Sept. 17, 1929. W. F. MOORE ET AL 1,728,693

HOLDBACK DEVICE AND DOOR CLOSER

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Fig 1

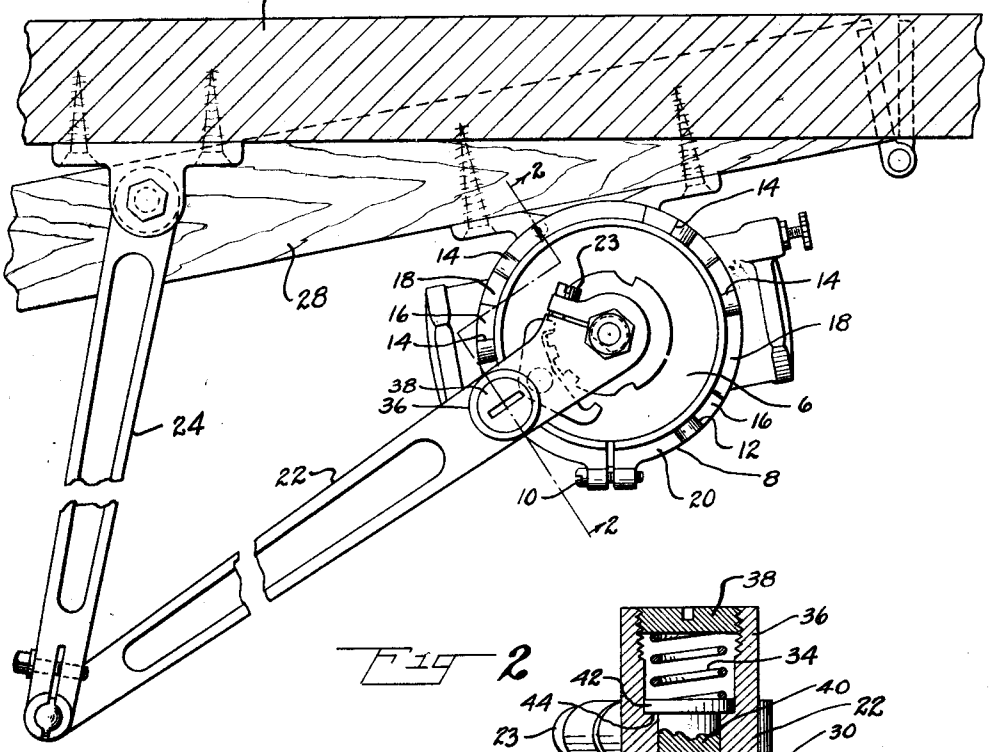


Fig 2

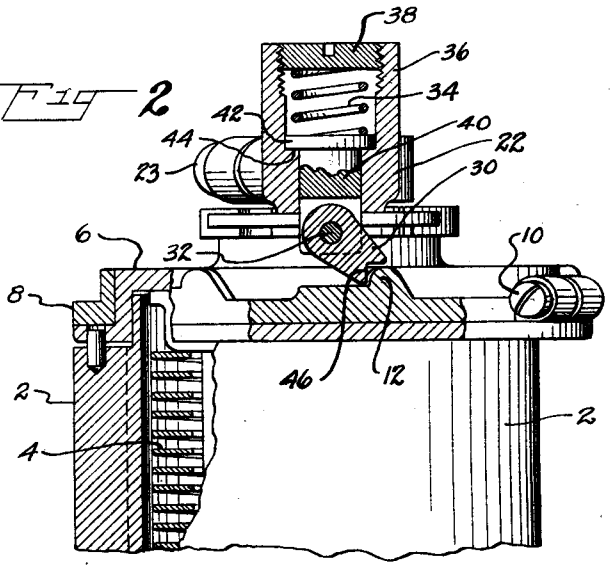
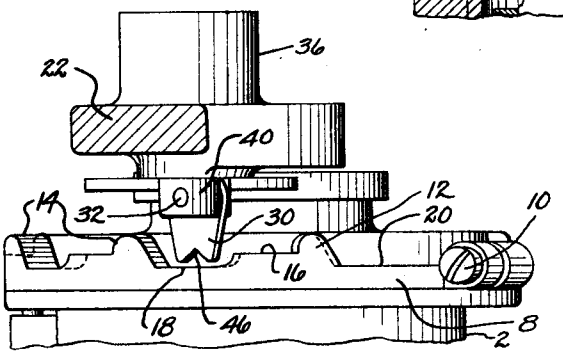


Fig 3



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Fig 4

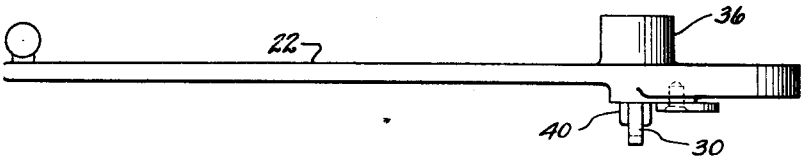


Fig 5

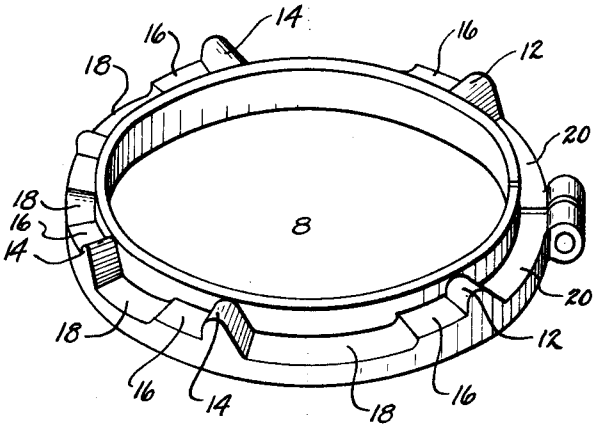
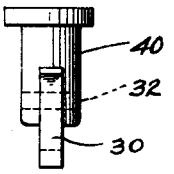


Fig 6



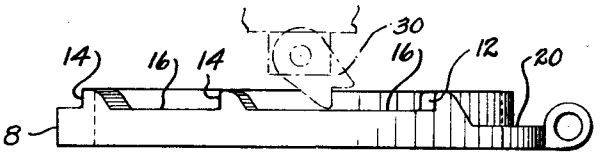


Fig 7

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UNITED STATES PATENT OFFICE

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HOLDBACK DEVICE AND DOOR CLOSER

Application filed July 22, 1927. Serial No. 207,638.

Our invention relates to improvements in hold-back devices and door closers of either the checking or non-checking type and has for its object to provide a new and improved means for holding the door open or partially open. It further has for its object to provide an improved door holder which permits the door to swing freely to close and is noiseless in its operation. It further has for its object to provide a reversible door holder adapted when applied to the door to hold the door open in a plurality of positions.

The following is a description of our invention, reference being had to the accompanying drawings, in which,

Figure 1 shows a plan view of a door closer embodying our invention and attached to a door and its casing;

Fig. 2 is a section of the same on the line 2—2, Fig. 1 on an enlarged scale;

Fig. 3 is a side elevation of the parts on top of the spring casing, the actuating lever being broken off;

Fig. 4 is a side elevation of the actuating lever and the holding pawl carried thereby;

Fig. 5 is a perspective view of an adjustable abutment member of Figs. 1 and 2.

Fig. 6 is a detail view of the pawl and the preferred mounting of the same; and

Fig. 7 shows a modification of the abutment member.

Referring more particularly to the drawings, 2 is a spring chamber containing the door closing spring 4 and provided with a cover 6 constituting a base on which an adjustable abutment member 8 is mounted. This abutment member is in the form of a divided ring whose ends are clamped together by the screw 10. Upon loosening this screw the abutment member can be turned to any desired position and thereafter tightened so as to be fixed in that position relatively to the base 6. This abutment member is provided on each half with initial stop shoulders 12 and one or more similar succeeding stop shoulders 14. Adjacent to the rear face of each of these stop shoulders is a guiding surface 16 which acts to guide a pawl hereinafter referred to into holding engagement with the respective stop shoulders when the pawl is in contact therewith and forwardly inclined. To the rear of these surfaces are depressions 18 of such depths that the guiding surfaces terminate some distance in front of each stop shoulder. In front of the first or initial stop shoulder is a similar depression 20 for purposes hereinafter described. 22 is the door actuating lever similar to those now in use, connected by the usual link 24 to the door casing 26. The spring casing is connected to the door 28 in the ordinary manner. 23 is a clamping screw.

In order to hold the door open we mount upon the lever 22 a pawl 30 which, as shown, is free to swing downward in a vertical plane under the action of gravity. The axis of rotation of this pawl is at 32 and is movable toward and away from the abutment member 8. 34 is a compression spring in a housing 36 whose compression can be adjusted by the screw plug 38. This spring, when the axis 32 is moved upward, tends to return it to initial position. Between the spring and the pawl we preferably have a plunger 40 having a head 42 which engages a stop shoulder 44 in the housing 36 limiting the downward movement of the plunger. The pawl in the construction shown is pivotally connected to this plunger.

In the operation of the apparatus as thus described the pawl 32 when above the space 20 hangs in vertical position. As the door is opened it drags over the initial stop shoulder 12 until it rests on a guiding surface 16. If the door is then released the pawl moves forward and engages the rear face of the initial stop shoulder. If it is desired to close the door with the parts in this position this can be accomplished by applying an abnormal closing pressure to the door, whereupon the detent will straighten up, compressing the spring 34 until the axis 32 is sufficiently elevated to permit the pawl to escape the initial stop shoulder. The door can also be released by swinging it slightly further open until the pawl is above one of the depressions 18, whereupon the pawl will assume a vertical position, and when the door is released, drag over both the surface 16 and the initial stop shoulder 12. The pawl coacts in a simi-

lar manner with the succeeding stop shoulders 14 and the surfaces 16 and recesses 18 associated therewith, the result being that if the pawl is engaged with either of the stop shoulders 14 and is released therefrom by either of the operations above referred to, the pawl will drag over all of the preceding stop shoulders, permitting the door to close completely and without any interference with its movement.

The compression spring 34 is of such strength that it will hold the axis of the pawl downward against the action of the door closing spring and thus cause the pawl to hold the door open under normal conditions whenever the pawl is in engagement with any of the stop shoulders.

If the pawl 30 were a single pointed pawl and in engagement with one of the stop shoulders and abnormal closing pressure were then applied, as soon as the dead center of the pawl was passed, the plunger 40 would be free to snap down under the action of its spring and the sudden engagement of the head 42 of the plunger with the shoulder 44 would produce a sharp click or noise which in some places, such as in hospitals, would be objectionable. In order to prevent this, we provide a recess 46 in the free end of the pawl which is adapted to engage the top or crown portion of the several stop shoulders 12. With this construction the pawl rides upon and the wall of the recess in the free end of the pawl is maintained in abutting engagement with the stop shoulder until after the dead center is well passed, which results in the axis of the pawl being slowly lowered and thus sudden engagement of the head of the plunger with the shoulder 44 is avoided. This anti-noise effect is assisted by making the top of the shoulder rounded, as shown in Figs. 2 and 3.

In the modification shown in Fig. 7, the recesses 18 in the abutment member are omitted. With this construction the pawl can be released only by the application of an abnormal closing force to the door. The operation is otherwise the same.

Our invention may be embodied in a construction having one or more stop shoulders but is particularly valuable in a check having a series of two or more stop shoulders.

Although the invention is shown as embodied in a door closer having a hydraulic check, the check feature constitutes no part of our invention and is not necessary to the embodiment thereof.

As will be evident to those skilled in the art, our invention permits of various modifications without departing from the spirit thereof or the scope of the appended claims.

What we claim is:

1. In a door closer, a stop shoulder, a pawl for engaging said stop shoulder to hold the door open, a spring-pressed support from which said pawl is pivotally suspended and which is adapted to yield so as to permit said pawl to be forced over said stop shoulder when an abnormal closing force is applied to the door, the end of said pawl being provided with a recess and said stop shoulder being suitably formed so that while the pawl is being forced over said stop shoulder the wall of said recess is maintained in abutting engagement with the stop shoulder so as to cause the axis of the pawl to be slowly lowered as it passes said stop shoulder.

2. A hold-back mechanism for door closers comprising an abutment member having a plurality of stop shoulders comprising an initial stop shoulder and a succeeding stop shoulder, a second member pivotally connected to said abutment member so that said members are capable of being oscillated relatively to each other, a door closing spring tending to move said members relatively to one another, a pivoted pawl freely swinging under the action of gravity and carried by said second member, said pawl tending to swing downward toward said abutment member and being adapted to engage said stop shoulders, the axis of rotation of said pawl being movable toward and from said abutment member, a pawl spring tending to move said axis toward said abutment member, said pawl spring causing said pawl when in holding engagement with said shoulders to hold the door open against the action of said door closing spring and permitting it to swing to non-holding position upon the application to the door of abnormal closing force, said abutment member having surfaces at the rear of said stop shoulders guiding said pawl toward said shoulders, and a plunger between said spring and pawl to which said pawl is pivotally connected, said plunger being vertical and having a shoulder limiting its movement toward said abutment member, and said pawl being pivotally connected to said plunger so as to be movable in a vertical plane under the action of gravity, said pawl having a recess adapted to engage the tops of said stop shoulders so that the axis of said pawl is moved away from and toward said stop shoulder slowly as the pawl passes said stop shoulder in one direction.

3. In a door closer, a hold-back mechanism comprising an abutment member having a series of stop shoulders comprising an initial stop shoulder and a succeeding stop shoulder, a second member pivotally connected to said abutment member so that said members are capable of being oscillated relatively to each other, a door closing spring tending to move said members relatively to one another, a pivoted pawl carried by said second member, said pawl tending to swing toward said abutment member under the action of gravity and being adapted to engage said stop shoulders, the axis of rotation of said pawl

being movable toward and from said abutment member, and a pawl spring tending to move said axis toward said abutment member, said pawl spring causing said pawl when in holding engagement with said shoulders to hold the door open against the action of said door closing spring and permitting it to swing to non-holding position upon the application to the door of abnormal closing force, a base member carrying said abutment member, said abutment member being angularly adjustable relatively to said base member and having a second series of stop shoulders reversed relatively to said first series, the tops of said stop shoulders being rounded and the engaging end of said pawl having a recess adapted to engage said rounded tops so that the axis of said pawl is moved away from and toward said tops slowly as the pawl passes said tops in one direction.

In testimony whereof, we have signed our names to this specification this 15th day of July, 1927.

WALLACE F. MOORE.
BERNARD J. STORER.