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Loikitz

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[54] **SLAM-STYLE SAFETY LOCK**

[75] Inventor: **Frank F. Loikitz,** Middletown, N.J.

[73] Assignee: **Instrument Systems Corporation,** Jericho, N.Y.

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[21] Appl. No.: **217,148**

[52] **U.S. Cl.**..... **70/150,** 292/153, 292/169.14, 292/DIG. 31

[51] **Int. Cl.**..... **E05b 65/06**

[58] **Field of Search**.. 70/150, 151 A, 208; 292/152, 292/153, 169.14, DIG. 31, DIG. 71

[56] **References Cited**

UNITED STATES PATENTS

2,622,430	12/1952	Adams et al.	70/146
3,266,277	8/1966	Chesler	70/150

Primary Examiner—Albert G. Craig, Jr.

Attorney, Agent, or Firm—Meyer A. Gross

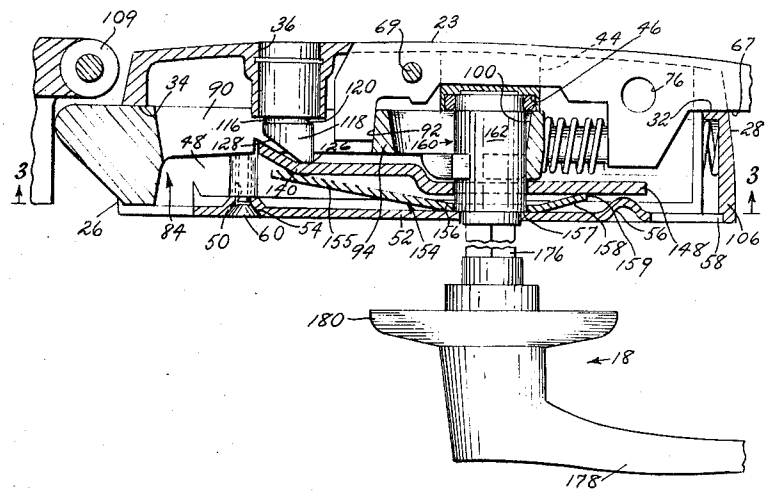
[57] **ABSTRACT**

A slam-style safety lock for industrial refrigerated walk-in compartments, truck bodies, and self-sealing environmental rooms, to allow egress from the interior when the lock is secured on the outside. The lock bolt is retractable, being actuated by a pivotal handle in the well known manner, and the bolt has a centrally positioned aperture in which is positioned a cam hub which engages a shoulder at the rear of the bolt, the shoulder acting as a cam follower.

The forward portion of the bolt has a rear lip under which is positioned a forwardly extending metal locking plate, also having a shoulder positioned just forwardly of the front surface of the cam hub. Positioned under the plate is a leaf spring maintaining constant pressure on the locking plate to actuate a drop action when locking is required.

In an unlocked position the plate is depressed inwardly so that the bolt passes along the plate without contacting it. When the lock is in a secured position rearward movement of the bolt will cause the forward portion of the plate to engage the lip on the bolt. If the cam hub is actuated from within, upon rotation, the forward surface of the hub will strike the shoulder of the plate, causing the plate to be depressed inwardly, and allowing the bolt to move rearwardly

8 Claims, 7 Drawing Figures



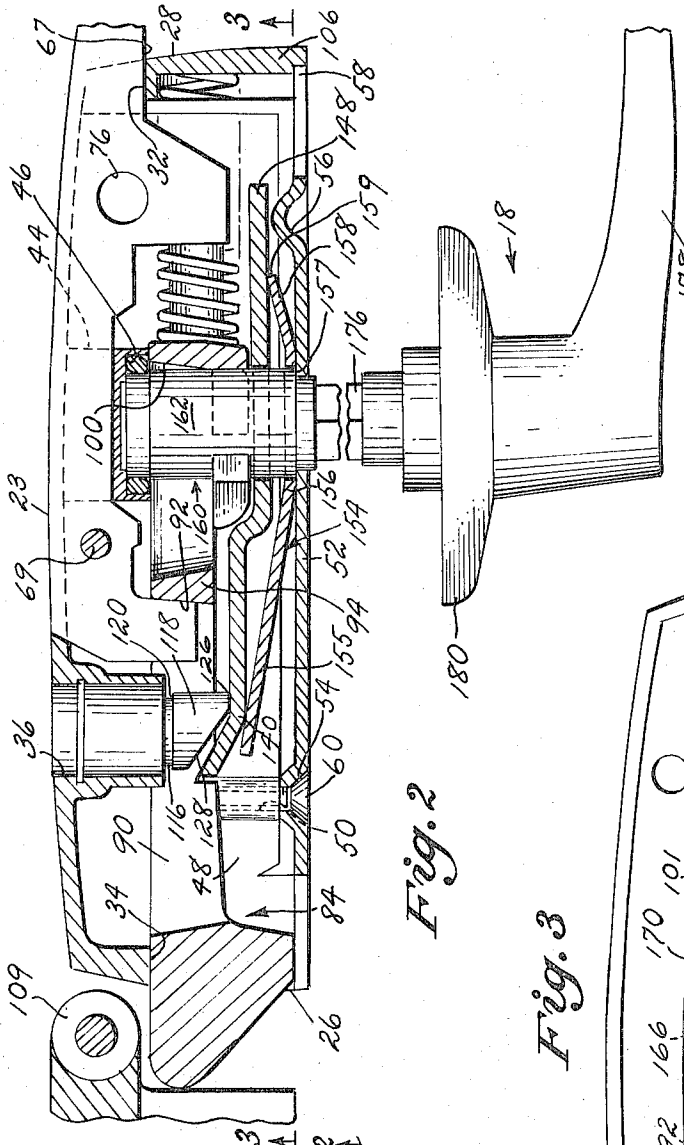


Fig. 2

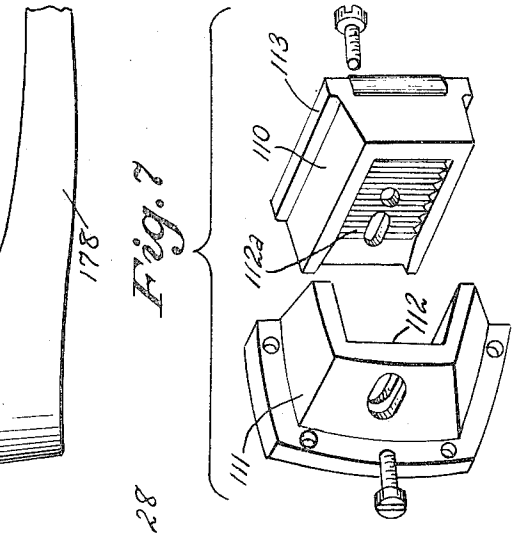


Fig. 7

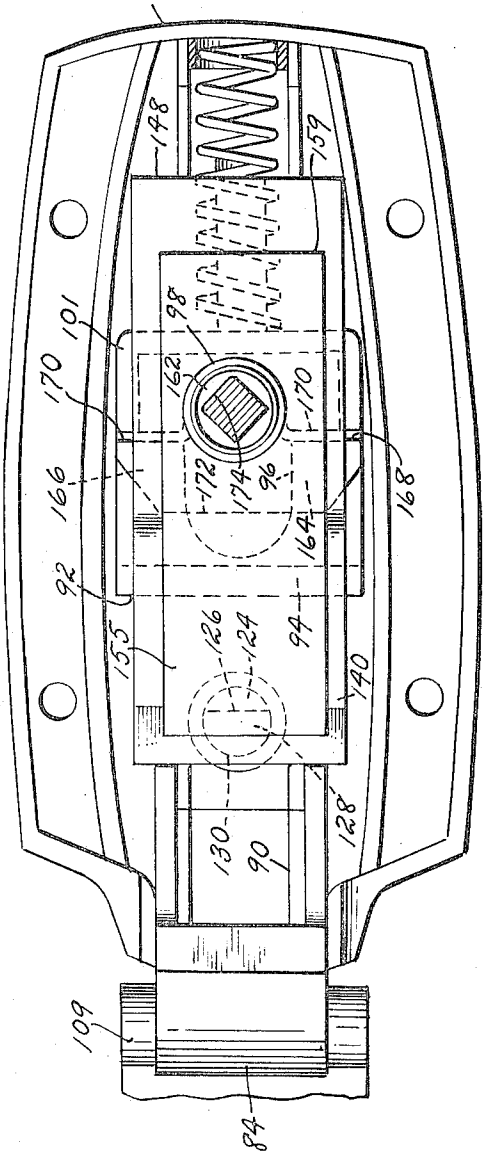


Fig. 3

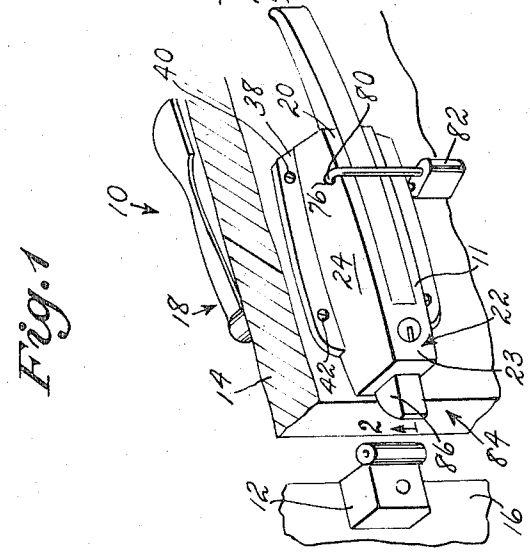


Fig. 1

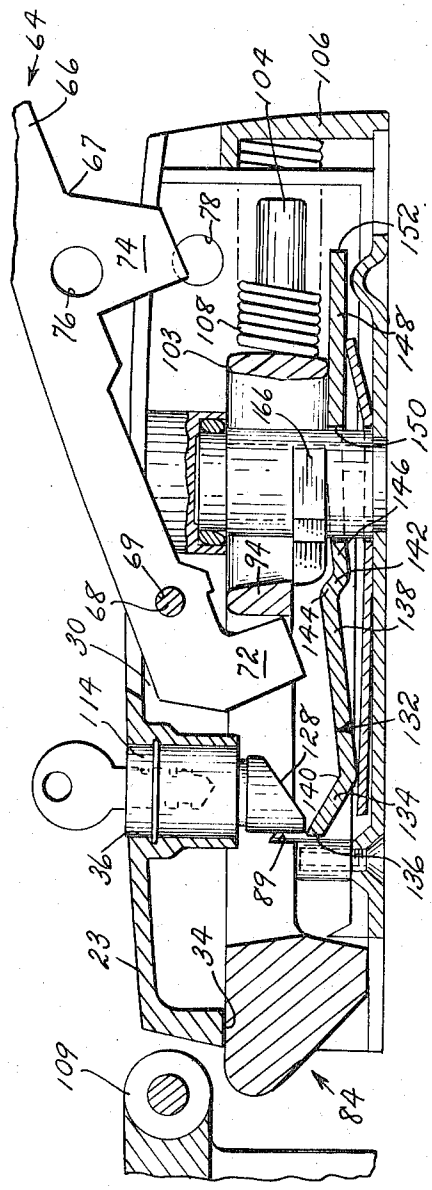


Fig. 4

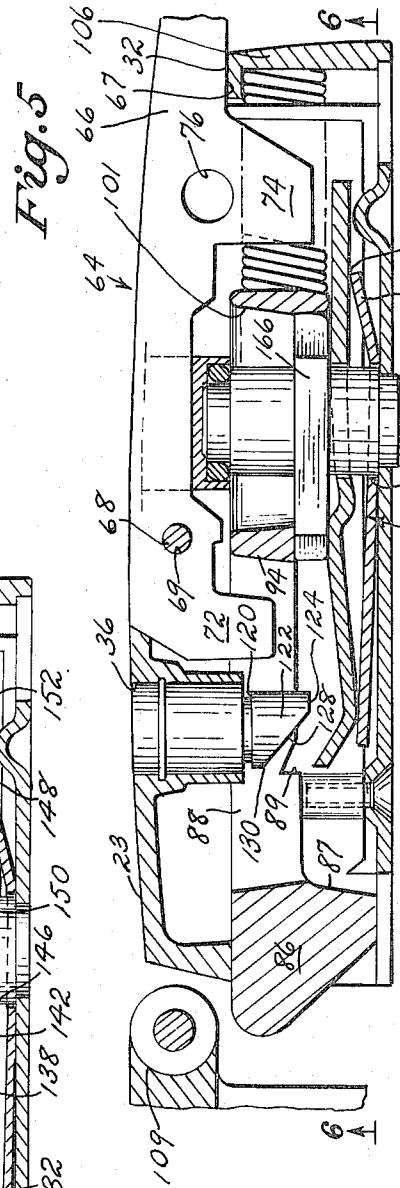


Fig. 5

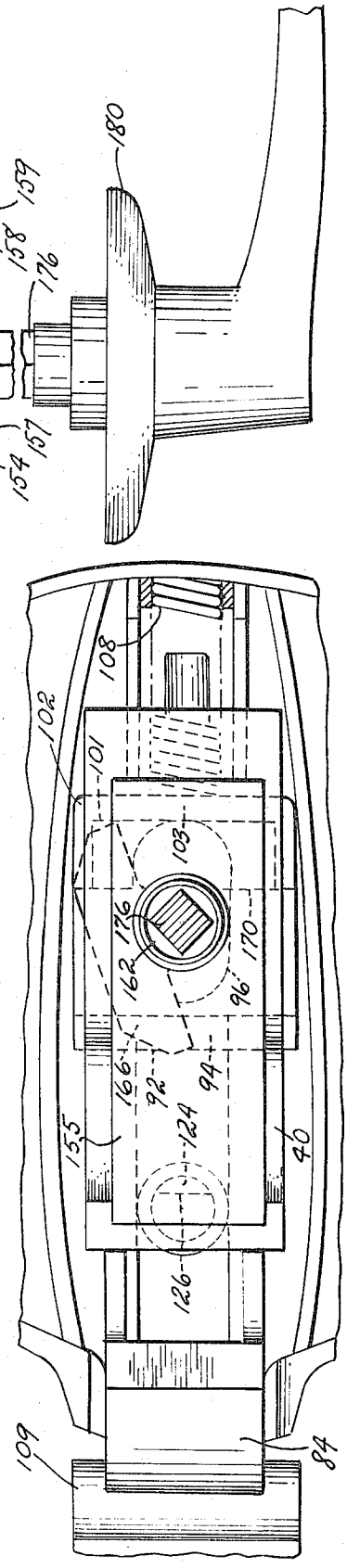


Fig. 6

SLAM-STYLE SAFETY LOCK

BACKGROUND OF INVENTION

The present invention relates to safety locks, and more particularly to a slam lock mechanism having unique structure to by-pass outer security locks from within.

Industrial refrigerator compartments utilize gasketed swing doors or self-closing doors with standard slam-type latches, the bolt catching the keeper or strike when the door is slammed shut. Because of the design of these compartments, the doors usually slam shut when someone enters the interior, and there are means on the inside of the compartment to cause the bolt to be retracted when someone wishes to leave the compartment.

Due to the value of merchandise in the enclosure, all such units contain means to lock the box for prevention of unauthorized entrance. Usually such security means consist of cylinder locks or padlocks, or both. However, if someone is accidentally caught in the interior after the locks have been secured, the results could be fatal. Complicated involved means have been developed in the past to by-pass the esterior locks, and allow the bolt to be retracted from the interior.

OBJECTS AND ADVANTAGES OF THE PRESENT INVENTION

Accordingly, among the principal objects of the present invention is to provide a new and novel by-pass construction which will allow egress from the interior of a box when the exterior locks have been actuated, all with a resultant overall economy of design.

Yet a further object of the present invention is to provide construction in which the interior actuating means simultaneously releases the cylinder locking means, by-passes the padlock, and retracts the bolt.

Yet another object of the present invention is to provide a simplified by-pass structure within a slam-style safety lock, which can be manufactured and produced on a relatively inexpensive basis, from inexpensive materials, and yet will be durable to a high degree in use.

BRIEF DESCRIPTION OF INVENTION

The invention consists of a casing which is secured to a door by mounting screws. Housed within the casing is a handle having an exteriorly extending lever, pivoted to the casing. Located inside the casing is a retractable bolt, which is maintained in an outwardly extended position by a compression spring. The exposed portion of the bolt engages a strike in its closed position, the strike being mounted on the jamb of the door. The bolt has an inner lip, and then a centrally positioned aperture defining a rear shoulder, which acts as a cam follower and is contacted by a cam hub (which will hereinafter be referred to as the hub), pivotally mounted in the aperture and positioned in a seat located in the housing. The hub has an opening to receive a spindle which extends through the door of the compartment into the interior thereof.

Positioned below the hub is a locking plate having an aperture through which the spindle extends, the plate extending rearwardly and forwardly with an upwardly extending shoulder just forward of the front surface of the hub, and then an upwardly extending tongue. Positioned below the plate is a leaf spring which maintains upward pressure on the locking plate.

The locks include a padlock which may be passed through apertures in the casing and the wings of the handle to prevent pivotal movement of the handle. The locks also include a cylinder lock having a truncated cylindrical member designed so that in its unlocked position, the non-truncated portion of the member engages the forward portion of the plate depressing it and allowing the bolt to move without obstruction. When the cylinder lock has been actuated to its blocking position, the non-truncated portion is positioned so as not to depress the plate which is then urged upwardly, and rearward movement of the bolt causes the forward edge or the tongue of the plate to engage the lip in the bolt, preventing other than nominal movement.

When the cylinder lock has been so actuated and the padlock hasp is in position, a person on the inside of the box may open the door by simply rotating the spindle in either a clockwise or counter-clockwise direction. This will cause the hub to pivot in either direction with its forward surface bearing against the upward shoulder of the plate, causing the tongue to be depressed, and the rear surface of the hub bearing against the cam follower shoulder of the bolt, allowing the bolt to be retracted, thus by-passing the tongue and the padlock.

The above description and objects of the present invention will become apparent from a reading of the following description, taken with reference to the accompanying drawings, in which

FIG. 1 is a perspective view of an improved slam-style safety lock embodying the present invention, showing the lock on the door (partly cut away) and the keeper on the jamb;

FIG. 2 is an enlarged, side-elevational view of the lock, keeper and lever, with sections cut away;

FIG. 3 is a bottom planned view with the bottom plate removed;

FIG. 4 is a side elevational view showing the cylinder lock in the unlocked position and with the padlock removed, and the handle partially actuated, causing a partial retraction of the bolt;

FIG. 5 is a view similar to FIG. 2 with the interior lever rotated and the cam hub depressing the tongue and bearing against the cam follower shoulder of the bolt;

FIG. 6 is a bottom plan view of FIG. 5 with the bottom plate removed; and

FIG. 7 is an exploded, perspective view of the strike.

Turning to the drawings, and particularly to FIGS. 1 and 2, there is shown an improved slam-style safety lock **10** embodying the present invention and broadly comprising a yieldable latch **11**, a keeper **12**, the latch and keeper being respectively mounted on a door **14** and a jamb **16**, and a lever **18**.

More specifically, the latch is housed in a casing **20** which may be die cast or formed in any other conventional manner.

The casing includes a somewhat rectangular shaped central portion **22** which is defined by a top wall **23**, sidewalks **24**, a front wall **26**, and a rear wall **28** (FIG. 2). A channel **30** (FIG. 4) is defined in the central portion, and extends from the front wall **26** to the rear wall **28**, and partially down the rear wall, ending at edge **32**. A rectangular aperture **34** is also formed in the front wall **26** and a round aperture **36** in the top wall **23**.

A pair of shoulders **38** extend outwardly from the lower edges of the side walls and contain apertures **40**

for receipt of screws or bolts **42** to secure the latch to the door.

Positioned towards the rear of the casing and extending downwardly from the top wall **23**, is an inverted cup member **44** (FIG. **2**) defining a receptacle **46** for the purpose hereinafter appearing.

Also positioned within the central cavity is a post **48** with a threaded bore **50**. Covering the entire cavity is a bottom plate **52** having a counter-sunk opening **54**, a location dimple **56**, and a back edge **58**. The bore **50** and the opening **54** mate and receive a screw **60** to secure the bottom plate **54** and close off the central portion cavity. The bottom plate is flush with the base of the shoulders **38** to insure a proper fit against the door.

Turning to FIGS. **4–5**, there is shown a handle **64** which is of the pivotal type and is used to retract the bolt from the strike when the latch is unlocked. The handle includes a gripping portion **66** (which is partially shown) to the rear with a forward bottom edge **67** and a forwardly placed pivot **68** which is received in apertures **69** of the handle and in apertures **70** (FIG. **6**) within the casing **20**. Forwardly of the pivot is a downwardly extending finger **72**.

The handle is received within the channel **30** of the casing and in its normal position the forward bottom edges **67** of the gripping portion rest against the edge **32** in the rear wall **26** of the casing **20**. The handle also includes two downwardly extending wings **74**. The wings contain apertures **76** which are aligned with openings **78** in the casing to allow the passage of the hasp **80** of the padlock **82** (FIG. **1**) to provide one if the means for locking the latch.

As previously mentioned, the handle actuates a retractable bolt **84**. The bolt extends through a major portion of the casing and includes a forward strike portion **86** with a rear first shoulder **87** causing a substantial decrease in thickness of the bolt, to an elongated basically rectangular portion **88** having a lip **89** (FIG. **5**), and then followed by an elongated rectangular two-stepped aperture **90** defined therein. This aperture is narrower and ends at rear surface **92** of an intermediate rear shoulder **94** which receives the finger **72** of the handle **64**.

Emanating rearwardly from the intermediate shoulder **94** is a second substantially rectangular portion **96** having defined therein a rear semi-cylindrical aperture **98** which terminates in a rear shoulder **100**, below which is located a rear cross-member **101** having symmetrical sections **102** as defined from a center line **103**. Extending rearwardly from the member and shoulder is a stop bar **104** (FIG. **4**) which is aligned with a bearing shoulder **106** adjacent the rear wall **28** of the casing **20**.

The shoulder **106** acts to receive and guide a compression spring **108** which encircles the stop **104** and bears against the back wall **28** of the casing **20** and the rear shoulder **100** and the member **101** urging the bolt **84** outwardly to a normal extending position with the handle in alignment with the rest of the casing. The bolt is properly guided during its retractable travel in the casing by means of the forward inner surfaces just behind the aperture **34** and the front wall **26**, as well as the upward forces from the locking plate.

The bolt is received by the keeper **12** containing a roller **109** engaging the top surface of the forward portion **86** of the bolt. The keeper may be secured to the door jamb by means of screws or the like. The roller is journaled in a carriage **110** riding in a channel member **111**. The carriage and roller may be adjustably positioned with respect to each other. The carriage and roller have abutting and mating ridged surfaces **112**, **112***a* and they are held in positive contact with each other by means of screws passing through opposed elongated slots and received within threaded apertures. Extending downwardly from the roller and enclosing the same are side guards **112** which completely enclose the forward portion of the bolt. This prevents tampering or forcing the bolt from outside of the door.

Extending into the cavity of the casing through the aperture **36** is a standard cylinder lock **114**. As shown in FIGS. **2**, **4–6**, extending downwardly from the lock **114** is a cylindrical support **116** carrying a drop action or truncated cylindrical member **118**.

More particularly, the member **118** consists of an annular shoulder **120** (FIG. **5**) from which depends a cylindrical surface **122**. At its longest length the surface extends down to a bottom surface **124** which in the end view (FIG. **3**) represents a portion of a circle. Commencing from the forward edge **126** of surface **124**, a sloping surface **128** extends upwardly towards the surface **122**, meeting it at edge **130** which is its shortest length.

Positioned just below the member **118** and extending towards the rear of the casing is the locking plate **132** (FIGS. **2**, **4**, and **5**). More specifically, it consists of an upwardly extending forward tongue portion **134** terminating in an edge **136**. The tongue joins a second upwardly extending portion **138** at **140**, the two portions forming an obtuse angle of greater than 90°. The second portion **138** terminates in a downwardly extending shoulder **142** at **144** and then at **146** the tongue has a portion **148** which extends rearwardly and substantially horizontally, and has an aperture **150** defined therein and terminating at a rear edge **152**. Located just beneath the tongue is a leaf spring (FIG. **2**) **154** having an upwardly extending forward portion **155** which extends just forwardly of the joinder **140** of the portions **134**, **138**; a horizontal central portion **156** with an aperture **157** defined therein; and an upwardly extending rearward portion **158**, whose rear edge **159** contacts the rearward portion **148** of the tongue. The purpose of the leaf spring is to constantly urge and maintain the locking plate in an upward direction, and because of the non-movable mechanism in the rear of the latch, the force is all translated to the forward portion of the tongue.

The receptacle **46** in the dish **44** is designed to receive a cam hub **160**. The hub includes (FIG. **2**) a cylindrical body section **162** which is received within the apertures **150**, **146**, and **98**. The cam hub also includes two symmetrical arms **164**, **166** (FIG. **3** having rear bearing shoulders **168**, **170**, and a forward bearing shoulder **172**. The rear shoulders face the shoulder **101** and the forward shoulder faces shoulder **146**.

The hub also includes a central aperture **174** which may be non-circular in cross-section and is shown as square. The aperture is designed to receive a spindle **176** (FIG. **2**) of similar cross-section and dimension, which forms a portion of the lever **18**. The lever also consists of an arm **178**, the arm and the inner portion of the spindle being located within the interior of the environment when the unit is assembled. The spindle is of sufficient length to pass through the entire door and may have an ascutcheon or rose **180** to receive the re-

lease lever **18.** The lever is secured to the inside of the door by screws (not shown) passing through the rose.

Because of the simplified construction of the locking by-pass means, the resultant structure of the entire safety latch is not only more economical, but durable to a high degree in use. FIG. **4** shows the normal operational position of the cylinder lock **114** when the refrigerator box is in use. The lock is turned so that the surface **124** is to the left, and bears against the forward edge **136** of the plate **132** depressing it. Thus, when the handle **64** is actuated and the finger **72** contacts the surface **92** of shoulder **94,** the bolt **84** passes into the latch without meeting any obstructions until the stop bar **104** contacts the rear wall **106.** However, the handle **64** allows opening of the door before this inward travel position is reached.

In order to lock the door solely with the cylinder lock **114,** the key is turned so that the member **118** assumes the position as shown in FIGS. **2, 3, 5,** and **6.** In this position the surface **124** is to the right as viewed in the drawings and the leaf spring **154** forces the plate **132** upwardly until the upper surface of portion **138** contacts surface **124.** Furthermore, the slope angle of the surface **128** is closer to the vertical than the slope of the portion **134** so that there is no contact between these sections in this position. In this position, when the handle **64** is turned, rearward movement of the bolt is stopped because the forward edge **136** engages the lip (FIG. **2**) **89** of the bolt **84.** Additional security can be provided by passing the hasp **80** of a standard padlock **82** through the apertures **76, 78.**

However, in these positions, it is still possible to open the latch, by-passing both of the locks, from the interior of the box. This is done by rotating the handle **178** of the lever **18** in either direction, clockwise or counterclockwise. This causes the spindle to rotate and since the spindle is secured to the cam hub within opening **174,** which is non-circular, the cam itself turns in either direction. As a result, either of the surfaces **168, 170** may bear against the rear cam follower shoulder **100** to initiate retraction of the bolt. Simultaneously, the forward shoulder **172** contacts the shoulder **142** of the tongue **132** both of which are somewhat rounded to insure proper co-action. Continued movement of the cam causes the plate to be forced downwardly so that the edge **136** is forced below the lip **89,** and this allows the bolt to move rearwardly. Because of the forward length of the aperture **90,** the finger **72** also does not prevent sufficient rearward movement of the bolt for it to disengage from the strike.

All that is necessary for the system to work is that the force on the shoulder **100** overcome the force within the compression spring. Since the handle is not actuated, there is no need for any complicated mechanism to release the handle. The only moving element within the latch is the bolt itself and the cam, everything else being completely by-passed.

The tongue and the leaf spring are fabricated from strong durable materials, and thus the whole unit will be capable of extended use without break-down.

The terms and expressions which have been employed here are used as terms of description and not of limitation and there is no intention in the use of such terms and expressions, of excluding equivalents of the features shown and described or portions thereof, it being recognized that various modifications are possible within the scope of the invention claims.

What is claimed is:

1. An improved slam-style safety lock for enclosed environments allowing egress from the interior when the exterior lock has been actuated, comprising:

a. a retractable bolt

b. means for housing the bolt, the housing having an opening, to allow passage of the bolt therefrom

c. means to secure the housing means to a door allowing access into the environment

d. keeper means on the door jamb in alignment with and receiving a portion of the bolt in its normal extended position when the door is closed

e. means mounted on the housing means for actuating the bolt between its engagement position with the keeper means to which it is normally yieldingly biased and its retracted position, out of engagement with the keeper means

f. the bolt having an aperture, cam means within said aperture

g. hand grip and spindle means movably mounted on the door inside the environment, the spindle means passing through the door and engaging the cam means for retracting the bolt from inside the environment without utilizing the actuating means,

h. a locking plate positioned inwardly of the bolt, the plate having an outwardly extending forward portion, the bolt having a lip adjacent the forward portion

i. means urging the plate outwardly and particularly the forward portion into the path of travel of the bolt and engagement with the lip

j. locking means positioned within the housing and extending inwardly toward the locking plate, the locking means in its locking position being free of the locking plate which prevents opening of the lock from the exterior, and the locking means having a second position which pushes the locking plate out of the path of travel of the bolt so that the lock may be actuated from the exterior

k. and means operable only from inside the environment for pushing the locking plate inwardly to a position free of said lip, thus allowing unobstructed rearward movement of the bolt by actuation of the hand grip and spindle means even when such movement is precluded from the exterior.

2. The invention according to claim **1,** the means urging the plate outwardly, being a leaf spring positioned inwardly of the locking plate.

3. The invention according to claim **1,** the locking plate having a shoulder adjacent the forward portion of said cam means.

4. The invention according to claim **3,** the cam means having a forwardly extending shoulder facing and adjacent to the shoulder of the locking plate so that upon actuation of the cam means in either rotational direction, the forward shoulder of the cam means contacts the shoulder of the locking plate and upon extended rotational movement, forces the locking plate inwardly to a position out of the path of travel of the lip of the bolt.

5. The invention according to claim **4,** the locking plate having a substantially planar portion placed in between and connecting the shoulder and the outwardly extending forward portion, and then having another rearwardly extending substantially planar portion having an opening defined therein to allow passage of the spindle means into engagement with the cam means.

6. The invention according to claim 5, the means urging the plate outwardly, being a leaf spring positioned inwardly of the locking plate.

7. The invention according to claim 6, the leaf spring having an outwardly extending forward portion and a central portion depending rearwardly therefrom, having an aperture defined therein to allow passage of the spindle means, and an outwardly and rearwardly extending rear portion, the forward and rear portions engaging the inward surfaces of the locking plate, and the forces being translated from the leaf spring to continually urge the locking plate outwardly.

8. The invention according to claim 1, the locking means including a cylinder lock with a truncated cylindrical section extending therefrom, the greatest length thereof extending to the rear in the locking position, and allowing the locking plate to be urged outwardly and into the path of travel of the lip of the bolt, and the longest length of the cylindrical portion extending towards the front during unlocking position to force the locking plate inwardly and out of the path of travel of the lip of the bolt.

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