April 5, 1966 E. F. REISS 3,243,836

DOOR CHECK

Filed Sept. 22, 1964

FIG. 1

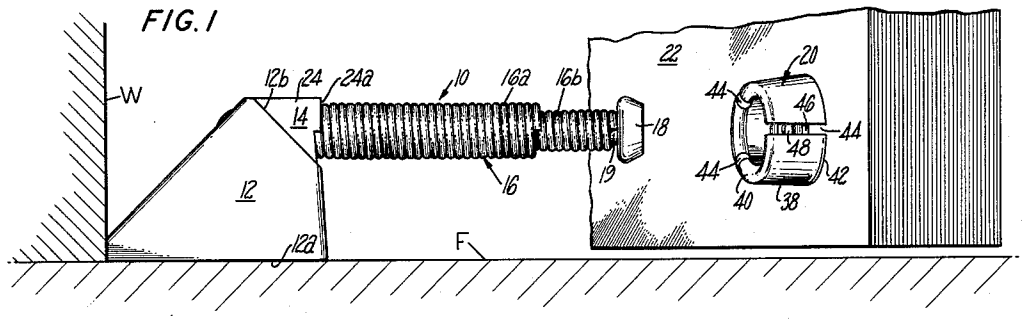


FIG. 2

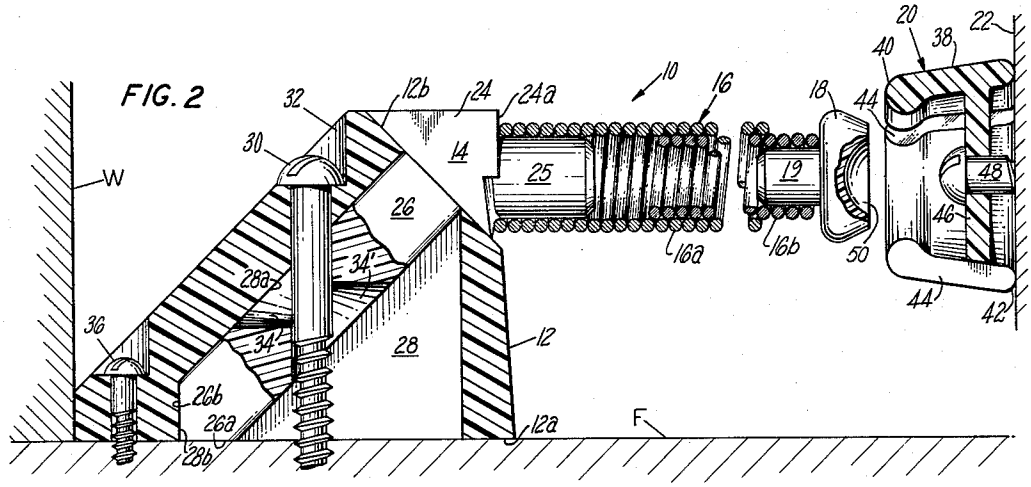
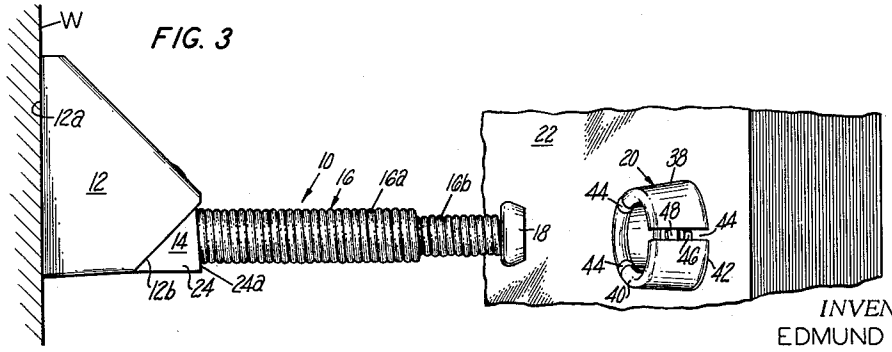


FIG. 3



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DOOR CHECK

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The present invention generally relates to devices for checking swinging doors and is directed more specifically to a doorstop and holding device for halting a swinging door and retaining it in a desired position.

A principal aim of the present invention is the provision of an improved door check having notable versatility in being adapted for either floor or wall mounting for arresting the movement of a swinging door.

Another primary aim of the present invention is the provision of an improved door check particularly adapted for stopping a swinging door and transmitting a substantial portion of its kinetic energy directly to a supporting surface thereby minimizing fatigue-creating stresses to provide an impact resistant door check having an extended period of usefulness.

A further aim of the present invention is the provision of a door check incorporating an improved holding device particularly adapted for selective adjustment of the gripping force for retaining doors of varying weights in a desired position while at the same time being readily disengaged so that the door may be released to swing to another position.

A more specific aim of the present invention is to provide a door check of the type described possessing a compact and rugged structure which is expeditiously installed with a minimum of effort in minimal time.

Other objects will be in part obvious and in part pointed out more in detail hereinafter.

The invention accordingly consists in the features of construction, combination of elements and arrangement of parts which will be exemplified in the construction hereafter set forth, and the scope of the application of which will be indicated in the appended claims.

In the drawing:

FIG. 1 is a side view of the invention, partially in perspective, illustrated in a first operative position;

FIG. 2 is an enlarged view of the invention of FIG. 1, partially broken away and partially in longitudinal cross section; and

FIG. 3 is another view of the invention of FIG. 1 illustrated in a second operative position.

Referring in detail to the drawing, the preferred embodiment of the door check of the invention is illustrated as comprising a doorstop, generally designated by the numeral **10**, which includes a mounting block **12** mounting a removable backstop **14** supporting the fixed end of a resilient arm or spring shaft **16** shown as extending horizontally outwardly therefrom, the free end of spring shaft **16** having a bumper **18** affixed thereto for coacting with a socket, generally designated by the numeral **20**, mounted in alignment with bumper **18** on a door **22**. As more fully explained hereafter, the doorstop **10** and socket **20** are designed to act as a holding device for retaining door **22** in a desired position. Except for the spring shaft **16**, the above-mentioned parts of the composite door check are preferably formed of an impact resistant, resilient, moldable material, such as nylon or delrin, to assure a high strength assembly requiring no lubrication for smooth and quiet operation.

The mounting block **12** is provided with a planar bottom or base **12***a* so that it can be rigidly mounted flush on a flat supporting surface, and the top or opposite side of mounting block **12** is illustrated as having an outer

surface **12***b* chamfered at an approximate 45° angle with respect to the base **12***a* for engageably supporting the head **24** of backstop **14**. For reasons more fully explained hereafter, block **12** is hollowed out to form a through chamber **28** extending from the chamfered surface **12***b* to the planar base **12***a*.

The head **24** is suitably dimensioned and configured, preferably triangular in cross section, for mating abutment with the chamfered surface **12***b*. In the preferred embodiment a short, generally cylindrical nose **25** is formed on an impact-receiving face **24***a* of head **24** to extend horizontally outwardly from backstop **14**, as viewed in FIG. 2, and one end of the spring shaft **16** is snugly fitted around the periphery of nose **25** to fix the spring shaft **16** thereon. The flexibility of spring shaft **16** thus accommodates minor misalignment between the bumper **18** and socket **20** and additionally provides protection for the ankles of pedestrians. Spring shaft **16** desirably is comprised of two concentric flexible coil springs, a large first spring **16***a* fixed as previously described on nose **25** for threadedly receiving a smaller second spring **16***b* in a frictionally locked, adjusted position, the smaller spring **16***b* coaxially extending outwardly to a free end wherein the stem **19** of bumper **18** is received in fixed engagement. Spring shaft **16** is thereby additionally adapted for longitudinal extension and retraction for adjusting the door position relative to doorstop **10**.

In accordance with one aspect of the present invention, a shank **26** fixed to head **24** of backstop **14** is received within the hollowed out chamber **28**. Shank **26** is shown as having a substantial portion of its surface engaging abutment means formed within chamber **28**, the abutment means comprising an oblique chamber wall **28***a* extended normally from the chamfered surface **12***b* toward base **12***a* at an approximate 45° angle and terminated adjacent the bottom of mounting block **12** by a wall or shoulder **28***b* which is shown as extending perpendicularly to the mounting block base **12***a*. In order to adapt doorstop **10** for mounting on either a floor "F" or a wall "W," shank **26** is dimensioned to extend through chamber **28** to the supporting surface with the end of shank **26** opposite head **24** being squared off to provide a pair of mutually perpendicular beveled edges **26***a* and **26***b* engageably braced against the supporting surface and the shoulder **28***b*.

A suitable fastener, such as the round head screw **30**, is provided to attach doorstop **10** to the supporting surface, screw **30** shown as being received within a counterbore **32** formed in mounting block **12** and extended normally to its base **12***a* through shank **26** to be embedded in the supporting surface. To assure that backstop **14** is immovable relative to the mounting block **12** in both operative positions of FIGS. 1 and 3, a pair of identical countersinks **34** and **34'** may be coaxially formed perpendicular to chamber wall **28***a* and extended toward one another from opposite sides of the shank **26** so as to be adjoined in alignment with counterbore **32**, as shown in FIG. 2, for receiving screw **30**. If desired, the assembly may be secured with further rigidity by providing an additional fastener **36** as illustrated at the end of mounting block **12** adjacent abutment **28***b*.

To mount the doorstop **10** in the position illustrated in FIG. 3, the backstop **14** is simply removed from block **12** and rotated 180° relative to mounting block **12** so as to be inverted with respect to its position in FIGS. 1 and 2, and then inserted into chamber **28** with the countersinks **34**, **34'** again in alignment with counterbore **32** for expeditious attachment to the wall "W." In this connection, it will be noted that portions of shank **26** surrounding each countersink **34** and **34'** are in contact with screw

30 in both positions of backstop 14 to provide a snugly fit, rattle-free assembly.

In the event door 22 is swung to impart a sharp impact blow on doorstop 10, a substantial component of the compressive force thereby received will be transmitted directly to the supporting surface. As illustrated, one of the beveled edges 26*a* or 26*b* of the shank 26 is engageably contacting either the floor "F" or the wall "W."

Turning now to the holding device for retaining door 22, socket 20 is provided with a sidewall 38 tapered outwardly from an arcuate lip 40, dimensioned for receiving bumper 18 in an intimately fitted position in the interior of socket 20, to a base 42 of semicircular cross section for engaging the surface of door 22.

To compensate for varying weights and sizes of doors as well as for manufacturing variations in the bumper-socket structure, the sidewall 38 is transmuted into a plurality of radially movable fingers (three being shown in the drawing) defined by longitudinal slots 44 extending entirely from one end of socket 20 to the other and interconnected between lip 40 and base 42 by a web or disk 46 intermediate the ends of socket 20. Upon mounting socket 20 on door 22 by a suitable fastener, such as the central mounting screw 48, the side fingers are fulcrumed on the periphery of base 42 to variably adjust the grasp of the holding device upon moving the mounting screw 48 toward and away from the door 22.

So that bumper 18 will be well seated in socket 20 upon their being registered with one another, bumper 18 can be hollowed out as at 50 to receive the head of the mounting screw 48 upon being engaged within the socket 20. The bumper 18 can thereafter be readily disengaged from socket 20 merely by pulling the door 22 away from doorstop 10 to swing the door 22 to another position.

The composite door check of the present invention provides a highly useful device for checking and braking the force of a swinging door by means of a built-in shock absorbing action which operates to effectively transmit percussive forces to a supporting surface so as to resist otherwise fatigue creating stresses over an extended period of time. Moreover, the assembly is comprised of a minimum number of parts which may be readily assembled and installed on either the floor or the wall without requiring additional parts. The high strength socket coacting with the bumper of the doorstop provides an efficient releasable holding device while at the same time having notable adjustability for retaining doors of various weights in a desired position.

As will be apparent to persons skilled in the art, various modifications and adaptations of the structure above described will become readily apparent without departure from the spirit and scope of the invention, the scope of which is defined in the appended claims.

I claim:

1. For limiting the movement of a swinging door, a door check rigidly attachable to a support surface for both floor and wall mounting comprising a mounting block for engaging the supporting surface, the mounting block having a chamfered outer surface extending toward the supporting surface at an angle of approximately 45°, and a removable backstop including a head engageably supported on the chamfered outer surfaces of the mounting block, the head having an impact-receiving face directed outwardly from the chamfered outer surface at an angle of approximately 45° for reversible positioning of the backstop relative to the mounting block.

2. For limiting the movement for a swinging door, a door check rigidly attachable to a supporting surface for both floor and wall mounting comprising a mounting block for engaging the supporting surface, the mounting block including a through chamber formed therein, a portion of the chamber being defined by abutment means within the mounting block, and a removable backstop including an impact-receiving face on one end thereof directed outwardly from the mounting block and a shank received within the chamber in contact with the abutment means and with the supporting surface for directly transmitting percussive forces thereto, the abutment means cooperable with the supporting surface for reversible positioning of the backstop relative to the mounting block.

3. The door check as recited in claim 2 wherein the abutment means within the chamber include an obliquely directed wall member extending toward the supporting surface at an angle of approximately 45° and a shoulder member extending from the wall perpendicular to the supporting surface, the shank of the backstop engaging at least one of the wall and shoulder means in abuting relationship.

4. For limiting the movement of a swinging door, a door check rigidly attachable to a supporting surface for both floor and wall mounting comprising a mounting block having a generally planar base for engaging the supporting surface, the mounting block including a through chamber formed therein having an obliquely directed wall extending toward the base at an angle of approximately 45°, a portion of the chamber defined by a shoulder extending from the obliquely directed wall perpendicular to the base, and a removable backstop adapted for reversible positioning relative to the mounting block, one end of the backstop having an impact-receiving face directed outwardly from the mounting block at an angle of approximately 45° with respect to the chamber wall, the opposite end of the backstop having beveled edges mutually perpendicular in cross section engageably braced against the shoulder and the supporting surface for directly transmitting percussive forces thereto when the door check is struck by the door.

5. For limiting the movement of a swinging door, a door check rigidly attachable to a supporting surface for both floor and wall mounting comprising a mounting block for engaging the supporting surface, the mounting block including a through chamber formed therein having an obliquely directed wall extending toward the supporting surface at an angle of approximately 45° and a bore extending into the chamber perpendicular to the supporting surface, a removable backstop including a head engageably supported on the mounting block and a connected shank received in the chamber in parallel relationship with its wall, the head having an impact-receiving face directed outwardly from one end of the shank at an angle of approximately 45° with respect to the axis thereof for reversible positioning of the backstop relative to the mounting block, the opposite end of the shank received within the chamber in contact with the supporting surface for directly transmitting percussive forces thereto, the shank having an aperture formed intermediate its ends in alignment with the bore of the mounting block, and a fastener extending through the bore and aperture for fixing the mounting block and the backstop in assembled relationship to the supporting surface.

6. The door check as recited in claim 5 wherein the aperture in the shank comprises a pair of opposed countersinks coaxially formed perpendicular to the chamber wall to adjoin one another in alignment with the bore of the mounting block.

7. For limiting the movement of a swinging door, a door check rigidly attachable to a supporting surface for both floor and wall mounting comprising a mounting block having a generally planar base for engaging the supporting surface, the mounting block including an outer surface chamfered at an angle of approximately 45° with respect to the base and a through chamber formed therein, a portion of the chamber defined by abutment means within the mounting block, a removable backstop including a head engageably supported on the chamfered surface of the block and a shank received within the chamber in contact with the abutment means and with the supporting surface, an arm fixed to the head of the backstop and extending outwardly to a free end thereof in a

plane parallel with the supporting surface, and an adjustable holding device for retaining the door in a selected position, the holding device having one part attachable to the door and another part attachable to the free end of the arm and including a bumper and a coacting open-ended socket for receiving the bumper, the socket including an annular side wall having longitudinal slots extending from end to end defining interconnected radially movable fingers for grasping the bumper.

8. The door check as recited in claim 7 wherein the mounting block includes a bore extending into the chamber perpendicular to the base, the shank includes a pair of opposed countersinks coaxially formed perpendicular to the chamber wall to adjoin one another in alignment with the bore of the mounting block, and wherein a fastener is extended through the bore and the countersinks for fixing the mounting block and the backstop in assembled relationship to the supporting surface.

9. In a door check for limiting the movement of a swinging door, an adjustable holding device for retaining the door in a desired position comprising a bumper attachable to one of the door and door check members and a coacting open-ended socket attachable to the other members for receiving the bumper, the socket having an annular side wall formed of nylon-type material and a disk fixed intermediate its ends with a central aperture for receiving a mounting screw, the side wall having

longitudinal slots extending from end to end defining radially movable side fingers interconnected by the disk, the side fingers being fulcrumed on the periphery of the socket to adjust the grasp of the holding device dependent upon the adjustment of the mounting screw.

10. In a door check for limiting the movement of a swinging door, a holding device for retaining the door in a desired position comprising a bumper for attachment to the door check and a coacting open-ended socket for attachment to the door for receiving the bumper, the socket having an annular side wall formed of nylon-type material and a disk fixed intermediate its ends with a central aperture for receiving a mounting screw attaching the socket to the door, the side wall having longitudinal slots extending from end to end defining radially movable side fingers interconnected by the disk, the side fingers being fulcrumed on the periphery of the socket to adjust the grasp of the holding device dependent upon the adjustment of the mounting screw.

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