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Messina et al.

[11] **3,825,290**

[45] **July 23, 1974**

[54] **SLIDING DOOR LOCK BAR APPARATUS**

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[52] **U.S. Cl.** **292/262,** 292/273

[51] **Int. Cl.** **E05c 17/04**

[58] **Field of Search** 292/262, 277, 263, 266, 292/269, 273, 338, 259

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Primary Examiner—Robert L. Wolfe

Attorney, Agent, or Firm—Leonard H. King

[57] **ABSTRACT**

A sliding door security lock is provided comprising at least one pair of rigid bars hingedly secured to each other. Where there is only one sliding panel in the door, one end of one of the bars is rigidly secured to a non-movable portion of the frame. The furthest end of the other bar is rigidly secured to the frame of the slidable panel. The two remaining adjacent ends of the two bars are pivotally secured to each other. When there are two sliding panels in the door, there will be two pairs of the hinged bars having the same general arrangement as described hereinabove with the adjacent ends of each of said pair of bars being hingedly secured to each other as well as to the frame of the second slidable glass panel. The hinged bars are arranged to fold in order to permit the door to open and to automatically lock in an unfolded or linear condition in order to maintain the door closed.

8 Claims, 11 Drawing Figures

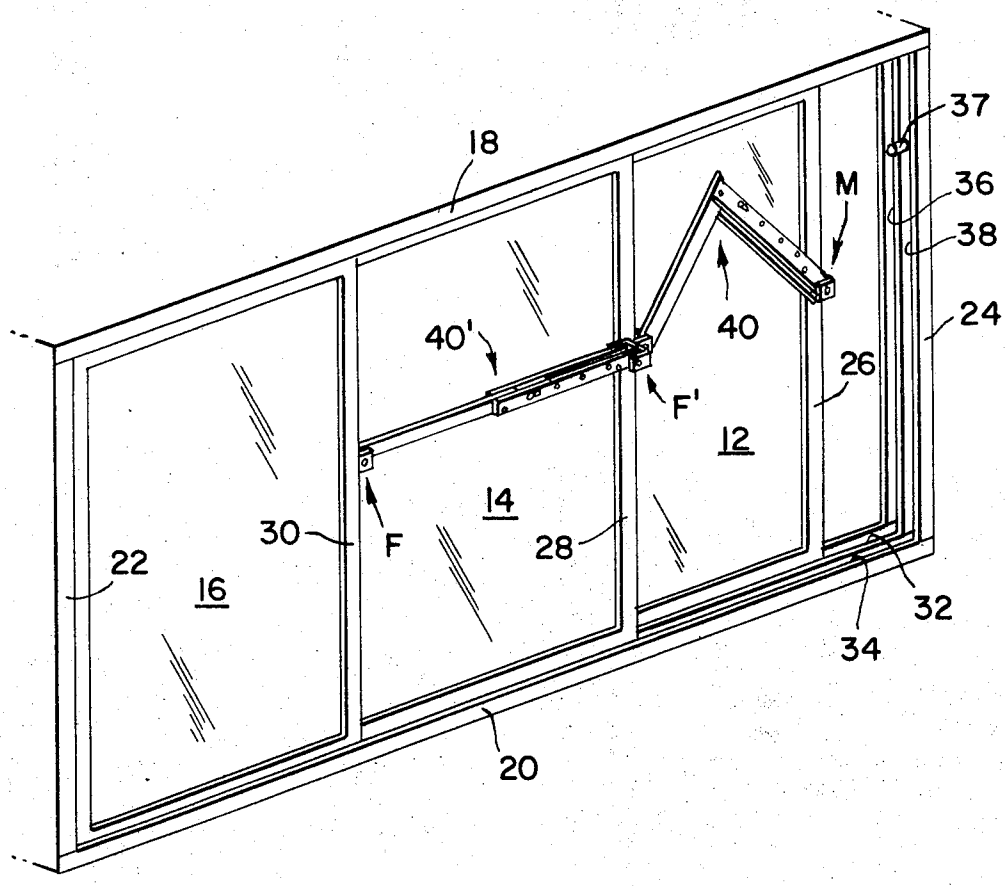
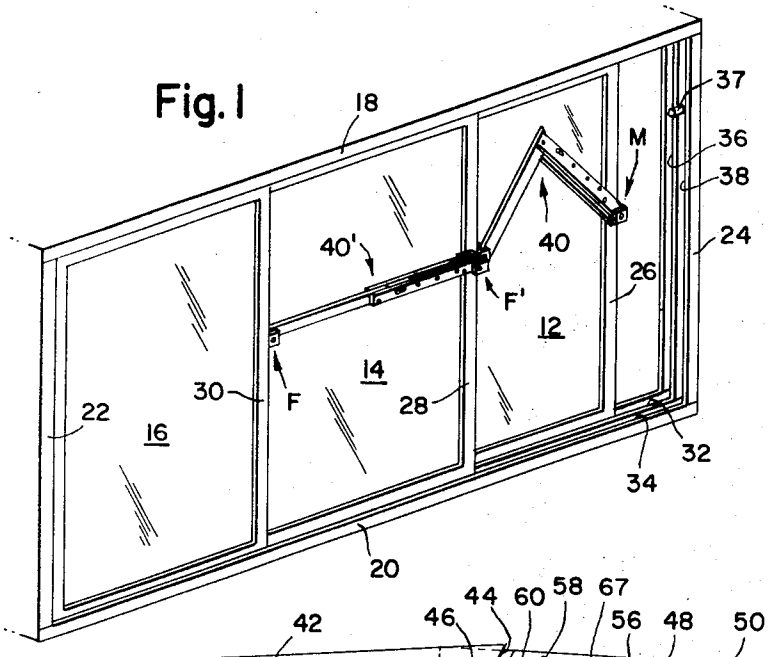


Fig. 1



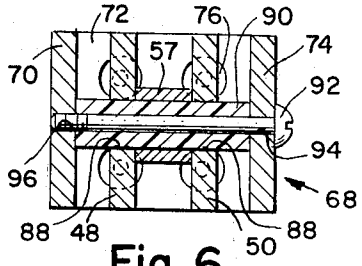


Fig. 6

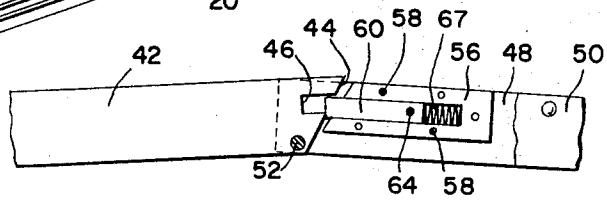


Fig. 3

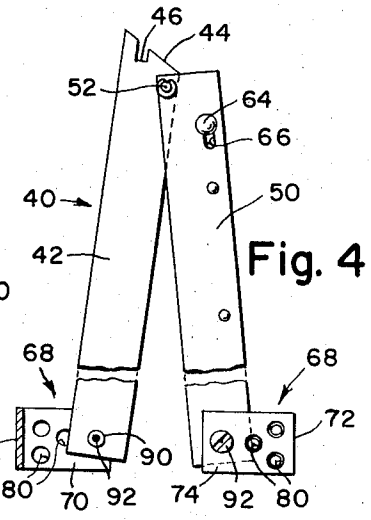


Fig. 4

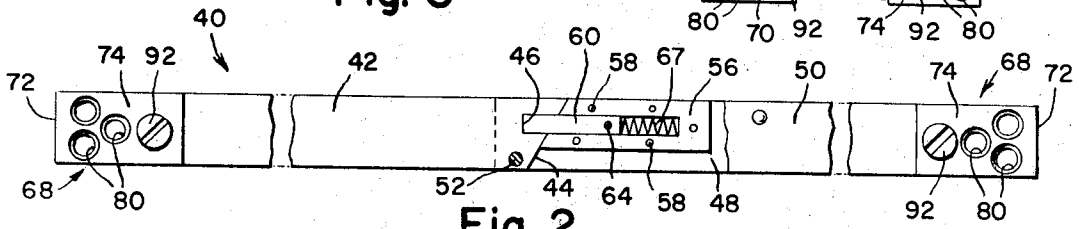


Fig. 2

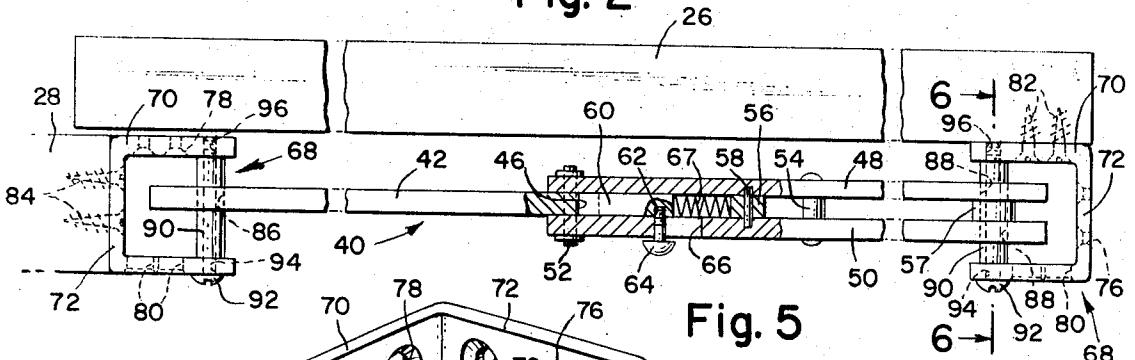


Fig. 5

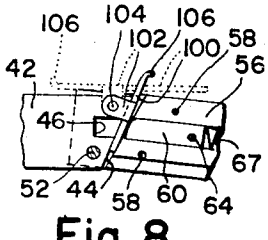


Fig. 8

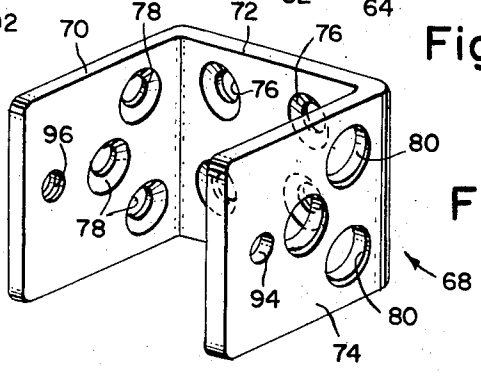


Fig. 7

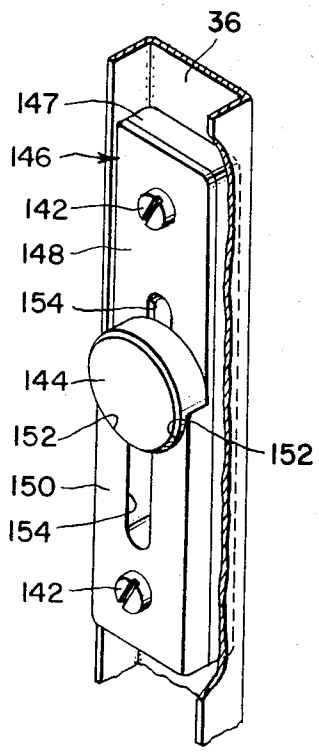


Fig. 9

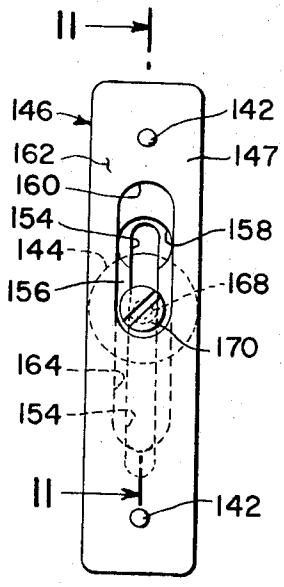


Fig. 10

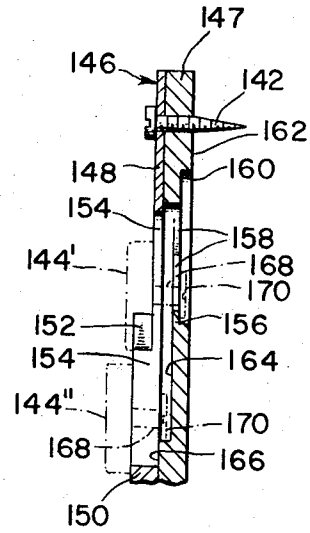


Fig. 11

SLIDING DOOR LOCK BAR APPARATUS

The aforementioned abstract is neither intended to define the invention of the application which, of course, is measured by the claims, nor is it intended to be limiting as to the scope of the invention in any way.

BACKGROUND OF THE INVENTION

1. Field of the Invention:

This invention relates generally to sliding doors or windows and, more particularly, to improved locking means therefor.

2. Description of the Prior Art:

A conventional feature of contemporary housing is the provision of so-called "patio doors". These doors consist of at least one slidable glass panel door and more often, two slidable doors that are supported in frames and which are mounted for movement in channel members of the door jamb. Since the function of the glass door is to provide a maximum quantity of transparent area, relatively narrow framing members are employed. This construction limits the type of locking hardware that may be utilized and such doors are vulnerable to attack by burglars. Typical glass door locks can easily be broken by readily accessible tools. Further, by the use of a pry bar, the conventional aluminum channels holding the doors may be readily bent and the pry bar then used to lift the sliding door out of its channel.

Despite a vast number of such doors in existence, and the need for improved locking means therefor, to date no device has captured a significant portion of the market. A deficiency common to the prior art devices is that they do not automatically lock the door in the closed position. Further, many of the prior art devices involve complex locking procedures that are beyond the capability of children and infirm or elderly persons.

While there are many types of safety locks presently available, they are, in general, either too costly to be practical, easily defeated or unsightly.

SUMMARY OF THE INVENTION

The present invention provides a secure safety lock for sliding structures such as door or windows. The safety lock is inexpensive to produce, may be readily installed, provides instant recognition between an open condition and a closed condition, is self-locking and is easily released and inexpensive. The present invention is particularly characterized by the absence of open-scissor type construction.

More specifically, the present invention provides a transverse bar having one end thereof rigidly secured to a fixed member of the door frame or to a fixed portion of one of the door panels. The other end of the bar is secured to the movable panel. Intermediate the ends of the bar there is provided pivot means for defining two hinged sections. Automatic locking means are defined by a plunger-like member that is integral with one of the hinged sections and which cooperates with a recess in the other hinged section. The transverse bar is automatically locked by a spring that biases the plunger-like member into the recess when the two sections are co-linear. The bar may be unlocked merely by retracting the plunger-like element and angularly displacing both hinged sections about the common pivot point thereof.

If more than one sliding door or window is involved, there may be provided two pairs of hinged sections. Ultimately, however, one end of one of the pairs of hinged sections must be secured to a non-movable portion of the frame.

As will be brought out more fully hereinafter, the present invention may be used on sliding members such as doors, double and single hung windows, etc. Since the present invention is normally positioned in the center of the panel, it cannot be reached with a tool unless the glass panel or window is destroyed. As an optional feature, means may be provided for selectively preventing the present invention from automatically locking. Thus, when a door or window is in frequent or continuous use, it may be desirable to prevent the hinged bar sections from becoming fully co-linear.

Accordingly, it is an object of the present invention to provide an improved locking device for sliding doors, windows, etc.

It is another object of the present invention to provide a locking device, as described above, that is automatic in operation.

Still another object of the present invention is to provide a locking device for a window, door or the like that is rigid, low in cost to manufacture and which is readily installed without special skills or tools.

These and other objects, features and advantages of the invention will, in part, be pointed out with particularity and will, in part, become obvious from the following more detailed description of the invention taken in conjunction with the accompanying drawing, which forms an integral part thereof.

BRIEF DESCRIPTION OF THE DRAWING

In the various figures of the drawing, like reference characters designate like parts. In the Drawing:

FIG. **1** is a perspective view illustrating one embodiment of the present invention as applied to a sliding door;

FIG. **2** is a fragmentary, partially broken away, side elevational view of the locking bar shown in FIG. **1** in the locked condition;

FIG. **3** is a fragmentary, elevational view similar to FIG. **2**, illustrating the locking bar comprising the present invention just prior to assuming the locked condition;

FIG. **4** is a fragmentary, elevational view illustrating the present invention in the unlocked condition;

FIG. **5** is a fragmentary, sectional plan view illustrating the locking bar comprising the present invention in the locked condition;

FIG. **6** is a transverse, sectional, elevational view taken along line **6—6** of FIG. **5**;

FIG. **7** is a perspective view of a typical end mounting member;

FIG. **8** is a fragmentary view illustrating means for overcoming the automatic locking feature of the present invention;

FIG. **9** is a fragmentary, perspective view of alternative means for overcoming the automatic locking feature of this invention;

FIG. **10** is a rear elevational view of the structure shown in FIG. **9** with the frame removed for clarity;

FIG. 11 is a sectional, elevational view taken along line 11—11 of FIG. 10 with the bumper button shown in phantom in two different positions.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring first to FIG. 1, there is shown one installation of the present invention as applied to sliding glass doors. In this application, there are two slidable panels 12 and 14 and a fixed panel 16. A frame for the panels 12, 14 and 16 is comprised of horizontal supports 18 and 20 as well as vertical supports 22 and 24. The sliding panels 12 and 14 are further comprised of vertical members 26 and 28, respectively, only one of which is shown in each instance. The fixed panel 16 also includes a vertical section 30. Upper and lower channels 32 and 34 are formed in a conventional manner in the horizontal sections 18 and 20 while channels 36 and 38 are formed in the vertical section 24 in a conventional manner.

In the embodiment illustrated in FIG. 1, there are two sliding glass panels 12 and 14 and a fixed panel 16. However, it should be clearly understood that the present invention will apply as well when there is only a single sliding panel and a single fixed panel.

In order to secure the two sliding panels 12 and 14, two locking bars 40 and 40' are illustrated. However, where the installation is of the type having only a single sliding panel and a single fixed panel, only one locking bar 40 will be required. Regardless of the type of installation, one end of the bar 40 is secured to a movable panel while the other end of the element 40 is secured to a fixed element. As shown in FIG. 1, the right hand end of the bar 40 is fixed to the vertical frame section 26 of the movable panel 12 as shown by the reference character M while the left hand end of the bar 40' is secured to the vertical frame portion 30 of the fixed panel 16 as shown by the reference character F. Had there been only a single movable panel, such as 12, and a single fixed panel such as 16, then the left hand end of bar 40, generally designated by the reference character F', would have been secured to a non-movable frame portion of the fixed panel.

The construction of the members 40 and 40' is shown in greater detail in FIGS. 2 – 5. It will be seen that there is provided a single, central bar 42 having an angular end face 44 at the right hand end thereof. A recess 46 is formed in the end face 44. The other half of the section 40 is formed by two bars 48 and 50 that straddle the bar 42 and which are pivotally connected thereto by means of a pin 52. Spacer means 54 and 56 maintain the bars 48 and 50 in their separated condition. At the left hand end of the bars 48 and 50, there is provided a housing 56 that is U-shaped in elevation as shown in FIG. 2. A plurality of pins 58 secure the housing 56 to the bars 48 and 50 as shown, for example, in FIG. 5.

A plunger-like member 60 is positioned between the spaced apart legs of the U-shaped housing 56. A pin 62 having a rounded head 64 is secured to the plunger-like member 60 and passes through a slot 66 formed in the bar 50. A spring-member 67 is positioned between the right hand end of the plunger-like member 60 and the connecting leg of the U-shaped housing 56 in order to normally bias the plunger-like member 60 to the left as shown in FIGS. 2, 3 and 5. The spaced apart legs of the housing 56 contain the plunger-like member 60, and the spring 67 is one plane, while the bars 48 and 50 contain the plunger-like member, and the spring in planes at right angles thereto.

The ends of the bars 42 and 48, 50 are mounted to fixed and movable portions of the sliding door assembly, respectively, by means of a U-shaped bracket 68 that is best shown in FIG. 7. It will be seen that two legs 70 and 72 of the bracket 68 are provided with a plurality of countersunk holes 76 and 78, respectively, while the third leg 74 is provided with clearance holes 80 in alignment with the holes 78. When the bracket 68 is used, such is shown at the left hand side of FIG. 5, the countersunk holes 76 in the leg 72 are used. When the bracket 68 is used, such as shown at the right hand side of FIG. 5, the countersunk holes 78 in the leg 70 are used. In this last mentioned instance, clearance holes 80 in the leg 74 are used to provide access to the screws 82 at the right hand end of the assembly shown in FIG. 5. No such access is required for the screws 84 at the left hand end of FIG. 5.

The left hand end of the bar 42 is provided with a clearance hole 86 while the right hand end of the bars 48 and 50 are provided with aligned clearance holes 88. A tubular nylon sleeve 90 is inserted in the holes 86 and 88 in order to receive mounting screws 92. As shown in FIG. 7, a clearance hole 94 is provided in leg 74 of the bracket 68 while a tapped hole 96 is provided in the leg 70 of the bracket 68 in order to receive the screws 92. The use of oversized holes 86 and 88 in combination with the nylon sleeves 90 permits lateral movement for adjustment purposes of the bars 42 and 48, 50.

When the bar is in the locked position, such as shown covering panel 14 in FIG. 1, the plunger-like member 60 will be positioned within the recess 46. When the bar is unlocked, for example, such as shown in FIG. 1 over the panel 12 or in FIG. 4, there will be no engagement between the plunger-like member 60 and the recess 46. When the bar is moved from the unlocked condition to the locked condition, the plunger-like member 60 will slide over the angular end face 44 of the bar 42, for example as shown in FIG. 3, until it reaches the recess 46 and then, by the action of the spring 67, will snap into place such as shown in FIG. 2. In order to unlock the bar, the button 64 is manually moved to the right carrying with it the plunger-like member 60. The sliding panel 12 may then be moved manually so as to assume the position shown by the reference character 40 in FIG. 1.

In certain instances it may be desirable to prevent the automatic locking of the bars when the panels must be moved frequently. In other words, the plunger-like member 60 must be prevented from entering the recess 46. One structure for accomplishing this is shown in FIG. 1 wherein it will be seen that there is provided a plate 100 having laterally spaced tabs 102 depending therefrom. When it is desired to use the door without the locking feature, the plate 100 is pivoted about the pin 104 that extends through the tabs 102 and the bar 42. Thus, the plate 100 covers the recess 46 and thereby prevents entrance of the plunger-like member 60. However, when it is desired to use the bar in the normal automatic locking mode, finger gripping portion 106 is used to move the plate 100 to the position shown in broken outline in FIG. 8. In this position, the bars 42 and 48, 50 are free to assume the position shown in FIG. 2.

Still another, alternative means for overcoming the automatic locking feature of the present invention is shown in FIGS. **9, 10** and **11.** Anti-locking assembly **140** is secured within the channel **36** by means of screws **142** and is comprised of a resilient, bumper **144,** a front plate **146** and a rear plate **147.** When the bumper **144** is in the position shown in FIG. **9** (and in the position designated **144'** in FIG. **11**), the doors can close and lock with the bumper **144** absorbing some of the force. However, when the bumper is in the position designated **144''**, the doors cannot completely close. Thus the plunger-like member **60** cannot enter the recess **46.**

The front plate **146** is comprised of a relatively thin section **148,** a relatively thick section **150** that terminates in an arcuate, centrally located shoulder **152** having substantially the same radius as the bumper **144** and an elongated, central slot **154** that extends through both sections **148** and **150.** The rear plate **147** includes a central, relatively thin web **156** having a keyhole slot **158** therein, an elongated, relatively short recess **160** formed on the rearward surface **162** and an elongated, relatively long recess **164** formed on the forward surface **166.** The bumper, which may be a resilient plastic or elastomeric member includes a shank **168** and a head **170.**

When the bumper **44'** rests on the thin section **148** and on the arcuate shoulder **152** as shown in FIGS. **9, 10** and **11,** the head **170** thereof is in the recess **160** as shown in FIGS. **9** and **10.** The shank **168,** of course, passes through the slot **154** in the front plate **146** as well as the recess **164** and the keyhole slot **158** in the rear plate **147.** If it is desired to prevent the doors from fully closing and locking, the bumper is manually moved to position **144''** (FIG. **11**) by pulling it forward and allowing it to drop. The head **170** thus moves through the enlarged portion of the keyhole slot and enters the recess **164.** The bumper **144''** then rests on the thick section **150.** The thickness of the bumper **44** prevents full closing and locking of the doors.

It should be noted that although only one construction was illustrated, the plunger-like member can, of course, be mounted on the free end of the bar **42** and, in this case, the left hand end of the bars **48, 50** will be beveled. That is to say, the relative positions of the recess **46** and the plunger-like member **60** may be reversed. Regardless of the construction, the beveled surface **44** acts as a caming member when the first and the second bar means **42** and **48, 50** move from the position shown in FIG. **4** through that shown in FIG. **3** through the relative position shown in FIG. **2.** Thus, the end of the plunger-like member **60** first contacts the beveled surface **42** and is pushed rearwardly thereby until the plunger-like member is in opposition to the recess **46** at which time the spring **67** biases the plunger-like member **60** directly into the recess **46** so that the two bar means **42** and **48, 50** are co-linear with respect to each other and are thereby locked. The first and second bar means **42** and **48, 50** cannot be moved to the unlocked position unless the pin **64** which is rigidly attached to the plunger-like member **60** is moved relative to the second bar means **48, 50** through the slot **66** formed in the bar section **50.**

From the foregoing, it will be appreciated that the present invention is relatively inexpensive to produce and may be readily installed without special skills or tools. The device is self-locking and easily released. Because the device extends across the transparent panels, there is instant recognition between the open and closed conditions.

There has been disclosed heretofore the best embodiment of the invention presently contemplated. However, it is to be understood that various changes and modifications may be made thereto without departing from the spirit of the invention.

What we claim as new and desire to secure by letters Patent is:

1. A locking device for a panel that is slidable relative to a non-movable member, said locking device comprising;

a. first elongated bar means including means for mounting a first end thereof to the non-movable member;

b. second elongated bar means including means for mounting a first end thereof to the sliding panel whereby the second ends of said first and second bar means are in opposition to each other;

c. means for hingability connecting the second end of said first and second bar means to each other;

d. a plunger-like member mounted on one of said bar means proximate the second end thereof, said other bar means having a recess in the second end thereof for receiving said plunger-like member;

e. spring means for normally biasing said plunger-like member in the direction of the recess whereby said first and second bar means are co-linear and are locked to each other to thereby prevent the slidable panel from moving relative to the non-movable member;

f. means for retracting said plunger from the recess whereby the locking device may be unlocked to thereby permit relative movement between the slidable panel and the non-movable member; and

g. a housing secured to said bar means for supporting said plunger-like member and said spring-means, said housing being U-shaped for supporting said plunger-like member in two spaced apart planes, said bar means supporting said plunger-like member further including means for supporting said plunger-like member in two other spaced apart planes that are at right angles to said first two spaced apart planes.

2. The locking device in accordance with claim **1** where said plunger-like member is mounted on said second bar means and the recess is in said first bar means.

3. The locking device in accordance with claim **1** wherein the second end of said first bar means is beveled.

4. The locking device in accordance with claim **1** wherein said second bar means is comprised of two, laterally spaced apart bars between which the second end of said first bar means fits when in the locked condition.

5. The locking device in accordance with claim **1** wherein said mounting means comprise U-shaped brackets each having fastener receiving apertures in two adjacent legs and access apertures in the third leg in opposition to the apertures in one of the first two legs, said two opposed legs further including aligned openings, said first and said second bar means being mounted on said brackets by a fastener extending

through the second end thereof and through said aligned openings.

6. The locking device in accordance with claim **5** wherein there is further included a low friction spacer extending between the opposed legs of said brackets, the first end of said first and said second brackets being laterally slidable on said spacer.

7. The locking device in accordance with claim **1** wherein said retracting means comprises a pin secured to said plunger-like member, said pin being axially displaceable relative to said bar means in which said plunger-like member is mounted.

8. The locking device in accordance with claim **1** wherein there is further included means for selectively preventing the locking of said first and said second bar means with respect to each other.

* * * * *