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(54) **Hinge**

(57) The present invention relates to a hinge which includes a frame part (10) which is intended to be fastened to a frame or the like, and a door part (20) which is intended to be fastened to a door leaf (D) or the like, wherein the frame part includes a frame leaf (11) and a tongue (12) which is connected to the frame leaf by means of a hinge axle, and wherein the door part includes a bent or folded metal plate (21) which is configured to accommodate the tongue on the frame part and an eccentric device (30) for height adjustment of the door part relative to the tongue of the frame part. The eccentric device includes an eccentric part (31) and a first peg (32) which projects out axially from the eccentric part and which is accommodated in a through-penetrating opening (29) in a base part (23) of the bent metal plate, and wherein the bent metal plate includes a first lug (35) which as a result of abutment with the side of the eccentric part opposite the first peg prevents the first peg from exiting from the opening.

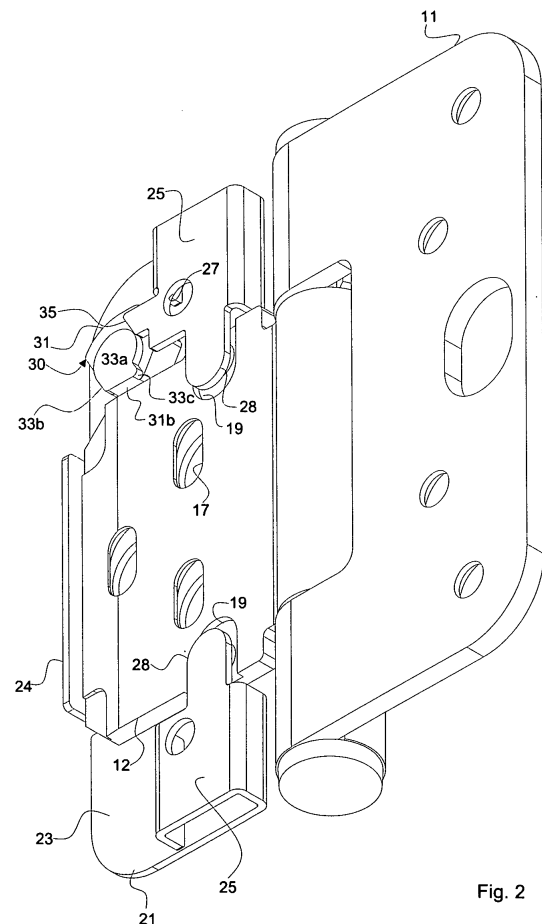


Fig. 2

Description

Field of invention

[0001] The present invention relates to a hinge of the kind defined in the preamble of claim 1.

[0002] A hinge of this kind is used, for instance, to fit doors, windows and the like in their respective frames where it is desirable to enable the height of the door or the window to be adjusted in relation to the frame. One advantage afforded by such a hinge is that the frame part of the hinge and the door part of the hinge can be fitted separately to their respective frames. The door can then be fitted to the frame, by threading the door parts of the hinge on to tongues provided on the frame part of the hinge.

[0003] The design of the hinge, and particularly the bent-plate design of the door part of the hinge enable the hinge to be manufactured easily and relatively cheaply and provide a robust and a hardy hinge that can also be used with heavy doors and windows.

[0004] The provision of an eccentric device for adjusting the vertical position of the door enables the door to be readily positioned, which can be made self-locking at chosen height adjustments.

[0005] With regard to this type of hinge it is desirable that the hinge can be produced easily and cheaply and that it will be robust and hardy. One desired property of such a hinge is that it will comprise two parts, and particularly that the frame component and the door component of the hinge will be held together even when the frame component and the door component are not fitted to the frame or the door respectively. This facilitates mounting of the frame component and the door component to the frame and to the door respectively, since only one unit need be fitted to the frame and to the door respectively. This minimizes the risk of losing loose components, the loss of a hinge component meaning that this component must be replaced or that the whole of the hinge must be scrapped because of the missing component. It is also desirable that the hinge will enable the position of the door to be readily adjusted in a lateral, or sideways, direction.

Description of earlier known techniques

[0006] GB 2 377 729 A describes a snap-in hinge with which the height of the door part can be adjusted in relation to the frame part with the aid of two eccentric devices that are accommodated and held in the door part of the hinge. The door part of the hinge is accordingly provided in two halves between which the eccentric devices are held firmly when the halves have been joined together in a door component. This hinge design is best suited for manufacture in a plastic material, but not for metal hinges which are also relatively expensive and complicated due to the fact that they must be manufactured in several stages, including casting in a mould tool,

which can be expensive to obtain.

[0007] Earlier known techniques also include snap-in hinges of folded or bent metal plate, where the door component of the hinge includes an eccentric device for carrying out height adjustments. In the case of these earlier known hinges, however, the eccentric device constitutes a separate part which, after the door component has been fitted to the door, is held firmly by the door fitted part of the hinge and the door itself. This known arrangement has a number of drawbacks, partly because it is necessary to keep a check on the separate eccentric device before fitting it to the door, and partly because it can be difficult to place the eccentric device and hold it in position at the door part of the hinge while fitting said part to the door. An additional eccentric device must be kept, to safeguard against the loss of the eccentric device during storage, transportation or fitting of the hinge. Alternatively, the entire hinge or at least the door part of the hinge must be scrapped if the eccentric device is lost.

Summary of the invention

[0008] Accordingly, an object of the invention is to provide a so-called snap-in hinge that enables height adjustments to be made to the door and which facilitates handling of the hinge prior to, during and subsequent to fitting of the hinge to frame and door.

[0009] Another object is to provide such a hinge in which the door part of the hinge is comprised of a coherent unit so as to facilitate fitting of the door part of the hinge and to minimize the danger of losing loose parts.

[0010] Another object is to provide such a hinge which can be easily manufactured while, nevertheless, being robust and durable and capable of managing large loads.

[0011] These and other object are achieved with a hinge of a kind defined in the preamble of claim 1 and having the features set forth of the characterising clause of claim 1.

[0012] By securing the eccentric device through the medium of a through-penetrating hole and a lug or like protrusion, both of which are formed in the bent metal sheet, ensures that the eccentric device will be held in place even when the door part of the hinge is not fitted to a door or mounted on the tongue of the frame part.

The securing arrangement according to the invention also enables the door part of the hinge to be readily manufactured cheaply, by carrying out a few punching, drilling and bending operations, and then inserting the eccentric device.

[0013] The eccentric device may include a second pin that projects out from the eccentric part on the side opposite to the first pin, wherein the second pin includes an abutment or stop which defines together with the first lug an end position for rotation of the eccentric device. This provides in a very simply fashion rotation stopping means that prevents the eccentric device rotating in a manner so that the height adjustment of the door will pass directly from the highest position to the lowest position in one

step. In the absence of such stopping means, a direct positional change of such magnitude would be liable to cause damage to the door, owing to its weight, or to the hinge, and also pinching injuries or the like to the person involved in the height adjustment.

[0014] The eccentric part of the eccentric device will suitably include a number of eccentrically planar casing segments. This results in a self-locking effect at the chosen height setting in which respective casing segments lie against the tongue on the frame part. In order to facilitate mounting of the eccentric device on the folded or bent sheet metal, the innermost casing segment will conveniently be spaced from the axle of the eccentric device at a distance relative to the length of the first lug such as to enable the first pin of the eccentric device to be inserted into the through-penetrating opening in the base part of the bent plate and thereafter turned so that the eccentric part will be received between the first lug and said base part. In this way it is possible to first form the bent or folded plate into its final configuration and then simply fit the eccentric device. This obviates the need to first place the eccentric device adjacent the plate and then secure the eccentric device by holding said device and folding down the first lug.

[0015] In order to enable the position of the door to be readily adjusted sideways, the bent plate may include at least one second lug which accommodates the tongue on the frame part between itself and the base part of the bent plate and which forms a stop means for an adjustment screw that is screwed into the tongue of the frame part of the hinge. The lateral adjustment screw is thus supported against the second lug and not directly against the door, which is otherwise often the case with the lateral adjustment means of prior art hinges of this kind. Earlier known lateral adjustment means are liable to damage the door when the lateral adjustment screw penetrates into the door, particularly when the door is made of wood. The folded or bent metal plate of the door part of the hinge conveniently includes two mutually opposing second lugs. This provides better stability and accuracy in respect to lateral adjustments and also enables the door part of the hinge to be positioned obliquely to the hinge axle if so desired.

[0016] Further objects of the invention and advantages afforded thereby will be apparent from the following description and the accompanying patent claims.

Brief description of the drawings

[0017] An exemplifying embodiment of the inventive hinge will now be described with reference to the figures of the accompanying drawings, in which

Fig. 1 is a perspective front view of a hinge according to the invention;

Fig. 2 is a perspective view taken obliquely from the rear of the hinge shown in figure 1;

Fig. 3 is a perspective view of the door part of the

hinge shown in figure 1, with the door part of the hinge fitted to a door;

Fig. 4a is a plan view from the rear of the hinge shown in figure 1, and Figure 4b is an enlarged view of a part shown in figure 4a;

Fig. 5a and 5b are perspective views of the door part and the frame part of the hinge when said hinge parts are separated from one another.

10 Detailed description of a proposed embodiment

[0018] The embodiment of an inventive so-called snap-in hinge illustrated in the figures includes a frame part 10 and a door part 20. As shown in figure 5b, the frame part of the hinge includes a frame leaf 11 and a frame tongue 12. The frame leaf 11 also includes two sleeves 13 which typically surround a hinge axle (not shown) which comprises a long pin and a short pin. The tongue 12 on the frame part also includes typically a corresponding sleeve 14. The frame leaf also includes four mounting holes 15 by means of which the frame part 10 is screwed firmly to a frame (not shown). A further through-penetrating hole 16 is provided in the frame leaf for receiving a so-called frame security device in the form of a pin (not shown). The tongue 12 of the frame part also includes three through-penetrating holes 17 for accommodating mounting screws (not shown). One of these through-penetrating holes 17 is placed in the tongue 12 of the frame part centrally opposite the hole 16 in which the frame security device is fastened, when the hinge is closed. This frame security device can therefore be achieved by providing one of the screws by means of which the tongue of the frame part is fastened with an outwardly projecting rear-edge fastening peg or pin which is received in the hole 16 in the frame part of the hinge in the closed state of the hinge.

[0019] The tongue on the frame part of the hinge also includes two lateral adjustment screws 18 which are screwed in corresponding holes in the tongue.

[0020] The door part 20 of the hinge shown in figure 5a is comprised of bent sheet metal 21 and an eccentric device 30. The metal sheet 21 includes a flat base part 23, an insert pin 24 that protects at right angles from the base part, and two support parts 25 which are raised from the base part and disposed parallel therewith. The base part includes central through-penetrating access holes 26 whose positions coincide with the positions of the mounting holes 17 in the tongue of the frame part, so as to provide access to the mounting screws received by the mounting holes 17 in the tongue on the frame part of the hinge. There are used to this end screws (not shown) whose heads are accommodated in the counter sinks of respective mounting holes 17, said screws being screwed into the door so as to fixate the position of the tongue subsequent to having adjusted the position of the door. It will be noted in this regard that the mounting holes 17 are elongated in a direction parallel with the hinge axle so as to enable adjustment of the height position of

the door part of the hinge relative to the tongue 12 on the frame part. The base part and support surfaces 25 of the door part 21 of the hinge include further mounting holes 27 for screwing the door part 21 to the door.

[0021] Insert tongues 28 extend towards one another from each of the support parts 25. The sides of the support parts 25 and the insert tongues 28 facing away from the base part 23 are spaced from the base part 23 by a distance which corresponds to the depth of an opening 40 (see figure 3) made in the side of the door D that faces towards the frame. The distance between the base part 23 and the mutually facing sides of the tongues 28 is such as to enable the tongue 12 of the frame part to be accommodated therebetween.

[0022] The eccentric device is described below with reference to figures 1, 4a, 4b and 5a. The eccentric device 30 includes an eccentric part 31, with a first pin or peg 32 (See figure 1) and a second pin or peg 33. The two pegs 32, 33 project out axially on each side of the eccentric part. The eccentric part also includes a number of eccentrically disposed planar casing surface 31a-31e. The planar surface 31a is located at a smallest distance from the rotational axle of the eccentric device, said axle extending axially and centrally through the two pegs 32, 33. The casing surface 31e is located at a largest distance from the rotational axle. In the illustrated case, respective casing surfaces are disposed at a larger distance by 1mm from the rotational axle than the preceding casing surface starting from the innermost casing surface 31a and ending with the outermost casing surface 31e.

[0023] The first peg 32 is rotatably mounted in a through-penetrating hole 29 in the base part 23 intended for this purpose (see figure 1). The free end of the second peg 33 of the eccentric device includes a planar support surface 33a which is disposed parallel with and in the same plane as the sides of the support parts 25 and the insert tongues 28 that face away from the base part 23. The eccentric device 30 is also supported against the bottom of the opening 40 through the planar surface 33b of the second peg 23 when the door part of the hinge is fitted to the door. The second peg 33 also includes two radial abutment surfaces 33b, 33c.

[0024] As will be seen from figure 5a, the upper support part 25 includes a fastening lug 35. The fastening lug 35 extends on a level with the side of the support part that faces away from the base part 23 generally in a direction towards the eccentric device 30. The free end of the fastening lug is disposed at a distance from the rotational axle of the eccentric device so that the first peg 32 of the eccentric device 30 can be moved axially into the hole 29 in the base part 23 without being impeded by the fastening lug 35 when the casing segment 31a located at said smallest distance from the axis of the eccentric device 30 is turned in a direction towards the fastening lug 35. When the eccentric device is placed on the base part 23 in this way and the first peg 32 is placed in the hole 29, the eccentric device can be turned so that the part of the eccentric part 34 which lies radially inwards of the

casing segments 34b-e located at a greater distance from the axis of the eccentric device is accommodated between the base part 23 and the fastening lug 35.

[0025] The distance between the mutually facing sides of the base part 23 and the fastening lug 35 is adapted to conform to the axial thickness of the eccentric part 31, so that the eccentric part 31 will be held secured between the fastening lug 35 and the base part 23 with a certain degree of bias. This bias, however, is not sufficiently great to prevent the eccentric device 30 from being easily rotated with the aid of a screw driver for instance inserted in a groove 32a provided in the free end of the first peg 32.

[0026] The door part 20 of the hinge can be readily manufactured in a cost saving fashion. There is first punched from a steel sheet or some corresponding material a blank whose contours and hole-configuration correspond to the finish bent plate 21. The insert stop 24 of the door part of the hinge is then bent together with support parts 25 with the insert lugs 28 and the fastening lug 35 to the shape illustrated in the figures. The eccentric device 30 cut from a steel blank can then be readily fitted, as described above. When fitting the eccentric device 30, the device will be held securely in place on the door part 20 of the hinge during transportation, storage and mounting of the door part on a door, owing to the bias exerted by the fastening lug.

[0027] The frame art 10 of the hinge is fitted to the frame with the aid of mounting screws inserted through the mounting holes 15 on the frame part of the hinge.

The door part 20 of the hinge is fitted to the door by first placing said door part in a hole 40 in the door so that the supportive parts 25, the insert lugs 28 and the supportive surface 33a on the second peg 33 of the eccentric device 30 will be supported by the bottom surface of the hole.

The door part of the hinge is then fastened to the door by screwing mounting screws in counter-sunk holes in the base part 21, said screws being accommodated in mounting holes 27 in the door part of the hinge. The respective frame part and door part of the hinge can either be mounted at the place where the door shall be fitted or in a factory. One advantage afforded by the inventive hinge is that fitting of the hinge components can be completed in a factory and the door and the frame then transported separately to their place of assembly, where the door can be readily hung on the frame. This avoids the requirement of storing, transporting or fitting loose hinge components.

[0028] This obviates the need to store, transport or fit loose hinge components from the time of manufacturing said components to the time of fitting the door to the frame.

[0029] When the door is to be fitted to the frame, the door part 20 of the hinge is presented to the frame part such that the tongue 12 on the frame part will be accommodated between the base part 23 and the insert tongues 28. When the tongue 12 on the frame part of the hinge is fully inserted the free end of the tongue will abut the insert stop 24. The eccentric device 20 is normally posi-

tioned in the factory so that the next innermost casing surface 31b will abut the upper side of the tongue 12 on the frame part, as shown in figure 4a. The door is held temporarily in place in this state by virtue of the weight of the door and the friction between the eccentric device 30 and the tongue 12 of the frame part, therewith enabling height and lateral adjustments to be made.

[0030] A height adjustment can be made, for instance, by inserting the blade of a screwdriver in the groove 32a on the first peg 32 of the eccentric device 30 and rotating said device. When the eccentric device is rotated one step in a counter clockwise direction from the position shown in figure 4 (clockwise in figure 1) the innermost casing surface 31a will lie against the tongue 12 of the frame part, causing the door to be lowered by 1 mm. If the eccentric device 30 is instead rotated clockwise from the position shown in figure 4a (counter clockwise in figure 1) the door will be raised stepwise by 1 mm in each step as the casing surfaces 31 c, 31 d and 31e sequentially come into abutment with the tongue 12 of the frame part. In the case of the illustrated example a height adjustment of -1 to +3 mm can be achieved from the normal position shown in figure 4a.

[0031] When the eccentric device has been rotated to a maximum height position in which the casing surface 31 e lies against the tongue 12 of the frame part, the first abutment 33b of the second peg 33 will lie in abutment with the free end of the fastening lug 35. The eccentric device 30 is therewith prevented from being rotated from the highest setting to the lowest setting directly, such direct movement otherwise causing damage to the hinge, to the door and injury to people located in the vicinity of the door. When the eccentric device is in its lowest setting position, in which the innermost casing surface 31 lies against the tongue 12 of the frame part, the second abutment 33c of the second peg 33 forms in co-action with the fastening lug 35 a corresponding rotation stopping means which prevents the eccentric device from being rotated directly from the lowermost setting to the highest setting. This provides a distinct end position that counteracts attempts made by persons carrying out positional adjustments to rotate the eccentric device directly from the lowermost to the highest setting, which would otherwise require application of a significant torque that would be liable to cause damage to the tool used in the adjustment or to the groove 32a.

[0032] Lateral adjustment to the door is achieved by turning the setting screws 18, whose free ends support against the insert tongues 28, until the base part 23 of the door-part of the hinge is at a desired angle relative to the tongue 12 of the frame part of the hinge. As indicated in figure 2, an aperture that corresponds to the shape of the insert tongue 28 can be made in the tongue 12 of the frame part around the mouth of the threaded holes that receive the lateral adjustment screws 18, in order to obtain a greater lateral adjustment range.

[0033] When height and lateral adjustments have been completed, the tongue 12 of the frame part of the hinge

is secured to the door D, by inserting mounting screws in through the access holes 26 and fastening the screws in the door such that the heads of the screws will lie against and be accommodated in the counter sinks of the mounting holes 17 in the tongue 12 of the frame part. This will result in further fixation of the door part 20 to the door, since the lateral adjustment screws press the insert lugs 28, and therewith the door part 20, against the bottom of the aperture 40.

[0034] Although the invention has been described with reference to an exemplifying embodiment of the invention, it will be understood that the invention can be varied within the scope of the accompanying claims. For example, the eccentric device may comprise a continuous eccentric casing surface instead of comprising a number of planar casing surfaces. Such a design will allow a totally smooth height adjustment to be carried out but will not afford the beneficial self-locking of the height setting described above. As indicated in figure 1, a height adjustment marking may be provided on the first peg 32 of the eccentric device so as to indicate a set position. If desired, this marking can be supplemented with corresponding position markings on the visible side of the door part 20 of the hinge, around the hole 29. These markings may conveniently show the relative height positions for the abutment of different casing surfaces with the tongue of the frame part of the hinge, i.e. -1,0,+1,+2,+3 for instance.

Claims

1. A hinge comprising a frame part (10) which is intended to be fastened to a frame or the like, and a door part (20) which is intended to be fastened to a door leaf (D) or the like, wherein the frame part includes a frame leaf (11) and a tongue (12) which is connected to the frame leaf by means of a hinge axle, and wherein the door part of the hinge comprises a bent or folded metal sheet (21) which is formed so as to accommodate the tongue on said frame part, and an eccentric device (30) for the height adjustment of the door part relative to the tongue of the frame part, **characterized in that** the eccentric device includes an eccentric part (31) and a first peg (32) which projects out axially from the eccentric parts and which is accommodated in a through-penetrating opening (29) in a base part (23) of the bent metal sheet; and **in that** the bent metal sheet includes a first lug (35) which when in abutment with the side of the eccentric part opposite the first peg prevents the first peg from exiting from the opening.
2. A hinge according to claim 1 wherein the eccentric device (30) includes a second peg (33) which projects out axially from the side of the eccentric part (31) opposite the first peg (32) and which includes an abutment surface (33) which when in abutment

with the first lug (35) defines a terminal position for rotation of the eccentric device.

3. A hinge according to claim 1 or 2 wherein the eccentric part (31) includes a number of eccentrically disposed flat casing segments (31a, 31b, 31c, 31d, 31e) for abutment with the tongue (12) of the frame part. 5
4. A hinge according to claim 3, wherein at least one of the casing segments (31a) is disposed at a distance from the axis of the eccentric device such that in relation to the length of the first lug (35) the first peg (32) of the eccentric device can be inserted into the through-penetrating opening (29) and thereafter be rotated so that the eccentric part will be accommodated between the first lug and the base part (23) of the bent metal sheet. 10
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5. A hinge according to any one of claims 1-3, wherein the bent metal sheet (21) includes at least one second lug (28) which accommodates the tongue (12) of the frame part between itself and the base part (23), and forms a stop for an adjustment screw (18) screwed in the tongue of the frame part so as to allow lateral adjustment of the door. 20
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6. A hinge according to claim 5, wherein the bent metal sheet (21) includes two mutually opposing second lugs (18). 30

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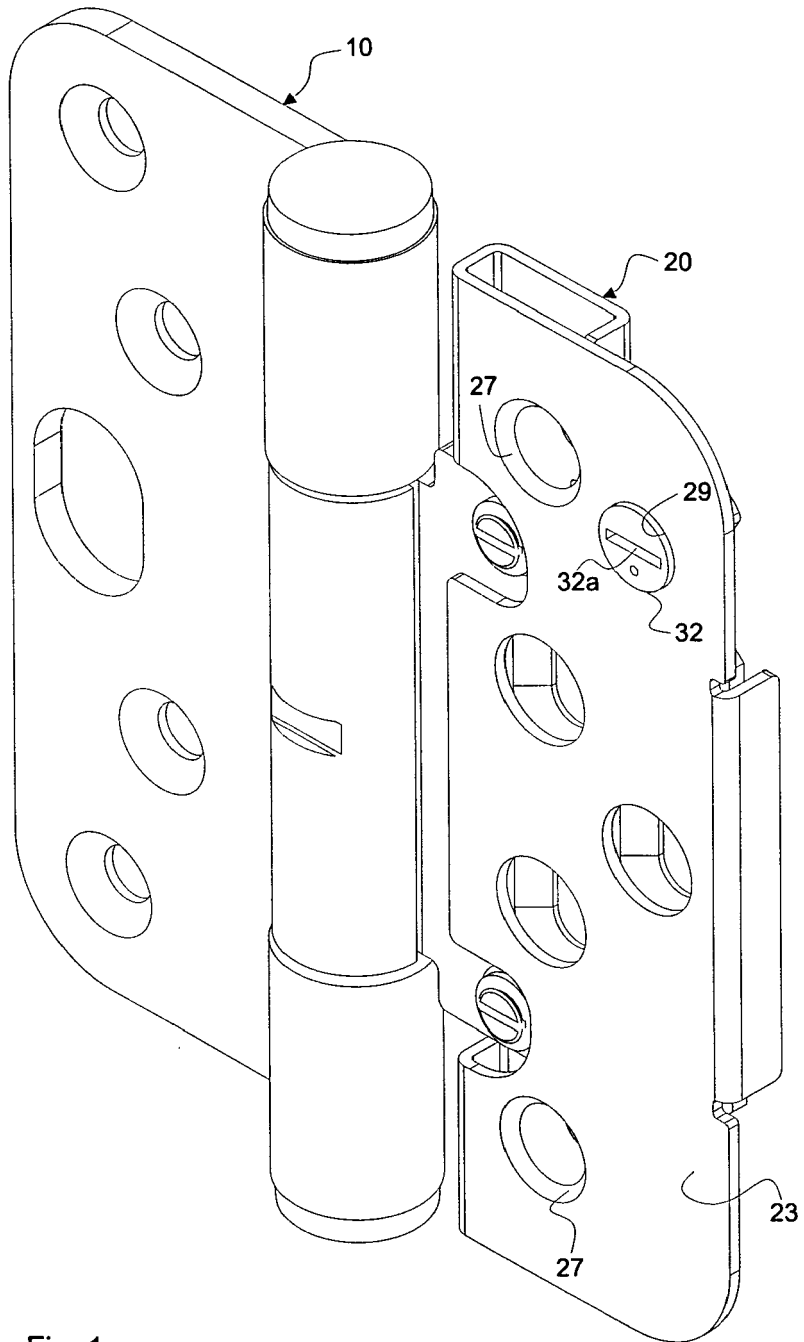


Fig. 1

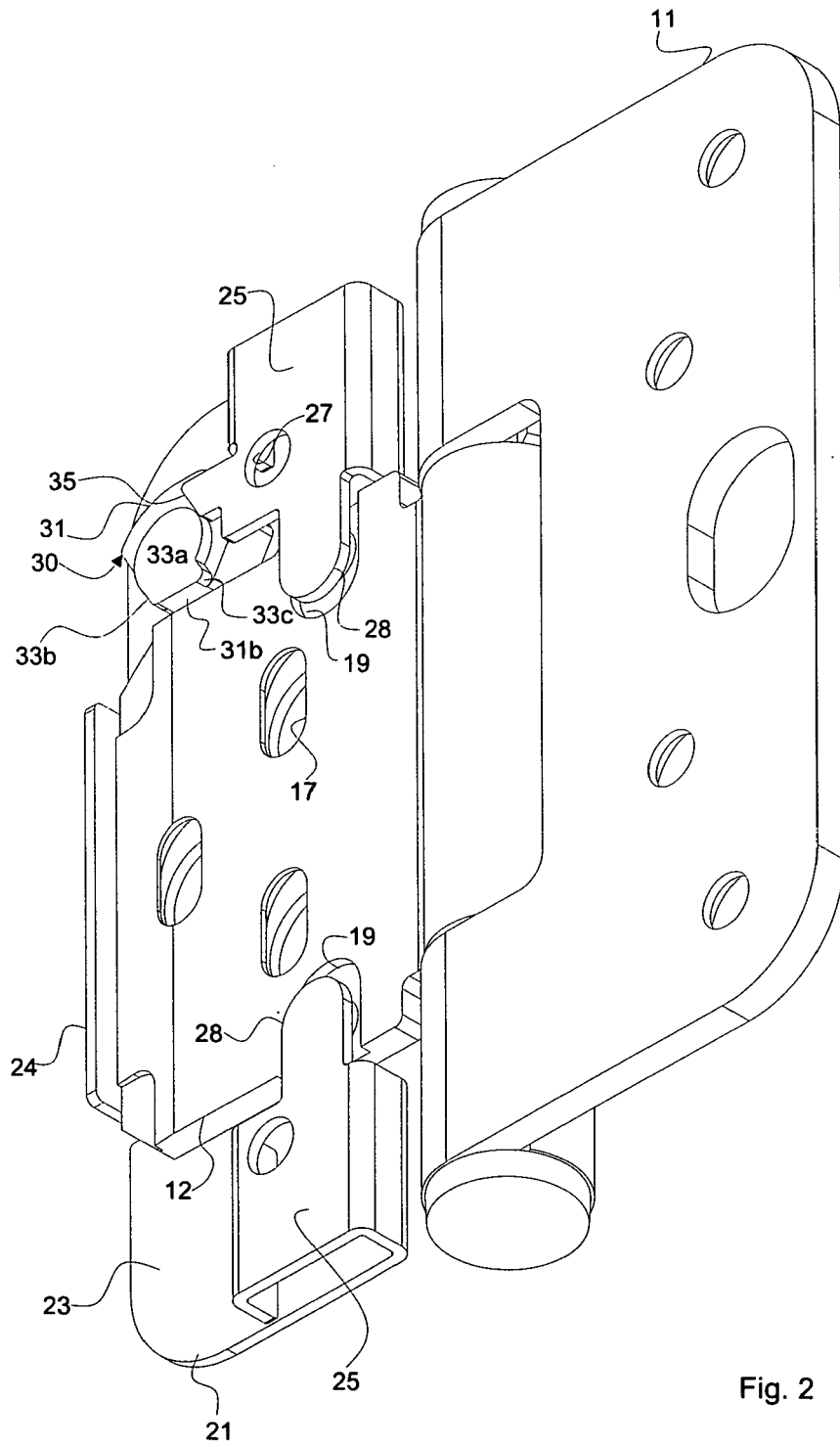


Fig. 2

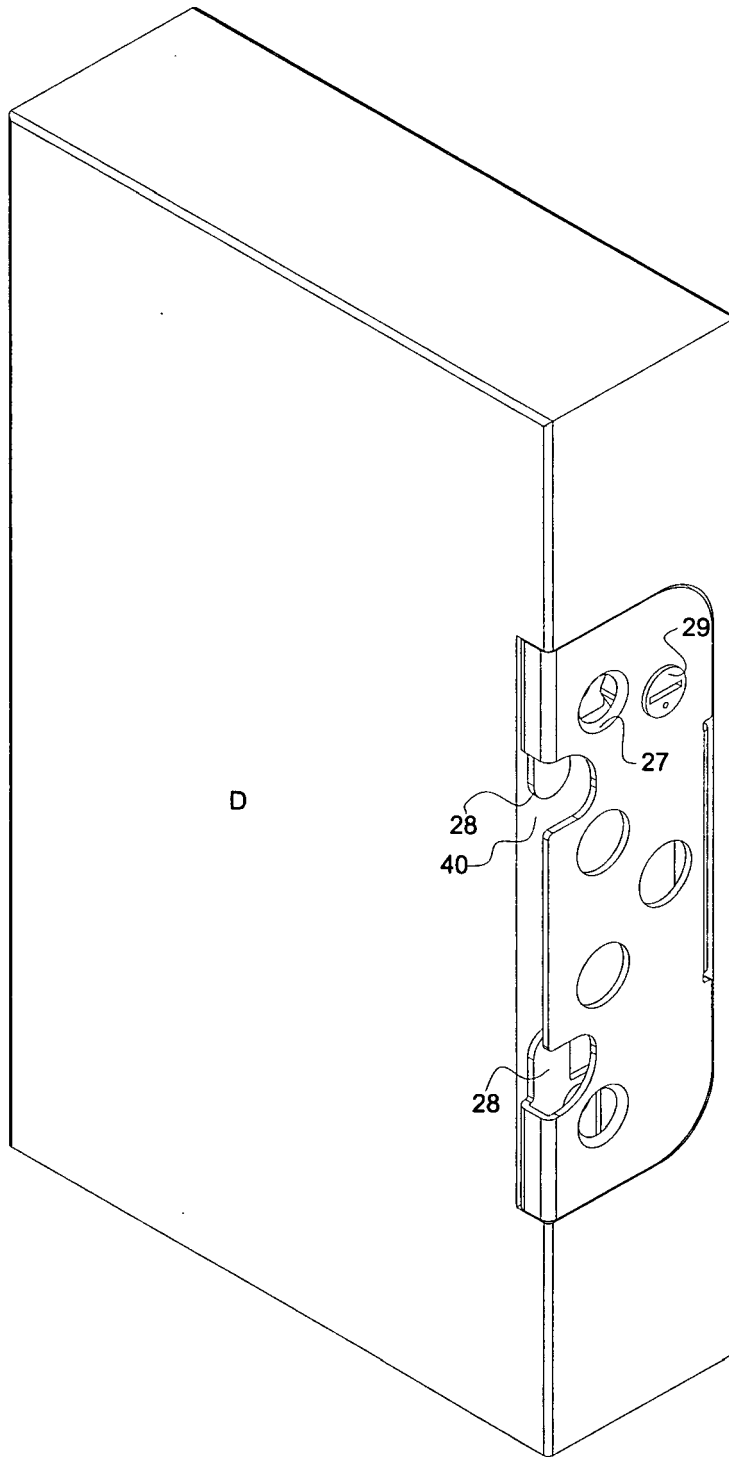


Fig. 3

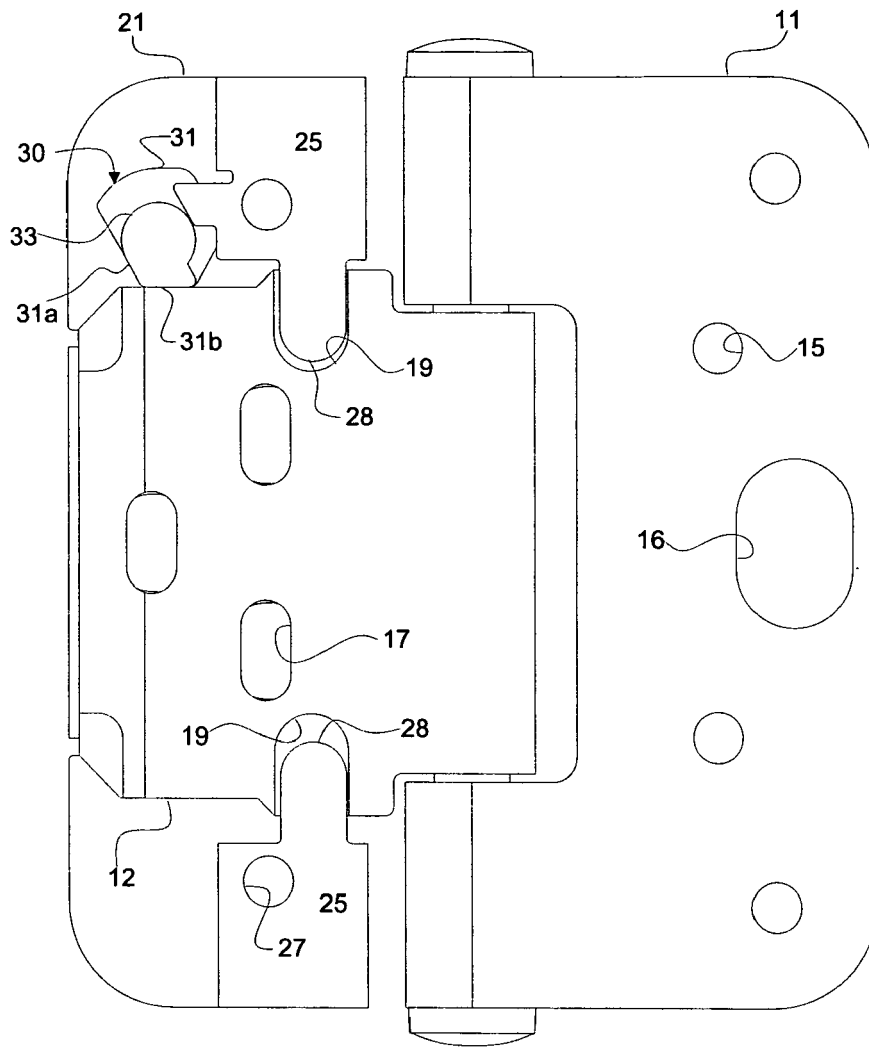


Fig. 4a

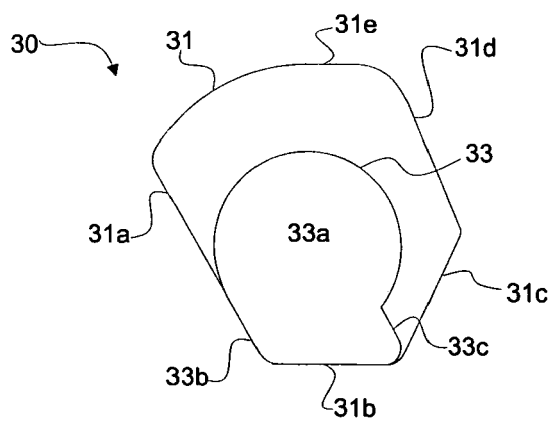


Fig. 4b

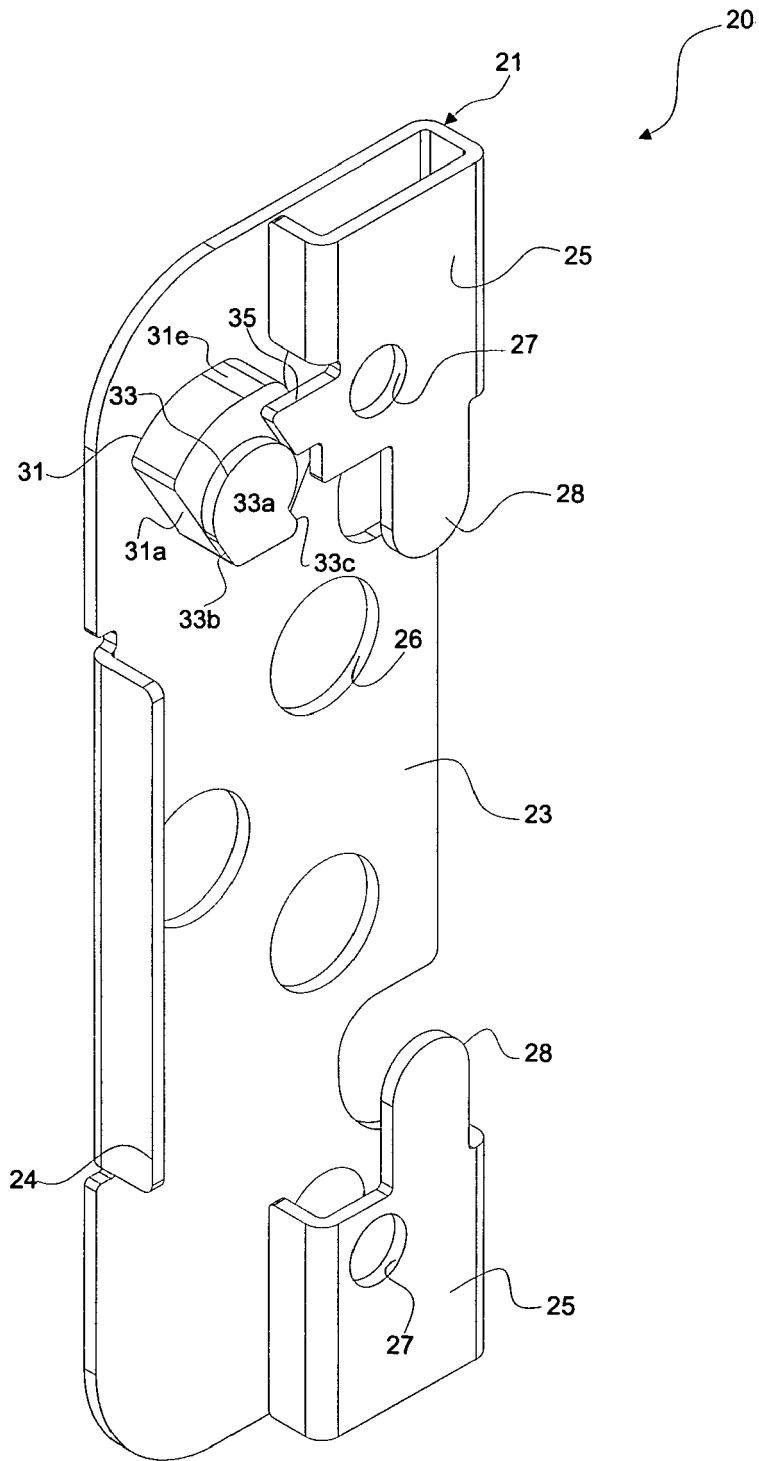


Fig. 5a

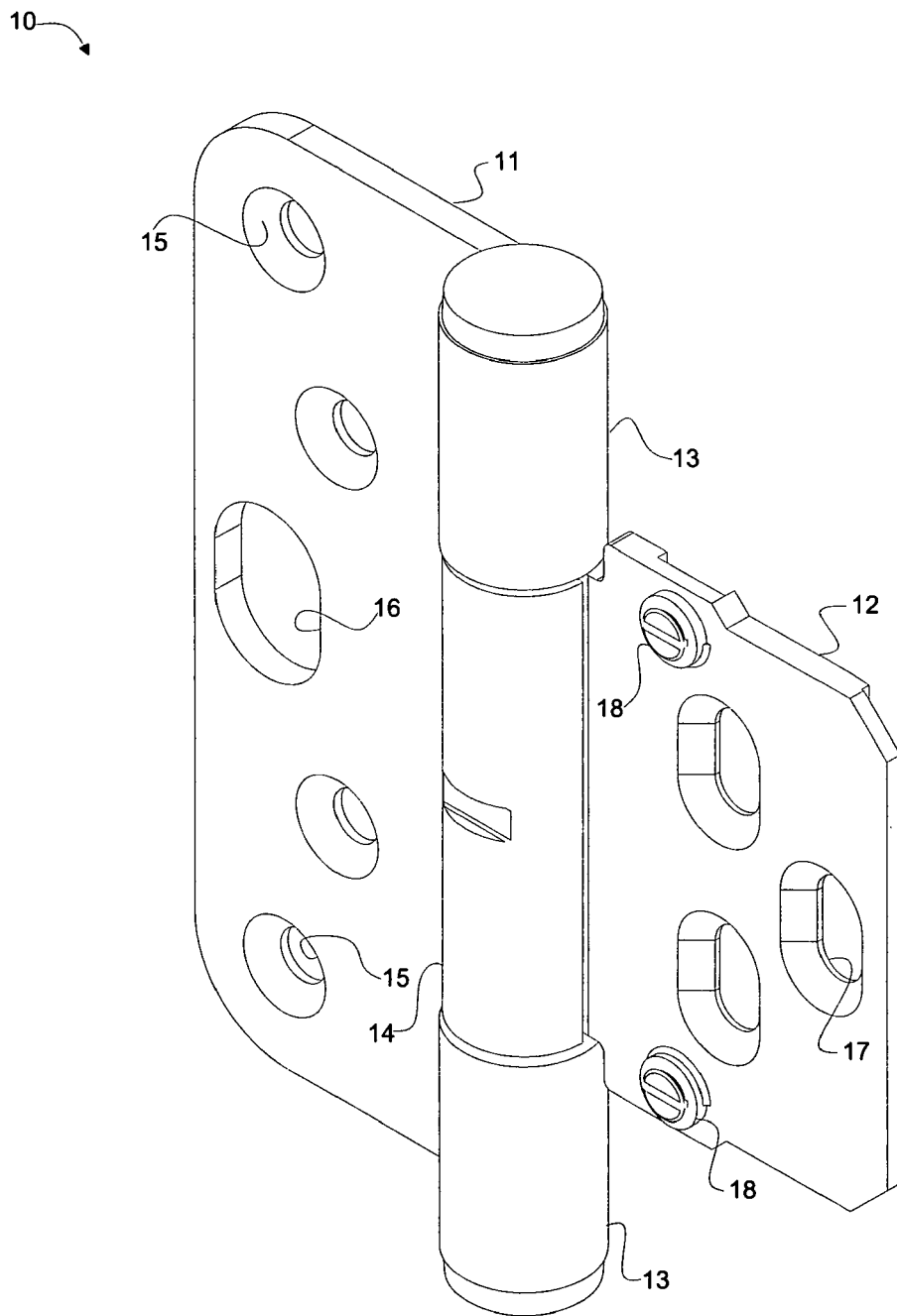


fig. 5b

REFERENCES CITED IN THE DESCRIPTION

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