



(11) **EP 2 128 362 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
02.12.2009 Bulletin 2009/49

(51) Int Cl.:
E05B 17/20^(2006.01) E05C 9/00^(2006.01)

(21) Application number: **09251111.2**

(22) Date of filing: **16.04.2009**

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO SE SI SK TR

(30) Priority: **28.05.2008 GB 0809672**

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(54) **Multi-point locking systems**

(57) A multi-point locking system has a locking mechanism (12) that includes a retractable latch (16) and a bolt (18). The locking mechanism (12) can be operated to extend and retract upper and lower drive bars (11a, 11b) that operate respective latches (13a, 13b) remote from the locking mechanism (12). An auxiliary lock (14) is provided and can be operated to extend a bolt (25) through a receiver (27) in the upper or lower drive bars (11a, 11b) and through a receiver (27) in an associated face bar (10) to lock the upper drive bars (11a, 11b) against movement and so provide additional security.

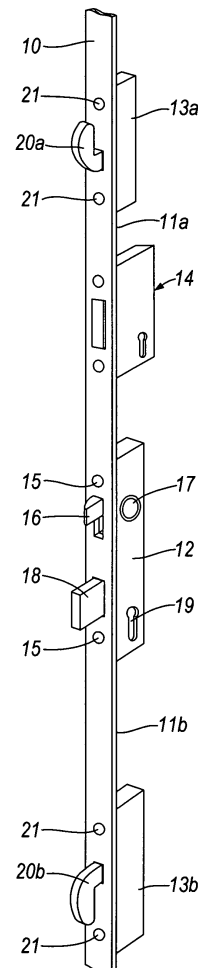


Fig.1

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Description

[0001] The invention relates to multi-point locking systems.

[0002] A multi-point locking system comprises a locking mechanism operable to retract and extend a bolt and to move at least one drive bar to retract and extend a latch remote from the locking mechanism. Such a multi-point locking mechanism is mounted in, for example, an edge of a door and the bolt and the latch are operated to lock the door to an associated frame. In general, the locking mechanism is associated with two moveable drive bars extending from the mechanism in opposite directions and each associated with a respective latch to provide three or more locking points between the door and the frame.

[0003] It is a problem with such multi-point locking systems that it is possible to gain forced access the locking mechanism and forcibly retract the bolt. Such bolt retraction also has the affect of moving the or both drive bars to retract the associated latch. In this way, the door can be forced open.

[0004] According to a first aspect of the invention, there is provided a multi-point locking system comprising a locking mechanism operable to retract and extend a bolt and to move at least one drive bar to retract and extend a latch remote from the locking mechanism, the at least one drive bar including a receiver, the at least one drive bar being overlaid by a face bar that is fixed relative to the locking mechanism, the face bar including a receiver that is in register with the receiver in the at least one drive bar when the drive bar has extended the associated latch, an auxiliary lock being located at a position spaced from the locking mechanism and being operable to extend a bolt into the registering receivers of the face bar and the at least one drive bar when the at least one drive bar is extended to lock the at least one drive bar against movement, the bolt being retractable to unlock the at least one drive bar to allow movement thereof.

[0005] By providing an auxiliary lock, the latch is prevented from being forcibly retracted if the bolt of the mechanism is forced. This provides an additional level of safety.

[0006] According to a second aspect of the invention, there is provided a multi-point locking system according to the first aspect of the invention and fitted to a door.

[0007] The following is a more detailed description of an embodiment of the invention, byway of example, reference being made to the accompanying drawings in which:-

Figure 1 is a schematic perspective view of a multi-point locking system including an auxiliary lock,

Figure 2 is a partial exploded view of part of the multi-point locking system of Figure 1 showing a face bar, a drive bar and the auxiliary lock, and

Figure 3 is a similar view to Figure 2 but with the parts assembled.

[0008] Referring first to Figures 1 and 2, the multi-point locking system comprises an elongate face bar 10 that carries upper and lower drive bars 11a, 11b (see Figure 2), a locking mechanism 12, two latches 13a, 13b and an auxiliary lock 14.

[0009] The face bar 10 is an elongate strip of metal of constant width along its length. The locking mechanism 12 is mounted centrally on the face bar 10 by screws 15. The locking mechanism 12 includes a retractable latch 16 that may be operated via a handle (not shown) connected to a square-section spindle (not shown) extending through a correspondingly shaped hole in a boss 17 of the locking mechanism 12. The locking mechanism 12 also includes a bolt 18 that can be retracted and extended by operation of a key (not shown) inserted through a keyhole 19.

[0010] The locking mechanism 12 also contains a drive mechanism (not shown) that converts rotation of the boss 17 into linear movement of the drive bars 11a, 11b such that rotation in one sense moves the drive bars 11a, 11b in respective directions from the mechanism 12 and reverse rotation of the boss 17 moves the drive bars 11a, 11b in respective opposite directions from the locking mechanism 12.

[0011] The upper and lower drive bars 11a, 11b are connected, at ends remote from the locking mechanism 12, to respective upper and lower latches 13a, 13b. Each latch 13a, 13b includes a locking member 20a, 20b, such as a pivoting hook, that, when the upper and lower drive bars 11a, 11b move from the locking mechanism 12, move to respective locking positions and that, when the upper and lower drive bars 11a, 11b are moved the locking mechanism 12, are retracted from the locking position.

[0012] The drive bars 11a, 11b slide over a rear surface of the face bar 10.

[0013] Multi-point locking mechanisms of this general type are known and will not be described in detail.

[0014] The auxiliary lock 14 is connected to the face bar 10 by screws 21 (see Figure 3) that extend through respective slots 22 in the associated drive bar 11a to engage in threaded holes 23 in the auxiliary lock casing 24. The auxiliary lock 14 is located on the face bar 10 at a position between the locking mechanism 12 and the upper latch 13a. The casing 24 houses a locking mechanism that extends and retracts a bolt 25 under the control of a key inserted through a keyhole 26. The auxiliary lock 14 is a key-operated lever deadbolt lock. Alternatives are possible as described below.

[0015] The face bar 10 is provided with a receiver in the form of a slot 27 aligned with the bolt 25 of the auxiliary lock 14. The upper drive bar 11a is provided with a similar receiver in the form of a slot 28 between the screw slots 22. The upper drive bar slot 28 is in alignment with the bolt 25 and the face bar slot 27 only when the upper drive

bar 11a is in its extended locked position. The slots 27, 28 are sized to receive the rectangular cross-section bolt 25. Of course, the bolt 25 could have any required cross-section and, in that case, the receivers will be correspondingly shaped.

[0016] In use, the multi-point locking system is mounted in an edge of a door (not shown), with the edge extending along a side of the door opposite the hinges. The face bar 10 and the drive bars 11a, 11b may be fitted in a so-called Eurogroove extending along the edge face of the door. Suitable cavities are provided for accommodating the locking mechanism 12, the latches 13a, 13b and the auxiliary lock 14. The door is also provided with keyholes to allow access to the locking mechanism keyhole 19 and the auxiliary lock keyhole 26.

[0017] The associated door frame (not shown) is provided with appropriate keeps for receiving the retractable latch 16, the bolt 18 and the locking members 20a, 20b. A square section spindle (not shown) is inserted through the boss 17 and handles (not shown) attached to each end of the drive rod in known fashion.

[0018] When the door is closed into the frame, a handle can be rotated to move the upper and lower drive bars 11a, 11b from the locking mechanism 12 to extend the locking members 20a, 20b of the upper and lower latches 13a, 13b. When this is done, the receiver 28 in the upper drive bar 11a is in register with the bolt 25 of the auxiliary lock 14 and with the receiver 27 in the face bar 10. In this position, the auxiliary locking mechanism 14 can be operated via a key to extend the bolt 25 through the receivers 27, 28. The effect of this is to prevent the upper drive bar 11a moving and since the upper drive bar 11a is connected to the lower bar 11b through the locking mechanism 12, it also prevents movement of the lower drive bar 11b. As seen in Figure 3, the bolt 25 of the auxiliary lock 14, when fully extended, has a throw that allows it just to pass through the receivers 27, 28 without engaging the door frame so that the bolt 25 does not extend beyond or extend significantly beyond a face of the face bar remote from the drive bars 11a, 11b. For example, the throw may be 6mm. The bolt 25 so provides just a connection between the upper drive bar 11a and the face bar 10 without the need for a keep in the frame for the bolt 25.

[0019] This provides a security feature. If the locking mechanism 12 is tampered with, it is not possible to move the mechanism that controls the drive bars 11a, 11b and so unlatch the locking members 20a, 20b. This provides an extra level of security.

[0020] Although as described above with reference to Figures 1 to 3 the auxiliary lock 14 cooperates with the upper drive bar 11a, it could co-operate with the lower drive bar 11b. This might be useful if the door is for use by a disabled person. It would also be possible to include two auxiliary locks 14; one engaging with the upper drive bar 11a and the other engaging with the lower drive bar 11b. This would give maximum security. The auxiliary lock 14 or auxiliary locks need not be a lever lock; could be cylinder locks or thumb turn locks. In this latter case,

the lock will be operated manually and not by use of a key. Although upper and lower drive bars 11a, 11b are shown, there need only be one drive bar.

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Claims

1. A multi-point locking system comprising a locking mechanism (12) operable to retract and extend a bolt (18) and to move at least one drive bar (11a, 11b) to retract and extend a latch (13a, 13b) remote from the locking mechanism (12), the at least one drive bar (11a, 11b) including a receiver (28), the at least one drive bar (11a, 11b) being overlaid by a face bar (10) that is fixed relative to the locking mechanism (12), the face bar (10) including a receiver (27) that is in register with the receiver (28) in the at least one drive bar (11a, 11b) when the drive bar (11a, 11b) has extended the associated latch (13a, 13b), an auxiliary lock (14) being located at a position spaced from the locking mechanism (12) and being operable to extend a bolt (25) into the registering receivers (27, 28) of the face bar (10) and the at least one drive bar (11a, 11b) when the at least one drive bar (11a, 11b) is extended to lock the at least one drive bar (11a, 11b) against movement, the bolt (25) being retractable to unlock the at least one drive bar (11a, 11b) to allow movement thereof.
2. A system according to claim 1 wherein the auxiliary lock is a deadbolt mechanism (14) key-operated to extend and retract a bolt (25) that engages with or disengages from the receivers (27, 28).
3. A system according to claim 1 or claim 2 wherein the bolt (25) of the auxiliary lock (14), when extended, does not extend beyond or extend significantly beyond a face of the face bar (10) remote from the at least one drive bar (11a, 11b).
4. A system according to any one of claims 1 to 3 wherein the auxiliary lock (14) is mounted on the face bar (10) with the at least one drive bar (11a, 11b) passing between the face bar (10) and the auxiliary lock (14).
5. A system according to any one of claims 1 to 4 wherein the auxiliary lock (14) is a key-operated lock.
6. A system according to claim 5 wherein the auxiliary lock (14) is a lever lock or a cylinder lock.
7. A system according to any one of claims 1 to 4 wherein the auxiliary lock is a thumb-turn lock.
8. A system according to any one of claims 1 to 9 wherein the locking mechanism (12) moves two drive bars (11a, 11b) to retract and extend respective latches

(13a, 13b) remote from the locking mechanism (12).

9. A multi-point locking system according to any one of claims 1 to 8 fitted to a door.

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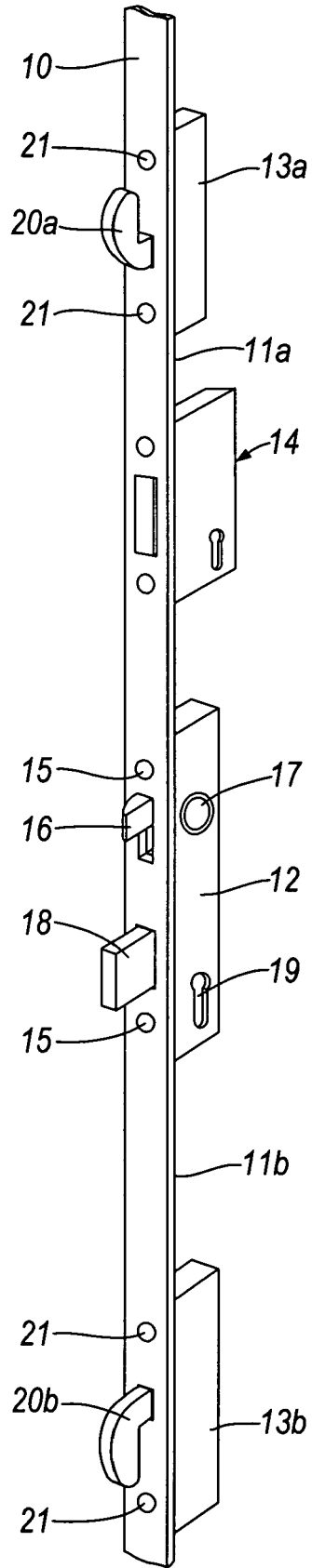


Fig. 1

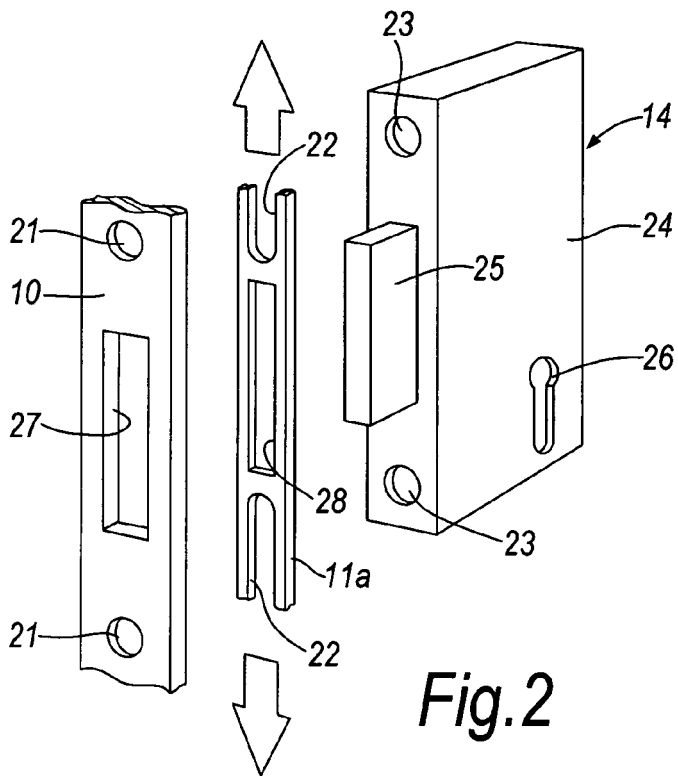


Fig. 2

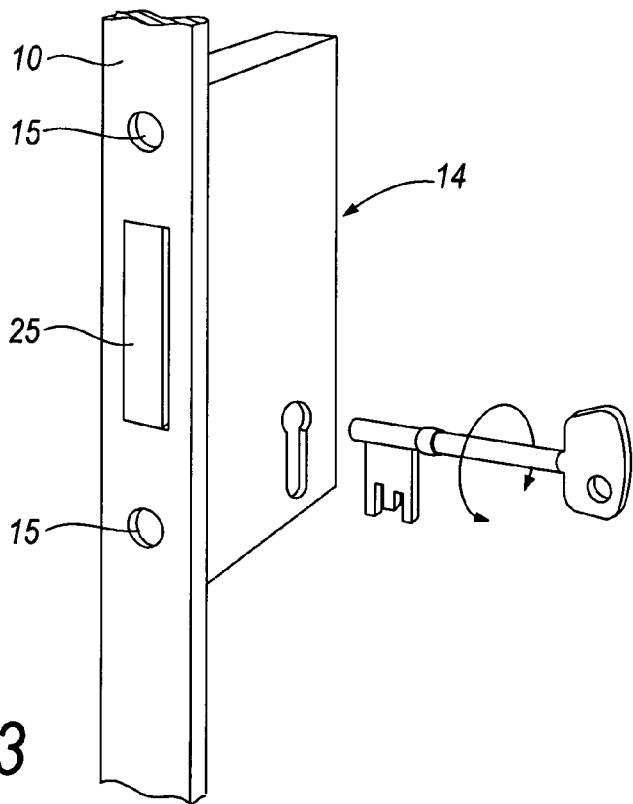


Fig. 3



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Application Number
EP 09 25 1111

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The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 6 October 2009	Examiner Westin, Kenneth
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