

(19)



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(11)

EP 0 878 598 A2

(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:
18.11.1998 Bulletin 1998/47

(51) Int Cl.⁶: **E05B 17/20**, E05B 65/10,
E05C 1/02, E05D 3/02,
E05D 7/12, E06B 3/92

(21) Application number: **98303822.5**

(22) Date of filing: **14.05.1998**

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

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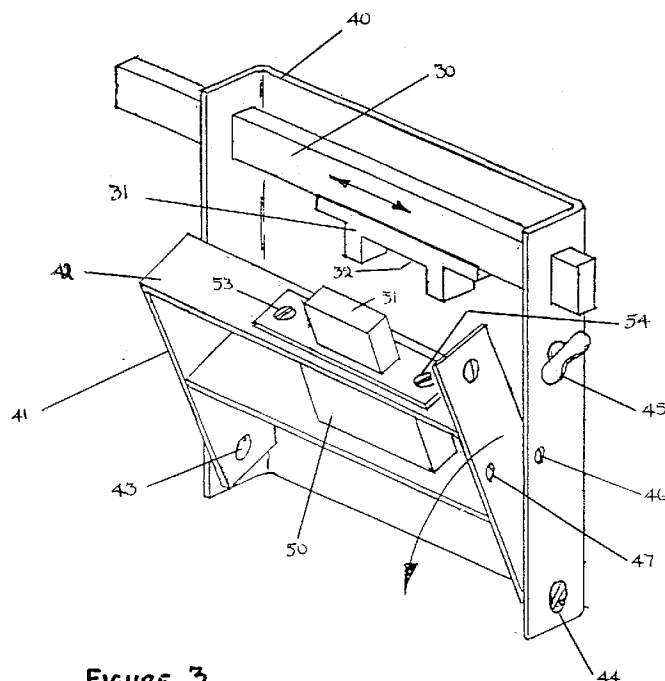
(30) Priority: **14.05.1997 GB 9709793**

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(54) Security door and frame assembly

(57) A security door and frame assembly comprises door 10 pivotally mounted in frame 20. Door 10 has interior and exterior surfaces and frame 20 has a slot 23 to receive bolt 30 mounted on the interior of door 10. Bolt 30 is operable between a first position in which it engages with frame 20 to secure door 10 in a closed condition, and a second position in which it is withdrawn from frame 20, allowing door 10 to pivot open. Lock 50

mounted on the interior of door 10 is operable between a locking condition in which it locks bolt 30 in said first position, and a release condition in which it allows bolt 30 to be released. Means accessible from both sides of door 10 are provided for moving bolt 30 between said first and second positions when lock 50 is in said release condition. Lock 50 is pivotable out of the plane of door 10 to release bolt 30 even when lock 50 is in its locking condition.

**FIGURE 3****EP 0 878 598 A2**

Description

The present invention relates to a security door and frame assembly. In particular, the invention is concerned with a security door which is:

- (a) easily unlocked from the inside in an emergency situation;
- (b) easy to mount in its associated frame, and
- (c) secure against ingress by small mammals and birds, or the like.

The present invention is especially suitable for void property maintenance and has been designed for use in areas prone to high incidences of vandalism, arson, etc. The invention may also be used in addition to domestic front entry doors and in community housing projects where additional security is desired.

Known security doors suffer from the drawback that, whilst they are effective against undesired access from outside, they are difficult to unlock from inside during an emergency situation. For example, during installation of barrier equipment to render a void property secure, the premises are vulnerable to attack and the fitters themselves may also be under threat. It is therefore sensible to make the main doorway secure first and to deal with other openings such as windows from within the secured area. Even when this is done, the premises remain vulnerable and means of escape must be provided for personnel in case of fire.

Another feature of security doors for void property is that they are heavy. This means that they are difficult to hang because they are not easily manhandled into position for mounting on the hinges.

In the interests of economy, security doors are typically supplied in a range of standard sizes to fit standardised frames. If a door opening to be secured is wider than the dimensions of a standard frame, additional fillers can be supplied to bridge the gap at one edge. Similarly, a fixed top panel can be installed to bridge any gap above the door where the height of the opening is significantly greater than the dimensions of the door leaf. Unfortunately, the same remedy is not available for gaps at both ends of the door.

One method of installing a standard security door frame in a door opening of a void property is to brace it by jacking in the vertical direction. In this method of installation, the frame is usually jacked up into the desired position from its base, since the alternative of jacking the top of the frame down is less safe in its execution: Jacking down into position may require the use of a step-ladder or similar raised working platform to enable the fitter to exert the required degree of torque to the jack or jacks. However, if the door opening includes a step or steps, jacking from the base of the frame may be impracticable and the only alternative is to jack the top of the frame down.

Depending on the direction of jacking, either the

base of the frame or its top becomes separated from the door opening and the door leaf which is to be suspended in the frame will be shifted by a corresponding amount. In extreme cases, a gap may result beneath or above the door sufficient in size to allow access by birds and/or small mammals. Landlords responsible for maintenance of void properties have indicated that any significant gaps at the ends of the door should be eliminated.

It is therefore an object of the present invention to overcome the drawbacks outlined above. In particular it is an object of the present invention to provide a security door and frame assembly which permits easy escape from inside the secured premises even when the door is locked. It is a further object of the present invention to provide a security door which is easy to mount in its associated frame. It is yet another object of the present invention to secure the security door and frame assembly against ingress by small mammals and birds, or the like.

In a first aspect, the invention is a security door and frame assembly comprising a door leaf pivotally mounted in a door frame, said door leaf having interior and exterior surfaces and said frame having means to receive a releasable fastening mounted on the interior surface of said door leaf, said releasable fastening being operable between a first position in which it engages with the frame to secure said door leaf in a closed condition and a second position in which it is withdrawn from the door frame allowing the door to pivot open, lock means mounted on the interior surface of the door leaf said lock means being operable between a locking condition in which it locks said releasable fastening in said first position and a release condition in which it allows said releasable fastening to be moved between said first and second positions, and means accessible from both the interior and exterior of the door for moving the releasable fastening between said first and second positions when said lock means is in said release condition, characterised in that said lock means is pivotable out of the plane of the door leaf to release said releasable fastening even if said lock means is in said locking condition.

Preferably, the releasable fastening comprises a sliding bolt and the frame features a slot for receiving the sliding portion of the bolt in its extended condition. Alternatively, the releasable fastening may be a rack bolt - preferably of heavy duty construction. The rack bolt may have include a vertical member at its end adjacent the door opening, said vertical member having a plurality of vertically-spaced horizontal protrusions extending therefrom for engagement in corresponding slots or recesses in the door frame. This arrangement, with vertical separation of the horizontal protrusions, means that the door leaf can be secured to the frame at a plurality of spaced-apart locations, thereby increasing its resistance to being prised open by virtue of minimising any inherent flexibility in the door leaf. For similar reasons, the rack bolt may also include an element or elements

adapted to protrude into the door frame on the hinge side of the door leaf.

The lock means may be a mortise lock mounted on a sub-frame attached to the interior of the door leaf. The mortise lock is mounted to lie in a plane parallel to the plane of the door leaf either immediately above or immediately below the releasable fastening and being separated therefrom by an amount which is less than the distance by which the tongue of the mortise lock protrudes from its casing when actuated. The releasable fastening is preferably provided with a notch for receiving the tongue of the mortise lock when the retaining means is in its so-called first position. The notch may be varied in size to accommodate different types of mortise lock, as required.

This type of indirect locking is preferred to an arrangement in which the mortise lock engages directly with the door frame. In high security applications, even the best mortise locks are regarded as possible weak spots because of the construction of the mortise lock tongue. This is reduced in thickness inside the lock casing where it slides over the tumblers. Hence, there is a site of weakness at the point where the mortise lock tongue reduces in thickness. Moreover, any activities calculated to lever the door open against the action of the mortise lock would concentrate forces on the weak point of the mortise lock tongue and may result in shear.

By using an indirect locking arrangement as described above, the tongue of the mortise lock is protected from such shear forces and hence greater security is achieved. The sub-frame on which the lock means is mounted is provided with a pivot whose axis is parallel to the plane of the door leaf. When the door needs to be opened in an emergency situation, against the action of the releasable fastening, the lock means can be pivoted out of engagement with the releasable fastening so that this can be withdrawn from the door frame to unlock the door.

It is preferable that this manner of opening the door is only employed in an emergency. Normally, the lock means will be actuated to its release condition so that the releasable fastening can be moved to the second position to unlock the door. Typically, the lock means will be key-operated and the key is simply turned to disengage the mortise lock tongue from the releasable fastening so that the door can be unlocked. To prevent misuse of the pivoting feature for the lock means, the sub-frame will normally be fastened in a non-pivoted disposition, for example by means of a latch. A visual indicator such as a frangible security tag or similar device may be incorporated to signify when the pivot has been employed.

In a second aspect, the invention is a security door and frame assembly comprising a door leaf pivotally mounted in a door frame, said door leaf having interior and exterior surfaces and said frame having hinge means adapted to engage with hinge means formed on the door leaf interior, said hinge means comprising at

least one retractable hinge pin mounted in a sub-frame, said hinge pin having first collar means at a first end thereof and intermediate collar means between said first collar means and the distal end of said hinge pin, the separation between said first collar means and said intermediate collar means being equal in distance to the amount by which said distal end of the hinge pin is moved axially upon full retraction of the hinge pin, said hinge pin being mounted in said sub-frame such that a portion of the sub-frame is held captive between said first and said intermediate collar means, said sub-frame being provided with biasing means to maintain said hinge pin in an extended condition.

Preferably, the sub-frame is a substantially U-shaped arrangement, the hinge pin extending transversely relative thereto and passing through the two arms of the "U". The biasing means may be a light weight flat leaf spring affixed to the base of the U-shaped frame by pop rivets or similar fastenings. The free end of the leaf spring is adapted to engage the intermediate collar means when the hinge pin is in its extended condition. This engagement serves to prevent inadvertent retraction of the hinge pin, since the leaf spring must be flexed manually before axial movement of the hinge pin is possible.

To retract the hinge pin, the leaf spring is flexed towards its fastenings to allow passage of the intermediate collar past the spring end. The hinge pin can be moved manually by gripping the end collar and pulling the hinge pin axially. The leaf spring may then be released from its flexed condition to hold the hinge pin in its withdrawn position by pressure contact, preferably between the side face of the leaf spring and said intermediate collar.

When a heavy door is to be mounted on hinges, the retractable hinge pin can be deployed to allow one hinge to be engaged at a time. When the first hinge has been engaged, the door leaf can be manhandled into a position where the retracted hinge pin merely needs to be extended to complete the engagement of the second hinge. To complete the installation, the hinge pin needs to be extended axially until the leaf spring snaps behind the intermediate collar.

In an alternative arrangement, the biasing means may be a compression spring mounted between the intermediate collar and the sub-frame. To retract the hinge pin, the compression spring is squeezed between the intermediate collar and the sub-frame by gripping the intermediate collar and moving the hinge pin axially against the action of the spring. Stop means may be provided to retain the hinge spring in its retracted condition until such time as it needs to be extended to full length again.

The collars may be releasably attached to the hinge pin by grub screws for ease of assembly, or may be permanently attached to the hinge pin by pins or welding, for example.

Most preferably, the hinge means comprise one

fixed hinge pin mounted on the bottom of the door frame for receipt in a hinge pin hole formed in the door leaf, and one retractable hinge pin in accordance with the invention mounted on the interior of the door leaf at the top. The frame is provided with a hole at the top to receive the retractable hinge pin mounted on the door leaf. The respective holes in which the hinge pins are received may be provided with bearing means.

Left- and right-hand security door and frame assemblies may be provided as separate items, but it is more economical to manufacture a single-handed security door and frame assembly which is capable of being inverted if a change of hand is required.

In another aspect, the invention comprises a security door and frame assembly comprising a door leaf pivotally mounted in a door frame, said door leaf having interior and exterior surfaces and said frame having an adjustable end plate provided with jacking means for jacking the frame into an opening to be secured, said end plate being disposed in a substantially vertical plane parallel to the plane of the door leaf when said door leaf is in a closed condition in use.

Preferably, the jacking means comprises a pair of substantially vertically-oriented screw jacks, the screw portions of which are obscured from the outside by the frame bottom cross-member.

The invention will now be described by way of example only with reference to the drawings, in which:

- Figure 1 is a diagrammatic view of part of the interior face of a security door in accordance with the present invention, showing the door locked into its frame;
- Figure 2 is a diagrammatic view similar to Figure 1 showing the door in its unlocked state;
- Figure 3 is a schematic perspective view showing the operation of the emergency release device;
- Figure 4 is a diagrammatic view of part of the interior face of a security door in accordance with the present invention, showing a retractable hinge assembly;
- Figure 5 is a diagrammatic view similar to Figure 4 showing the retractable hinge in its retracted state;
- Figure 6 is a schematic perspective view of the retractable hinge assembly in its extended state, and
- Figure 7 is a diagrammatic view of an adjustable end panel for a security door frame in accordance with the present invention.

Referring now to Figures 1 and 2, these views show part of the interior surface of a security door 10 on which is mounted a locking assembly 11 consisting of a sliding bolt 30 and a mortise lock 50, the operation of which will be described in more detail below.

The security door 10 is a single skin sheet metal

construction of 1.5 mm thick steel sheet, the surfaces of which may be powder coated or similarly finished according to customer requirements. The edge of the door 10 nearest the locking assembly 11 includes a lip 12 extending substantially perpendicular to the plane of the door leaf and the lip incorporates a slot 13 providing clearance for the end of the sliding bolt 30 when the sliding bolt 30 is in an extended state.

In use, the security door 10 is mounted in a door frame 20 which, in the exemplified embodiment, comprises vertical members 21 formed of steel tube 40 mm square and 2 mm in thickness. The vertical member 21 nearest the locking assembly 11 of the door 10 includes a slot 23 for receiving the end of the sliding bolt 30.

The locking assembly 11 consists of a sliding bolt 30 mounted in a sub-frame 40 attached to the interior surface of the door 10, and a mortise lock 50 mounted in a lock bracket 41 which is pivotally connected to the sub-frame 40 through pivots 43, 44. A block 31 is attached by threaded bolts 33, 34 to the sliding bolt 30 on the surface 30a thereof nearest the mortise lock 50. As depicted in the Figures, surface 30a of the sliding bolt is its lower surface. Block 31 is provided with a notch or recess 32 on the surface thereof nearest the mortise lock 50. The notch or recess 32 is dimensioned to receive the bolt or tongue 51 of the mortise lock 50 when this is in its extended state. If the user wishes to substitute the mortise lock 50 for another having a tongue with different dimensions, an alternative block 31 with a different-sized notch or recess 32 can be attached to the sliding bolt 30 simply by unfastening the threaded bolts 33, 34.

In normal use, the lock bracket 41 is restrained in the same plane as the sub-frame 40, i.e. in a plane parallel to the plane of the door leaf, by means of a fastening latch 45.

The mortise lock 50 is key-operated by means of a key inserted into keyhole 52. A corresponding keyhole is accessible from the other face of the door 10. Figure 1 shows the mortise lock 50 in its actuated condition with its bolt or tongue 51 extended and received in notch 32 of block 31 attached to the underside 30a of sliding bolt 30. Sliding bolt 30 is shown in its fastening condition in which its free end is axially shifted to the left as seen in this view, passing through slot 13 in the door lip 12 and through slot 23 in the door frame 20, thereby securing the door 10 to the frame 20. Figure 2 shows the mortise lock 50 in its retracted condition with bolt or tongue 51 withdrawn into the lock casing. This enables sliding bolt 30 to be moved axially to the right as seen in this view, disengaging from slots 23 and 13 in the door frame 20 and the door lip 12, respectively. When the sliding bolt 30 has been moved axially to the right as far as it will go, the door 10 becomes unfastened from the frame 20 and may be pivoted open on its hinges.

Referring now to Figure 3, the mortise lock 50 is shown mounted on the lock bracket 41 by means of threaded bolts 53, 54 received in threaded holes (not

shown) formed in the lock bracket seating member 42. This view shows the lock bracket 41 pivoting relative to the sub-frame 40, out of the plane of the door leaf. This pivoting motion disengages the bolt or tongue 51 of the mortise lock 50 from the notch 32 in the block 30, thereby releasing sliding bolt 30 so that it may be moved axially without the need to operate mortise lock 50 by means of its key. Fastening latch 45 must first be released before the pivoting motion can be initiated.

Since it is generally intended that this mode of unfastening the door 10 will only be employed in an emergency, the sub-frame 40 and lock bracket 41 may be provided with respective holes 46, 47 which are in register when the lock bracket 41 is in its non-pivoted state. Holes 46, 47 may be fitted with a frangible security tag which is ruptured when an emergency exit is effected, thereby providing visual evidence after the event that an emergency evacuation occurred.

Although not shown in any of the views discussed above, the lock bracket 41 is preferably provided with a cover on which instructions may be posted informing the user how to deploy the emergency pivot when required. The cover may also incorporate a handle to enable the lock bracket to be gripped with sufficient force to effect the desired pivoting motion against any restraining force exerted by the security tag, if present.

Turning now to Figures 4 and 5, these views show part of the interior surface of a security door 110 on which is mounted a retractable hinge assembly 120 in accordance with another embodiment of the invention. The illustrated hinge assembly 120 is attached to the inside surface of the door skin 111 at the top left hand corner of the door 110. Of course, alternative positions could be chosen according to circumstances.

The hinge assembly 120 consists of a hinge pin 121 and a bracket 130 affixed to the door skin by any suitable method, such as welding. The bracket 130 is a strip of steel bent into a substantially U-shaped element having a pair of arms 131, 132 and a base 133. The arms 131, 132 each have an aperture 134, 135 dimensioned to receive the shaft of hinge pin 121. Biasing means in the form of a light weight flat leaf spring 140 is affixed to the base 133 of the bracket by rivets 136, 137. Alternative fixing means could be used in keeping with the expertise of persons skilled in the art, but the heads of the rivets 136, 137 perform a secondary function in addition to their fastening role, which will be explained in more detail below.

Hinge pin 121 is fitted with an end collar 122 and an intermediate collar 123 between the end collar 122 and the free end 124 of the pin 121. The hinge assembly 120 is put together in such a way that the hinge pin 121 passes through respective apertures 134, 135 in the arms 131, 132 of the bracket 130 with intermediate collar 123 captured between the two arms 131, 132. End collar 122 lies outside the bracket 130.

As depicted in Figure 4, when the hinge pin 121 is in its extended state, i.e. when the hinge pin 121 is

moved axially in the direction of arrow A to the limit of its available travel, the leaf spring 140 engages the shank of the hinge pin behind the rear face 123a of the intermediate collar 123. The hinge pin 121 cannot move in the opposite direction beyond the point at which the rear face 123a of the intermediate collar 123 engages the free end 141 of the leaf spring 140.

As depicted in Figure 5, when the hinge pin is in its fully retracted state, i.e. when the hinge pin 121 is moved axially in the direction of arrow B to the limit of its available travel, the curve of the leaf spring 140 engages the forward edge 123b of the intermediate collar 123. The hinge pin 121 cannot move in the opposite direction without overcoming the restoring force of the leaf spring 140.

Turning now to Figure 6, this is a schematic perspective view of the hinge assembly 120 showing the hinge pin 121 in its extended state. In order to retract the hinge pin 121, the installer must first flex the free end 141 of the leaf spring 140 in the direction of arrow C. This provides clearance for the intermediate collar 123, so that the hinge pin 121 can be moved axially in the direction of arrow B by grasping the end collar 122 or by pushing on the free end 124 of the hinge pin 121. The heads of the rivets 136, 137 used to secure the leaf spring 140 to the base 133 of the bracket 130 serve to prevent flexure of the leaf spring 140 beyond its elastic limit.

The advantage of a retractable hinge pin of this type is that it facilitates installation of a (heavy) door on its hinges. The retractable hinge pin 121 can be deployed to allow one hinge to be engaged at a time. When the first hinge, which may be of a fixed hinge type, has been engaged, the door leaf can be manhandled into a position where the retracted hinge pin 121 merely needs to be extended to effect engagement of the second hinge. To complete the installation, the hinge pin 121 is moved axially in the direction of arrow A, against the restoring force of leaf spring 140, until the free end 141 of leaf spring 140 snaps behind the intermediate collar 123.

Referring now to Figure 7, this view shows an adjustable end panel 210 for a security door frame 220 in accordance with another embodiment of the invention.

The adjustable panel 210 comprises a pair of spaced-apart upstanding legs 211, 212 mounted on a horizontal base plate 213 and having a substantially vertical plate 214 extending therebetween. The separation between the upstanding legs 211, 212 is equal to the distance between the vertical members 221, 222 of a security door frame 220 and the legs 211, 212 are dimensioned to be received within said vertical members. Vertical plate 214 has a height *h* at least as great as the distance by which the frame 220 may need to be jacked into position in use. Also mounted on horizontal base plate 213 is a pair of upstanding jacking legs 215, 216 which house respective screw jacks 217, 218. The jacking legs 215, 216 stand in front of the vertical plate 214 and may be affixed thereto, for example by welding, for

additional strength.

As discussed above in relation to Figures 1 and 2, a security door frame 220 comprises vertical members 221, 222 formed of steel tube 40 mm square and 2 mm in thickness. Each vertical member 221, 222 has a vertical slot (not shown) in the surface thereof nearest its opposite number, said vertical slot extending from the base of the vertical member 221, 222 to a point at least equal in height to the height h of the vertical plate 214 of the adjustable panel 210.

Frame 220 also includes a horizontal cross-member 224 at its base and a corresponding horizontal cross-member at the top (not shown) to define a rectangular frame. Horizontal cross-member 224 is substantially C-shaped in cross-section and consists of a top face 224a, a front face 224b and a bottom face 224c. Bottom face 224c is provided with cut-out portions (not shown) to accommodate the jacking legs 215, 216 of the adjustable end panel 210.

On initial assembly, the upstanding legs 211, 212 are inserted into the respective vertical members 221, 222 of the frame 220. Vertical plate 214 is accommodated in the respective vertical slots provided in the opposing surfaces of the vertical members 221, 222. The screw jacks 217, 218 are screwed down to their minimum height and there is likely to be a degree of clearance between the underside of the top face 224a of the horizontal cross-member 224 and the tops of the screw jacks 217, 218. Vertical plate 214 sits behind the rear edge of bottom face 224c of the horizontal cross-member 224 and there is a substantial overlap in the vertical direction between the vertical plate 214 and the front face 224b of the horizontal cross-member 224.

The screw jacks 217, 218 are obscured from view at the exterior of the property to be secured and can only be accessed through the open channel forming the rear of the C-section horizontal cross-member 224. In order to brace the frame 220 into position in the door opening, the screw jacks 217, 218 are turned until they engage the underside of the top face 224a of the horizontal cross-member 224. Further turns of the screw jacks 217, 218 raise the entire frame 220 in relation to the adjustable panel 210, but a secure closure is maintained by virtue of the overlap between the vertical plate 214 and the front face 224b of the horizontal cross-member 224. Although the vertical plate 214 and the front face 224b of the horizontal cross-member 224 are separated on the front-to-back dimension, any gap between them is bridged by the bottom face 224c of the horizontal cross-member 224. Hence, small mammals and/or birds are prevented from gaining access to the secured property.

Of course, if the construction of the door opening to be secured precludes installation of an adjustable panel 210 at the bottom, for example owing to the presence of a step or steps preventing access to the screw jacks 217, 218, the panel can be installed at the top instead. The frame 220 is designed with equivalent features at

the top of the vertical members 221, 222 to accommodate an adjustable panel 210 in like manner to the installation described above.

Although the invention has been particularly described above with reference to specific embodiments, it will be understood by persons skilled in the art that these are merely illustrative and that variations are possible without departing from the scope of the claims which follow.

Claims

1. A security door and frame assembly comprising a door leaf (10) pivotally mounted in a door frame (20), said door leaf (10) having interior and exterior surfaces and said frame having means to receive a releasable fastening (11) mounted on the interior surface of said door leaf (10), said releasable fastening (11) being operable between a first position in which it engages with the door frame (20) to secure said door leaf (10) in a closed condition and a second position in which it is withdrawn from the door frame (20) allowing the door leaf (10) to pivot open, lock means (50) mounted on the interior surface of the door leaf (10) said lock means (50) being operable between a locking condition in which it locks said releasable fastening (11) in said first position and a release condition in which it allows said releasable fastening (11) to be moved between said first and second positions, and means accessible from both the interior and exterior of the door for moving the releasable fastening (11) manually between said first and second positions when said lock means (50) is in said release condition, characterised in that said lock means (50) is pivotable out of the plane of the door leaf (10) to release said releasable fastening (11) even if said lock means (50) is in said locking condition.
2. A security door and frame assembly as claimed in claim 1 wherein the releasable fastening (11) comprises a sliding bolt (30) and the door frame (20) features a slot (23) for receiving the sliding portion of the bolt (30) in its extended condition.
3. A security door and frame assembly as claimed in claim 1 or claim 2 wherein the lock means is a mortise lock (50).
4. A security door and frame assembly as claimed in claim 3 wherein the mortise lock (50) is mounted on a sub-frame (40) attached to the interior of the door leaf (10).
5. A security door and frame assembly as claimed in claim 4 wherein the mortise lock (50) is mounted to lie in a plane parallel to the plane of the door leaf

(10) either immediately above or immediately below the releasable fastening (11), being separated therefrom by an amount which is less than the distance by which the bolt or tongue (51) of the mortise lock protrudes from its casing when actuated.

6. A security door and frame assembly as claimed in claim 5 wherein the releasable fastening (11) is provided with a notch (32) for receiving the bolt or tongue (51) of the mortise lock when the retaining means is in its so-called first position.
7. A security door and frame assembly as claimed in claim 5 wherein the notch (32) is variable in size to accommodate different types of mortise lock.
8. A security door and frame assembly comprising a door leaf (10) pivotally mounted in a door frame (20), said door leaf (10) having interior and exterior surfaces and said door frame (20) having hinge-receiving means adapted to engage with hinge means (120) formed on the door leaf (10) interior, said hinge means (120) comprising at least one retractable hinge pin (121) mounted in a sub-frame (130), said hinge pin (121) having first collar means (122) at a first end thereof and intermediate collar means (123) between said first collar means (122) and the distal end (124) of said hinge pin (121), the separation between said first collar means (122) and said intermediate collar means (123) being equal in distance to the amount by which said distal end (124) of the hinge pin (121) is moved axially upon full retraction of the hinge pin (121), said hinge pin (121) being mounted in said sub-frame (130) such that a portion of the sub-frame (130) is held captive between said first and said intermediate collar means (122, 123), characterised in that said sub-frame (130) is provided with biasing means in the form of a light weight flat leaf spring (140) affixed to the base (133) of the sub-frame (130) said leaf spring (140) serving to maintain said hinge pin (121) in an extended condition.
9. A security door and frame assembly as claimed in claim 8 wherein the sub-frame (130) is substantially U-shaped and wherein the hinge pin (121) extends transversely relative thereto and passes through the two arms (131, 132) of the "U".
10. A security door and frame assembly as claimed in claim 8 or claim 9 wherein the free end (141) of the leaf spring (140) is adapted to engage the intermediate collar means (123) when the hinge pin (121) is in its extended condition.
11. A security door and frame assembly as claimed in any one of claims 8 to 10 wherein the leaf spring (140) is adapted to hold the hinge pin (121) in its

withdrawn position by pressure contact between the side face of the leaf spring (140) and said intermediate collar means (123).

12. A security door and frame assembly as claimed in any one of claims 8 to 11 wherein the respective holes (134, 135) in which the hinge pin (121) is received are provided with bearing means.
13. A security door and frame assembly comprising a door leaf (10) pivotally mounted in a door frame (20), said door leaf (10) having interior and exterior surfaces and said frame having an adjustable end plate (214) provided with jacking means (215, 216, 217, 218) for jacking the door frame (20) into an opening to be secured, said end plate (214) being disposed in a substantially vertical plane parallel to the plane of the door leaf (10) when said door leaf (10) is in a closed condition in use.
14. A security door and frame assembly as claimed in claim 13 wherein the jacking means (215, 216, 217, 218) comprises a pair of substantially vertically-oriented screw jacks (217, 218), the screw portions of which are obscured from one side of the door and frame assembly by a horizontal cross-member (224) forming part of the door frame (20).
15. A security door and frame assembly as claimed in claim 13 or claim 14 wherein said door frame (20) consists of tubular vertical side members (221, 222), said tubular vertical side members (221, 222) being slotted at their ends to slidably receive said end plate (214).
16. A security door and frame assembly as claimed in claim 14 or claim 15 wherein said horizontal cross-member (224) is substantially C-shaped in cross-section and wherein said jacking means (215, 216, 217, 218) engages against the underside of a top face (224a) of said horizontal cross-member (224).
17. A security door and frame assembly as claimed in any one of claims 1 to 7 and further including the features of any one of claims 8 to 12.
18. A security door and frame assembly as claimed in any one of claims 1 to 7 and further including the features of any one of claims 13 to 16.
19. A security door and frame assembly as claimed in any one of claims 8 to 12 and further including the features of any one of claims 13 to 16.
20. A security door and frame assembly as claimed in claim 17 and further including the features of any one of claims 13 to 16.

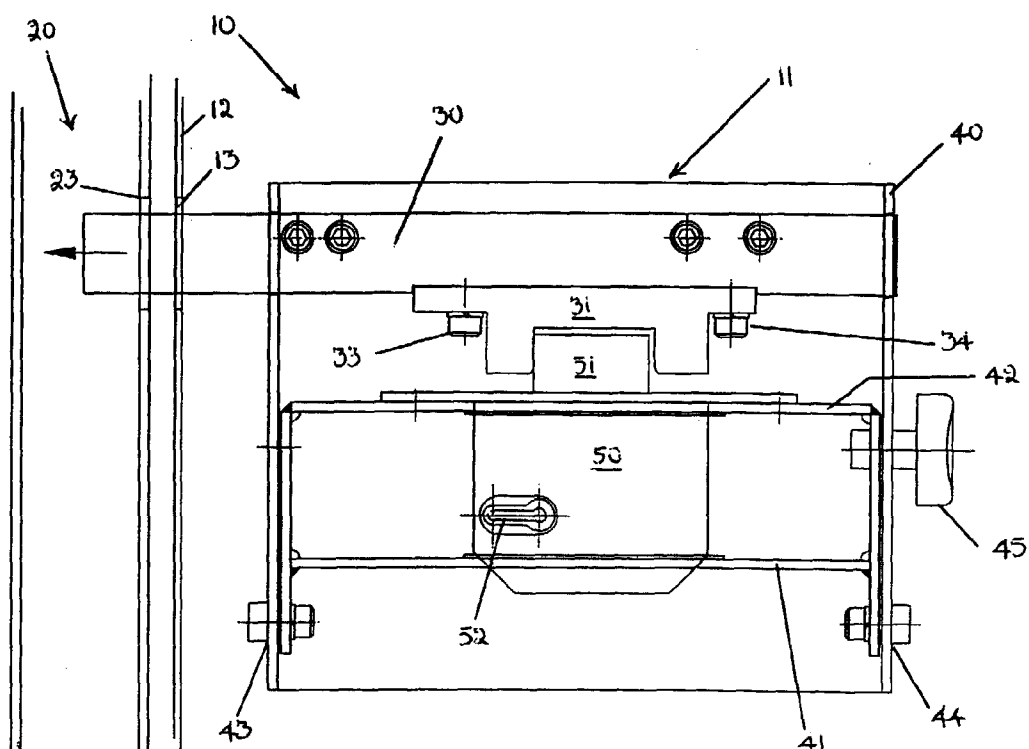


FIGURE 1

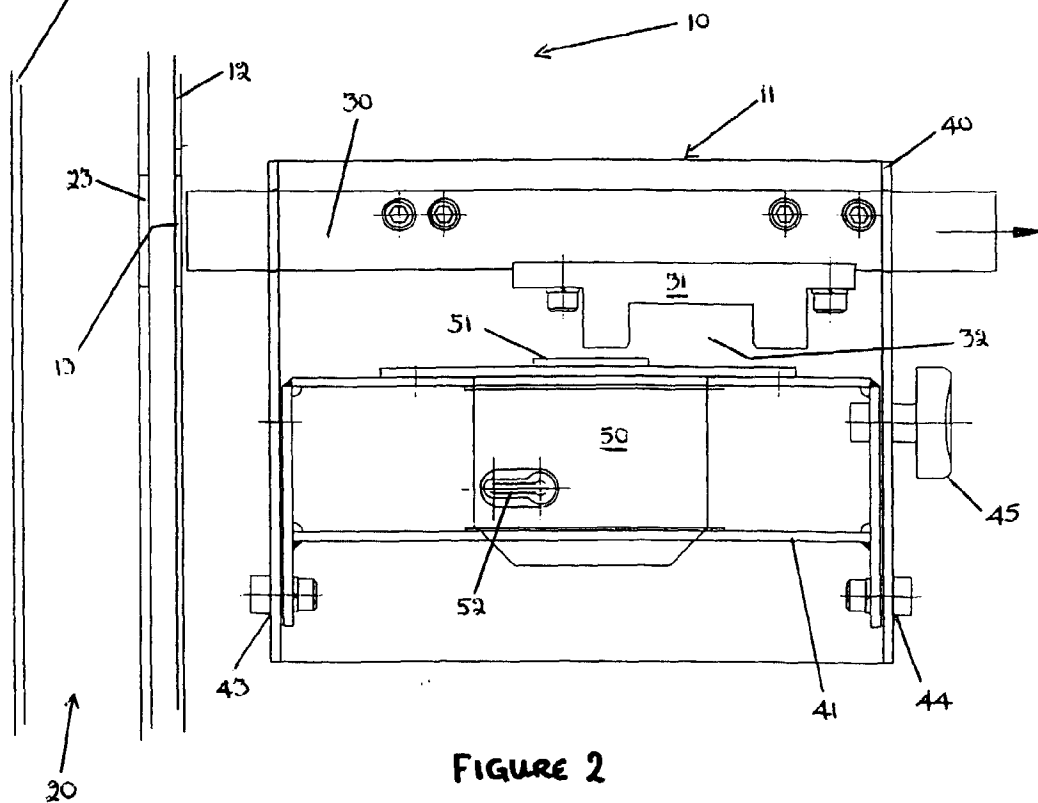


FIGURE 2

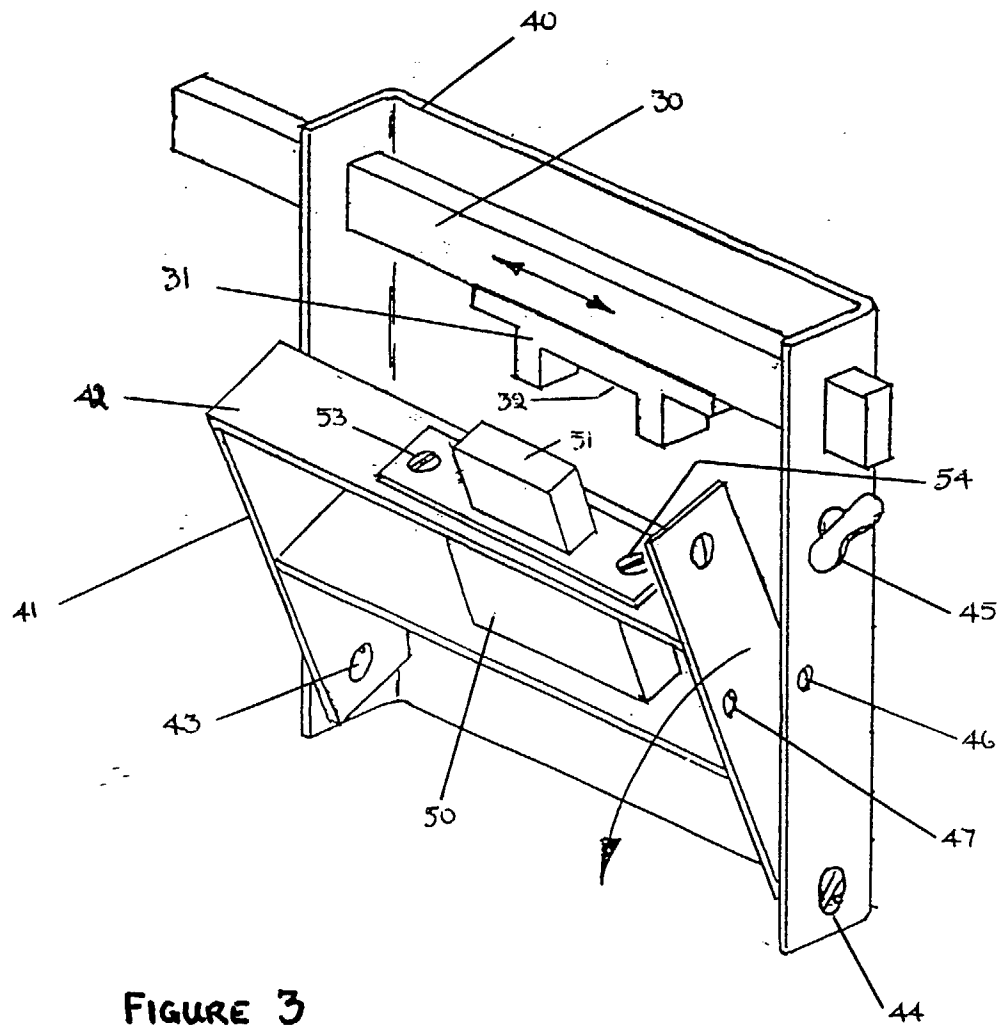


FIGURE 3

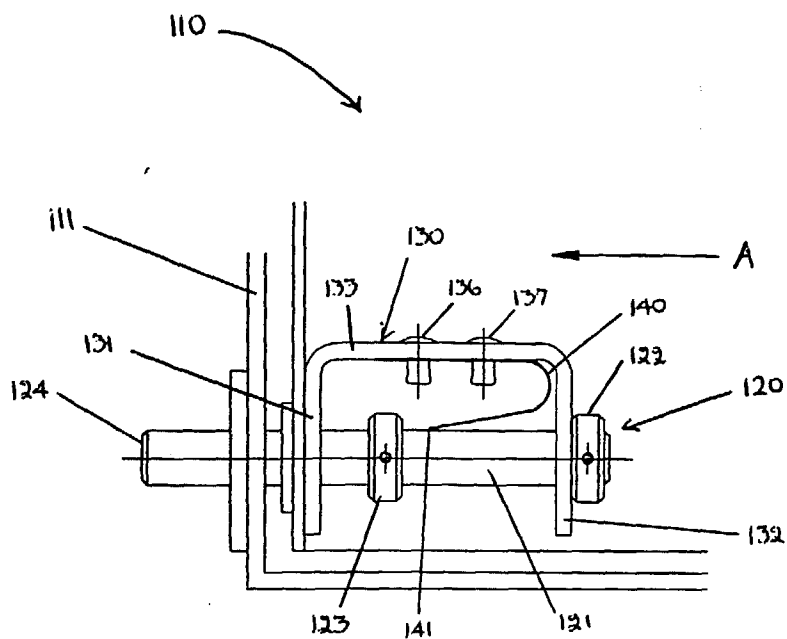


FIGURE 4

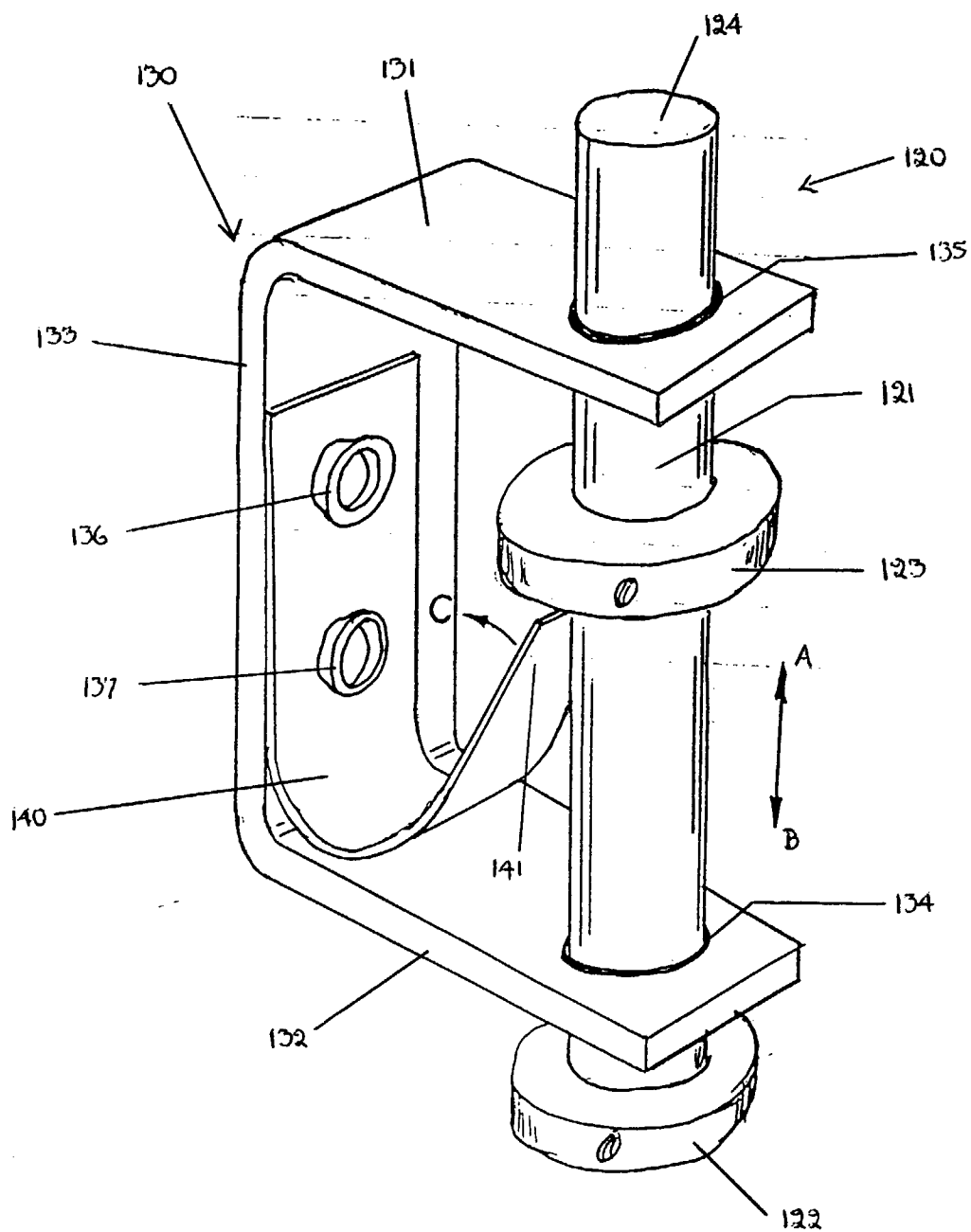


FIGURE 6

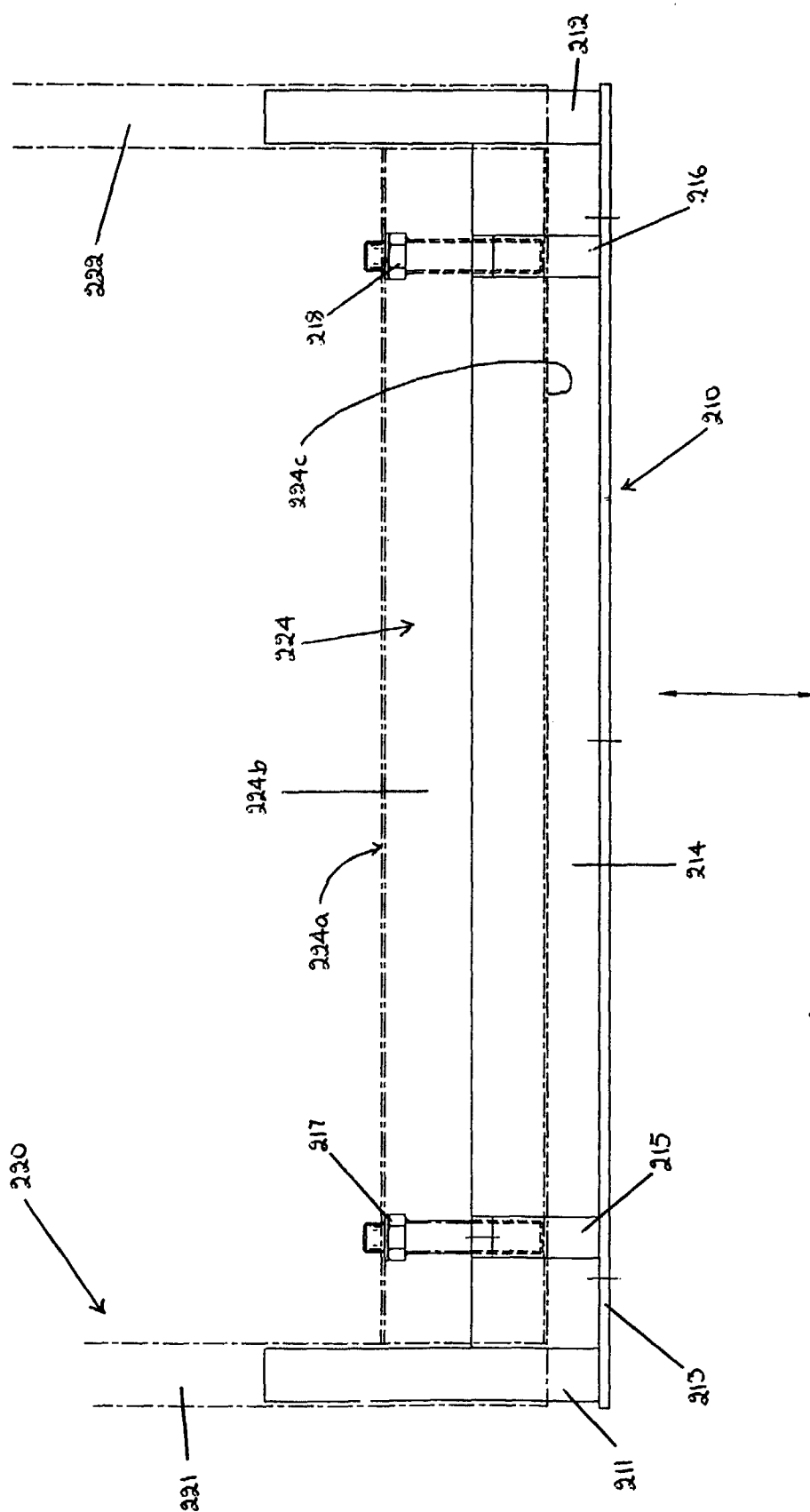


FIGURE 7