United States Patent [19]

Bisbing et al.

[11] **3,841,674**

[45] **Oct. 15, 1974**

[54] **SLAM-LATCH**

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[73] Assignee: **Southco, Inc.**, Lester, Pa.

[22] Filed: **May 23, 1973**

[21] Appl. No.: **363,070**

[52] **U.S. Cl.**.... **292/175**, 292/DIG. 30, 292/DIG. 38, 292/DIG. 53

[51] **Int. Cl.**..... **E05c 1/10**

[58] **Field of Search**..... 242/42, 74, 87, 163, 175, 242/DIG. 30, DIG. 38, DIG. 46, DIG. 53, DIG. 61, DIG. 63; 339/128

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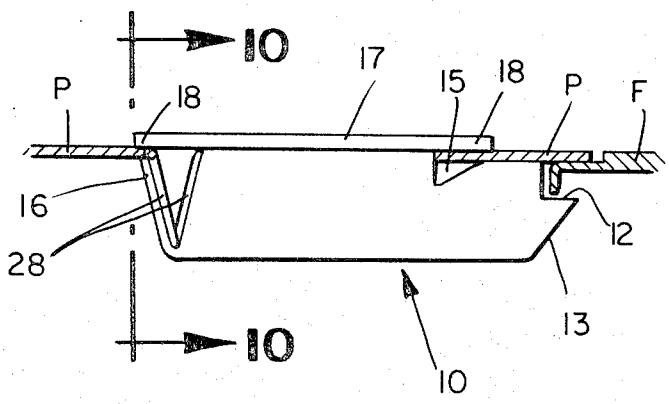
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Primary Examiner—Albert G. Craig, Jr.
Attorney, Agent, or Firm—Paul & Paul

[57] **ABSTRACT**

A sliding-action slam latch for securing a door panel, especially a hinged door panel, in closed position is constructed of one piece and is installed in a single opening in the door panel and is self-retained therein. The latch operates by spring-biased sliding action to engage the door frame or striker plate. In one form, the spring bias is provided by the resilience of the plastic material of which the latch is made. Modified embodiments are shown in which the spring bias is provided by a separate spring member. Several forms of separate spring members are shown.

6 Claims, 13 Drawing Figures



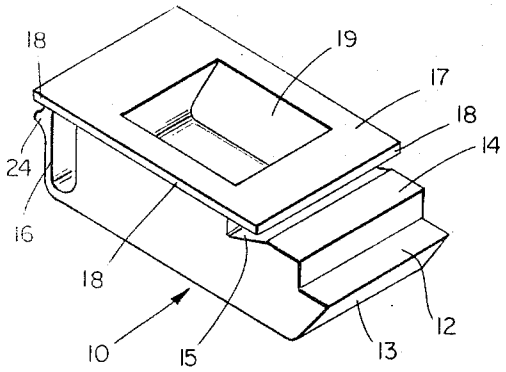


Fig. 1

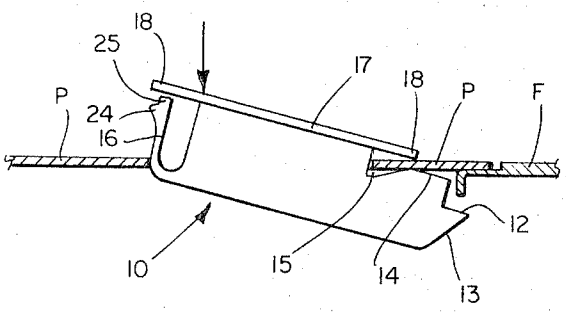


Fig. 2

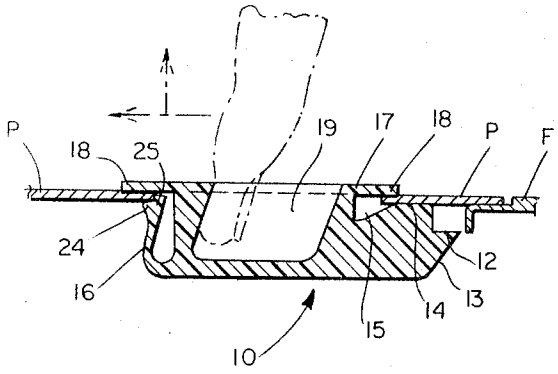


Fig. 4

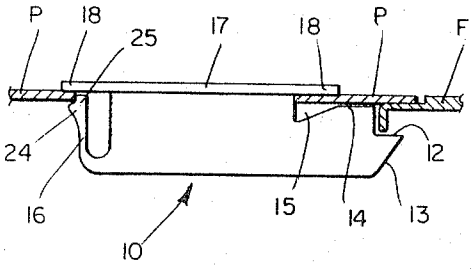


Fig. 3

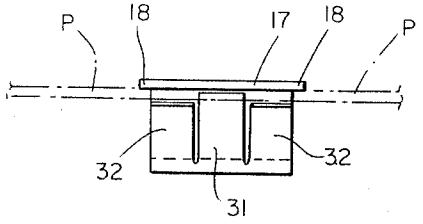


Fig. 5

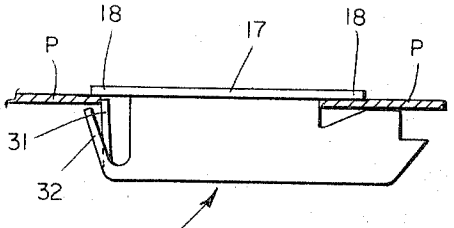


Fig. 6

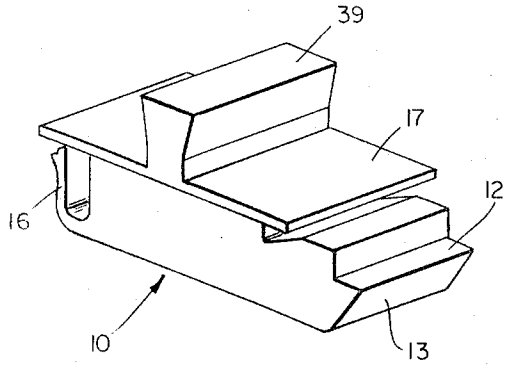


Fig. 7

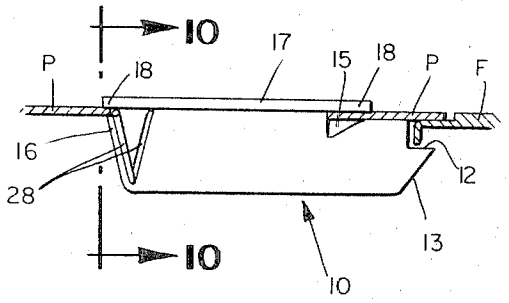


Fig. 8

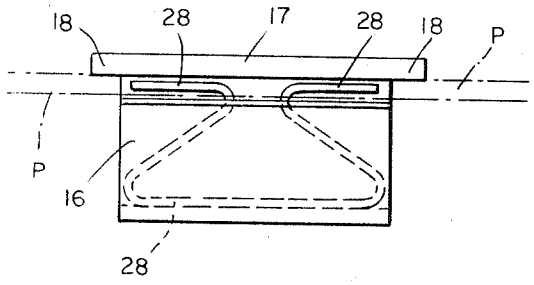


Fig. 10

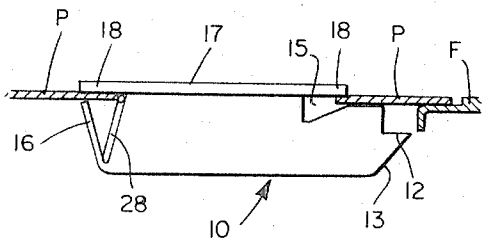


Fig. 9

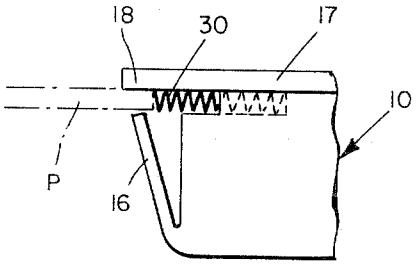


Fig. 13

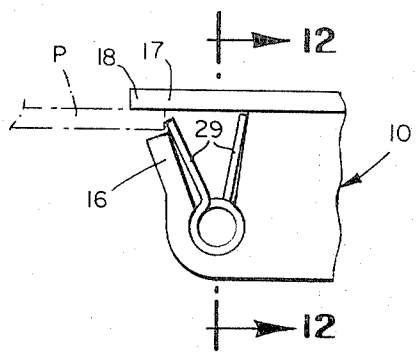


Fig. 11

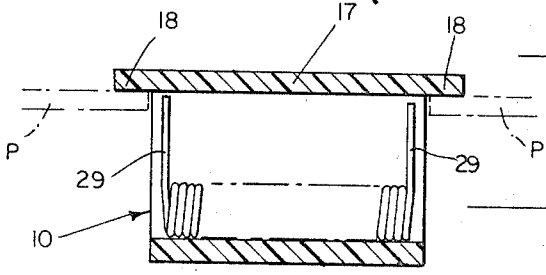


Fig. 12

SLAM-LATCH

BACKGROUND OF THE INVENTION

This invention relates to latches used to secure, in closed position, hinged panels on doors.

The invention relates especially to that class of latches in which a camming surface on the end of a sliding-bolt element co-operates with a striker surface on the door frame to cause the bolt action to secure the door upon its closing against the frame.

The slam action principle has been widely used in the prior art and has been embodied in various latch designs which usually incorporate a housing which encloses several components, one of which is a sliding-bolt element. The general characteristic of this type of latch is that it is activated to secure the door by co-operation of a door-frame-mounted striker when the door is merely pushed shut or slammed, but some operation of the latch mechanism is required to release the latch and open the door.

The particular class of latches to which the present invention belongs uses a cam surface on the end of the bolt element to co-operate with the striker surface to slide the bolt into the housing against the force of a spring contained therein. This spring force thereafter urges the bolt to engage behind the door frame or to engage a keeper element provided on the door frame. In order to open a door secured with such a latch, a hand grip is usually provided to operate the mechanism which withdraws the end of the bolt from engagement with the keeper on the door frame.

Presently available latches of the sliding-bolt slam type are installed by mounting the latch assembly to the door panel using rivets, or bolts and nuts, or screws, or other fastening means.

SUMMARY OF THE INVENTION

The primary object of the present invention is to provide a latch of the sliding-bolt slam-action type which may be more easily installed, at low cost, without the use of rivets, or bolts and nuts, or screws, or other fasteners.

The foregoing object is accomplished, in accordance with one embodiment of the present invention, by constructing a latch of material having sufficient resilience or spring characteristics to achieve both "snap in" installation and also slam-latching function with but single component construction.

The foregoing object is accomplished in accordance with other embodiments of the present invention, by constructing a latch of material having sufficient resilience or spring characteristics to achieve "snap in" installation but wherein the slam-latching function is provided by a separate spring.

BRIEF DESCRIPTION OF THE DRAWING

FIG. **1** is a perspective representation of one embodiment of the latch of the present invention, wherein the latch is of single-component construction.

FIG. **2** illustrates the embodiment of FIG. **1** in an interim position during its installation into a door panel.

FIG. **3** illustrates the embodiment of FIGS. **1** and **2** fully installed in a door panel. The latch unit in FIG. **3** is shown in its forward or latched position.

FIG. **4** illustrates the latch of FIG. **3** being pushed to its rearward or unlatched position.

FIGS. **5** and **6** are views showing a modification of the latch of FIGS. **1–4** wherein the single flexible leg element of FIG. **1** is a plurality of segments.

FIG. **7** illustrates a modification in which the hand grip is a thumb-and-finger knob, rather than the finger recess shown in FIGS. **1–4.**

FIGS. **8–13** illustrate additional embodiments wherein the spring bias is provided by an additional spring component. In FIGS. **8–10,** the additional spring component is a torsion bar spring. In FIG. **11,** the additional spring component is a coil-type torsion spring. In FIG. **13,** a compression spring is shown.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now to FIG. **1,** this figure is a perspective view of one embodiment of the invention wherein the slam latch consists of a single component of a resilient plastic material formed by molding or by other manufacturing methods. The slam latch of FIG. **1** includes a latch body **10** having at one end a frame-engaging portion **12** adapted to engage the frame F, an angled camming surface **13,** an adjacent guide surface **14,** and a shaped recess **15.** Latch body **10,** at its other end, has an upstanding resilient flexible leg **16** which is integral with the body of the latch at its base but which is spaced therefrom thereabove. A top surface **17** covers the latch body **10** and projects therebeyond in all directions forming a peripheral flange **18.** Flange **18** overlaps the perimeter of the installation hole provided in the door or other panel. A finger cavity **19** is provided in top surface **17** having a rearward wall which inclines rearwardly downwardly. By means of finger cavity **19,** the latch may be manually slid rearwardly to its unlatched position, as indicated in FIG. **4,** whereupon the door may be pulled open by the finger, shown in phantom in FIG. **4,** as indicated by the phantom arrows.

FIG. **2** illustrates the manner in which the latch body of FIG. **1** is inserted into a rectangular opening prepared in the door panel P. It is to be noted that the recess **15** has a specific shape and size for receiving the forward edge of the opening in the door panel P. The rear edge of the opening contacts the flexible leg **16.** From the partial insertion position illustrated in FIG. **2,** the latch body is rotated counter-clockwise about the forward edge of the panel opening. During this rotation, the flexible leg **16** is forced to bend forwardly, toward the latch body, to allow the ridge **24** of the flexible leg **16** to pass by the rear edge of the panel opening. In this manner, the latch is inserted into the panel opening into its final position, illustrated in FIG. **3.** In FIG. **2,** the installation force is indicated by the arrow.

Referring now to FIG. **3,** the latch is here shown in its normal latched position. All edges of the panel opening underlie and are concealed by the peripheral flange **18** of the top **17.** The shaped upper end **25** of flexible leg **16** bears against the rear edge of the panel opening. The panel portion adjacent the front edge of the opening is slidingly maintained between the undersurface of flange **18** and the guide surface **14.** The frame-engaging portion **12** retains the latch body, and hence the door panel P, in closed position with respect to frame F.

In FIG. **4,** by means of the finger shown in phantom, the latch has been pushed slidingly to its rearward posi-

tion against the action of resilient leg **16.** This is the unlatched position of the latch, with the frame-engaging portion **12** being clear of the door frame F. The front edge of the panel opening has moved forwardly in the cavity **15** but nevertheless remains captive beneath the flange **18,** as is clearly seen in FIG. **4.** The rear edge of the panel opening continues to be retained in the shaped end of the flexible leg **16** formed by the portions **24** and **25.** The leg **16** has flexed toward the body **10.** It is, of course, this flexing of leg **16** which has allowed sliding movement of the latch in the panel opening. When the rearwardly applied force supplied by the finger in cavity **19** is removed, or, for that matter, when the latch body is free from that or any other outside force, the resilient flexible leg **16** returns to the position shown in FIG. **3,** and this force urges the latch body **10** to slide forwardly with respect to the panel P until the forward edge of the panel opening abuts against the rearward edge of cavity **15,** as illustrated in FIG. **3.** Thus, the flexible leg **16,** by returning to its unflexed position, causes the frame-engaging portion **12** of the latch body to engage the door frame F.

FIGS. **5** and **6** illustrate a modification wherein the flexible leg **16,** instead of being comprised of one piece, is comprised of three resilient segments, a middle segment **31** and two side segments **32.** At least one of the segments (the middle segment **31** in the embodiment shown in FIG. **5**) is of proper length and cross section to contact the rear edge of the panel opening, so as to be able to bias the latch body toward the latched position. In addition, at least one segment is (in FIG. **5,** both end segments **32** are) of proper length and cross section to underlie the door panel P adjacent the rear edge of the panel opening, so as to slidingly retain the latch body in the panel.

FIG. **7** illustrates another modification wherein, in lieu of a finger cavity, such as **19** shown in FIG. **1,** latch **10** is provided with an upper thumb-and-finger projection **39.**

FIGS. **8, 9** and **10** illustrate a presently preferred embodiment wherein a separate metal torsion-bar spring **28** is used to provide the spring bias to bias the latch body **10** toward the latched position. In FIG. **8,** the latch body is shown in its latched position. In FIG. **9,** the latch body is shown in its unlatched position to which it has been slidingly moved against the action of torsion-bar spring **28.** FIG. **10,** which is a view looking along the line **10-10** of FIG. **8,** shows that when the latch is in latched position, the opposite extremities of the torsion-bar spring **28** are restrained beneath the underside of the flange **18** of the latch top **17** with one said extremity against the rear edge of the opening in panel P, the other extremity against the latch body. When the latch has been moved to the limit of its motion to be in the unlatched position (FIG. **9**), both opposite extremities of the torsion-bar spring **28** are restrained between the latch body and the rear edge of the panel opening.

In the embodiment of FIGS. **8–10,** the resilient leg **16** does not flex when the latch is slid to its unlatched position, and the bias is provided only by the torsion-bar spring **28.** The leg **16** flexes, however, during insertion of the latch into the panel opening, after which leg **16** snaps back to its natural unflexed position in which it functions to retain the latch body in the panel opening.

FIGS. **11** and **12** show an alternate form of metallic spring element **29** in which the spring is a torsion coil spring, rather than a torsion-bar spring as in FIGS. **8–10.**

FIG. **13** shows yet another form of metallic bias spring in which the spring **30** is a compression spring.

In FIGS. **11–13,** as in FIGS. **8–10,** the flexible leg **16** flexes to allow insertion of the latch body into the panel opening after which leg **16** snaps back into a position to retain the latch in the panel. The spring bias for the sliding movement of the latch is provided only by the metallic spring element.

It is to be understood that other forms of metallic spring elements other than those illustrated may be used. The use of a metallic spring element, rather than relying on the resilience of the flexible plastic leg **16,** is preferable particularly in those conditions where the environmental temperature may be too warm or too cold. If too warm, the plastic material may creep and lose its elasticity. If too cold, the plastic leg **16** may become brittle and snap when flexed.

The new slam latch which has been described and illustrated has a number of advantages over prior art sliding-action slam-type latches. Its cost of manufacture is low, due to its design as a single component molded of low-cost plastic material. It is fast and simple, and also economical, to install since it requires no fastening devices, no tools, and no fixtures. Once installed, it should operate without mechanical failure since it incorporates no mechanical components which are prone to fail, or to jam, or to malfunction. Installed, it has a neat and attractive appearance. Only the flap top surface of the latch with the finger-grip cavity is visible from the outside of the installation. No unsightly screw heads or other fasteners are present to detract from its appearance and from its style. Finally, the plastic material of which the body of the latch is made is not subject to corrosion or to deterioration under normal environmental conditions.

Having described our invention, we claim:

1. A latch of the sliding-action slam type for installation in an opening in a door panel, said latch comprising:

a. a latch body having a shaped recess at its forward end for receiving cooperatively the forward edge of the panel opening;

b. said latch body having a flexible leg element at its rearward end, the upper end of said leg element being spaced from the main portion of said latch body and adapted to flex forwardly during snap-in insertion of the latch body into the panel opening and to thereafter snap back into a position to retain the latch body in the panel opening;

c. said latch body having also a frame-engaging latching portion at its forward end; and

d. spring means for biasing said latch body forwardly toward latching position;

e. said spring means comprising an additional metallic spring component carried by said latch body in the space between said flexible leg element and the main portion of said latch body, said metallic spring component being shaped to engage the rearward edge of the panel opening.

2. A latch according to claim **1** characterized in that said additional metallic spring component is a torsion-bar spring.

3. A latch according to claim 2 wherein one of the extremities of said torsion-bar spring engages the rearward edge of said panel opening and the other extremity is restrained against the latch body in order to bias the latch body toward its latched position.

4. A latch according to claim 1 wherein said additional metallic spring component is a coiled torsion spring one of the extremities of which engages the rearward edge of said panel opening and the other extremity is restrained against the latch body in order to bias the latch body toward its latched position.

5. A latch according to claim 1 wherein said additional metallic spring component is in the form of a coiled compression spring carried in said latch body, the rearward end of said spring being adapted to engage the rearward edge of the panel opening.

6. A latch of the sliding-action slam type for installation in an opening in a door panel, said latch comprising:

a. a latch body having a shaped recess at its forward end for receiving cooperatively the forward edge of the panel opening;

b. said latch body having a flexible leg element at its rearward end, the upper end of said leg element being spaced from the main portion of said latch body and adapted to flex forwardly during snap-in insertion of the latch body into the panel opening and to thereafter snap back into a position to retain the latch body in the panel opening;

c. said latch body having also a frame-engaging latching portion at its forward end; and

d. an additional elastic element for biasing said latch body forwardly toward latching position, said additional elastic element being carried by said latch body in the space between said flexible leg element and the main portion of said latch body, said additional elastic element being shaped to engage the rearward edge of the panel opening.

* * * * *