Oct. 20, 1931. W. E. STONEBRIDGE 1,828,082

DOORCHECK

Filed Jan. 10, 1930

Fig. 1

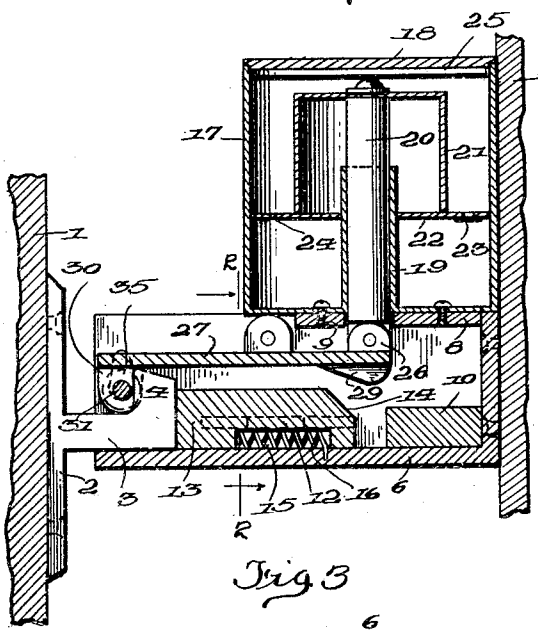


Fig. 2

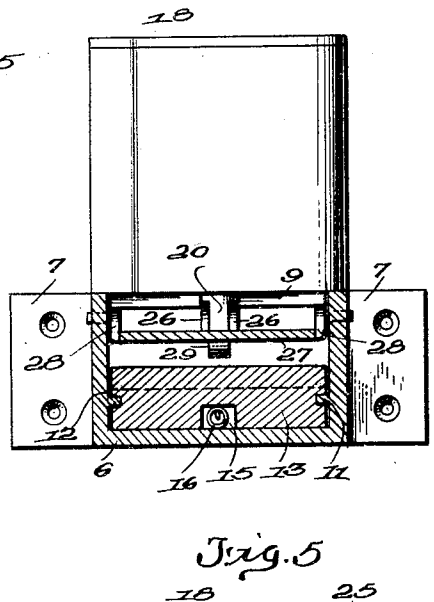


Fig. 3

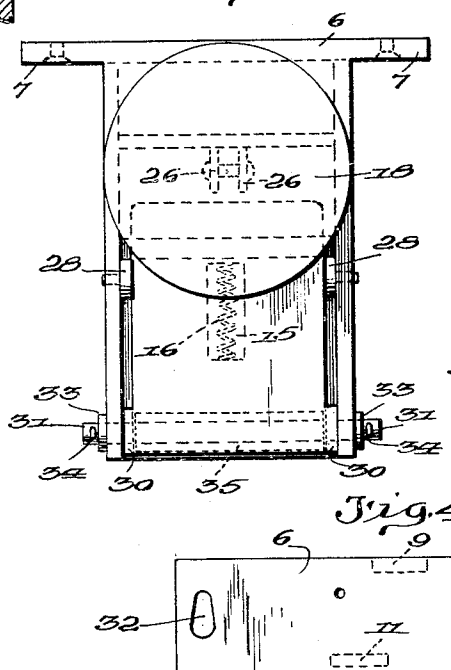


Fig. 5

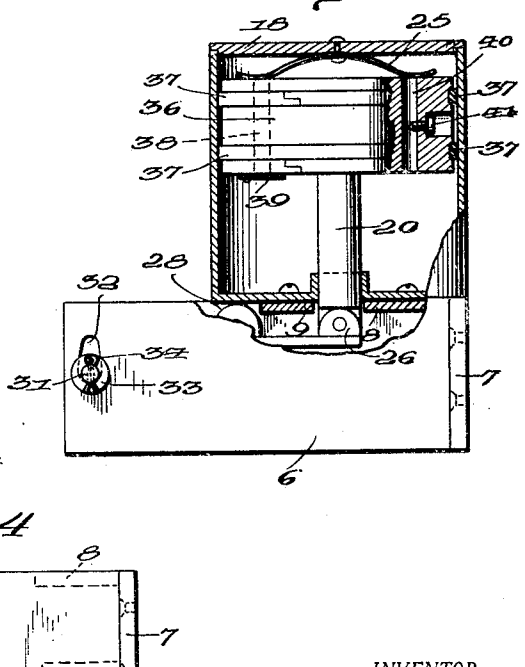
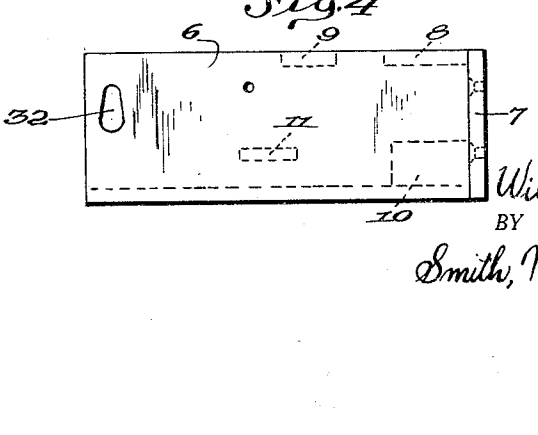


Fig. 4



INVENTOR:—
William E. Stonebridge,
BY
Smith, Michael & Gardiner,
ATTORNEYS.

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UNITED STATES PATENT OFFICE

WILLIAM E. STONEBRIDGE, OF NEW YORK, N. Y.

DOORCHECK

Application filed January 10, 1930. Serial No. 419,857.

My invention relates to door-checks, and has particular reference to an improved time-release door-check or hold-back.

It is an object of my invention to provide a door-check or hold-back adapted to cooperate with a suitable door or other closure to permit the same to be retained in opened position during a predetermined time interval, after which the door or closure is released and permitted to be moved to closed position. Such a device has particular adaptability for use in connection with the stair and/or exit doors of schools, churches, theatres or the like, as by its use, the door or doors can be opened, maintained in open position for a sufficient time to permit the class congregation, audience or other assemblage to pass through the open doors, and the doors then released and closed.

It is an object of my invention to provide a door check adapted for attachment to the wall, frame, or other stationary portion in proximity to a door or other closure, and to provide a catch adapted to be engaged by the check or hold-back when the door is moved to opened position, said check holding the catch in locked or engaged position during a predetermined time interval and then releasing the catch to permit the door to be moved or returned to closed position, either manually or through the instrumentality of a suitable spring or other desired form of door-closing mechanism.

It is a further object of my invention to provide a door-check adapted for attachment to a stationary portion of a wall, frame, or other structure in proximity to the door, and including a pneumatic or hydraulic dash-pot controlled latching mechanism which engages a catch carried by the door as the door is moved to open position, the dash-pot retaining the catch and latch in engaged position until the retarded action of the latch mechanism occasioned by the action of its associated dash-pot, functions to release the latch from engagement with the catch to permit the door to be returned to its closed position.

A still further object of my invention is to provide a device of the above mentioned character which is simple in construction, inexpensive to manufacture, strong and durable and highly reliable and efficient in the purposes for which designed.

In the accompanying drawings forming a part of this specification and in which like numerals are employed to designate like parts throughout the several views:

Figure 1 is a vertical sectional view of my improved door-check showing the door-carried catch in latched position within the door-check or hold-back device;

Fig. 2 is a sectional view on the line 2—2 of Fig. 1;

Fig. 3 is a plan view of the device;

Fig. 4 is a side elevation of the base portion of the device, and

Fig. 5 is a side elevation, partly in section showing a modified form of dash-pot construction, showing the piston thereof in its uppermost position.

Referring to the drawings, wherein for the purpose of illustration is shown several preferred embodiments of my invention, the numeral 1 designates a sliding or swinging door of any desired or preferred construction equipped with a catch 2 which has an outwardly-extending portion 3 terminating in an upstanding hooked-shaped portion 4. The catch 2 is mounted at any desired height on the face or edge of the door, it being understood that if the door-check or hold-back to be hereinafter described is used in connection with a swinging door, the catch is mounted on the front face of the door preferably near the upper portion thereof at a point remote from the hinged edge, whereas, if the device is used in connection with a sliding door, the catch is mounted on the upper edge of the door.

The numeral 5 designates a wall, frame or other stationary structure to which is attached, by screws or other fastening means, a hollow box-like structure 6, having at its rear end laterally extending lugs 7 by means of which the device is attached to the wall or other stationary support 5. The forward end of the member 6 is open and the top of the said member is also open through substantially its entire length except for the spaced connecting webs 8 and 9 which extend

completely across the top portion between the two side walls of the member 6 near the rear thereof. At its lower rear corner, the member 6 has formed integrally therewith or attached thereto a block or stop 10 for a purpose to be hereinafter described, and opposite sides of the member 6 are provided on their inner faces with horizontally-alined guide members 11 and 12, which engage longitudinal slots in the opposite sides of a pusher block 13 adapted to slide back and forth along the base of the member 6. The upper rear edge of the pusher block is beveled as indicated at 14, and the bottom face of this pusher block is provided with an elongated recess or pocket 15, within which is positioned a compression spring 16 having its inner or rear end embedded or anchored in the base of the member 6 and its outer or forward end bearing against the forward end of the recess 15, this spring normally urging the pusher block 13 toward the forward or open end of the member 6.

Mounted above the member 6 and attached thereto by means of suitable screws or rivets passing through the connecting webs 8 and 9, is a fluid tight dash-pot cylinder 17, having a removable top cover 18, through which access may be had to the interior of the cylinder. The base of the cylinder is provided with a centrally-disposed opening surrounded by an up-standing sleeve 19 of appreciable height and of a sufficient diameter to permit free vertical sliding movement of a piston rod 20 therein. Attached to the upper end of the piston rod 20 is an inverted, cup-shaped member 21, to the lower open edge of which is secured, as by welding, soldering or the like, a piston 22, provided with a centrally-disposed opening slidably engaging the outer surface of the sleeve 19. The piston 22 is provided with a flap valve or valves 23, which open downwardly to permit the piston 22 to be moved toward the top of the cylinder with minimum resistance, but which close upon downward movement of the piston to prevent the passage therethrough of liquid or fluid from beneath the piston to the space above the piston. The piston is provided with a restricted orifice or by-pass 24 and suitable means (not shown) may be associated with this orifice or by-pass to enlarge or restrict the by-pass to regulate the flow of liquid or fluid therethrough, depending upon the fluidity of the liquid and/or the predetermined time interval which is desired for the piston to move from its upper to its lower position. Between the top of the piston rod 20 and the inner face of the removable cover plate 18 is positioned one or more flat leaf springs 25 which normally tend to urge the piston rod and its associated piston downwardly. This spring or springs can be attached either to the top of the piston rod 20 or to the inner face of the removable cover plate 18, it being noted that the piston rod 20 is relatively heavy and that with the initial downward impulse imparted by the spring, the weight of the piston rod and its associated parts is ordinarily sufficient to move the piston downwardly. Of course, if the liquid employed within the cylinder is too viscous to enable the weight of the piston and its associated parts to effect the downward movement of the piston, a more powerful leaf spring or springs or else a coil spring could be positioned between the head of the cylinder and the top of the piston rod 20 or member 21, to insure the desired downward movement of the piston.

The lower end of the piston rod 20 has pivotally attached thereto, as by means of centrally-disposed upstanding lugs 26, a plate 27, this plate being pivoted intermediate its ends as by means of upstanding side lugs 28, which are pivotally attached to the opposite sides of the member 6 as clearly shown in the accompanying drawings. The underside of the rear portion of the plate 27 is provided with a depending cam-shaped lug 29 and the forward portion of said plate is provided with a pair of depending lugs 30, one of said lugs being positioned at each side edge of the plate, these lugs 30 being apertured to receive therethrough a transverse rod 31, which has its extremities disposed within elongated openings 32 located in opposite sides of the member 6. At each end of the rod 31 and beyond the outer side faces of the member 6, washers 33 are placed on the rod ends and are held thereon by means of cotter pins 34. A roller 35 is loosely mounted on the rod 31 between the depending lugs 30. In Fig. 5, of the accompanying drawings, I have shown a modified form of cylinder and piston construction, wherein the piston rod 20 has attached at its upper end a solid, relatively heavy piston 36, provided with packing rings 37. The piston 36 is provided with one or more axially extending passages 38, at the lower end of which is provided a flap valve 39 corresponding to the flap valve 23 above described, and opening downwardly, whereby the liquid or fluid within the cylinder is permitted to flow from above the piston to below the piston with the minimum of resistance, these valves closing upon the downward movement of said piston. The piston 36 is further provided with an axially extending passage or by-pass 40, the flow of liquid or fluid through this passage or by-pass being regulated by means of the adjusting screw 41 which extends into the passage and controls the size thereof and the consequent by-pass of liquid or fluid therethrough. In the form of the invention shown in Fig. 5, the leaf spring 25 is preferably secured to the removable cover plate 18.

Referring now to the operation of the form of my invention shown in Figures 1 to 4 in-

clusive, the member 6 and its associated parts is rigidly secured to a frame, wall, bracket or other stationary support in proximity to the door, in such a location that when the door is opened, be it a sliding or swinging door, the catch 2 carried by the door will enter the member 6 through the forward, open end thereof. In this normal position of the check or hold-back, the piston rod 20 and its associated parts are in their lowermost positions and, hence, the forward end of the plate 27 and the roller 35 are in their raised positions. Inward movement of the catch 2 forces the pusher block 13 inwardly against the tension of the spring 16, the pusher block 13 being guided during its inward movement by means of the guides 11 and 12 and the slots in the opposite side faces of said block. The inward movement of this pusher block causes contact between the inclined surface 14 of the block and the depending cam member 29 and, hence, the plate 27 is rocked about its pivotal mounting to elevate the piston 22 within the cylinder and to lower roller 35 into a position in front of the upstanding portion 4 of the catch. The inward movement of the pusher block 13 continues until the forward end of the block contacts with the block or stop 10, this contact occurring after the piston rod 20 has been raised to its uppermost position. The spring 16 then returns the pusher block 13 to its opposite or forward position, this movement of the pusher block forcing the hook-like portion 4 of the catch 2 into close contact with the inner periphery of the roller 35 and the parts are retained in this position until the piston rod 20 moves downwardly to move the plate 27 about its pivotal mounting. During the upward movement of the piston, effected by the inward movement of the pusher block 13 as described, there is very little resistance to such upward movement, due to the provision of the flap valves 23 which open up to permit the by-pass of the liquid or fluid from above the piston 22 to the space below said piston. After the piston rod 20 and its associated parts have reached their uppermost position, the spring 25 gives an initial impulse to the piston rod to move the same downwardly, this downward movement being assisted by the weight of the piston rod and its associated parts. The speed of the downward movement of the piston rod and hence the time interval consumed by the downward movement of the piston rod and its associated parts, is of course dependent upon the by-pass of the liquid or fluid from the lower side of the piston to the upper side thereof, the rate of this by-pass being regulated or determined by the size of the orifice or passage 24 in the piston 22, it being understood that the size of this orifice is dependent upon the fluidity of the liquid within the cylinder 17 and the time interval which is desired for the operation of the check or hold-back. After the lapse of the desired time interval required for the piston to travel to the lowermost position, the plate 27 has moved about its pivotal mounting and has raised the roller 35 out of engagement with the upstanding hooked end 4 of the catch 2, whereupon the catch is no longer maintained in latched position within the catch or hold-back and the door can then be moved, either manually or through the instrumentality of a spring or other form of closure, to its closed position.

The operation of the form of my invention shown in Fig. 5, will be readily apparent from the above description. In this device, the solid piston 36 reciprocates within the cylinder and partakes of a relatively free or unrestricted upward movement due to the opening of the flap valves 39 and the by-pass of the liquid or fluid therethrough, and a retarded downward movement, due to the restricted passage 41, the by-pass of the liquid or fluid through this passage being regulated or controlled by the adjusting screw 41.

It will thus be seen that I have provided a pneumatic or hydraulic check or hold-back for doors or other closures by means of which the closure may be retained in open position during a predetermined time interval and then released and moved to closed position, the retarded action of the device being readily adjustable to hold the closure open for the desired time.

It is to be understood that the forms of my invention herein shown and described are to be taken as preferred embodiments of my invention and that various changes may be made in the shape size and construction, without departing from the spirit of my invention or the scope of the subjoined claims.

Having thus described my invention, I claim:

1. A hold-back comprising a casing, a dash-pot mounted above the casing and having a piston rod extending downwardly into the casing, said piston rod partaking of relatively free upward and retarded downward movements, a pivoted latch member mounted within the casing having one end attached to the piston rod, and a catch adapted to enter the casing and to be engaged by the free end of the pivoted latch member to be retained within the casing by the latch member until released by the action of the dash-pot at the completion of the retarded downward movement of the piston rod thereof.

2. A hold-back comprising a casing, a dash-pot mounted above the casing and having a piston rod extending downwardly into the casing, said piston rod partaking of relatively free upward and retarded downward movements, a pivoted latch within the casing having one end attached to the piston rod, a catch adapted to enter within the casing and to be engaged by the free end of the pivoted

latch member to be retained within the casing by the latch member until released by the action of the dash-pot at the completion of the retarded downward movement of the piston rod therein, and means within the casing engaged by the catch as it enters the casing to engage the latch with the catch.

3. A hold-back comprising a casing, a dash-pot mounted above the casing and having a piston rod extending downwardly into the casing, said piston rod partaking of relatively free upward and retarded downward movements, a latch pivoted intermediate its ends within the casing and having its inner end attached to the piston rod, a catch adapted to enter within the casing and to be retained therein by engagement with the free end of the pivoted latch until released by the completion of the retarded downward movement of the piston rod of the dash-pot, and means within the casing and engaged by the catch as it enters the casing to move the latch about its pivotal mounting to engage the latch with the catch.

4. A hold-back comprising a casing, a dash-pot mounted above the casing and having a piston rod extending downwardly into the casing, said piston rod partaking of relatively free upward and retarded downward movements, a latch pivoted intermediate its ends within the casing and having its inner end attached to the piston rod, a catch adapted to enter within the casing and to be retained therein by engagement with the free end of the pivoted latch until released by the completion of the retarded downward movement of the piston rod of the dash-pot, and a sliding block within the casing engaged by the catch as it enters the casing and engaging the inner end of the latch to move the latch about its pivotal mounting to engage the latch with the catch.

5. A hold-back comprising a casing, a dash-pot mounted above the casing and having a piston rod extending downwardly into the casing, said piston rod partaking of relatively free upward and retarded downward movements, a latch pivoted intermediate its ends within the casing and having its inner end attached to the piston rod, a catch adapted to enter within the casing and to be retained therein by engagement with the free end of the pivoted latch until released by the completion of the retarded downward movement of the piston rod of the dash-pot, a sliding block within the casing engaged by the catch as it enters the casing and engaging beneath the pivoted end of the latch to move the latch about its pivotal mounting to engage the latch with the catch, and means to return the sliding block to its normal position after engagement has been established between the latch and catch.

6. A hold-back comprising a casing, a dash-pot mounted above the casing and having a piston rod extending downwardly into the casing, said piston rod partaking of relatively free upward and retarded downward movements, a pivoted latch member within the casing having one end attached to the piston rod, a catch adapted to enter within the casing and to be engaged by the free end of the latch member, and means to raise the piston rod within the dash-pot and to move the free end of the latch member into engagement with the catch, the latch and catch remaining in engaged position until the downward retarded movement of the piston rod raises the free end of the latch to release the catch.

7. A hold-back comprising a casing, a dash-pot mounted above the casing and having a piston rod extending downwardly into the casing, said piston rod partaking of relatively free upward and retarded downward movements, a catch adapted to enter within the casing, a latch member pivotally mounted intermediate its ends within the casing, the inner end of said latch member being pivotally attached to the end of said piston rod and the outer end engaging the catch member, and means to move the piston rod and inner end of the latch member upwardly to move the free end of the latch member into engagement with the catch, the latch and catch remaining in engaged position until the downward, retarded movement of the piston rod and the inner end of the latch member raises the free end of the latch member to release the catch.

8. A hold-back comprising a casing, a dash-pot mounted above the casing and having a piston rod extending downwardly into the casing, said piston rod partaking of relatively free upward and retarded downward movements, a pivotal latch member within the casing having its inner end attached to the piston rod, a catch adapted to enter within the casing and to be engaged by the free end of the latch member, a sliding block engaged by the catch as it enters the casing, the inward movement of the block forcing the inner end of the latch member and its connected piston rod upwardly and lowering the free end of the latch member into engagement with the catch, the latch and catch remaining in engaged position until the downward, retarded movement of the piston rod raises the free end of the latch to release the catch, and means for returning the sliding block to its normal position.

9. A hold-back comprising a casing, a dash-pot mounted above the casing and having a piston rod extending downwardly into the casing, said piston rod partaking of relatively free upward and retarded downward movements, a pivoted latch member within the casing having its inner end attached to the piston rod, the inner end of said latch member having a depending cam member,

a catch adapted to enter within the casing and to be engaged by the free end of the latch member, a sliding block engaged by the catch as it enters the casing, the inward movement of the block causing contact between said block and said depending cam surface to force the inner end of the latch and its connected piston rod upwardly and lowering the free end of the latch member into engagement with the catch, the latch and catch remaining in engaged position until the downward, retarded movement of the piston rod raises the free end of the latch to release the catch, and means for returning the sliding block to its normal position out of contact with the depending cam member.

10. A hold-back comprising a casing, a dash-pot mounted above the casing and having a piston rod extending downwardly into the casing, said piston rod partaking of relatively free upward and retarded downward movements, a pivoted latch member within the casing having its inner end attached to the piston rod, the inner end of said latch member having a depending cam member, a roller attached to the forward end of the latch member, a catch adapted to enter within the casing and to be engaged by the roller, a sliding block engaged by the catch as it enters the casing, the inward movement of the block causing contact between said block and said depending cam surface to force the inner end of the latch and its connected piston rod upwardly and lowering the roller into engagement with the catch, the roller and catch remaining in engaged position until the downward, retarded movement of the piston rod raises the roller to release the catch, and means for returning the sliding block to its normal position out of contact with the depending cam member.

In testimony whereof I hereunto affix my signature.

WILLIAM E. STONEBRIDGE.