Oct. 25, 1955 J. T. RUDIS ET AL 2,721,750

LATCH MECHANISM

Filed Jan. 16, 1952 2 Sheets-Sheet 1

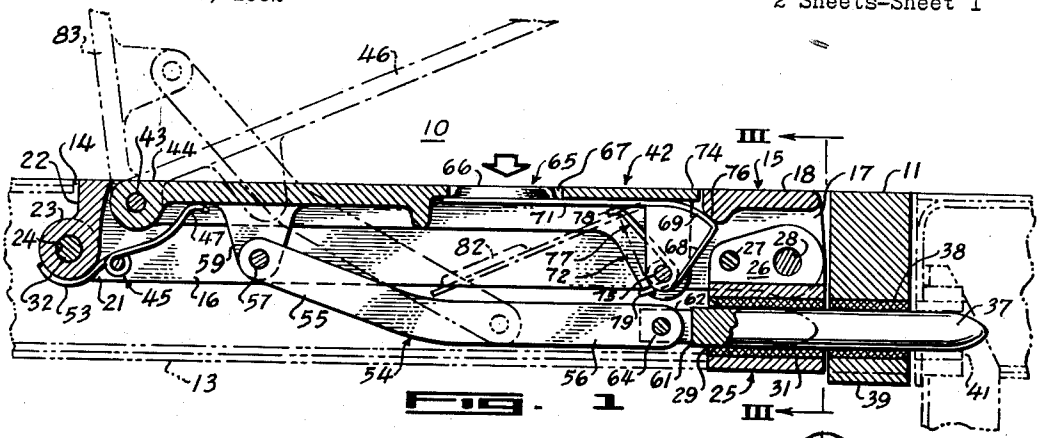


FIG. 1

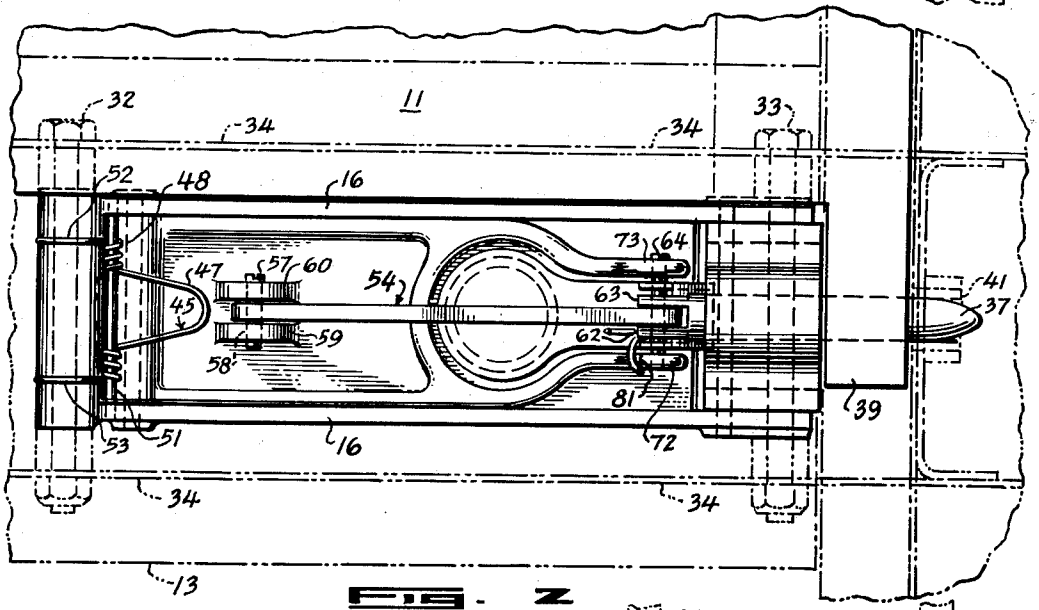


FIG. 2

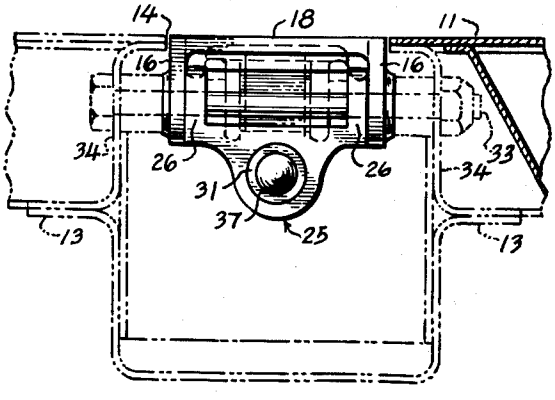


FIG. 3

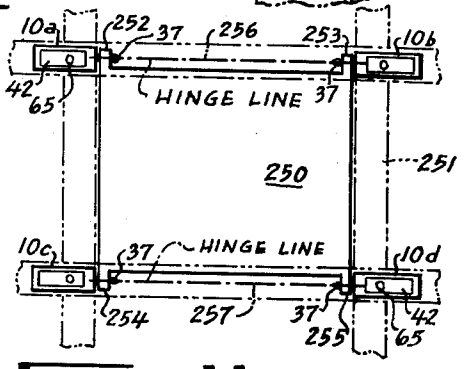


FIG. 4

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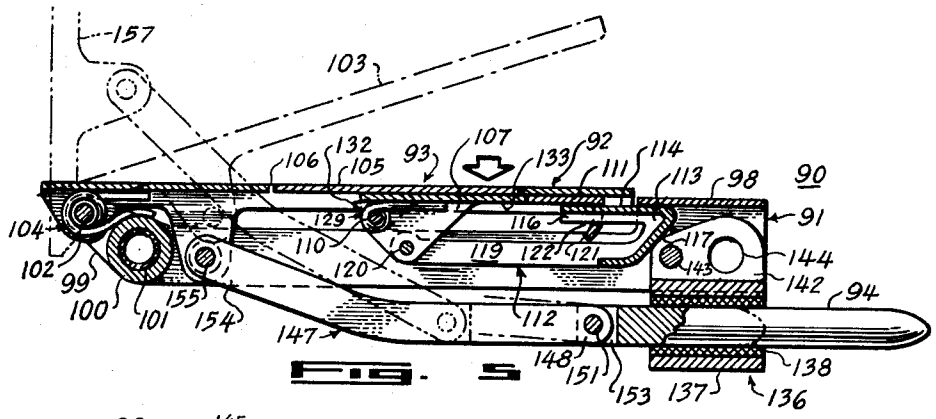


Fig. 5

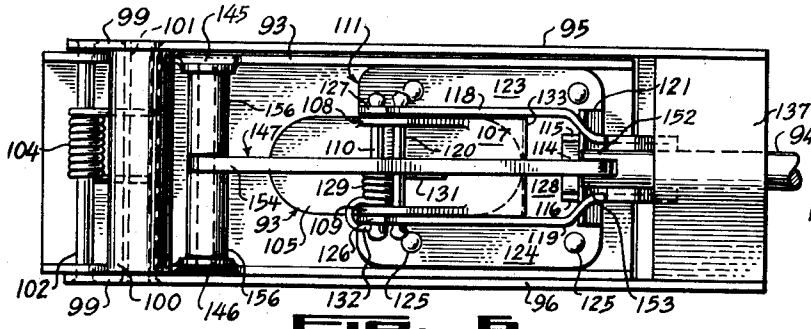


Fig. 6

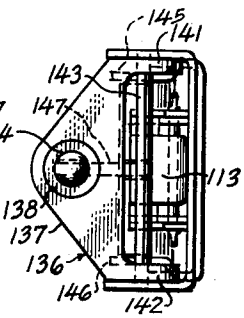


Fig. 7

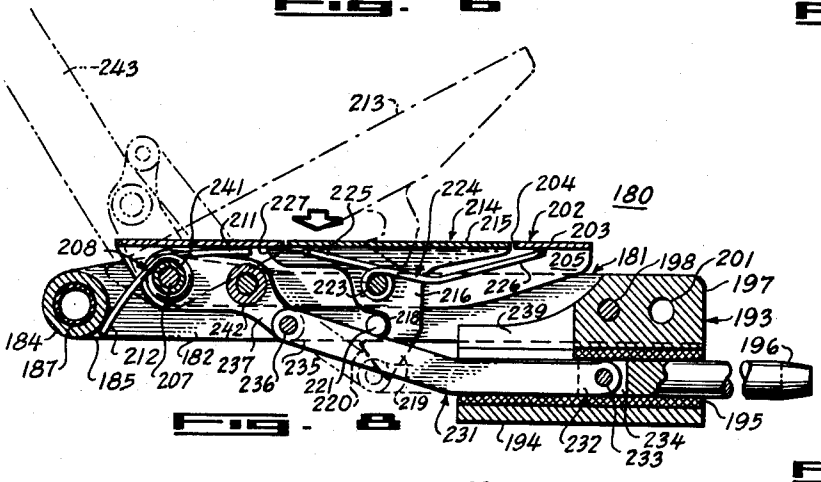


Fig. 8

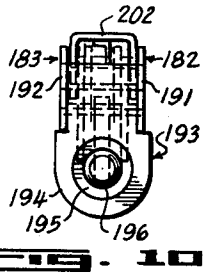


Fig. 10

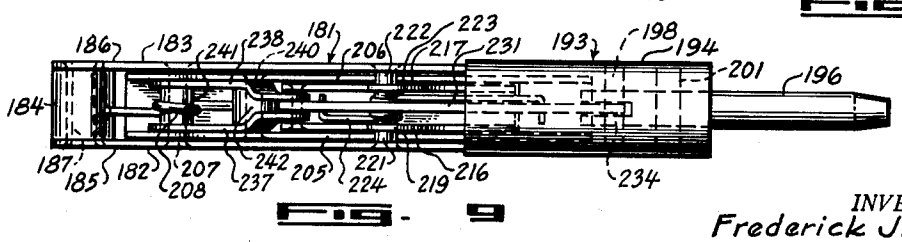


Fig. 9

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LATCH MECHANISM

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Application January 16, 1952, Serial No. 266,766

6 Claims. (Cl. 292—139)

This invention relates to latch mechanisms and more particularly to flush type latches.

An object of the present invention is to provide a flush type latch mechanism having an improved construction adapting it for use both as a restraining member and as a hinge for doors, aircraft engine cowl panels, and like coverings for openings.

Another object of the present invention lies in the provision of an improved latch mechanism wherein its locking bolt is under the control of an operating handle adapted to lie with its outer surface flush with the outer surface of the door or other closure with which it is used, the operating handle normally being maintained in flush position by a flush mounted manually actuable latching lever carried by the operating handle.

Another object of the present invention resides in providing a flush type latching device having an improved construction particularly adapting it for use in aircraft where smooth contours are a primary consideration.

Another object of the invention is to provide an improved flush type latching device for use on aircraft for securing access doors, cowling, inspection hole closures, and the like, which latching device embodies a construction which is extremely reliable and insures against a closure member being inadvertently opened, but which is adapted manually to be readily and easily operated to permit a covering to be opened quickly when such is desired.

A further object of the invention is to provide a unique mounting arrangement for a closure covering utilizing a plurality of latch mechanisms of the above described character for hingedly supporting the closure covering with its exterior surface being flush or in streamlined relationship with the exterior surface of the member which carries the closure covering.

A still further object of the invention is the provision of an improved construction for a latching device embodying a novel locking bolt which is adapted to serve as a hinge member about which a closure covering may be swung.

A further object of the invention is the provision of an improved flush type latch mechanism which is characterized by its simplicity, its lightness of weight, its efficiency, its low cost of manufacture, and its durability.

Other objects and features of the present invention will be readily apparent to those skilled in the art from the following specifications and appended drawings wherein is illustrated a preferred form of the invention, and in which:

Figure 1 is a sectional view of a latch constructed in accordance with the present invention, the latch being shown in latched condition.

Figure 2 is a fragmentary view illustrating the bottom of the latch of Figure 1 and showing a portion of the framing structure which carries the latch, and further showing a portion of the cover secured by the latch.

Figure 3 is an end view taken along line III—III of Figure 1.

Figure 4 is an illustration of a door hingedly mounted by a plurality of latches which are constructed in accordance with the present invention.

Figure 5 is a sectional view of a modified form of the latch of this invention.

Figure 6 is a bottom view of the modified form of latch of Figure 5.

Figure 7 is an end view of the latch of Figure 5.

Figure 8 is a sectional view illustrating a further modification of the invention.

Figure 9 is a bottom view of the modified latch of Figure 8; and

Figure 10 is an end view of the latch of Figure 8.

Having reference now with greater particularity to the drawings, there is shown in Figures 1 to 3, inclusive, an illustrative embodiment of the latch of the present invention, which is generally designated by the numeral **10**. Latch **10** is illustrated as mounted in latching position adjacent a cover, indicated generally at **11**, which cover may be an access door, inspection door, cowl panel, or any other like cover which is releasably to be latched. It is understood that cover **11** may be embodied in an airplane, vehicle, other conveyances or any structure where an openable cover must be used. Cover **11** may be swingably mounted upon a wall, a panel, an engine nacelle, a wing, or any other structure having an opening to be closed.

Cover **11** is designed, when in latched position, to lie in flush relation to a framing structure **13** defining an opening to be covered.

Framing structure **13** is provided with an opening **14** adjacent an edge of cover **11**, within which opening the latch **10** is adapted to be operatively supported in a manner to be described.

Latch **10** comprises a generally rectangular frame or supporting bracket **15** having a pair of downwardly depending, laterally spaced flanges or side walls **16** interconnected at one of their ends **17** and at the top edges thereof by an integral web **18** whose exterior surface is flat or otherwise conforms closely to the exterior surface of cover **11** and framing **13** to lie in flush relationship therewith. The opposite ends **21** of the flanges **16** are interconnected by an integral end wall **22** having a thickened portion **23** at its lower end with a transverse opening **24** therethrough for a purpose to be described. A guide block **25** having laterally spaced upstanding flanges **26** is secured to the ends **17** of flanges **16** by a pin **27** which passes through aligned openings in the guide block flanges **26** and has its ends fixed, as by peening to the flanges **16**. Guide block flanges **26** are provided with aligned bolt receiving openings **28** and the guide block **25** itself has a longitudinal bore **29** which accommodates a bushing **31** serving a purpose to be described.

Latch frame **15** is fixedly secured to framing structure **13** and at the opening **14** therein by bolts **32** and **33**, bolt **32** passing through transverse opeening **24** in end wall **22** and being suitably mounted upon opposed structural members **34** of framing structure **13** and bolt **33** passing through openings **28** in flanges **26** of guide block **25** and also being suitably mounted upon the spaced structural members **34**.

A latching pin or bolt **37** is reciprocally supported in bushing **31** and is adapted to be extended beyond the end of bushing **31** and into a bushing **38** carried by a projection **39** of cover **11** and positioned in alignment with bushing **31**. A third bushing **41** may be positioned on framing structure **13** in alignment with bushings **31** and **38** to receive the end of bolt **37** and provide support therefor.

An elongated actuator or handle **42** is fitted into the space between flanges **16** of frame **15** and is of a configuration which adapts it to substantially close this space.

The outer surface of actuator 42 when in its closed position as shown in full lines in Figure 1, is designed to lie in flush relationship to the outer surface of the cover 11. Actuator 42 is preferably mounted near its end 43 for rotative movement on a transverse pivot pin 44 carried by frame flanges 16 adjacent the upper edge of end wall 22. Actuator 42 is biased by a torsion spring 45 for opening movement in a counterclockwise direction to an intermediate position projecting above cover 11, which position is shown in Figure 1 by broken lines and indicated generally by the numeral 46. Torsion spring 45 includes a medial portion 47 which bears against the undersurface of actuator 42 for urging it outwardly, two spaced series of loops 48 encircling a pin 51 carried by frame flanges 16, and two extending ends 52 and 53 which are curved or bent over the thickened portion 23 of end wall 22 and bear thereagainst.

Actuation of bolt 37 to and from latched position by handle 42 is effected through a connection therebetween afforded by a link 54 having an arm 55 and an arm 56 disposed at an obtuse angle to each other. Pivoted connection of the outer end of arm 55 is made to handle 42 by a screw 57 which has the outer end of its shank 58 threaded and which screw is supported by a pair of laterally spaced depending flanges 59 and 60 provided on the undersurface of handle 42 at a position displaced from the pivoted end 43 of handle 42. The end of arm 55, as shown in the drawings, lies positioned between depending lugs 59 and 60, and the pivoted connection therebetween is effected by passing screw 57 through aligned openings in lug 59 and arm 55 and screwing the threaded end of screw 57 into an opening in the second lug 60, the arm 55 being adapted to rotate upon a smooth surfaced portion of the shank 58 of screw 57.

Latching bolt 37 is provided at its outer end 61 with a pair of longitudinally extending projections 62 and 63 between which the outer end of arm 56 of link 54 is fitted. Pivoted connection between link 54 and latching bolt 37 is effected by a pivot pin 64 passed through aligned openings provided in projections 62 and 63 and arm 56.

Actuator or handle 42 under the bias of torsion spring 45 will be urged normally to occupy intermediate position 46 shown by broken lines in Figure 1, wherein it may be readily manually grasped for effecting movement of bolt 37 rectilinearly out of engagement with cover bushing 38 and framing bushing 41 as will be hereinafter further described. To hold handle 42 in closed position, wherein its outer surface conforms to the outer surface of framing structure 13, there is provided a release member or trigger lever 65 which is pivotally supported by handle 42. Release member 65 is preferably constructed of sheet metal which is suitably formed to provide a cover portion 66 which is adapted to close an access opening 67 afforded in the handle 42. The sheet metal material comprising release member 65 is also suitably bent to effect a camming portion 68 having a camming or latching face 69. Cover portion 66 and camming portion 68 of release member 65 are interconnected by a flat section 71 which is adapted normally to abut against the under-surface of handle 42 in the closed position of release member 65. Handle 42 has spaced depending lugs 72 and 73 afforded near its free end 74 to which the camming portion 68 of release member 65 is pivotally connected by a pivot pin 75. It is noted that pivot pin 75, in the closed position of handle 42, is located directly above the pivot pin 64 which connects link 54 and latching bolt 37, that is, both pivot pins lie in the same plane normal to handle 42, as viewed in Figure 1.

Camming face 69 is adapted to engage a depending projection or keeper 76 provided by flange connecting web 18 and thereby hold release member 65 in latched position shown by full lines in Figure 1. Release member 65 is normally maintained in its latched position, by the biasing force of a torsion spring 77 coiled upon pivot pin 75 and having one end 78 bearing against the under surface of section 71 and its other end 79 hooked about lug 72 and lying in a notch 81 provided in an edge surface of lug 72 to prevent slipping therefrom.

Release member 65 is adapted to be moved from closed, or latched position, to a depressed position, indicated by broken lines in Figure 1 at 82, in which latter position the camming face 69 will have moved out of engagement with projection 76. Pivotal movement of release member 65 about its pivot 75 and against the biasing force of spring 77 to free camming face 69 from keeper 76 is accomplished by the application of manual pressure upon the cover portion 66 of release member 65. With camming face 69 disengaged, the biasing force of torsion spring 45 is then available to move handle 42 in a counterclockwise direction to its intermediate position 46, as shown in Figure 1. Manual pressure need be maintained upon cover portion 66 of release member 65 only until handle 42 has moved sufficiently under the urging of spring 45 to carry release member 65 beyond the position where camming face 69 could reengage keeper 76. It is understood that the strength of spring 75 is less than that of spring 45 so that the pressure required to overcome the bias of spring 75 to rotate release member 65 will not prevent torsion spring 45 from effecting the required counterclockwise movement of handle 42 to its intermediate position 46.

The distance moved by handle 42 under the urging of spring 45 is limited and determined by the length afforded link 54 which is pivotally connected to handle 42 and bolt 37. Handle 42 will rotate on its pivot 44 and the ends of interconnecting link 54 will rotate on pivot screw 57 and pivot pin 64 under the bias of spring 45 but the force exerted by spring 45 through link 54 upon pivot 64 is preferably designed not to be sufficient to effect a movement of bolt 37. Thus movement of handle 42 from its closed position to its intermediate position 46 preferably does not result in movement of bolt 37.

To effect retraction of bolt 37 from latching engagement with projection 39 of cover 11, it is necessary manually to grasp handle 42 and move it arcuately in counterclockwise direction from its intermediate position 46 to the position shown by broken lines in Figure 1 and indicated by numeral 83. This manual movement of handle 42 counterclockwise from intermediate position 46 to full open position 83 carries or pulls link 54 with it thereby to apply a withdrawing force to bolt 37 to the pivot connection 64 of link 54 to bolt 37. This results in a rectilinear, withdrawing movement of bolt 37 from locked to unlocked position to free cover 11 for movement relative to framing structure 13. It is noted that bolt 37 is of elongated cylindrical form having substantial thickness to afford strength thereto, and having its forward end somewhat pointed to enable it to readily enter bushings 38 and 41.

Relatching of cover 11 is effected by placing it in flush position and then manually rotating handle 42 from its open position 78 to its closed position. In this movement cam portion 68 of release member 65 will strike against the edge of web 18 to effect rotative movement of release member 65 against the bias of its spring 77, this positions cam face 69 beneath the upper surface of handle 42. As soon as handle 42 is in its closed position spring 77 rotates release member 65 in a clockwise direction to carry cam face 69 into engagement with keeper 76 thereby to latch handle 42 closed.

While latch 10 has been described as mounted on the permanent structure and locking a cover 11 in position by engaging a projection thereof, the invention contemplates supporting the latch on the cover and projecting the bolt 37 into a keeper bushing carried by the permanent structure thereby to secure the cover in place.

The modified form of latch illustrated in Figures 5 to 7, and indicated generally by the numeral 90, comprises

as its essential elements a frame **91**, an actuating handle **92**, a release member **93** for controlling the movements of the actuating handle **92** and a rectilinearly movable elongated, cylindrical bolt **94**.

Frame **91** comprises opposed flanges **95** and **96** connected at one of their ends **97** by an integral web **98** and having adjacent their opposite ends **99** a cylindrical spacer **100** which lies disposed in the space between the flanges **95** and **96** and is supported by a bushing **101** which latter member is itself secured to opposed flanges **95** and **96** by peening of its outer ends. Bushing **101** is adapted to accommodate a bolt (not shown) by means of which frame **91** may be mounted either to an appropriate closure cover or upon the permanent structure. Ends **99** of flanges **95** and **96** are upwardly directed and serve to mount a pin **102** which rotatably supports the actuating handle **92**.

Actuating handle **92** is normally biased for movement to an intermediate position, shown in broken lines in Figure 5 and indicated generally by the numeral **103**, by a torsion spring **104** which extends about pivot pin **102** and has one end bearing against the undersurface of handle **92** and its other end engaging the upper surface of spacer **100**.

Release member **93** serves to maintain actuating handle **92** in its closed position shown in full lines in Figure 5. Release member **93** embodies a trigger plate **105** having a configuration which adapts it to fill substantially an access opening **106** provided in handle **92**. Suitably affixed, as by welding, to the undersurface of trigger plate **105** is a generally U-shaped bracket **107** having opposed legs **108** and **109**, through which extends a pin **110** by means of which release member **93** is pivotally supported upon a bracket **111** affixed to the undersurface of handle **92**. Release member **93** also includes an elongated catch member **112** comprising a nose portion **113** having a platform portion **114** with depending flanges **115** and **116** and an inclined face **117**. Platform portion **114** is flat across its upper surface and is adapted to abut against the undersurface of web **98**. The engagement of the flat upper surface of platform **114** with web **98** prevents the free movement of actuating handle **92** to its intermediate position **103** under the urging of spring **104**. Catch member **112** includes rearwardly extending leg portions **118** and **119** spaced below the platform flanges **115** and **116** and whose outer ends are pivotally supported by a pin **120** upon the legs **108** and **109** of bracket **107** carried by trigger plate **105**. It is noted that pivot pin **120** is located below and to one side of pivot pin **110** about which trigger plate **105** and its bracket **107** pivot as a unit. It is apparent that as trigger plate **105** and bracket **107** are rotated about pivot **110** pivot pin **120** carried by bracket **107** will be moved relative to pivot pin **110** and generally to the left as viewed in Figure 5. Since pivot pin **120** is connected to catch member **112** this will result in the latter also being moved to the left thereby to disengage nose portion **113** from web **98**. Catch member **112** is supported and guided in its movements by a depending flange **121** provided by bracket **111**. Flange **121** is slotted as at **122** to accept platform **114**. Thus as pivot pin **120** is displaced upon movement of trigger plate **105** and bracket **107**, platform **114** will move within slot **122**. The slot **122** is of sufficient dimensions that any generally arcuate movement that may be afforded nose portion **113** is readily accommodated.

Bracket **111** which mounts the pivot pin **120** comprises, as best shown in Figure 6, a flat body portion of generally U-shape having spaced legs **123** and **124** disposed on either side of access opening **106**, each leg being rigidly secured to the undersurface of handle **92** by rivets **125**. Bracket **111** includes spaced lugs **126** and **127** which support pivot pin **110**. Slotted flange **121** which guides and supports nose portion **113** of catch **112** is bent downwardly from the bight portion **128** of bracket **111**.

To maintain release member **93** in its closed position there is afforded a torsion spring **129** encircling pivot pin **110** and having one end portion **131** bearing against the undersurface of bracket **107** and its other end portion **132** hooked about lug **126** to engage the undersurface of bracket **111**. As shown in Figure 5, the body portion **133** of bracket **107** extends beyond an end of access opening **106** to abut against the undersurface of handle **92** to limit the outward movement of trigger plate **105** to a position wherein its outer surface lies substantially flush with the exterior surface of handle **92**.

A guide block **136** having a body portion **137** with a through bore within which is positioned a bushing **138** and having upstanding spaced flanges **141** and **142** is carried by frame **91** just below web **98**. A suitable pin **143** passing through aligned openings in flanges **141** and **142** and having its ends secured to frame flanges **95** and **96** mounts guide block **136** in the required location. Aligned openings **144** are afforded in upstanding flanges **141** and **142** for accommodating a bolt (not shown) for mounting the latch **90** upon a suitable cover or permanent structure.

Guide block **136** with its bushing **138** supports bolt **94** for rectilinear movement. Actuation of bolt **94** is controlled by handle **92** and is effected by interconnecting the inner end of bolt **94** to lugs **145** and **146** provided on handle **92** by means of an angled link member **147**. As shown, one end **148** of link **147** is pivotally connected by a pin **151** to rearwardly extending, spaced projections **152** and **153** of bolt **94** and the other end **154** of link **147** is rotatably mounted on a pivot pin **155** carried by handle lugs **145** and **146**. Spacers **156** are also positioned on pivot pin **155** on either side of the point of connection of end **154** of link **147** to hold the end **154** generally centrally on pin **155**. The operation of latch **90** is similar to that of latch **10** first hereinbefore described. Actuating handle **92** is adapted to move in a counterclockwise direction to its intermediate position **103** under the urging of its spring **104** when trigger plate **105** and bracket **107** of release member **93** are manually caused to rotate clockwise against the resistance of spring **129** about pivot pin **110** to move catch **112** to disengage its nose portion **113** from web **98**. As in the case of latch **10** movement of handle **92** by spring **94** to its intermediate position **103** does not result in any movement of bolt **94** from its latched position shown in full lines in Figure 5, the ends of interconnecting link **147** in this free movement of handle **92** merely rotating about two pivot pins **151** and **155**. In its intermediate position **103** handle **92** is adapted to be grasped readily and moved counterclockwise to open position, shown in broken lines in Figure 5 and indicated by the numeral **157**. In this latter movement of handle **92**, end **154** of link **147** is moved outwardly and to the left thereby applying a pulling force at the pivot pin connection **151** of link **147** to bolt **94** to result in rectilinear movement of bolt **94** within bushing **138** to its unlatching position.

To return bolt **94** to its latched position handle **92** is merely moved in clockwise direction toward frame **91** to apply pressure, through link **147**, upon the end of bolt **94** and cause it to move rectilinearly within its bushing **138** to project beyond the end of the bushing. As handle **92** is moved into closed position inclined face **117** rides upon the edge of web **98**, to displace catch **112** against the bias of spring **129** and permit the nose portion **113** thereof to clear web **98**. As soon as nose portion **113** is clear spring **129** exerts its force to rotate trigger plate **105** and bracket **107** counterclockwise to force catch **112** to the left to position the platform portion **114** thereof beneath web **98** and thereby secure handle **92** in its closed position.

Reference is now made to the form of the invention shown in Figures 8 to 10 which includes the essential elements of the two embodiments previously described. This third modification of the latch of the present invention is indicated in the drawings generally by the numeral **180**

and comprises a frame **181** formed of two side wall members **182** and **183** held in spaced relation by a spacer **184** positioned between the ends **185** and **186** of the wall members. A concentric bushing **187** whose outer ends are secured to the wall members **182** and **183**, as by peening, mounts spacer **184** and is adapted to accommodate a bolt (not shown) which attaches latch **90** to the particular cover with which latch **90** is to be used. Affixed to the opposite ends **191** and **192** of wall members **182** and **183** is a guide member **193** comprising a generally cylindrical body portion **194** bored to accept a bushing **195** within which is positioned, for rectilinear movement, a latching bolt **196**. A protuberance **197** is provided upon the cylindrical body portion **194** and is transversely bored to permit the passage of a mounting pin **198** whose opposite ends are suitably fixed to side wall members **182** and **183** thereby to attach guide member **193** to frame **181**. A transverse bore **201** is provided in protuberance **197** through which a bolt (not shown) may be passed for mounting latch **90** to its cover.

An actuating handle **202** comprising a base portion **203** with an access opening **204** and two depending spaced flanges **205** and **206** is pivotally mounted upon frame **181** by a pin **207** which extends through aligned openings in flanges **205** and **206** and has its ends affixed to side walls **182** and **183** of frame **181**. A torsion spring **208** supported by pin **207** and having end portions **211** and **212** engaging respectively the undersurface of handle **202** and spacer **184** exerts its force to move handle **202** to an intermediate position shown by broken lines in Figure 8 and identified by the numeral **213**. To hold handle **202** in its closed position shown by full lines in Figure 8 there is provided a release member **214**. Release member **214** comprises a base portion **215** which conforms in shape to that of access opening **204** in handle **202** and is adapted to substantially fill such opening. Projecting downwardly from base portion **215** are two flanges **216** and **217** each having a notch **218** provided in an edge surface to effect a hook **219** having an inclined face **220**. Keeper pins **221** and **222** are affixed respectively to side wall members **182** and **183** of frame **181** for cooperation with hooks **219**, the pins projecting sufficient distance from the wall members to be received within notches **218** of flanges **216** and **217** thereby to latch release member **214** to frame **181**. Release member **214** is rotatably supported upon handle **202** by a transverse pivot pin **223** affixed to handle flanges **205** and **206**. Pivot pin **223** is located directly above keeper pins **221** and **222** in the same vertical plane. Hooks **219** are adapted normally to be held in engagement with keeper pins **221** and **222** by the force of a spring **224** mounted on pivot pin **223** having one end **225** bearing against the undersurface of base portion **215** of release member **214** and its other end **226** engaging the undersurface of base portion **203** of actuating handle **202**. Spring **224** by holding hooks **219** in engagement with keeper pins **221** and **222** releasably secures release member **214** to frame **181** and positions the outer surface of base portion **215** of release member **214** substantially in flush relationship with the outer surface of handle **202**. To assure that this flush relationship is attained, a projection **227** is afforded on base portion **215** of release member **214** which under the urging of spring **224** engages the undersurface of the handle **202** in an area adjacent the access opening **204**.

Rectilinear movement of bolt **196** within its bushing **195** on operation of handle **202** is effected through an angled link **231** having one end **232** pivotally connected by a pin **233** to rearwardly extending projections **234** of bolt **196** and having its other end **235** pivotally secured by a pin **236** to connecting brackets **237** and **238** movable with handle **202**. It is noted that cylindrical portion **194** of guide member **193** is cut away as at **239** to permit the rotation of link **231** about its connection to bolt **196**. In this rotative movement link **231** is adapted to pass between the ends of keeper pins **221** and **222** which project from walls **182** and **183** of frame **181**. Brackets **237** and **238** are pivotally connected at one of their ends to pivot pin **207** and are supported on handle **202** by a pin **240** whose ends are suitably rigidly fixed to handle flanges **205** and **206**. Spacers **241** and **242** supported respectively on pin **207** and pin **240** hold connecting brackets **237** and **238** in spaced apart relationship. It is apparent that as handle **202** moves, carrying pin **240** with it, there will be a pivotal movement of brackets **237** and **238** about pin **207** and displacement of pin **236** which joins the ends of the brackets to the end **235** of link **231** thereby shifting the position of link **231**.

The operation of latch **180** is substantially the same as that of latches **10** and **90** previously described. Manual pressure is applied to release member **214** to rotate it about pivot **223** against the bias of spring **224** to disengage hooks **219** from keeper pins **221** and **222** thereby freeing handle **202** from frame **181** and permitting spring **208** to rotate handle **202** counterclockwise to its intermediate position **213**. This movement of handle **202** shifts end **235** of link **231** upwardly and rotates its other end **232** about pin **233** mounted on bolt **196**. As in the case of the other latches described this initial operation of handle **202** does not affect bolt **196**, there being no force applied at pin **233** sufficient to shift bolt **196**. To actuate bolt **196** to its unlatched position it is necessary to grasp and move handle **202** arcuately to its full open position shown by broken lines in Figure 8 and indicated by the numeral **243**. This movement of handle **202** shifts link **231** to pull bolt **196** to the left to its unlatched position.

In returning handle **202** to its closed position shown in full lines in Figure 8, the inclined faces **220** of hooks **219** ride over keeper pins **221** and **222** until a position is reached wherein the keeper pins **221** and **222** can slide within notches **218** thereby to secure release member **214** in position and latch handle **202** to frame **181**.

Thus in each of the latches described the actuating handle is maintained in a latched position by a release member which when operated results in the actuating handle being moved under spring action to a first or intermediate position. This initial movement of the actuating handle has no effect on the latching bolt. In order to effect rectilinear movement of the latching bolt it is necessary to displace the actuating handle to a second position. In this latter operation the elements interconnecting the handle and the latching bolt are moved bodily to apply a withdrawing force to the end of the latching bolt. The latches are readily installed in operative position by the use of a pair of mounting bolts. Each of these latches may be installed directly on a cover in a suitable opening therein and have its latching bolt cooperate with means on the permanent structure to releasably maintain the cover in closed position, or the latch may be supported upon the permanent structure and have latching engagement with the cover.

As was hereinbefore stated, the latches of the present invention are adapted to serve as hinge means for a cover. Figure 4 illustrates adaptation of the latches to such use. As shown a cover **250** is located within a surrounding framing structure **251** and with its exterior surface in flush relationship to the surface of the wall carrying the framing structure **251**. Four latches are employed with cover **250**, these latches could be latches **10**, **90** or **180** hereinbefore described. Assuming that the latches shown in Figure 4 are of the preferred construction illustrated in Figures 1 to 3, there will be suitably mounted to framing structure **251** one latch at each of the four corners of the cover **250**, these latches for the sake of convenience of description are identified by the numerals **10***a*, **10***b*, **10***c* and **10***d*. As shown, cover **250** preferably has four projecting portions **252**, **253**, **254**, and **255**, one located at each of its four corners and each adapted to be engaged

by the cylindrical latching bolt **37** of the particular latch positioned adjacent thereto. Cover **250** will thus be held in required position by the four latching bolts **37**. It is noted that the latches **10***a*, **10***b*, **10***c* and **10***d* are positioned, a pair adjacent opposite edges of cover **250**, and so located that the latching bolt **37** of latch **10***a* is oppositely disposed to and coaxially aligned with the latching bolt **37** of latch **10***b* and that the latching bolt **37** of latch **10***c* is similarly located relative to latching bolt **37** of latch **10***d*.

Providing a latching engagement, as described, at the four corners of cover **250** will adapt the cover **250** to be swingably moved either about a hinge line **256** passing through cylindrical bolts **37** of the pair of spaced latches **10***a* and **10***b* or about a second hinge line **257** extending through the cylindrical bolts **37** of spaced latches **10***c* and **10***d*.

To swing door **250** about the hinge line **257** it is necessary merely to depress release members **65** of latches **10***a* and **10***b* to free handles **42** for manual actuation thereof to effect the withdrawal of bolts **37** from engagement with cover projections **252** and **253**. The bolts **37** of the second pair of latches **10***c* and **10***d* may then serve as hinges for cover **250** and the cover may then be moved to open position as by means of handholds (not shown) suitably located thereon.

It is apparent, then, that cover **250** may be selectively rotated about either hinge line **256** or hinge line **257** dependent on which pair of latches is maintained in latched position to project the latching bolts **37** thereof to serve as hinges. It is also evident that the cover **250** may be removed completely by disengaging all of the latches.

In some installations it may be more desirable to support the four latches upon the cover itself and in such case the latching bolts will be adapted to project outwardly beyond the edges of the cover to be received within suitable apertures afforded on the framing structure defining the opening to be covered.

While certain preferred embodiments of the invention have been specifically disclosed, it is understood that the invention is not limited thereto, as many variations will be readily apparent to those skilled in the art and the invention is to be given its broadest possible interpretation within the terms of the following claims.

What we claim is:

1. In a latch mechanism, a support member, an actuating handle mounted for pivotal movement on said support member, a latching bolt, means carried by said support member for slidably mounting said latching bolt for rectilinear movement between projected and retracted positions, link means having a pivotal connection to said actuating handle and a pivotal connection to said latching bolt, and spring means for moving said actuating handle from a closed position to an intermediate open position to displace the pivotal connection of said link means to said actuating handle and rotate said link means about its pivotal connection to said latching bolt without movement of the latter from projected position, said actuating handle being movable from its intermediate open position to a second position to transmit a withdrawing force through said link means to said latching bolt to move it to retracted position.

2. In a latch mechanism, a support member, an actuating handle mounted for pivotal movement on said support member, a latching bolt, means carried by said support member for mounting said latching bolt for movement between projected and retracted positions, link means having a pivotal connection to said actuating handle and a pivotal connection to said latching bolt, spring means mounted on said support member and exerting a bias on said actuating handle, movable means carried by said handle and cooperating with said support member for releasably holding said handle in closed position against the bias of said spring means, said movable means adapted when actuated to free said handle for movement by said spring means to an intermediate open position to displace the pivotal connection of said link means to said actuating handle and rotate said link means about its pivotal connection to said latching bolt without movement of the latter to its retracted position, said actuating handle being manually movable from its intermediate open position to a second position to displace said link means bodily to apply a withdrawing force to said latching bolt to move it to retracted position.

3. A latch mechanism comprising support means, an actuating handle mounted for pivotal movement on said support means, a latching bolt, means carried by said support means for slidably mounting said latching bolt for rectilinear movement between projected and retracted positions, link means having a pivotal connection to said actuating handle and a pivotal connection to said latching bolt, spring means exerting its bias upon said actuating handle, means movably mounted on said actuating handle for releasably holding said actuating handle in closed position against the urging of said spring means adapted when actuated to free said actuating handle for movement by said spring means to an intermediate open position to displace the pivotal connection of said link means to said actuating handle and rotate said link means about its pivotal connection to said latching bolt without movement of the latter to its retracted position, said actuating handle being manually movable from its intermediate open position to a second position to transmit a withdrawing force through said link means to said latching bolt to move it to retracted position.

4. A latch mechanism comprising a support member, an actuating handle mounted for pivotal movement on said support member, a latching bolt, guide means carried by said support member for slidably mounting said latching bolt for rectilinear movement between projected and retracted positions, link means having a pivotal connection to said actuating handle and a pivotal connection to said latching bolt, spring means mounted on said support member exerting its bias against said actuating handle, means pivotally supported on said actuating handle and cooperating with said support member for releasably securing said handle in closed position, said pivotally supported means being operable to free said handle for movement by said spring means to an intermediate open position to displace the pivotal connection of said link means to said actuating handle and rotate said link means about its pivotal connection to said latching bolt without movement of the latter to its retracted position, said actuating handle being manually movable from its intermediate open position to a second position to apply a withdrawing force through said link means upon said latching bolt to move it to retracted position.

5. A flush-type latch mechanism comprising a frame member having spaced side walls, an actuating handle pivotally mounted adjacent one end of said frame member and adapted when in closed position to span the space between said wall members to close entry therein-between, a latching bolt, guide means carried by said frame member adjacent the opposite end thereof for slidably mounting said latching bolt for rectilinear movement between projected and retracted positions, a link member having one end pivotally connected to said actuating handle and its other end pivotally connected to said latching bolt, release means movably mounted on said actuating handle and cooperating with said frame member for normally maintaining said actuating handle in closed position, and spring means mounted on said frame member and exerting its bias on movement of said release means to release position to move said actuating handle from its closed position to an intermediate open position to displace bodily the end of said link member connected to said handle and rotate the opposite end of said link member about its connection to said latching bolt without movement of the latter to its retracted position, said actuating handle being manually movable from its intermediate position to a second position to pull said

latching bolt, by means of said link member, from its projected to its retracted position.

6. A flush-type latch mechanism comprising a frame member having spaced side walls, an actuating handle pivotally mounted adjacent one end of said frame member and adapted when in closed position to span the space between said wall members to close entry therein-between, a latching bolt, guide means carried by said frame member adjacent the opposite end thereof for slidably mounting said latching bolt for rectilinear movement between projected and retracted positions, a link member having one end pivotally connected to said actuating handle and its other end pivotally connected to said latching bolt, spring means mounted on said frame member and exerting its bias against said actuating handle, said handle having an opening in its exterior surface, holding means pivotally supported by said handle and spring biased normally to close said opening, said holding means cooperating with said frame member to releasably secure said actuating handle in its closed position and being operable to free said handle for movement by said spring means from its closed position to an intermediate open position to displace bodily the end of said

link member connected to said handle and to rotate the opposite end of said link member about its connection to said latching bolt without movement of the latter to its retracted position, said actuating handle being manually movable from its intermediate position to a second position to transmit a withdrawing force through said link member to move said latching bolt from its projected to its retracted position.

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