

[54] BOLT ASSEMBLY

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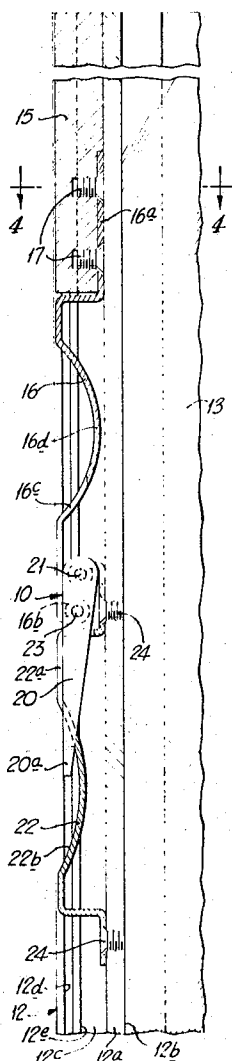
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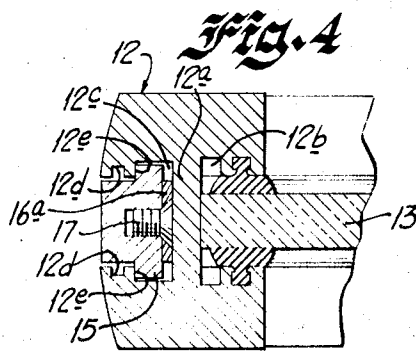
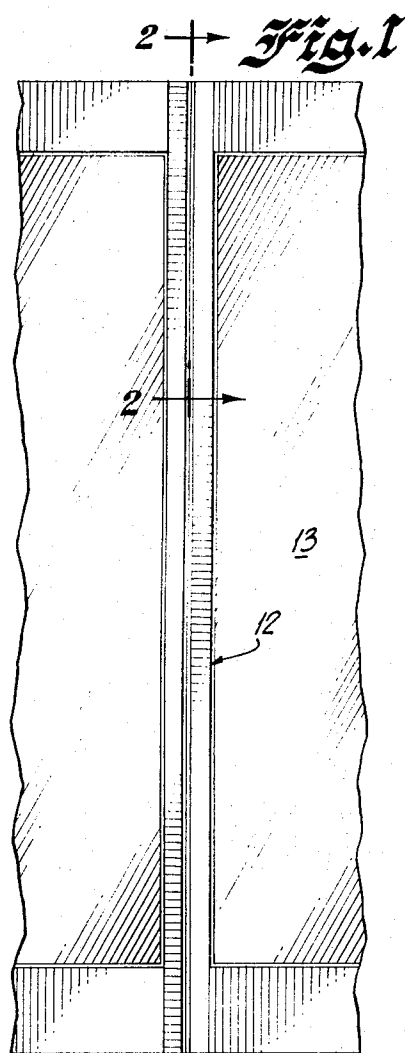
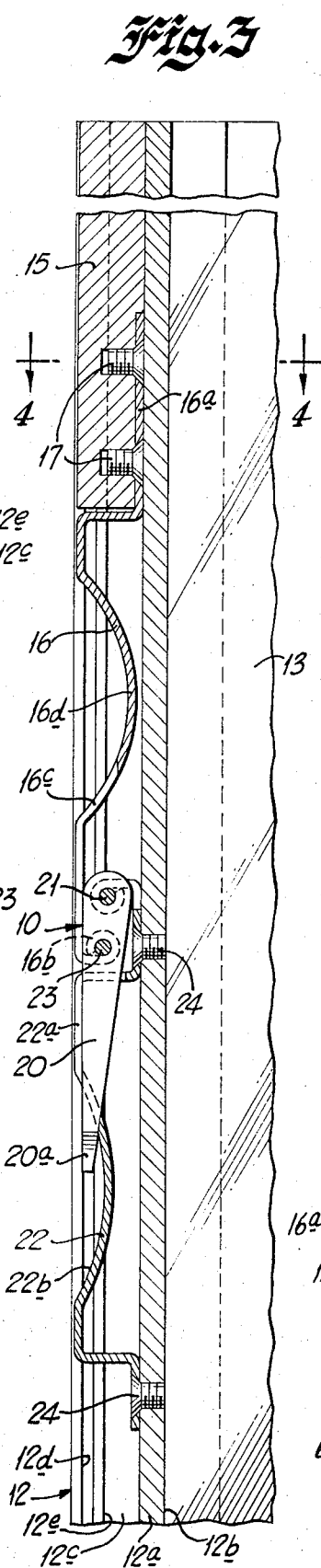
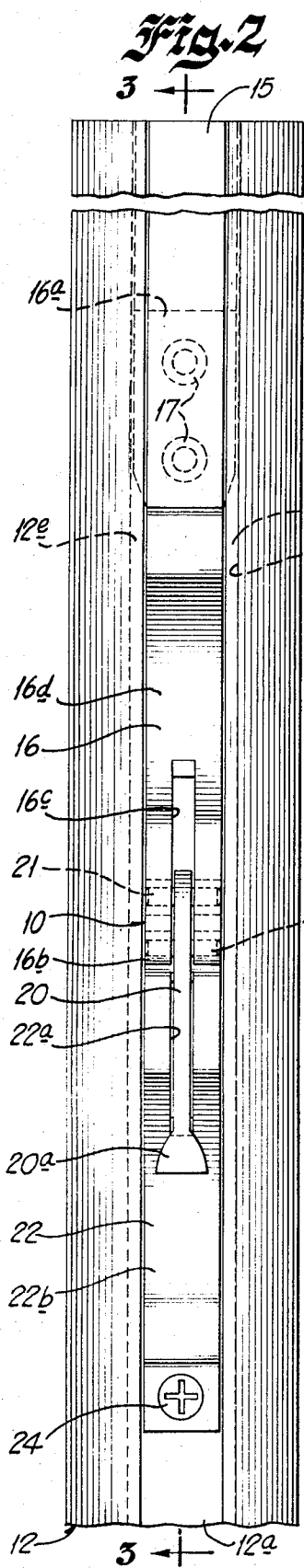
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ABSTRACT

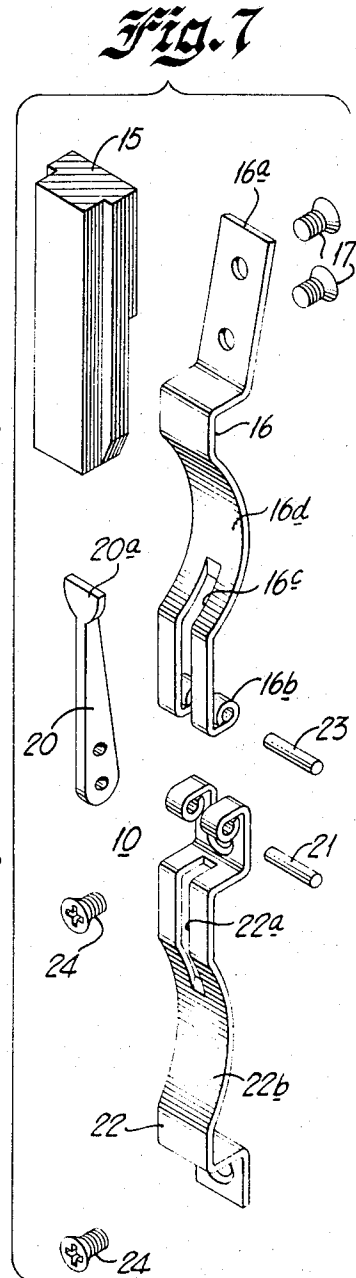
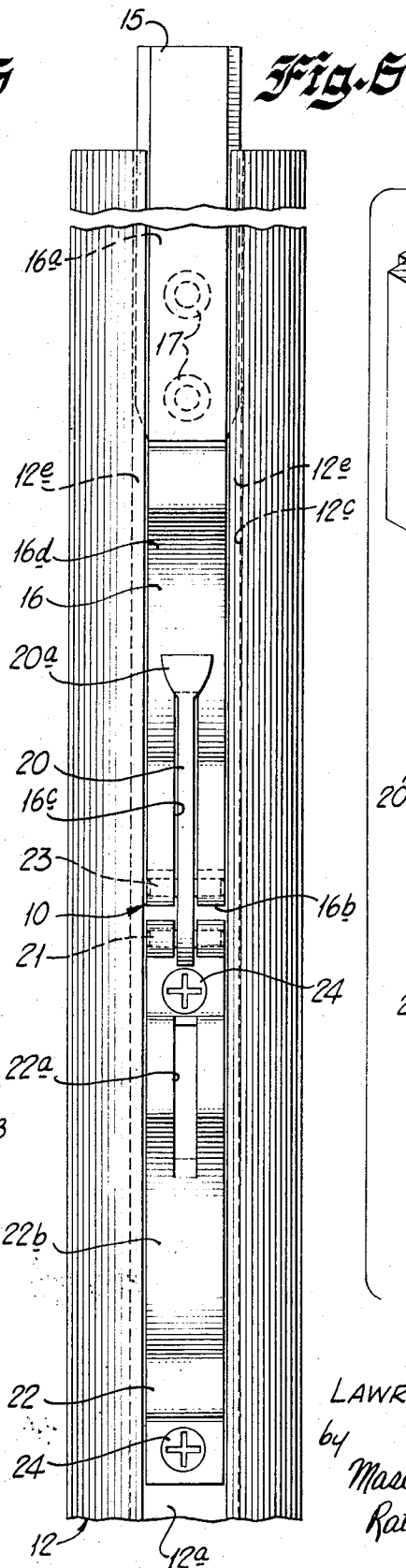
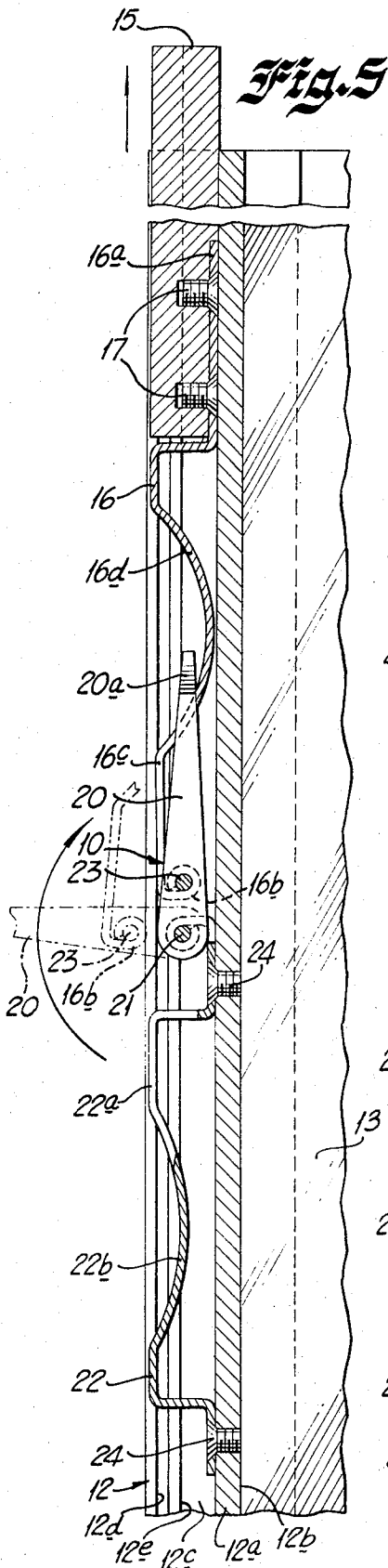
There is provided an improved projecting bolt assembly for flush mounting within the edge of a door and including a combination stile cap and bolt member slidably mounted in a channel in the edge of the door. An actuating lever is adapted to be pivotally mounted adjacent one of its ends, and a leaf spring is provided having one end rigidly secured to the combination stile cap and bolt member, and having its other end pivotally mounted to the actuated lever intermediate its ends. A double acting bolt assembly may be provided by pivotally securing the actuating lever to a second bolt member.

4 Claims, 10 Drawing Figures





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Fig. 8

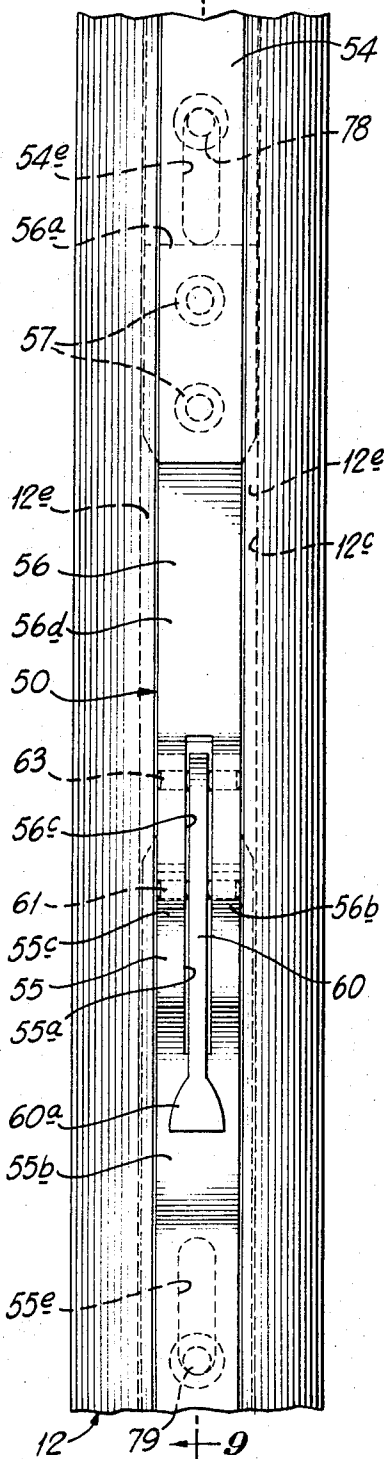


Fig. 9

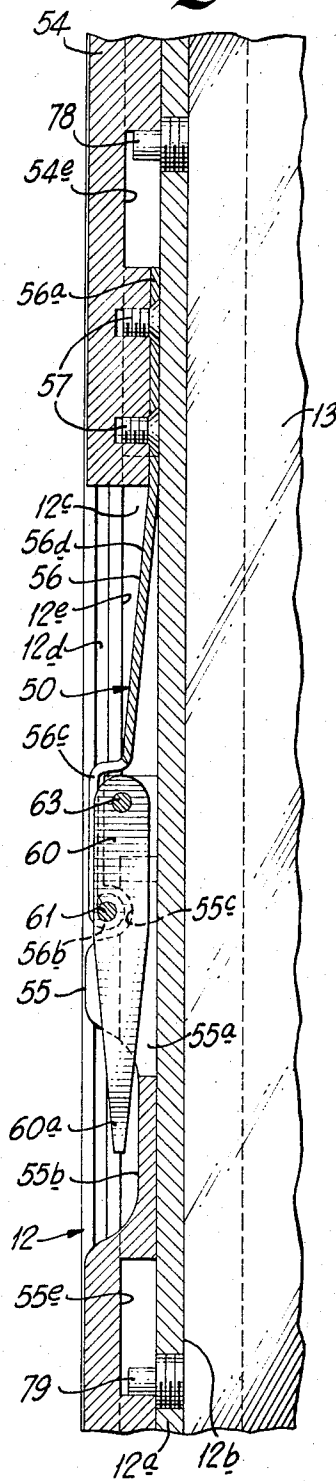
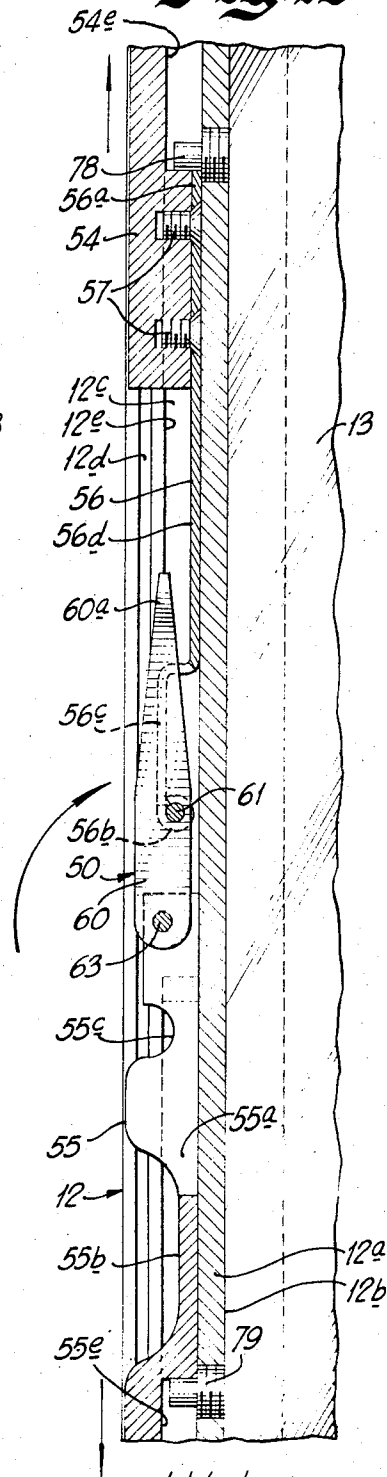


Fig. 10



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BOLT ASSEMBLY

This invention relates to an improved bolt assembly for a door, and, more particularly, to a flush mounted bolt assembly mounting in an edge channel of a door.

Heretofore difficulty has been experienced in obtaining door constructions having a maximum glass or panel size and characterized by having a minimum width of stile member. Some of the difficulty arises from the requirement that the door frame accept hardware, such as bolts, locks, hinges, and the like. Moreover, it is desirable that a door bolt afford maximum security, while being economical to manufacture and install.

Accordingly, it is an object of the present invention to provide a new and improved door bolt assembly.

Another object is to provide a new and improved door bolt assembly having minimum depth so that it may be readily attached to a door frame of very narrow width.

Still another object of the present invention is the provision of a new and improved door bolt assembly affording improved security to the closure.

Still another object of the present invention is the provision of a new and improved double acting bolt assembly.

Other objects and advantages of the present invention will become apparent as the following description proceeds and the features of novelty which characterize the invention will be pointed out with particularity in the claims annexed the specification.

In accordance with these and other objects, there is provided an improved door bolt assembly including a combination bolt member and stile cap slidably mounted in an edge channel of a door and projectable into a locked position and retractable into an unlocked position. An actuating lever is provided adapted to be pivotally mounted adjacent one of its ends. The actuating lever is attached to the combination bolt member and stile cap by a leaf spring having one end rigidly secured to the bolt member, and the other end pivotally mounted on the lever and to meet at its ends.

Advantageously, the bolt assembly, according to the present invention, is extremely narrow, so that it may be installed in door stiles of very narrow width. Additionally, the combined function of the bolt member as a stile cap enhances the narrow width of the bolt assembly and the economical cost and installation within a door frame.

In accordance with another aspect of the present invention the bolt assembly may be of the double acting type, with the actuating lever thereof mounted to a second bolt member also movable between a retracted and projected position upon throwing of the actuating lever.

For a better understanding of the present invention, reference may be had to the accompanying drawings, wherein:

FIG. 1 is a fragmentary sectional view of a set of double doors of the double-acting type;

FIG. 2 is an edge view of one of the doors of FIG. 1, taken along line 2—2 of FIG. 1, and illustrating the installation of a bolt assembly in the edge of the door stile, illustrated with the bolt retracted;

FIG. 3 is a cross-sectional view of the door and bolt assembly of FIG. 2, taken along line 3—3 of FIG. 2;

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FIG. 4 is a cross-sectional plan view of the door of FIG. 1 taken along line 4—4 of FIG. 3, and illustrating the combined bolt member and stile cap;

FIG. 5 is a cross-sectional elevational view through the door bolt assembly, similar to FIG. 3, but illustrated with the bolt projected;

FIG. 6 is an edge view of the door assembly of FIG. 1, similar to FIG. 2, but illustrated with the bolt projected;

FIG. 7 is a perspective, exploded view of the bolt assembly according to the present invention;

FIG. 8 is an edge view of a door illustrating the installation of a bolt assembly according to another embodiment within the edge of the door stile, illustrated with the bolt retracted;

FIG. 9 is a cross-sectional view of the door and bolt assembly of FIG. 8, taken along line 9—9 of FIG. 8; and

FIG. 10 is a cross-sectional view of the door assembly of FIG. 8, similar to FIG. 9, but illustrated with the bolt projected.

Referring now to the drawings, and particularly to the embodiment of FIGS. 1 to 7, there is illustrated a bolt assembly 10 in accordance with the present invention and mounted in the lock stile 12 of a door 13. Advantageously, the lock stile 12 is of the type formed of an extruded element, such as of aluminum, and provided with relatively heavy face portions interconnected by a transverse web 12a. The face portions and web together define a glazing pocket 12b, FIG. 4, and an opposed edge channel 12c. The edge channel is adapted to carry a suitable stile cap, in a known manner, and for this purpose the edge channel 12c is provided with confronting grooves 12d, FIG. 4, for receiving a known type of stile cap. In addition, the edge channel 12c is of somewhat T-shape having undercup portions 12b. One such door 13 is more fully described in my copending application, filed on even date herewith, entitled "DOOR STRUCTURE".

Referring now to the bolt assembly 10, the bolt assembly 10 includes a combination stile cap and bolt member 15, hereinafter referred to as "bolt member", of some T-shaped cross section, so as to be slidably received within the T-shaped edge channel 12c of the door stile 12. The lower end of the bolt member 15 is coped along the web 12a, so as to receive a tongue portion 16a of a preloaded actuating leaf spring 16, having the end 16a thereof rigidly secured to the bolt member 15 in any suitable manner, as by screws 17. The other end 16b is pivotally mounted to an actuating lever 20 intermediate its ends by a suitable pin 21. One end of the actuating lever 20 is pivotally mounted on a suitable mounting bracket 22 within the edge channel 12c by a pin 23. The mounting bracket 22 is secured to the web 12a in any suitable manner as by the screws 24.

The bolt member 15 is movable between a retracted position illustrated in FIGS. 2 and 3, with the actuating lever 20 thereof projected down, and a projected position, as illustrated in FIGS. 5 and 6, with the actuating lever 20 thereof positioned upwardly.

To provide for the necessary clearance of the actuating lever 20, the lower end of the leaf spring 16 is bifurcated by a slot 16c, and in addition a slot 22a is provided in the mounting bracket 22 securing the actuating lever 20. The free end of the actuating lever 20 is provided with an enlarged gripping portion 20a to pro-

vide for the manual gripping of the actuating lever. Gripping clearance is provided in both the leaf spring 16 and the mounting bracket 22, as shown at 16*d* and 22*b*, by arcing of both members inwardly toward the web 12*a*. The preloading bias of the leaf spring tends to push the pin 21 and end 16*b* of the leaf spring inwardly toward the web 12*a*, in both the projected and retracted positions of the bolt member 15. Travel of the actuating lever inwardly is arrested by the engagement of the enlarged gripping portion 20*a* thereof against the leaf spring 16 and mounting bracket 22.

With the lever 20 in its upward position, and the bolt member 15 therefore in the projected position, the lower end 16*b* of the leaf spring 16 is over center with reference to the pivot of the lever 20 on the mounting bracket 22 and, accordingly, in this locked position it is impossible to force the bolt member 15 down from the top of the door 13.

From the above detailed description, the operation of the improved projecting bolt assembly will be clear. However, briefly, it will be understood that the bolt member 15 is movable between a retracted position, illustrated in FIGS. 2 and 3, with the actuating lever 20 thereof in a down position, to a projected position, as indicated by the arrow in FIG. 5, with the actuating lever 20 thereof in an upward position. Moreover, the preloading of the actuating spring 16 is effective to bias the actuating lever 20 inwardly toward the web 12*a* of the stile 12, and with the bolt in the projected position as illustrated in FIGS. 5 and 6, the pivot of the spring 16 will be over center with reference to the pivot of the lever 20 on the mounting bracket 22 preventing forcing of the bolt member 15 when the door is bolted.

Advantageously, the bolt member 15 is mounted for sliding movement within an edge channel of the door stile 12 and serves the combination function of the bolt assembly and a stile cap. No further stile cap is required over the bolt assembly. Moreover, in view of the dual purpose of the edge channel 12*c*, the bolt assembly 10 may be used with a door 13 having very narrow stiles 12, as more fully described in my above-mentioned copending application.

Advantageously, the bolt assembly 10 is mounted wholly within the edge channel 12*c*, flush with the edge of the door to prevent interference with mating doors, frames, and the like.

The bolt assembly of FIGS. 1 through 7 may readily be adapted for double acting operation by mounting opposing levers onto a single mounting bracket with the bolt members projecting upwardly and downwardly therefrom. Such a bolt assembly could be placed in various positions on the door stile, and advantageously could be operated from the center position of the door. Not only would such mechanism be in a convenient location to operate, but would require less parts to do the same job as two of the assemblies of the separate mounting brackets. Advantageously it would be desirable in double acting bolt operation to provide a double acting flush bolt with a single throw lever. Such a double acting flush bolt is illustrated in the embodiments of FIGS. 8, 9, and 10.

Referring now to the embodiment of FIGS. 8 through 10, there is illustrated a bolt assembly 50 mounted in the lock stile 12 of the door 13. As heretofore described the lock stile 12 is of the type formed of an

extruded element, such as of aluminum, and provided with relatively heavy face portions interconnected by the transverse web 12*a*. The face portions and web together form the glazing pocket 12*b*, FIGS. 9 and 10, and an opposed edge channel 12*c*. The edge channel is adapted to carry a suitable stile cap, in a known manner, and for this purpose the edge channel 12*c* is provided with confronting grooves for receiving a known type of stile cap. In addition the edge channel 12*c* is of somewhat T-shape having undercut portions 12*d*.

Referring now to the bolt assembly 50, the bolt assembly 50 includes a pair of combination stile cap and bolt members 54, 55 hereinafter referred to individually as "bolt member", of somewhat T-shaped cross section, so as to be slidably received within the T-shaped edge channel 12*c* of the door stile 12. The confronting end of one of the bolt members, here shown as member 54, is coped along the web 12*a* so as to receive a tongue portion 56*a* of a preloaded actuating leaf spring 56, having the end 56*a* thereof rigidly secured to the bolt member 54 in any suitable manner, as by screws 57. The other end 56*b* is pivotally mounted to an actuating lever 60 intermediate its ends by a suitable pin 61. One end of the actuating lever 60 is pivotally mounted to the other one of the bolt members 56 by a suitable pin 63.

The bolt members 54 and 55 are movable between a retracted position illustrated in FIGS. 8 and 9, with the actuating lever 60 thereof projected down, and a projected position, as illustrated in FIG. 10, with the actuating lever 60 thereof positioned upwardly.

To provide for the necessary clearance of the actuating lever 20, the lower end of the leaf spring 56 is bifurcated by a slot 16*c*, FIG. 8, and in addition a slot 55*a* is formed in the bolt member 55 securing the actuating lever 60. The free end of the actuating lever 60 is provided with an enlarged gripping portion 60*a* to provide for the manual gripping of the actuating lever. Gripping clearance is provided in both the leaf spring 56 and the bolt member 55, as shown at 56*d* and 55*b*. In addition an arcuate clearance is provided in the bolt member 55 and 55*c* for the end 56*b* of the leaf spring 56 and pin 61 when the bolt assembly is in the retracted position. The preloading bias of the leaf spring tends to push the pin 61 and end 56*b* of the leaf spring inwardly toward the web 12*a* in both the projected and retracted positions of the bolt assembly 50. Travel of the actuating lever inwardly is arrested by the engagement of the enlarged gripping portion 60*a* thereof against the leaf spring 56 when the bolt assembly 50 is in the projected position, and by the seating of the lever 60 in the groove 55*a* in the retracted position.

With the lever 60 in its upward position, the bolt members 54 and 55 are in the projected position, the lower end 56*b* of the leaf spring is over center with reference to the pivot of the lever 60 on the bolt member 55, and accordingly in this locked position it is impossible to force the bolt members 54 and 55 inwardly to release the door.

The bolt members 54 and 55 are guided and limited in their movement by suitable pins defining stops, and specifically there is provided a pair of pins 78, 79 each threaded through the transverse web 12*a* of the lock stile 12 and projecting into guide grooves 54*e*, 55*e*

formed in the undersurface of the respective bolt members 54 and 55. The pins 78 and 79 define stops to insure operation of both of the bolt members 54 and 55. Specifically when the bolt assembly is actuated by raising the lever 60 to its upright position, the bolt with the least friction will move first. Once either of the bolts reaches its projected position so as to be limited from further movement by bottoming of its respective pin in its guide groove, the opposite bolt is forced to complete its travel. The same manner of operation occurs when the bolts are retracted. The bolt member with the least friction will move first, until it reaches the limit of its travel as defined by its respective pin and guide slot, and thereafter the other one of the bolt members will be retracted.

I claim:

1. A projecting bolt assembly for a door comprising:
a bolt member adapted to be slidably mounted for projection into a locked position and withdrawal into an unlocked position;

an actuating lever adapted to be pivotally mounted adjacent one end;

and a leaf spring having one end cantilevered to said bolt member and having the other end pivotally mounted on said lever intermediate its ends, said spring being generally elongated and depressed intermediate its length to define a clearance recess for gripping said lever;

whereby actuation of said lever against the restraining bias of said spring between a position toward said bolt member and a position away from said bolt member is effective to slide said bolt member between said locked and said unlocked positions;

said leaf spring being bifurcated adjacent said other end providing a slot for clearance for the pivoting

of said lever toward said bolt member.

2. A projecting bolt as set forth in claim 1 wherein said lever is provided with an enlarged end portion wider than said slot defining a gripping end, and wherein said spring is preloaded to bias said lever into said slot, said enlarged end portion forming a stop for the travel of said lever.

3. A projecting bolt assembly for a door comprising:
a first bolt member adapted to be slidably mounted for projection into a locked position and withdrawal into an unlocked position;
an actuating lever adapted to be pivotally mounted adjacent one end;

a leaf spring having one end cantilevered to said bolt member and having the other end pivotally mounted on said lever intermediate its ends;

whereby actuation of said lever against the restraining bias of said spring between a position toward said bolt member and a position away from said bolt member is effective to slide said bolt member between said locked and said unlocked positions; and

a second bolt member adapted to be slidably mounted for projection in an opposed direction to the first mentioned bolt member into a locked position and withdrawal into an unlocked position, said actuating lever being pivotally mounted solely to said leaf spring and to said second bolt member at its said one end.

4. A projecting bolt assembly as set forth in claim 3 wherein each of said bolt members is provided with guide grooves, and additionally including projecting means extending into said guide grooves defining stops to insure operation of both bolt members upon actuation of said lever.

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