Feb. 22, 1938. E. H. JOHNSON 2,108,891

DOOR HOLDER

Filed Oct. 19, 1934 4 Sheets-Sheet 1

Fig. 1

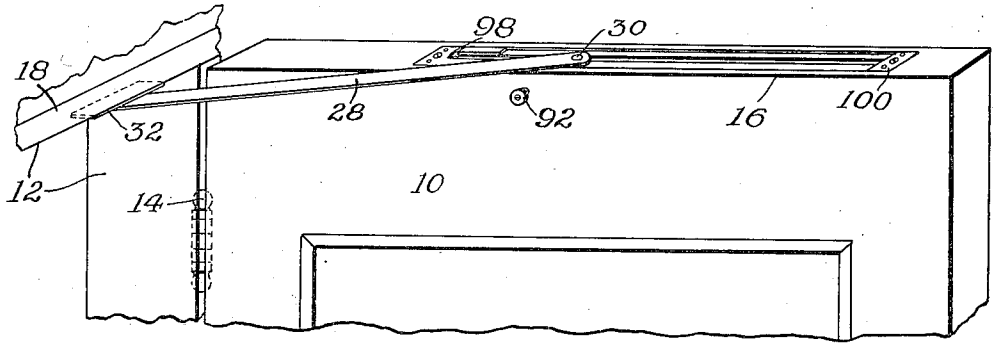


Fig. 2

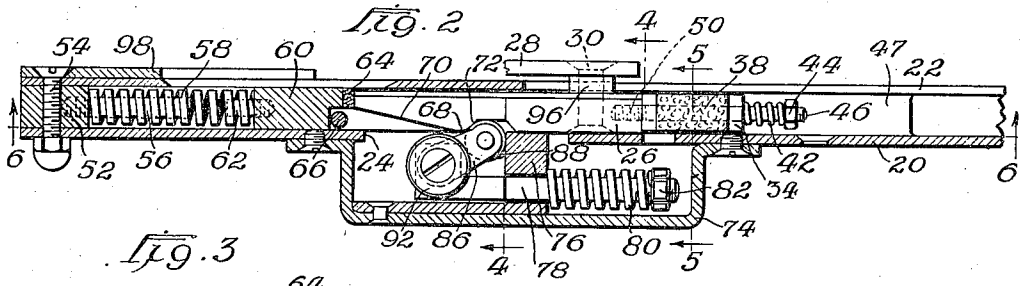


Fig. 3

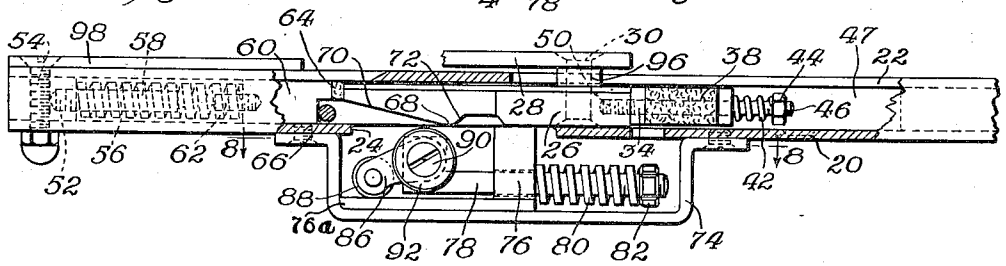


Fig. 4

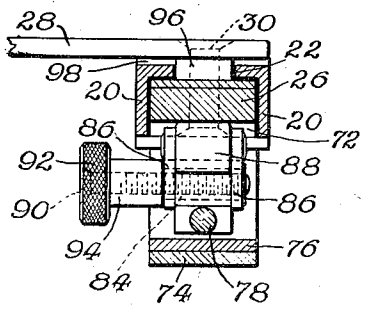
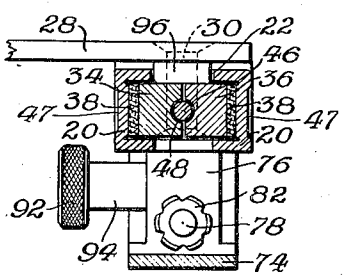


Fig. 5



Inventor
Elvin H. Johnson
By Freeman and Sweet
Attorneys

Feb. 22, 1938. E. H. JOHNSON 2,108,891

DOOR HOLDER

Filed Oct. 19, 1934 4 Sheets-Sheet 2

Fig. 6.

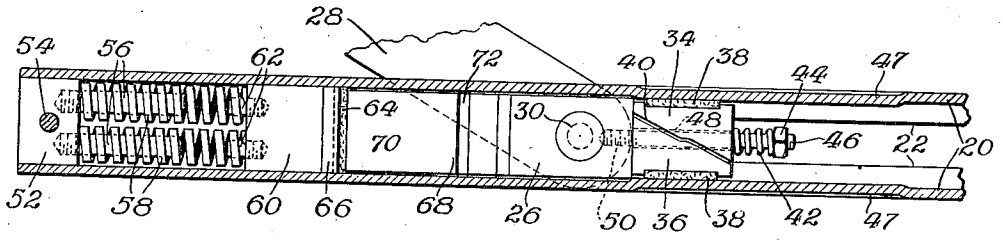


Fig. 7.

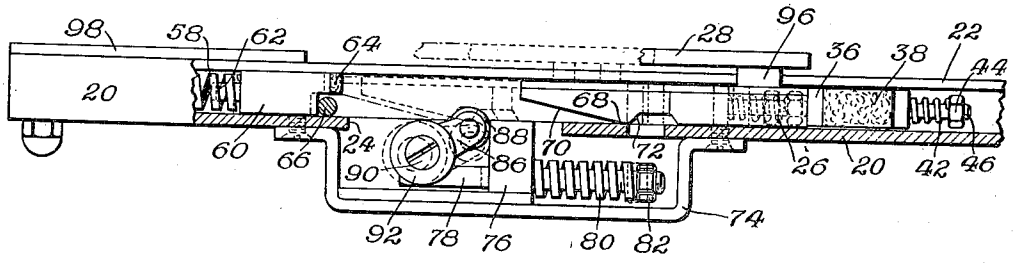


Fig. 8.

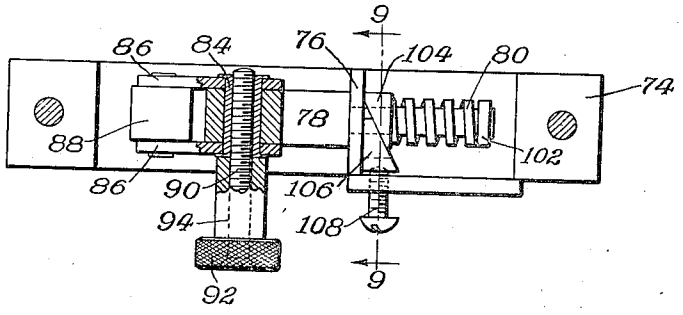


Fig. 9.

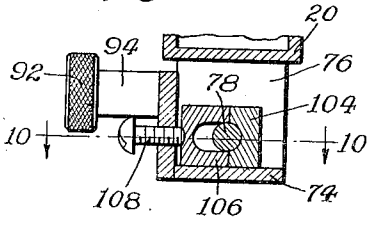
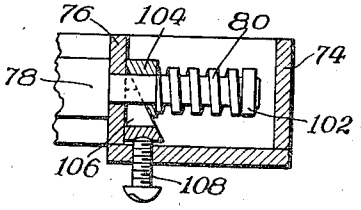


Fig. 10.



Inventor
Elvin H. Johnson
By Freeman and Sweet
Attorneys

Feb. 22, 1938. E. H. JOHNSON 2,108,891

DOOR HOLDER

Filed Oct. 19, 1934 4 Sheets-Sheet 3

Fig. 11

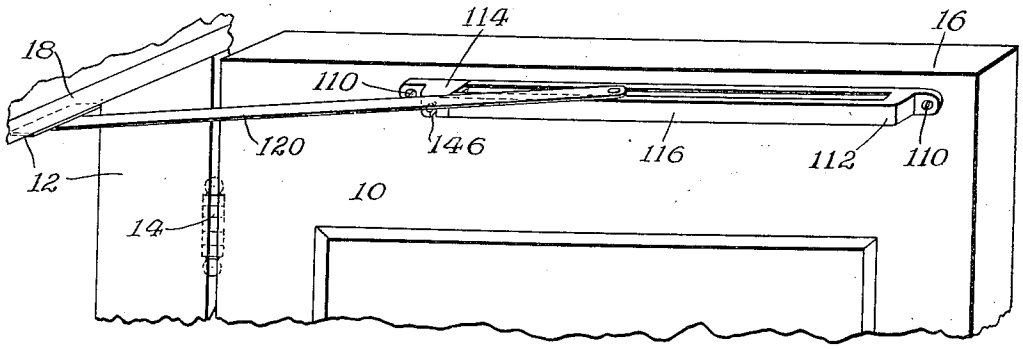


Fig. 12

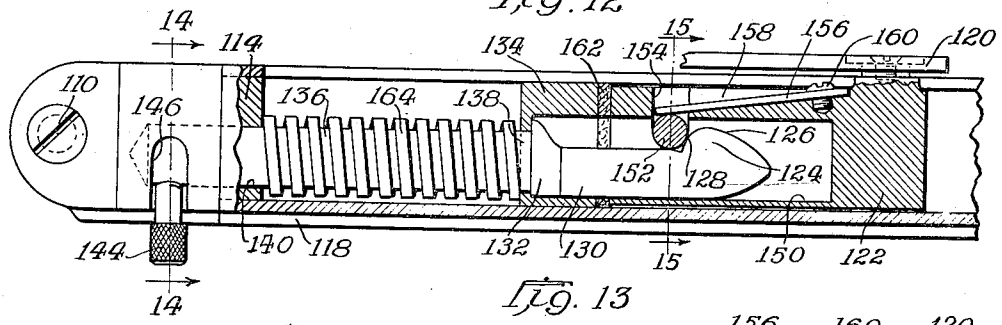


Fig. 13

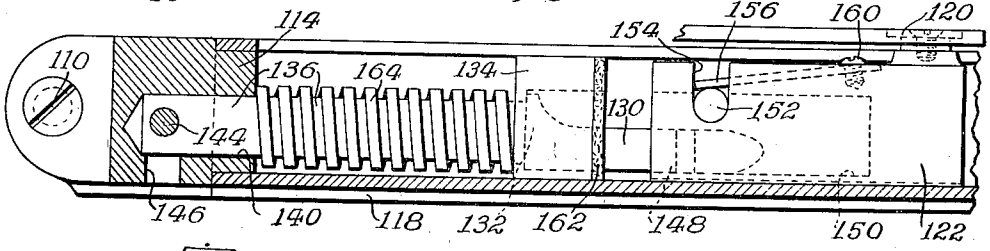


Fig. 14

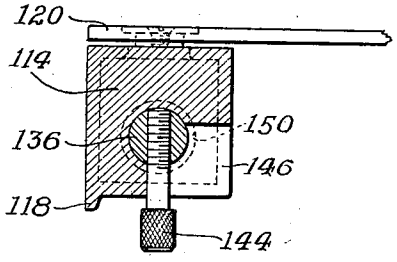
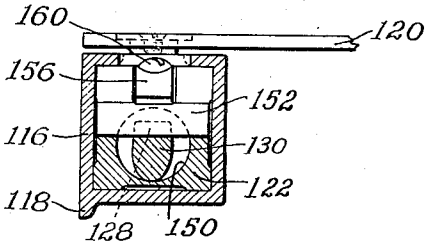


Fig. 15



Inventor
Elvin H. Johnson
By Freeman and Sweet
Attorneys

Feb. 22, 1938. E. H. JOHNSON 2,108,891

DOOR HOLDER

Filed Oct. 19, 1934 4 Sheets-Sheet 4

Fig. 16.

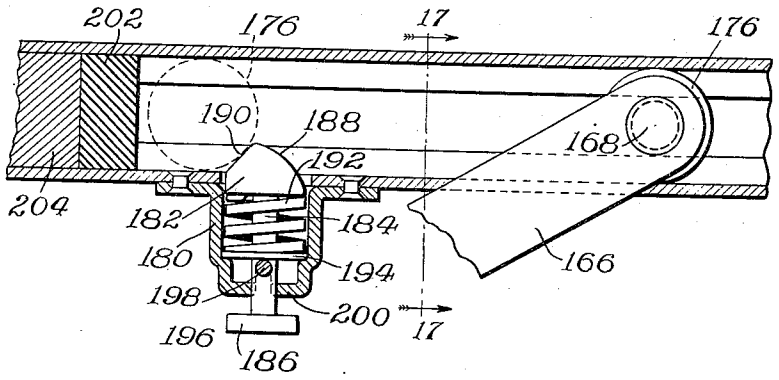


Fig. 17

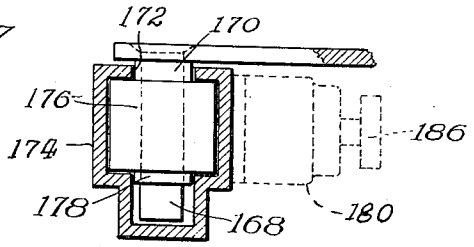


Fig. 18.

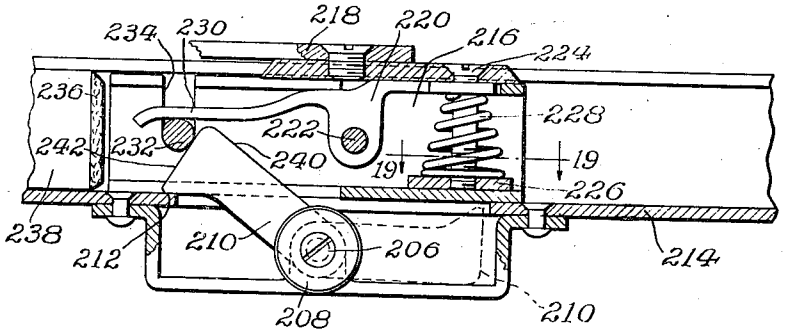
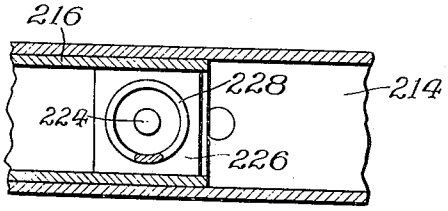


Fig. 19.



Inventor:
Elvin H. Johnson
By Freeman and Sweet
Attorneys

Patented Feb. 22, 1938 2,108,891

UNITED STATES PATENT OFFICE

2,108,891

DOOR HOLDER

Elvin H. Johnson, Winnetka, Ill.

Application October 19, 1934, Serial No. 749,016

4 Claims. (Cl. 292—275)

My invention relates to door checks and more specifically to an improvement in an overhead door holder. It includes among its objects and advantages adaptability to a greater variety of installations, and a simple and cheap way of uniting in a single structure cushioning means for cushioning the opening movement of the door and damping means for absorbing a suitable amount of energy during opening or closing of the door.

In the accompanying drawings:

Figure 1 is a perspective view of a door and door casing indicating the manner of installing one embodiment of my invention;

Figure 2 is a longitudinal central section through the installation of Figure 1;

Figure 3 is a view similar to Figure 2 with some of the parts in elevation and with the parts in a different condition of adjustment;

Figure 4 is a section on line 4—4 of Figure 2;

Figure 5 is a section on line 5—5 of Figure 2;

Figure 6 is a section on line 6—6 of Figure 2;

Figure 7 is a section similar to Figure 3 with the slide out of engagement with the slide holder;

Figure 8 is a plan view as on line 8—8 of Figure 3 indicating a modified adjustment means;

Figure 9 is a section on line 9—9 of Figure 8;

Figure 10 is a section on line 10—10 of Figure 9;

Figure 11 is a perspective view of a door and door casing indicating the external attachment of an alternative embodiment;

Figure 12 is a longitudinal central section through part of the installation of Figure 11;

Figure 13 is a view of the same parts with the slide and cam holder in elevation and the cam in inoperative position;

Figure 14 is a section on line 14—14 of Figure 12;

Figure 15 is a section on line 15—15 of Figure 12;

Figure 16 is a horizontal section of a construction in which the slide structure is of simplified construction;

Figure 17 is a section on line 17—17 of Figure 16;

Figure 18 is a vertical section of a construction in which the catch member is of simplified construction; and

Figure 19 is a horizontal section on line 19—19 of Figure 18.

In the embodiment of the invention selected for illustration in Figures 1 to 7, inclusive, the door 10 is pivotally mounted on the door casing 12. Any suitable means resiliently tending to close the door may be employed, such as a spring or a door closer. I have diagrammatically indicated a spring hinge at 14, as illustrating one of the forms in which such resilient means may be embodied. The door includes a horizontal top member 16 and the casing includes a horizontal top member 18. In one of these members a recess is fashioned receiving the main guide structure 20. The guide structure illustrated is in the form of a square tube with an elongated slot at 22 in its upper face and a suitable aperture at 24 in its lower face to permit the holder to engage the cam surface on the slide 26. The slide structure 26 is slidable to and fro inside the guide 20, and is connected by a suitable linkage to that one of the elements 16 and 18 not housing the guide. I have illustrated a single drag link 28 pivotally associated with a pintle 30 carried by the slide 26 and having its other end pivotally associated with a plate 32 fastened to the other member.

It will be apparent on inspection of Figure 1 that movement of the door to the open position there illustrated will cause the slide 26 to move in the guide 20 toward the pivot 14 until it comes to the end of its path of movement and thereby mechanically prevents further opening of the door.

During opening or closing movement of the door, the movement of the door is damped by the absorption of a small but suitable amount of energy. I have illustrated twin friction blocks 34 and 36 each provided with a friction face 38 positioned to rub against the vertical side walls of the guide 20 as clearly indicated in Figures 5 and 6. The friction blocks have a wedging action by reason of their inclined abutting faces at 40 combined with the thrust of the spring 42 adjustably compressed by the nut 44 and guided on the bolt 46 passing through a central bore at 48 and threaded into the rear end of the slide 26 as at 50. I have shown the side walls of the guide 20 pressed in a little at 47, to make the friction much greater just before the door reaches open position. To reduce shock when the door comes to the end of its opening movement I mount cushioning means in the left end of the guide 20. The block 52 is assembled and held in place by means of the retaining screw 54 and carries studs 56 entering the adjacent ends of coil springs 58. A movable block 60 carries similar studs 62 and a facing 64 of leather or the like to receive the impact of the adjacent end of the slide 26. In the position illustrated in Figure 2 the block 60 is restrained against move-

ment to the right by a stationary rivet or pin 66, but it may move to the left as indicated in dotted lines in Figure 7 whenever the door is swung open with sufficient force to overcome the initial tension of the springs 58.

The slide 26 is provided at its front end with a cam 68 having a forwardly facing straight face 70 of relatively great length and slight inclination operating as a cam face, and a rearwardly facing face 72 relatively short and of steeper inclination operating as a holding face. The cam-holding means illustrated is supported in a separate U-shaped bracket 74. An inner support 76 rigid in the bracket 74 slidably receives and guides a plunger 78 urged to the right by the tension of the spring 80 adjustably compressed by the nut 82. The left end of the plunger extends upwardly and provides a pivot for the sleeve 84. The ends of the sleeve 84 are riveted into spaced arms 86 constituting together a single rigid arm carrying a roller 88 at the free end thereof. When the arm and roller are in the position of Figures 2 and 7 it will be apparent that the long cam face 70 will depress the roller, pushing downwardly and away from the support 76 to move the arm and roller to the dotted line position of Figure 7. Then the roller will rise again to the position of Figure 2, and in this position will bear against the face 72. To dislodge the parts from this position a much greater force will be required because the face 72 lies at a much steeper angle, and because the roller 88 is pushed by the face 72 against the support 76, and the friction of the engagement with the support 76 increases the force necessary to disconnect the parts.

It will also be apparent that with the arm and roller in the position of Figure 3, the entire cam holder is inoperative and the slide 26 moves freely to and from the position of Figure 2, but is still cushioned at the end of this movement by the springs 58. In this position the roller 88 lies idle on the projecting base portion 76*a* of the support 76.

The sleeve 84 is internally threaded throughout its length to receive a retaining screw 90 by means of which the knurled nut 92 and its connecting sleeve 94 may be clamped firmly against the end of the sleeve 84.

Because the sleeve 84 is threaded from end to end it will be apparent on reference to Figure 4 that the knurled nut 92 may be mounted in the position of Figure 4 projecting to the left from the cam holder, or it may be mounted projecting to the right from the cam holder by merely removing the retaining screw 90 and screwing it in from the other side. This makes the door holder as a whole universal in the sense that it can be mounted on left hand doors or right hand doors, and the manual adjustment means 92 can be mounted in the proper accessible position in either case.

I prefer to space the arm 28 above the slide 26 by means of an intervening collar 96 and to mount end plates 98 and 100 on the upper face of the guide 20 at the ends. By making the plates 98 and 100 of such thickness that their upper surfaces are flush with the upper surface of the link 28, the clearance between the door and its casing when the door is closed is the same throughout as it would be if no door holder had been installed. In other words, the presence of the door holder does not increase the necessary clearance or air leakage around the door.

Referring now to Figures 8, 9, and 10, the spring 80 is confined at its right end by a fixed collar 102 and means are provided for adjusting the spring tension including an adjusting element readily accessible from the outside. The twin wedges 104 and 106 operate between the support 76 and the adjacent end of the spring 80, and the wedge 106 may move inwardly from the position of Figure 8 by means of the adjusting screw 108.

The embodiment of Figures 11 to 15, inclusive, requires no mortising of the member 16 but is fastened to the vertical side face of that member as by attaching screws 110. I have illustrated end castings 112 and 114 closing the ends of an extruded square channel 116. The extrusion process makes it possible to employ an irregular cross section including such features as the projecting flange 118 and thus improve the appearance of the holder. The linkage 120 is connected with the slide 122 which, in this embodiment, is equipped with a cam holding means instead of a cam. The cam illustrated comprises a non-cylindrical point 124 having a cam surface 126 and a holding surface 128. From the cam portion proper the shank 130 extends to the left and is enlarged at 132 to form an abutment for the movable cushioning block 134. The shank 130 is extended further in the form of a main cylindrical body 136 journaled at 138 in the movable block 134 and at 140 in the fixed end block 114. The shank 136 extends through the block 114 and is transversely bored to receive the manual adjusting handle 144. The block 114 is cut away as at 146 to permit rotation of the entire cam about its axis of rotation through an angle of about ninety degrees. Upon reference to Figures 12 and 13 it will be apparent that rotation of the cam to the position of Figure 14 will move the cam down to the dotted line position indicated at 148 in Figure 13.

The slide 122 is provided with a cylindrical bore 150 to receive the cam end 124. A pin or roller 152 lies in an upwardly opening transverse slot 154 in the slide 122 and is resiliently pressed down into the position of Figure 12 by a leaf spring 156 clamped down in a groove 158 in the upper surface of the slide 122 by the retaining screw 160.

With the cam in the position of Figure 12, the slide will come from the right up to the position of Figure 12, first forcing the roller 152 to ride up the cam surface 126 and then causing it to snap down into the position of Figure 12 by the force of the spring 156. If the force of the opening movement exceeds that necessary to bring the parts to the position of Figure 12, the slide 122 will strike the leather facing 162 on the end of a movable block 134, and a slight further movement will take place against the tension of the coil spring 164 encircling the body 136 and having abutment between the fixed block 114 and the movable block 134.

Upon reference to Figure 15 it will be noted that the acting head 124 of the cam is asymmetrical with respect to its axis of rotation, so that the shift from the operative position of Figure 12 to the inoperative position of Figure 13 may be accomplished merely by rotating the body 136 ninety degrees about its axis of rotation.

In Figure 16 the arm 166 corresponds with the arm 28 of Figure 1 and carries a vertical pintle 168 rigid therewith. The pintle carries a ring 170 to improve the guidance of the movement by contact with the edges of the slot 172 in the guide structure 174. Below the enlargement 172 and substantially filling the main portion of the

guide structure is a roller 176 held in place on the pintle 168 by the enlargement 178.

The small lateral housing 180 houses the cam member 182 mounted on the end of the stem 184 which carries the externally accessible head 186 for manual adjustment thereof. Cam 182 has the camming face 188 and the holding face 190, and the relative slopes of these faces may be adjusted to give any desired ratio between the resistance to closing and the resistance to opening. The actuating spring 192 abuts the cam member at one end and the abutment plate 194 at the other end. The housing 180 is slotted at 196 to receive a transverse pin 198 rigid with the stem 184. In the position illustrated in Figure 16 the pin 198 abuts the plate 194 to limit inward movement of the cam 182. By pulling outwardly on the handle 186 the pin 198 can be lifted out of the slot 196 and turned at an angle to the slot where it will bear against the outer face of the housing at 200 and hold the stem and its cam out of operative position.

For abutment with the roller 176 I prefer to provide a rubber block 202 lying against the face of a metal block 204 which may be identical with the block 60 of Figure 6.

In the embodiment of Figure 18 the shaft 206 and head 208 correspond to the head 92 and shaft 90 of Figures 3 and 4 but the catch member is a simple arm 210. In operative position this arm rests at its outer end at 212 on the lower wall of the guide structure 214, but may be rotated into the dotted line position shown in Figure 18 to render it inoperative. The slide structure 216 is pivoted to the arm 218 and houses a rocker arm 220 pivoted on a transverse pivot at 222. The heel of the rocker arm is apertured to allow clearance for the adjusting screw 224 which extends down into threaded engagement with the spring supporting plate 226 supporting the spring 228. As clearly indicated in Figure 19, the plate 226 is square and the sides of the plate engage the sides of the slide structure 216 to prevent rotation of the plate. The other arm 230 of the rocker overlies the pin 232 which may be identical with the pin 152 of Figure 12 and is vertically movable in the slot 234. The slide as a whole may strike against the leather facing 236 on the block 238 which may be identical with the block 60 of Figure 6.

I have illustrated the camming surface 240 making an angle of substantially 38 degrees with the line of movement of the pin 232, and the holding face 242 making an angle of substantially 57 degrees. With the slot 234 extending vertically, this relatively slight difference between the inclination of the two faces is that suitable for a door equipped with a very light closing spring or even with none at all. It will be obvious that inclining the slot to open upwardly and to the right in Figure 18, will greatly increase the difference between the resistance to closing and the resistance to opening, without any change at all in the configuration of arm 210.

Without further elaboration the foregoing will so fully explain my invention that others may, by applying knowledge current at the time of application, readily adapt the same for use under various conditions of service. It will, for instance be obvious that a door closer employed in lieu of the spring hinge 14 may be housed in or carried by either of the top members 16 and 18, and connected directly to the adjacent end of the link 28.

I claim:

1. A door holder comprising: a guide structure; a slide structure slidable along said guide structure; resilient catch means associated with said guide and slide for holding said slide in a predetermined position; readily accessible manual adjustment means for preconditioning said catch means to be operative or inoperative; and manual adjustment means independent of said preconditioning means, for varying the effective tension of said catch means; said preconditioning means including a manual handle and preconditioning mechanism proper inside said guide structure, shaped to receive said handle when inserted from either one of two different outside positions.

2. A door holder comprising: a guide structure; a slide structure slidable along said guide structure; and resilient catch means associated with said guide and slide for holding said slide in a predetermined position; said catch means including a pivoted arm; a latch at the end of said arm remote from the pivot; means at one side of said pivot for supporting said latch in an operative position; means at the other side of said pivot for supporting said latch in an inoperative position; and manual means to precondition said catch means by moving said latch into the selected position.

3. A door holder comprising: a guide structure; a slide structure slidable along said guide structure; and resilient catch means associated with said guide and slide for holding said slide in a predetermined position; said catch means including a pivoted arm; a latch at the end of said arm remote from the pivot; means at one side of said pivot for supporting said latch in an operative position; means at the other side of said pivot for supporting said latch in an inoperative position; and manual means acting through the pivot to precondition said catch means by moving said latch into the selected position.

4. A door holder comprising: a guide structure; a slide structure slidable along said guide structure; resilient catch means associated with said guide and slide for holding said slide in a predetermined position; said catch means including a pivoted arm; a latch at the end of said arm remote from the pivot; means at one side of said pivot for supporting said latch in an operative position; and manual means acting through the pivot to precondition said catch means by moving said latch into the supported operative position or to an inoperative position on the other side of said pivot.

ELVIN H. JOHNSON.