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U1S S1714

(56) Documents Cited
GB 2056550 A **US 4438963 A**

(58) Field of Search
UK CL (Edition L) **E2A ACCC AEM AMX**
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Online database WPI

(54) Locking mechanism

(57) An anti-ligature locking device for prison windows with frame (1), sash (2), locking mechanism (3), and stop (4) compatible with a high security environment is provided.

Movement of body member (15) drives rotary latch (11) towards or away from stop (4). In the unlocked position rotary latch (11) is withdrawn into body member (15) and in the locked position cam shaped portion of rotary latch (11) is exposed.

An internal cavity (16) in body member (15) protects rotary latch (11) and pivot assembly (18) so that the anti-ligature device does not provide a point of attachment for a rope or a noose.

Slots (9) in plate member (10) limit movement of the body member (15) preventing overload of small diameter connecting pin (12).

Weak link fasteners (19) secure locking mechanism (3) to window sash (2) so that any overload will separate locking mechanism (3) from the window sash (2).

Fig.1.

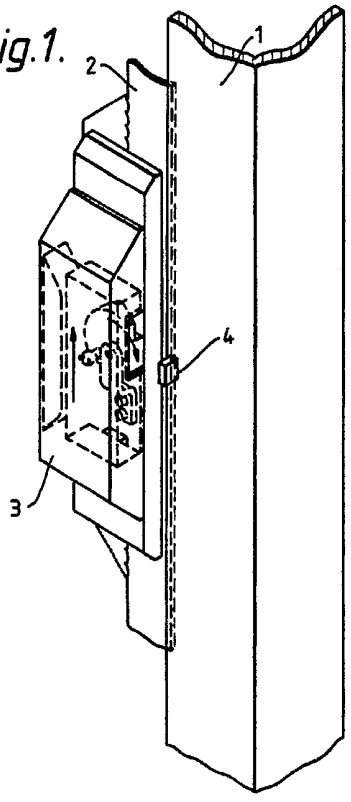
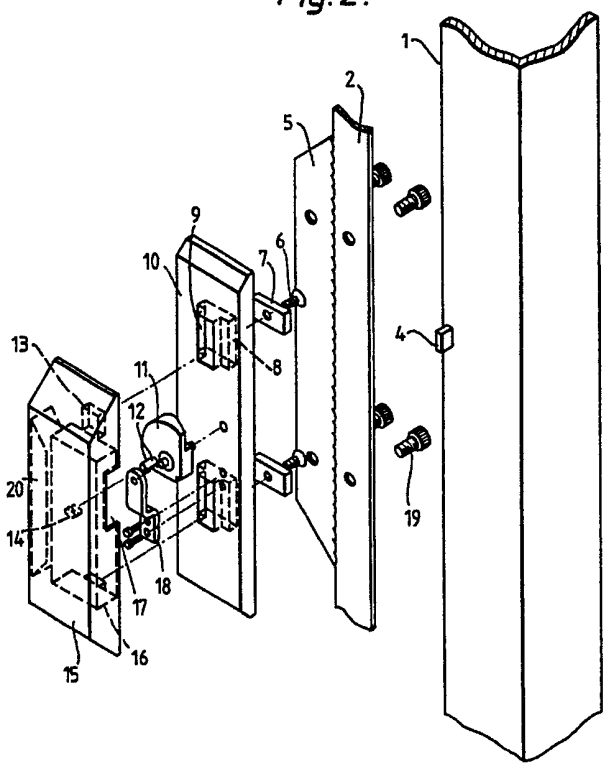


Fig.2.



GB 2 276 659 A

At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

Fig.1.

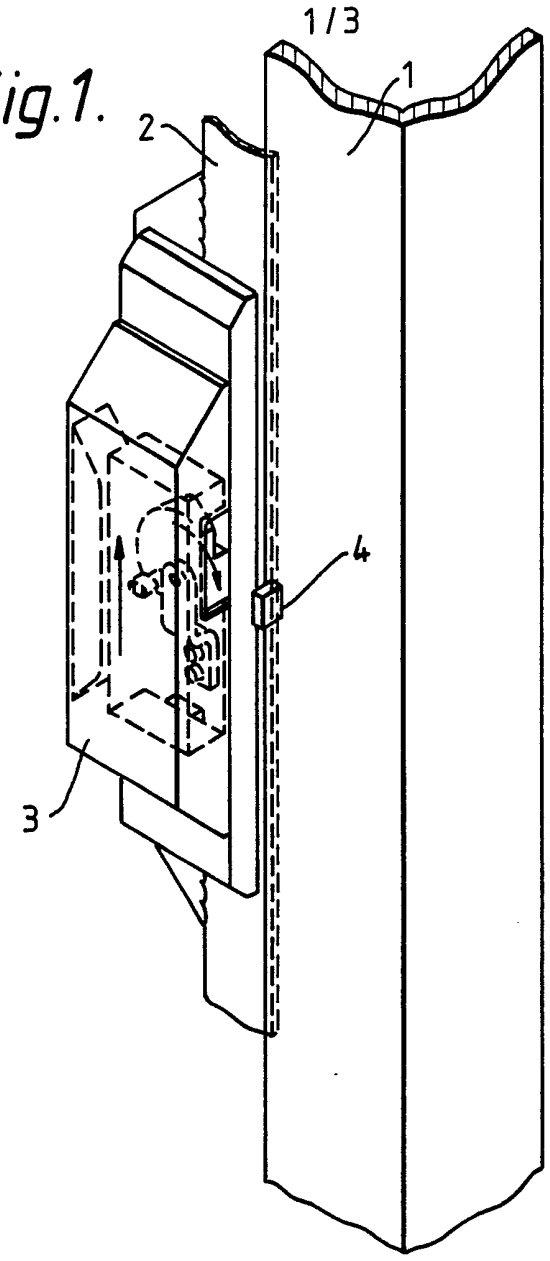


Fig.5.

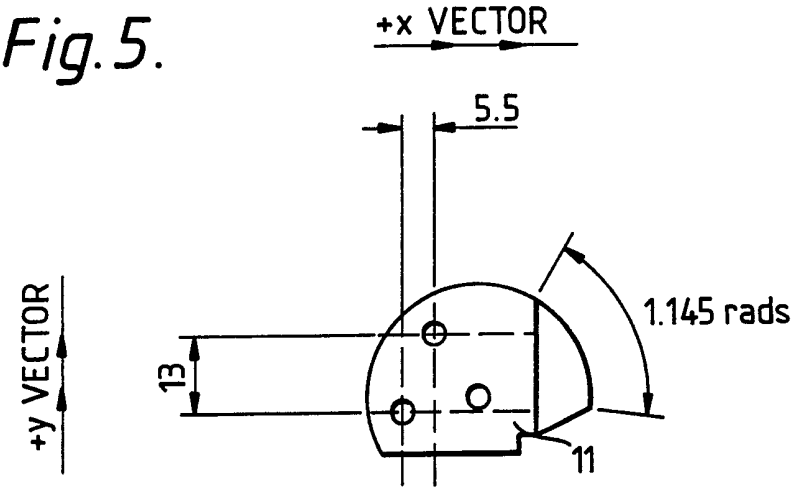


Fig. 2.

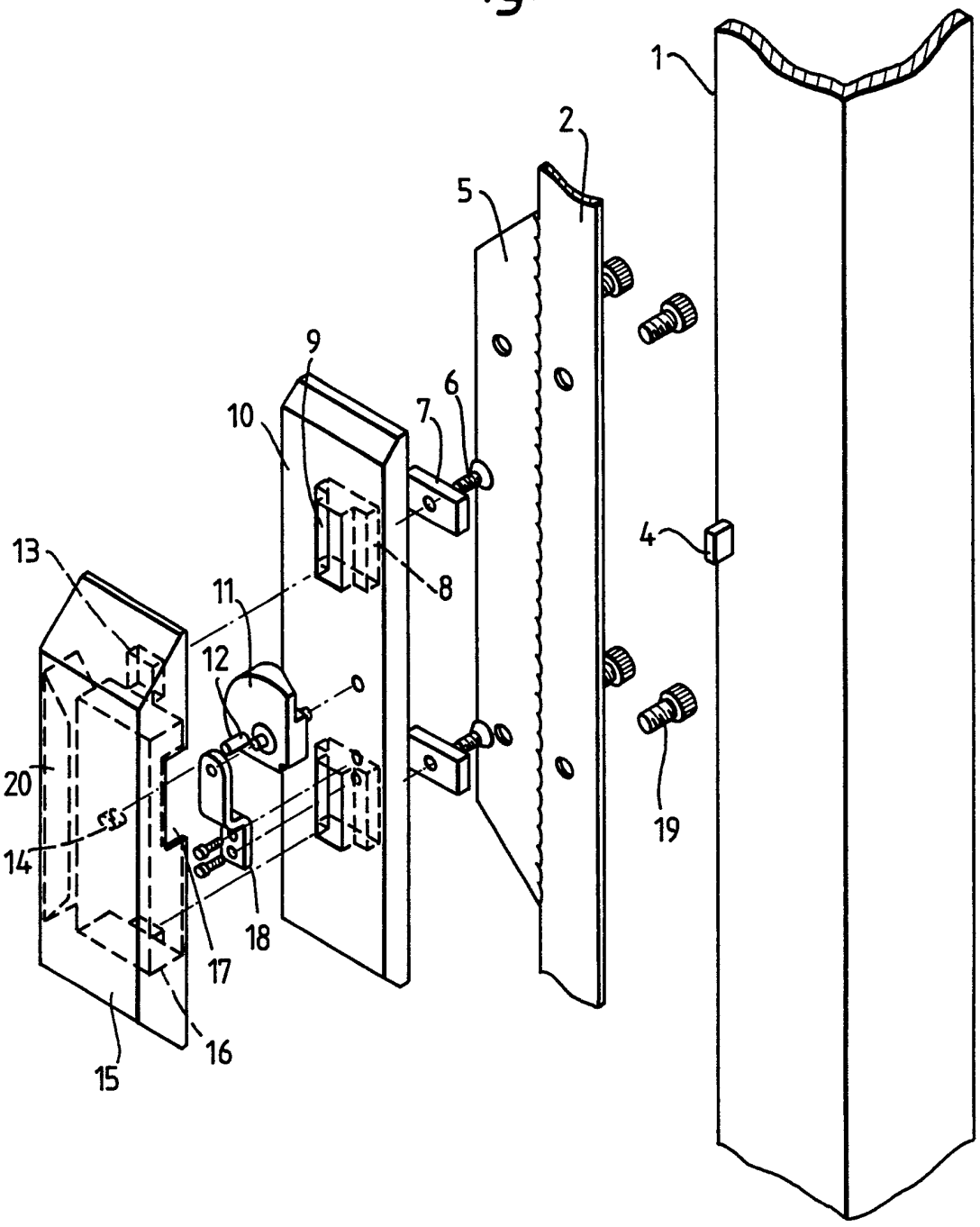


Fig. 3.

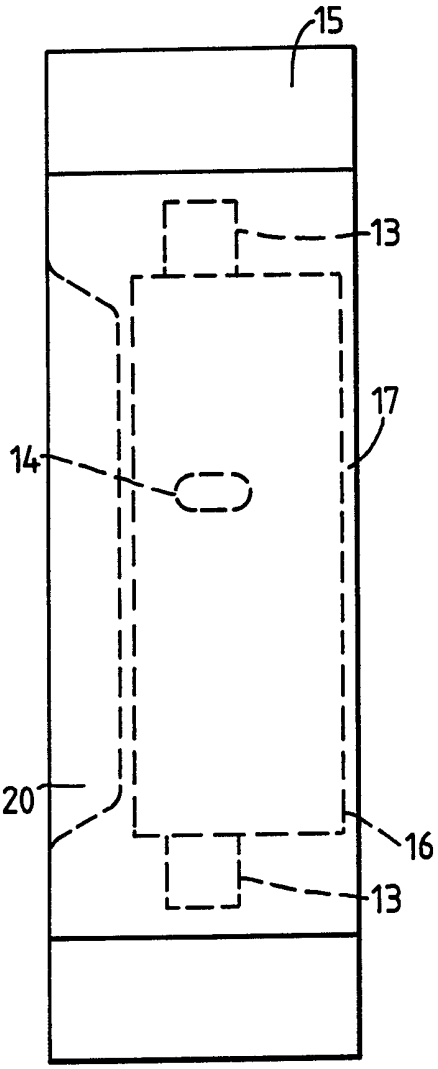
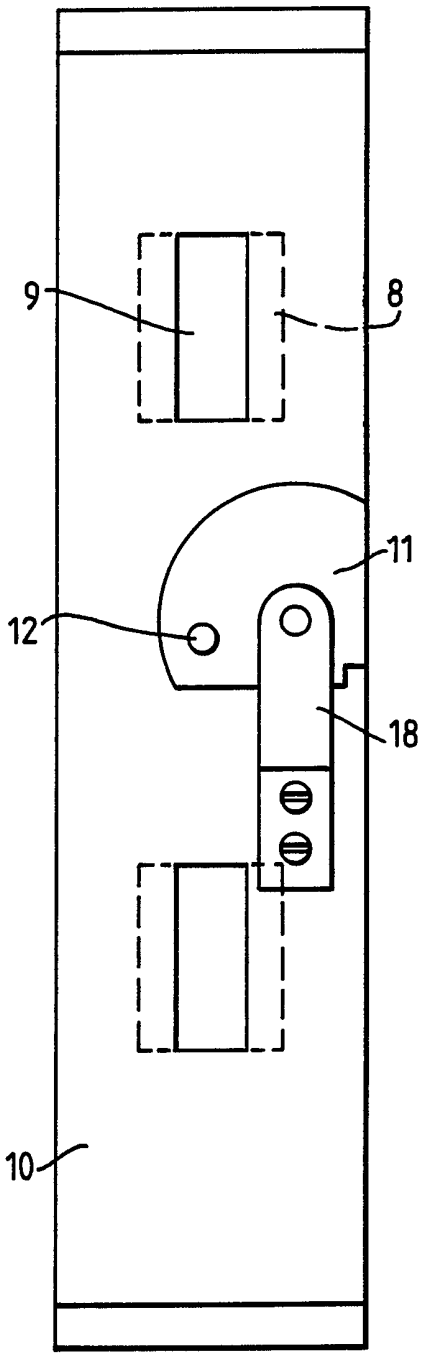


Fig. 4.



LOCKING MECHANISM

The present invention relates to locking mechanisms for secure buildings particularly to locking mechanisms for windows of cells in prisons or of rooms in hospitals for the insane.

For a number of years prison authorities have experienced difficulties in the development of window locks that do not provide an anchor point for a rope or cord which a potential suicide victim could use to hang himself or herself.

Known attempts to design such an anti-ligature locking mechanism involved the use of magnets. Whilst success was possible, magnets are not acceptable in a prison environment because of the risk of compromising the security of the locks on doors for example.

Traditionally turn and fasten latches have been used successfully to secure prison cell windows but these create an ideal anchor point for a noose.

In order to overcome these disadvantages the inventor has designed an anti-ligature locking mechanism that is safe to install in a prison cell because it does not provide a convenient anchor point for a noose, and that is also compatible with a high security environment.

According to the present invention a locking device suitable for windows with a first member in the form of a moveable sash and a second member in the form of a stationary frame, includes a stop mountable on one of the first or second members, guide means mountable on the other of the first or second members, a moveable body member co-acting with the guide means, a latch mechanism and connecting means, the device being arranged so that the body member is constrained to move in a direction substantially parallel to an edge of the frame and such that the connecting means connects the body member with the latch mechanism and causes the latch mechanism to

either engage or disengage the stop to prevent or to allow movement of the moveable sash.

The present invention removes the above disadvantages by replacing the traditional window latch with a locking mechanism in which movement of the body member moves a rotary latch connectable to the body member. This movement causes a cam shaped portion of the rotary latch to protrude from the body member. As a result the inventor has been able to design a locking mechanism that does not provide a convenient anchor point for a noose whilst at the same time being compatible with a high security environment.

In a preferred form of the invention the guide means remains stationary relative to the body member.

Preferably the locking mechanism includes a rotary latch engageable with the body member, and means for pivoting the rotary latch so that traversing of the body member in opposite directions drives the rotary latch in alternately opposite rotational senses so that the rotary latch is urged against or retracted from the stop. It is also preferable that rotary latch is cam shaped with a convex upper surface which is exposed in the locked position but which in the unlocked position is drawn within the body member.

According to another aspect of the invention the guide means includes a plate member pierced with slots, projections formed on the body member pass through the slots, and sliders on the opposite side of the plate member secure the body member in the slots so that movement of the body member is limited to prevent overload of the connecting pin.

Preferably the body member has a smooth exterior surface and is provided with an external finger grip for manual drive thereof and an internal cavity such that the rotary latch and pivot assembly is substantially covered

by the body member so that neither the body member, nor the rotary latch in the fully exposed position or any intermediate position between fully retracted and fully open, nor the stop provide a point of attachment for rope or any other ropelike material or improvised noose.

Preferably the connecting means is a small diameter pin mounted on the rotary latch and slidably engageable with an elongate pocket in the body member such that linear movement of the body member is converted into rotational movement of the rotary latch.

According to yet another aspect of the invention the locking mechanism is secured to the sash (or frame) by fasteners which form the weakest part of the locking mechanism with the result that overloading of the locking mechanism will separate the locking mechanism from the sash (or frame) on which it is mounted.

One specific embodiment of the invention will now be described, by way of example only, with reference to the accompanying diagrammatic drawings of which:

Fig. 1 is an illustration of a locking mechanism according the invention;

Fig. 2 is an exploded view of a locking mechanism according to the invention;

Fig. 3 is a plan view of body member used in the invention;

Fig. 4 is a plan view of a plate member used in the invention; and

Fig. 5 is a plan view of a rotary latch used in the invention.

In one form of the invention (Figs.1 to 5) a window has a sash 2 slidably mounted in a frame 1. A locking mechanism for the window includes a latch mechanism 3 (Fig. 1) secured to the sash 2 and a stop 4 mounted on the frame 1.

The latch mechanism 3 has a body member 15 (Figs. 2 and 3) slidably connected to plate member 10 (Figs. 2 and 4) by means of fasteners 6 which pass through sliders 7 and screw into projections 13 on body member 15. The projections 13 are contained in slots 9 in the plate member 10 and the sliders 7 are contained in the recesses 8 which lead from the slots 9. A rotary latch 11 (Figs. 2, 4 and 5) is rotatably mounted on a pivot assembly 18 which is secured to the plate member 10. The rotary latch 11 is contained in cavity 16 in the body member 15 and has a connecting pin 12 which is contained in a pocket 14 in the body member 15. Sliding motion of the body member 15 relative to the plate member 10 causes rotation of the rotary latch 11 to cause it to move in or out of a gap 17 in the body member 15 to allow a portion of the rotary latch 11 to engage or disengage with the stop 4.

The latch mechanism 3 is secured to the sash 2 by means of fixing screws 19 which screw into the plate member 10. The sash 2 may be locally widened by attachment of widening member 5.

In one form of the invention the fixing screws 19 are designed to fail if the latch mechanism 3 is subject to overload.

The geometry of one particular form of rotary latch 11 made according to the invention is shown in Fig. 5 in which a clockwise angular movement of 1.145 rads. is caused by a connecting pin 12 +y vector movement of 13mm and a +x vector movement of 5.5mm (in turn caused by upwards movement of the body member 15). The result of this clockwise angular movement is that the rotary latch 11 is urged against the stop 4, thereby locking the sash 2 to the frame 1. Conversely the result of an anti-clockwise angular movement (caused by downwards movement of the body member 15) is that the rotary latch

11 is moved away from the stop 4 thereby un-locking the sash 2 from the frame 1.

The length of the slots 9 limits the relative movement of the body member 15 with respect to the plate member 10 in accordance with the full desired rotation of the rotary latch 11. This prevents deliberate overload of the relatively weak connecting pin 12.

The body member 15 is preferably provided with a finger grip 20 which has no projections.

It can be seen that in use the locking mechanism does not form a suitable anchor point for ropelike material or an improvised noose constructed by a potential suicide victim.

WHAT IS CLAIMED IS

1. A locking device suitable for windows with a first member in the form of a moveable sash and a second member in the form of a stationary frame, including a stop mountable on one of the first or second members, guide means mountable on the other of the first or second members, a moveable body member co-acting with the guide means, a latch mechanism and connecting means, the device being arranged so that the body member is constrained to move in a direction substantially parallel to an edge of the frame and such that the connecting means connects the body member with the latch mechanism and causes the latch mechanism to either engage or disengage the stop to prevent or to allow movement of the moveable sash.

2. A device according to claim 1 wherein the guide means remains stationary relative to the body member.

3. A device according to claim 1 or claim 2, in which the latch mechanism includes a rotary latch, connecting means for connecting the rotary latch with the body member and means for pivoting the rotary latch so that traversing of the body member in opposite directions drives the rotary latch in alternately opposite rotational senses so that a portion of the rotary latch emerges from or withdraws within the body member, and is urged against or retracted from the stop.

4. A device according to claim 2 or claim 3, wherein the guide means includes a plate member pierced with slots and projections formed on the body member pass through the slots in the plate member and on the opposite side of the plate member sliders secure the projections in the slots so that movement of the body member is limited to prevent overload of the connecting means.

5. A device according to any of the previous claims, wherein the rotary latch is cam shaped so that in the unlocked position the rotary latch is withdrawn into the body member and when in the locked position the portion of the rotary latch protruding from the body member has a convex upper surface.

6. A device according to any of the preceding claims in which the connecting means is a pin of small diameter mounted on the rotary latch and slidably engageable with an elongate pocket in the body member such that linear movement of the body member is converted into rotational movement of the rotary latch.

7. A device according to any of the preceding claims in which the body member has a smooth exterior surface and is provided with an external finger grip for manual drive thereof and an internal cavity such that the latch mechanism is substantially covered by the body member so that neither the body member, nor the rotary latch in the fully exposed position or any intermediate position between fully retracted and fully open, nor the stop provide a point of attachment for rope or any other ropelike material or noose whether improvised or not.

8. A device according to any of the preceding claims secured to the window frame by fasteners which form a weak link so that overloading of the device will cause it to detach from either the first or second members.

9. An locking device substantially as described herein with reference to the accompanying drawings.

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Examiner's report to the Comptroller under Section 17 (The Search Report)

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Relevant Technical fields

(i) UK Cl (Edition L) E2A (AEM, ACCC, AMX)

(ii) Int Cl (Edition 5) E05B

Search Examiner
P J SILVIE

Databases (see over)

(i) UK Patent Office

(ii) ONLINE DATABASE: WPI

Date of Search
23 JUNE 1993

Documents considered relevant following a search in respect of claims 1-8

Category (see over)	Identity of document and relevant passages	Relevant to claim(s)
X	GB 2056550 A (PROGRESS) - see page 1, lines 14-19	1,2
X	US 4438963 A (FRIEDRICH) - see whole document	1,2

Identity of document and relevant passages	Relevant to claim(s)

Categories of documents

X: Document indicating lack of novelty or of inventive step.

Y: Document indicating lack of inventive step if combined with one or more other documents of the same category.

A: Document indicating technological background and/or state of the art.

P: Document published on or after the declared priority date but before the filing date of the present application.

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