May 22, 1951 E. F. BACON ET AL 2,554,438

DOOR LATCH

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FIG. 1

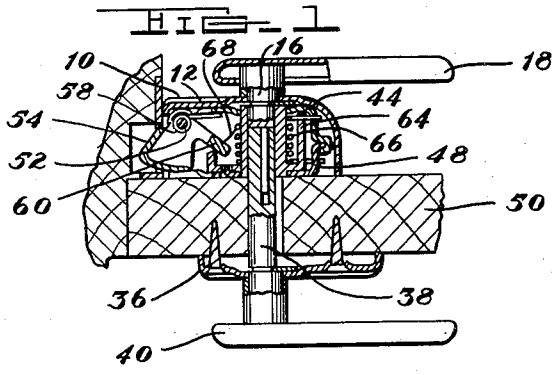


FIG. 5

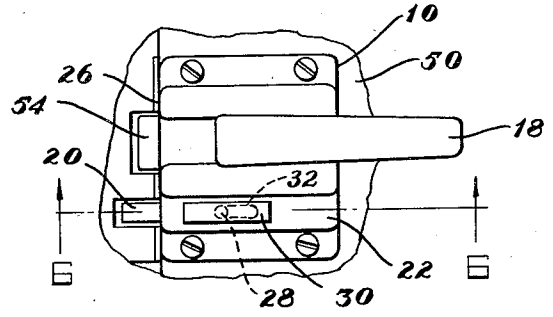


FIG. 6

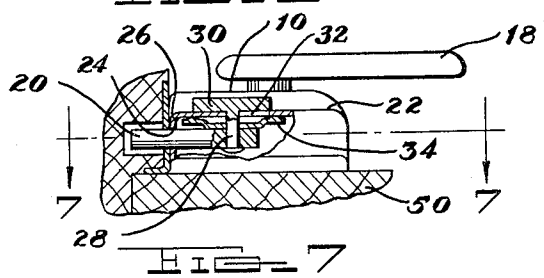
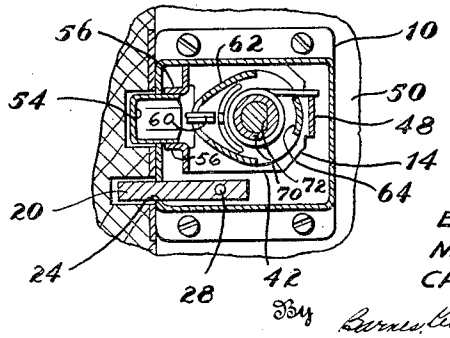


FIG. 7



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FIG. 4

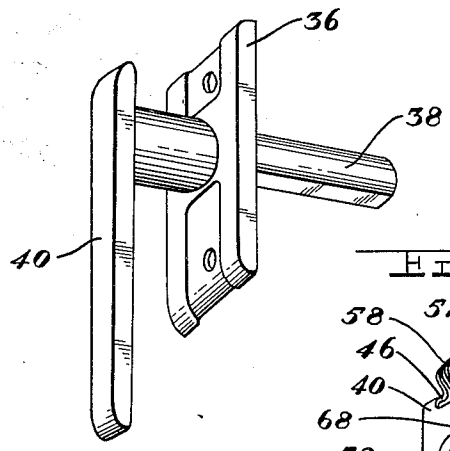


FIG. 3

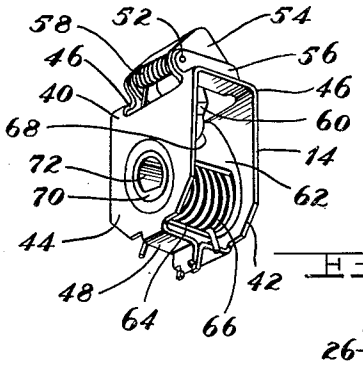
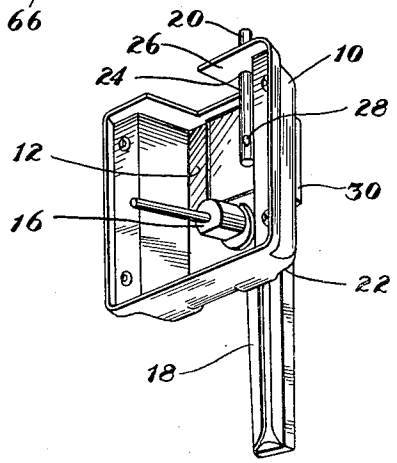


FIG. 2



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Patented May 22, 1951 2,554,438

UNITED STATES PATENT OFFICE

2,554,438

DOOR LATCH

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Application September 19, 1946, Serial No. 697,865

9 Claims. (Cl. 292—244)

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This invention relates to a door latch and particularly to one of the type commonly used for screen doors and similar applications.

It is an object of the present invention to provide an improved economical, rigid and reliable construction which is adapted for easy installation in a variety of situations.

Figure 1 is a longitudinal sectional view of a door latch incorporating a preferred form of the present invention.

Figure 2 is a perspective view of the inside trim and latch assembly housing.

Figure 3 is a perspective view of the latch bolt assembly.

Figure 4 is a perspective view of the outside trim unit.

Figure 5 is a front view of the inside trim housing.

Figure 6 is a cross section on lines 6—6 of Figure 5.

Figure 7 is a cross section on line 7—7 of Figure 6.

Referring now to the drawing, there is shown an inside trim and latch assembly housing which is a rectangular stamping 10 having a recess 12 for the reception of a latch bolt assembly 14. The housing 10 has a stub spindle 16 of non-circular shape which carries the usual handle 18 at its outer end. The housing 10 may also carry a dead bolt 20 which is located inside of a flat portion 22 of the housing 10 and projects through an aperture 24 in the flat end wall 26 of the housing. Riveted in the inner end of the bolt 20 is a shouldered pin 28 which carries a long knob 30 on the outside of the surface 22. The pin 28 projects through a longitudinal slot 32 in the surface 22 and carries a leaf spring 34 secured between the shoulder of the pin and the dead bolt 20. The spring 34 bears frictionally against the under face of the flat portion 22.

The outside trim member shown in Figure 4 comprises an escutcheon plate 36 having a spindle 38 of non-circular form rotatably secured thereto and carrying a handle 40.

The latch bolt assembly 14 shown in Figure 3 comprises a frame 40 preferably formed of a single piece of sheet metal to provide parallel plates 42 and 44. The latter are joined by spacer members 46 at the latch end and 48 at the inner end.

The frame 40 is so proportioned that it fits freely within the recess 12 so that it may be positioned therein with either plate 42 or plate 44 adjacent the door 50. Pivotally mounted at 52 is a latch bolt or keeper 54 which is carried in

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ears 56 preferably formed integrally from the sheet metal of the main frame. A suitable helical spring 58 urges the bolt 54 into projected position. The bolt 54 has an operating lever 60 which serves as the follower for a cylindrical cam 62. The latter is formed as half of an oval as shown in Figure 7 and is provided with a spring stop bar 64 at its opposite end. The bar 64 normally lies adjacent the spacer member 48 and is preferably of the same width.

A helical centering spring 66 is mounted inside the cam 62 and has its ends lying on opposite sides of the stop bar 64 and overlapping the spacer member 48. The cam 62 is provided with an operating surface 68 which co-acts with the follower arm 60, the latter being urged into engagement therewith at all times by the spring 58. The cam 62 is also provided with a tubular center portion 70 having a non-circular hole 72 extending therethrough for the reception of the spindles 16 and 38.

It is preferred to form the majority of parts of sheet metal as illustrated although the cam 62 is more conveniently formed as a die casting, the spindles, of course, being formed from bar stock.

In operation it will be seen that the latch bolt 54 is freely retracted in the usual manner when the door is closed against the usual striker plate, the spring 58 permitting rotation of the bolt clockwise in Figure 3 for this purpose. It will be noted that there is ample space above the cam surface 68 through which the follower arm may move at this time. When either handle 18 or 40 is rotated approximately 45 degrees from its neutral position, the cam surface 68 acting through the follower arm 60 retracts the bolt 54 about its axis.

By reason of the oval form of the cylinder from which cam 62 is formed, it is possible to increase the radial distance of the nose of the cam from the axis of the spindle and yet to require only a small distance vertically for the travel of the cam nose. The latch bolt assembly of Figure 3 being positioned entirely by contact of its frame with the cavity 12 is readily mounted in the cavity in either the position shown for an inswinging door or in the opposite position for an outswinging door.

At the same time, the latch bolt assembly is entirely self-contained and can be reversed with extreme ease without removing any screws or having any loose parts to replace. All that is involved is a simple lifting out of the assembly, turning it over and replacing it in the housing 10. By the provision of the long tube 70 extending between the spindles 16 and 38, their accurate

alignment is assured when the latch is installed.

It will thus be seen that the present invention provides an inexpensive, free operating latch assembly which is readily adapted to various installations and which may be economically manufactured.

We claim:

1. In a door latch, an inside trim and latch assembly housing, a unitary latch bolt assembly positively located in said housing by contact with the walls thereof and with the door when the housing is attached thereto, said latch assembly comprising a main frame formed of sheet metal bent to provide parallel front and back plates with spacer members therebetween, a latch member pivoted to said frame on an axis parallel to the door edge and adjacent thereto, a latch actuator cam pivoted on said frame on an axis perpendicular to the door and comprising a cylinder cam, a follower lever associated with the latch and cooperating with the cam, and oscillatable handle means carried by the housing and connected to the latch actuator to rotate the latter and retract the latch.

2. In a door latch, an inside trim and latch assembly housing, a unitary latch bolt assembly positively located in said housing by contact with the walls thereof and with the door when the housing is attached thereto, said latch assembly comprising a main frame formed of sheet metal bent to provide parallel front and back plates with spacer members therebetween, a latch member pivoted to said frame on an axis parallel to the door edge and adjacent thereto, a latch actuator cam pivoted on said frame on an axis perpendicular to the door and comprising a cylinder cam, a follower lever associated with the latch and cooperating with the cam, oscillatable handle means carried by the housing and connected to the latch actuator to rotate the latter and retract the latch, and preloaded torsion spring means cooperating with the cam and frame to maintain the cam in central position.

3. In a door latch, an inside trim and latch assembly housing, a unitary latch bolt assembly positively located in said housing by contact with the walls thereof and with the door when the housing is attached thereto, said latch assembly comprising a main frame formed of sheet metal bent to provide parallel front and back plates with spacer members therebetween, a latch member pivoted to said frame on an axis parallel to the door edge and adjacent thereto, a latch actuator cam pivoted on said frame on an axis perpendicular to the door and comprising a cylinder cam, a follower lever associated with the latch and cooperating with the cam, oscillatable handle means carried by the housing and connected to the latch actuator to rotate the latter and retract the latch, a longitudinal spring stop bar carried by the cam in a normal position parallel to and of the same width as one of the spacer members, and a helical torsion spring mounted axially inside the cam and stop bar and having its free ends extending outwardly to overlap opposite sides of both the stop bar and the adjacent spacer member.

4. In a door latch, an inside trim and latch assembly housing, a unitary latch bolt assembly positively located in said housing by contact with the walls thereof and with the door when the housing is attached thereto, said latch assembly comprising a main frame formed of sheet metal bent to provide parallel front and back plates with spacer members therebetween, a latch member pivoted to said frame, a latch actuator cam pivoted on said frame and comprising a cylinder cam, a follower lever associated with the latch and cooperating with the cam, and oscillatable handle means carried by the housing and connected to the latch actuator to rotate the latter and retract the latch.

5. In a door latch, an inside trim and latch assembly housing, a unitary latch bolt assembly positively located in said housing by contact with the walls thereof and with the door when the housing is attached thereto, said latch assembly comprising a main frame formed of sheet metal bent to provide parallel front and back plates with spacer members therebetween, a latch member pivoted to said frame, a latch actuator cam pivoted on said frame and comprising a cylinder cam, a follower lever associated with the latch and cooperating with the cam, oscillatable handle means carried by the housing and connected to the latch actuator to rotate the latter and retract the latch, and preloaded torsion spring means cooperating with the cam and frame to maintain the cam in central position.

6. In a door latch, an inside trim and latch assembly housing, a unitary latch bolt assembly positively located in said housing by contact with the walls thereof and with the door when the housing is attached thereto, said latch assembly comprising a main frame formed of sheet metal bent to provide parallel front and back plates with spacer members therebetween, a latch member pivoted to said frame, a latch actuator cam pivoted on said frame and comprising a cylinder cam, a follower lever associated with the latch and cooperating with the cam, oscillatable handle means carried by the housing and connected to the latch actuator to rotate the latter and retract the latch, a longitudinal spring stop bar carried by the cam in a normal position parallel to and of the same width as one of the spacer members, and a helical torsion spring mounted axially inside the cam and stop bar and having its free ends extending outwardly to overlap opposite sides of both the stop bar and the adjacent spacer member.

7. In a door latch, an inside trim and latch assembly housing, a unitary latch bolt assembly positively located in said housing by contact with the walls thereof and with the door when the housing is attached thereto, said latch assembly comprising a main frame formed of sheet metal bent to provide parallel front and back plates with spaced members therebetween, a latch member pivoted to said frame, a latch actuator cam pivoted on said frame and comprising a cylinder cam, a follower lever associated with the latch and cooperating with the cam, and oscillatable handle means carried by the housing and connected to the latch actuator to rotate the latter and retract the latch, said latch assembly being interchangeably mountable in the housing with either plate adjacent the door whereby the latch may be assembled for inside swinging or outside swinging doors.

8. In a door latch, an inside trim and latch assembly housing, a unitary latch bolt assembly positively located in said housing by contact with the walls thereof and with the door when the housing is attached thereto, said latch assembly comprising a main frame formed of sheet metal bent to provide parallel front and back plates with spacer members therebetween, a latch member pivoted to said frame, a latch actuator cam pivoted on said frame and comprising a

cylinder cam, a follower lever associated with the latch and cooperating with the cam, and oscillatable handle means carried by the housing and connected to the latch actuator to rotate the latter and retract the latch, said cam being formed with a half oval cylindrical contour at its working end whereby a large range of travel of the follower lever may be obtained with a limited angle of oscillation of the cam and with limited clearance space required for travel of the apex of the oval.

9. In a door latch, a latch assembly housing open on one face and adapted to be mounted with its open face against the face of a door adjacent the edge thereof, a unitary latch bolt assembly positively located in said housing by contact with the walls thereof and with the face of the door when the housing is attached thereto, said latch assembly comprising a main frame including a pair of parallel plates having spacing members therebetween, a latch member pivoted on said frame and normally projecting through an opening in one of the side walls of said housing, and an oscillatable handle permanently and rotatably carried by the housing, said latch assembly including a cam operatively connected with said latch member for retracting the latch and having a non-circular opening therein, said handle member having a non-circular spindle adapted

to telescope within the non-circular opening in the cam when the latch assembly is arranged within the housing, an escutcheon plate adapted to be mounted on the opposite face of the door and having an oscillatable handle permanently and rotatably mounted thereon, said handle having a spindle of non-circular cross section adapted to be telescopically received by the non-circular opening in said cam.

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