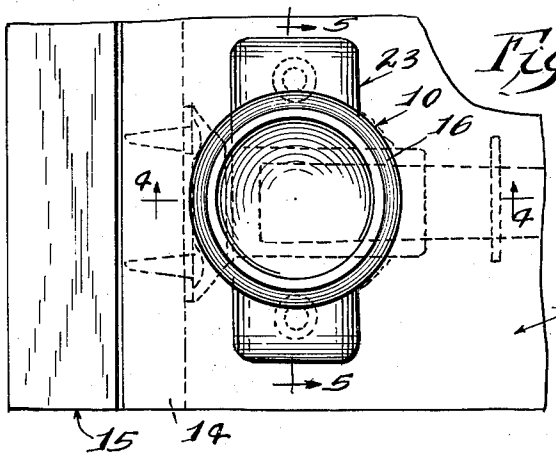
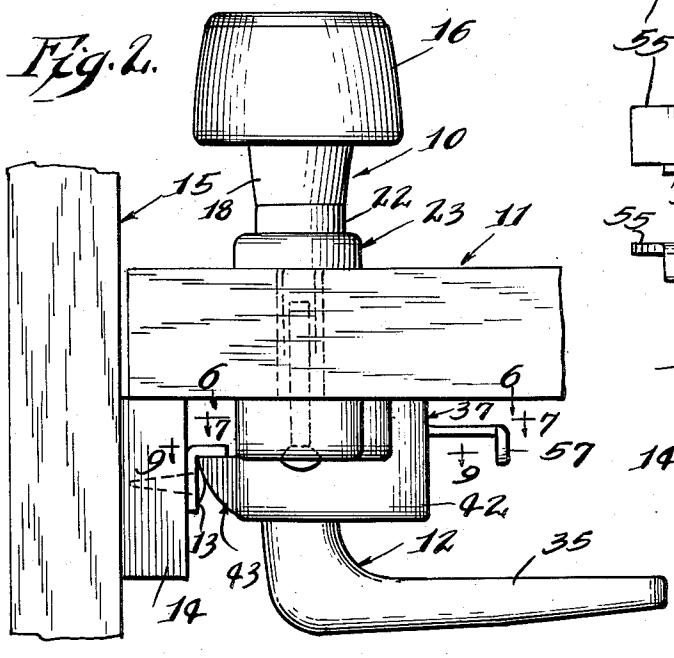
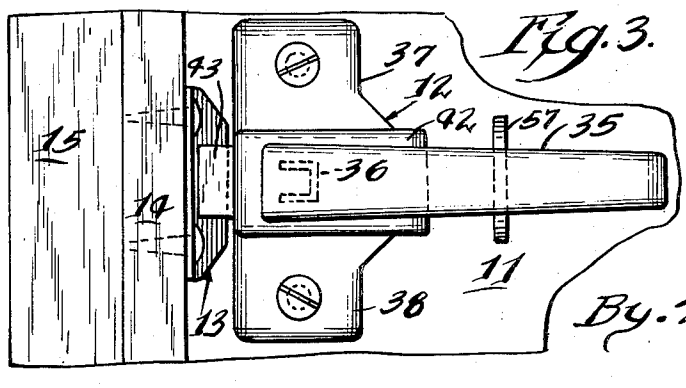
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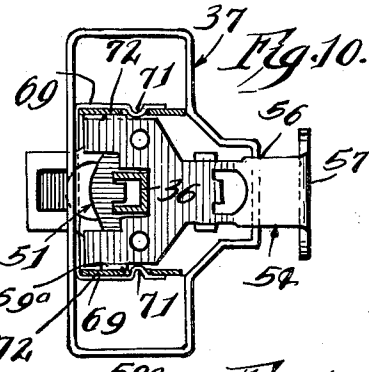
LATCH CONSTRUCTION

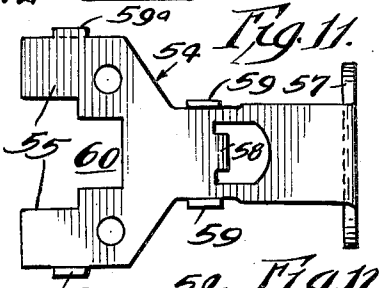
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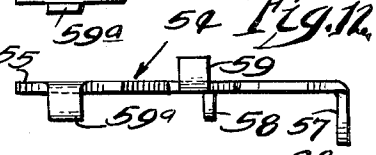


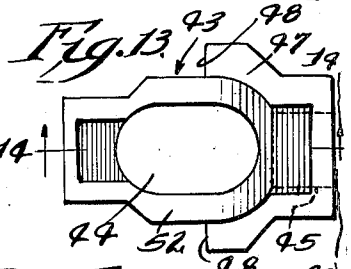


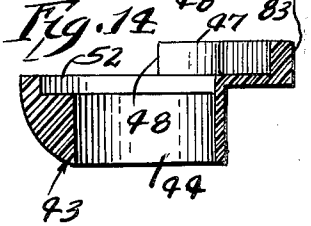












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LATCH CONSTRUCTION

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Fig. 4.

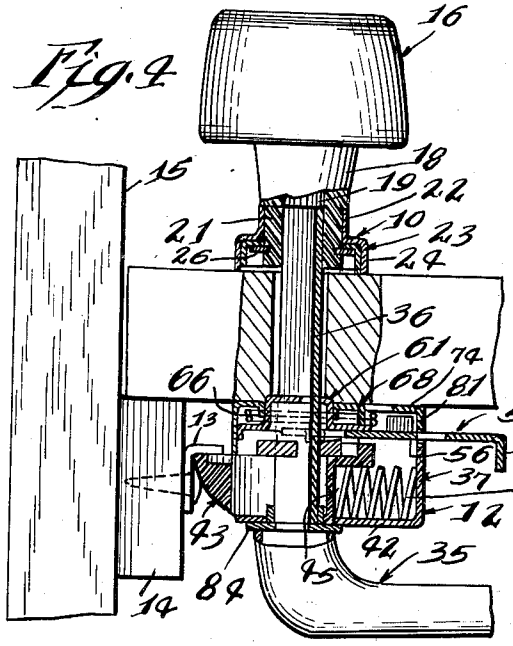


Fig. 5.

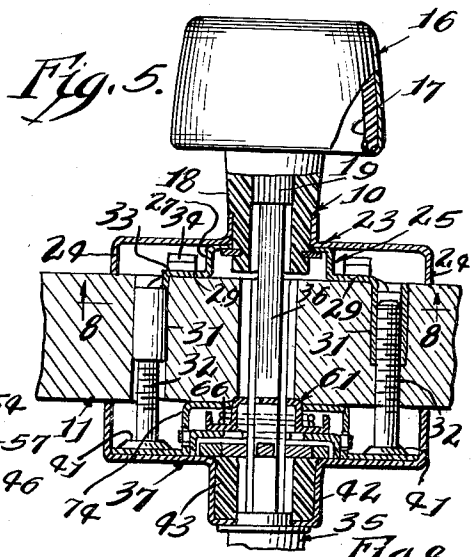


Fig. 8.

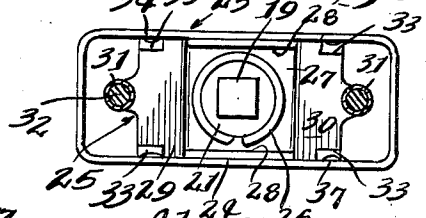


Fig. 6.

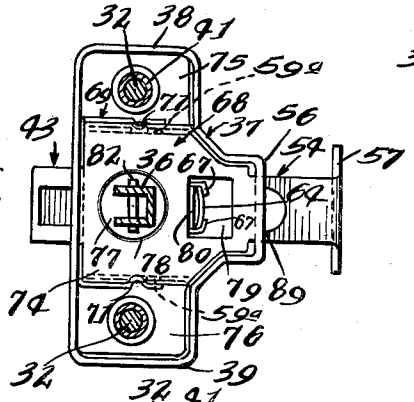


Fig. 9.

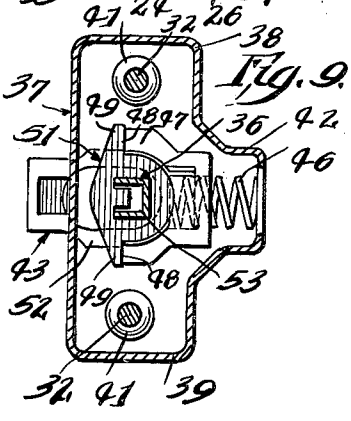
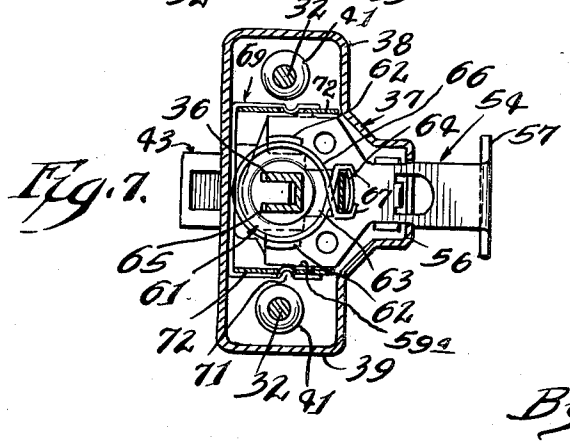


Fig. 7.



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LATCH CONSTRUCTION

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2 Claims. (Cl. 292—169)

The present invention relates to a novel latch construction for use on screen doors and the like and so designed and constructed that the assembly may be quickly and easily installed on such a door whether it be of aluminum, stainless steel, wood, etc.

Among the objects of the present invention is the provision of a novel latch construction or assembly consisting of two pre-assembled units, one to be mounted at the exterior and the other at the interior of either a metal or a wooden screen door, and capable of being readily installed on relatively narrow and thin stiles of doors of aluminum or stainless steel, as well as on the relatively wide and thick stiles of wooden doors. For example, many aluminum doors have a narrow stile of approximately 1¾" in width and a thickness of approximately ½", whereas wooden doors frequently have stiles or frame members approximately 6" in width and of a thickness of approximately 1⅛".

In the novel assembly, a relatively narrow housing is provided with a raised section receiving the latch bolt, and the component parts of the latch assembly are so designed and arranged as to provide for a compact assembly in which the latching bolt is capable of a maximum stroke and cocking of the bolt is eliminated.

In the present embodiment, the pre-assembled units are designed for easy field application in that the installation requires the drilling or forming of but three holes, one of which is to receive the operating shaft or spindle of approximately ½" in diameter, and two of approximately 5/16" in diameter to receive the screws or connecting means for locating and assembling the inner and outer units from the interior of the door into an operative assembly.

Another important feature of the present invention is the provision in a latch assembly of novel safety means whereby it is impossible to lock oneself out in the event the locking plate is accidentally or unintentionally pushed inwardly or moved to locked position when the door is open. In the present novel latch assembly, provision is made whereby when the door moves toward closed position and the inclined surface of the latching end of the bolt engages the strike and is retracted to permit the door to close, an abutment on the latch bolt contacts a lip on the locking plate and moves the latter to unlocked position.

A further important feature of the present invention is the provision of double-locking means for positively and securely locking and retaining the latch locked against unauthorized entry. In the present assembly, this novel manner of locking is accomplished by means of a novel locking assembly including a locking plate which when pushed inwardly locks against the sides of a channelled or U-shaped shaft or spindle and also against the ends of a tensioning spring provided on a cup-centering washer whereby the latch bolt is securely locked against retraction until the locking plate is released.

To retain the locking plate in its unlocked or retracted position as well as in its locked or inwardly projected position, the opposite sides thereof are provided with spaced indentations one of which is adapted to receive a detent for tensionally and frictionally retaining the locking plate in unlocked position and the other for retaining this locking plate when moved to its locking position.

Another important object of the present invention is the provision of a novel latch unit in which the component parts are so constructed and arranged as to provide a compact assembly requiring a relatively narrow housing. In this novel assembly and housing design, a self-lubricating nylon latch bolt slides directly on and in a raised section of the housing providing a long bearing length for the latch bolt.

Yet another important feature of the present invention is the novel construction of a combined handle and shaft comprising a substantially U-shaped rigid handle and shaft formed as an integral unit.

Further objects are to provide a construction of maximum simplicity, efficiency, economy and ease of assembly and operation, and such further objects, advantages and capabilities as will later more fully appear and are inherently possessed thereby.

In the drawings:

Figure 1 is a view in front elevation of the knob unit or assembly at the exterior of a screen door and the like and showing in dotted outline the arrangement of the latch assembly at the interior of the door.

Fig. 2 is a top plan view of the combined latch assembly applied to a closure, such as a screen door.

Fig. 3 is a view in front elevation of the latch and operating handle unit at the interior of the door.

Fig. 4 is a fragmentary view in horizontal cross section through the combined latch assembly taken in a plane represented by the line 4—4 of Fig. 1 and viewed in the direction of the arrows.

Fig. 5 is a fragmentary view in vertical cross section taken in a plane represented by the line 5—5 of Fig. 1 and viewed in the direction of the arrows.

Fig. 6 is a view in rear elevation of the latch and handle unit, the view being taken on the line 6—6 of Fig. 2 and viewed in the direction of the arrows.

Fig. 7 is a view in vertical cross section taken on substantially the line 7—7 of Fig. 2 and viewed in the direction of the arrows.

Fig. 8 is a view in rear elevation of the outer knob unit, the view being taken on the line 8—8 of Fig. 5 and viewed in the direction of the arrows.

Fig. 9 is a view in vertical cross section taken in a plane represented by the line 9—9 of Fig. 2 and viewed in the direction of the arrows.

Fig. 10 is a view similar to Fig. 7 but with additional parts of the latch unit adjacent the locking plate removed.

Fig. 11 is an enlarged view in rear elevation of the locking plate of Fig. 10.

Fig. 12 is an enlarged view in end elevation of the locking plate of Fig. 11.

Fig. 13 is a view in rear elevation of the latching bolt.

Fig. 14 is a view in horizontal cross section through the latching bolt, the view being taken in a plane represented by the line 14—14 of Fig. 13 and viewed in the direction of the arrows.

Referring more particularly to the disclosure in the drawings and to the novel illustrative embodiment selected to illustrate the present invention, the novel latch assembly comprises a knob unit 10 affixed to the exterior of a closure, such as a screen door or the like 11, a latch and handle unit 12 affixed to the interior of the door, and a strike 13 mounted on a stop 14 on the side jamb of a door frame 15.

The outer knob 16 is preferably formed as a hollow cast insert 17 with the knob portion thereof encased by a

cover or shell as shown in Fig. 5, and the hollow shank 18 provided with a longitudinally extending square or polygonal opening 19. The shank is reduced at its inner end at 21 and provided thereat with an annular shoulder against which abuts the end of an encompassing collar 22 projecting from the outer face of a substantially rectangular escutcheon 23 having a peripheral flange 24 and enclosing an escutcheon plate 25. The shank 18 of the knob assembly is freely journalled in the collar of the escutcheon 23 and its escutcheon plate 25 but retained against longitudinal movement relative thereto by a split retaining ring 26 conformably received within an annular groove in the shank 18 adjacent its inner end.

The escutcheon plate 25 (Fig. 8) is conformably received within the confines of the continuous peripheral flange 24 of the escutcheon 23, and includes a raised or offset central part 27 positioned flat against the interior of the escutcheon and against which the retaining ring 26 seats to hold the parts assembled. The part 27 has a central opening for receiving the end of the hollow shank 18 and at its longitudinally extending opposite sides is provided with an inturned longitudinally extending flange 28 positioned against the interior of the longitudinal sides of the peripheral flange 24 of the escutcheon 23. At its opposite ends the escutcheon plate is provided with opposed extensions 29 and 30 each provided with an offset and inwardly projecting cylindrical stud 31 internally threaded to receive the threaded shank of a screw 32 (Figs. 2, 5 and 8). Also the extensions 29 are indented at 33 and the opposite side flanges 24 of the escutcheon 23 provided with spaced detents 34 whereby the escutcheon plate 25 is firmly anchored in the escutcheon 23, and the component parts of the outer knob unit 10 are rigidly connected together in a pre-assembled unit.

The inner handle and latch unit 12 comprises an assembly including a handle 35 having a projecting shaft 36 of substantially channel or U-shape, a hollow housing 37 (Figs. 6, 7, 9 and 10) of irregular contour provided with lateral extensions 38 and 39 each having a countersunk opening 41 for receiving a screw 32 threaded into an aligned stud 31 on the knob unit 10. In a centrally arranged, elevated portion 42 (Fig. 3) of the housing 37 is slidably mounted a latch bolt 43 (Figs. 4, 5, 13 and 14) provided with an elongated and centrally arranged slot 44 for the projection therethrough of the shaft 36 on the handle 35. The rear of the latch bolt is also recessed at 45 to locate one end of a coil spring 46, the other end of this spring abutting the interior of an end wall in the housing 37 (Figs. 4 and 9), thus spring-loading the latch bolt to its extended or latching position.

The spring-loaded latch bolt 43 (Figs. 13 and 14) at its recessed end 45 is provided with a substantially U-shaped flange or ledge 47 having oppositely disposed shoulders 48 against which bear laterally projecting and oppositely disposed wings 49 on a cam member 51. This cam member lies flat against the surface 52 of the latch bolt and has a central slot 53 of substantially U-shape to conformably receive the shaft 36 (Fig. 9). Thus when the shaft 36 is rotated by turning the handle 35 in either direction, one of the wings 49 engages its shoulder 48 on the latch bolt 45 and retracts the latter against the coil spring 46.

A locking plate 54 (Figs. 4, 5, 6, 7, 10, 11 and 12) is slidably mounted in the housing 37 adjacent to but out of contact with the adjacent surface of the flange 47 of the latch bolt 43 to permit free and easy operation of the latter. The inner end of this locking plate is bifurcated to provide spaced arms 55 spanning the shaft 36, and with its other or reduced end projecting through a slot in the end 56 of the housing 37, and this latter end bent to form a projection or finger piece 57 for moving the locking plate 54. Intermediate its ends the locking plate is provided with a transverse formed lip 58 projecting in the same direction as the projection 57, and longitudinally extending lips or flanges 59 along the opposite margins of the reduced portion of this plate. The lip 58 and lips 59a on the outer margins of the bifurcations 55 project in the opposite direction from the lips 59 (Figs. 11 and 12). A reduced slot 60 at the inner end of the bifurcations 55 is adapted to conformably receive therein the shaft 36 when the locking plate is moved to locking position.

In contact with the adjacent surface of the locking plate 54 is a cup member 61 (Figs. 4, 5 and 7) having oppositely disposed and outwardly projecting arcuate flanges 62, a radial extension 63 between the flanges 62 and this extension provided at its outer end with a rearwardly or outwardly projecting arcuate flange 64. This cup member 61 is provided with a centrally disposed U-shaped slot 65 in the base of the cup to conformably receive and permit the U-shaped shaft 36 to project therethrough.

The radial extension 63 and its arcuate flange 64 are adapted to be received between the spaced lips 59 on the locking plate 54 when the latter is moved inwardly into locking position. A coil centering spring 66 encompasses the cup member 61 and has its opposite ends 67 hooked over and anchored onto the arcuate flange 64.

Over the above mentioned assembly in the housing 37 is then disposed a back plate 68 provided with a friction spring 69 of substantially channel-shape with each leg having an arcuate detent 71 (Figs. 6, 7 and 10) projecting through a slot in an end wall 72 of the back plate and adapted to engage one or the other edge of a lip 59a on each edge of the bifurcations 55 of the locking plate 54 to retain the latter in unlocked (Figs. 6 and 7) or in locked position (Fig. 10).

The back plate 68 (Fig. 6) is provided with an elevated portion 74 and wings 75 and 76 conformably received in the lateral projections 38 and 39, respectively, of the housing 37 and anchored therein by upsetting the metal about the countersunk screw openings 41 aligned with the similarly spaced openings in the wings 75 and 76. This back plate provides a cover for enclosing the locking plate 54, cup member 61 and associated parts and is provided with an opening 78 into which projects the hub 77 of the cup member 61, an opening 79 into which projects the arcuate flange 64 of the cup member, an inturned lip 80 adjacent to but spaced inwardly from the flange 64, and an inturned lip at 81 providing a closure for the slot in the end 56 of the housing 37 through which the extended end of the locking plate 54 projects. A pin 82 projects through the sides of the U-shaped shaft 36 over the hub of the cup member 61 and retains this shaft against longitudinal movement.

The latch bolt 43 is spring-biased to extended or latching position by the coil spring 46. With the locking plate 54 pulled outwardly to its retracted position, the handle 35 and its shaft 36 may be turned clockwise or counterclockwise to retract the latch bolt 43 through the action of the cam member 51. The shaft 36 being also projected through the cup member 61, rotates the latter against the tension of the coil centering spring 66 and in which rotation the arcuate flange 64 on the cup member 61 rotates about the inturned lip 80 of the backing plate, with the flange 64 carrying therewith one end of the spring 66 and the other end held by the lip 80. Upon release of the handle 35 this handle and its shaft 36 are returned to their normal position by the centering spring 66 and the spring-biased latch bolt 43 is projected to latching position.

In the event the locking plate 54 is projected inwardly to locking position, the shaft 36 is positioned within the slot 60 of the locking plate 54 and the shaft is thereby locked against rotation. Also in this locking position the radial extension 63 and its flange 64 on the cup centering member 61 are positioned between the spaced lips 59 on the locking plate 54 which prevents rotation of the cup member. This provides a most effective double-locking means for locking the latch bolt 43 against unintentional or unauthorized retraction.

Means is also provided for retaining the locking plate 54 in either its unlocked or locked positions consisting

of the friction spring 69 with its upper and lower detents 71 each adapted to engage either edge of a lip 59a on the spaced bifurcations 55 of the locking plate 54. The ends of these lips 59a ride on the inner surface of the housing 37 and thereby maintain the locking plate 54 out of frictional contact with the latch bolt 43.

As an added safety feature to prevent locking oneself out in the event the locking plate 54 is accidentally or unintentionally pushed inward to locking position when the door 11 is in open position, the lip 58 is provided on the locking plate. When the door closes with the locking plate 54 in locking position and the tapered surface of the extended latch bolt 43 engages the strike and retracts, the inner end 83 of the latch bolt contacts the lip 58 on the locking plate and automatically retracts the locking plate 54 to its unlocked position.

The novel latch construction providing a compact assembly, blends in with the narrow stiles found in most aluminum or metal screen doors, as well as with the wider frame of wooden screen doors.

The latch bolt 43 being of nylon, as is also the insert 84 in the housing 37 encompassing the shaft 36 adjacent the handle 35 (Figs. 4 and 5), assures a long life to the usual wearing parts of the assembly. Nylon being self-lubricating, no lubrication is required.

Having thus disclosed the invention, we claim:

1. In a latch construction for a screen door or the like adapted to engage a strike on the door frame to retain the door in closed position, a knob unit mounted on the exterior of the door and a latch unit mounted on the interior of the door, said latch unit including a handle and a shaft of substantially U-shape in cross section on said handle with the shaft projecting through an opening in the door and into an aligned opening in and connected to the knob unit, said knob unit having spaced internally threaded projections adapted to project into aligned openings in the door, said latch unit having a housing provided with screw openings aligned with the internally threaded projections on the knob unit and screws for connecting said units in rigid assembly on the door, an offset in said housing, a spring-biased latch bolt slidably mounted in said offset and provided with an elongated opening through which the shaft projects, a cam member abutting said latch bolt and having a slot for conformably receiving the shaft and rotatable therewith, projections on said latch bolt and on said cam member for retracting the latch bolt upon turning of the handle and the shaft to cause a projection on said cam member to engage an adjacent projection on said latch bolt, a locking plate slidably mounted in said housing with an outer end projecting to the exterior of the housing for manually moving the locking plate into and out of locking engagement and when in locking engagement retaining the shaft against rotation, a centering member also mounted in said housing having a slot for conformably receiving the shaft and rotatable therewith, a centering spring for returning said centering member, shaft and handle to centered position, and a backing plate providing a closure for the rear of said housing, said locking plate at its inner end within the housing provided with spaced projections spanning and spaced from said shaft when the locking plate is retracted for free rotation of the shaft, a slot adjacent said projections adapted to conformably receive the shaft when the locking plate is moved inwardly to its locking position, an extension on said centering member and provided with an upstanding flange upon which the ends of said centering spring are anchored, upstanding spaced flanges on said locking plate between which the extension and upstanding flange on said centering member are disposed when the locking plate is moved inwardly to locking position whereby said centering member and the shaft are prevented from rotating and retracting the latch bolt, and a lip on said locking plate adapted to be engaged by said latch bolt in the event said locking plate is inadvertently moved to locking position with the door open, said lip being engaged by and the locking plate retracted by the latch bolt as the latter is moved to unlocked position when the open door is moved to closed position and the latch bolt engages and is retracted by the strike.

2. In a latch construction for a screen door or the like adapted to engage a strike on the door frame to retain the door in closed position, a knob unit mounted on the exterior of the door and a latch unit mounted on the interior of the door, said latch unit including a handle and a shaft of substantially U-shape in cross section on said handle with the shaft projecting through an opening in the door and into an aligned opening in and connected to the knob unit, said knob unit having spaced internally threaded projections adapted to project into aligned openings in the door, said latch unit having a housing provided with screw openings aligned with the internally threaded projections on the knob unit and screws for connecting said units in rigid assembly on the door, an offset in said housing, a spring-biased latch bolt slidably mounted in said offset and provided with an elongated opening through which the shaft projects, a cam member abutting said latch bolt and having a slot for conformably receiving the shaft and rotatable therewith, projections on said latch bolt and on said cam member for retracting the latch bolt upon turning of the handle and the shaft to cause a projection on said cam member to engage an adjacent projection on said latch bolt, a locking plate slidably mounted in said housing with an outer end projecting to the exterior of the housing for manually moving the locking plate into and out of locking engagement and when in locking engagement retaining the shaft against rotation, a centering member also mounted in said housing having a slot for conformably receiving the shaft and rotatable therewith, a centering spring for returning said centering member, shaft and handle to centered position, and a backing plate providing a closure for the rear of said housing, said locking plate at its inner end within the housing provided with spaced projections spanning and spaced from said shaft when the locking plate is retracted for free rotation of the shaft, a slot adjacent said projections adapted to conformably receive the shaft when the locking plate is moved inwardly to its locking position, an extension on said centering member and provided with an upstanding flange upon which the ends of said centering spring are anchored, upstanding spaced flanges on said locking plate between which the extension and upstanding flange on said centering member are disposed when the locking plate is moved inwardly to locking position whereby said centering member and the shaft are prevented from rotating and retracting the latch bolt, spaced projecting lips on the outer edges of the spaced projections of said locking plate, and resilient means mounted adjacent the sides of said spaced projections having detents adapted to engage either edge of a projecting lip to hold the locking plate in either locked or unlocked position.

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