

A RELEASABLE LOCKING ASSEMBLY

FIELD OF THE INVENTION

THIS INVENTION relates to a releasable locking assembly for releasably holding two members in a secured state and in particular, but not limited to, a
5 releasable locking assembly for locking a hinged member relative to a fixed support.

BACKGROUND ART

The present invention will be described below in relation to a hinged security grill being one example of a hinged member moveable relative to a fixed
10 support. It will, however, be appreciated that the present invention has general application wherever it is desirable to hold two members together in releasable configuration.

Hinged security grills were employed over sliding windows. In cases of emergency it may be necessary for persons to escape through a window. At
15 present security grills are locked so that during an emergency a key may be required to open the security grill from the inside. Alternatively, where the security grills are locked using a system where a key is not required, these systems are prone to tampering and unauthorised entry from the outside.

It is an object of the present invention to alleviate at least to some degree
20 the above mentioned problems associated with the prior art.

The applicant has devised inventions in relation to releasable locking assemblies particularly suited to security grills. In doing so, the present applicant has devised a number of independent inventions which are set out below as independent aspects although it is preferable that the aspects be used in
25 synergistic combinations. The applicant reserves his rights to divide the present application into separate applications should the applicant deem this necessary following an International Search.

OUTLINE OF THE INVENTION

In one broad aspect, therefore, the present invention resides in a releasable
30 locking assembly holding first and second locking means together, the first and second locking means being fitted to respective relatively moveable members, for example, a security grill and an outside portion of a window frame respectively, the assembly having an actuator for releasing the locking means, the first locking

means comprising spaced retractable catches and the second locking means comprising projections including shoulder means automatically engageable with said catches to lock the assembly, said actuator communicating with the first locking means through passage means.

5 In another aspect the present invention resides in a tamper proof releasable locking assembly holding first and second locking means together, the first and second locking means being fitted to a security grill and an outside portion of a window frame respectively, the first locking means comprising an elongate housing including a plurality of spaced apertures, the second locking means
10 comprising a channel like member secured to the security grill and having projections located within the channel so that when the first and second locking means are retained together the channel extends around and covers the first locking means thereby inhibiting access to the projections and the apertures.

In a further aspect the invention resides in a method of fitting a releasable
15 locking assembly comprising first and second locking means to a security grill window combination, the method comprising securing the first locking means to the window frame, the first locking means having a plurality of spaced retractable catches, subsequently positioning the second locking means in operative position over the first locking means, the second locking means having a plurality of
20 projections engageable with the catches, the first locking means being manoeuvred relative to the second locking means and being tested thereby for release and engagement prior to the second locking means being secured to the security grill, subsequently securing the second locking means to an inside surface of the security grill so that when the security grill is closed the second locking means
25 returns to its predisposition over the first locking means according to the tested position thereby alternatively locking the locking means together.

Preferably the first locking means comprises an elongate housing set vertically or horizontally, the housing having catches at opposite ends thereof and preferably at least one intermediate catch to inhibit the first and second locking
30 means from being levered apart.

The first locking means preferably comprises inner and outer telescopically disposed members moveable relative to one another to engage or disengage the catches with the projections on the second locking means.

Where the first locking means is positioned vertically the catches are typically biased into an engaged position by gravity. Alternatively where the catches are not arranged vertically or where gravity is not operative to bias the catches into their catch positions the catches are preferably biased by a spring bias or other suitable biasing means so that they automatically engage the projections when the first locking means is pushed into position relative to the second locking means.

The actuator is preferably a remote actuator and preferably comprises a tube located inside the window extending horizontally to a remote position away from the normally open window. Where the actuator is not remotely positioned a key lock can be employed so that rotation of a key actuates release of the locking means. A cord and pulley assembly is preferably employed and the actuator includes telescopically slideable inner and outer tubes that can be pulled manually or in response to opening of a window to release the catches.

Preferably where the locking assembly is used with a window frame and security grill, a hinge means having an integral frame received is employed between the window frame and security grill.

The hinge, said hinge comprises at least two longitudinal channel members; said channel members concentrically located and rotatable with respect to each other; wherein in operation said channel members are fastened to members which are attached and moveable with respect to each other.

The hinge preferably comprises an inner channel member concentrically located and rotatable within an outer channel member; a central pin attached by means of a web to said outer channel member wherein in operation said inner channel member rotates about said pin, and said inner and outer channel members are fastened to members which are attached and moveable with respect to each other.

In preference said inner and outer channel members have substantially arcuate cross sectional profiles. Suitably said inner channel member has an outside diameter which is less than the inside diameter of said outer channel member to enable said inner channel member to be concentrically located and rotatable within said outer channel member.

Preferably said hinge is constructed of channel members of extruded

aluminium section or resilient plastic material, however other suitable extrusion material may be used such that hinges of various lengths may be constructed.

Suitably, the central pin is of an outside diameter which is less than the inside diameter of said inner channel member to enable said inner channel member to engage and rotate about said pin.

Preferably the position of a line of attachment of said web to said outer channel member enables said first inner channel member to rotate through an arc of at least ninety degrees. It will be appreciated that greater and lesser arcs of rotation may be achieved by variation to both the position of the web with respect to the inside surface of the outer channel member and width of the opening of the inner channel member. It will also be appreciated that the inclusion of a central pin and web further contributes to the integrity of the hinge and eliminates the possibility of the breaking or peeling away of the outer channel member due to an over extension of the hinge.

Suitable the inner and outer channel members have brackets or lugs for attachment to the members to be hinged together.

Suitably there are detachable end plates and/or detent mechanisms to fixedly locate the inner and outer channel members with respect to each other and to provide a bearing surface to support the weight of a hinged member. In the embodiment having a central pin, the end plate may be attached to the pin.

BRIEF DESCRIPTION OF THE DRAWINGS

In order that the present invention can be more readily understood and be put into practical effect reference will now be made to the accompanying drawings illustrating application of the present invention to a security grill and wherein:-

Figure 1 is a perspective view illustrating a security grill and window assembly employing a locking assembly according to the present invention;

Figure 2 is a perspective drawing in cut away illustrating operation of a first locking means and an actuator according to one embodiment of the present invention;

Figure 3 is a front view illustrating one method of automatic actuation of the locking assembly in response to movement on a sliding window;

Figures 4 and 5 are detailed views illustrating parts of a preferred first

locking means suitable for use with a locking assembly according to the present invention;

Figure 6A to 6D illustrate a preferred fitting method suitable for a locking assembly according to the present invention; and

5 Figure 7 illustrates a further embodiment of a first locking means suitable for use with the present invention;

Figure 8 to 10 are respective sections through extension forming a hinged assembly shown in Figure 10 are suitable for fitting the assembly grill to the window assembly.

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METHOD OF PERFORMANCE

Referring to the drawings and initially to Figure 1 there is illustrated . Upon engagement the catches 16, 17 and 18 automatically hold the second locking means 19 effectively locking the security grill closed.

15 The first locking means 15 comprises inner and outer tubes. This is shown more clearly in Figure 2. The outer tube 20 includes three apertures illustrated at 16, 17 and 18. In Figure 1 and the inner tube 21 includes apertures which are normally offset and biased downwardly relative to the apertures in the outer tube so that the inner tube 21 is normally in a "catch" position. When projections carried by the channel 19 pass through the apertures in the outer tube 20 the tube 20
20 21 is moved vertically until the projections are moved sufficiently far into the interior of the hollow tube 21 that the hollow tube 21 falls by gravity into its "catch" position engaging behind shoulders in the three projections thereby effectively locking the security grill closed.

25 As can be seen in Figure 2 the inner tube 21 includes a rod 22 coupled to a pully cord 23 which extends over pulleys 24 and 25 the cord travelling through a single hole drilled through the window frame 26 (see Figure 1). The window frame 26 has being omitted in Figure 2 and the cord extends to a telescopically moveable actuating tube 27 protruding from the cord tensioning adjustment tube 28 which is fixed relative to tube 29 of the actuator 30. It will
30 be appreciate that upon movement of the tube 27 in the direction of arrow 31 that the tube 21 will be raised to thereby release the projections and allow the security grill 10 to be pushed open.

Referring to Figure 3 an alternative to direct manual actuation is illustrated.

In Figure 3 like numerals have been used to illustrate like features. A projecting finger 32 engages with an edge of the fully open sliding window 14 to release the security grill. As an alternative for this a releasable stop is employed at 33 and when the releasable stop is engaged it prevents movement of the window to a position where it engages the finger 32.

Figures 4 and 5 illustrate typical projections and also in Figure 5 in cut away view a typical second locking means in the form of channel 19 is illustrated. The projections are formed having a generally cone shaped leading section 34, a shoulder 35 formed as part of a slot 36 and a bracket section 37 having a pair of holes 38 and 39 in respective flanges thereof. The projection includes a flat lower surface at 40 so the slot is not annular. This provides faithful engagement and release as only raising and lowering of the catch tube influence the catching and release action.

As can be seen in Figure 5 the channel 19 includes an inner channel 41 acting as a fairly tight fit slide for the bracket section 37 of the projections 42 on the assembly as shown illustrated in position in Figure 5. It will be appreciated that although there is a fairly tight frictional engagement between the bracket section 42 and the channel 41 the projections can be moved in order to place them in the correct positions relative to the apertures 16, 17 and 18. Once this is done the channels 19 can then be screwed directly to the security grills in the correct position using screws passing through apertures 38 and 39.

This process is illustrated graphically in Figures 6A to 6D.

In Figure 6A the first locking means 15 has been secured in place and then the channel 19 with its three projections positioned generally in the right position is placed over the locking means 15 and the projections are juggled and moved slightly so that they all engage and the locking means is in its locked position as shown in Figure 6B. The security grill is then moved into the position illustrated in Figure 6C where appropriate markings are applied. The actuator is used to release the channel 19. Once the channel 19 is released and placed according to the markings it can be screwed directly to the security grill as illustrated in Figure 6D. Clearly then the security grill when closed will automatically engage the catches thereby locking the security grill.

It will be appreciated that there are many modifications to the present

invention apparent to those skilled in the art, which fall within the broad ambit and scope of the invention as here in set forth. For example, an alternative embodiment of a channel 19 is illustrated in Figure 7 at 48 whereby one flange 49 includes a weakened section in the form of a groove 50 so that the flange section outboard of the groove 50 can be torn away. This may be used in the case of a close fitting of the first locking means 15 relative to a portion of a widow frame where the torn away section would otherwise prevent the channel 19 from being moved into position. It will be appreciated that a portion of the flange shown generally at 51 would remain and thereby prevent a tool being inserted and thereby inhibit unauthorised access to the interior of the channel with say a screw driver or other tools used by a person in effort to gain unauthorised entry.

Preferably where the security grill and window frame are hinged as shown a hinge assembly as described below in relation to Figures 8 to 10 is employed.

Referring to Figure 8 there is shown a section through a hinge member 70 having a bracket 71 and an inner channel member 53 of a semi circular cross sectional profile. The bracket 71 is used to secure the hinge member to a window frame.

In this embodiment the inner channel member 53 is shown with a semi-circular opening 54. The inner channel member 53 is attached by a neck portion 55 to a bracket member 56 for attachment to a fixed support (not shown). The internal diameter 57 of the inner channel member 53 is such that it will snugly enclose and rotate about a central pin of an outer channel member (shown as 7 in Figure 9).

In Figure 9 is a hinge member 71 which co-operates with the hinge member 70 by an outer channel member 58 and a central pin 59 which is attached by means of a web 60 to the inner surface 61 of the outer channel member 58. The hinge member 72 includes a security grill frame receiver 73. In this embodiment, the outer channel member 58 is attached to a U-shaped bracket member 62 which has shouldered regions 63 for attachment to the frame of a security grill (not shown).

The diameter 59a of the central pin 59 and the inside diameter 58a of the outer channel member 58 are such that the inner channel member 53 of Figure

60 will be snugly accommodated and able rotate about the central pin 59.

It will be apparent that the dimensions of the opening 54 of the inner channel member and the opening 64 of the outer channel member as well as the position of the web 60 determines a maximal arc of opening or closure of the hinge.

Referring to Figure 62, it is shown that the complete hinge assembly 65 comprises an inner channel member 53 and an outer channel member 58 wherein the internal surface 66 of the inner channel member 53 is in contact with the central pin 59 of the outer channel member 58. The ends 67, 68 of the inner channel member by coming into contact of the web 60 of the central pin 59 restrict the rotation of the outer channel member with respect to the inner channel member or vice versa depending on which channel member is attached to a fixed support.

It will be readily apparent that the distance between the ends 67, 68 of the inner channel member 53 and the position of the web 60 on the inner surface 61 of the outer channel member 58 will determine the angle through which the hinge may be opened or closed.

CLAIMS

1. A releasable locking assembly holding first and second locking means together, the first and second locking means being fitted to respective relatively moveable members, for example, a security grill and an outside portion of a window frame respectively, the assembly having an actuator for releasing the locking means, the first locking means comprising spaced retractable catches and the second locking means comprising projections including shoulder means automatically engageable with said catches to lock the assembly, said actuator communicating with the first locking means through passage means.
2. A tamper proof releasable locking assembly holding first and second locking means together, the first and second locking means being fitted to a security grill and an outside portion of a window frame respectively, the first locking means comprising an elongate housing including a plurality of spaced apertures, the second locking means comprising a channel like member secured to the security grill and having projections located within the channel so that when the first and second locking means are retained together the channel extends around and covers the first locking means thereby inhibiting access to the projections and the apertures.
3. A method of fitting a releasable locking assembly comprising first and second locking means to a security grill window combination, the method comprising securing the first locking means to the window frame, the first locking means having a plurality of spaced retractable catches, subsequently positioning the second locking means in operative position over the first locking means, the second locking means having a plurality of projections engageable with the catches, the first locking means being manoeuvred relative to the second locking means and being tested thereby for release and engagement prior to the second locking means being secured to the security grill, subsequently securing the second locking means to an inside surface of the security grill so that when the security grill is closed the second locking means returns to its predisposition over the first locking means according to the tested position thereby alternatively locking the locking means together.
4. A releasable locking assembly according to claim 1 or claim 2 wherein the first locking means comprises an elongate housing set vertically or horizontally,



the housing having catches at opposite ends thereof and preferably at least one intermediate catch to inhibit the first and second locking means from being levered apart.

5 5. A releasable locking assembly according to claim 1 or claim 2 wherein the first locking means comprises inner and outer telescopically disposed members moveable relative to one another to engage or disengage the catches with the projections on the second locking means.

10 6. A releasable locking assembly according to claim 1 or claim 2 wherein the first locking means is positioned vertically the catches being biased into an engaged position by gravity, or the catches are by biasing means so that they automatically engage the projections when the first locking means is pushed into position relative to the second locking means.

15 7. A releasable locking assembly according to claim 1 or claim 2 wherein the actuator is a remote actuator and comprises a tube located inside the window extending horizontally to a remote position away from the normally open window or the actuator is not remotely positioned and a key lock is employed so that rotation of a key actuates release of the locking means.

20 8. A releasable locking assembly according to claim 1 or claim 2 wherein the actuator employs a cord and pulley assembly and telescopically slideable inner and outer tubes that can be pulled manually or in response to opening of a window to release the catches.

25 9. A releasable locking assembly according to claim 1 or claim 2 wherein the security grill is hinged to the window frame by a hinge, said hinge comprising at least two longitudinal channel members, said channel members being concentrically located and rotatable with respect to each other, wherein in operation said channel members are fastened to members which are attached and moveable with respect to each other, said hinge comprising an inner channel member concentrically located and rotatable within an outer channel member; a central pin attached by means of a web to said outer channel member wherein
30 in operation said inner channel member rotates about said pin, and said inner and outer channel members are fastened to members which are attached and moveable with respect to each other.

10. A releasable locking assembly according to claim 1 or claim 2 according



to claim 9 wherein said inner and outer channel members have substantially arcuate cross sectional profiles said inner channel member having an outside diameter which is less than the inside diameter of said outer channel member to enable said inner channel member to be concentrically located and rotatable within said outer channel member.

- 5 11. A releasable locking assembly according to claim 1 or claim 2 according to claim 9 wherein the central pin is of an outside diameter which is less than the inside diameter of said inner channel member to enable said inner channel member to engage and rotate about said pin.
- 10 12. A releasable locking assembly according to claim 1 or claim 2 according to claim 9 wherein the position of a line of attachment of said web to said outer channel member enables said first inner channel member to rotate through an arc of at least ninety degrees.