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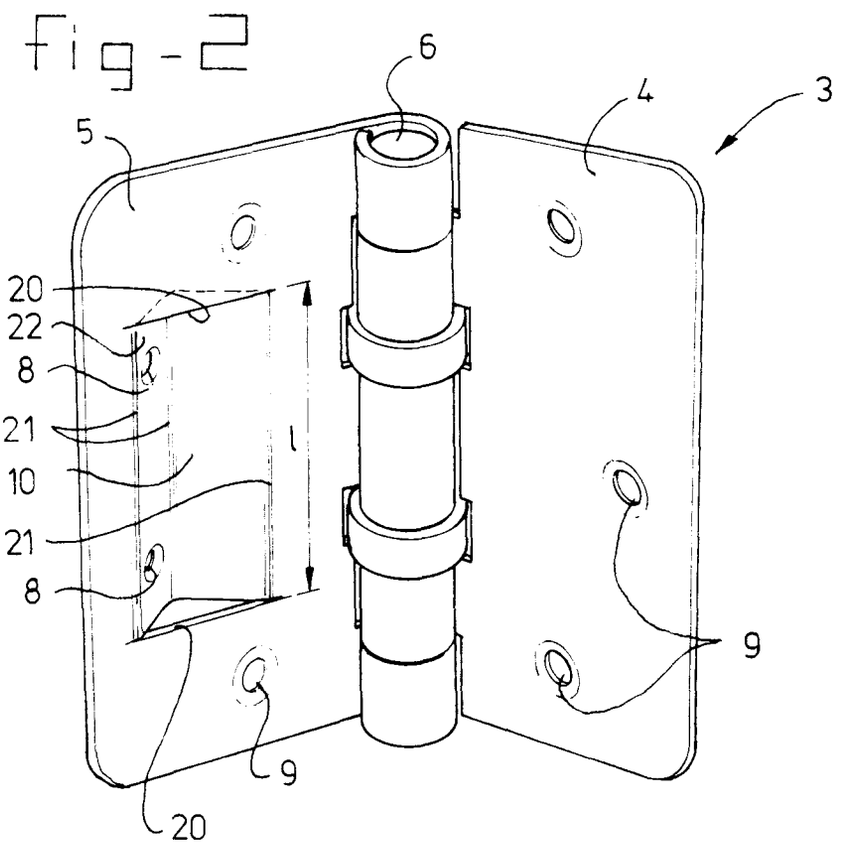
(54) Hinge

(57) Hinge consisting of two leaves (4,5) joined by a pin (6). In order to provide, on the one hand, a stronger fixing to a window, door and frame and, on the other hand, a construction automatically providing security, at least one leaf (5) is provided on one side with a first flanged part (10) which, starting from the hinge line, extends further into the construction. A second flanged part (22), which can be provided with at least one hole (8) for taking screws, adjoins said first flanged part (10).

Fig - 2



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Description

The invention relates to a hinge according to the preamble of Claim 1.

A hinge of this type is generally known in the prior art.

In recent years a system has been developed with which the burglary prevention characteristics of certain components to be used in hinges and locks are classified. This system operates with stars and the greater the number of stars the better are the burglary prevention characteristics.

To date the emphasis in this context has lain primarily on testing the components individually. However, it has been found that if hinge and lock components which have very good burglary prevention characteristics are incorporated in structural constructions, these components, when used in the construction, can easily fail despite the fact that in themselves they are designated as having very good burglary prevention characteristics. In this context it is, of course, the weakest link which determines the strength of the chain.

In order to obviate the possibility, after tapping hinge pins loose or wrenching away the hinge leaves in the case of outward-opening doors and windows, of moving the window or the door concerned, all sorts of pins have been proposed, which are also known as 'hinge bolts', which provide additional security when the construction concerned is closed.

However, it has been found that if any force is used to move the moving part away from the frame there is always sufficient give to enable such a pin to be moved away in the gap produced.

Furthermore, it has been found that in the case of hinges which are used for, in particular, inward-opening doors or windows, such hinges, provided the latter have good burglary prevention characteristics in themselves, will not fail in the event of an attempted break-in, but that the fixing to the structural construction will simply give way. This applies in particular in the case of frames in which rebates (grooves) have been made to ensure the frames retain their position in the construction. It has been found that, as a result of the sharp corners present, stress concentration arises in the wood at the location of the transition from the frame to the rebate. If the fixing screws for the hinges are located in the vicinity of this location of stress concentration, splitting of the frame will occur.

In this context it is of less significance whether hardwood or deal is used. It is true that hardwood offers more resistance to breakage, but, on the other hand, it splits more easily. Softer varieties of wood give, but are less strong.

It has also been found that there is little point in increasing the length of the fixing screws. The screw bears only over a restricted number of threads.

The aim of the present invention is to provide an improved hinge which can be fixed to the structural construction in such a way that the resistance of the entire construction to burglary is improved.

This aim is achieved with a hinge as described above by the characterising measures of Claim 1.

The flanged part or first flanged part provides a wedge effect when the construction fixed with hinges is forced relative to the frame or the like in which it is fitted.

It is pointed out that US Patent 3 445 883 discloses a hinge construction which has a lowered part. The flanged part consists of a pressed-in bore which extends perpendicularly to the plane of the leaf. As a result the material thickness of the wood, suitable for taking a screw, is restricted and, consequently, the construction is weakened. Because the bore extends perpendicular to the leaf, the wedge effect according to the invention, which has been described above, is not achieved.

According to an advantageous embodiment, the angle β described above is between 20 and 60° and more particularly is 30°.

According to a further advantageous embodiment, the lowered part is delimited on all sides by the flat part of the leaf and the length thereof makes up 30-80 % of the total length of the leaf.

It is also possible for the hinge leaf which is fixed to the hinged part to be constructed with a first and a second flanged part. Since the thickness of such a hinged part, such as a window, will in general be less than that of a frame in which the latter is hung, the effect of the hole and a fixing fitted therein will not be realised in the second flanged part there.

If both hinge leaves are provided with flanged parts and further flanged parts and are aligned such that they delimit a cavity between them, it is possible to accommodate a block which substantially fills said cavity. By fixing said block to one of the two hinge leaves, a security feature to prevent removal of the hinged part after taking out the hinge pin is obtained.

According to a further advantageous embodiment, the first and second flanged parts are constructed with different angles with respect to the flat part and/or are of different lengths, the first flanged part of the one leaf being located opposite the second flanged part of the second leaf when the hinge is in the closed position.

The holes in the leaf which has to be fitted against the frame, which holes are oriented at an angle relative to the perpendicular to the leaf, can be made in any way which can be conceived in the prior art.

If this further flanged part is used in a frame or other static construction, a hole is preferably provided which is at an angle α of at least 80° with respect to the perpendicular to the plane of the leaf, which perpendicular is directed away from the line of the hinge in the direction face of the hole to rear of the hole. This aspect of the invention is based on the insight that at least one of the fixing screws of the hinge no longer extends perpendicularly to the related leaf, which in general will have been mounted on the frame. As a result the risk, described above, of splitting of part of the frame as a result of the

combined effect of stress concentration attributable to the screw and the stress concentration attributable to the rebate is prevented. Furthermore, a screw of a given length will extend relatively less far through the thickness of the structural construction, which makes a further contribution to reducing the stress concentration which emanates from the screw.

As indicated above, the angle made by the centre line of the hole deviates from the customary 90° with respect to the leaf. In principle, this angle can vary between a few degrees deviation and being essentially in line with the direction of the leaf.

In practice, however, it has been found desirable to choose the angle between 70 and 50° and preferably at about 60°.

The hinge can be any hinge known from the prior art. The fixing of the hinge to, for example, a door or a window can comprise any constructions known from the prior art.

Preferably, this component is likewise constructed as a leaf-shaped component.

In order to obtain the wedge effect described above it is not necessary for the holes described above to be present.

The invention will be explained in more detail below with reference to illustrative embodiments shown in the drawings. In the drawings:

Fig. 1 shows, in cross-section, a top view of a structural construction in which a first embodiment of the hinge according to the invention has been fitted;
Fig. 2 shows a perspective view of the hinge according to Fig. 1;
Fig. 3 shows a variant of the embodiment according to Fig. 1; and
Fig. 4 shows a modified embodiment with respect to the variant according to Fig. 3; and
Fig. 5 shows the hinge according to Fig. 4 in the folded-open position.

In Fig. 1 part of a door or window, which in this case is designed to open inwards, is indicated diagrammatically by 1. 2 indicates a frame and a draught excluder 7 is fitted in the gap in the shut between door or window 1 and frame 2.

Irrespective of whether or not such a gap in the shut is present, this is the location which is frequently used to gain access for burglary. A crowbar, for example, is placed by an unauthorised person in the gap located at this point between door or window 1 and frame 2 and door or window 1 is moved away from frame 2. It has been found that with conventional hinges (not shown), screws which extend exclusively perpendicularly to the hinge and are fixed in the frame, and in particular the screws which are fixed in the vicinity of the rebate 12, lead, as a result of the stress concentration which emanates from both said screws and the rebate, to tearing away of part 17 from frame 2.

To prevent this it is proposed to construct the hinge 3 as shown in Figs 1 and 2. Hinge 3 consists of a conventional leaf 4 which is fixed via screws, which are shown diagrammatically, to door or window 1. Fixing to the leaf 5 is achieved by means of a hinge pin 6. This leaf 5 is provided with a first flanged part 10. A second flanged part 22 adjoins the first flanged part 10. In addition to the customary holes 9 for accommodating screws, holes 8 are also present in the second flanged part 22 for accommodating screws 11. As can be seen from Fig. 1, such a screw 11 extends at an angle α with respect to the perpendicular to leaf 5. For a given screw length, the screw extends through an appreciably smaller thickness of the frame 12, as a result of which the stress concentration emanating from screw 11 is limited appreciably. Moreover, the screw does not end close to a corner point of rebate 12, with the result that the stress concentration emanating from the corner points of rebate 12 and the point of screw 11 are never coincident and never lead to fracture. The screws fitted through hole 9 now serve merely to hold the leaf of the hinge against the frame. After all, the shear forces to which the latter were previously subjected are, according to the invention, converted into essentially tensile forces which are taken up by the fixing means through holes 8.

Tests have shown that a construction of this type can take appreciably greater loads than is the case with fixings of hinges according to the prior art, that is to say where the screws would extend exclusively perpendicularly to leaf 5. The construction according to the invention can thus offer greater resistance to burglars and can be awarded a higher certification rating under the various regulations.

If the screws fitted through holes 8 should fail or not have been fitted, the hinge with leaves 4 and 5 will move, together with part 1, towards the right in the drawing when force is exerted in the vicinity of draught excluder 7. This causes the first flanged part automatically to wedge tight in frame 2 in the course of the movement. In this way a double security feature against breakage is obtained.

In order to optimise such a wedge effect, the first flanged part 10 is at an angle β which is preferably between 15 and 75° and more particularly between 20 and 60° and preferably is 30°. Because, in the embodiment shown, the first and second flanged parts are perpendicular to one another, angle β corresponds to angle α. It is not absolutely essential that the first and second flanged parts are perpendicular to one another. In order to introduce sufficient forces into the frame concerned, it is important that the flanged part is of a certain length. This length 1 is indicated in Fig. 2 and is preferably between 30 and 80 % of the total length of the leaf 5 concerned. Said length is dependent on the total height of the hinge. With a longer or higher hinge this length can be disproportionately greater.

In Fig. 3 the variant of the hinge according to the preceding figures is indicated by 38.

As can be seen from this figure, it is also possible to construct the leaf 35, which is joined to the door or window 1, in a corresponding manner to leaf 5 according to Fig. 1 or one of the subsequent figures.

The first flanged part is indicated by 10, whilst the second flanged part is indicated by 22.

In this way a double wedging effect is obtained.

With the construction according to Fig. 4, which can be constructed for use with an outward-opening window or door, the second flanged part 22 is provided with a hole 39 in which a block 36 is fixed by means of a screw 37, so that the gap between the two opposite chambers delimited by the first and the second flanged parts is essentially filled.

A block of this type can assume the action of a hinge bolt in a particularly simple manner and in practice is found to be much more effective. After the hinge pin has been removed from hinge 38 it is not possible, because of the presence of block 36, to move the hinge leaves over one another by inserting a crowbar.

In Fig. 5 hinge 38 according to Fig. 4 is shown opened out by way of illustration.

Although the invention has been described above with reference to preferred embodiments, it will, after reading the above, be clear to those skilled in the art that numerous variants are possible which are obvious and fall within the scope of the present invention.

Claims

1. Hinge comprising two parts which are rotatable about a hinge line and are connected to one another, at least one part of which comprises a leaf (5) provided with holes (8, 9) for receiving fixing means, such as screws, characterised in that the at least one leaf comprises a lowered part which is delimited on at least two opposite sides by the other, flat part of said leaf, which lowered part comprises at least two first and second flanged parts (10, 22) joined to one another from said opposing flat parts of the leaf, the first flanged part (10) located closest to the hinge line being flanged essentially parallel to said hinge line and the angle β between the flat part and said first flanged part being between 15 and 75°.

2. Hinge according to Claim 1, wherein the lowered part is delimited on all sides by the flat part of the leaf and the length (1) thereof makes up 30-80 % of the total length of the leaf.

3. Hinge according to one of the preceding claims, comprising the two leaves each provided with a lowered part.

4. Hinge according to Claim 3, wherein the lowered parts are fitted such that they are opposite one another when the hinge is in the closed position, a block (36) being fitted in the gap between the flanged parts, which block is fitted against one of said leaves and extends beyond that leaf.

5. Hinge according to Claim 3 or 4, wherein the first and second flanged parts are constructed with different angles with respect to the flat part and/or have a different dimension in the direction essentially perpendicular to the hinge line, the first flanged part of the one leaf being opposite the second flanged part of the second leaf when the hinge is in the closed position.

6. Hinge according to one of the preceding claims, wherein at least one flanged part is provided with at least one hole (8), the centre line of said hole being at an angle α of at least 80° with respect to the perpendicular to the plane of the leaf.

7. Hinge according to Claim 6, wherein the angle a is between 50 and 70°.

8. Hinge according to Claim 7, wherein the angle α is 60°.

9. Hinge according to one of the preceding claims, wherein the first flanged part (10) is perpendicular to the second flanged part (22).

10. Hinge according to one of the preceding claims, wherein a hole (9) is made on either side adjacent to the lowered part.

Fig-1

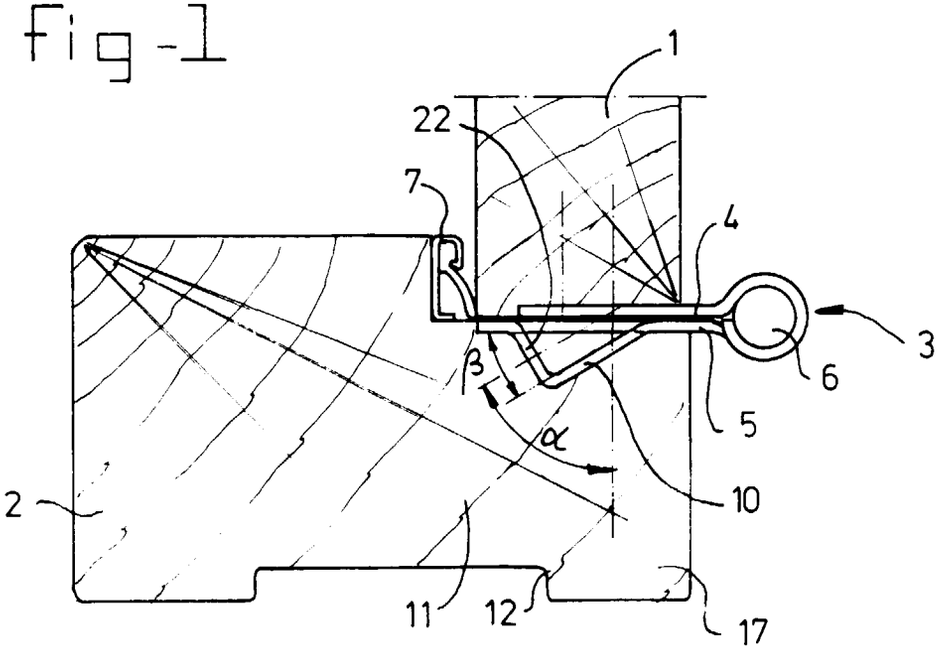


Fig-2

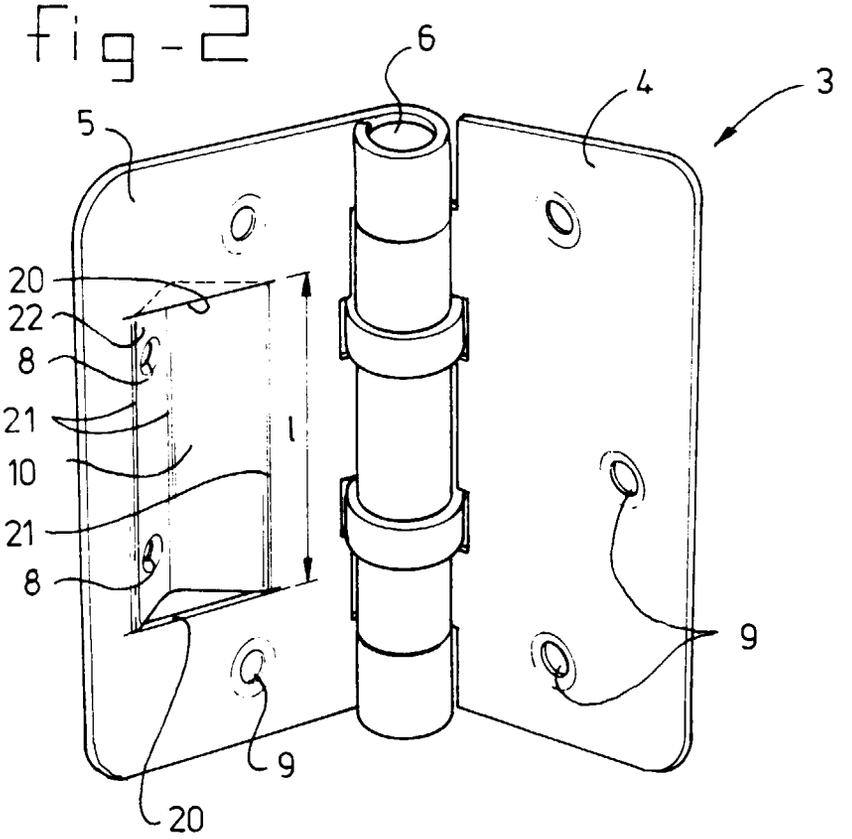


Fig-3

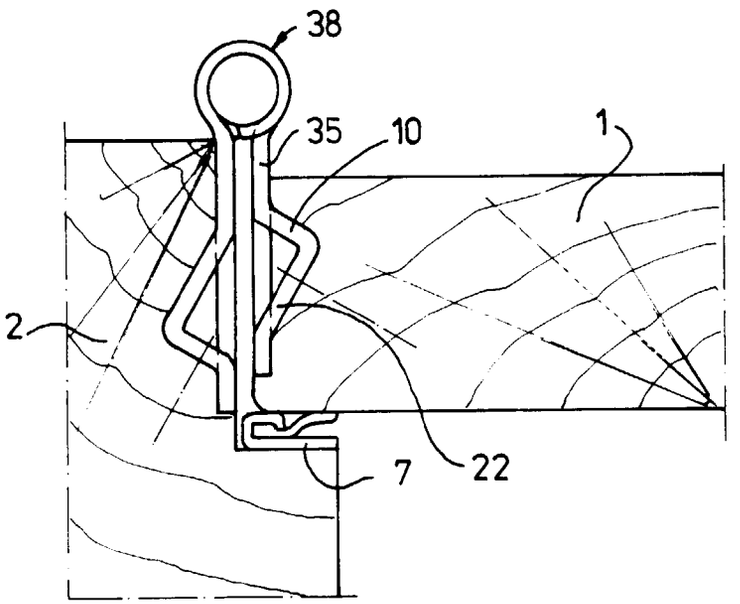


Fig-4

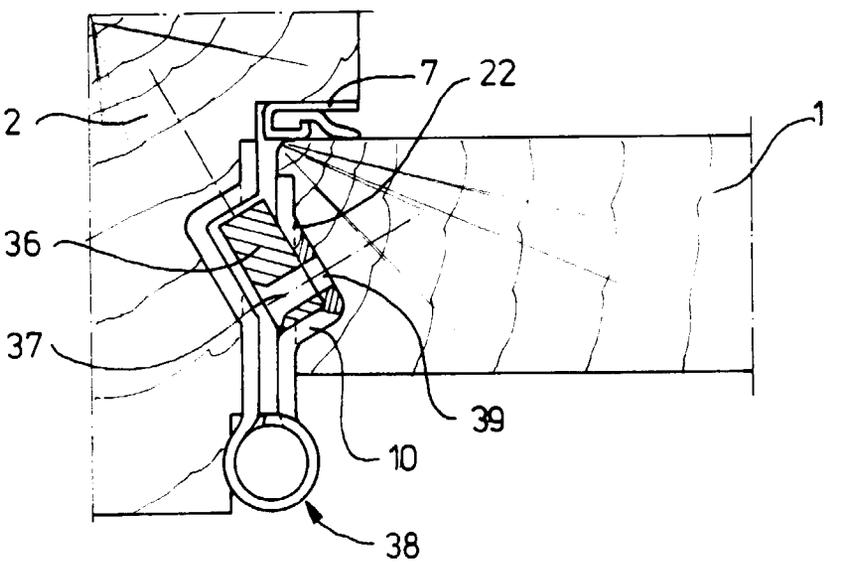
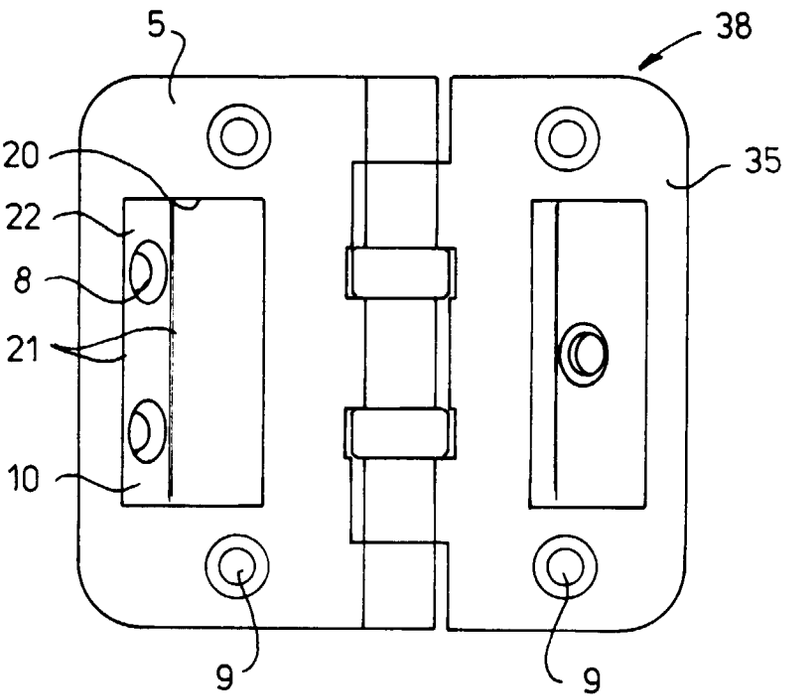


Fig-5



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EUROPEAN SEARCH REPORT

Application Number
EP 97 20 0247

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.6)
A	US 3 445 883 A (LOWE) 27 May 1969 * the whole document * -----	1,3	E05D5/04 E05D5/06

TECHNICAL FIELDS SEARCHED (Int.Cl.6)
E05D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	28 April 1997	Van Kessel, J

CATEGORY OF CITED DOCUMENTS

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