



(11) Publication number : **0 504 115 A1**

(12) **EUROPEAN PATENT APPLICATION**

(21) Application number : **92830037.5**

(51) Int. Cl.⁵ : **E05D 5/02**

(22) Date of filing : **30.01.92**

Amended claims in accordance with Rule 86 (2) EPC.

(30) Priority : **12.03.91 IT 7091**

(43) Date of publication of application :
16.09.92 Bulletin 92/38

(84) Designated Contracting States :
DE ES FR GR PT

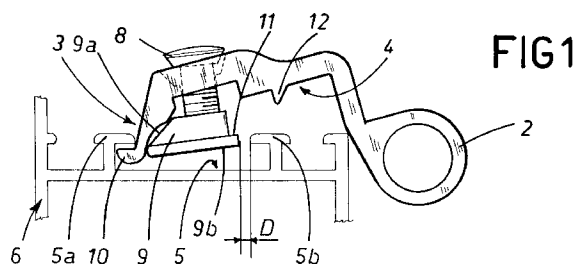
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(54) **A hinge for metal door and window fixtures.**

(57) Each component (2) of the hinge comprises a flange portion (1) of which one longitudinal edge (3) affords a coved internal profile, positioned to accommodate the angled surface (9a) of a clamp plate (9) in such a manner that the plate itself can be seated loosely in the anchor channel (5) of the relative frame section (6) when the flange portion is positioned initially by hooking a flat appendage (10) under one fin (5a) of the channel ; screws (8) are then tightened to draw the plate (9) upwards, forcing the coved internal surface of the flange portion and the angled surface of the plate into sliding contact and causing the longitudinal face (9b) of the plate (9) opposite from the angled surface to engage positively with the remaining fin (5b) of the channel, thus securing the hinge (2) to the frame.



The present invention relates to a hinge for metal door and window fixtures.

Among the more pressing problems encountered by installers of metal door and window fixtures are those connected with the fitment of hardware and furniture in general, and hinges in particular; the typical hinge comprises two halves, one associated with the moving sash frame and the other with the fixed surround frame.

The traditional fixing system envisages the use of self-tapping screws driven into the upright members of the relative frame; this fixing solution betrays the drawback of being somewhat insecure, however, given the trend toward ever thinner metal sections, and the difficulty of correcting any initial errors made in positioning the hinge.

In due course, improved systems have appeared based on the use of clamp plates drawn up from underneath with screws so as to lock against the profiles of an anchor channel now afforded by all modern metal door and window frame sections.

The fitment of hardware incorporating this system is effected by inserting the plate from one end of the relative channel; in the case of a sash frame, fitment is possible even with the frame already assembled, as the channel is directed outward from an external face of the sash and thus open-ended.

In the case of the fixed surround frame, on the other hand, the plates must necessarily be inserted prior to assembly, and this operation is often the source of difficulties. In effect, it can happen that an installer overlooks the clamp plate when assembling the fixed frame, and to avoid prolonging the installation by dismantling the assembled parts (which may be totally impractical), will generally proceed to cut away a part of the channel profile so that the plate can be admitted. Neither is this expedient without drawbacks, however, since there is no absolute guarantee that the plate will remain anchored transversely in the channel; in practice, the channel in question is moulded to dimensional tolerances which vary from one manufacturer to another, with the result that the plates (generally made to standard sizes) may be suitable for some metal sections and less so for others.

Another fixing system utilizes grub screws inserted at an angle through the flange of the hinge, which impinge directly on one of the internal surfaces of the channel. Whilst simple and effective, such a system is unable to ensure an accurate and stable position following the initial assembly operation, since further adjustments, however fine, tend to be upset by the tendency of the screw point to find its way back to the first indentation, due to the very geometry of the screw itself.

Accordingly, the object of the present invention is to overcome the drawbacks mentioned above, through the embodiment of a hinge for metal door and window fixtures which is structured in such a way as

to allow of being fitted before or after assembly of the fixture, and affords features of stability and precision post-assembly.

The stated object is fully realized in a hinge as characterized by the appended claims, of which the flange portion exhibits one longitudinal edge with a coved internal profile directed toward the angled surface of a clamp plate, such that when the flange is offered initially to a given metal section, the plate can be accommodated loosely within an anchor channel afforded by the section, and thereafter, translated as the result of a cam action generated when screws are tightened to bring the respective surfaces of the flange and the plate into frontal contact, such that the longitudinal edge of the plate located farthest from the angled surface is brought into stable engagement with a corresponding profile of the metal section and the flange portion thus locked permanently to the section.

The invention will now be described in detail, by way of example, with the aid of the accompanying drawings, in which:

- fig 1 shows the hinge according to the invention in plan from above, with certain parts omitted better to reveal others, viewed in a first position assumed during fitment to a section forming part of a metal door or window fixture;
- fig 2 shows the hinge of fig 1, in plan from above and with certain parts omitted better to reveal others, viewed in a second position assumed during fitment to the metal section;
- fig 3 shows the hinge of fig 1, in plan from above and with certain parts omitted better to reveal others, stably associated with the metal section;
- fig 4 shows the hinge of figs 1 to 3 in a frontal elevation.

As shown in the accompanying drawings, a hinge for metal door and window fixtures is fitted to metal sections 6 affording at least one anchor channel 5 consisting in a pair of parallel fins 5a and 5b moulded with respective lips projecting one toward the other.

Each component of the hinge 2, which can be fitted either to the fixed surround frame or the moving sash frame, comprises a base or flange portion 1 of which the longitudinal edges 3 and 4 are shaped in such a way that the first edge 3 can be inserted frontally and positively under one fin 5a of the pair, and the second edge 4 offered in simple frontal contact to the lip of the remaining fin 5b; thus, the flange portion 1 is insertable sideways into and restrainable slidably in the channel 5.

The flange portion 1 further comprises a plurality of sockets 7 affording passage to relative screws 8 of which the ends are associated with a plate 9 serving to clamp the flange portion 1 to the metal section 6; a substantially trapezoid profile allows the plate 9 to be positioned by sideways insertion between the flange portion 1 and the channel 5 and thereupon to be secured by rotating the screws 8 in such a way as causes

one of the angled surfaces 9a of the trapezoid to slide against and across a matching cam-profiled surface offered by the first longitudinal edge 3 of the flange portion 1.

In the example illustrated, the first longitudinal edge 3 of the flange portion 1 is embodied with a flat appendage 10 insertable frontally and stably under the respective fin 5a, and a substantially coved profile directed toward a respective surface of the plate 9.

More exactly, the coved profile of the longitudinal edge 3 in question is divided substantially into three successive sectors merged with no break in continuity: a first 3a, at bottom, horizontally disposed and coinciding in practice with the flat appendage 10; a second 3b, intermediate and concave in profile, which coincides with the part of the cove directed toward and accommodating the angled surface 9a of the plate 9; and a third sector 3c uppermost which is straight and angled in such a manner as to function as a cam by interacting with the angled surface 9a of the plate (as will become clear in due course).

The longitudinal edge 4 offered to the parallel fin denoted 5b, i.e. farthest from that engaged by the flat appendage 10, affords a vertically disposed bead 12 extending the full length of the flange portion 1 and functioning as an external restraint, positioned against the fin 5b adjacent to the point where the flange portion 1 meets the section 6. Similarly, the face 9b of the plate 9 farthest from the angled surface 9a is undercut longitudinally in such a manner as to afford a discernible lip 11 directed toward and positioned to enter into stable contact with the underside of the lip afforded by the relative parallel fin 5b. Thus, the bead 12 and the lip 11 combine to produce a clamping action on the fin 5b from either side when the flange portion is fastened to the section 6.

Fitment of the hinge 2 thus embodied will now be described.

The flange portion 1 is inserted frontally into the channel 5 by hooking the flat appendage 10 under the corresponding fin 5a; in this initial position, shown in fig 1, the plate 9 is retained only in a loose association with the screws 8, and thus sits freely with the angled surface 9a offered to the coved longitudinal edge 3 of the flange portion 1, a freedom allowed not least by the ability of the screws 8, accommodated loosely in the sockets 7, to lean in one direction or the other.

Positioned thus in frontal contact with the coved surface 3, the plate 9 is disposed at a distance D from the fin denoted 5b whereby the flange portion 1 can be rested on the fin 5b without interference from the plate (as shown in fig 2). Clearly, with the flange portion 1 flush against the section 6, the plate 9 settles into its natural position, i.e. orthogonal to the flange portion; thereafter, it becomes possible to select the exact position of the hinge 2 on the section 6 by sliding the flange portion 1 along the channel 5. This accomplished, the hinge is clamped to the section 6 by tight-

ening the screws 8, thus drawing the plate 9 upwards and causing the angled surface 9a to enter into contact with the corresponding angled surface 3c afforded by the longitudinal edge 3 of the flange portion 1; the cam action produced in this manner between the two angled surfaces has the effect of driving the plate 9 toward the fin 5b opposite, and causing the lip 11 to enter into full positive engagement with the lip of the fin (as in fig 3), thereby locking the flange portion 1 to the section 6.

The advantages of a hinge embodied according to the invention are numerous: in particular, the concave profile of one of the longitudinal edges of the flange portion allows the hinge to be positioned even following assembly of the relative frame; the lip afforded by the plate and the bead afforded by the flange portion combine to lock the hinge safely and stably to the relative section when the screws are tightened. Moreover, the compact design of the entire flange portion and the plate is instrumental in achieving notable long term durability, compared to solutions afforded by the prior art.

Claims

1) Fittings, particularly for metal fixtures hinge, fixtures for door or window constructed from metal section (6) exhibiting at least one anchor channel (5) encompassed laterally by a pair of parallel fins (5a, 5b) affording lips projecting one toward the other, each component (2) of such a hinge comprising:

- a base or flange portion (1) affording a plurality of sockets (7) to receive respective screws (8), of which a first longitudinal edge (3) is insertable frontally under one of the parallel fins (5a, 5b) and a second longitudinal edge (4) simply offered in frontal contact to the other fin (5b, 5a), such that the flange portion is laterally insertable into and slidably retainable in the channel (5);
- at least one clamp plate (9) of substantially trapezoid profile, associated with the flange portion (1) by way of the screws (8) and serving to secure the flange portion (1) to the section (6), which is interposed between the flange portion (1) and the channel (5) and translated by tightening the screws in such a way as to occasion sliding contact between an angled surface (9a) of the trapezoid profile and a corresponding cam surface afforded by the first longitudinal edge (3) of the flange portion,

characterized

in that the first longitudinal edge (3) affords a coved internal profile substantially facing the angled surface (9a) of the clamp plate (9) in such a way that the plate can be accommodated initially to a loose fit in the channel (5) when the first longitudinal edge (3) of the flange portion (1) is inserted frontally under one par-

allel fin (5a), and translated thereafter by the cam action brought about between the corresponding surfaces of the longitudinal edge (3) and the plate (9) when the screws (8) are tightened, with the result that at least one longitudinal face (9b) of the plate (9) remote from the angled surface (9a) is brought into stable contact with the remaining parallel fin (5b) and the flange portion (1) thus locked permanently to the section (6).

2) Fittings as in claim 1, wherein the longitudinal face (9b) of the plate (9) positioned to enter into stable contact with the fin (5b) farthest from that engaged by the first longitudinal edge (3) of the flange portion (1) is embodied with a longitudinal undercut establishing a discernible lip (11) placed to engage the underside of the lip afforded by the fin (5b).

3) Fitting as in claim 1, wherein the flange portion affords a vertically disposed bead (12) projecting from the second longitudinal edge (4), extending the full length of the flange portion (1) and functioning as an external restraint positioned to engage the respective fin (5b) at the point where the flange portion is offered in frontal contact to the section (6).

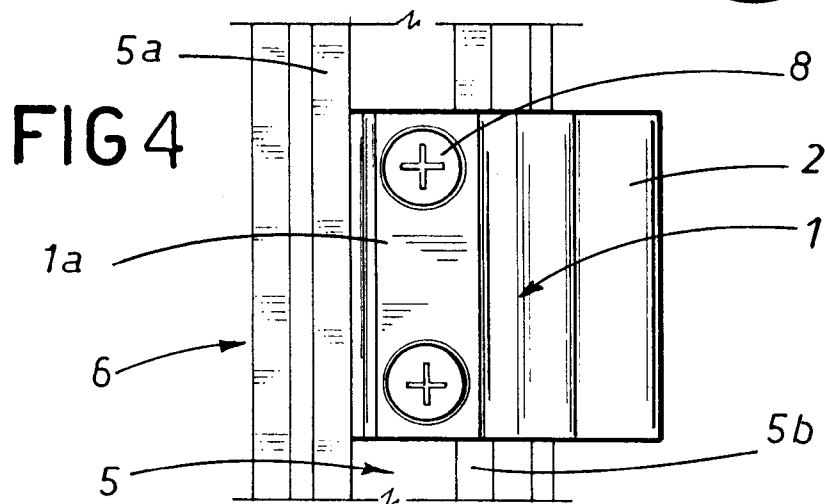
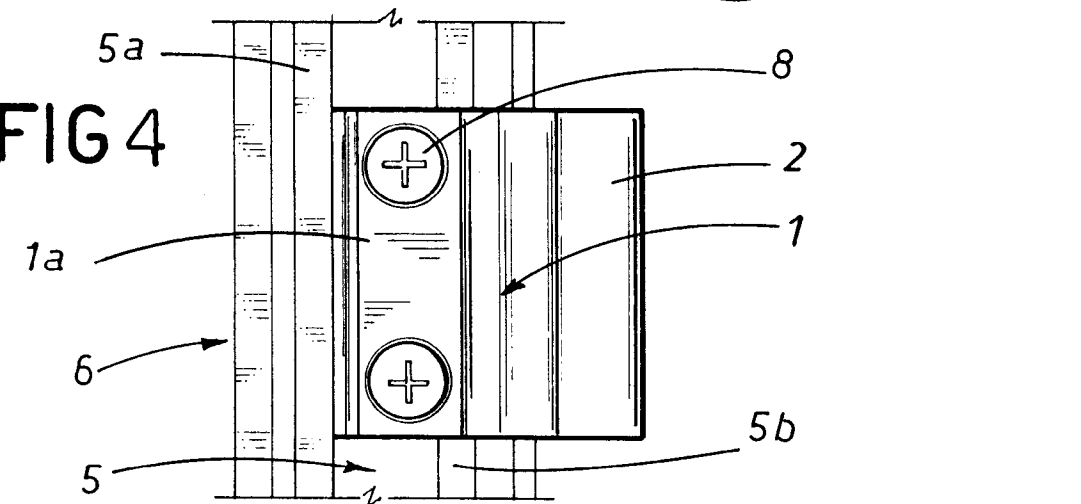
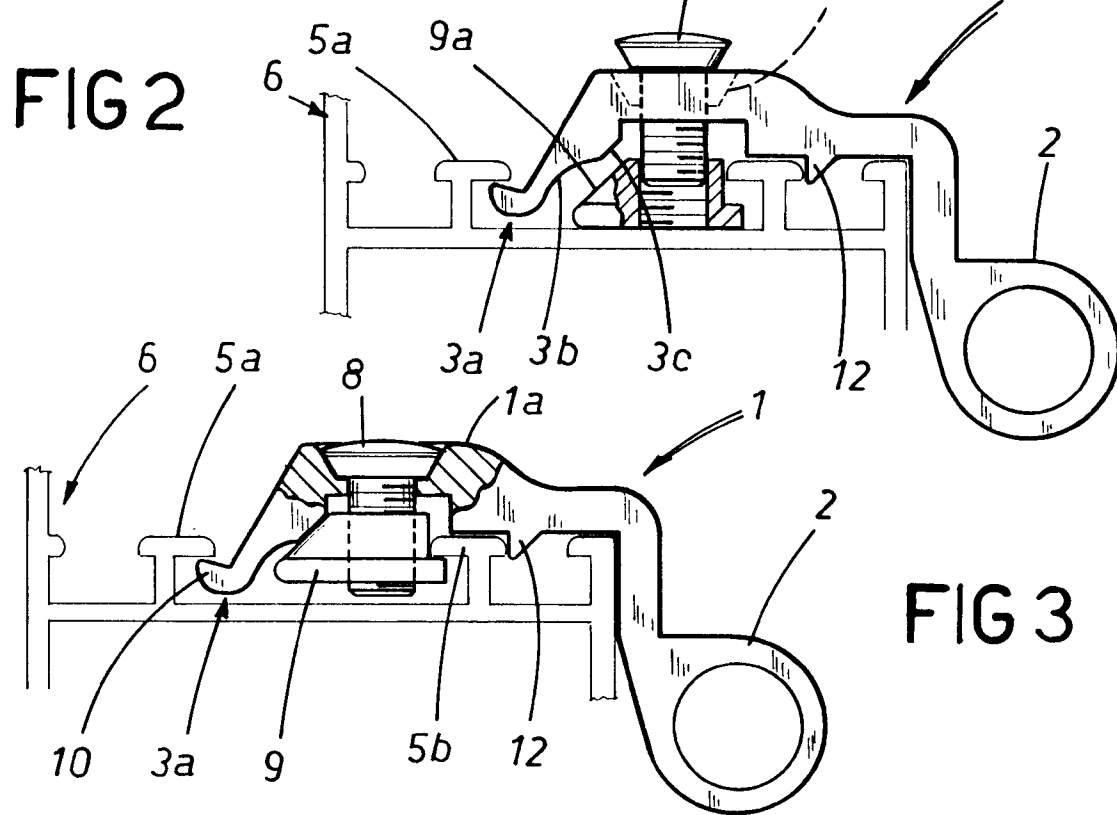
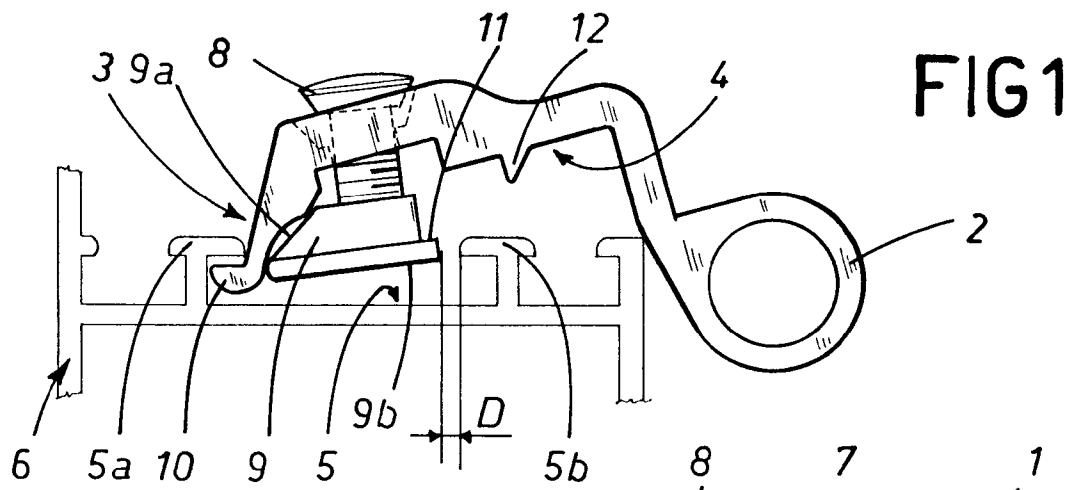
4) Fittings as in claim 1, wherein the coved internal profile of the first longitudinal edge (3) is divided substantially into three successive sectors merged with no break in continuity: a first (3a) at bottom, horizontally disposed and coinciding with a flat appendage (10) insertable under the relative parallel fin (5a), a second (3b), intermediate and concave in profile, coinciding with the part of the coved profile facing the angled surface (9a) of the plate (9), and a third sector (3c) uppermost which is straight and angled in such a way as to interact with the angled surface (9a) of the plate (9) and thus bring about the cam action.

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European Patent
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EUROPEAN SEARCH REPORT

Application Number

EP 92 83 0037

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)
Y	GB-A-1 054 687 (ELTREVA A. G.) * the whole document *	1,2	E05D5/02
Y	CH-A-541 058 (METALLBAU KOLLER AG) * the whole document *	1,2	
A	DE-A-3 626 451 (GEZE GMBH) * column 6, line 4 - line 46; figures 1,2 *	1,2	
			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			E05D
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 25 MAY 1992	Examiner VAN KESSEL J.
CATEGORY OF CITED DOCUMENTS 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 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			

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