

[54] SLAM-LATCH

[76] Inventors: **Robert H. Bisbing**, 854 Grove Ave., Springfield, Pa. 19064; **James H. Vickers**, 854 E. Chester Pike, Ridley Park, Pa. 19078

[22] Filed: **June 3, 1974**

[21] Appl. No.: 475,400

Related U.S. Application Data

[62] Division of Ser. No. 363,070, May 23, 1973.

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

[51] Int. Cl. E05c 1/10

[58] **Field of Search**..... 292/163, 175, DIG. 38,
292/74, 75

[56] **References Cited**

UNITED STATES PATENTS

3,380,770	4/1968	Risley	292/175
3,469,875	9/1969	Ahlgren	292/175

3,632,007 1/1972 Kantor 217/57

FOREIGN PATENTS OR APPLICATIONS

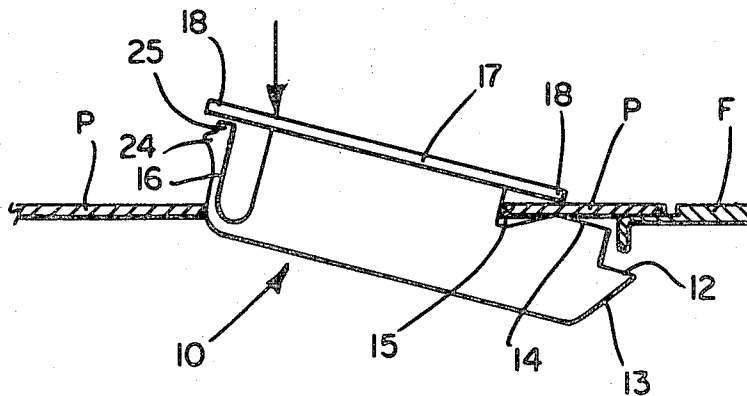
2,029,081 12/1970 Germany 292/DIG. 38

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.

3 Claims, 13 Drawing Figures



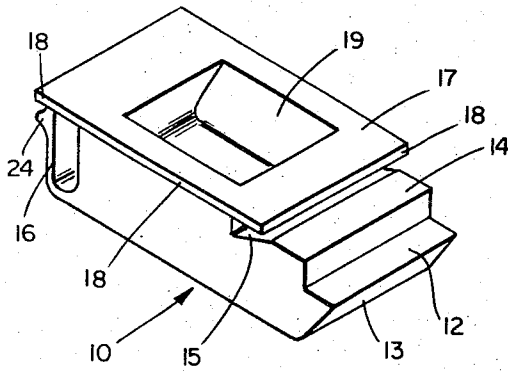


Fig. 1

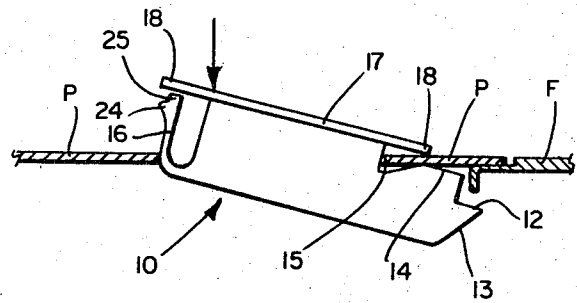


Fig. 2

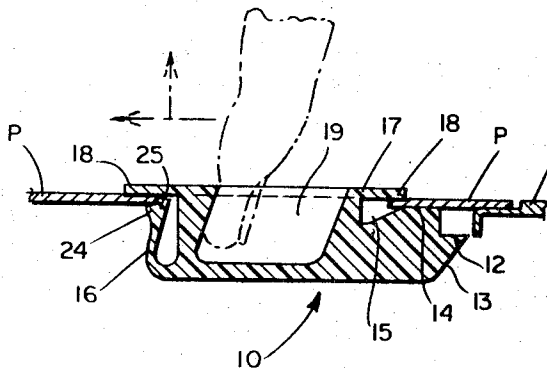


Fig. 3

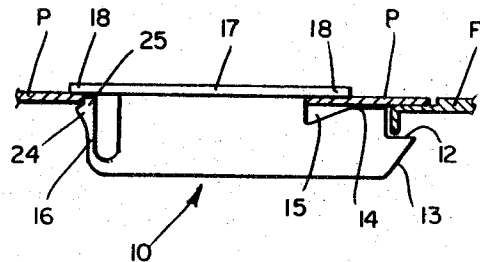


Fig. 4

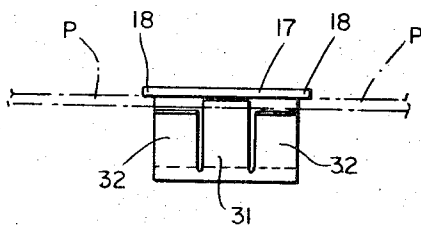


Fig. 5

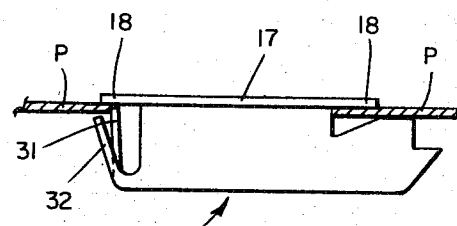


Fig. 6

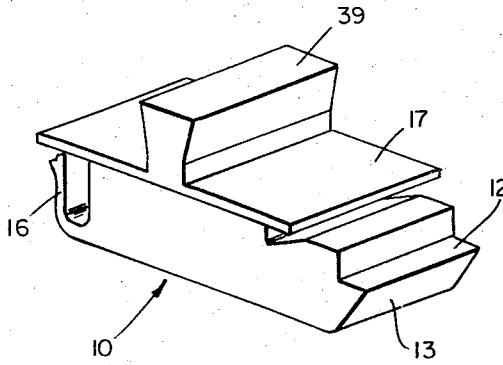


Fig. 7

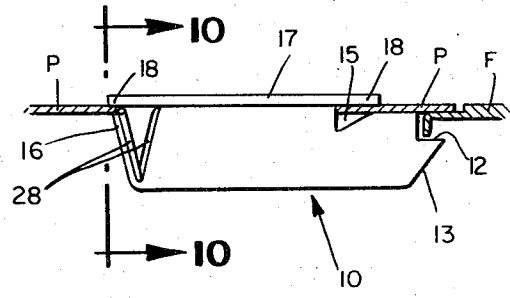


Fig. 8

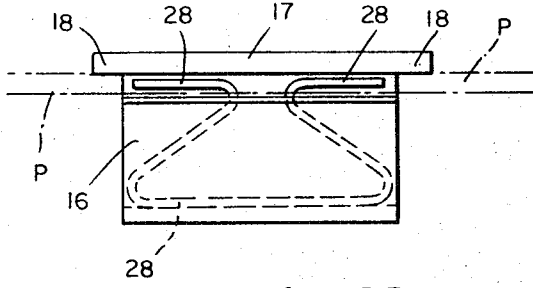


Fig. 10

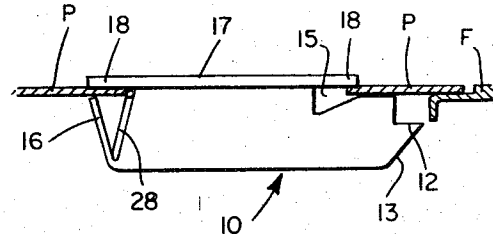


Fig. 9

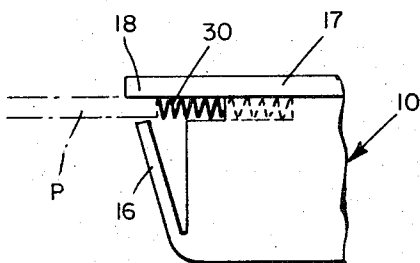


Fig. 13

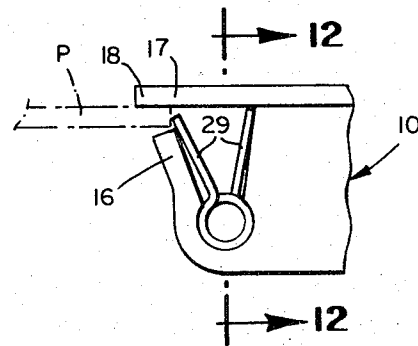


Fig. 11

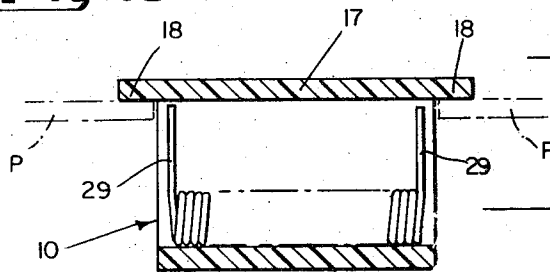


Fig. 12

1

SLAM-LATCH

This is a division of application Ser. No. 363,070, filed May 23, 1973.

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.

2

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 counterclockwise 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 slidably maintained between the under surface 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 slidably 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 slidably 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 slidably 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 flat 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 for releasably retaining said door panel relative to a frame, said latch comprising:

- a. a latch body having a shaped recess at its forward end for receiving cooperatively the edge of the panel at the forward edge of the panel opening;
- b. said latch body at its forward end having a first portion which projects forwardly beyond said recess for retaining said latch body in said panel and for guiding said latch body in its back-and-forth sliding movements;
- c. said latch body at its forward end having a second portion which projects forwardly beyond said first portion, said second portion being adapted to cooperate with said frame when said latch body is in its forward position to maintain said door panel in latched position relative to said frame;
- d. said latch body having a flexible leg element at its rearward end, the upper end of said leg element being spaced rearwardly 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 said spaced position;

5

- e. the upper end of said flexible leg element being shaped to receive the rearward edge of the panel opening for spring biasing the latch body forwardly toward latching position;
 - f. the upper end of said leg element being also shaped for engaging the under-surface of the panel for retaining the latch body within said panel opening.
2. A latch according to claim 1 wherein said flexible leg element is a single element having a retaining pro-

6

trusion near its upper end and thereabove a panel-edge engaging portion.

3. A latch according to claim 1 wherein said flexible leg element has a plurality of segments at least one of which engages the under-surface of said panel and at least another of which engages the rear edge of the panel opening.

* * * * *

10

15

20

25

30

35

40

45

50

55

60

65