Aug. 31, 1937. C. BAUMANN 2,091,904

DOOR CLOSING AND CHECKING DEVICE

Filed May 13, 1935

Fig. 1.

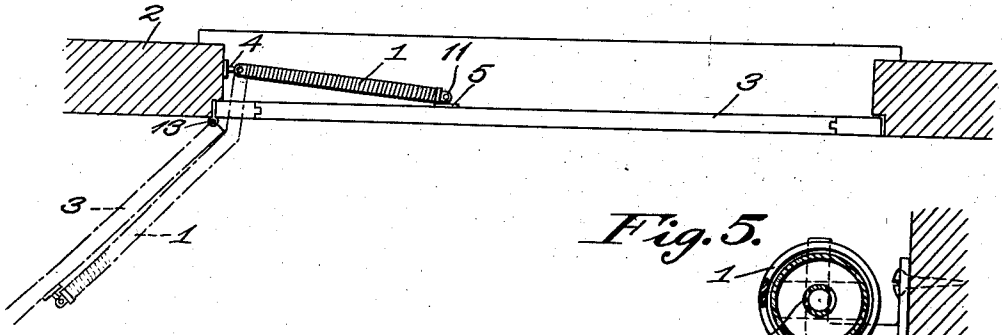


Fig. 5.

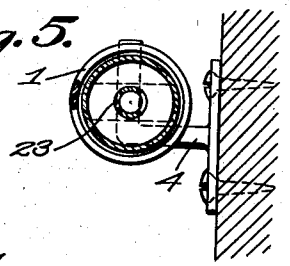


Fig. 2.

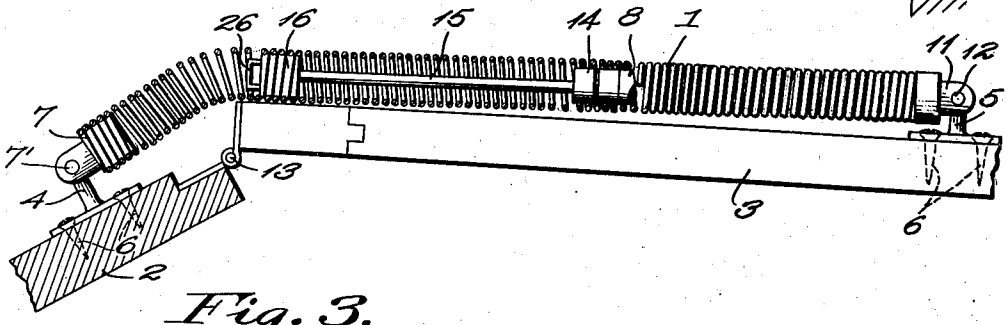


Fig. 3.

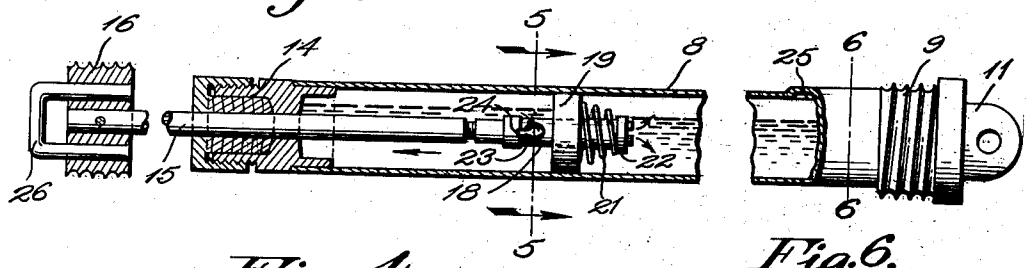


Fig. 4

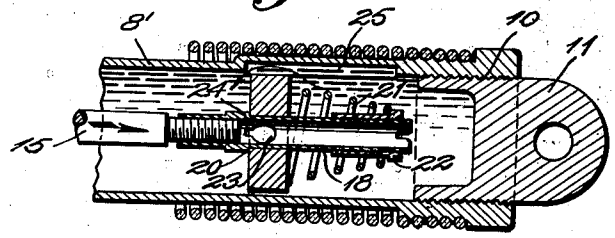
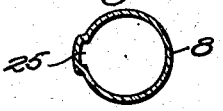


Fig. 6.



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DOOR CLOSING AND CHECKING DEVICE

Charles Baumann, Chicago, Ill.

Application May 13, 1935, Serial No. 21,221

1 Claim. (Cl. 16—51)

My invention relates to improvements in door closing and checking devices for screen doors or the like.

Generally speaking, the primary object of my invention is to provide a practical and efficient means for positively closing a door and checking closing movement thereof to prevent the same from slamming against the door casing.

Another object is to incorporate tension means for closing the door and hydraulic means for checking closing movement of said door into a single unit readily attachable as such to a door and to the door casing.

Another object is to incorporate with a door closing coil spring, hydraulic door checking means, so that the latter is operated by the action of the spring to check closing movement of the door in variable degree.

Other objects such as simplicity in construction, durability, and low cost of manufacture are also contemplated by my invention as will presently appear when the following description and claim are read in conjunction with the accompanying drawing.

In said drawing:

Figure 1 is a view partly in section and partly in elevation of a door and a door casing having my invention applied thereto.

Figure 2 is a similar fragmentary view, drawn to an enlarged scale, and illustrating the relation of the parts in an open position of the door.

Figure 3 is a view in longitudinal section, partly broken away and drawn to a further enlarged scale, of the hydraulic checking means of my invention.

Figure 4 is a fragmentary view, drawn to a further enlarged scale and illustrating the normal position of parts of the hydraulic checking means.

Figure 5 is a view in transverse section taken on the line 5—5 of Figure 3 and

Figure 6 is a similar view taken on the line 6—6 of Figure 3.

Referring to the drawing, in its preferred embodiment my invention comprises, an elongate helical tension spring 1, the opposite ends of which are secured to a door casing 2 and door 3, on the inside and transversely thereof, by a pair of brackets 4 and 5 secured, as by screws 6 to said casing and door, respectively, and to which the opposite ends of the spring 1 are connected as follows.

Screwed into the casing end of the spring 1 is a threaded plug 7 pivoted to the bracket 4 as at 7¹. Projecting into the other, or door end, of the spring 1 is a cylinder 8 of slightly smaller diameter than the inside diameter of the spring 1 for the greater portion of its length and having at its outer end an exteriorly threaded head portion 9 screwed into said end of the spring 1 and having threaded into the same as at 10, an ear member 11 pivoted as at 12, to the bracket 5. The cylinder 8 is designed to contain a suitable liquid such as oil. The connection of the spring 1 to the casing 2 and the door 3 is such that said spring for the greater portion of its length extends across the door 3 whereby when the latter is swung open, upon its hinges 13, said spring, adjacent one end thereof, bears against the rear edge of the door 3 thereby maintaining the greater portion of the spring straight during the door opening operation, the remaining portion of the spring being free to flex laterally around said edge of the door as shown in Figure 3 all for a purpose presently clear.

Suitably secured in the inner end of the cylinder 8 is a stuffing box 14 through which passes a piston rod 15 having fast on its outer end an externally threaded collar 16 for engagement with coils of the spring 1 whereby said rod is fixed to said coils. Threaded upon the inner end of said rod 15, as at 17, and projecting therefrom in axial alignment therewith, is a sleeve 18 upon which a piston 19 is mounted for sliding movement longitudinally thereof. The piston 19 is normally yieldingly held against a shoulder 20 on the sleeve 18 by a compression spring 21 interposed between said piston and another shoulder sleeve 22 threaded onto the outer end of the sleeve 18. A port 23 is provided in the sleeve 18 which, in the normal position of the piston 19, relative to said sleeve, is substantially closed thereby with the exception of a small bleed opening 24 for a purpose presently clear. Normally the piston 19 is located adjacent the outer end of the cylinder 8, as shown in Figure 4, in which position the liquid pressure in the cylinder 8 is equalized on both sides of said piston by means of a by-pass 25 in the form of a channel formed in the cylinder wall, adjacent its outer end, and which is cut off from communication with the inner end of the cylinder 8 by movement of said piston from its normal position. The cylinder 8, piston rod 15, and collar 16 are located within the before described straight portion of the spring 1, so that their axial alignment is not disturbed during opening and closing of said door.

Referring to the operation of my invention, when the door 3 is opened, the expansion of the

spring 1 causes movement of the piston rod 15 outwardly of the cylinder 8, thereby moving the piston 19, from its normal position, toward the inner end of the cylinder 8, and cutting off the by-pass 25 from communication with the front end of said cylinder. The back pressure in the front end of the cylinder 8 causes the piston 19 to slide from its normal position on the sleeve 18, against the tension of the spring 21, to completely uncover and open the port 23 so that the pressure in the cylinder becomes substantially equalized on both sides of said piston. When the door 3 starts its closing movement the contraction of the spring 1 moves the piston 19 in the reverse direction, the spring 21 returning the piston, to its normal position in the sleeve 18, thus closing the port 23 with the exception of the bleed opening 24 which is left open, to break the suction in the inner end of the cylinder 8. In this direction of movement piston 19 moves against liquid pressure until it reaches a position slightly past the inner end of the by-pass 25. Up to this point in its movement, said piston 19 operates to check the contraction of the spring 1 throughout the greater portion of its length and consequently to check the closing movement of the door 3. As soon as the piston 19 reaches said position the liquid pressure is equalized in the cylinder 8 and the spring 1 is relieved of opposition to its contraction so that as it nears a condition of minimum efficiency, its action is unrestrained and thereby speeded to effect quick and positive closing of the door 3. In the door closing operation, the free end of the spring 1 contracts immediately, the straight portion, first slowly under the checking action above explained, and then with an accelerated action when it is relieved of the checking opposition exerted thereagainst. By adjusting the collar 16 in the spring 1 to different set positions, the length of the checking period may be varied as desired. For adjusting the collar, an eyelet member 26 is provided thereon, whereby said collar may be turned by a suitable instrument inserted through the coils of the spring 1.

Obviously, modifications in the described form of my invention may be resorted to without departing from the inventive concept disclosed and right is herein reserved to all such modifications, falling within the scope of the claim appended hereto.

What I claim is:

A door closing and checking device comprising a helical spring, brackets for securing the ends of the spring to a door and to the door frame respectively, a shock absorbing cylinder in the spring having one end secured to one end of the spring adjacent to the bracket which attaches said end of the spring to the door, a piston in the cylinder, a piston rod for the piston extending longitudinally in the spring, a circumferentially grooved collar on the piston rod threadable longitudinally of the spring to vary the length of the checking period and securing the piston rod to the spring at a point considerably spaced from the bracket which secures the opposite end of the spring to the door frame whereby a portion of the length of the spring may flex independently of the piston carrying portion of the spring and bend freely across the hinged intersection of the door and the door frame without obstruction from the shock absorbing piston and piston rod, and means on the collar whereby the collar may be adjusted longitudinally of the spring by a suitable instrument inserted through the coils of the spring.

CHARLES BAUMANN.