

April 11, 1933.

C. GREENE

1,903,669

YIELDABLE DOOR STOP AND CATCH

Filed Aug. 18, 1930

2 Sheets-Sheet 1

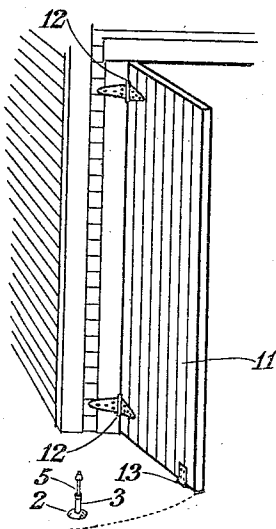


Fig. 1

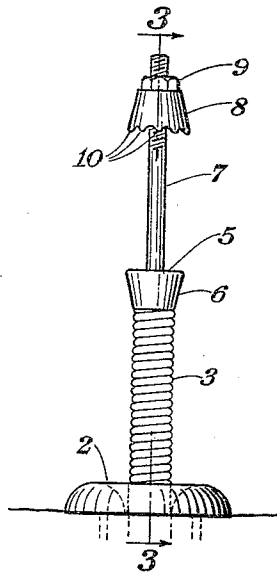


Fig. 2

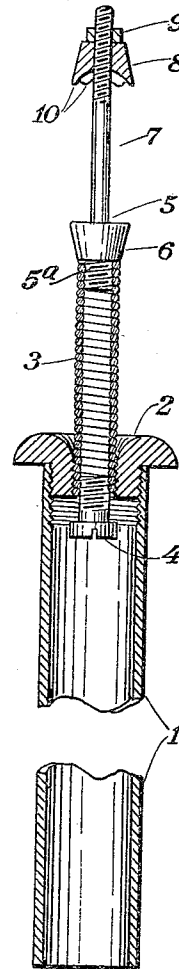


Fig. 3

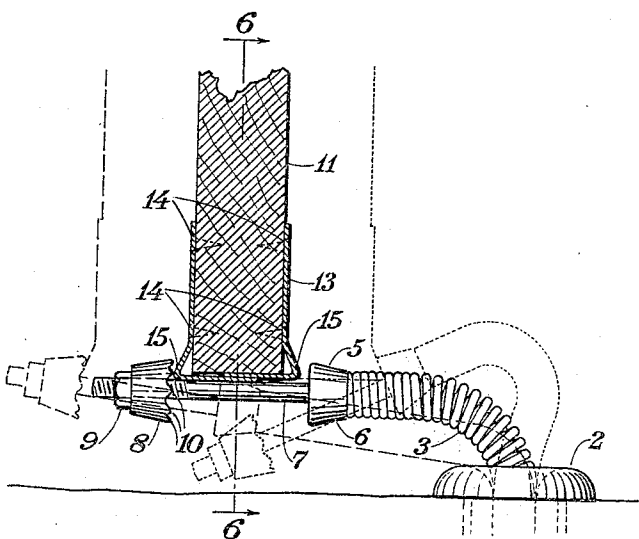


Fig. 4

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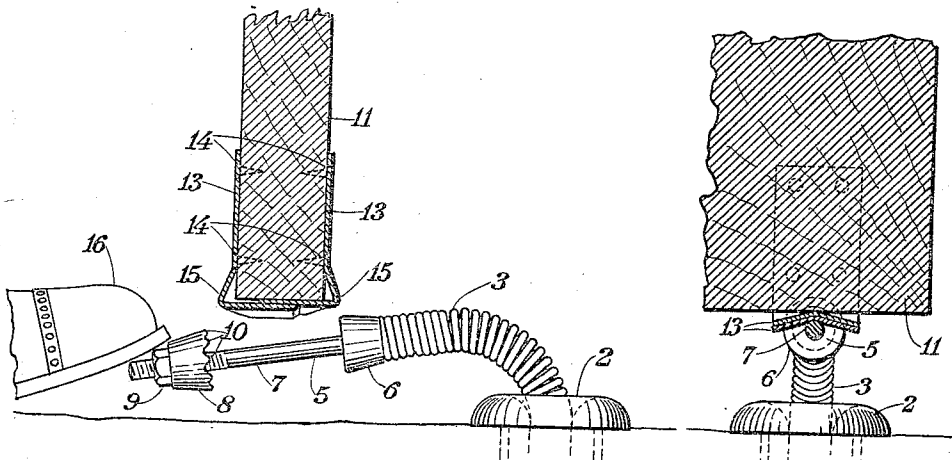


Fig. 5

Fig. 6

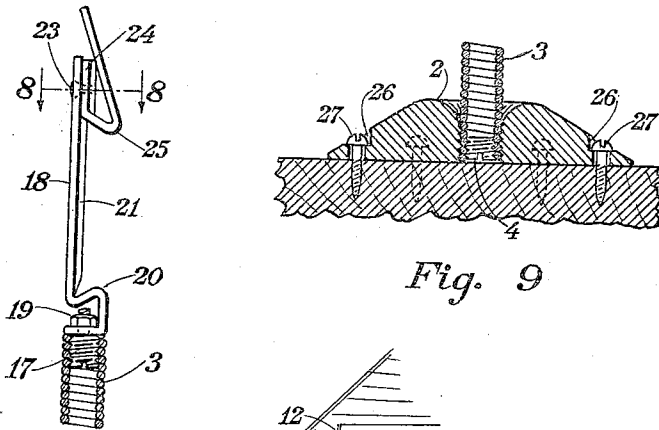


Fig. 9

Fig. 7

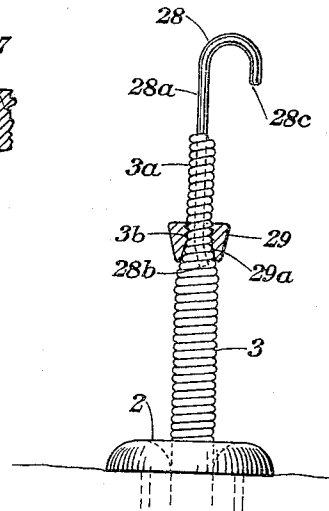


Fig. 11

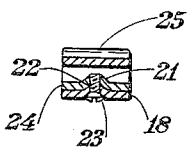


Fig. 8

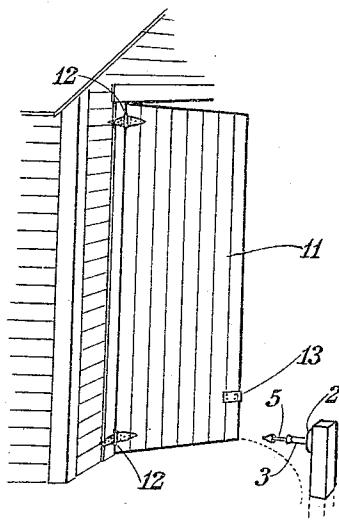


Fig. 10

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YIELDABLE DOOR STOP AND CATCH

Application filed August 18, 1930. Serial No. 475,869.

My invention relates to stops and catches for doors, gates, and other closure members, and is very effective for automatically stopping garage or barn doors or fence gates which have to be held open for passage of vehicles or other purposes. My invention is designed to limit and stop the opening of doors and the like and to hold the same open in a thoroughly safe and reliable way, and with the greatest possible convenience, limiting the labor required when opening the door or gate, to merely swinging it outwardly with enough momentum to carry it over the stop, which automatically stops and holds the door near the edge of the roadway or other open position. From this position, it may be reached, when it is to be closed, with much greater convenience than if it were free to swing outwardly beyond the stop. From this position, the door or gate may be released to swing in either direction from the stop by merely pressing a foot downwardly on the stop while pushing the door or gate in the direction desired.

A further object of my invention is to provide a yieldable, resilient stop and catch, to prevent injury not only to the various parts of the stop itself, but also to the closure member, which is likely to be severely wrenched and damaged when striking an unyielding obstruction at its edge, particularly at or near its upper or lower edge; and also to prevent injury to any person, who in walking about, may strike the stop, and who would be in danger of being tripped by a rigid stop, but not by a light, flexible one.

A further object of my invention is to provide an automatic stop which will stop and hold a closure member as it passes over it, and from which it may be readily released, and which will operate with equal efficiency irrespective of the direction in which the closure member is moved relative to the device.

A further object of my invention is to provide such a stop which is very simple and rugged in construction, inexpensive to manufacture, long lived, and proof against accidental injury.

With the above and other objects in view

as will appear hereinafter, my invention further includes the following novel features and details of construction, to be hereinafter more fully described, illustrated in the accompanying drawings, and particularly set forth in the appended claims.

In the drawings:

Figure 1 is a perspective view of a garage or barn door and of my yieldable stop and catch installed on the ground at the side of the roadway leading from the doorway, and in operative relation to the door, but clear of the same; Fig. 2 is an enlarged side elevational view of my device, separate and apart from the door, with the spring in its normal, vertical position; Fig. 3 is a longitudinal cross-sectional view of the same taken through 3—3 of Fig. 2 with the supporting member shown fragmentarily; Fig. 4 is a side elevational view of the same, with the door or gate (which is shown fragmentarily in cross-section) held in an open position by the device, and with the various moving parts shown outlined in dotted lines in the positions they assume when the door or gate is pushed in the direction toward the rigidly installed base portion of the stop; and with the same moving parts shown outlined in broken lines in the positions they assume when the door or gate is pushed in the direction away from said base portion; Fig. 5 is a side elevational view of the device with the catch portion depressed clear of the door or gate (shown in cross-section and fragmentarily) to permit the same freely to move in either direction; Fig. 6 is a sectional elevational view thereof taken on the line 6—6 of Fig. 4; Fig. 7 is a side elevational view of a modified form of the stop and catch portion of my invention and with a portion of the supporting spring shown fragmentarily and in section; Fig. 8 is a cross-sectional view of the same, taken on the line 8—8 of Fig. 7; Fig. 9 is an elevational sectional view of a modified form of the base portion of my device, and with the lower portion of the spring shown fragmentarily and in section; and Fig. 10 is a perspective view of a door with my stop mounted horizontally on the side of a post by means of a modified form

of the base portion of the stop, and in operative relation to the door, but clear of the same; Fig. 11 is a side and part sectional elevation showing a simplified form of my device.

Similar characters of reference refer to similar parts and portions throughout the several views of the drawings.

In the one form of my invention shown in Figs. 1 to 6 inclusive, the main portion of the device is supported on a galvanized iron pipe 1 which is of sufficient length and diameter to anchor the device securely when installed, by being embedded in the ground, pavement, or other foundation, with its upper end flush with or a short distance above the surface of the ground or pavement.

This supporting pipe is provided with screw threads in its interior for a short distance from its upper end. Into this threaded hole is secured a plug 2 which may be a metal casting, its lower portion having a reduced shank which is externally threaded and screwed into the upper end of the pipe. The upper portion of the member or plug 2 is in the form of the upper half of a horizontal, circular ring or torus. The central hole of the ring or torus extends downwardly through the shank. The outer edge portion of the plug is considerably larger than the pipe and forms a shoulder against which the upper end of the pipe abuts, and may also form a floor flange.

The aforesaid hole through the plug is provided with screw threads of the proper pitch to receive the lower portion of a strong, close-coiled, kinkable steel wire spring 3, the pitch of the threads being substantially equal to that of the convolutions of the spring. The spring is locked in the hole by a tapered screw 4 which extends into the lower end of the spring through the hole in the plug. The spring extends upwardly a short distance above the plug, when in its normal position of rest. The radius of the semi-circular vertical cross-section of the upper portion of the plug is such that the spring may be distorted or gyrated against it, conforming closely to its surface, without breaking or permanent distortion. Thus the plug supports the spring when it is forced to the side and prevents injury to the spring, which is universally deflectable and therefore capable of a gyratory movement.

At the free end of the spring is supported the stop and catch means, which consists in part of a bolt 5 of wrought iron, the terminal portion of its head 6 being provided with a threaded shank 5a which is screwed into the upper end of the spring. The head 6 is in the form of a truncated cone, with its small end or truncated portion of substantially the diameter of the spring against the end of which it is positioned, the portion of the truncated end of the head around the shank

forming a shoulder engaging the end of the spring. The large end of the head is square or normal with its axis. This bolt is provided with another shank or stem 7 integral and concentric with the head, joining it at the shoulder last described opposite the end of the head from the shank 5a, and extended outwardly in alinement with the spring when in the position of rest. The shank or stem 7 is of small diameter, and its terminal portion farthest from the head is threaded to receive a nut 8 and a lock nut 9. The space between the head and nut is slightly greater than the thickness of the thickest door or gate with which the device is used. The nut 8 is also in the form of a truncated cone of approximately the size of the bolt head or somewhat larger but tapers or converges outwardly; that is, the nut is positioned in opposed relation to the head. The large end of the nut, being the end nearest the bolt head, is slightly cupped with its outer rim serrated, forming small rounded lugs 10 that project toward the bolt head. The lock nut 9 is an ordinary nut of smaller diameter than the smaller end of the nut 8 against which it is screwed on the bolt shank or stem 7. All edges of the bolt and nuts are made slightly rounded to insure smooth operation of the device.

The head of the bolt and the nut form two opposed stops and catches for receiving therebetween the edge portion of a closure member or suitable means on the closure member, the stops and catches being preferably rigidly secured together by a connecting portion or stem 7, as described.

The device, as shown, is installed vertically, the pipe being embedded in the ground or pavement at or near the edge of the roadway leading from the door or gate 11, at a distance from the pivotal supports 12, slightly less than the length of the lower edge of the door or gate, and at such an elevation that the top of the plug 2 is a little more than the diameter of the spring 3 below said lower edge of the door or gate.

On the door, gate or other closure member are provided catch plate means, which, in this instance, consist of two shields 13 which may be thin pieces of sheet brass twice the width of the widest portion of the bolt 5. They are identical in size and form, and are attached with screws 14, to opposite sides of the door adjacent to the portion of its lower edge which passes directly over the device when the door is swung outwardly. These plates or shields extend upwardly from the lower edge of the door slightly higher than the widest portion of the nut or catch 8, when the spring is in its normal, vertical position. These shields are substantially right angular in cross-section but the same are bent at an obtuse angle outwardly from the door or gate a short distance above the lower edge

thereof, and are then bent inwardly in curves of very short radius into the lower horizontal flanges of the shields. The corners of these shields form catch portions 15 at the opposite corners of the lower edge of the door or gate. The lower horizontal flange of one of the shields lies against the bottom edge of the door or gate, while the corresponding portion of the other overlaps the first. The lower horizontal flanges of the shields are gradually warped to a shallow channel-shaped cross-section; the channel which is inverted, extends transversely to the edge of the door or gate and is adapted to receive therein the shank or stem 7 of the bolt and to retain the same against movement longitudinally with respect to the edge of the door or gate at which the shields are located.

After the shields have been attached to the door or gate, the lock nut 9 is loosened and the distance between the adjacent faces of the bolt head and the nut 8 is adjusted so that it is slightly greater than the distance between the outer edges of the catch portions 15. The lock nut 9 is then tightened, holding the nut or catch 8 securely in position.

When it is desired to open the door or gate for the passage of a vehicle, the door or gate is pushed outwardly, the momentum causing the upper portion of the device to bend over when struck by the nearest shield, the spring and bolt head or catch 6 sliding relative to the curved edge of the catch portion 15, and relative to the lower flange portions of the shields, until the shouldered end of the bolt head or catch 6, at its junction with the shank 7 clears the catch portion 15, on the opposite side of the door or gate from the side first struck, when the bolt head is forced upwardly until the shank or stem 7 rests against the lower flange portions of the shields and in the channel thereof, with the said end of the bolt head engaging one of the catch portions 15, and the larger end of the nut 8 adapted to engage the other. In this position the force of the spring keeps the stem or shank 7 very nearly along the center of the channel, and this position is maintained whether the door or gate remains at rest or is pushed against the bolt head or the nut 8, i. e., against either catch. When the catch portion 15, in engagement with the bolt head or catch 5, is forced hard against the same, it causes the spring to arch or kink upwardly as shown by dotted lines in Fig. 4, inclining the highest portion of the said flat shoulder on the bolt head toward the door or gate, so that it interlocks securely with said catch portion 15, and motion of the door in that direction is limited to that allowed by the flexibility of the spring in its arched position. When the door or gate is forced in the opposite direction and the other catch portion 15 of the shields forced against the serrated rim of the concave end of the nut or

catch 8, said catch portion of the shield is gripped firmly and the bolt head pulled down somewhat, causing the highest portion of the said serrated rim on the nut 8 to incline toward the door, or gate, and to lock more firmly against the catch portion 15 which it engages. The motion of the door in that direction is limited to the tension of the spring. The form assumed by the various parts in this position with the spring extended is outlined in broken lines in Fig. 4 of the drawings.

From the foregoing, it will be noted that the door or gate is held by the stop very securely and at the same time very flexibly so that no damage can occur to the door or gate through wrenching, and that the parts of the device itself are cushioned from impact and thus protected from injury or displacement, so that they may be safely made relatively small, light and inexpensive.

It will be noted that if the lugs 10 were omitted and the inner side of the nut 8 were made flat instead of cupped, the nut and the shield would still interlock securely when the door or gate is forced open farther so as to extend the spring. The function of the serrations formed by the lugs 10 is simply to afford greater security under extreme conditions, as when the door is forced quickly over the device.

When the door or gate is caught by the stop and catch means, and it is desired to free the door or gate to swing in either direction, it is grasped with one hand and a foot of the operator, designated 16, is pressed on the device, either on the nuts projecting beyond the lower edge of the door or gate, or on the spring projecting at the other side, and the bolt is depressed until the bolt head and the nut 8 clear the catch portions 15, when the door or gate may be pushed in the direction desired. With the lower flange portion of one of the shields over either the bolt head or the nut 8, as the case may be, the foot may be removed from the device, and when the door is pushed further in the same direction as at first, the shields clear the stop and catch portions, and the spring assumes its normal vertical position, so that the door or gate will be caught by the device if the door or gate is again swung over it.

A modified form of my invention is illustrated in Figs. 7 and 8 of the accompanying drawings. In this form all the parts are identical with those of the form illustrated in Figs. 1 to 6, inclusive, and hereinbefore described, excepting that for the bolt and nuts of that form, there are substituted a short bolt 17, a long bar 18, nut 19, a catch member 24 and a screw 23.

The bolt is in the form of a shoulder stud having two diameter threaded shanks at its ends. The large diameter portion is screwed within the upper end of the spring 3; a slot

for the use of a screwdriver is provided at its lower end. The small diameter shank extends above the spring 3 concentric with the lower portion of the stud and with the spring. The bar 18 is of strap or bar steel. At one end is provided a hole, through which extends the small shank or stud, said end of the bar being secured to the stud and spring by the nut 19. The end of the bar is flush with the one side of the spring. At the opposite side of the spring, the bar is bent squarely upwardly, flush with the outside of the spring, and is then bent sharply inwardly and downwardly to an inclination of about 30 degrees below the horizontal, forming the hook or catch 20. The bar is again bent sharply upwardly flush with the outside of the spring to which the first mentioned end of the bar extends, and continues straight and vertical to its upper end. Above said bend, the bar is provided with a central longitudinal rib 21 at the side at which the catch 20 is located. The upper portion of the bar is provided with a central longitudinal slot 22, for receiving the shank of a countersunk screw 23, the head of which fits into the channel of the bar from which the rib is pressed, as shown in Fig. 8. The catch member 24 is in the form of a slide made of strap steel of the same width and thickness as the bar 18, and is of substantially triangular form, with one side straight longitudinally and bent transversely to conform closely to the ribbed face of the bar. A threaded hole is provided in the center of said side to receive the screw 23, clamping the slide firmly against the bar. From the lower end of said side, the slide is bent sharply outwardly forming a second side which is inclined downwardly at an angle of about thirty degrees from the horizontal, forming a catch or hook 25. From the end of the catch, the slide is bent upwardly at an angle beyond the upper end of the bar. The outer end of the catch is offset the same or a greater distance from the straight, upper portion of the bar as the hook or catch 20.

The distance between the hooks or catches 20 and 24 must be slightly greater than the distance between the two catch portions on the shields. If adjustment is needed, it is made by loosening the screw 23 and moving the slide along the bar to the correct position, when it is locked in place by tightening the screw.

The operation of the device in this form is identically the same as with the form first described, excepting that in this form, it will stop the door or gate only when the same approaches the device from the side at which the catches are located. For this reason, it is necessary that the bar at the outset be given the correct orientation in relation to the door or gate and that it be preserved.

A modified form of the base of my invention is illustrated in Fig. 9. This form of the

base is suitable for attaching the stop to any floor, wall or post or other stationary support by means of screws. It differs from the form hereinbefore described only in that the pipe is omitted entirely, and that the screw threads are omitted from the exterior of the lower portion of the plug 2, said lower portion being enlarged and provided near the outer edge with holes 26 for securing the flange to the floor or other support by screws 27. With this type of base the tapered screw 4 for locking the spring in the plug is very short and without a head. Either of the forms of the stop and catch means hereinbefore described may be mounted on this form of base.

In some situations, it is preferable to mount the device horizontally against a wall or post situated just a little beyond the outer or free edge of the door or gate. In this case, the stop is mounted so that the spring is substantially perpendicular to the axis of the said pivotal supports, and the shields 13 are attached to said outer edge directly opposite the spring.

When mounted horizontally, the operation of the stop is exactly similar to its operation when mounted vertically, excepting that the pressure brought upon the device when releasing it from the closure member is directed away from the axis of the pivotal supports 12 instead of downward.

It will be here noted that, if desired, the portion of the spring secured in the plug 2 or floor flange may be slightly tapered and secured in corresponding tapered and internally threaded holes in said members, thus eliminating the set screws or other locking means.

In Fig. 11, I have shown a simplified form of my device. The coil spring 3, in this instance, is reduced at its outer or free end, as indicated by 3a, and is wound tightly around the shank 28a of a hook member 28 for securing the hook to the free end of the spring. This shank may be retained therein by a bent portion 28b at the inner end of the shank. The end 28c of the hook member forms a catch corresponding to the nut 8 in the first described structure. The inner catch, in this instance, is formed by a nut 29, which is screwed on the exterior of reduced portion 3a of the coil spring, the threads of the nut conforming with the pitch of the convolutions of the reduced portion of the coil. The inner end of the nut is provided with a tapered recess 29a for receiving a tapered portion 3b connecting the reduced portion with the main portion of the spring, said tapered portion of the spring locking the nut in position.

Though I have shown and described a particular construction, combination and arrangement of parts and portion and various modifications thereof, I do not wish to be limited to this particular construction, com-

5 combination and arrangement, nor to the modifications, but desire to include in the scope of my invention the construction, combination and arrangement substantially as set forth in the appended claims.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In a device of the class described, a support, a coil spring secured at one end thereto and extended with its opposite end therefrom, a frusto-conical catch having its small end of substantially the diameter of the spring and secured with said end to the free end of the spring, a reduced stem secured to and extending outwardly and coaxially from the large end of the catch, and a second frusto-conical catch secured with its large diameter end coaxially with and to the extended end of the stem.

2. In a device of the class described, the combination with a closure member, of a support having a central hole therethrough and having its upper portion rounded outwardly and divergently from said hole, a universally deflectable coiled spring supported at one end adjacent the path of a moving closure member which is adapted to be first engaged at its side and then swayed by the closure member as it is directed thereover to one side over the rounded portion relative to its supported end, and a pair of truncated catch members secured in spaced apart relation to the free end of the coiled spring engageable with said closure member to hold it therebetween.

3. In a device of the class described, the combination with a closure member, of a support having a central hole and its upper portion rounded outwardly and divergently from said hole, said support being mounted adjacent the path of a closure member when opened, a resilient member secured with one end in said hole adapted to gyrate and to be swayed to one side over the rounded portion when encountered by the edge of said closure member in its movement thereacross, and a pair of combined stop and catch members secured to the free end of the resilient member in spaced relation to each other, said pair of members being adapted to receive an edge portion of said closure member between them while said resilient member is in its swayed position.

4. In a device of the class described, in combination, a closure member, a support having a central hole and having its upper portion rounded outwardly and divergently from said hole, a coiled spring secured at one end thereto adapted to be deflected toward all sides over said rounded portion and extended with its opposite end therefrom, a frusto-conical catch secured to the free end of the spring, a connecting member extending outwardly from the catch and a second frusto-conical catch provided with serra-

tions secured to the extended end of said connecting member in opposed relation to the first catch, said catches being adapted in the deflected position of said spring to receive said closure member between them.

5. In a device of the class described, the combination with a swinging closure member including a catch plate secured to its edge and provided with a channel therein extending transversely to the edge of the closure member; of a support mounted adjacent and in the path of the closure member when opened, a coil spring secured at one end to said support and extending with its opposite end directed away therefrom, a frusto-conical catch secured to the free end of the spring, a stem secured coaxially to and extending from said catch, a second frusto-conical catch secured to the end of said stem, said catches being adapted to engage opposite sides of said channelled plate as said spring is flexed to a deflected position during the passage of said closure member thereover.

In testimony whereof, I have hereunto set my hand at San Diego, California, this 11th day of August, 1930.

CURTIS GREENE.