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Joseph et al.

[11] **3,744,831**

[45] **July 10, 1973**

[54] **UNITARY LOCKER DOOR LATCH**

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[52] **U.S. Cl.** **292/81**, 292/DIG. 68, 292/244

[51] **Int. Cl.** **E05c 1/06**

[58] **Field of Search** ..... 292/17, 76, 77, 81, 292/86, DIG. 30, DIG. 68, 137, 184

[56] **References Cited**

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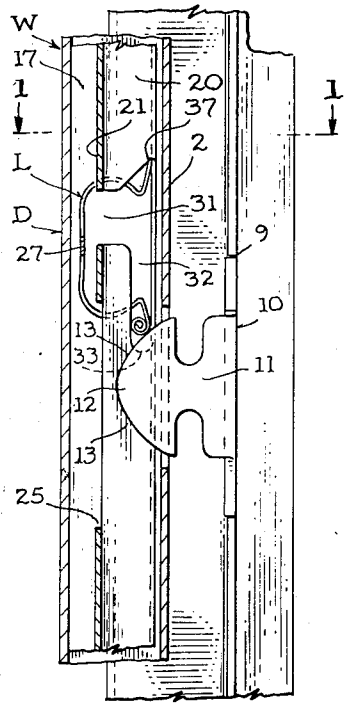
Primary Examiner—Richard E. Moore

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[57] **ABSTRACT**

A door latching mechanism includes a rigid hook element mounted upon one component of an enclosure and cooperating with a spring latch member of substantially C-shaped configuration mounted upon another component of the enclosure. A lock bar is provided of improved construction adapted to receive and retain the spring latch member without the use of separate fastening elements.

12 Claims, 6 Drawing Figures



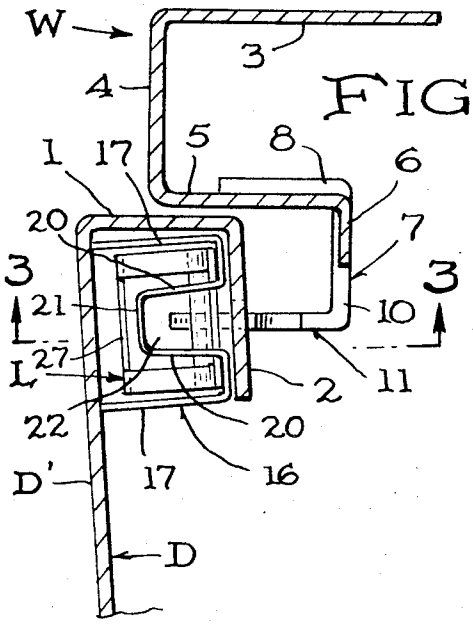


FIG. 1.

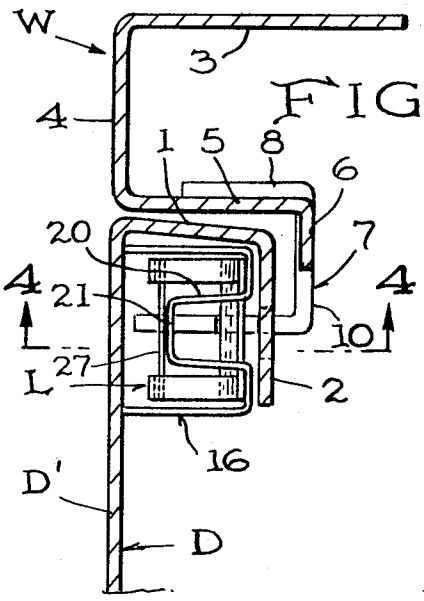


FIG. 2.

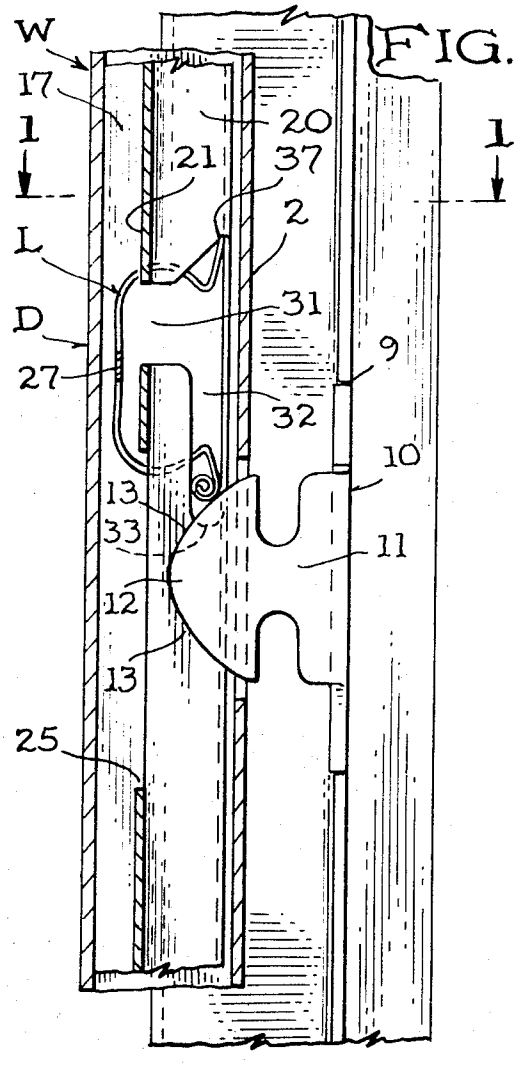


FIG. 3.

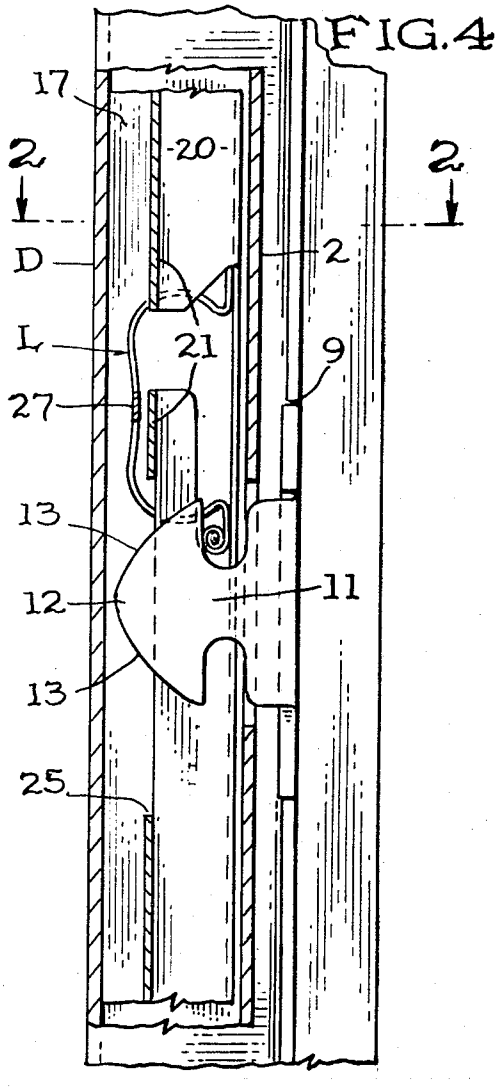


FIG. 4

FIG. 5.

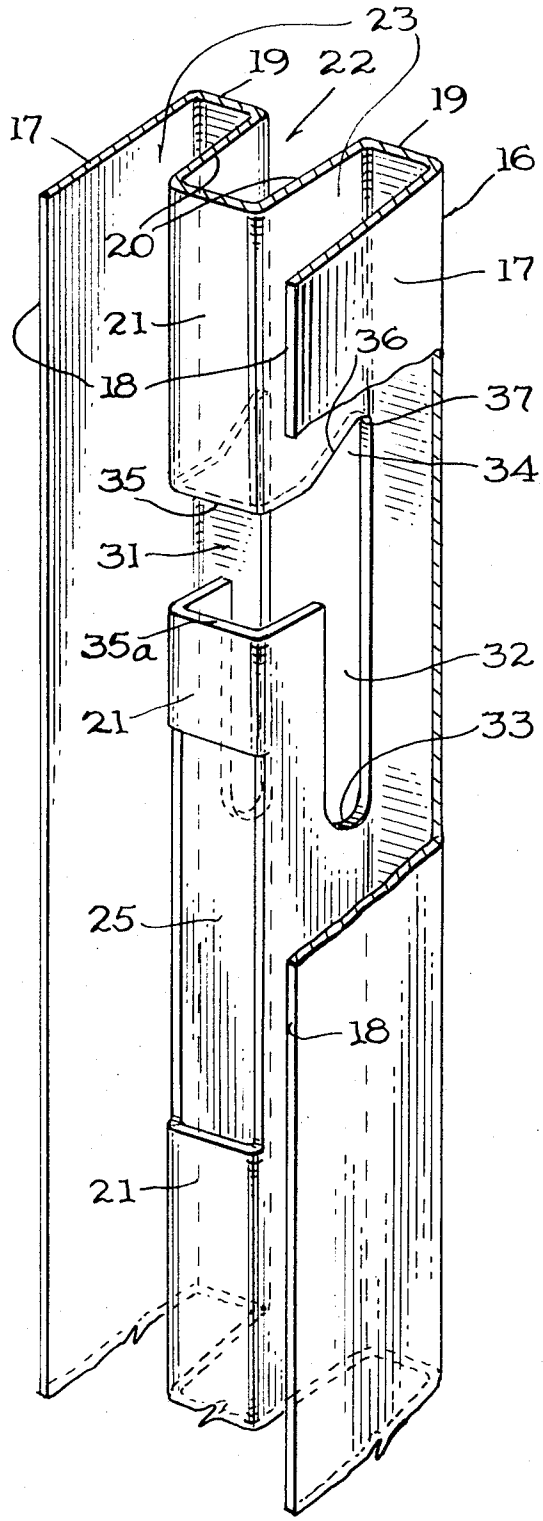
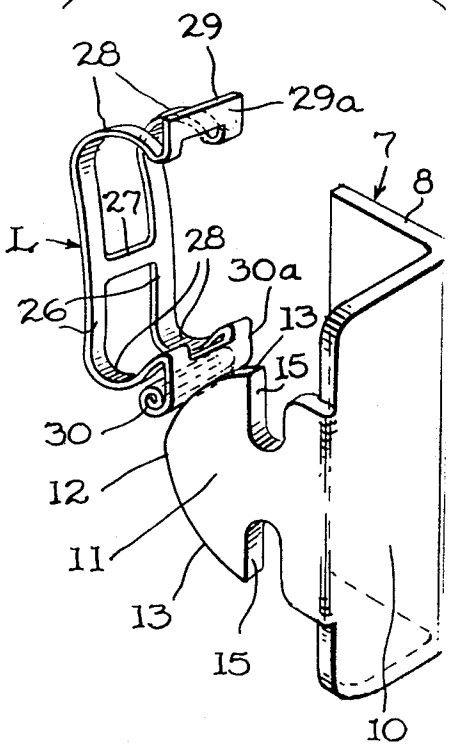

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FIG. 6.


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UNITARY LOCKER DOOR LATCH

This invention relates generally to a latching mechanism and more particularly to latch devices especially adapted for use with cabinet or locker closures such as metal wall lockers.

Latching mechanisms are well known for use in connection with the doors of enclosures wherein one component, either the door or casing, is provided with a hook element or keeper while the other component is equipped with a latch member such that when the door is closed, the hook element strikes the latch member to cause a deflection thereof followed by a subsequent engagement of a portion of the latch member with a catch on the hook element thereby retaining the door in the closed or locked position. An exemplary structure is shown in U.S. Pat. No. 2,835,523 issued May 20, 1958. The arrangement shown in this patent is typical of the means commonly employed to disengage various latch devices from the keeper or hook element and includes a vertically displaceable lock or lift bar to which the latch element is attached whereby upon elevation of this lock bar by any suitable handle means accessible from the exterior of the door, the latch device is disengaged from the keeper member so that the door may be opened. An additional example of the prior art will be found in Application Ser. No. 26,699 filed Apr. 8, 1970 and which is assigned to the assignee of the instant invention.

The majority of the prior known latching mechanisms in this area involve the fabrication of a plurality of sometimes intricate components, many of which require extensive labor to produce and to subsequently assemble. An apparent objection to the use of a mechanism comprising a plurality of parts is the noise generated during opening and closing of the door even considering the provision of various bumper and cushion means in an effort to preclude much of this noise. Additionally, forcible entry is quite often readily attainable with many of the known devices since some of these may be jarred to an open position by the application of a sharp blow to the operating handle. The security of the present apparatus is further insured by the use of a high grade heat treatable spring steel of minimum thickness in the formation of the instant spring latch, thus significantly reducing the mass of the latch device to both discourage noise during use as well as displacement caused by striking blows applied to portions of the enclosure components.

Accordingly, one of the primary objects of the present invention is to provide an improved unitary locker door latch formed of spring steel and having a minimum thickness and mass.

Another object of the present invention is to provide a latching mechanism including a stationary frame hook engageable with a spring steel latch carried by a movable component of an enclosure and including a curled end section on the latch.

A further object of the present invention is to provide an improved latching device including a spring steel latch member carried by a lock bar of substantially W-shape and provided with an access opening therein for receiving and retaining the spring latch member.

Still another object of the present invention is to provide an improved spring steel latch member adapted to be freely mounted within a lock bar and having a configuration which when viewed in side elevation is C-shaped and when viewed in front elevation is H-shaped.

With these and other objects in view which will more readily appear as the nature of the invention is better understood, the invention consists in the novel construction, combination and arrangement of parts hereinafter more fully described, illustrated and claimed.

A preferred and practical embodiment of the invention is shown in the accompanying drawings, in which:

FIG. 1 is a partial horizontal sectional view taken along the line 1—1 of FIG. 3 and illustrates the unitary locker door latch of the present invention as carried by a door and shown in an open position with respect to an enclosure casing or frame.

FIG. 2 is a view similar to FIG. 1 and illustrates the components in the closed and latched position as taken along the line 2—2 of FIG. 4.

FIG. 3 is a vertical view, partly in section, taken along the line 3—3 of FIG. 1.

FIG. 4 is a vertical view, partly in section, taken along the line 4—4 of FIG. 2.

FIG. 5 is an enlarged fragmentary perspective view of the lock bar of the present invention.

FIG. 6 is an exploded perspective view and illustrates in an enlarged manner the spring steel latch and frame hook of the present invention.

Similar reference characters designate corresponding parts throughout the several figures of the drawings.

Referring now to the drawings, it will be appreciated that although the present invention is illustrated as combined with the construction of an enclosure suggestive of a metal wall locker, the unique structure involved herein may be practiced with any type of arrangement including an enclosure provided with components including a door and a related frame or casing.

An enclosure, such as the wall locker shown in the fragmentary views of FIGS. 1–4, is generally designated W and includes a movable panel or door D provided with an outer face D′ and having an inturned side edge 1 terminating in an inner flange 2. It will be understood that the opposite vertical side edge (not shown) may be attached by any suitable means well known in the art to the opposite side of the locker casing to permit pivoting of the door D from its fully opened to its locked position. The casing of the wall locker W is modified in the area of the side edge 1 of the door D to permit movement and latching of the door in the closed position of FIG. 2. This casing includes a locker side frame 3, a front wall 4 and a rearwardly directed jamb flange 5 which terminates in a stop flange 6 disposed substantially parallel to the outer front face of the wall locker W.

A U-shaped keeper or frame hook 7 includes a mounting or base plate 8 which is suitably attached such as by welding to the inner face of the jamb flange 5. The frame stop flange 6 is notched as at 9 in FIGS. 3 and 4 to provide a vertical clearance no less than the height of the cross arm 10 of the frame hook to permit the recessed positioning of the hook as shown in FIGS. 1 and 2 whereby a smooth rear surface will be provided between the stop flange 6 and cross arm 10 to preclude snagging in this area by the user. Extending forwardly from the cross arm 10 is the hook arm 11 comprising a vertically disposed element having a forwardmost nose 12 from which extends rearwardly a contoured ramp 13 both upwardly and downwardly from the point of the nose 12 to a point intermediate the horizontal extent of the hook arm as shown most clearly in FIGS. 3

and 4. A pair of vertically extending catch openings 14—14 are provided in the body of the hook arm and each opening includes a front face 15 intersecting the distal portion of each respective contoured ramp 13. Thus, it will be seen that the entire frame hook 7 is of symmetrical construction above and below a medially disposed horizontal plane whereby this single hook element may be used in either left-hand or right-hand installations in which case it will follow that in each instance only the uppermost ramp 13 and opening 14 will be utilized.

Cooperating with the stationary hook arm 11 of the frame hook 7 is a unique spring steel latch generally designated L and which is carried by a novel lift or lock bar 16 disposed within the confines of the door front panel, side edge 1 and inner flange 2. The general operation of a lock bar such as that disclosed is well known in this art. Any suitable handle means (not shown) may be provided on the outer face D' of the door to permit selective vertical displacement of the lock bar 16 by a user from the exterior of the wall locker. The specific construction of the present lock bar 16 is shown most clearly in FIG. 5 wherein it will be seen that this lock bar is generally of a W-shaped configuration when viewed in horizontal cross section and includes a pair of spaced apart parallel outside walls 17 each having a vertical front edge 18 adapted to be disposed immediately behind the door panel front while the opposite or rear edge of each outside wall 17 is connected to an inturned base wall 19. Projecting from each base wall 19 is a connecting wall 20 which extends forwardly from the base wall 19 at a slight inward inclination to join with a medially located transverse web 21 disposed parallel to the base walls 19 and spaced well inwardly of the outside wall front edges 18. With the foregoing construction in mind, it will be appreciated that the connecting walls 20 and web 21 provide a vertically disposed central inside channel 22 extending the length of the lock bar while each connecting wall 20 forms with its opposed outside wall 17 a vertically extending side channel 23.

With the lock bar 16 positioned within the door D as shown in FIGS. 1 and 2, the hook arm 11 of the frame hook 7 will be guided into the central inside channel 22 as the door is moved from the open to the closed position. For this action to occur, several structural features must be understood. First, a flange opening 24 must be provided through the inner flange 2 of the door to allow passage of the hook arm 11 therethrough. Additionally, a frame hook opening 25 is provided through the web 21 of the W-shaped lock bar 16 as shown in FIGS. 3–5 since the nose 12 of the hook arm 11 extends well forward of the plane of the web 21 when the door is closed as in FIG. 4.

The construction of the spring latch L will now be discussed together with the attendant construction of the lock bar 16. The latch L will be understood to be constructed of a high grade heat treatable steel having a minimum thickness and which is preformed to provide a latch having a side profile which is generally C-shaped and as will be seen in FIG. 6 includes a front profile which is generally H-shaped. The spring latch L includes a pair of parallel vertically disposed side bars 26—26 which are joined together in the intermediate portions thereof by means of a center cross bar 27. The spring latch L, when removed from the lock bar 16, assumes the general configuration as shown in FIG. 6 wherein it will be seen that the upper and lower portions of each side bar 26 are slightly curved away from the center cross bar 27 and include an inwardly curved end section 28 at both the top and bottom thereof. The distal portions of one pair of curved end sections 28—28 are connected together by a transverse upper terminal blade portion 29 having a rearwardly directed face 29*a* while the distal portions of the opposite pair of curved end sections 28—28 are connected to a transverse plate section 30*a* terminating in a lower terminal curled or rounded portion 30.

As previously mentioned, the frame hook 7 is adaptable to either a left or right-hand installation in view of its symmetry about a medial horizontal plane. It will now be appreciated that the construction of both the lock bar 16 and spring latch L lend themselves to this alternative use in view of the symmetry of these latter components about a central vertical axis.

In order to accommodate the aforedescribed spring latch L, the lock bar web 21 and connecting walls 20—20 are modified as shown most clearly in FIG. 5. In this respect, the web 21 is cut away to provide a latch access opening 31 extending forwardly to communicate with a vertical channel 32 cut out from each of the connecting walls 20—20. The vertical channel 32 extends downwardly a significant distance in each connecting wall 20 adjacent the respective base wall 19 and terminates in a rounded channel bottom 33 while the upper limit of each vertical channel 32 is defined by a notch 34 disposed slightly above the horizontal plane of the bottom wall 35 of the web 21. The notch 34 will be seen to be formed by the intersection of the inclined edge 36 of the connecting wall 20 and the uppermost limit of the vertical channel 32 at a point adjacent the rear surface of the base wall 19 such that a notch apex 37 is provided therein.

The aforedescribed spring steel latch L is assembled to the channel-shaped lock bar 16 and retained thereby without the necessity of employing any tools or separate fastening elements. The lower curled portion 30 of the latch is initially introduced through the access opening 31 between the web bottom wall 35 and top wall 35*a* and into the vertical channel 32. At this point, the latch is lowered with the lowermost pair of curved end sections 28—28 disposed within the respective side channels 23—23 of the lock bar such that the curved end sections of the latch in effect straddle the upstanding central web portion of the lock bar. The latch is further lowered until the curled portion 30 abuts the channel bottom 33 and then the topmost pair of curved end sections 28—28 of the spring latch are manually compressed downwardly to displace the upper terminal blade portion 29 a sufficient amount to permit its clearance beneath the bottom wall 35 after which the top of the latch is moved inwardly to position the blade portion 29 within the forward portion of the vertical channel 32. Then the pressure upon the upper curved end sections may be released to permit the top edge of the blade portion 29 to snap into engagement within the notch apex 37. The latch will now be installed and will appear as shown in FIG. 4 of the drawings. It will be understood that in this position, the spring latch is under the influence of a slight degree of compression, that is, the top of the blade portion 29 and the bottom of the curled portion 30 are each exerting a constant pressure against the notch apex 37 and channel bottom 33, respectively. In this regards, it will be noted that the face

29*a* of the blade portion abuts the rear surface of the base walls **19—19** of the lock bar while the vertical plate section **30***a* associated with the curled portion **30** likewise abuts the rear surface of the base walls **19—19** as both the blade portion **29** and curled portion **30** bridge the forward opening of the central inside channel **22.**

The operation of the present unitary door latch may now be fully appreciated. When the door D is being moved to the closed position, the lock bar **16** carrying the spring latch L will be in its lowermost position and the initial contact between the locker frame and the door will occur after the door has been closed a sufficient distance to move the nose **12** of the frame hook through the flange opening **24** in the door. Shortly after this point, the upper contoured ramp **13** on the nose of the hook arm **11** engages the curled portion **30** of the spring latch and continued closing movement of the door will be seen to exert a camming action against the resilience of the spring latch so that the lower curled portion **30** will be progressively displaced upwardly as in FIG. **3** of the drawings until such time as the door has been closed sufficiently to progress the displaced curled portion **30** past the front face **15** of the hook arm **11** at which time the compressed spring latch will snap into the position of FIG. **4** wherein it will be seen that the rounded or curled portion **30** will abut the channel bottoms **33** of the lock bar as formed in the two connecting walls **20—20,** while the intermediate portion of this curled portion **30** will be disposed within the confines of the vertically extending catch opening **14** of the hook arm **11** thereby locking the door D in place. During the aforedescribed closing action as shown in FIG. **3,** it will be seen that as the curled portion **30** is displaced upwardly, the arched side bars **26—26** are partially flattened and in view of the spring characteristics of the unitary latch, this deflection is also transmitted through the curved end sections **28—28** at both the top and bottom of the latch to cause an angular displacement of the upper blade portion **29** as well as the lower plate section **30***a*. Thus, the purpose of the clearance provided by the notch **34** will now be apparent as the blade portion **29** is urged rearwardly during deflection of the latch. Adequate clearance to accommodate the rearward deflection of the lower plate section **30***a* is provided in view of the width of the lower vertical channel **32** and the fact that the convolutions of the curled portion **30** extend rearwardly from the bottom of the plate section **30***a*. In the locked position of FIG. **4,** the convolutions forming the curled portion **30** provide sufficient strength to the lower portion of the spring latch L to preclude forceful separation of the closed door D from the locker frame or casing. The unlocking of the door is achieved upon elevation of the lock bar **16** from the position as shown in FIG. **4.** Since any vertical displacement of the lock bar will result in a simultaneous and equal displacement of the spring latch, it will follow that it is only necessary to elevate the lock bar a distance sufficient to clear the bottom of the curled portion **30** from the upper portion of the front face **15** of the vertical catch opening **14** formed in the hook arm. Thereafter, this door may be readily swung open and when the operator releases the handle (not shown) the lock bar and latch will fall by gravity to the lowered at-rest position as is conventional in locker assemblies of this general type.

From the foregoing, it will be appreciated that an improved unitary latch is provided which includes an integral spring metal element, preferably of constant thickness material, and which is preformed to provide a resilient element adapted to be inserted within a lock bar opening to produce a latch installed under tension.

We claim:

1. A latching mechanism for retaining a movable component in a closed position with respect to a stationary component, including, hook means attached to one of said components and provided with catch means thereon, latch means carried by the other of said components and provided with a displaceable terminal portion, said hook and latch means disposed in a common horizontal plane whereby upon closure of said movable component said hook means engages and deflects said latch means until said terminal portion passes into said catch means, said latch means comprising a unitary spring metal latch having both upper and lower terminal portions, a vertically displaceable lock bar carried by said movable component, said lock bar having a transverse cut-out providing a vertically extending channel therein having upper and lower limits, and said latch is disposed within said lock bar channel under tension with said latch terminal portions normally abutting said channel limits, whereby said lock bar is operable to vertically displace one said terminal portion from within said catch means to permit separation of said components.

2. A latching mechanism according to claim **1** wherein, said lock bar is W-shaped in horizontal section.

3. A latching mechanism according to claim **1** wherein, said spring latch is substantially C-shaped in side elevation.

4. A latching mechanism according to claim **1** wherein, said spring latch is substantially H-shaped in front elevation.

5. A latching mechanism according to claim **1** wherein, said spring latch upper terminal portion comprises a blade and said lower terminal portion includes a curled section.

6. A latching mechanism according to claim **1** wherein, said lock bar is channel-shaped and includes a pair of inner connecting walls joined by a web, a base wall extending from each connecting wall, an outside wall projecting from each base wall, and said transverse cut-out is formed in said connecting walls.

7. A latching mechanism according to claim **1** wherein, said hook means includes a hook arm having a forwardly extending nose, a contoured ramp on the upper surface of said nose disposed in the horizontal plane of said latch displaceable terminal portion, and said catch means includes a vertically extending opening in said hook arm rearwardly of said ramp.

8. A latching mechanism according to claim **5** wherein, said latch includes a pair of laterally spaced-apart side bars each normally curved rearwardly from their medial portion when viewed in side elevation.

9. A latching mechanism according to claim **5** wherein, said latch includes a pair of side bars connected to said blade and curled section and the two ends of each said bar are curved inwardly adjacent said blade and curled section, respectively.

10. A latching mechanism according to claim **6** wherein, a side channel is provided between each said connecting wall and outside wall, said latch including

a pair of laterally spaced-apart side bars joined to said upper and lower terminal portions, and the ends of said side bars are disposed within said side channels.

11. A latching mechanism according to claim **6** wherein, said lock bar is symmetrical about a vertical plane through said web.

12. A latching mechanism according to claim 7 wherein, said hook means is symmetrical about a medial horizontal plane.

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