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Armstrong

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[54] **LATCH BOLT AND KEEP ASSEMBLY**

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[52] **U.S. Cl.** **29/2,** 292/341.13

[51] **Int. Cl.** **E05b 15/02,** E05c 21/00

[58] **Field of Search** 290/341.12, 341.13, 340, 290/DIG. 73, 2; 70/463

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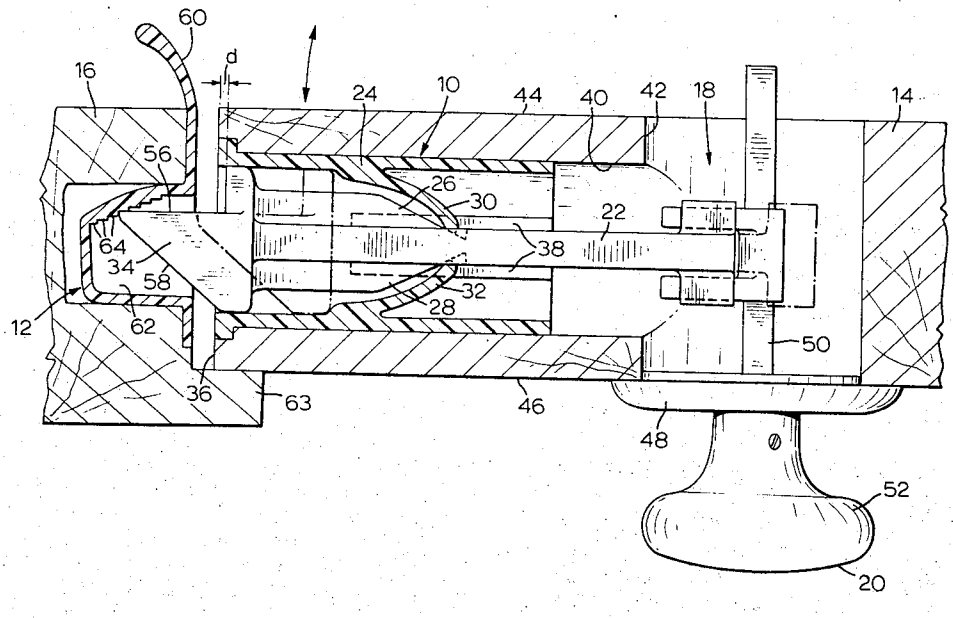
Primary Examiner—Robert L. Wolfe

Attorney, Agent, or Firm—Rogers, Bereskin & Barr

[57] **ABSTRACT**

The invention relates to the combination of a latch bolt and latch keep having co-operating structure for holding a door closed, and more particularly to a latch bolt and latch keep combination which when fitted respectively to a door and door frame provide limited adjustment to close the door more tightly should the door rattle. The latch keep includes a series of steps for selective engagement by an end portion of the latch bolt to retain the door in a closed position.

1 Claim, 4 Drawing Figures



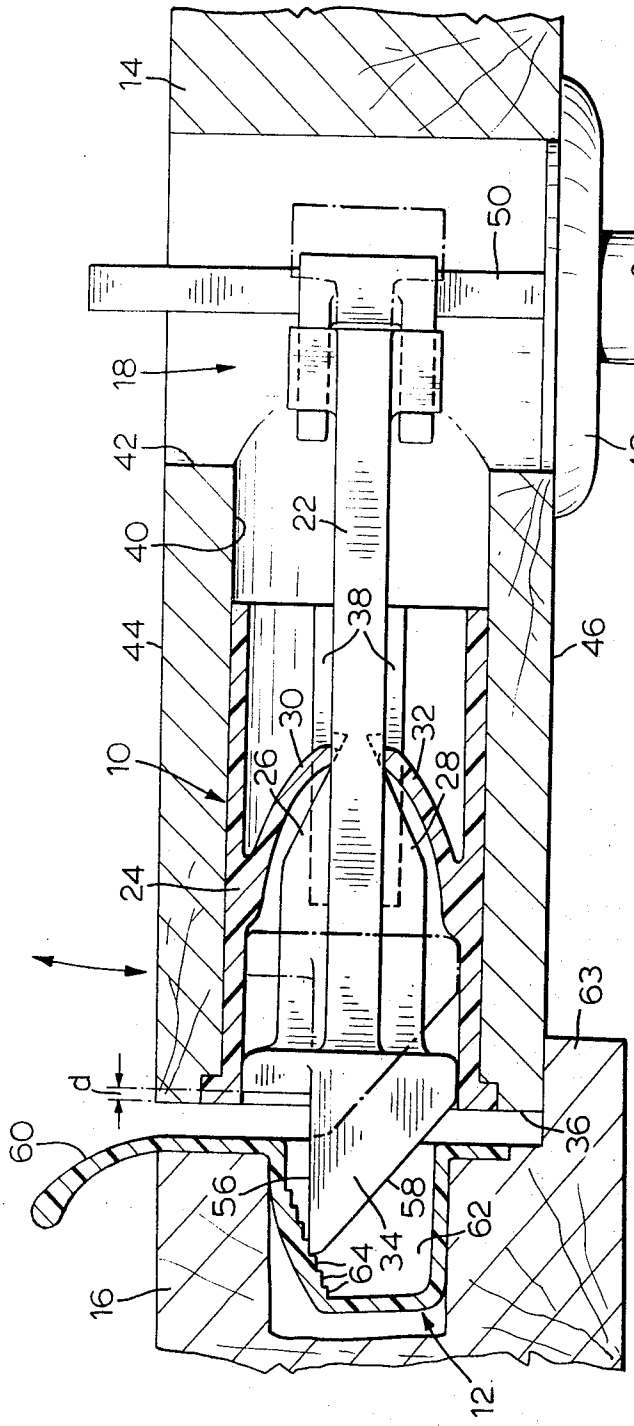


FIG. 1

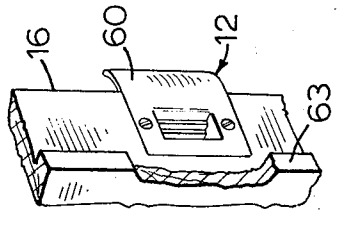


FIG. 2

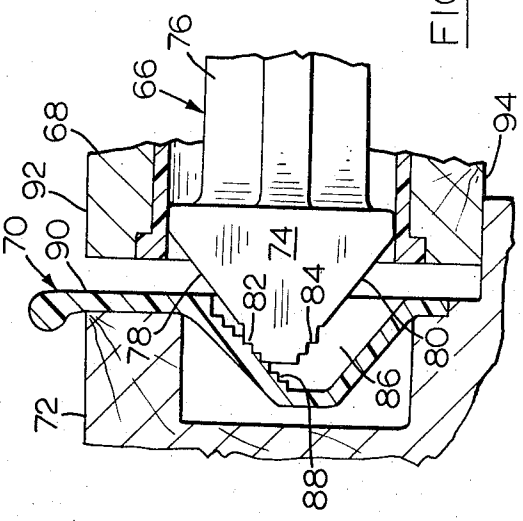


FIG. 4

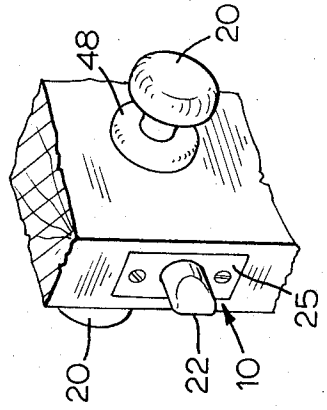


FIG. 3

LATCH BOLT AND KEEP ASSEMBLY

This invention relates to the combination of a latch bolt and latch keep having co-operating structure for holding a door closed, and more particularly to a latch bolt and latch keep combination which when fitted respectively to a door and door frame provide limited adjustment to close the door more tightly should the door rattle.

When assembling conventional latch bolts in a door, the door is first prepared and then the latch bolt entered in the door and held in place by screws. Next, a latch keep is attached to the door frame so that when assembly is complete, the door can be retained in a closed position by engagement of the latch bolt in the latch keep. The position of the latch keep should be such that the door is held closed against a door stop on the door frame. In some instances, because of the difficulties of accurate assembly, the keep is so positioned that the door can be closed only by applying considerable force to press the door against the door stop, and in other instances the position of the latch keep is such that the door is not in position against the door stop when the latch bolt is engaged in the latch keep. In this latter instance the door will tend to rattle.

It is an object of the present invention to provide a latch keep which can be positioned on a door frame within relatively large tolerances to combine with a latch bolt to hold an associated door closed securely.

It is a further object of the invention to provide a combination of a latch bolt and a latch keep which co-operate on assembly to provide for adjustment of an associated door to more securely close the door should the door rattle.

Accordingly, in one of its aspects, the present invention provides a latch keep for use in combining with a latch bolt in a door to retain the door in a closed position, the door having parallel faces and an edge extending between the faces, and the latch bolt having an end portion projecting beyond the edge and defining a surface which is substantially parallel to the door faces, the latch keep being adapted to be attached to a door frame and the latch keep comprising a striker portion for deflecting said end portion inwardly upon closing the door and means defining a cavity which on assembly receives at least part of said end portion when the door is closed, said cavity defining means including a plurality of steps at a side of the cavity adjacent the striker portion, the steps defining step faces which upon assembly and with the door closed are substantially parallel to the door faces for selective face-to-face engagement with said end portion surface to retain the door in a closed position.

Accordingly, in another of its aspects the invention provides a combination of a latch keep and a latch bolt for use in retaining a door in a closed position, the latch bolt being adapted to be attached to a door adjacent an edge of the door, and comprising: a housing, a slider contained in the housing, means locating the slider within the housing for axial movement and including means limiting the rotational movement of the slider, an end portion having a surface which on assembly is parallel to the faces of the door, and means biassing the slider towards a normal position such that on assembly the end portion portions beyond the edge of the door; and the latch keep being adapted to be attached to a door frame and comprising: a striker portion for deflecting the slider inwardly upon closing the door, and means defining a cavity which on assembly receives at least part of said end portion when the door is closed, said cavity defining means including a plurality of steps at a side of the cavity adjacent the striker portion, the steps defining step faces which upon assembly and with the door closed are substantially parallel to the door faces for selective face-to-face engagement with said end portion surface to retain the door in a closed position.

The invention will be better understood with reference to the drawings, in which:

FIG. 1 is a sectional view of a latch bolt and latch keep according to the invention and assembled respectively on a door and door frame;

FIG. 2 is a perspective view of the latch keep;

FIG. 3 is a perspective view of the latch bolt; and

FIG. 4 is a view similar to FIG. 1 showing an alternative embodiment of the latch bolt and latch keep.

Reference is first made to FIG. 1 which shows a latch bolt **10** and latch keep **12** assembled respectively in a door **14** and door frame **16.** The latch bolt **10** is coupled by a retracting mechanism **18** to a handle **20** for withdrawing a slider **22** of the latch bolt from a normal position to a withdrawn position shown in ghost outline in FIG. **1.** As drawn the slider is deflected slightly from the normal position towards the withdrawn position by an amount 'd' as will be described.

The latch bolt slider **22** is reciprocally engaged in a generally cylindrical housing **24** having an end plate **25** (FIG. 3) through which screws are engaged to retain the housing on the door. A pair of ramps **26, 28** are formed on the slider. The ramps combine with resilient fingers **30, 32** on the inner wall of the housing to bias the slider towards a normal position in which an end portion **34** of the slider projects beyond an edge **36** of the door.

The inner wall of the housing **24** defines two pairs of ribs **38** (one pair of which is shown) for guiding the slider as it moves between the normal and withdrawn positions and for preventing rotation of the slider. Housing **24** is a snug fit in a first cylindrical door opening **40** extending inwardly from the door edge **36** and meeting a second cylindrical opening **42** which extends between door faces **44, 46** and contains the retracting mechanism **18.** Conventional cover plates **48** (one of which is shown) engage over respective ends of opening **42** and journal a spindle **50** on which a pair of handles **52** (one of which is shown) are mounted.

The end portion **34** of the slider **22** is generally cylindrical and bordered in part by a first surface **56** parallel to the door faces **44, 46** and a second surface **58** inclined generally from the outer extremity of the surface **56.** When closing the door the surface **56** co-operates with a striker portion **60** of the latch keep **12** to automatically deflect the slider **22** towards the withdrawn position for subsequent engagement in a cavity **62** inthe latch keep.

As seen in FIGS. **1** and **2,** the cavity **62** in the latch keep **12** contains part of end portion **54** of the slider when the door is closed to retain the door in a closed position against a door stop **63** on the door frame **16.** The latch keep **12** is recessed into the door frame **16** and the entrance to the cavity is generally rectangular. A side of the cavity adjacent the striker portion **60** is defined by a series of steps **64** having faces which on

assembly and with the door closed are substantially parallel to the faces **44, 46** of the door **14.**

Reference is again made to FIG. **1** to describe the co-operation between the latch bolt slider **22** and the latch keep **12** in retaining the door **14** closed. As drawn, the first surface **56** of the slider end portion **34** is in engagement with an intermediate one of the surfaces of the steps **64,** and the door face **46** is firmly engaged against the door stop **63.** As shown, the latch bolt slider is deflected inwardly an amount 'd' against an outward bias exerted by the fingers **30, 32** on the respective ramps **26, 28.** In the event that the door is closed to a point where it rattles because it is not up against the door stop **63,** door rattle will cause the end portion **34** of the slider **22** to move outwardly onto the next step thereby automatically adjusting the position of the door into a more firmly closed position such as that shown in FIG. **1.** Alternatively the door can simply be pushed into engagement with the door stop **63** whereupon the slider will move outwardly onto a corresponding step to substantially retain the door in the fully closed position.

It will be evident that the latch keep can be positioned within a range of positions relative to the width of the door frame **16** and the steps **64** will combine with the latch bolt **10** to locate the door **14** in a fully closed position against door stop **63.** Consequently, on assembly there is less need for accurate placing of the latch keep on the door frame.

Reference is now made to FIG. **4** which shows an alternative embodiment of the latch bolt and latch keep combination. A latch bolt **66** in a door **68** engages a latch keep **70** on a door frame **72.** An end portion **74** of a latch bolt slider **76** is defined in part by a pair of generally inclined surfaces **78, 80** arranged symmetrically about the axis of the slider and defining respective steps **82, 84** adjacent the flat front end of portion **74.**

The latch keep **70** defines a cavity **86** including steps **88** at a side adjacent a striker portion **90** of the keep **70.** The steps **88** are of a complementary shape to the steps **82, 84** for engagement either with the steps **82** (as shown) or with the steps **84** in the event that the door is to be hung to move in the opposite direction to that shown.

Each of the steps **82, 84** includes a surface which on assembly on door **76** is parallel to faces **92, 94** of the door and the steps **88** have corresponding faces for face-to-face engagement with the surfaces of steps **82, 84.** Consequently, the door is adjustable in the manner of door **14** (FIG. **1**) previously described.

The latch bolt **66** and latch keep **70** have advantages over the structures shown in FIG. **1.** Either of the surfaces **78, 80** will ride on the striker portion **90** of latch plate **70** when closing the door to deflect the slider **76** into a withdrawn position preparatory to the engagement of the end position **74** in the latch keep cavity **86.** As shown, surface **80** rides over the striker portion **90** and on engagement slider steps **82** engage keep steps **88.** If the door movement were reversed, the positions of the latch keep would also be reversed relative to the position shown in FIG. **4** and then surface **78** would ride over striker portion **90** and slider steps **84** would engage in keep steps **88.**

The latch bolts and latch keeps described with reference to the drawings are preferably of a polyoxymethylene plastic sold under the trade mark *DELRIN.* However, any other material or materials having suitable physical characteristics can be used. Also, although the description has included a specific form of latch bolt it will be appreciated that the form of the latch bolt can be changed significantly provided that a slider is provided which is biassed outwardly and has an end portion suitable for co-operation with one of the latch keeps previously described.

What I claim as my invention is:

1. The combination of a latch keep and latch bolt for use in retaining a door in a closed position, the latch bolt being attached to a door adjacent an edge of the door, and comprising: a housing, a slider contained in the housing, means locating the slider within the housing for axial movement and including means limiting the rotational movement of the slider, an end portion having a pair of generally inclined surfaces disposed symmetrically about the axis of the slider, each of these surfaces defining a plurality of similar steps each of which includes a step surface which is substantially parallel to the faces of the door and means biassing the slider towards a normal position such that on assembly the end portion projects beyond the edge of the door; and the latch keep being attached to a door frame and comprising a striker portion for deflecting the slider inwardly upon closing the door, and means defining a cavity which receives at least part of said end portion when the door is closed, said cavity defining means including a plurality of steps at a side of the cavity adjacent the striker portion, the steps defining step faces which with the door closed are substantially parallel to the door faces for selective face-to-face engagement with the step surfaces of one of the inclined surfaces to retain the door in a closed position, the pair of inclined surfaces permitting the combination to be attached either to a door opening to the left or to a door opening to the right.

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