

A LOCKING MECHANISMBACKGROUND OF THE INVENTION

5 This invention relates to a locking mechanism.

With outward opening windows it is common practice to have a locking mechanism at the side of the window opposite to the hinged side so as to lock the window in a closed position.

10 Such a locking mechanism can be of an espagnolette type where a central handle operates locking bars or connectors which cause a bolt associated with each locking bar to interact with a striker to create the locking effect. With such an arrangement, the striker can be a mounting plate with an
15 upstand and the locking bolt can be a pin or other projection which, when moved by the connector, moves behind or away from the projection of the striker to effect locking or unlocking as the case may be.

20 Problems can arise with known forms of bolts and strikers. For example, an outward force applied to a window, eg during unauthorised entry or as a consequence of a negative pressure in extreme wind conditions can cause an interaction between

the pin of the locking bolt and the striker. This can lead to a twisting of the bolt relative to the striker so that the pin adopts an angle to the striker projection whereby the pin slides over the projection resulting in loss of the locking effect. Such forces can also apply high loadings on the projection of the striker with the result that the striker can break usually by fracturing of the mounting plate about the base of the projection. Once again, loss of the locking effect is the outcome.

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A further problem which can arise is a lack of smoothness or binding of the pin as it moves relative to the strike. This can occur due to the particular configuration of the bolt and strike or as a consequence of loadings arising from the wedging action which normally takes place to ensure that the lock side of the window is drawn firmly onto the window seals.

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SUMMARY OF THE INVENTION

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It is an object of the present invention to provide improvements in locking mechanisms which include a bolt and strike so as to at least go some way to overcoming the

aforementioned problems or at least providing the public with a useful choice.

In one broad aspect of the invention there is provided a
5 locking mechanism comprising a sliding bolt and a locking
striker, the sliding bolt having at least one projection
which is engageable with an abutment of the striker to effect
a locking action, there being retaining means for retaining
the locking action in the event of a torque applied to the
10 bolt and/or striker when in the locking position.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a perspective view of a locking striker
15 according to a first form of the invention,

Figure 2 is a perspective view of a sliding bolt
according to the first form of the invention,

20 Figure 3 is a perspective assembly view of the locking
striker and sliding bolt of Figures 1 and 2,

Figure 4 is a perspective view of a locking striker according to a second form of the invention,

5 Figure 5 is a plan view of the locking striker as shown in Figure 4,

Figure 6 is a perspective view of the locking striker of Figures 4 and 5 in combination with a sliding bolt according to the second form of the invention the relative disposition being shown in a locking position,

10 Figure 7 is a similar perspective assembly view to Figure 6 of the second form of the invention but from the opposite side, and

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Figure 8 is a similar view to Figure 6 but showing the locking striker and sliding bolt in an unlocking position.

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DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring to Figures 1 to 3 the locking striker 10 is according to the preferred form of the invention of die cast

zinc construction. The striker 10 includes a plurality of abutments 11 which are spaced apart by openings 12. In the preferred form of the invention each opening 12 has an inclined or ramp surface 13 extending up to the floor 14 of the striker.

Spaced from the abutments 11 is a back wall 15 which has a pair of spaced apart projecting portions 16 which are located opposite the openings 12.

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In the floor 14 of the striker 10 are a plurality of openings 17 through which mechanical fasteners can be engaged to mount the striker to, say, the frame of a window.

15 The sliding bolt 18 as shown in Figure 2 comprises an elongate base 18 from each end of which project flanges 19. Pins 20 on flanges 19 are provided for coupling the sliding bolt to a coupling rod and/or corner transmission of a typical espagnolette or multi-point locking mechanism. In
20 the form illustrated the base 18 has projecting edges 21 which engage in a sliding manner in a groove of a window sash in once again a typical espagnolette or multi-point locking arrangement.

Projecting upwardly from the base 18 are projections 27 formed by a pair of pins 22 on which are preferably rotatably located rollers 23. In a preferred form of the invention the
5 sliding bolt is of die cast zinc construction with stainless steel rollers.

As shown in Figure 3 the rollers 23 pass through openings 12 in the striker when the window with which the locking
10 assembly is mounted moves to the closed position. The ramp portions 13 can assist in correct entry of the rollers through openings 12.

Upon longitudinal movement of the sliding bolt in either of
15 the directions shown by the arrows in Figure 3 the rollers 23 engage with the angled edges 24 of the abutments 11, this causing a lateral movement of the sliding bolt body 18 which as is normal with locking assemblies of this type pushes the lock side of the window sash firmly against the seals of the
20 window frame.

The rollers thus become located between abutments 11 and the opposing surfaces 25 of the back wall 15 between the

projecting portions 16. In the preferred arrangement the distance between the abutment face 11a and the back wall surface 25 is just slightly greater than the external diameter of the roller 23. As a result the rollers 23 are
5 snugly located within the striker 10.

As a consequence if any torque or twisting action is applied to the locking assembly or more particularly the striker such torque or twisting action is resisted by the snug fit of the
10 roller 23 between abutment face 11a and back wall surface 25. Consequently, the roller 24 is not able to be twisted to an angle whereby it can slip out of the locking striker.

The angled surfaces 24 and the corresponding sloped surfaces
15 24' of the projecting portion 16 are in the preferred form of the invention at an acute angle to provide a long lead-in for smooth movement of the rollers into the locking position between faces 11a and 25. This long acute angle lead-in together with the big diameter rollers provide for a smooth
20 action as the locking assembly moves between locked and unlocked positions.

- A further advantage of the plurality of rollers, or pins 22 if rollers 23 are not present, is a sharing of load which is particularly advantageous when the locking assembly is used with heavy weight sashes such as those up to 160kg in weight.
- 5 The locking assembly is also of particular advantage in such situations in that the entrapment of the rollers 23/pins 22 provides good resistance to any opening force such as a negative pressure force in high or extreme wind conditions.
- 10 The locking assembly is also non-handed. As can be shown in Figure 3, the locking effect can be achieved irrespective of the direction of longitudinal movement of the sliding bolt.

Figures 4-8 show a second embodiment of the invention in which like components are identified by the same reference numerals as used in Figures 1-3.

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As can be seen in Figures 4 and 5 the striker 10 simply provides a plurality of abutments 11, the top surface of which, however, is extended to provide an overhang 26. As can also be seen, the overhang 26 follows the contour of the lead-in surfaces 24 and abutment surface 11a. As with the first described embodiment the lead-in surfaces 24 are at an

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acute angle, though preferably more acute than the first embodiment, to thus provide a long lead-in portion.

The sliding bolt as shown in Figures 6 to 8 has a plurality
5 of fixed projections 27 in place of the pins 22/rollers 23 of the first embodiment. The projections 27 are of the same general configuration as the abutments 11 of the striker 10 and thereby have overhangs 28.

10 As shown in Figure 8 the projections 27 once again engage between the pairs of abutments 11 when the window moves to the closed position whereupon the sliding bolt can be moved in either of the directions shown by the arrows to cause the
15 projections 27 to move into an opposing face to face engagement with the abutments 11 (see Figures 6 and 7). In doing so, the overhang 28 of each of projections 27 of the sliding bolt 18 engage beneath the overhangs 26 of abutments 11 of the striker 10. This provides a positive interlocking of the striker and sliding bolt such that if a torque or
20 twisting action is applied as previously described the overhangs 26 and 28 resist any separation of the sliding bolt from the striker.

The long acute angled lead-ins of the projections 27 and the abutments 11 provide a smooth sliding action as the sliding bolt moves to and from the locking position. With the three points of contact arising from the three separate abutments 5 11 and projections 27 of the sliding bolt there is a positive and strong interengagement between the striker and the sliding bolt thereby making the locking assembly particularly useful in situations where a heavy weight sash is to be locked in the closed position and where high negative 10 pressures may be experienced in extreme or high wind conditions.

CLAIMS

1. A locking mechanism comprising a sliding bolt (18) and a locking striker (10), the sliding bolt having at least one projection (27) which is engageable with an abutment (11) of the striker to effect a locking action, there being retaining means (25 or 26) for retaining the locking action in the event of a torque applied to the bolt and/or striker when in the locking position.
2. A locking mechanism as claimed in claim 1 wherein the striker (10) includes at least a pair of abutments (11) spaced apart such that a said projection (27) can pass therebetween in a first direction, at least one abutment (11) being spaced a distance from a surface (25), there being guide means (24, 24') to guide said projection (27) in a second direction to locate between said abutment (11) and said surface (25), said distance being slightly greater than the cross-sectional thickness of the projection (27) between said abutment (11) and said surface (25).



3. A locking mechanism as claimed in claim 2 wherein the projection (27) is formed by a pin (22) and roller (23) rotatably mounted therewith.
- 5 4. A locking mechanism as claimed in claim 2 wherein the projection (27) includes a roller.
5. A locking mechanism as claimed in claim 2 further including a limit means (16) to limit the extent of
10 movement of the projection (27) in said first direction.
6. A locking mechanism as claimed in claim 5 wherein the guide means includes opposed guide surfaces (24 and 24') which extend at an acute angle relative to said first
15 direction.
7. A locking mechanism as claimed in claim 2 further including ramp means (13) in the space between said abutments (11).
- 20 8. A locking mechanism as claimed in claim 1 wherein the striker includes at least a pair of abutments (11) spaced apart such that a said projection (27) can pass



therebetween in a first direction, the sliding bolt (18) having at least one projection (27), at least one said abutment (11) and the projection (27) having engagement means (26 and 28) which are interengageable when the
5 sliding bolt (18) is moved in a second direction to the locking position where the abutment (11) and projection (27) are located in an opposing disposition and if a said torque is applied to the sliding bolt and/or striker.

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9. A locking mechanism as claimed in claim 8 wherein the engagement means includes an overhang (26 and 28) extending from the abutment (11) and projection (27) respectively.

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10. A locking mechanism as claimed in claim 9 wherein a said overhang (26, 28) extends from a distal end of the respective abutment (11) and projection (27).

20 11. A locking mechanism as claimed in claim 8 wherein at least one of the abutment (11) or projection (27) includes an abutment surface (11a) which is engageable with an engagement means (28) of the respective

projection (27) or abutment (11) when in the locking position if relative movement occurs substantially in said first position to release the sliding bolt (18) from the striker (10).



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12. A locking mechanism as claimed in claim 8 or 11 wherein at least one of the abutment (11) or projection (27) includes a lead-in surface (24) which is engageable with the projection or abutment as the case may be during sliding movement of the bolt (18) substantially transverse to said first direction.

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13. A locking mechanism as claimed in claim 12 wherein the lead-in surfaces (24) are located at an acute angle relative to said first direction.

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14. A locking mechanism as claimed in any one of claims 1 to 12 wherein the striker (10) is provided with mounting means (17) whereby the striker is mountable in a fixed manner to a first structure and the sliding bolt (18) is provided with locating means (21) whereby it is slidably mountable with a second structure, the first

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and second structure being movable relative to one another.



15. A locking mechanism as claimed in claim 13 wherein the
5 sliding bolt (18) includes coupling means (20) for
coupling the sliding bolt (18) to sliding control means.