

SPECIFICATION

Locking Device in Hinged Door or Window

The present invention relates to a locking device for locking a hinged window or hinged door in a door frame or window frame when the door or window is in the closed position.

Some doors and windows for a window or doorway are usually provided with a locking device which is driven by turning a handle such as a Gramont handle whereby a lock bolt protrudes from the upper or lower edge of the door to enter a bolt receptacle in the upper or lower rail of the door frame to fasten the door temporarily to the door frame when the door is in the closed position. When the door is to be opened, the lock bolt retracts into the body of the door by turning the handle to effect unlocking.

In conventional devices for locking of hinged doors, the lock bolt can be freely protruded out of or retracted into the body of the door if the handle is turned regardless of whether the door is in the closed position or in the open position, i.e. whether the door is in a position fitting the door frame or not. Therefore the door is often closed inadvertently with the lock bolt protruding out of the door resulting in damage to the door frame by being hit with the protruding lock bolt and damage to the lock bolt itself as well as related parts. For example, the floor near the door is sometimes marred by being scratched with the tip of the lock bolt protruding downwardly out of the door when the door is moved with the lock bolt protruding.

According to the invention there is provided the combination of a door or window hinged to a door frame or window frame with a locking device and comprising at least one lock bolt capable of being made to protrude and retract by manual operation of a handle connected to the or each lock bolt via a connection rod so as to engage in a bolt receptacle in the said frame to effect locking of the door or window or to disengage from the bolt receptacle to effect unlocking of the door or window, characterized in that a detector device is provided in the free end of the door or window facing the said frame to be operated by contact with the said frame, an interlock, which is connected to said detector device in linkage motion therewith and engageable with said lock bolt or said connection rod, being adapted to lock said lock bolt in the retracted position thereof by coming into interengagement with said lock bolt or the connection rod, wherein the detector device comprises a member which is slidably movable in a direction perpendicular to the plane of the door or window by coming into contact with the said frame, and wherein the interlock comprises a member which is disengageably engageable with a necked part of the or each lock bolt.

In the accompanying drawings:—

Figure 1 is a schematic illustration of a hinged door with a handle and lock bolts;

Figure 2 is a horizontal cross sectional view of

a locking device embodying the invention in the door of Figure 1;

Figure 3 is a view of the left side view of the device of Figure 2;

Figure 4 is a front view of the device of Figures 2 and 3; and

Figure 5 is a side view of the same showing the setting of detector means of the device of Figures 2 to 4.

In Figure 1 the temporary locking device embodying the invention is installed in a stile 2 at the free end, i.e. opposite end to the hinges, of the body of the door 1.

The locking device of which details are illustrated in Figures 2 to 5, comprises essentially a handle 3 such as a gramont handle provided in the stile 2 at a convenient height, a connecting rod 4 extending through the stile 2 and capable of upward and downward sliding movement in linkage motion with the turning of the handle 3, a lock bolt 5 fixed at the top end of the connecting rod 4 and an interlocking mechanism 6 which ensures free extension and retraction of the lock bolt 5 when the door is in the closed position but prohibits the movement of the lock bolt 5 when the door is in the open position. (Figure 1 shows a second lock bolt 5 at the bottom of stile 2). A guide member 7 is provided for guiding the upward and downward sliding movement of the bolt 5. Receptacles (not shown) are provided in the door frame to receive the lock bolts 5.

The interlocking mechanism 6 is provided with a detector device 9 in the form of a member which is L-shaped as viewed from above with a wing 17 extending away from the body of the door 1 in a direction parallel to the plane of the door 1 and capable of sliding in the direction perpendicular to the plane of the door by virtue of the wing 17 coming into contact with and being pushed by the door frame 8 when the door 1 is closed. The interlocking mechanism 6 is also provided with a stopper 11 connected with a base part of the detector member 9 through a connection pin 10.

The detector member 9 is mounted by a mounting plate 12 at a position corresponding to the lock bolt 5 in the upper part of the surface of the stile 2 facing the door frame 8, i.e. the peripheral surface of the door 1 and capable of sliding movement in the direction perpendicular to the plane of the door. Similarly, the connection pin 10 is also capable of sliding, linked to the sliding movement of the detector member 9, since the pin 10 extends through an oblong opening 13 with the longer axis of opening 13 extending in the direction perpendicular to the plane of the door.

The stopper 11 is connected at one end thereof to the detector member 9 by the connection pin 10 and at the other end thereof to a middle part of the guide member 7 by a pivot 19 and is capable of pivoting around the pivot 19 as a pivotal axis. The lower part of the stopper 11 is bent at a right angle to form a wing-like interconnection 14 where the stopper 11 is always in press-contact

with a necked (i.e. narrowed or restricted) interconnection-receiving part 15 of the lock bolt 5 under the action of a spring 16.

In operation, when the hinged door 1 is in the open position, the interconnection 14 is held by the interconnection-receiving part 15 with the spring 16 to effect interlocking so that the lock bolt 5 cannot be pushed out of the body of the door 1 by turning the handle 3.

When the door 1 is just coming to the closed position, the wind 17 at the end of the detector member 9 is contacted by the door frame 8 so that the detector member 9 is made to slide. Thus the detector member 9 moves from position B to position A in Figure 2. The sliding movement of the detector member 9 causes pivoting of the stopper 11 around the pivot 19 so that the interconnection 14 is disconnected from the interconnection-receiving part 15 and the lock bolt 5 is freed for possible sliding movement capable of extension to effect temporary locking by turning of the handle 3.

As is explained above, the lock bolts 5 are held in the retracted position and cannot be pushed out of the upper and lower ends of the door 1 by turning the handle 3 when the door is in the open position so that an advantage is obtained that damage of the lock bolts 5 and the door frame 8 as well as other related parts can be prevented as would occur by inadvertent closing of the door with the lock bolts 5 extended.

The direction of the sliding movement of the detector member 9 depends on the direction of opening of the door 1 but the above described interlocking mechanism 6 can be used as such with only reversing the direction of its setting in both of the doors opening outwardly or inwardly.

As is described above, the lock bolt is locked at

the retreat position to be prevented from protrusion by being linked to the detector means when the door is open so that damage to the lock bolt, door frame and other related parts as would be caused by inadvertent closing of the door with the lock bolts protruding can be avoided with reliability.

Claims

1. The combination of a door or window hinged to a door frame or window frame with a locking device and comprising at least one lock bolt capable of being made to protrude and retract by manual operation of a handle connected to the or each lock bolt via a connection rod so as to engage in a bolt receptacle in the said frame to effect locking of the door or window or to disengage from the bolt receptacle to effect unlocking of the door or window, characterized in that a detector device is provided in the free end of the door or window facing the said frame to be operated by contact with the said frame, an interlock, which is connected to said detector device in linkage motion therewith and engageable with said lock bolt or said connection rod, being adapted to lock said lock bolt in the retracted position thereof by coming into interengagement with said lock bolt or the connection rod, wherein the detector device comprises a member which is slidably movable in a direction perpendicular to the plane of the door or window by coming into contact with the said frame, and wherein the interlock comprises a member which is disengageably engageable with a necked part of the or each lock nut.

2. The combination as claimed in claim 1 wherein the interlock member is pivoted.

14



with a necked (i.e. narrowed or restricted) interconnection-receiving part 15 of the lock bolt 5 under the action of a spring 16.

- 5 In operation, when the hinged door 1 is in the open position, the interconnection 14 is held by the interconnection-receiving part 15 with the spring 16 to effect interlocking so that the lock bolt 5 cannot be pushed out of the body of the door 1 by turning the handle 3.
- 10 When the door 1 is just coming to the closed position, the wind 17 at the end of the detector member 9 is contacted by the door frame 8 so that the detector member 9 is made to slide. Thus the detector member 9 moves from position B to position A in Figure 2. The sliding movement of the detector member 9 causes pivoting of the stopper 11 around the pivot 19 so that the interconnection 14 is disconnected from the interconnection-receiving part 15 and the lock bolt 5 is freed for possible sliding movement capable of extension to effect temporary locking by turning of the handle 3.

- As is explained above, the lock bolts 5 are held in the retracted position and cannot be pushed out of the upper and lower ends of the door 1 by turning the handle 3 when the door is in the open position so that an advantage is obtained that damage of the lock bolts 5 and the door frame 8 as well as other related parts can be prevented as would occur by inadvertent closing of the door with the lock bolts 5 extended.

- The direction of the sliding movement of the detector member 9 depends on the direction of opening of the door 1 but the above described interlocking mechanism 6 can be used as such with only reversing the direction of its setting in both of the doors opening outwardly or inwardly.

As is described above, the lock bolt is locked at

- the retreat position to be prevented from protrusion by being linked to the detector means when the door is open so that damage to the lock bolt, door frame and other related parts as would be caused by inadvertent closing of the door with the lock bolts protruding can be avoided with reliability.

Claims

1. The combination of a door or window hinged to a door frame or window frame with a locking device and comprising at least one lock bolt capable of being made to protrude and retract by manual operation of a handle connected to the or each lock bolt via a connection rod so as to engage in a bolt receptacle in the said frame to effect locking of the door or window or to disengage from the bolt receptacle to effect unlocking of the door or window, characterized in that a detector device is provided in the free end of the door or window facing the said frame to be operated by contact with the said frame, an interlock, which is connected to said detector device in linkage motion therewith and engageable with said lock bolt or said connection rod, being adapted to lock said lock bolt in the retracted position thereof by coming into interengagement with said lock bolt or the connection rod, wherein the detector device comprises a member which is slidably movable in a direction perpendicular to the plane of the door or window by coming into contact with the said frame, and wherein the interlock comprises a member which is disengageably engageable with a necked part of the or each lock nut.
2. The combination as claimed in claim 1 wherein the interlock member is pivoted.