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DOOR CHECK

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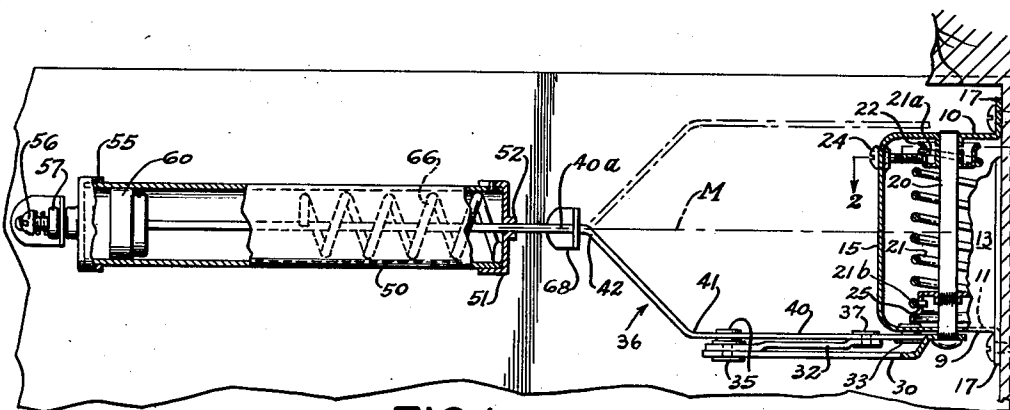


FIG. 1

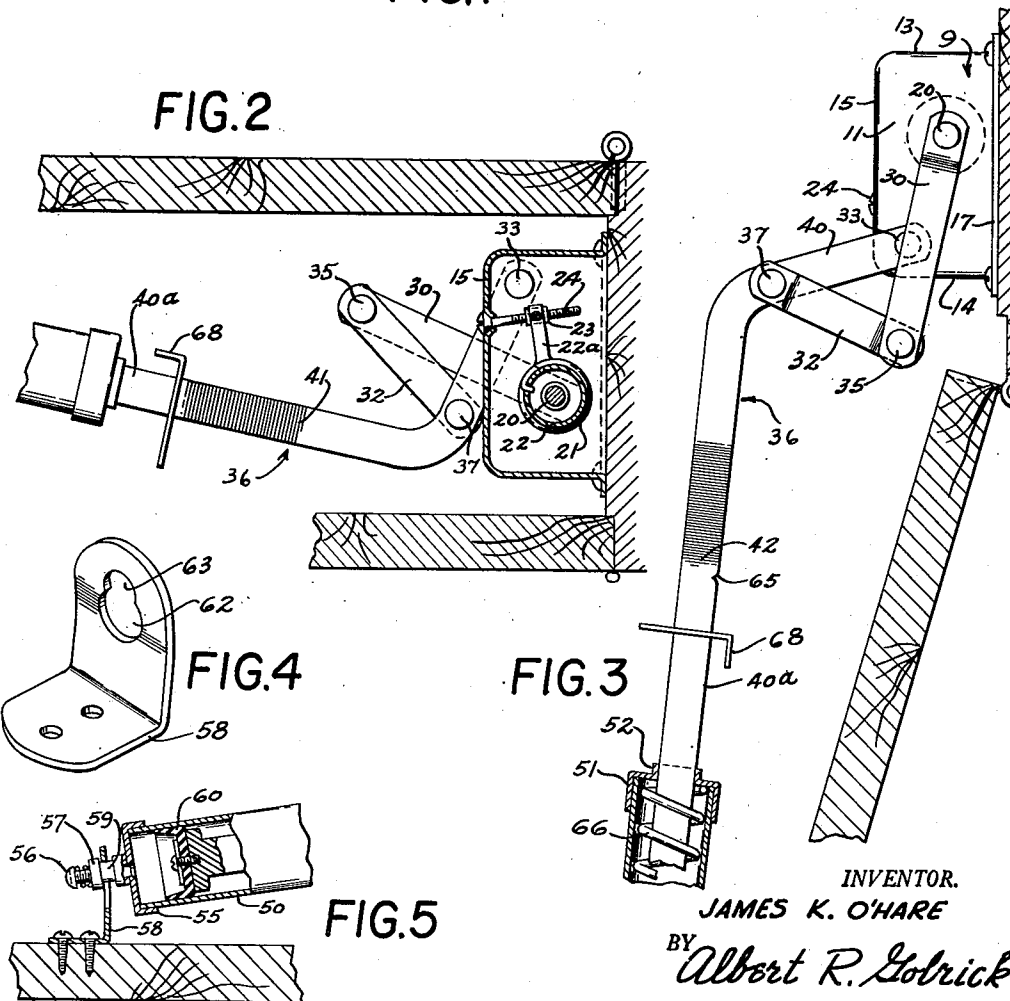


FIG. 2

FIG. 3

FIG. 4

FIG. 5

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DOOR CHECK

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2 Claims. (Cl. 16—70)

This invention is directed to improvements in door checks of the type adapted to the control of screen and storm doors, and the general object thereof is the provision of a dependable door check mechanism which may be installed readily by attachment to the hinge panel of a door jamb structure and to the face of the screen or storm door regardless of whether the main door and accordingly the screen or storm door are mounted to swing right or left handed.

A more particular object of the present invention is the provision of a door check mechanism which may be installed in the above stated manner without the necessity of disassembling the mechanism to reverse the positions of operating parts thereof to meet, for example, the requirements of a left hand swinging door.

A still further object of the present invention is to fulfill the foregoing objects while retaining certain features of lever arrangement wherein the piston rod of a pneumatic piston and cylinder check serves as a lever of the third class in a highly advantageous manner for door closing.

Still other objects of the present invention will become apparent in the following description referring to the drawing which illustrates a preferred embodiment thereof.

In the drawing Fig. 1 is a side view of the door check in position on a door frame and door, certain parts being broken away;

Fig. 2 is a fragmentary view, partly in section taken as indicated by the line 2—2 in Fig. 1;

Fig. 3 is a fragmentary view of the door check taken from below, with the door partly open;

Fig. 4 is a detail perspective view of the door clip; and

Fig. 5 is a fragmentary detail of the bleeder valve body-door clip connection.

The present invention contemplates the utilization of the lever mechanism disclosed in the United States Patent No. 2,477,486, reissued May 5, 1953 as Re. 23,652, with certain alterations, changes and improvements therein whereby the energy storing means may be more positive in action and more economical in construction and the energy storing means or spring may be helical in form and supported and housed by a bracket housing which also supports the lever mechanism. The shape and arrangement of the parts has been so effected that the check may be applied quite readily to either a right hand or left hand swinging door installation by simply reversing the position, vertically speaking, of the entire unit. The importance of this feature will be appreciated when it is realized that many screen doors have narrow frame strips and the check mechanism has to be confined, in a vertical direction to the width (or depth) of the top frame strip of the screen door. This problem, of course, is not present in the use of those types of door check mechanisms which are attached to an outside face of a door frame where ample space is available.

In the instant construction the use of a helical spring while more economical than a convolute spring of the same torque effort permits of the disposition of the spring

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axis closer to the base of the bracket and the width of the bracket can be maintained at a minimum thus permitting installation on the more narrow door jambs while still retaining the reversibility advantage.

Referring to the drawing, I have provided a rugged spring and lever bracket structure 9 in the form of a box like cup drawn from sheet metal stock to have end walls 10 and 11, side walls 13 and 14 and a top or face panel 15. The end walls have integral flanges 17 formed at right angles therewith and which are perforated to provide screw holes for securement of the housing bracket to the door jamb face in the desired location.

The energy storing means comprises a stiff helical spring 21 disposed within the housing bracket on a stud shaft member 20 extending through the housing end walls 10 and 11, the shaft being thus turnably supported in the housing as viewed in Fig. 1. The internal diameter of the spring member is shown as being considerably greater than the diameter of the stud shaft 20 and I provide stamped supporting members 22 and 25 for supporting and anchoring the end coils of the spring. The member 25 is fixed to the shaft by a ferruled press fit between the hub opening of the member 25 and the shaft.

To adjust the pre-wound tensioning of the spring the spring supporting member 22 has a similar hub construction but which fits loosely upon the shaft. The member 22 also has a radially extending arm 22a integrally formed thereon having a stud member 23 pivotally mounted at the outer end of the lever arm. The stud member has a threaded opening in which an adjusting screw 24 fits. The adjusting screw extends through and the head thereof bears upon the outer face of the housing wall 15. The spring supporting members 22 and 25 have radial perforations through which are disposed the inwardly bent spring ends 21a and 21b.

The lever system for swinging the door shut comprises a flat lever arm 30 secured to the stud shaft by a ferruled press fit connection at the projecting headed end of the shaft adjacent the end wall 11 of the housing bracket. The lever arm, adjacent its shaft connected end is offset to space the remainder thereof from the housing wall 11. Pivotally connected at 33 to the housing wall 11 at a position remote from the axis of the shaft 20 is a piston rod lever 36 formed to the shape shown from flat stock. The outer end of the lever arm 30 and the angular flat end 40 piston rod lever 36 are pivotally joined to an intermediately disposed connecting link 32 at points 35 and 37 generally in the manner and for the purpose disclosed in said Patent #2,477,486, now Reissue Patent 23,652, dated May 5, 1953. As described in said patent the piston rod lever has an elbow bend formed therein adjacent the link pivotal connection 37.

In the instant construction the flat sides of the arm, link and piston lever extend parallel to each other and are embossed at the respective pivotal points to space the flat faces of the members from each other. Also the pivot member 35 on the outer end of arm 30 is made to extend into the swinging path of the piston rod lever so that when in stock the spring is prevented from unwinding itself by this interference to the free movement of the arm 30. When the check mechanism is installed the stop 35 never is swung to contact with the piston rod lever.

The check mechanism as described will be suitable for many installations where the top cross piece of the screen or storm door are of sufficient depth, vertically speaking, to permit of a left hand installation by simply reversing or inverting the entire unit before securement to the door jamb. However by constructing the piston rod lever with a recurrent or ogee bend to bring the acting piston rod part of the lever to operate in a plane which vertically bisects the housing, the check unit can be reversed or turned upside down as desired and the piston cylinder lo-

cation relative to the door structure can remain the same. Thus in the drawing I show a flatwise bend at 41 formed in the piston rod lever just beyond the point of contact of the pivot structure 35 and a second bend 42 to dispose the piston rod part 40a of the lever in a vertical plane M extending through the over all center of the housing structure.

The cylinder 50 has an inner end 51 preferably a die cast piece with a protruding flange 52 to afford top, bottom and side bearing surfaces for the flat piston rod structure. The outer end of the cylinder is closed by an end member 55 provided with the usual bleeder valve screw member 56 in a body 57 for adjusting the pneumatic effect of the piston 60 in opposing the over-rapid action of the spring 20 acting through the described leverage upon the door.

To facilitate adjusting at the time of installation the piston end member 55 is provided with a quick detachable connection to the L shaped door clip or bracket 58. Thus the bleeder valve body 57 may have an annular groove 59 thus forming shoulders. The bracket 58 has an opening 62 through which the valve body 57 may pass. A contiguous opening 63 has a diameter equal to the groove bottom diameter. Since the tendency of the lever system including the cylinder is to swing away from the bracket when the latter is fixed to the door the bracket is maintained in the valve body groove. In installing the unit the housing bracket is attached to the door jamb and the clip or bracket position then is determined by having the inner cylinder end coincide with notch 65. The clip bracket may then be located relative to the outer cylinder end. Should it be desired to release the cylinder end from the bracket this may be effected by forcing the outer cylinder end toward the latched door and sufficient piston-cylinder movement is available to pass the valve body 57 out of the clip bracket opening, the notch 65 having been so located as to permit this movement.

If desired a bumper spring 66 may be incorporated in the piston-cylinder assembly to react between the inner face of the piston structure and the inner face of the inner cylinder end bearing member thereby to meet high wind and storm hazards. The L shaped clip 68 is provided with an aperture approximating the cross section of the stock used for the piston rod lever so that it may be slid end wise onto the latter during manufacture. A slight clearance relative to the lever member permits the clip 68 to be slideably positioned along the piston rod part thereof and the unperforated leg of the clip extending toward the end of the cylinder in bearing against the cylinder end cap 51 causes the apertured portion to cant and come into locking edge engagement with the piston rod, thereby holding the piston rod from inward movement into the cylinder to maintain the door at a selected open position.

Thus the door closing force of the spring is applied, between the connection of the door through the cylinder as a load and the housing pivot 33 as a fulcrum, to piston rod lever 36 serving therefore as a third class lever. However, if the spring reaction force, applied through link 32 to the piston rod lever 36 on opening the door, is considered as a load being moved, and the acting force as being applied at the door connection through the cylinder, the piston rod lever 36 would of course under this aspect be termed a second class lever.

It will be noted that most of the elements are formed of pressed metal parts and that the bracket housing affords a rugged reaction absorbing medium for the relatively heavy helical spring which has been found necessary to effect the final closing movements of the door against

the pneumatic action of the piston and cylinder while both of the latter are also acting as part of the lever system.

I claim:

1. In a door check for screen and storm doors adaptable for use between two doors, the combination of a spring bracket housing attachable to a door jamb comprising parallel side and end walls, a turnable shaft supported by a pair of said walls, said shaft having an end protruding through one of the parallel walls, a lever member having one end pivotally attached to the last named housing wall at a point remote from the shaft axis, a pair of pivotally interconnected links respectively secured to the protruding shaft end and said lever, an energy storing helical spring within the housing having one end connected to the housing adjacent one of said pair of walls and the other end connected to the shaft adjacent the other of said pair of walls, the other end of said lever comprising a piston rod, a piston structure on the said other end of the lever, a cylinder structure containing the piston and having one end consisting of a bearing for the piston rod part of the lever and the other end consisting of a means for detachable attachment of the cylinder to a door, said lever having a bent offset formation in the region of the housing whereby the cylinder and piston rod part of the lever are disposed approximately at a plane extending normal to the shaft and through the mid-length of the spring.

2. In a door check mechanism of the type described, an energy storing means disposed within a housing bracket having end walls and adapted to be attached to a door jamb between the building door and a screen or storm door, a piston and cylinder for retarding the action of the energy storing means, a shaft connected to said energy storing means and protruding from an end wall of the housing, a lever arm with one end affixed to the protruding part of the shaft and having the fixed end offset and disposed adjacent said wall, a piston rod lever rectangular in cross section and having one end thereof pivotally connected to said wall at a point removed from the shaft axis and swingable in a plane lying intermediate the lever arm and said wall, the inner end of said cylinder having a bearing and said piston rod lever having a part connected to the piston and slidably mounted in said bearing, the outer end of said cylinder being provided with an air vent, bracket means adapted to be fastened to the inner face of the screen or storm door and having a quick detachment means connected to the outer cylinder end, said piston rod lever having an offset bend to dispose the piston rod part thereof in a plane perpendicular to the shaft and approximately midway between said housing bracket end walls, and a link member pivotally connected to the piston rod lever intermediate the said offset bend and said one end of the piston rod lever and to the lever arm, whereby the piston rod lever operates as a lever of the third class in door closing action and said piston rod part will be drawn outwardly from said cylinder during opening of the screen or storm door to energize said energy storing means for returning said door to closed position under the retarding action of air displaced through said air vent by the piston.

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