

[54] DOOR LATCH CONSTRUCTION

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[51] Int. Cl. E05c 3/04

[58] Field of Search..... 292/200, 209, 254

[56] References Cited

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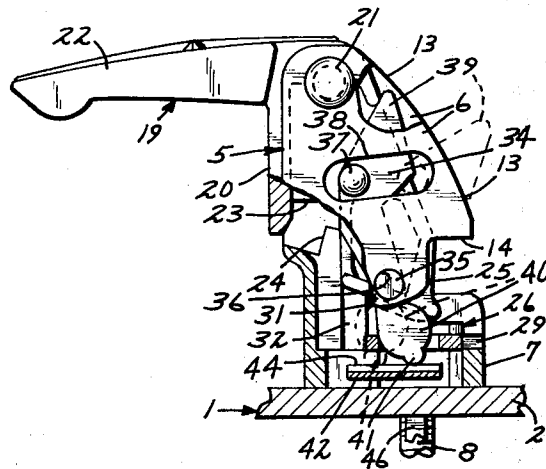
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Attorney, Agent, or Firm—Merchant, Gould, Smith & Edell

[57] ABSTRACT

A door latch having a fixed latch hook for mounting on a door and a cooperating movable strike for mounting on a door frame for movements into and out of the path of travel of the latch hook and yieldingly urged toward latching engagement with the latch hook. A handle-equipped release member is mounted on the latch hook for moving the strike out of engagement with the latch hook. A locking element is mounted for movements between a first position for holding the release member away from the strike, and a second position permitting the release member to engage the strike. A pivotally mounted operating lever has one portion engaging the locking element for moving it between its first and second positions and another portion engaging the strike during closing movements of the door, to prevent the door from closing when the locking element is in its first position. A spring frictionally engages the operating lever to hold it in either of its positions.

3 Claims, 9 Drawing Figures



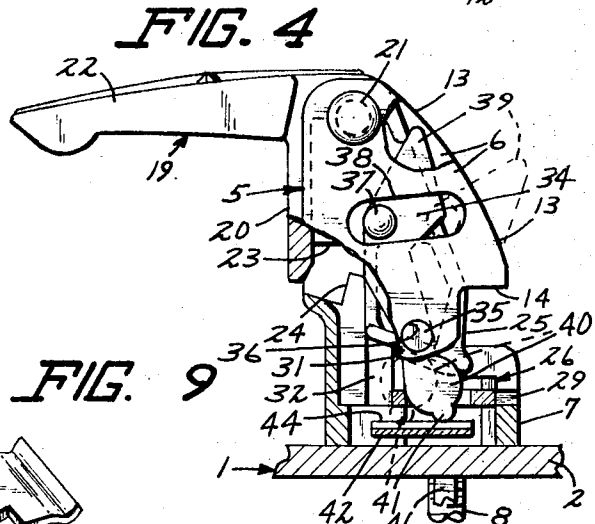
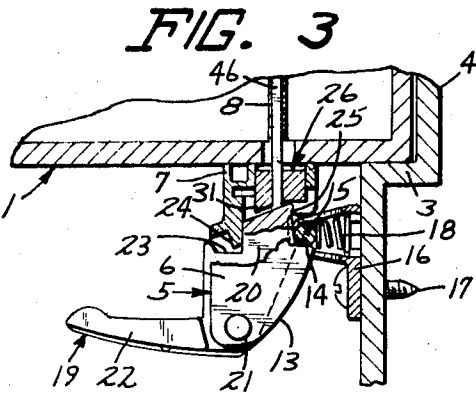
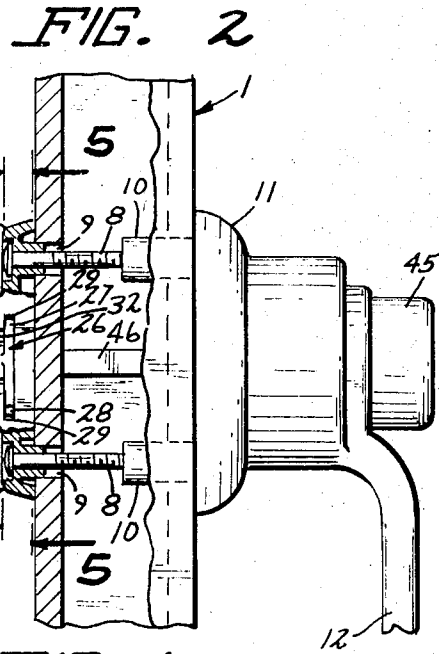
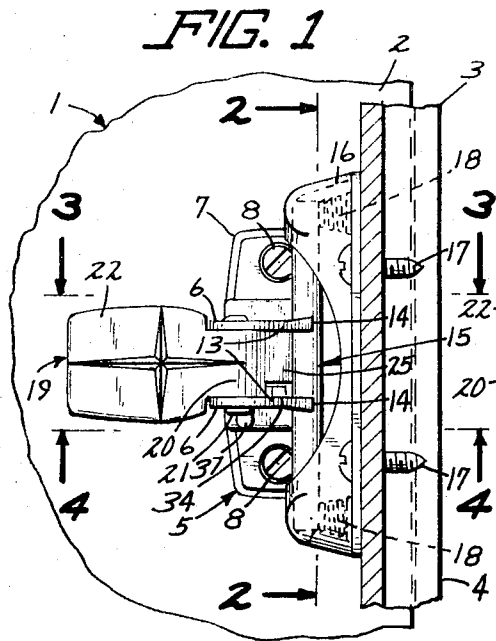


FIG. 5

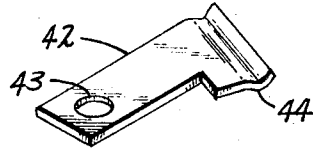
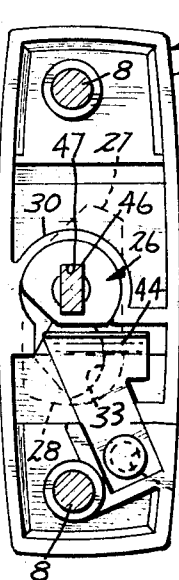


FIG. 6

FIG. 7

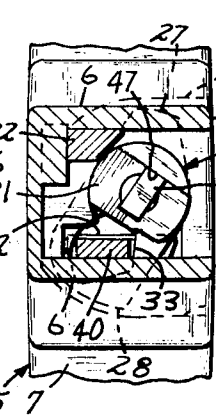
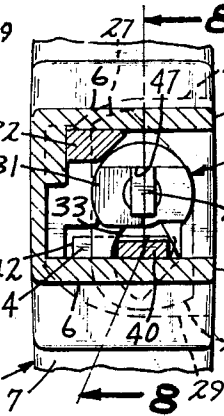
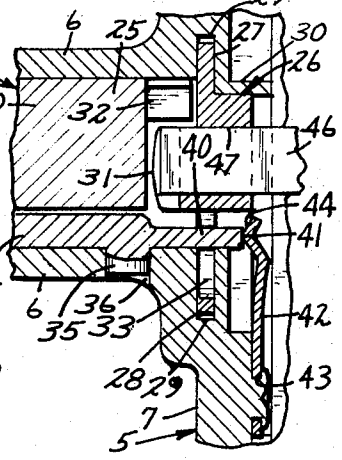


FIG. 8



DOOR LATCH CONSTRUCTION

BACKGROUND OF THE INVENTION

This invention is in the nature of an improvement over the structures disclosed in U.S. Letters Pat. No. 3,333,879 assigned to the assignee corporation of this invention, the name of the assignee corporation having been changed. The structure of this invention eliminates the use of a detent and spaced notches, or a toggle-acting coil spring of said patent.

SUMMARY OF THE INVENTION

An important object of this invention is the provision of a door latch having a locking element and an operating lever for the locking element, which lever incorporates an anti-latching feature, and of an arrangement for releasably holding the lever selectively in the locked or unlocked position of the locking element.

Another object of this invention is the provision of a simplified door latch having structure which lends smoothness and uniformity to the movement of the operating lever.

To the above ends, I provide a door latch having a rigid latch hook for mounting on a door to cooperate with a retractable strike mounted on a door frame in the path of travel of the latch hook. The latch hook is formed to provide strike engaging cam and hook portions. A handle-equipped release member is movable toward and away from engagement with the strike to release the strike from the hook portion to permit opening of the door. A locking element is rotatively mounted in the latch hook and has a portion movable between locking and releasing positions relative to the release member, and has an opening for reception of a lever mounted in the latch hook for operating the locking element. The lever has a portion that moves into a position to engage the strike upon closing movements of the door, when the locking element is moved to its locking position while the door is open, to positively prevent latching of the strike by the latch hook. Thus a person is prevented from being accidentally locked out of a room. The lever has an inner end portion that moves in an arcuate path against a leaf spring disposed tangentially to the arcuate path and urged into frictional engagement with the inner end of the lever.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a fragmentary view partly in side elevation and partly in vertical section of a conventional door and door frame and showing the latch mechanism of the present invention mounted thereon;

FIG. 2 is a fragmentary view partly in vertical section and partly in elevation, taken substantially on the line 2-2 of FIG. 1;

FIG. 3 is a fragmentary horizontal section taken substantially on the line 3-3 of FIG. 1;

FIG. 4 is an enlarged fragmentary section taken substantially on the line 4-4 of FIG. 1;

FIG. 5 is an enlarged fragmentary view partly in elevation and partly in section, taken substantially on the line 5-5 of FIG. 2;

FIG. 6 is an enlarged fragmentary section taken generally on the line 6-6 of FIG. 2;

FIG. 7 is a view corresponding to FIG. 6 but showing a different position of some of the parts;

FIG. 8 is a further enlarged fragmentary section taken on the line 8-8 of FIG. 6; and

FIG. 9 is a view in perspective of a leaf spring of this invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

A conventional door, shown fragmentarily in FIGS. 1-4 and indicated generally at 1, has its free edge portion 2 normally engaging a jamb portion 3 of a conventional door frame 4 when the door 1 is closed. The door 1 and door frame 4 may be of any well-known material and construction, the same being shown as being of metal, such as extruded aluminum.

The latch mechanism of this invention includes a latch hook 5 which comprises a pair of spaced generally parallel hook elements 6 that are formed with a base member or mounting plate 7 that is shown as being mounted to the inner surface of the door 1 by means of a pair of mounting screws 8. As shown in FIG. 2, the mounting screws 8 extend through a pair of holes 9 in the inner wall portion of the door 1, and are screw threaded in mounting bosses or the like 10 that extend inwardly through suitable openings in the outer wall surface of the door 2 from the base portion 11 of an outer handle 12.

The hook elements 5 define coplanar cam surfaces 13 and a pair of coplanar latching surfaces 14. The surfaces 13 and 14 are arranged and located to engage a strike element 15 in the form of a rod that is carried by a mounting bracket 16 secured to the door frame 4 by means of a pair of mounting screws or the like 17. The strike element 15 is yieldingly urged toward the path of travel of the latch hook 5 by a pair of coil compression springs 18 disposed within the mounting bracket 16, as shown in FIGS. 1 and 3. The latch hook 5 is positioned relative to the strike element 15 so that, during closing movements of the door 1, the cam surfaces 13 engage the strike 15 and push the same in a retracting direction against yielding bias of the springs 18. When the door 1 is completely closed against the jamb 3, the strike 15 is urged outwardly into engagement with the coplanar latching surfaces of the hook elements 5.

A latch release member 19 comprises a body portion 20 that is mounted on a pivot pin 21 extending through the outer end portions of the hook elements 6 for swinging movements of the release member 19 on an axis parallel to the plane of the door 1 and to the axis of the strike element or rod 15. As shown, the release member 19 is formed to provide a laterally outwardly projecting handle portion 22 integrally formed with the body portion 20. The body portion 20 is formed to provide a notch 23 for reception of a stop lug 24 forming a portion of the latch hook 5, for limiting swinging movements of the release member 19 in opposite directions. Further, the release member 19 defines a toe portion 25 that is disposed to engage the strike element 15 to move the same against bias of the springs 18 out of latching engagement with the latching surfaces 14 when the handle portion 22 is swung toward the door 1. Normally, when the door is closed, the springs 18 urge the strike element 15 in a direction to swing the release member 19 to one limit of its movement against the stop lug 24. Then, when the handle 22 is pushed toward the door, the strike 15 is moved out of engagement with the latching surface 14 by the toe portion 25, the opposite side of the notch 23 being engaged by the

stop lug 24, to limit further movement of the release member 19 in a latch releasing direction.

A generally cylindrical locking element 26 is disposed within the base 7, and includes a pair of circumferentially spaced radially outwardly projecting wing-like portions 27 and 28 that are slidably mounted in opposed notches 29 in the base 7. As shown in FIG. 5, the locking element 26 is further supported by a circumferentially extended base wall portion 30 for limited rotary or oscillatory movement of the locking element 26. The locking element 26 includes a portion 31, see FIGS. 6 and 7, which is movable into and out of the path of movement of a leg portion 32 projecting inwardly from the release member 19 and integrally formed therewith. In the position of the locking element 26 shown in FIG. 6, the portion 31 thereof is laterally displaced from the leg 32 permitting free movement of the release member 19 toward and away from the strike element 15. When the locking element 26 is rotated to its position of FIG. 7, the portion 31 thereof is disposed in the path of movement of the leg 32, to positively lock the release member 19 against movement toward the strike element 15. As shown particularly in FIGS. 6-8, the wing-like portion 28 of the locking element 26 is provided with an opening 33 extending therethrough.

For the purpose of imparting oscillatory or limited rotary movement to the locking element 26 between its locked and unlocked positions, an operating lever 34 is disposed between one of the hook elements 6 and the release member 19, the operating lever 34 being formed to provide a cylindrical boss 35 that projects transversely thereof and which is journaled in an opening 36 in said one of the hook elements 6, see particularly FIG. 8. The operating lever 34 is further provided with a laterally outwardly projecting button or handle 37 that projects outwardly through a slot-like opening 38 in the adjacent hook element 6 whereby movement may be imparted to the operating lever 34. The operating lever 34 has an outer end portion 39 that is movable between a retracted position laterally inwardly of the cam surfaces 13 of the hook elements 6, as shown by full lines in FIG. 4, and an operative anti-latching position disposed laterally outwardly of the cam surfaces 13, as shown by dotted lines in FIG. 4.

The operating lever 34 has an inner end portion 40 that extends through the opening 33 and which engages opposite sides of the opening 33 to impart rotary or oscillatory movement to the locking element 26 responsive to pivotal movement of the lever 34. The arrangement is such that, when the operating lever 34 is moved to its full line position of FIG. 4, the locking element 26 is rotated to its release position of FIG. 6 permitting release movement of the release member 19 to unlatch the door. When the operating lever 34 is moved to its opposite limit of swinging movement to rotate the locking element 26 to its locking position of FIG. 7, the outer end portion 39 of the operating lever is moved to its strike intercepting or engaging position, illustrated by dotted lines in FIG. 4. Thus, should the operating lever 34 be moved to rotate the locking element 26 to its locked position while the door is opened, the outwardly projecting outer end portion 39 of the operating lever 34 will engage the strike 15 during closing movement of the door and in a direction at substantially right angles to the direction of normal movement of the strike 15, so that the strike will not yield to permit clos-

ing of the door until the locking element is moved to its unlocked or release position.

The extreme inner end of the operating lever 34 is in the form of a rounded nodule or boss, indicated at 41, the same traveling in an arc about the axis of the boss 35 upon pivotal movement of the operating lever 34. A leaf spring 42 shown in its entirety in FIG. 9, is provided adjacent one end with an opening 43 by means of which the spring 42 may be riveted to the base 7, as shown in FIGS. 5 and 8. At its opposite end, the leaf spring 42 is formed to provide a ridge 44 that extends in a direction tangentially of the arc of movement of the operating lever boss 41 for frictional sliding engagement with the boss 41. As indicated in FIG. 8, the leaf spring 42 is disposed to exert yielding bias of the ridge portion 44 thereof in a direction toward the axis of pivotal movement of the operating lever 34 so as to yieldingly hold the operating lever 34 at either extremity of its pivotal movement, as shown by full and dotted lines in FIG. 4. As the boss 41 moves longitudinally of the ridge 44 from one extreme position to the other, the leaf spring 42 flexes to permit such movement of the boss 41 in a smooth and uniform manner. The spring 42 exerts sufficient yielding bias upon the boss 41 to prevent accidental movement of the operating lever 34 from one extreme position of its pivotal movement to the other thereof.

It is clearly disclosed in the aforementioned U.S. Pat. No. 3,333,879, the release member 19 may be moved from the exterior of the door by means of a push button 45 mounted in the base 11 for movements toward and away from the door 1, and a push rod 46 connected to the push button 45 and having an inner end portion extending longitudinally slidably through an opening 47 in the locking element 26 for engagement with an adjacent portion of the release member 19, to swing the same in a latch releasing direction responsive to inward movement of the push button 45.

Preferably, and as shown, the push rod 46 and opening 47 are cross sectionally rectangular, so that the locking element 26 may be rotated or oscillated from the exterior of the door to unlock the latch, such rotation of the push rod 46 being effected by means of a key, not shown, but being received in a lock within the button 45, in the usual manner.

While I have shown and described a commercial embodiment of my improved door latch construction, it will be understood that the same is capable of modification, without departure from the spirit and scope of the invention, as defined in the claims.

What is claimed is:

1. In a door latch mechanism:

- a. a rigid latch hook having a base portion adapted to be mounted on one side of a door for common movements therewith;
- b. a cooperating strike element adapted to be mounted on a door frame in the path of travel of the latch hook, said strike element being yieldingly urged into said path of travel of the latch hook and retractable transversely out of said path;
- c. said latch hook having a strike engaging cam portion and a strike engaging hook portion, the strike being engaged by said cam portion and retracted thereby during closing movements of said door and urged into engagement with said hook portion, when the door is fully closed;

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d. a handle-equipped release member pivotally mounted on said latch hook for swinging movements toward and away from engagement with said strike, when the strike is in engagement with said hook portion;

e. stop means on said latch hook limiting movements of said release member in a direction away from engagement with said strike, said release member being urged toward engagement with said stop means by said strike, when the door is fully closed;

f. a locking element mounted for oscillatory movements between a release member engaging position, wherein said release member is blocked from engagement with said strike, and a release member disengaging position;

g. an operating lever mounted for limited pivotal movements on said latch hook and having an inner end portion engaging said locking element to impart said oscillatory movement thereto, and a second portion selectively movable into and away from a position to engage said strike upon closing

movements of the door and responsive to movement of said lever to a release member engaging position of said locking element, to positively prevent closing of the door;

h. and a yielding element frictionally engaging said inner end portion of the operating lever to frictionally hold the lever at the limits of said pivotal movement thereof.

2. The door latch mechanism defined in claim 1 in which said locking element defines an opening there-through for reception of said inner end portion of the operating lever, said inner end portion including a boss, said yielding element frictionally engaging said boss.

3. The door latch mechanism defined in claim 2, in which said boss is disposed to move in an arcuate path responsive to pivotal movements of said operating lever, said yielding element comprising a leaf spring having a boss-engaging surface portion disposed in a plane tangent to said arcuate path, said surface portion being yieldingly urged in a direction radially inwardly of said arcuate path.

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