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E. H. JOHNSON
BUILDER'S HARDWARE
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2,171,065

Fig. 1

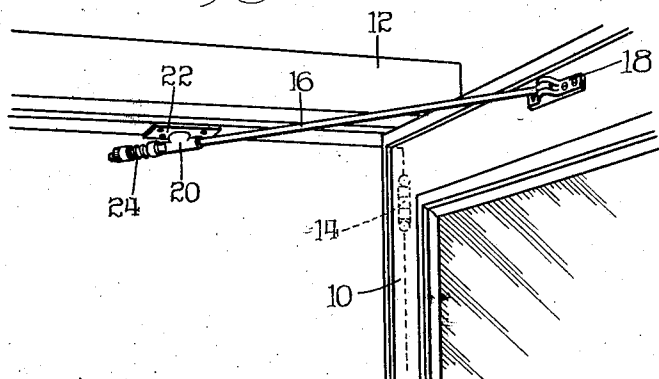


Fig. 2

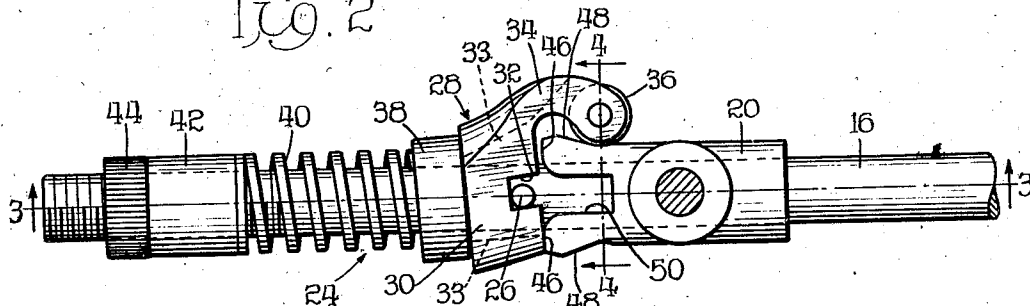


Fig. 3

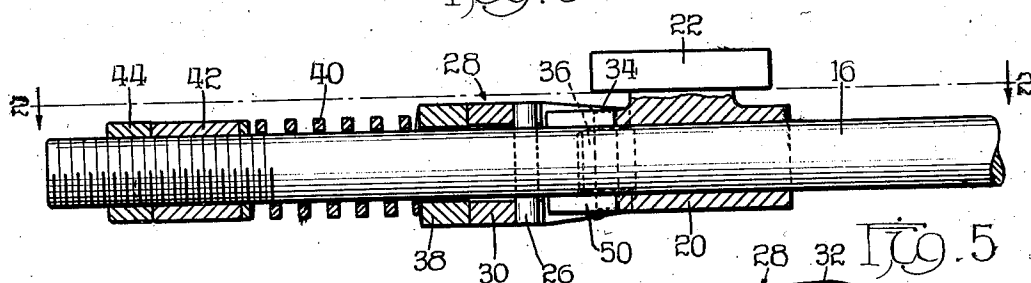


Fig. 4

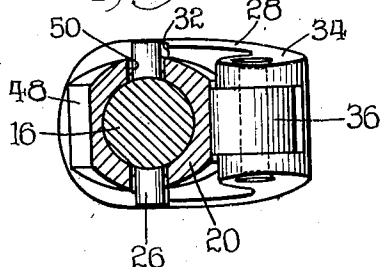
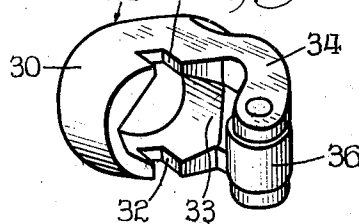


Fig. 5



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BUILDER'S HARDWARE

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10 Claims. (Cl. 189—49)

My present invention relates generally to builder's hardware, and more particularly to door stops and door checks. It includes among its objects and advantages the provision of an improved door check which is simple in construction and which requires only a small number of parts.

In the accompanying drawing:

Figure 1 is a general view in perspective of a door and casing with my improved door check applied thereto;

Figures 2 and 3, respectively, are plan and elevational views, partly in section, of the device of my present invention, Figure 2 being taken along the line 2—2 of Figure 3, and Figure 3 being taken along the line 3—3 of Figure 2;

Figure 4 is a view, partly in section, taken along the line 4—4 of Figure 2; and

Figure 5 is a view in perspective of one of the parts of my improved door check.

In the embodiment of the invention selected for illustration, the door 10 is hinged in a door casing by means of one or more spring hinges 14 adapted to move the door to its closed position. The door check comprises a rod 16 pivoted to the bracket 18 mounted on the door 10, and it includes also a sleeve 20 in which the rod 16 slides and which is pivoted on the plate 22 on the door casing 12. Carried on the extreme end of the rod 16 is a bumper and retaining mechanism indicated generally by the reference numeral 24.

Referring to Figures 2, 3, and 4, the rod 16 is provided with a transverse vertical pin 26 which extends on opposite sides of the rod to form pintles for the bumper piece 28. The bumper 28 comprises a body portion 30 which has a pair of notches 32 which are adapted to receive the ends of the pin 26, on which the bumper 28 is adapted to rock, as clearly shown in Figure 2. To permit this rocking movement, the opening in the body 30 is elongated horizontally and also flared, as clearly indicated at 33 in Figure 2. Extending from the body portion 30 of the bumper 28 is a curved arm 34 carrying a roller 36 which lies to one side of the rod 16 and slightly removed therefrom, and which also lies away from the notches 32 in a direction approximately 45° from the direction of the rod 16.

A collar 38 encircles the rod 16 and lies to that side of the bumper 28 opposite the pin 26. The collar 38 fits the rod 16 more closely than does the bumper 28, and therefore is not free to rock with the bumper 28. A compression spring 40 encircling the rod 16 bears against the collar 38 and at its other end abuts a long fusible bushing 42 adjustably held in place by a nut 44 threaded

onto the rod 16. It will be clearly noted in Figure 2 that the abutting faces of the bumper 28 and collar 38 are so shaped that the contact between them always tends to resist tilting of the bumper out of the holding position illustrated in Figure 2.

The sleeve 20 is provided with a cam portion having a forward, or deflecting, face 46 and a rearward, or holding, face 48 for engagement with the roller 36 of the bumper 28. The cam portion comprising the faces 46 and 48 is provided in duplicate on opposite sides of the sleeve 20 so as to permit the door check to be adapted conveniently to either a right or left hand door. In the illustrated embodiment, the deflecting faces 46 function also as impact faces to engage the opposing face of the bumper and to cushion the movement of the door by compressing the spring 40. The sleeve 20 is notched at 50 to clear the pin 26 when the spring 40 is compressed.

Figure 1 illustrates the door 10 in its open position, in which position the sleeve 20 is in engagement with the bumper 28, and Figures 2, 3, and 4 illustrate the mechanism in the same position. When the apparatus is in this position, the roller 36 lies in engagement with the rearward or holding face 48 of the sleeve 20 to retain the door in the open position. As the door is moved toward its closed position, the rod 16 must slide through the sleeve 20, and as this motion is initiated, the roller 36 must ride off the holding surface 48 of the cam portion of the sleeve 20. In so riding, the roller 36 causes the bumper 28 to rock about the pin 26 against the force of the spring 40. Consequently, the force required to withdraw the bumper 28 from engagement with the cam 20 depends upon the tension of the spring 40. This tension is adjustable by turning the nut 44 along the threaded portion of the shaft 16. Once the roller 36 has ridden over the cam portion of the sleeve 20, it disengages the sleeve 20 and the rod 16 may slide freely through the sleeve 20, permitting the door to close under the force of the springs of the hinges 14.

The distances at which the bracket 18 and the plate 20 are located from the axis of the door hinge 14 are so chosen with respect to each other that in the closed position of the door 10 the rod 16 folds against the door into a final position substantially parallel thereto and below the door casing 12.

When the door is opened, the rod 16 again slides through the sleeve 20 and brings the bumper 28 into engagement with the sleeve. As the sleeve 20 approaches the bumper 28, the forward

face 46 of its cam engages the roller 36 and rocks the bumper 28 on the pin 26 against the force of the spring 40 so as to raise the roller 36 as the cam surface 46 moves thereunder. As the peak of the cam moves under the roller 36 so that the roller comes into engagement with the holding surface 48 of the cam, the rocker 28 rocks in the other direction under force of the spring 40. As the rod 16, propelled by the momentum of the door 10, continues to move and carries the bumper with it, the bumper 28 comes sharply into engagement with the end of the sleeve 20. The bumper 28 stops against the sleeve 20, and as the rod 16 continues to move, the pin 26 moves away from the bumper 28 and into the notches 50, the spring 40 being compressed so as to provide a cushioned stop for the door 10 when it reaches the extreme open position.

In case of fire while the door is open, only a slight rise in temperature is necessary to fuse the bushing 42. This deprives the spring 40 of its tension and the holder becomes inoperative and permits the springs of the hinges 14 to close the door.

Because the same spring 40 determines both the force of the holding action on the surface 48 and the cushioning action, the adjustment of the nut 44 to get a holding action that just overcomes the tension of the springs of the hinges 14, will automatically provide also a stiff cushioning action for a large and heavy door, and a lighter cushioning action for a lighter door.

Without further elaboration the foregoing will so fully explain my invention that others may, by, applying knowledge current at the time of application, readily adapt the same for use under various conditions of service.

I claim:

1. In combination in a door check: a rod; a foot pivoted at one end of said rod and adapted to swing about said end of said rod on a first axis which is transverse to the axis of said rod, said foot being adapted to be mounted on a door, and having a face parallel to said first axis adapted to engage the surface of said door; a sleeve fitting said rod so that said rod slides therethrough; a plate pivoted on said sleeve about a second axis transverse to the axis of said sleeve, said plate being adapted to be mounted on a casing, and having a surface perpendicular to said second axis adapted to engage the surface of said casing; said sleeve being oriented on said rod so that said first and second axes are substantially parallel; said sleeve having a forward end thereof facing away from said one end of said rod; a cam on said forward end of said sleeve, said cam having a forward lifting face and rearward holding face; a pair of pintles extending transversely from said rod; an abutment ring encircling said rod and adapted to rock on said pintles opposite said sleeve; said ring having a forward face adapted to abut the forward end of said sleeve; an arm extending laterally and forward from said ring and having a holding portion adapted to overhang said cam and engage said holding face of said cam when said forward face of said ring abuts said forward end of said sleeve; a collar rearward of said ring fitting said rod closely whereby said collar is restrained from rocking with said abutment ring; a spring behind said collar and a nut behind said spring threaded onto said rod; the rearward surface of said abutment ring being such that said spring normally holds said holding portion in the path of said cam, whereby as said sleeve and

abutment ring approach each other and said holding portion rides over said cam, said abutment ring rocks to compress said spring.

2. In combination in a door check: a rod; a foot pivoted near one end of said rod and adapted to swing on said rod about a first axis which is transverse to the axis of said rod, said foot being adapted to be mounted on a door; a sleeve fitting said rod so that said rod slides therethrough; a plate pivoted on said sleeve about a second axis transverse the axis of said sleeve, said plate being adapted to be mounted on a casing; said sleeve being oriented on said rod so that said first and second axes are substantially parallel; said sleeve having a forward end thereof facing away from said one end of said rod; a cam near said forward end of said sleeve, said cam having a forward lifting face and rearward holding face; a pair of pintles extending transversely from said rod, an abutment ring encircling said rod and adapted to rock on said pintles on that side of said pintles opposite said sleeve; said ring having a forward face adapted to abut the forward end of said sleeve; an arm extending laterally and forward from said ring and having a holding portion adapted to overhang said cam and engage said holding face of said cam when said forward face of said ring abuts said forward end of said sleeve; a spring behind said ring for holding said ring on said pintles and against said sleeve; the rearward surface of said abutment ring being such that said spring normally holds said holding portion in the path of said cam, whereby as said sleeve and abutment ring approach each other and said holding portion rides over said cam, said abutment ring rocks to compress said spring.

3. In combination in a door check: a rod; a mounting bracket pivoted near one end of said rod and adapted to swing on said rod about a first axis which is transverse the axis of said rod; a sleeve fitting said rod so that said rod slides therethrough; a mounting bracket adapted to turn on said sleeve about a second axis transverse the axis of said sleeve, said mounting brackets being adapted to be mounted on a casing and door; said sleeve being oriented on said rod so that said first and second axes are substantially parallel; said sleeve having a forward end thereof facing away from said one end of said rod; a cam formed on said forward end of said sleeve, said cam having a forward lifting face and rearward holding face; an abutment ring encircling said rod; a fulcrum between said ring and sleeve for adapting said ring to rock about an axis transverse to said rod; said ring having a forward face adapted to abut the forward end of said sleeve; said ring having a holding portion adapted to overhang said cam and engage said holding face of said cam when said forward face of said ring abuts said forward end of said sleeve; a spring behind said ring for holding said ring on said fulcrum and against said sleeve; the rearward surface of said abutment ring being so shaped that said spring normally holds said holding portion in the path of said cam, whereby as said sleeve and abutment ring approach each other and said holding portion rides over said cam, said abutment ring rocks to compress said spring.

4. In combination in a door check: a rod; a mounting bracket pivoted near one end of said rod and adapted to swing on said rod about a first axis which is transverse the axis of said rod; a sleeve fitting said rod so that said rod

slides therethrough; a mounting bracket adapted to turn on said sleeve about a second axis transverse the axis of said sleeve, said mounting brackets being adapted to be mounted on a casing and door; said sleeve being oriented on said rod so that said first and second axes are substantially parallel; said sleeve having a forward end thereof facing away from said one end of said rod; a cam formed on said forward end of said sleeve, said cam having a forward lifting face and rearward holding face; an abutment ring encircling said rod; a fulcrum between said ring and sleeve for adapting said ring to rock about an axis transverse to said rod; said ring having a forward face adapted to abut the forward end of said sleeve; said ring having a holding portion adapted to overhang said cam and engage said holding face of said cam when said forward face of said ring abuts said forward end of said sleeve; a spring behind said ring for holding said ring on said fulcrum and against said sleeve; the rearward surface of said abutment ring being so shaped that said spring normally holds said holding portion in the path of said cam, whereby as said sleeve and abutment ring approach each other and said holding portion rides over said cam, said abutment ring rocks to compress said spring; said sleeve being shaped to clear said fulcrum whereby to adapt said sleeve to lift said abutment ring off said fulcrum against the force of said spring to cushion the abutment of said sleeve and ring.

5. In combination in a door check: a rod; a mounting bracket pivoted at one end of said rod and adapted to swing on said rod about a first axis which is transverse the axis of said rod; a sleeve fitting said rod so that said rod slides therethrough; a mounting bracket adapted to turn on said sleeve about a second axis transverse the axis of said sleeve, said mounting brackets being adapted to be mounted on a casing and door; said sleeve being oriented on said rod so that said first and second axes are substantially parallel; said sleeve having a forward end thereof facing away from said one end of said rod; an abutment ring encircling said rod; a fulcrum between said ring and sleeve and adapting said ring to rock about an axis transverse to said rod; said ring having a forward face adapted to abut the forward end of said sleeve; engageable gripping elements on said ring and sleeve adapted to be moved into and out of gripping engagement by the rocking action of said ring when said forward face of said ring abuts said forward face of said sleeve; a spring for holding said ring against said fulcrum and for rocking it thereon to a normal position such that as said sleeve and abutment ring approach each

other said spring rocks said ring to engage said gripping elements.

6. In a door check, in combination: a rod; means for pivoting one end of said rod to a door; a guide having sliding engagement with said rod; means for mounting said guide on a door casing; unitary abutment means mounted on said rod for sliding and tilting movement with respect to said rod; stop means on said rod for limiting the movement of said abutment means toward said guide means; and unitary spring means for urging said abutment means toward said stop means and for resiliently resisting tilting movement of said abutment means; said guide means and abutment means having interlocking irregularities of contour movable into and out of engagement by tilting of said abutment means.

7. In a door check, in combination: a rod; means for pivoting one end of said rod to a door; a guide having sliding engagement with said rod; means for mounting said guide on a door casing; unitary abutment means mounted on said rod for sliding and tilting movement with respect to said rod; stop means on said rod for limiting the movement of said abutment means toward said guide means; and spring means for urging said abutment means toward said stop means and for resiliently resisting tilting movement of said abutment means; said guide means and abutment means having interlocking irregularities of contour movable into and out of engagement by tilting of said abutment means.

8. A door check according to claim 6 in which said spring means comprises a unitary helical compression spring encircling said rod, and a fusible abutment sleeve encircling said rod and abutting the end of said spring remote from said abutment means.

9. A door check according to claim 6 in which said guide means and abutment means include a roller mounted on one of said means and constituting the active portion of the irregularity of contour of the means on which it is mounted.

10. In a door holder: elements adapted to be connected to a door and a door casing and to be actuated by movement of said door; one of said elements including a bumper and a holding hook; a single unitary spring means for restraining cushioning movement of said bumper, and hooking movement of said hook; and means for adjusting the tension of said spring means, whereby adjustment of said spring means simultaneously increases or decreases both the cushioning action of said bumper and the holding action of said hook.

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