United States Patent [19]

Foote

[11] **3,742,742**

[45] **July 3, 1973**

[54] **INSET LOCK FOR LOCKERS AND THE LIKE**

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[73] Assignee: **Master Lock Company,** Milwaukee, Wis.

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[21] Appl. No.: **174,773**

[52] **U.S. Cl.** **70/78,** 70/432, 292/DIG. 68

[51] **Int. Cl.** **E05b 65/02**

[58] **Field of Search** 70/77, 78, 80, 81, 70/82, 83, 84, 207, 208; 292/DIG. 68

[56] **References Cited**

UNITED STATES PATENTS

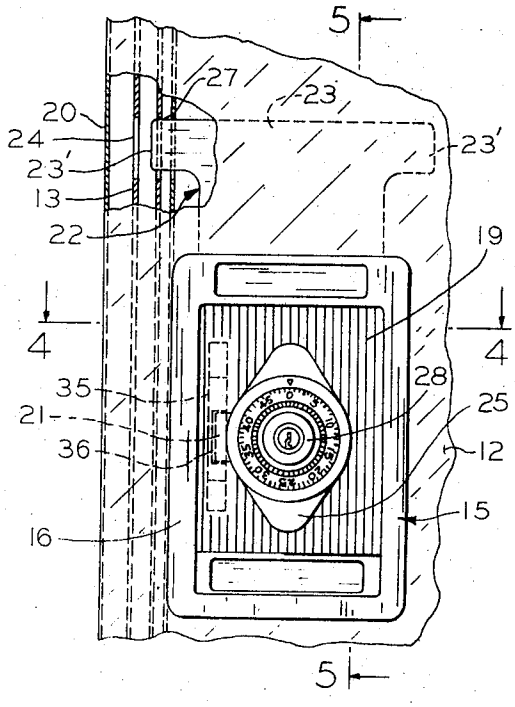
3,058,334	10/1962	Abelson et al.	70/81
2,912,271	11/1959	Schaefer	70/78 X
2,825,219	3/1958	Marzillier	70/82 X

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[57] **ABSTRACT**

The door of a locker or the like has a portion of its front face recessed to receive a lock mechanism (either permutation, or key operated, or both) with the forwardmost portion of the lock mechanism being inwardly of or flush with the front face of the major portion of the locker door. The lock mechanism employs a spring bolt which is retracted and released when the lock is properly operated through its permutation mechanism or the turning of an inserted key. The door is devoid of the usual operating handle and when the spring bolt is released the vertically reciprocating latching bar carried by the inner face of the locker door can be lifted and released for door opening purposes, by using the dialing knob or an inserted key as a handle.

8 Claims, 9 Drawing Figures



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SHEET 1 OF 2

FIG -1

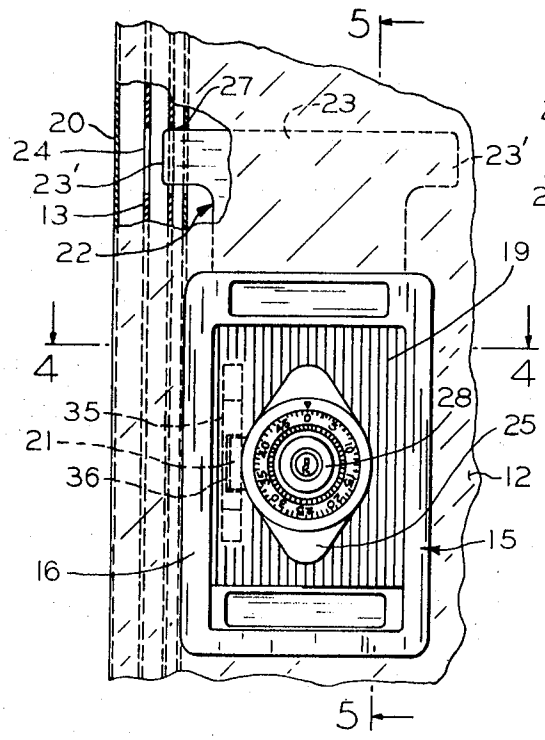


FIG -2

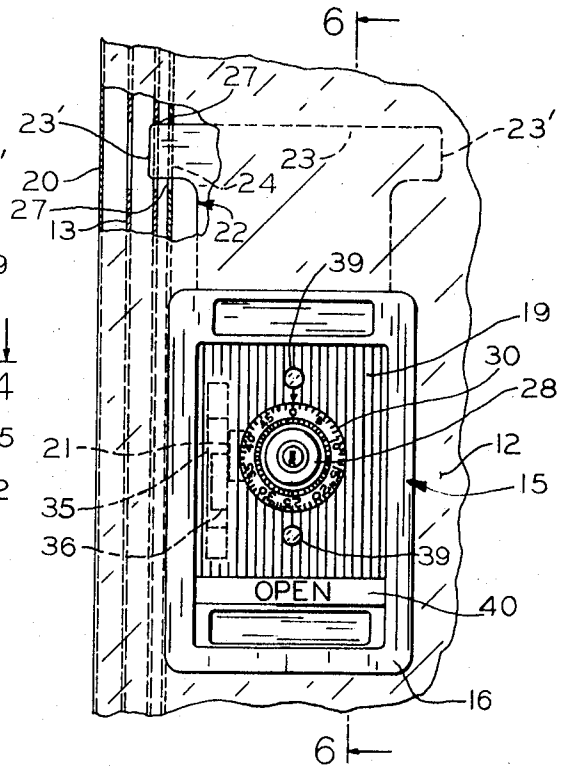


FIG -3

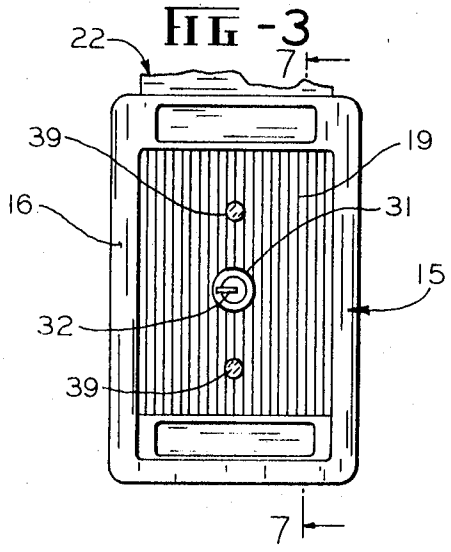
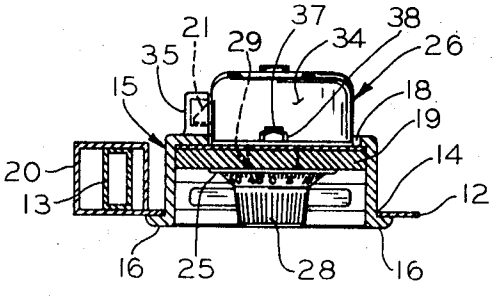


FIG -4



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FIG -5

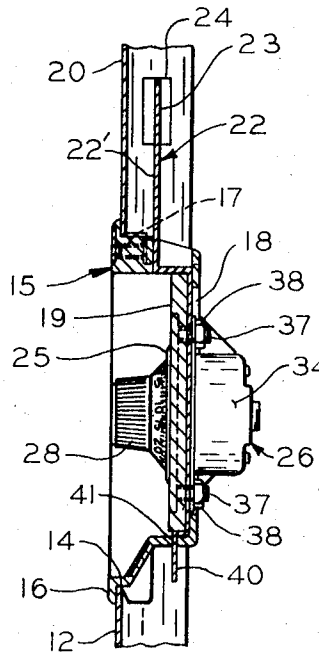


FIG -6

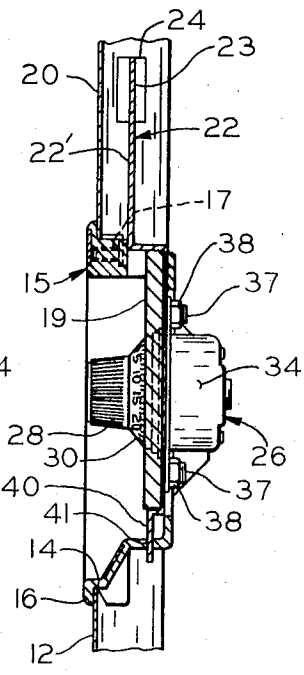


FIG -7

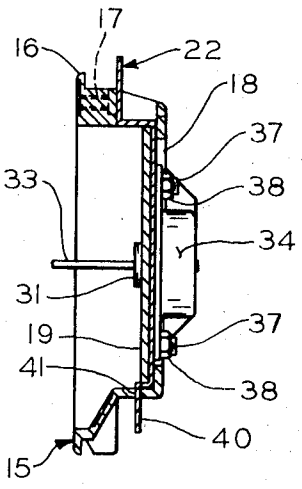


FIG -8

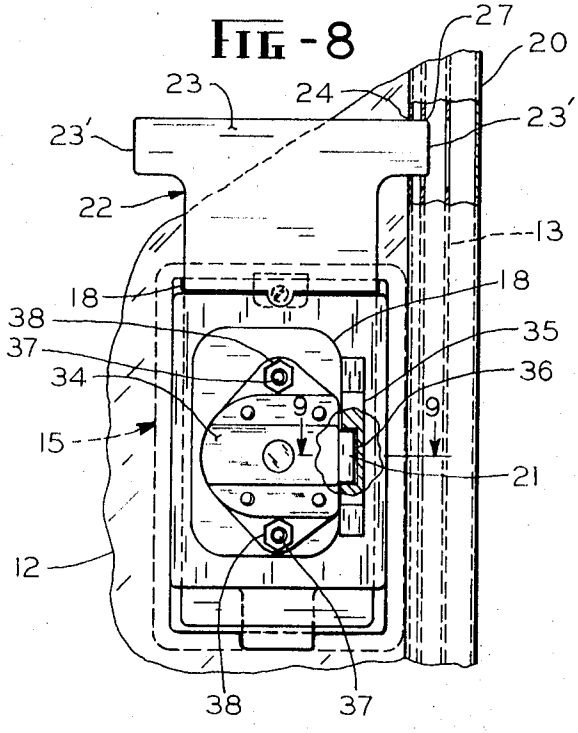
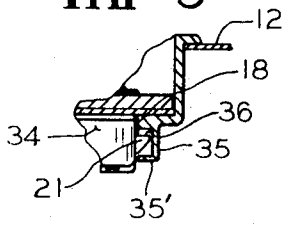


FIG -9



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INSET LOCK FOR LOCKERS AND THE LIKE

BACKGROUND OF THE INVENTION AND ITS OBJECTIVES

Locks which are built into the doors of lockers used in schools, factories, gym, etc., ordinarily require an operating handle on the exterior of the locker door adjacent the built-in lock. Severe problems have developed from the abuse to which these accessible handles and allied mechanism are subjected by destructive persons or tamperers who may kick the locker handles and in other ways apply undue leverage thereto which may be transmitted to the lock bolts and cause damage to the lock cases.

With the foregoing difficulties in mind the present invention provides a vertically reciprocal plate or escutcheon, inwardly mounted relative to the front face of the locker door, carrying a lock whose dialing knob or other protruding element, although protectively housed within the locker door recess, serves as the handle for lifting the lock-carrying plate for door releasing and opening purposes.

A further object of the invention is to provide an inset lock for lockers or the like wherein the inset lock, which is protected against external blows and surreptitious leverage application, serves as the handle for the locker door operation, eliminating the need for a separate and exposed door handle or lift against which an unauthorized person or thief might exert undue forces in trying to raise the locker handle or lift to gain entry into the locker through resulting bending, breaking or jamming of the internal lock parts to improperly release the lock bolt.

A further object of the invention is to provide, in combination with a locker door having an inwardly offset lock recess and a door releasing latching bar, a spring bolt type lock mounted in said door recess on an inset vertically reciprocal plate or escutcheon with the latter being connected to the locking bar whereby, when the lock is operated to retract the spring bolt, the lock knob, or a protruding element of the lock, can be used as a handle to lift the lock carrying plate and through the connections with the latching bar lift and release the latter, for door opening purposes.

Further objects of the invention are to provide an inset lock for handleless locker doors which protects the exposed parts against vandalism, which is easy to install and operate, which is of simple and rugged construction, which is neat and atrractive in appearance, and which is otherwise well adapted for the intended purposes.

In an attempt to protect locker door handles against improper pressures applied thereto by tamperers it has heretofore been proposed to provide locker doors with recessed handles which are in fact nested and the handles serve as lifts. Such constructions do not fully cure the problem because pressures transmitted to the locking bolts may result from improper leverage applied against the lifts.

Applicant has no knowledge of any prior art wherein a handleless locker door has a recessed front area wherein the lock is protectively inset with a protruding but protected portion of the lock, or element thereof serving as a handle for the lifting of the entire lock for door releasing purposes, as opposed to the normal procedure of lifting up on the locker door handle.

BRIEF DESCRIPTION OF THE DRAWINGS

In the drawings wherein the same reference characters indicate the same or similar parts in all of the views:

FIG. 1 is a fragmentary front view of a hinged door for a locker or the like having installed in a face opening an inset lock assemblage wherein the lock mechanism is of the permutation type and the dialing knob is mounted on a teardrop shaped escutcheon plate, the spring bolt being in its locked condition and a portion of the door being broken out to show a structural detail;

FIG. 2 is a view similar to FIG. 1 only showing the dialing knob of the permutation lock mechanism mounted directly on an inset, vertically reciprocal plate which serves as the escutcheon, the lock bolt being retracted and the plate being raised for door releasing purposes:

FIG. 3 is a fragmentary front view of another modification wherein the lock mechanism is a conventional key operated lock mounted directly in an inset, vertically reciprocal, rectangular plate which is shown in its lowered position;

FIG. 4 is a horizontal sectional view taken approximately along line 4—4 in FIG. 1;

FIG. 5 is a vertical sectional view taken on line 5—5 in FIG. 1;

FIG. 6 is a vertical sectional view taken on line 6—6 of FIG. 2;

FIG. 7 is a vertical sectional view taken on line 7—7 of FIG. 3;

FIG. 8 is a fragmentary rear view of a hinged locker door showing the rear of the inset lock assemblage of FIGS. 1 and 2, parts being broken away and in section; and

FIG. 9 is a fragmentary horizontal sectional view taken approximately on line 9—9 of FIG. 8.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

While the improved inset lock assemblage is primarily intended for installation on the horizontally swinging doors of lockers such as are used in schools, factories, gyms, etc., it is equally applicable to the hinged doors of other types of boxes and compartments.

In the drawings, and by way of illustration, the numeral 12 indicates the swinging door of a locker or the like which is shown as being hingedly mounted to swing on a vertical axis along the right hand margin of the door, but obviously the hinged mounting for the door could be reversed. The hinged door is of the type which is releasably maintained in its closed condition by a vertically reciprocating latching bar 13 similar to that shown in the prior Foote et al. U.S. Pat. No. 3,052,114. At a convenient location in the front of the locker door 12, which is generally plane, and relatively close to that vertical margin of the door which swings to and from open position, there is a rectangular opening 14 which receives the inset lock assemblage, which is the subject of the present invention. The latter includes a box-like, open front frame generally indicated by the numeral 15 which is rigidly inset within the door opening 14 by having certain forward peripheral portions thereof flanged, as at 16, and secured to the adjacent underlapped stock of the door 12 by any suitable means which may include rivets 17. The major portion of the

rear of the rigid frame 15 is formed with an opening 18 closed by a vertically reciprocal lock-carrying plate 19 seated within the rear of the frame and overlapping the stock which surrounds the opening 18. Adjacent the left hand margin of the door opening 14 (relative to FIGS. 1, 2, and 4) the inner face of the door rigidly carries a vertical housing 20 in which is vertically reciprocatably mounted the elongated latching bar 13, previously mentioned. When the lock mechanism, later to be described, is operated to release and retract its spring bolt 21, a protruding portion of the inset lock mechanism is manually grasped as a handle to raise the lock carrying plate 19 and a T-plate 22 whose lower portion is affixed to the rear of the plate 19 and which has a forwardly off-set portion 22' projecting above the upper margin of the plate 19. The head 23 of the T-plate has horizontal end extensions 23', one of which, depending on whether the locking door 20 is a right or left hand opening door, projects laterally through an opening 24 therefor in the latching bar housing 20 and into an opening 27 therefor in the latching bar 13. Consequently, an upward reciprocation imparted to the latching bar through a manual lift on the protruding lock elements, and transmitted to the latching bar through the raising of the plate 19 and attached T-plate 22, will release locking dogs on the latching bar (not shown) from hooks (not shown) on the adjacent locker frame whereby the locker door is released and is free to be swung to its open position, as is conventional in the locker door art. Conversely, when the lifting force on the parts is released, the parts will gravitate to their lowered positions and when the locker door is closed there will be latching engagement between the latching bar — carried dogs and the door frame-carried hooks, all as is conventional.

In the form of the invention shown in FIGS. 1, 4 and 5 the lock carrying plate 19 may have fixidly superimposed thereon a specially shaped and decorative escutcheon plate 25 having an opening in its mid-portion registering with an opening 29 in the plate 19 and through which the body of the lock mechanism 26 extends, as best shown in FIGS. 4 and 5, to be beyond the rear face of the locker door and frame 15. The lock mechanism 26 may take different forms, but it includes a spring bolt 21. One acceptable type of lock mechanism may be a key-controlled, combination changing, permutation lock similar to that shown in the Foote et al. U.S. Pat. No. 3,190,089 wherein the lock mechanism actuates a spring bolt. As is shown in FIGS. 1, 2, 4, 5, and 6 of the present drawings the body of the lock 26 being mounted through the inset plate 19, permits the dialing knob 28 to be inset and housed within and protected by the frame 15. Thus, said knob 28 is relatively inaccessible to tamperers who might wish to apply improper leverage thereto or kicks, but the legitimate operator may use the knob 28 as a handle for lifting the parts previously mentioned when the spring bolt 21 has been retracted by proper operation of the lock mechanism.

In the slight modification illustrated in FIGS. 2 and 6 the decorative escutcheon plate 25 of FIGS. 1, 4, and 5 is omitted. Instead, the annular external flange of said dialing knob 28 operates in a circular recess 30 therefor in the reciprocal plate 19.

The second modification of the invention shown in FIGS. 3 and 7 employs a key-operated, spring-bolt lock instead of the permutation lock of FIGS. 1 and 2. As is shown in FIGS. 3 and 7 the cylinder shell 31 is mounted through the inset plate 19, projecting slightly forwardly of the front face of said plate to render accessible from the front of the locker door 12 the key hole 32 in the lock plug. When a proper key 33 is inserted into the key hole 32, through the conventional mechanism the lock bolt will be released as in the other forms of the invention.

The lock mechanisms in all forms of the invention include a mechanism housing rear casing 34 carried by the rear of the reciprocal plate 19 and the attached lower portion of the T-plate 22 and secured thereto by bolts 37 and nuts 38. The spring bolt 21 projects laterally of a side margin of said casing 34, as best shown in FIGS. 8 and 9. The lock mechanism housed within the casing 34, when properly operated, will cause the spring bolt 21 to move laterally from a projected locking position, as shown in the drawings, to a retracted position. As is best shown in FIGS. 8 and 9 the rear face portion of the inset frame 15 adjacent a side margin of the casing receiving opening 18 therein, is formed with a rearwardly projecting lock bolt rib 35. Within said rib and registering with the lock bolt 21 when the plate 19 and parts carried thereby are in their lowered positions, is a bolt slot 36 of a size to snugly accommodate said lock bolt when the latter is projected. Said bolt slot 36 is open only on the inside of the rib 35 and the external overhand 35' of said rib terminates closely adjacent the adjacent side wall of the casing 34. Without this protection for the lock bolt 21 a tamperer, when the locker door was open, might thwart attempts to latch and lock the door in its closed position by inserting a card or pick between the outer end of the retracted lock bolt and an inner side wall portion of the rib 35.

To further appreciate the elimination of the hazard last-described the relocation of certain parts during the steps of unlocking and releasing the locker door should be understood. When the door 12 is closed and locked the components are as shown in FIGS. 1, 4, 5, 8 and 9 with the reciprocal plate 19 being in its normal lowered position and with the spring action on the bolt 21 yieldingly holding the same in its projected locking position wherein the bolt extends into slot 36 in the fixed lock bolt rib 35. Of course in the locked condition of the locker door the latching bar 13, engaged by an extension 23' of the T-plate 22, is in its lowered, latching position.

Upon proper operation of the lock mechanism, whether by dial-manipulation or the turning of a key, the lock bolt 21 will be yieldingly retracted from its lodgment within the rib slot 36 to a freed position which will permit the plate 19 and all parts carried thereby to be lifted somewhat when a manual lift is applied to the lock knob 28 or inserted key 33. The manual raising of the plate 19 and parts carried thereby, including the lock mechanism casing 34 and bolt 21, will move the retracted bolt out of registry with its slot 36 and the outer end of the bolt can then, in its retracted condition, contactingly engage and ride on the solid inside face of the anchored rib 35 above the side entrance to the slot 36, as shown in FIG. 2.

Any convenient means may be utilized for securing the vertically reciprocal plate 19 to the under-lying portion of the T-plate 22. As shown in FIGS. 2 and 3 rivets 39 may be employed for that purpose. Also, the lower margin of the plate 19 may carry a forwardly offset depending flange 40 which, when the locker door

is closed and locked, is concealed behind the stepped lower margin of the fixed frame **15.** However, when the plate **19** and parts carried thereby are raised for door releasing and opening purposes a portion of said flange, moving through a slot **41** in the lower portion of the frame **15,** becomes exposed as is shown in FIGS. **2** and **6** and said exposed portion may carry a suitable legend to advise the operator that the door is open or released. Said legend carrying flange portion disappears when the lock and plate are lowered for door closing purposes.

SUMMARY

The mode of operation of a horizontally swinging locker door equipped with the improved inset lock assemblage should be apparent from the preceding detailed description. However, to briefly capitulate, it should be pointed out that the locker door is formed near its freeable vertical margin with an opening in which is fixedly mounted a frame **15** which projects rearwardly from the plane of the door with the rear of the frame being closed by a vertically reciprocal plate **19.** The latter has mounted in it and through it a lock mechanism which may take several forms but the dialing knob **28** (for a permutation lock) or a key **33** (for a key controlled lock) are substantially confined within the open front frame **15.** The latter is of such limited proportions that it prevents a tamperer or vandal from kicking or applying other types of improper forces and leverage to the exposed portions of the lock mechanism and the locker door is furthermore devoid of the usual handle or lift for operating the reciprocating latching bar to which a temperer might apply surrepticious forces. The limited size of the frame **15** will only permit a legitimate operator to turn the dial **28** or operate a key **33** which results in the retraction of the spring bolt **21.** Then by lifting up on the knob or key or other exposed portion of the lock mechanism within the frame **15,** the plate **19** will be raised, as will be latching bar, through the interposed T-plate **22.** Thus the locker door may be released and opened solely by using the dialing knob or key as a handle or lift. When the door is closed and the exposed lock element is manually released the plate **19** and parts carried thereby will drop by gravity and the spring bolt **21** will snap into the rib slot **36** as in FIGS. **1, 4, 8,** and **9,** and the latching bar **13** will drop to its latching position.

The improved inset lock for lockers and the like is free of manufacturing complications, is easy to install and operate, is of strong and safe construction and discourages tamperers, and is well adapted for the intended purposes.

What is claimed is:

1. In combination, a swinging door for a locker or the like with the face of the door having an opening therethrough adjacent a freeable margin of the door; an actuatable latching bar operatively carried by the door; a frame rigidly set into the door opening and extending rearwardly of the plane of the door and having a portion formed with a bolt receiving slot; movable latching bar controlling means having a portion which forms a shiftable rear of said frame and having another portion extending to and in operative engagement with said latching bar; and a lock mechanism carried by the first-mentioned portion of said latching bar controlling means and having an exposed element confined within said frame but accessible from the front of the frame for manual engagement and operation, said lock mechanism including a reciprocal bolt movable into and out of said bolt receiving slot upon operation of the lock mechanism so that when said bolt is free of said slot, manual force applied to the exposed element of the lock mechanism will transmit movement to the latching bar controlling means to thereby actuate said latching bar.

2. The combination recited in claim **1** wherein the latching bar is mounted for vertical reciprocation, as is the latching bar controlling means, and the lock mechanism bolt reciprocates horizontally and the exposed element of the lock mechanism, when subjected to a lifting force, will raise the latching bar controlling means and the engaged latching bar.

3. The combination recited in claim **2** wherein, when the lifting force on the exposed element of the lock mechanism is released, the latching bar controlling means will gravitate to its normal lowered position.

4. The combination recited in claim **1** wherein the reciprocal bolt is spring loaded.

5. The combination recited in claim **1** wherein the lock mechanism includes a component-containing casing mounted on the rear face of the first-mentioned portion of the latching bar controlling means and is covered and protected thereby.

6. The combination recited in claim **4** wherein the rigidly mounted frame has affixed thereto a slotted bar relative to which the spring loaded bolt may be projected or retracted.

7. The combination recited in claim **2** wherein the portion of the latching bar controlling means which extends into operative engagement with the latching bar is "T" shaped for interchangeable engagement with a latching bar on either margin of the door.

8. The combination with a swinging door for a locker or the like with the face of the door having an opening therethrough adjacent a freeable margin of the door with an actuatable latching member operatively carried by the door adjacent the freeable margin of the latter; of a frame rigidly set into said door opening and extending rearwardly of the plane of the door and having a portion formed with a bolt receiving slot; an inset reciprocal plate closing the rear of the frame and having a first, inactive position and a second, operative position; a manually operated lock mechanism including a reciprocal bolt carried by said plate to control locking and release of the latter and plate reciprocations; and motion transmitting means extending between said plate and said latching member and being movable with said reciprocal plate when the lock bolt is free of its frame slot through operation of the lock and movement of said plate from its first position to its second position, the latter being accomplished by manually moving a plate carried element.

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