

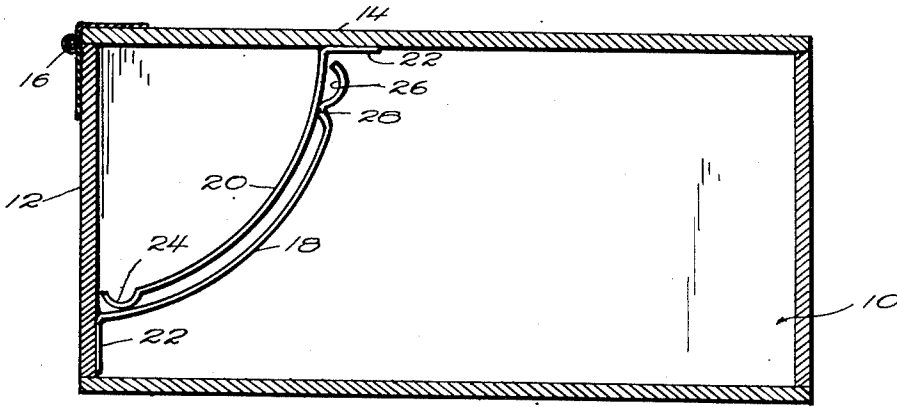
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A. M. CASTELLO

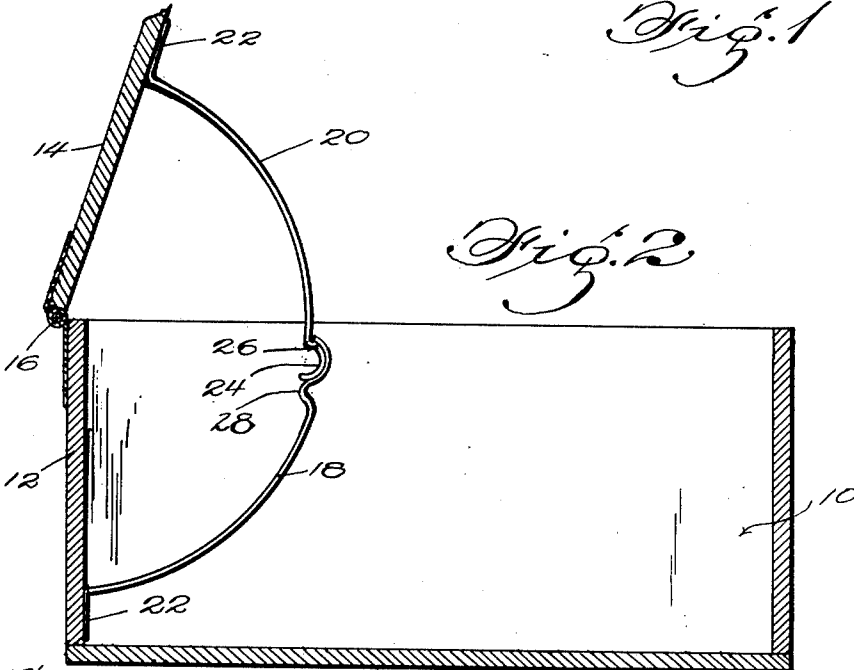
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DOOR STOP

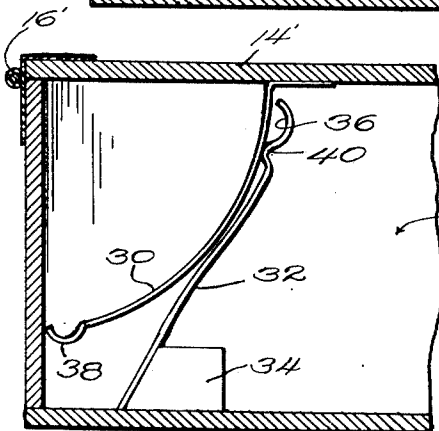
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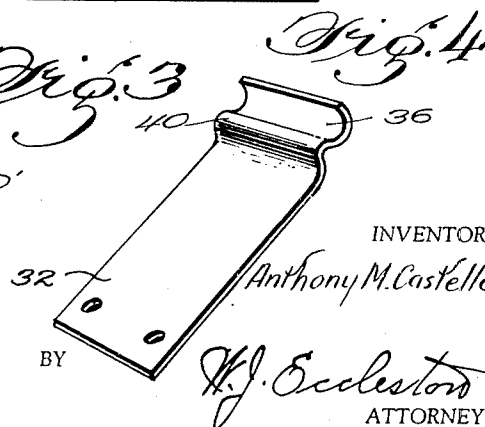
*Fig. 1*



*Fig. 2*



*Fig. 3*



*Fig. 4*

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## DOOR STOP

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The invention described herein, if patented, may be manufactured and used by or for the Government for governmental purposes, without the payment to me of any royalty thereon.

The present invention relates to checks or stops for limiting relative swinging movement of hinged members such as closures and more particularly, to a check or stop which automatically engages and automatically releases when force in excess of a predetermined amount is applied thereto.

An object of the invention is to provide a new and improved closure stop or check including locking elements which automatically lockingly engage when the closure is opened a predetermined amount and which automatically release upon the application of a force to the closure exceeding by a predetermined amount the force required to hold the locking elements in locked position.

Another object of the invention is to provide a new and improved closure stop or check in which the locking elements are yieldingly biased to locking position so that they will release automatically when force exceeding a predetermined value is applied to a closure equipped therewith.

A further object of the invention is the provision of a new and improved closure stop or check adapted automatically to check the closure at a predetermined position or to release the closure for movement beyond the predetermined position.

A still further object of the invention is to provide a new and improved check or stop which may be stamped in its entirety from sheet or strap spring metal so that it is inexpensive to construct and may be constructed in various sizes and which is compact so that it occupies a minimum of space both when operative and inoperative.

These and other objects, advantages and capabilities of the invention will become apparent from the following description wherein reference is had to the accompanying drawing in which:

Fig. 1 is a transverse sectional view through a box-like container having a hinged closure disposed in closed position showing one form of the improved closure stop of the present invention;

Fig. 2 is a view similar to Fig. 1 but showing the closure for the container in open position and the position assumed by the closure stops when the closure is open;

Fig. 3 is a fragmentary view similar to Fig. 1 showing a modification of the invention, and

Fig. 4 is a perspective view of one of the elements of the closure stop disclosed in Fig. 3.

For the purpose of illustrating a practical application of the present invention, it is shown applied to a relatively small box 10 having an end wall 12 and a cover 14 hinged to the latter by a hinge 16. In the form of the invention disclosed in Figs. 1 and 2, the improved stop or check comprises a pair of substantially symmetrical generally arcuate shaped arms 18 and 20 having radially extending anchoring flanges 22 on one end thereof. Preferably these arms are stamped from spring metal and they are relatively narrow compared to the width of the box 10 so that little space in the interior of the box is occupied thereby.

The anchor flanges 22 on the arms 18 and 20 are fixed to the end wall 12 and inner side of the cover 14 respectively, by any suitable means such as screws (not shown) at a position to center the arms on the axis of the hinge

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16 and so as to dispose the arms 18 and 20 in substantially the same circular plane. Adjacent their free ends, the arms 18 and 20 are provided with complementary formations which may, for example, comprise a radially outwardly directed projection 24 in arm 20 and a complementary recess 26 in the side of arm 18 confronting arm 20.

In view of the fact that arms 18 and 20 are anchored so as to lie in substantially the same circular plane, the projection 24 in arm 20 forms a point of contact between the free end of this arm and the body of arm 18 spacing the free end of arm 20 and the body of arm 18 from each other. An area of contact between the free end of the latter arm and the body of arm 20 is provided by a radially inwardly directed projection 28 in arm 18 adjacent the recess 26 in the free end thereof. A predetermined spacing is thus maintained between the coextensive portions of arms 18 and 20 when they move relatively angularly due to opening or closing of the cover 14, and the projections 24 and 28 thus form areas of sliding contact between the two arms 18 and 20. Moreover, since these arms are flexible and are anchored to lie in substantially the same circular plane as previously explained, the bodies thereof are held in spaced relation by these projections 24 and 28 as seen in Fig. 1, thereby flexing the arms 18 and 20 so that the free ends thereof are yieldingly biased toward each other.

As a result of the flexibility of arms 18 and 20, the projection 24 on arm 20 may be made to ride over the projection 28 in arm 18 by the application of force to the cover 14 in excess of that required to open the same. Since the arms 18 and 20 are biased toward each other at all times, as explained above, the projection 24 on arm 20 will be forced into the recess 26 in arm 18 as the projection 24 passes over projection 28 in response to continued movement of cover 14 in an opening direction. When this occurs, the projection 24 and recess 26 will be brought into releasable locking interengagement by virtue of the flexibility of the arms 18 and 20 and will resist disengagement with a force more than sufficient to maintain the cover 14 in open position. However, the projection 24 and recess 26 may be disengaged by the application of a predetermined force to the cover 14 in an opening or closing direction so that the cover may be swung to fully open position, if that is desired or may be closed without manipulating the arms 18 and 20.

It will be noted that the arms 18 and 20 shown in Figs. 1 and 2 are substantially 90° in end to end length. The range of movement of the cover 14 between closed and fixed open position allowed by these arms is therefore at a maximum. Making the arms or one of the arms of less length would of course shorten the range of movement, while making them of longer length would result in the free ends of the arms being too long to be housed in the box when the cover 14 is closed.

In Fig. 3 a modification of the invention is shown in which an arcuate shaped arm 30 and a rectilinear arm 32 cooperate to form a stop. The arm 30 may be similar in construction to the arm 20 previously described and preferably is anchored to the cover 14' centered on the axis of hinge 16'. Arm 32 comprises a generally rectangular strip of spring metal (Fig. 4). At one end, it is suitably anchored to the bottom of the box 10' as by fixing the same to an anchor block 34 in the bottom of the box by means of screws, etc. At its free end, the arm 32 is provided with a recess 36 in the side thereof confronting arm 30 complementary to a projection 38 in the latter arm. Adjacent the recess 36, the arm 32 has a projection 40 oppositely directed from the recess 36 and located at a position to engage the body of arm 30 as seen in Fig. 3.

In order to operate in the manner intended, the arm 32 is anchored sufficiently close to the rear end of the box 10' to bring projection 40 into biased engagement with the body of arm 30 so as to flex the arm 32. The projection 40 thus forms an area of sliding contact between the arms 30 and 32 when the cover is moved in an opening or closing direction and the projection 38 on arm 30 and recess 36 in arm 32 will firmly lockingly interengage when the cover 14' is opened far enough

to bring these parts opposite each other. Like the form of the invention disclosed in Figs. 1 and 2, the stop disclosed in Fig. 3 allows for full opening of the cover 14' should that be desired.

From the above description of two embodiments of the invention, its advantages and various modifications in the construction thereof will be suggested. For example, while both arms in both modifications have been described as flexible, it will be understood that the stop could be made to function with one rigid and one flexible arm. It is also to be noted that provisions could be made for opening the cover 14 to various degrees by providing a series of recesses similar to recess 26 along the body of arm 18.

In any event, it will be noted that a stop has been provided which is extremely inexpensive to construct because it may be stamped from spring metal and because it is of relatively small size. Not only is it inexpensive to construct but also it is easily installed. Moreover, it is designed to hold a cover or the like at a predetermined position or to allow for full opening of the cover.

While a preferred embodiment of the invention has been shown and described, it will be apparent that numerous variations and modifications thereof may be made without departing from the underlying principles of the invention. It is desired, therefore, by the following claims to include within the scope of the invention all such variations and modifications by which substantially the results of the invention may be obtained through the use of substantially the same or equivalent means.

What I claim is:

1. A check to limit relative swinging movement between hingedly connected members comprising a pair of substantially symmetrical arcuate shaped flexible arms, complementary formations in said arms respectively adapted to interengage when brought together for releasably locking the arms at a predetermined position of extension, and means to anchor corresponding ends of said arms to said hinged members respectively centered on the axis of swinging movement of the latter and flexed against each other to adapt the arms for relative endwise sliding movement in response to swinging movement of said hinged members, the arms being of a material sufficiently resistant to flexing so that opposing forces are generated therebetween sufficient firmly to interchange the complementary formations brought together upon predetermined relative swinging movement of the hinged members releasably to lock the said swinging members at a position.

2. A check releasably to lock the hinged cover of a box in open position comprising a pair of flexible substantially symmetrical approximately 90° segments, complementary radially extending formations along said segments respectively adapted releasably to interengage, and means to anchor corresponding ends of said segments respectively to said cover and to the box centered on the axis of swinging movement of said cover and flexed against each other to adapt the segments for relative endwise sliding movement in response to swinging movement of said cover, the segments being of a material sufficiently resistant to flexing so that opposing forces are generated therebetween sufficient firmly to interengage the complementary formations brought together upon predetermined swinging movement of the cover releasably to lock the said cover in open position.

3. A check to limit relative swinging movement between hingedly connected members comprising a pair of substantially symmetrical arcuate shaped flexible arms, offsets adjacent corresponding ends of said arms extending radially in opposite directions, a depression in the end of one of said arms adjacent the offset therein, said depression being complementary to the offset in the other of said arms to adapt the same lockingly

to receive the said offset, and means to anchor the ends of said arms opposite said offsets to said hinged members respectively so as to center the arms on the axis of swinging movement of said hinged members and to flex the body of each arm against the offset in the opposing arm to adapt the arms for endwise sliding movement, the amount of flexibility of said arms being sufficient releasably lockingly to force the said one offset into said depression when they are brought opposite each other by predetermined relative swinging movement of the hinged members releasably to lock the latter at a position.

4. A check to limit relative swinging movement between hingedly connected members comprising a generally arcuate shaped arm adapted to be secured to one of said hinged members, a relatively thin, flat, generally rectangular strip adapted to be secured to the other of said hinged members, at least said strip being flexible, a cooperating offset and recess in said arm and strip adapted releasably to interengage, means including flanges on said arm and strip for anchoring the same to the hinged members respectively positioned to lie in substantially side-by-side closely spaced relation over the major portion of their length when the hinged members are at one extreme in their range of relative movement and to flex the strip against the arcuate side of said arm sufficiently firmly lockingly to interengage the offset and recess when they are brought opposite each other by relative swinging movement of the hinged members to the other extreme in their range of movement.

5. A check to limit relative swinging movement between hinged members comprising a first elongated arm fixedly secured adjacent one end to one of said hinged members, a second elongated arm fixedly connected adjacent its corresponding end to the other of said hinged members at a position closely to space the same from the first arm and at least partially to overlap the arms over a major portion of their end-to-end length when the hinged members are at one limit in their range of relative swinging movement, and locking means including substantially complementary formations upon said arms adapted to be brought into releasable interengagement, at least one of said arms having sufficient flexibility to bias the same in a direction to bring the complementary formations in releasable interengagement upon relative swinging movement of the hinged members in a direction to extend the elongated arms relatively a predetermined amount.

6. A check to limit relative swinging movement between hinged members comprising first and second elongated arms of strap metal, means fixedly to anchor the arms adjacent corresponding ends thereof respectively to the hinged members positioned to lie in substantially coextensive closely spaced relation over the major portion of their end-to-end length when the hinged members are at one extreme in their range of relative swinging movement, and locking means including a recess adjacent the free end of one of said arms and a substantially complementary projection adjacent the free end of the other, at least one of said arms being spring tempered and having sufficient flexibility to bias the same in a direction to bring the recess and projection into releasable interengagement when the hinged members are swung relatively in a direction to extend the elongated arms relatively a predetermined amount.

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