pins abutting the outer sides of said main links adjacent said toggle links to limit lateral movement of said main links by thrust on their respective toggle links while said main links are engaged with said stop means.

3. A door closer, comprising a support, a spindle journalled on said support, an arm extending radially from said spindle, a toggle link pivoted on said arm in a plane transverse to the axis of said spindle, a shoulder on said spindle positioned to limit the pivotal movement of said toggle link toward said spindle, a second toggle link pivoted to said first-named link, a main link pivoted to said second toggle link, a torsion spring having pivotal connection to said main link, stop means positioned for limiting the movement of said main link by the pull of said torsion spring, and guide means to prevent lateral displacement of said main link through relative buckling movement of said toggle links, said stop means comprising a vertically beveled surface on the end of said main link adjacent to said spring, and a vertically adjustable stationary conical member coacting with said beveled surface.

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