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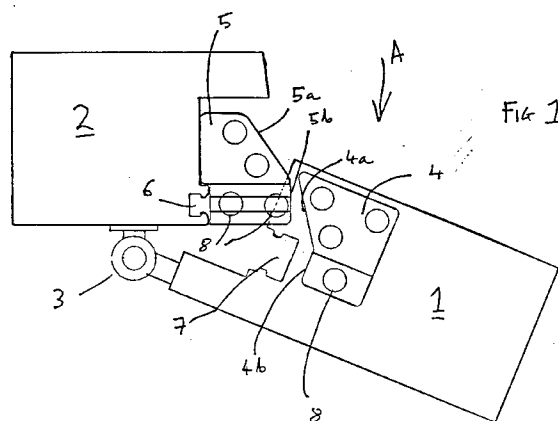
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(54) **Door security device.**

(57) A device for preventing the opening of a door (1) by brute force comprises two blocks (4,5) to be mounted opposite one another on the door (1) and door frame (2). The block (4) on the door having a concave face (4a,b) matching a convex face (5a,5b) on the block (5) on the door frame. The door may be swung open normally but lateral displacement of the door out of the frame is limited by the blocks. Interlocking teeth may be provided on the blocks.



The present invention relates to security devices for doors and in particular elements for reinforcing the hinge side of a door.

Although there are many devices for strengthening the lock side of doors and preventing any bolt being forced there still exists a need for a cheap and effective means for reinforcing the hinge side of a door. Frequently, the hinges provided on doors are not very strong and entry may be gained by breaking the hinges more easily than forcing the lock. One existing device comprises a number of metal studs to be attached to the edge of the door or to the door frame. When the door is closed the studs enter corresponding holes in the other of the frame or door and prevent the door being forced at the hinge side. This device, however, suffers from the drawback that it is necessary to provide quite deep holes in either the door or frame which is not possible where the door and frame are manufactured from extruded synthetic resin.

According to the present invention there is provided the combination of a hinged door and frame, having top and bottom first members mounted respectively on the top and bottom surfaces of the door at the hinge side thereof, and each having a first concave engaging surface; and top and bottom second members mounted on the door frame and each having a second convex engaging surface so that, when the door is closed, the first and second engaging surfaces are in an adjacent opposed relationship, said engaging surfaces being shaped so as to allow rotation of the door about the hinge but restrict displacement of the hinge side of the door from the plane of the frame and vertical displacement of the door.

The term "door" as used herein is intended to encompass any form of hinged covering for an aperture, e.g. a hatch, window etc.

Preferably, the first and second engaging sections are respectively concave and convex, most preferably each being formed from two or more flat surfaces. When the door is closed the first and second members are close together with the engaging surfaces in an opposing relationship. The surfaces are shaped so that they slide past one another as the door is rotated on its hinge but displacement of the door out of the plane of the frame or vertically within it will cause the two engaging surfaces to contact so that the load on the door is borne by the two parts of the device rather than the hinge.

The first and second members are preferably blocks provided with projections to engage slots provided on the door and door frame. They may be die-cast, preferably of zinc.

The present invention will be further described hereinafter with reference to the following description of exemplary embodiments and the accompanying drawings, in which:

Fig 1 is a plan view of a first embodiment of the invention on a partially open door;

Fig 2 is a plan view of a second embodiment of the invention installed on a closed door;

Fig 3 is a partial sectional view along the line XX' in Figure 2; and

Figures 4A-D are views of a third embodiment of the present invention.

In the drawings, like parts are indicated by the same reference numerals.

In Figure 1 a door 1, constructed of UPVC sections, is pivotally mounted in frame 2, also of UPVC sections, by hinge 3. Blocks 4 and 5 are respectively mounted on the door 1 and door frame 2 via projections (not shown) which engage in slots 6 and 7 which are provided around the inside of the door frame 2 and outside of the door 1 respectively. Additionally bolts 8 may be provided to prevent the blocks 4 and 5 sliding along the blocks.

Block 4 is provided with first engaging surface comprising two flat faces 4a and 4b which are angled so that the first engaging surface is concave and faces the hinge 3. Block 5 has a corresponding second engaging surface again comprising two flat faces 5a and 5b, which meet at the same angle as faces 4a and 4b, so that the second engaging surface is convex and faces away from the hinge 3. When the door is closed the two engaging surfaces will be opposite one another and separated by a small gap, perhaps of a few millimetres. Faces 4a and 5a are angled so that the blocks offer no obstacle to normal opening of the door, by rotation about the hinge 3. However, any force exerted on the door from the outside in direction A, perpendicular to the plane of the door, will bring faces 4a and 5a into contact. Any further force exerted on the door will be borne by blocks 4 and 5, rather than the hinge 3.

The engaging faces 4a and 4b, 5a and 5b are angled, as shown in Figure 3 to prevent vertical movement of the door in the plane of the frame.

Figure 2 shows a second embodiment of the invention in which the first and second engaging surfaces each comprise 3 faces 4c, d, e and 5c, d, e respectively. The division of the engaging surfaces into more faces does not affect the principle of operation of the device but allows the blocks to be closer together when the door is closed without obstructing opening of it. It also ensures that a greater sideways displacement of the door is required to enable block 4 to move past block 5, thus increasing the security of the device.

Further security can be achieved by providing steps or teeth on the engaging surfaces. These are arranged so as to engage when the door is displaced out of its normal plane and resist the blocks 4 and 5 sliding over one another. The steps or teeth may be elongate horizontally to prevent vertical movement of the door and/or elongate vertically to prevent horizontal movement of the door.

Additionally, a tether, e.g. steel wire or cord, may

be provided between the two blocks 4, 5. The tether should be of a sufficient length to allow the door to open but prevents the door being taken out of the door frame if the hinges are broken.

The blocks may be made of any suitable hard material e.g. metal and may be formed by any convenient method. A diecasting in zinc or zinc alloy is suitable.

A pair of blocks is provided at both the top and bottom of the door. As well as being bolted on they may be incorporated in the door and frame during manufacture at any convenient position.

As shown in Figure 3, the engaging faces are inclined to the axis of rotation of the hinge so as to restrict movement of the door parallel to that axis.

Figure 4A is a plan view of a block 4 for mounting on top of a door.

Figure 4B is a cross-section on the line Y-Y' showing steps 6 to prevent vertical movement of the door. Figure 4C shows the corresponding blocks 5 for mounting on the frame and Figure 4D is a cross-section on line Z-Z' showing the corresponding steps 7 on the engaging faces 5 and 6.

For additional security, the blocks may be provided with vertically elongate engaging teeth to prevent the blocks sliding over one another.

at least some of said teeth are elongate in a direction generally perpendicular to the axis of the hinge of the door.

6. A combination according to any one of the preceding claims wherein the two members are connected together by a tether.

7. A combination according to claim 6 wherein said tether comprises a length of steel cord.

8. A combination according to any one of the preceding claims further comprising fixing means to fix said first and second members to a door and a door frame respectively, said fixing means comprising at least one projection shaped to engage a slot provided in the door or door frame.

9. A combination according to any one of the preceding claims wherein said first and second members are diecast in zinc.

10. A combination according to any one of the preceding claims wherein the door and door frame are integrally formed with said first and second members respectively.

Claims

1. The combination of a hinged door and frame, having top and bottom first members mounted respectively on the top and bottom surfaces of the door at the hinge side thereof, and each having a first concave engaging surface; and top and bottom second members mounted on the door frame and each having a second convex engaging surface so that, when the door is closed, the first and second engaging surfaces are in an adjacent opposed relationship, said engaging surfaces being shaped so as to allow rotation of the door about the hinge but restrict displacement of the hinge side of the door from the plane of the frame and vertical displacement of the door.
2. A combination according to claim 1, wherein the engaging surfaces each comprise at least two flat faces.
3. A combination according to claim 1 or 2, wherein said first and second members are provided with interlocking teeth on the engaging surfaces.
4. A combination according to claim 3 wherein at least some of said teeth are elongate in a direction generally parallel to the axis of the hinge of the door.
5. A combination according to claim 3 or 4, wherein

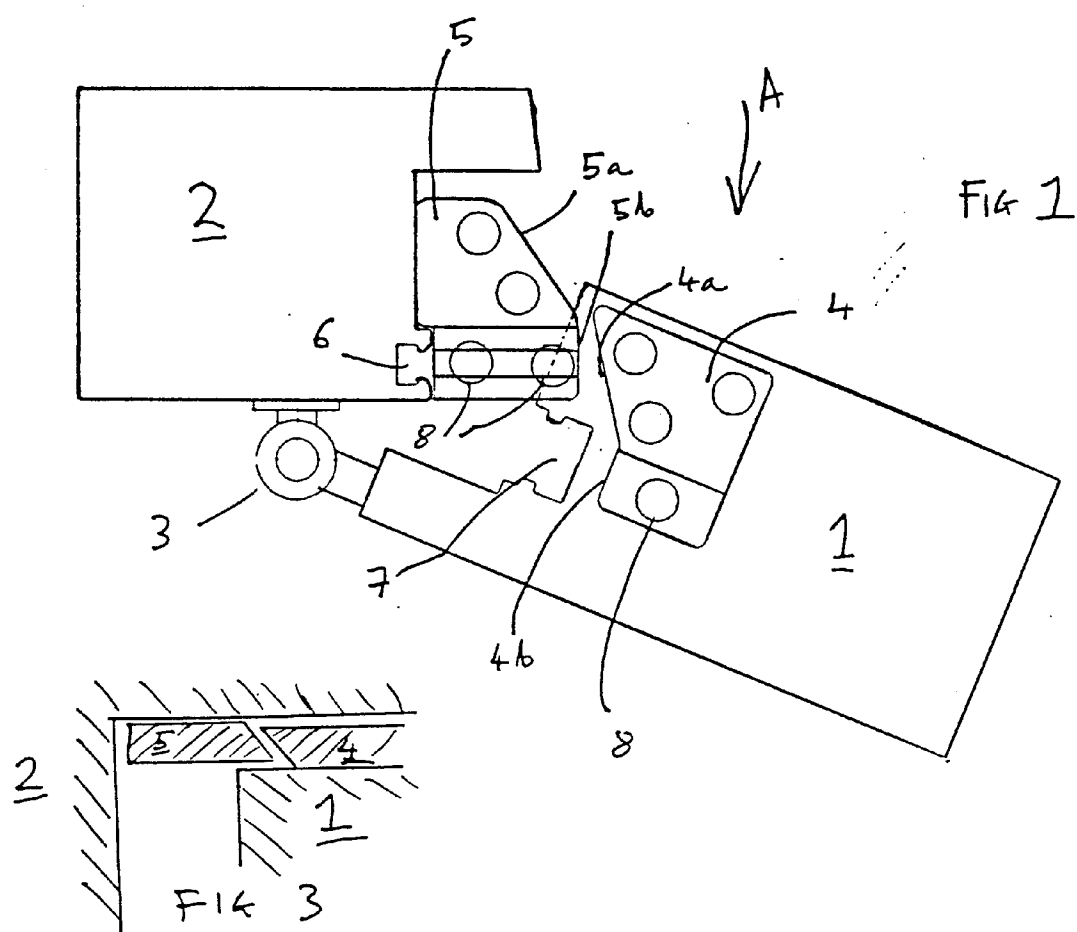
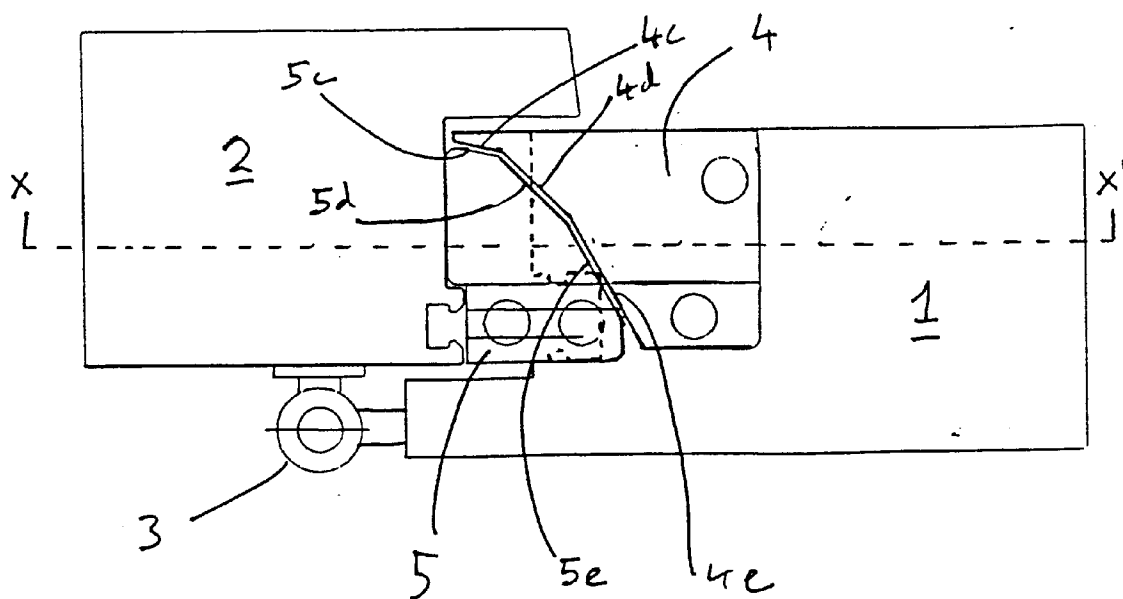
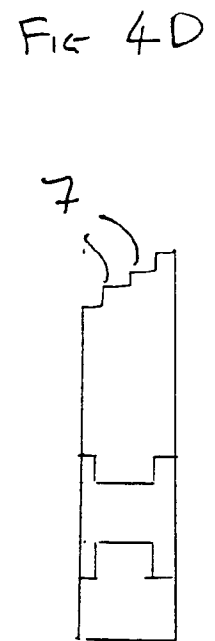
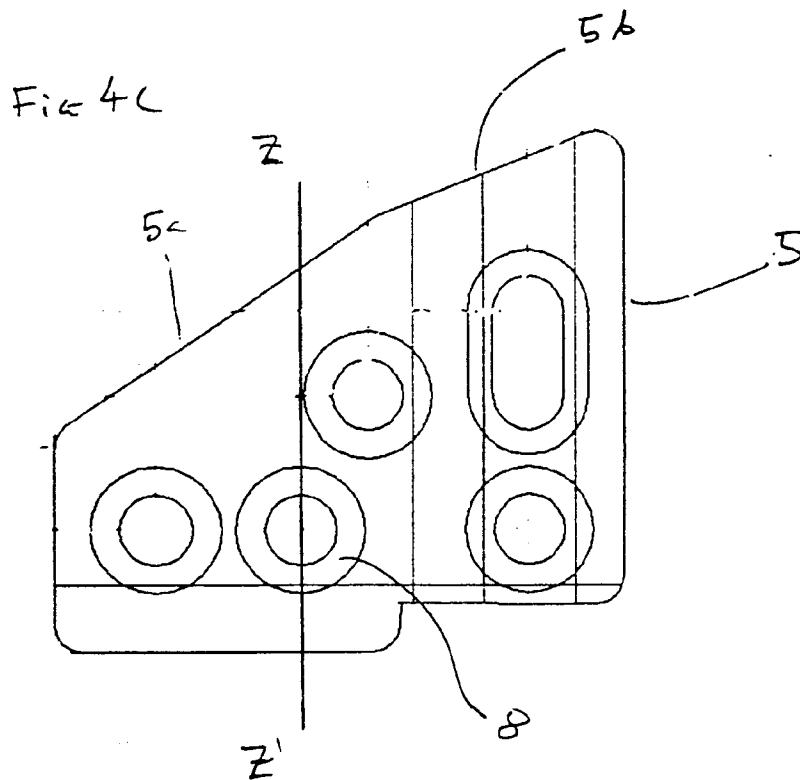
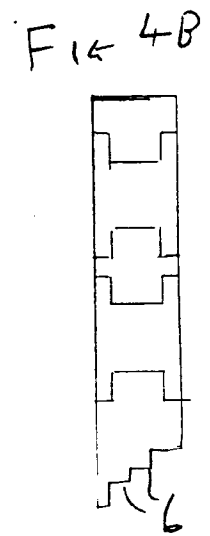
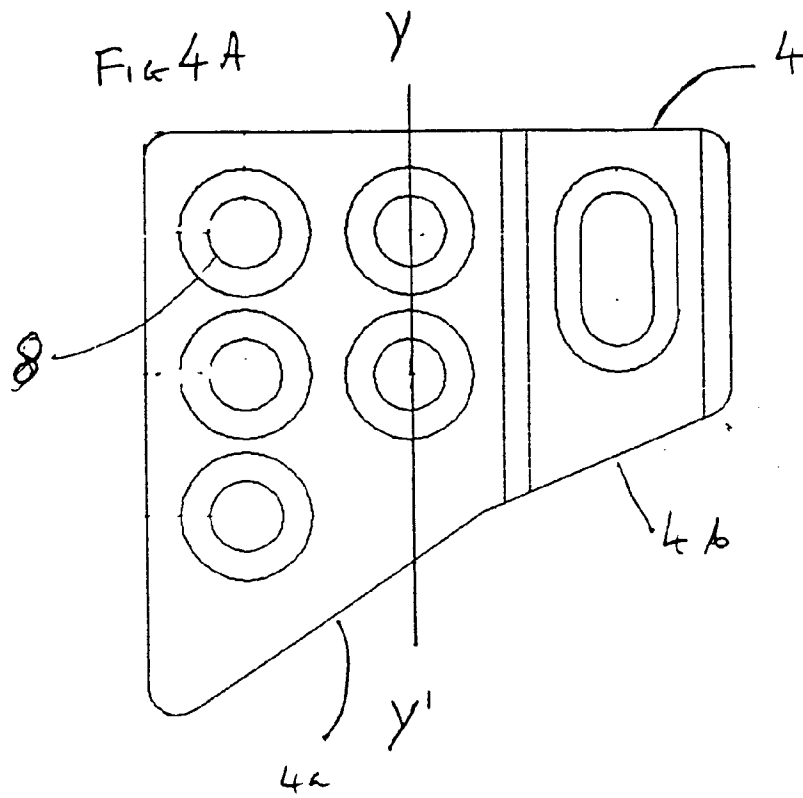


FIG 2







European Patent
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EUROPEAN SEARCH REPORT

Application Number
EP 94 30 1992

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.5)
A	DE-C-32 19 196 (BIERGANS) * abstract; figures 3,6 * ---	1	E05D11/00 E06B5/10
A	US-A-4 014 571 (ELLIS) * column 2, line 18 - line 61; figures 1-7 * -----	1	
			TECHNICAL FIELDS SEARCHED (Int.Cl.5)
			E05D E05B E06B
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 5 July 1994	Examiner Van Kessel, J
<p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document</p> <p>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document</p>			

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