

[54] DOOR LATCHING MECHANISM

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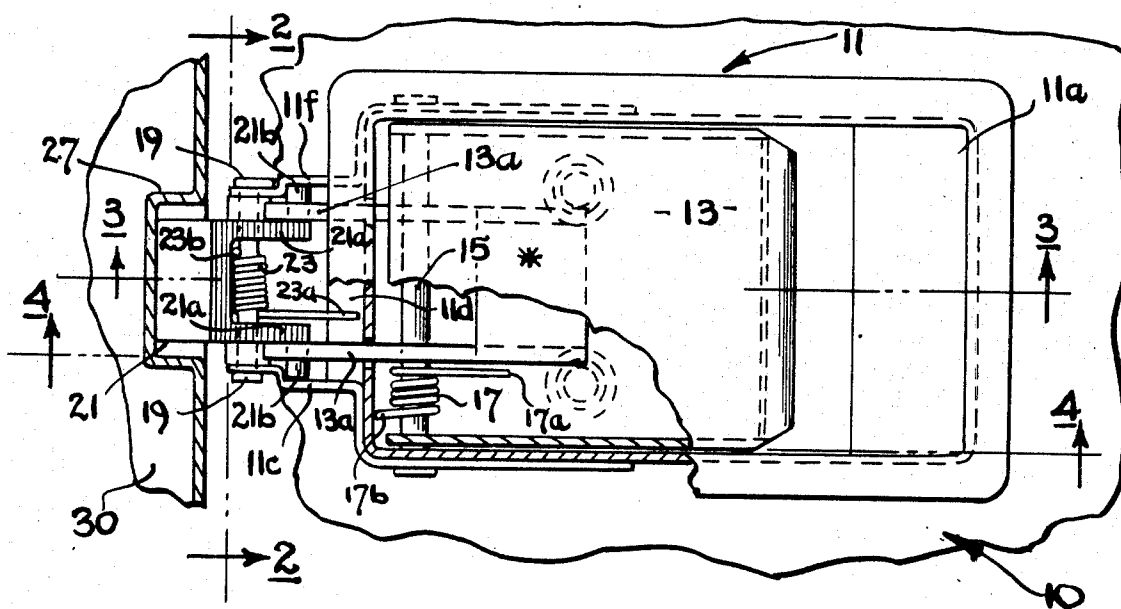
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[57] ABSTRACT

A door latching mechanism has a frame with a recessed portion in which a handle for operating the latching mechanism is pivotally mounted. A pair of arms extend from the frame, these arms pivotally supporting a bolt. Spring means are provided to urge the bolt towards its latching position. Actuator means is provided on the handle which extends therefrom and engages projections which extend from the bolt. When the handle is rotatably drawn out of the recessed portion of the frame, the actuator means drives against the bolt projections to rotatably withdraw the bolt away from the striker plate, thereby unlatching the door with which the mechanism is used. If the bolt should inadvertently become jammed in its unlatched position, a flagging signal is provided indicating the failure of the bolt to properly latch.

11 Claims, 10 Drawing Figures



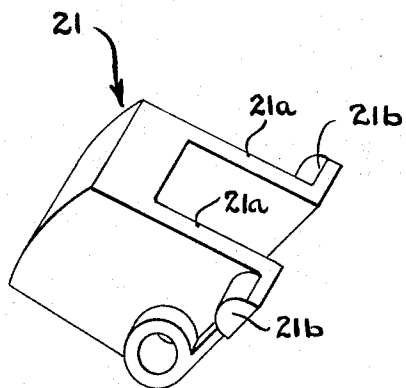
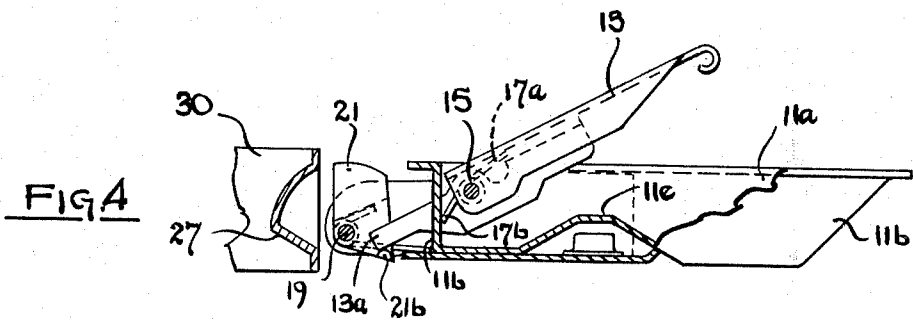
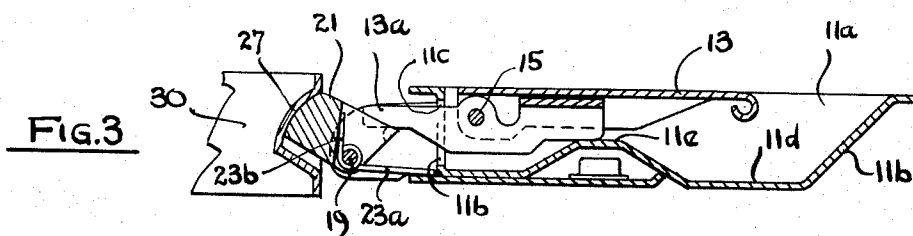
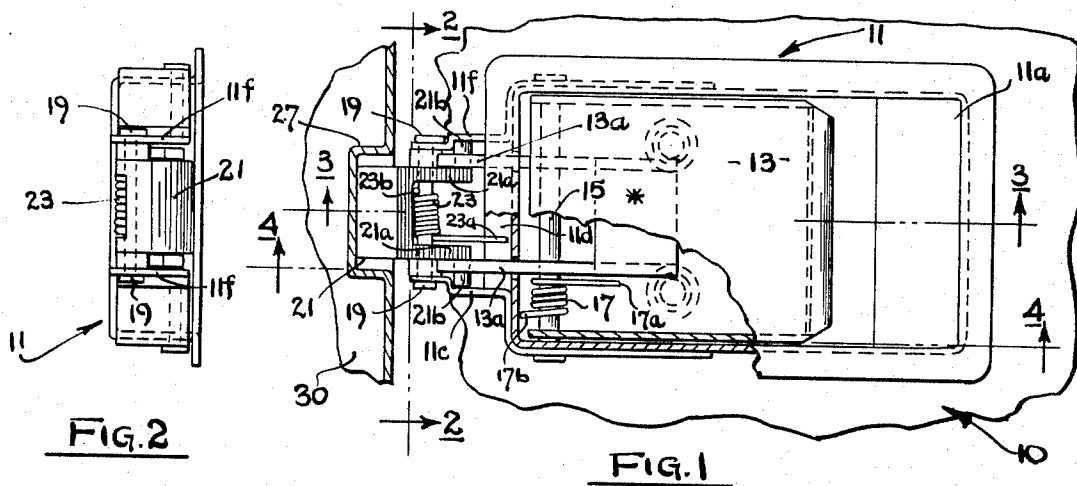
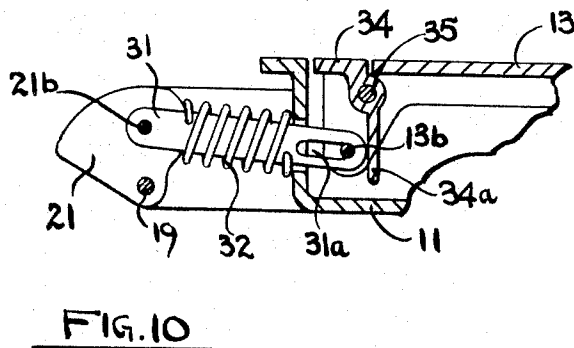
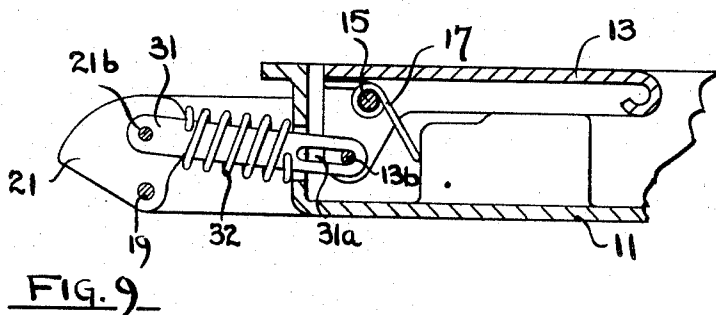
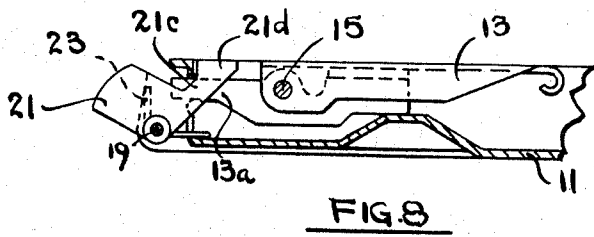
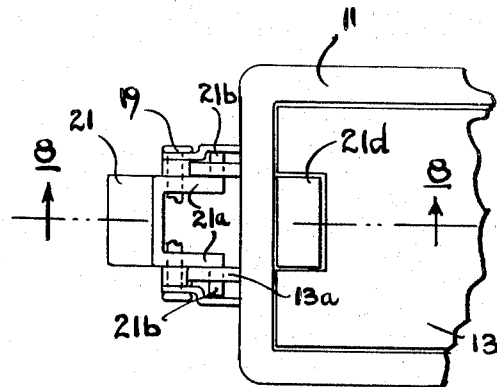
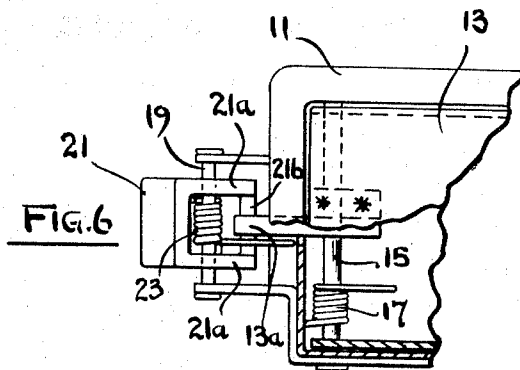


FIG. 5



DOOR LATCHING MECHANISM

This invention relates to a door latching mechanism, and more particularly to such a mechanism utilizing a spring actuated pivotal latching bolt. In the design of door latching mechanisms for use in fairly tight quarters such as the pantry of an aircraft, it is important that the latching mechanism satisfies several criteria. First, the operating handle and its associated frame should protrude as little as possible from the surface of the door so as to minimize the possibilities of snagging on clothing and otherwise acting to cause interference. Secondly, it is necessary that the latching mechanism operate reliably with as little force as possible to assure that the doors will be reliably latched closed even when hurriedly slammed in view of the fact that an unlatched swinging door in a moving vehicle such as an aircraft could present a hazard. Further, it is desirable to provide a positive warning signal when the mechanism is thought to be latched but has become inadvertently jammed on the striker plate.

The device of this invention provides an improvement over prior art latching mechanisms in satisfying all of the aforementioned criteria. This end result is achieved by utilizing a reliably latching rotary bolt which is operable by a handle which is recessed into its support frame. Further, the device of this invention provides a "flagging" signal should the bolt become jammed against the striker plate.

It is therefore an object of this invention to provide an improved latching mechanism particularly suitable where reliable latching operation is essential.

It is another object of this invention to provide a latching mechanism providing a warning "flag" should the bolt become jammed.

Other objects of this invention will become apparent as the description proceeds in connection with the accompanying drawings, of which:

FIG. 1 is a top plan view of a preferred embodiment of the invention;

FIG. 2 is an end view taken along the plane indicated by 2—2 in FIG. 1;

FIG. 3 is a cross sectional view taken along the plane indicated by 3—3 in FIG. 1;

FIG. 4 is a sectional view taken along the plane indicated by 4—4 in FIG. 1, showing the device in an unlatched condition;

FIG. 5 is a perspective view illustrating the bolt of the preferred embodiment;

FIG. 6 is a top plan view with a cutaway section of a second embodiment of the invention;

FIG. 7 is a top plan view illustrating a third embodiment of the invention;

FIG. 8 is a cross sectional view taken along the plane indicated by 8—8 in FIG. 7;

FIG. 9 is a cross sectional view in elevation illustrating a fourth embodiment of the invention; and

FIG. 10 is a cross sectional view in elevation illustrating a fifth embodiment of the invention.

Briefly described, the device of the invention comprises a frame having a recessed portion in which a bolt operating handle is pivotally supported. The frame further has a pair of arm portions which extend outwardly therefrom on which a bolt is pivotally supported. Spring means are provided to urge the bolt to its latched position. The handle includes actuator means which engages pin means extending from the bolt. With the bolt in its latched position, the handle is retained

within the recessed portion of the frame. When the handle is rotatably drawn out of the recessed portion, the actuator means thereof rotatably drives the bolt to an unlatched position. Means are further utilized to provide a flagging signal in the event that the bolt should become inadvertently jammed in an unlatched position.

Referring now to FIGS. 1—5, a first embodiment of the invention is illustrated. Frame 11 is mounted on door 10 and has a recessed portion 11a formed by the side walls 11b of the frame. Handle 13 is pivotally supported on pivot pin 15, the ends of this pin being fixedly attached to a pair of opposite walls 11b of the frame. Coil spring 17 is supported on pin 15, one of the end portions 17a of this spring abutting against the inner surface of handle 13, the opposite end 17b of the spring abutting against a side wall 11b of the frame. Spring 15 thus urges handle 13 out of the recessed portion 11a of the frame, as shown in FIG. 4, in the event that bolt 21 were to be inadvertently driven to the unlatched position.

Handle 13 has a pair of fingers 13a which extend therefrom, these fingers fitting through apertures 11c formed in the front wall 11b of the frame.

Frame 11 further has a pair of arm portions 11f which extend therefrom. Fixedly supported between the ends of arm portions 11f is a pin 19. Bolt 21 is pivotally supported on pin 19. The bolt is pivotally urged towards its latched position, as shown in FIGS. 1—3, by coil spring 23 which is supported on shaft 19, one end 23a of the spring abutting against the inner surface of the bottom wall of the frame, the opposite end 23b of the spring abutting against the bolt. Bolt 21 has a pair of arm portions 21a which have a pair of outwardly extending pins or projections 21b at the ends thereof. Finger portions 13a of handle 13 abut against bolt arm projections 21b.

The latching mechanism is shown in FIGS. 1—3 in its latched position with latch 21 engaging striker plate 27 which is installed in the door jamb 30. As can be seen, in this position handle 13 lies within the recessed portion 11a of the frame and spring 23 urges the bolt against the striker plate in its latched condition. Projections 21b of the bolt are driven by the action of spring 23 against finger portions 13a of the handle, this limiting the travel of the bolt in view of the fact that the handle bottoms, in the position shown, against raised portion 11e of the frame.

When the handle is raised, as shown in FIG. 4, fingers 13a drive downwardly against projections 21b to rotatably draw bolt 21 out of engagement with striker plate 27, thereby enabling the opening of the door. In the event that bolt 21 should become jammed against the striker plate or otherwise so that it is inadvertently in the unlatched position, spring 17 drives handle 13 upwardly so that the handle provides a "flagging" signal indicating that the door is not properly latched.

Referring now to FIG. 6, a second embodiment of the device of the invention is illustrated. This second embodiment is similar to the first except for the fact that rather than utilizing a pair of fingers extending from the handle to actuate the bolt member, only a single finger is utilized, this finger member being centrally located. Handle member 13 has a single finger 13a which extends forwardly therefrom and is located along the center line thereof. Bolt member 21 has a single pin 21b that bridges the gap between bolt arm portions 21a.

When handle 13 is lifted out of its recess, finger 13a drives pin 21b downwardly to draw bolt 21 out of engagement with its associated striker plate (not shown). Otherwise, this embodiment is identical with the first described embodiment and operates in the same fashion thereas.

Referring now to FIGS. 7 and 8, another embodiment of the invention is illustrated. This embodiment differs from the first described embodiment in that it does not utilize handle 13 to provide a flagging signal, and there is no spring means provided for urging the handle member out of the frame recess. Flagging is rather provided by a flagging device integrally formed with bolt 21. Otherwise, this embodiment is identical with the first embodiment. Bolt 21 has similar oppositely positioned arms 21c (not shown) extending therefrom with a flat plate 21b being formed at the ends of the arms. Spring 23 urges bolt 21 to the latched position. In the latched position, plate 21b is flush with the top surface of handle 13. When, however, bolt 21 is unlatched, i.e., rotated in a clockwise direction with reference to FIG. 8, plate 21b is drawn beneath the top surface of handle 13 into the frame recess. This provides a flagging signal indicating that the bolt is in an unlatched condition.

Referring now to FIG. 9, still another embodiment of the invention is illustrated. This embodiment differs from the first in that it utilizes a pair of similar oppositely positioned link arms 31 (only one shown) for joining handle 13 to bolt 21. Link arms 31 are pivotally supported on pins 21b which project from bolt 21 and pins 13b which project from handle 13. Link arms 31 have elongated slots 31a formed therein to permit longitudinally slidable motion of the link arms relative to handle 13. Springs 32 are mounted on the link arms, these springs being compressed between the front wall of frame 11 and the rear portion of bolt 21 so as to urge the bolt towards its latched position. When handle 13 is raised, link arms 31 are drawn rearwardly to draw bolt 21 to the unlatched position. As for the first embodiment, handle 13 provides a flagging signal should the bolt be inadvertently placed in the unlatched position, the bolt driving the link arm downwardly and rearwardly so as to cause handle 13 to be driven out of the recess.

Referring now to FIG. 10, a further embodiment of the invention is illustrated. This embodiment is similar to that just described in connection with FIG. 9 except for the fact that handle 13 is not utilized to provide a flagging signal, such a signal rather being provided by a separate flagging indicator. Handle 13 is not spring actuated and is utilized to withdraw bolt 21 from its latched position through linkage arms 31, in the same manner just described. Pivotally mounted on pin member 35 which projects from the under portion of handle 13, is flagging device 34. In the event that bolt 21 is inadvertently driven to the unlatched position, link arm 31 will be driven to the right as viewed in FIG. 10. The end of the link arm drives against finger portion 34a of flagging device 34, thereby causing the flagging device to rotate counterclockwise on pin member 35 such that its top surface is withdrawn into the recess of frame 11 to provide the desired flagging signal.

The device of this invention thus provides a simple and reliable mechanism for latching a door in situations where reliability of latching is essential with repeated hurried opening and closing of the door.

While the device of this invention has been described and illustrated in detail, it is to be clearly understood that this is intended by way of illustration and example only, and is not to be taken by way of limitation, the spirit and scope of this invention being limited only by the terms of the following claims.

I claim:

1. In a latching assembly for latching a door to a striker plate installed in a door jamb,
 - a frame for mounting on said door, said frame having a recessed portion and a pair of oppositely facing arm portions extending therefrom,
 - a bolt member having pin means extending therefrom,
 - means for pivotally supporting said bolt member between the arm portions of said frame,
 - spring means for urging said bolt member outwardly from said frame into engagement with said striker plate when said door is closed,
 - a handle for pivotally actuating said bolt member to withdraw said bolt member from engagement with said striker plate to permit the opening of the door, said handle including means for engaging and driving the pin means extending from the bolt member,
 - means for pivotally mounting said handle on said frame, said handle being recessed in the recessed portion of said frame when said bolt member is in the latched condition and being withdrawn from said recessed portion in actuating said bolt member, and
 - means for providing a flagging signal when said bolt member is inadvertently jammed in an unlatched position.
2. The device of claim 1 wherein said means for providing a flagging signal comprises spring means for urging said handle out of said recessed portion of the frame.
3. The device of claim 1 wherein said means for pivotally supporting said bolt member comprises a pin extending between the arm portions of the frame and wherein said spring means for urging said bolt member comprises a coil spring placed on said bolt member, one end of said spring abutting against an inner wall of said frame, the other end of said spring abutting against said bolt member.
4. The device of claim 2 and further including means for pivotally supporting said handle comprising a pin fixedly mounted on said frame, said spring means for urging said handle comprising a coil spring fitted on said last mentioned pin, one end of said spring abutting against an inside wall of said handle, the other end of said spring abutting against said frame.
5. The device of claim 1 wherein said handle has a broad flat outer surface, the means for driving the bolt member pin means comprising finger portions on said handle extending in a direction substantially parallel to said surface.
6. The device of claim 5 wherein said frame has a bottom wall and four side walls extending upwardly from said bottom wall, the handle being pivotally supported between two of said side walls, said frame arm portions extending from one of the side walls of said frame forming an end wall joining said two last mentioned side walls together.
7. The device of claim 6 wherein said end wall has apertures formed therein for permitting the passage of the handle finger portions therethrough.

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8. The device of claim 6 wherein said bottom wall of said frame has a raised portion therein for limiting the downward travel of the handle.

9. The assembly of claim 1 wherein said means for providing a flagging signal includes arm means extending from the bolt member and a plate attached to said arm means, said plate being substantially flush with said handle when the bolt is latched with the striker plate and being rotated within said recessed portion when the bolt is unlatched from the striker plate.

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10. The assembly of claim 1 wherein said handle means for driving the bolt member pin means comprises a single arm extending from said handle.

11. The assembly of claim 1 wherein said handle means for driving the bolt member comprises link arm means pivotally connected to the pin means of said bolt member, said link arm means being connected to said handle for slidable and rotatable motion relative thereto.

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