



Europäisches Patentamt  
European Patent Office  
Office européen des brevets



(11) **EP 1 413 697 A2**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:  
**28.04.2004 Bulletin 2004/18**

(51) Int Cl.7: **E05B 15/02**, E05C 9/18,  
E05B 63/04

(21) Application number: **03256517.8**

(22) Date of filing: **16.10.2003**

(84) Designated Contracting States:  
**AT BE BG CH CY CZ DE DK EE ES FI FR GB GR  
HU IE IT LI LU MC NL PT RO SE SI SK TR**  
Designated Extension States:  
**AL LT LV MK**

(72) Inventor: **Hughes, Anthony Lee**  
**Stropshire, WV16 5BW (GB)**

(74) Representative: **Calderbank, Thomas Roger et al**  
**MEWBURN ELLIS**  
**York House**  
**23 Kingsway**  
**London WC2B 6HP (GB)**

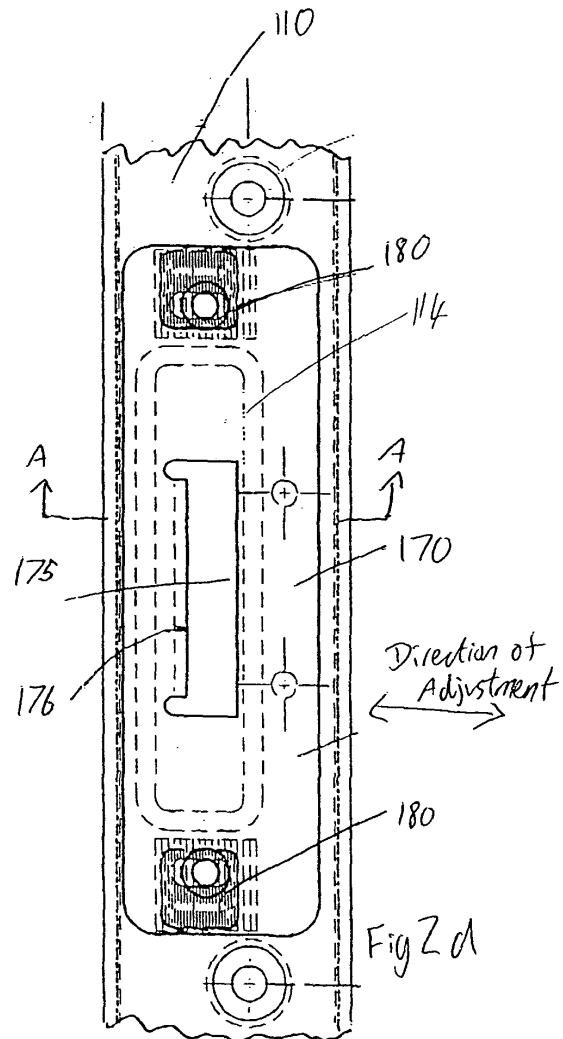
(30) Priority: **25.10.2002 GB 0224924**

(71) Applicant: **Epwin Group Plc**  
**Cheltenham GL51 9TX (GB)**

(54) **Keep and lock assembly and keep for receiving locks**

(57) A keep rail 110 having a plurality of keeps 112, 114, 116 for engagement with respective portions of the door lock 122, 124, 126. The keeps 112, 114, 116 are arranged symmetrically with respect to a central axis of the keep rail which is perpendicular to the longitudinal axis of the keep rail. Thus the keep rail can be used on both left and right handed doors or windows by rotation of the keep rail about its axis of symmetry.

Also disclosed is a keep rail 200 having one or more keeps 202, 204, 206 and a plurality of slots 210, 212, 214, 216 through which elongate fixing means such as screws can be inserted. This makes it possible to fix the frame to the structure of the building after the keep rail has been mounted to the frame, even though the keep rail covers most of the frame.



**EP 1 413 697 A2**

## Description

**[0001]** The present invention relates to a keep and lock assembly. It is particularly applicable to door keeps and locks, but not limited there to. For example it could be applied to keeps and locks for windows. Whilst the present invention is discussed below mostly with reference to doors it is to be understood that similar considerations apply to windows.

**[0002]** Existing PVC-U doors, and doors made from other materials, have a number of keeps, or strikes, fixed to the outer door frame in positions to engage with various features in a lock or latch of the door leaf. PVC-U doors, being more flexible than doors made from most other conventional materials, usually require a number of keeps (typically at least three and often as many as eight) for the lock or locks to engage with to maintain the integrity of the door leaf to the door frame and to provide effective security and weathering of the door.

**[0003]** The provision of a number of keeps makes the door frame look untidy and, from a manufacturing point of view, it takes time to position and fix each of these keeps. The existing solution to this problem is to provide a single piece of metal, sometimes running the full height of the (outer) frame of the door, having the necessary features to engage with the door lock(s) in the same way as a plurality of separate keeps.

**[0004]** However, the door locks currently available in the industry are not symmetrical about the horizontal centre line. This is because, especially for a hinged door, the arrangement of locks and keeps not only needs to provide security against an intruder, but also needs to provide good weathering (e.g. by pressing the door leaf against seals in the outer frame). In order to achieve good weathering, the locks of hinged doors engage with the keeps in a manner which pulls the door leaf and the door frame together so as to press the door leaf against seals provided on the door frame.

**[0005]** The positioning of keeps for security purposes is determined by potential methods of attack by an intruder, while the positioning for weathering purposes is determined by the need to urge the door leaf against seals in the frame in a reasonably even manner over the height of the door. These different requirements have previously resulted in asymmetrical lock and keep arrangements. Furthermore the door handle of a hinged door (as opposed to a patio door) is usually below the horizontal centre line of the door and in previous designs this asymmetry has extended to the lock and keep rail arrangement.

**[0006]** Therefore when one piece keeps or keep rails are used, different left and right-handed versions must be provided to fit left and right-handed doors (doors which close on their left or right sides). The need for different left and right-handed versions is a disadvantage in terms of stocking, manufacture and supply since one part is preferable to two.

**[0007]** A further problem is that keeps, especially

'one-piece keeps' or 'keep rails' having a plurality of keeps take up space on the outer door frame and therefore limit the positions at which the frame can be fixed to the brickwork. The positions for fixing are important and must ideally comply with industry standards.

**[0008]** At its most general one aspect of the present invention proposes providing a keep and lock assembly in which the lock(s) are operable to extend into the keeps in a manner which urges the body supporting the lock(s) sideways of the direction of the lock's extension into the keeps, wherein the keeps are provided on an elongate member and disposed symmetrically about a horizontal centre line of the elongate member.

**[0009]** The 'horizontal' centre line is a centre line that extends perpendicular to the longitudinal length of the elongate member (i.e. perpendicular to its longest axis). This gives rise to two possibilities: a centre line extending in the plane of the elongate member and one extending perpendicular to the plane of the elongate member. Preferably the keeps are disposed symmetrically about the first of these (the centre line in the plane of the elongate member and perpendicular to the longitudinal length of the elongate member), however they may be symmetrical with respect to both.

**[0010]** This symmetry allows the elongate member, hereinafter also referred to as a 'one piece keep' or 'keep rail', to be rotated about its horizontal centre line without altering the relative position of the keeps so that the keep rail can be used for example, on either the left or right hand side of a door. If instead of a door, the keep rail is used with a window the above described symmetry allows the keep rail to be used on either the left or right or alternatively the upper or lower edge of the window. The elongate member, or keep rail is preferably, but not necessarily formed of metal.

**[0011]** A first aspect of the present invention may provide a keep and lock assembly comprising a keep rail having a plurality of keeps and a lock or locks operable to extend into the keeps, so as to engage the keeps in such a manner that the lock or locks are urged sideways of their direction of extension and wherein the keeps are positioned symmetrically about a central axis of the keep rail extending perpendicular to the longitudinal axis of the keep rail.

**[0012]** Preferably said central axis extends in the plane of the keep rail.

**[0013]** The symmetry means that by 180° rotation about said central axis the rail can be converted from a left handed rail for use on the left hand side of a door to a right handed rail for use on the right hand side of a door or on different sides of a window. Thus only one type of keep rail is necessary which provides economy in manufacturing, stock and supply of the rail.

**[0014]** It is not usually possible to convert a left-handed keep rail to a right-handed keep rail (or vice versa) by rotation about its longitudinal (i.e. vertical) axis. Even if the keep rail is rotationally symmetrical about its vertical axis, the seating platform (e.g. the surface of a door

frame) on which the keep rail is to be mounted is very unlikely to be symmetrical about its vertical axis, and so a keep rail rotated about its vertical axis will not fit the door frame. However, where the keep rail's keeps are positioned symmetrically about a horizontal axis it is possible to convert the keep rail from a left-handed keep rail to right-handed keep rail (and vice versa) without difficulty by rotation about the horizontal axis. This is because, in general, the seating platforms on which the keep rail is to be mounted are symmetrical about the horizontal axis.

**[0015]** In use the assembly is fixed or attached to a door frame and a door leaf. Alternatively the assembly can be fixed or attached to a window frame and a window leaf. For the purposes of this specification a window frame is the frame mounted to the building structure and the 'window leaf' is the part of the window which can be opened (e.g. window pane and the sash or casement in which the pane is mounted). Preferably the keep rail is mounted on the frame and the lock(s) is/are mounted on the leaf; however, it would theoretically be possible to use the reverse configuration with the keep rail mounted on the leaf and the locks mounted on the frame. Preferably the door or window is hinged, i.e. the leaf is hingedly attached to the frame.

**[0016]** Extension of the lock(s) into the keeps has the effect of locking the door or window by preventing (or at least strictly limiting) movement of the leaf out of the plane of the frame. The above mentioned lateral urging of the body (e.g. the door or window leaf) supporting the lock(s) relative to the direction of the lock's extension is an urging (e.g. pushing or pulling) of the door or window leaf in a direction out of the plane of the frame so as to press it against seals provided on the frame. This provides good weathering.

**[0017]** There are various ways of providing this urging effect. If the lock(s) have bolts or pins, which taper to widen away from their distal ends, then as the bolts or pins are extended into the keeps, their engagement with the sidewalls of the keeps will push the leaf laterally to engage seals provided on the frame. Alternatively, the walls of the keep aperture (which in use receives the lock) can be tapered to provide the same effect.

**[0018]** Each keep may be provided with a top plate having an aperture, which the lock passes through before entering the keep (when the lock is operated). The top plate has a tapered leading edge and engagement of the extended portion of the lock (which may e.g. be a bolt, or a hook) with the leading edge, urges the body holding the lock sideways of the direction of extension as described above. Preferably the positioning of the top plate is adjustable, for example by an adjustment mechanism that allows its horizontal position relative to the keep to be adjusted. This enables adjustment of the top plate to provide optimal pressing of the door leaf against the seals.

**[0019]** A second aspect of the present invention may provide a kit of parts for making a lock and keep rail as-

sembly according to the first aspect of the invention, the kit of parts comprising a keep rail having a plurality of keeps for engaging a lock, the lock or locks operable to extend into the keeps so as to engage the keeps in such a manner that the lock or locks are urged sideways of their direction of extension and wherein the keeps are positioned symmetrically about a central axis of the keep rail extending perpendicular to the longitudinal axis of the keep rail.

**[0020]** The lock(s) and the keep rail may have any of the features described above in the first aspect of the invention.

**[0021]** The kit of parts may also include a door or window frame and/or a door or window leaf to which the lock or the keep rail can be attached.

**[0022]** A third aspect of the present invention may provide a method of assembling a (preferably hinged) door or window comprising the steps of:

providing a keep rail and lock assembly according to the first aspect of the present invention; and if necessary rotating the keep rail about said central axis perpendicular to its longitudinal axis, so as to fit the left or right side of a door; and fixing the keep rail to the left or right side of the door.

**[0023]** Preferably the keep rail is fixed to the frame (and a lock is provided in the leaf), but it would theoretically be possible to attach the keep rail to the leaf and have the lock on the frame.

**[0024]** It is thought that the present invention will find particular application to PVC-U doors (doors in which the door leaf is formed from PVC-U) as these types of doors tend to require a large number of keeps which can conveniently be provided in a one piece keep rail. However, the present invention is not limited to PVC-U doors and can be used with doors formed from other materials. The present invention can also be applied to windows, including but not limited to windows having a PVL-U frame.

**[0025]** A fourth aspect of the present invention provides a keep rail (especially, but not necessarily for a hinged door or window) having one or more keeps for engaging with a lock or latch of a door or window and one or more slots in the keep rail through which fixing screws can be inserted for fixing a door or window frame to the structure of a building.

**[0026]** This enables the person installing the door or window to fix the door or window frame to the building even after the keep rail has been fixed to the frame. This is particularly desirable as it means that the responsibility for integrity of the door rests with the manufacturer of the door or window, rather than the installer (which would be the case if the keeps were fixed to the frame after it had been attached to the building).

**[0027]** The door or window frame (or a side of the frame) will usually be provided to the installer with the keep rail already attached.

**[0028]** Preferably the keep rail has a plurality of keeps. Preferably there are a plurality of slots through which door frame fixing screws can be inserted.

**[0029]** Preferably the slot or slots are elongate which gives the installer freedom to fix the frame to the building at the most convenient location. Preferably the slots have a greater longitudinal extent than the keeps.

**[0030]** Preferably the slots are provided at separate locations to the keeps so that any fixing screws do not interfere with the lock/latch-keep engagement.

**[0031]** Preferably a cover is provided that can be positioned over the head of screws or other means for fixing the frame to the building. The screw heads can then be covered after they have been inserted through the slots, so that they are not visible. This gives the frame a tidier appearance. The cover may be in the form of a moulding and conveniently clips to the keep rail.

**[0032]** The fourth aspect of the present invention may be combined with any of the above aspects of the present invention.

**[0033]** A fifth aspect of the present invention provides a method of installing a door or window frame, comprising the steps of fixing a keep rail having one or more keeps to a frame and then fixing the frame to a building structure by inserting fixing means, such as screws, through slots in the keep rail.

**[0034]** The keep rail may have any of the features mentioned above under the other aspects of the invention.

**[0035]** In all of the above aspects, the door leaf (when present) may be made of PVC-U or any other appropriate material. The keep rail preferably, has at least 3 keeps and may have more.

**[0036]** Examples of doors and embodiments of the present invention will now be described with reference to the accompanying drawings in which:-

Fig. 1a and 1b are examples of a keep rail symmetry about a vertical axis, Fig 1a is a cross section in a horizontal plane showing the keep rail when used on a left handed and Fig 1b is a cross section in a horizontal plane showing the keep rail when used on a right handed door;

Fig. 2a and 2b are schematic representations of a first embodiment of the present invention which is a lock and keep rail arrangement having symmetry about a horizontal axis; in Fig. 2a the keep rail is orientated to engage with the lock of a left handed door and in Fig. 2b the keep rail is orientated to engage with the lock of a right handed door;

Fig 2c is a partial horizontal cross section of the Fig 2a door showing the engagement of the door leaf with seals on the door frame;

Fig 2d is an enlarged partial front view of the keep rail of Fig 2a and 2b, showing a top plate adjustably attached to the keep rail;

Fig 2e is a cross section along the line A-A of Fig 2d; and

Fig. 3 is a front view of a second embodiment of the present invention which is a one piece keep rail having three keeps and five slots.

**[0037]** To aid understanding of the present invention, a keep rail having symmetry about a vertical axis will be described first. Fig. 1a is a cross section of a horizontal plane of a left handed (LH) door having such a lock and keep rail assembly. The door comprises an outer frame, the left side 1 of which is shown in Fig. 1a, a keep rail 10 and a door leaf (not shown) hingedly attached to a right side of the frame and having a lock 20 for engaging with a keep 30 in the keep rail 10 when the door is closed. The keep 30 includes an aperture with which a projecting part of the lock 20 can engage with when the door is closed. The lock 20 engages with the keep 30 in a manner which holds (and in this example actually pulls) the door leaf and the keep rail 10 together to effect a weathering seal.

**[0038]** Fig. 1b shows a cross section in a horizontal plane of a right handed (RH) door. The door is the same as that shown in Fig. 1b except that the door leaf (not shown) hinges on the left side of the frame and closes towards the right side 1a of the frame and the keep rail 10 has been rotated 180 degrees about its centre line to fit with the lock 20a on the right hand side of the door leaf.

**[0039]** In both cases, the keep rail 10 is an elongate member, formed of metal, having a plurality of keeps 30 along its length. Each keep 30 is in the form of an aperture, which engages with a feature of a lock 20 of the door leaf (each keep can engage with a different feature of the same lock, or with a different lock from the other keeps if there are several locks in the assembly).

**[0040]** It is to be noted that the keep rail 10 in Fig. 1a has the same physical structure as the keep rail 10 in Fig. 1b, the difference simply being that the keep rail in Fig. 1b has been rotated about 180 degrees about its vertical longitudinal axis to fit the right side 1a of a door frame and to engage with a lock 20a on the right side of a door leaf.

**[0041]** With an assembly having a non-symmetrical structure this would not be possible. However, in the current example, the keep rail 10 and the keeps therein are symmetrical about a vertical plane 40 bisecting the keep rail. Thus the keep rail 10 can be rotated about a central vertical axis by 180 degrees and maintain symmetry about the centre line 40.

**[0042]** In other words, the keep rail has reflectional symmetry about the vertical bisecting plane 40 and 180 degree rotational symmetry about its vertical axis (i.e. two-fold rotational symmetry). In the above example, this allows the same keep rail to be used for both left and right handed doors. In fig. 1A and Fig. 1B the nominal front and rear of the keep rail are shown by reference numerals F and R respectively. The rail is the opposite way round in Fig 1B as it has been rotated by 180° about its central vertical axis.

**[0043]** However, it is only possible to convert a left handed keep rail to a right handed keep rail, by rotation about the vertical axis, if the seating platform 12 is also symmetrical about the vertical axis. This is rarely the case and is difficult to achieve, especially with PVC-u doors, as the seating platform needs to provide various other functions and tends to have a varied contour. Thus, even with rotational symmetry about the vertical axis it is still necessary to have different left and right handed keep rails.

**[0044]** However, the seating platforms tend to be symmetrical about a central horizontal plane. Thus, if the keep rail can be rotated about a central horizontal axis, then the problem is solved. A first embodiment of the present invention, shown in Figs 2a and 2b, is a keep rail and lock assembly having reflectional symmetry about a horizontal plane and rotational symmetry about a horizontal axis.

**[0045]** Fig. 2a is a schematic diagram showing the keep rail 110 when orientated for engagement with features of a lock on a left handed door. As shown in Fig. 2a the keep rail 110 has three keeps 112, 114, 116 for engagement with features 122, 124 and 126 respectively of lock 120 of the left handed door leaf. The lock features 122, 124 and 126 are hook shaped and capable of engaging their respective keeps 112, 114 and 116 so as to hold the lock 120 and keep rail 110 together.

**[0046]** The letters T and B are used to denote the nominal top and bottom of the keep rail which is the "right way up" in Fig. 2a.

**[0047]** In Fig. 2b the keep rail 110 is used in a right handed door and the same reference numerals are used to denote corresponding features. Note that the keep rail is structurally the same as in Fig. 2a, but has been rotated 180 degrees about its horizontal axis 140 so it is now the "wrong way up" with its bottom B at the upper end, its top T at the lower end and it faces the opposite direction (towards the left side of the door frame). The lock 110 in Fig. 2b belongs to a right handed door.

**[0048]** Thus in the Fig. 2a, Fig. 2b embodiment the keep rail 110 has reflectional symmetry about a bisecting horizontal plane and 180 degrees rotational symmetry about a central axis 140 in that plane. The rotational symmetry about the horizontal axis has the advantage that the seating platform does not have to be symmetrical about a vertical centre line. Thus, this solution works even when the keep rail is used on the seating platforms having a varied contour. However it does mean that the lock(s), which the keeps engage with, need to be symmetrical about the horizontal bisecting plane.

**[0049]** In addition to locking the door, the lock 120 and the keeps 112, 114 and 116 engage in a manner which provides good weathering, by urging the door leaf against seals in the door frame. Fig 2c is a partial cross section in the horizontal plane, showing the direction in which the door leaf 150 is pressed against the seals 160, 161 provided on the door frame 1.

**[0050]** Figs 2d and 2e show a mechanism for urging the door leaf against the seals 160, 161 when the door is locked. Each keep 112, 114, 116 has a top plate placed over it. Fig 2d is a front plan view showing a top plate 170 attached to the keep rail 110 over keep 114. The top plate 170 has an aperture 175 through which a portion 124 of the lock 120 extends when the lock is operated to engage the keep 114.

**[0051]** As the lock is operated to extend into the keep, a side of the extended portion 124 slides along the leading edge 176 of the aperture 175. The leading edge 176 is tapered inwards as shown in Fig 2e, which is a cross section along the line A-A of Fig 2d. Because the leading edge 176 tapers inwards the lock is pushed sideways of its direction of extension and this pulls the door leaf 150 into the seals 160, 161.

**[0052]** The top plate 170 is adjustably attached to the keep rail 110 by a screw and slot arrangement 180. This enables the horizontal positioning of the keep rail to be adjusted by the installer, as indicated by the arrow in Fig 2d, to give optimum engagement of the door leaf 150 with the seals 160, 161 when the door is locked.

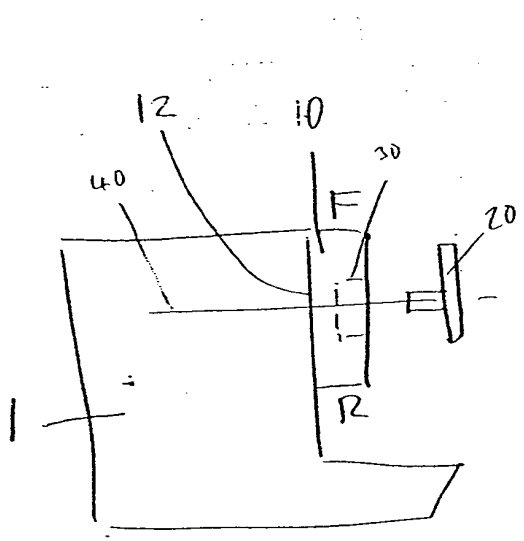
**[0053]** Fig. 3 shows a third embodiment of the present invention. This third embodiment comprises a one piece keep rail 200 which has a plurality (in this case three) keeps 202, 204 and 206 disposed along its length. In addition to the keeps there are a plurality of elongate slots 210, 212, 214 and 216 disposed along the length of the rail between the keeps. These slots allow a door frame, to which the keep rail 200 is attached, to be fixed to the structure of the building, for example by the use of frame fixing screws which are driven through the slots. As the slots are elongate the installer has a choice of positions for securing the frame to the building structure. This is desirable as industry standards prescribe fixing in certain positions. A cover moulding (not shown) is also provided and clips to the keep rail so that the heads of the frame fixing screws are not visible.

**[0054]** The above embodiments have been described by way of example only and the present invention is not limited thereto. For example, as will be appreciated by a person skilled in the art, the present invention can also be applied to a keep rail or keep and lock assembly for a window.

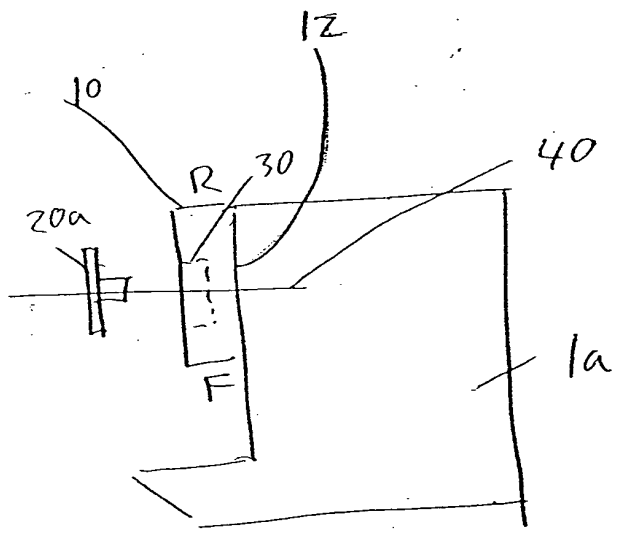
## Claims

1. A keep and lock assembly comprising a keep rail having a plurality of keeps and a lock or locks operable to extend into the keeps and engage the keeps in such a manner that the lock or locks are urged sideways of their direction of extension; the keep rail being an elongate member having a central axis perpendicular to its longitudinal axis and the keeps being positioned symmetrically about said central axis.

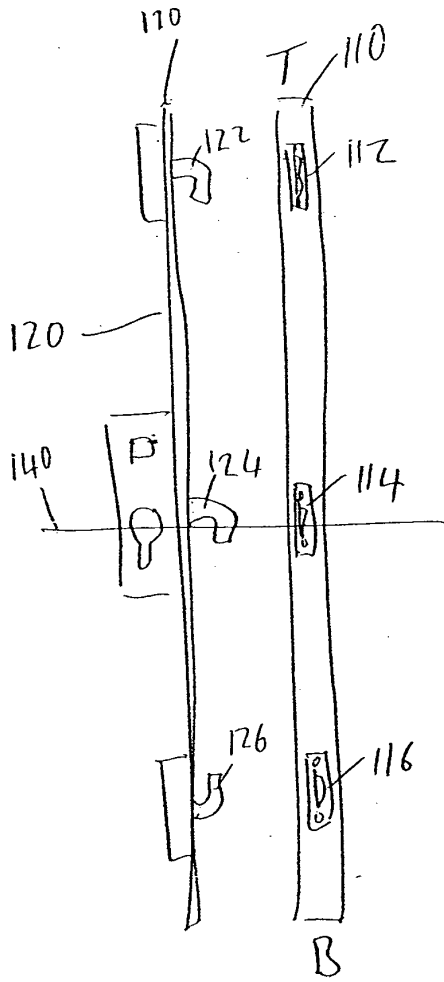
2. An assembly according to claim 1 wherein the keeps have a tapered wall for engagement with the lock or locks, whereby when in use the lock or locks are extended into the keeps, engagement of the lock or locks with the tapered wall provides a force urging the lock or locks sideways of their direction of extension into the keeps. 5
3. An assembly according to claim 2 wherein each keep is provided with a top plate having an aperture with a tapered leading edge positioned for engagement with a lock. 10
4. An assembly according to claim 4 wherein the position of the top plate relative to the keep is adjustable. 15
5. A door or window comprising a door or window leaf, a frame and a keep and lock assembly according to any one of the above claims wherein the lock or locks are mounted on the leaf and the keep rail is mounted on the frame. 20
6. A door according to claim 6 wherein the leaf is hingedly mounted to the frame. 25
7. A door or window according to claim 5 or 6 wherein the frame has one or more seals for engaging the leaf when the leaf is in the closed position. 30
8. A door according to claim 5 or 6 wherein the door leaf is made of a PVCu material. 35
9. A kit of parts for making a door or window keep and lock assembly according to any one of claims 1 to 4, comprising an elongate keep rail having a plurality of keeps symmetrically arranged with respect to a central axis of the keep rail, said central axis being perpendicular to the keep rail's longitudinal axis, and a lock or locks configured such that when assembled together with the keep rail the lock or locks are operable to extend into and engage said keeps in such a manner that the lock or locks are urged sideways of the direction of extension. 40
10. A method of fixing a door or window frame to the structure of a building comprising the steps of fixing a keep rail having one or more keeps to a door or window frame and then fixing the door frame to the structure of the building by inserting elongate fixing means through slots in the keep rail. 45
11. A method according to claim 10 wherein the keep rail has at least three keeps. 50
12. A method according to claim 10 or 11 wherein the elongate fixing means are screws which are screwed through the door or window frame and into the structure of the building. 55
13. A method according to any one of claims 10 to 12 wherein the slots are at different locations on the keep rail to the keeps.
14. A method according to any one of claims 10 to 13 wherein the slots are elongate.
15. A method according to any one of claims 10 to 14 comprising the further step of fixing a cover to the keep rail over heads of the fixing means to conceal the fixing means after the door or window frame has been fixed to the structure of the building.
16. A keep rail having one or more keeps for engaging with a lock or latch of a door or window and one or more slots in the keep rail through which elongate fixing means can be inserted for fixing a door or window frame to the structure of a building.
17. A keep rail according to claim 16 wherein said slots are elongate.
18. A keep rail according to claim 16 or 17 wherein the keep rail has at least three keeps.
19. A keep rail according to any one of claims 16 to 18 wherein said slots are provided at different locations on the keep rail to said keep or keeps.
20. A keep rail according to any one of claims 16 to 19 having a cover adapted to clip over the keep rail, whereby the head of an elongate fixing means can be concealed after the fixing means has been inserted through one of said slots.
21. A keep rail according to any one of claims 1 to 4 wherein the keep rail has one or more slots through which elongate fixing means can be inserted for fixing a frame to the structure of a building.



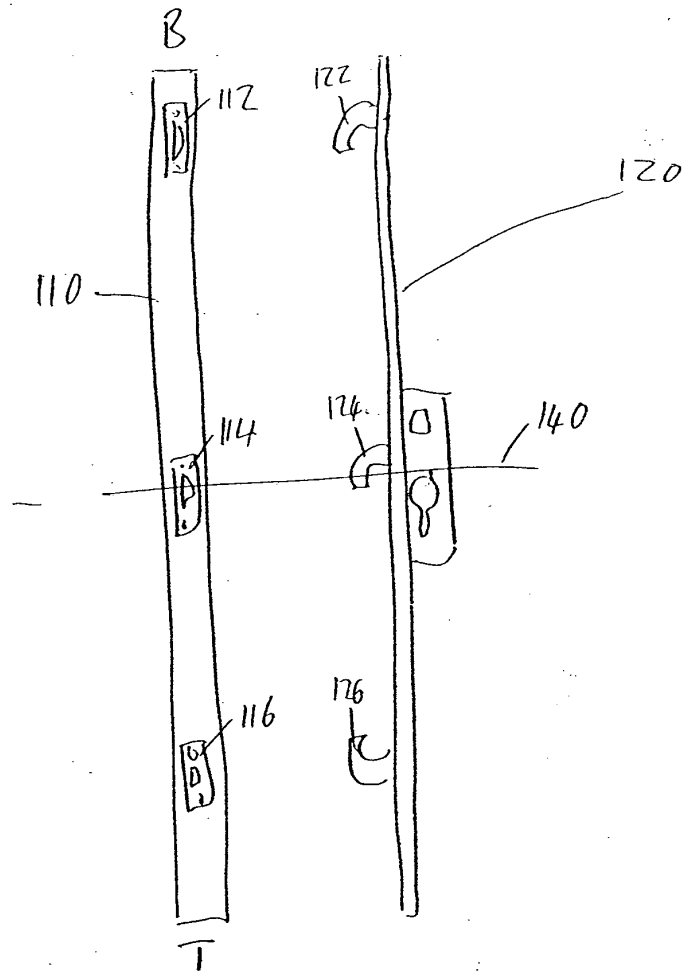
LH Door  
Fig 1A



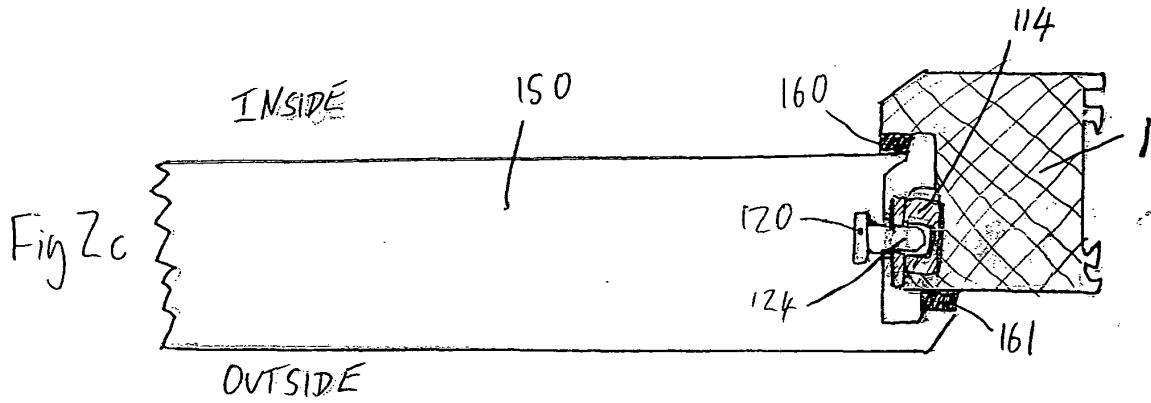
RH Door  
Fig 1B



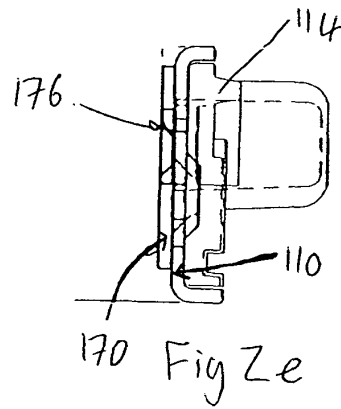
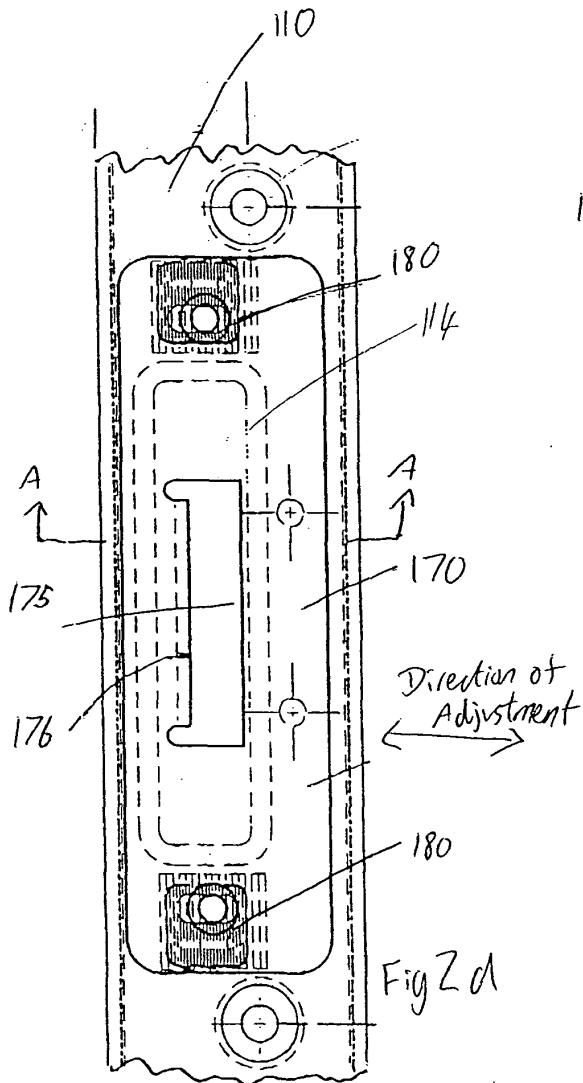
LH door  
Fig 2a



RH door  
Fig 2b



DIRECTION OF EXTENSION OF LOCK →  
 DIRECTION OF URGING OF DOOR LEAF ↑



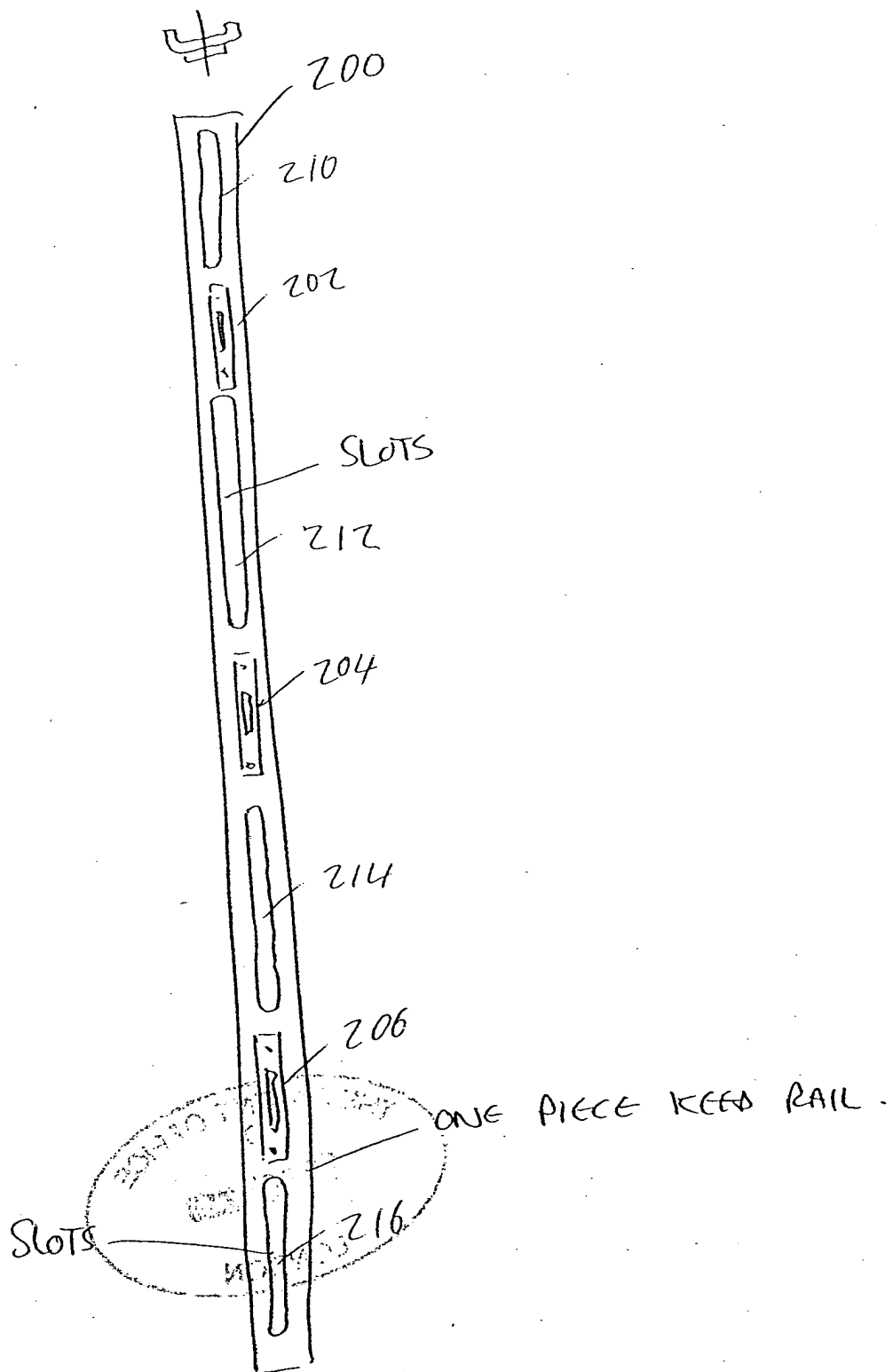


FIG 3