(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number : **0 546 800 A1**

(12) EUROPEAN PATENT APPLICATION

(21) Application number : **92311178.5**

(51) Int. Cl.[5] : **E06B 3/58,** E06B 7/30

(22) Date of filing : **08.12.92**

(30) Priority : **10.12.91 GB 9126155**

(43) Date of publication of application :
16.06.93 Bulletin 93/24

(84) Designated Contracting States :
DE ES FR

(71) Applicant : **PORTAL PRODUCTS LIMITED**
Kingsditch Lane
Cheltenham, Gloucestershire GL51 9BP (GB)

(72) Inventor : **Mason, David**
206 London Road
Cheltenham, Gloucestershire GL52 6HJ (GB)

(74) Representative : **Carter, Gerald et al**
Arthur R. Davies & Co. 27 Imperial Square
Cheltenham, Gloucestershire GL50 1RQ (GB)

(54) Clamping device.

(57) A clamping device (10) for securing two glazing beads (11, 12) to opposite faces of a door panel (13) comprises a carrier (20) which lies within the thickness of the panel, and a locking element (22) mounted on the carrier for rotation relatively thereto about an axis extending across the thickness of the panel. The locking element (22) has on each of its opposite ends a cam member (28, 29) which projects beyond the carrier and engages in a slot (18) in a respective glazing bead. Rotation of the locking element (22) by a suitable tool causes the cam members to draw the glazing beads firmly into engagement with the door panel.

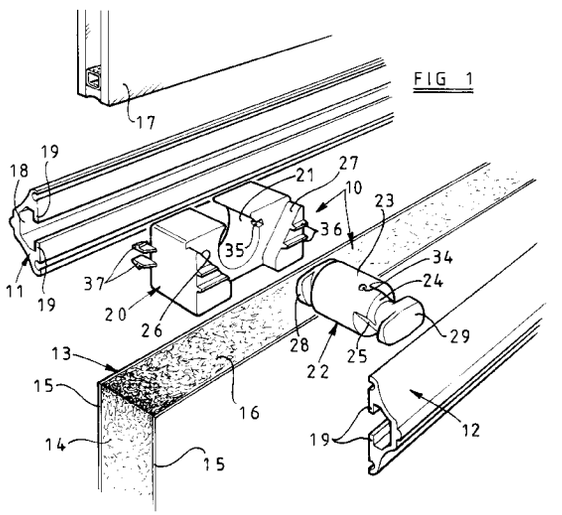

FIG 1

EP 0 546 800 A1

The invention relates to a clamping device for securing two elements to opposite faces of a panel. The device is particularly suitable for clamping glazing beads around a glazed aperture in a door panel, and an embodiment of this type will be specifically described. However, it will be appreciated that a device according to the invention is also of wider application and may be used in many other circumstances where it is required to secure elements to opposite faces of a panel.

In one common form of glazed door, the door panel is formed with a rectangular aperture to receive a pane of glass or a double-glazed unit. In order to keep the glazing panel in position, and to provide a decorative finish, a frame of beading is secured to each side of the panel, around and slightly overlapping the aperture, each length of beading usually being mitred at the corners.

In traditional forms of manufacture, where the door panel and beading are formed from wood, the beads have usually been nailed and/or glued in position. In more modern forms of construction, however, the door panel may be formed from a wood/plastics composition material faced with sheets of aluminium or plastics, and the beading may comprise extruded sections of aluminium or plastics. With such forms of construction the use of nails and/or adhesive is not suitable and a concealed form of securing device is required to attach the beading to the door panel. Clamping devices according to the present invention are particularly suitable for this purpose.

In one known form of clamping device for securing two extruded beading sections to opposite sides of a panel, the device comprises a plastics block which is nailed to an edge of the panel facing into the glazing aperture and has projections which extend into generally T-shaped longitudinal grooves in the extruded aluminium glazing beads. Screwed into each side of the block is a generally T-shaped metal catch element, and each catch element may be separately screwed into or out of the block by means of a spanner. With the cross-bar of each catch element parallel to the groove in the bead it may be entered into the groove, and once in the groove the element is rotated by the spanner. As rotation is continued the catch element is screwed further into the block and thus draws the bead towards the panel.

However, such arrangements suffer from disadvantages. Due to the inaccessibility of the catch elements, it is an awkward and time-consuming business to rotate each catch element through the number of whole rotations necessary to ensure that the bead is tightly clamped to the surface of the panel. Each time the element rotates through a position where its cross-bar is parallel to the groove in the bead it is, in effect, out of engagement with the bead and only comes back into engagement as the cross-bar is rotated to a position at right angles to the groove. During this part of the movement the cross-bar has an increasing tendency to foul the edges of the groove and to cause deformation of the aluminium. It is therefore necessary for each catch element to be made of sufficiently hard metal to ensure that the element itself does not deform and become ineffective. It can also be difficult to ascertain that, when the operation is completed, the cross-bar is in its most secure position, namely at right angles to the groove in the bead. The operation has to be repeated for each of the two opposed beads.

The present invention provides an improved form of clamping device which, when used for a similar purpose to that just described, simply and easily clamps two opposed glazing beads simultaneously to the door panel by one quick and convenient operation.

According to the invention there is provided a clamping device for securing two elements to opposite faces of a panel comprising a carrier which, in use, lies wholly or mainly within the thickness of the panel, and two cam members projecting from opposite sides respectively of the carrier and mounted for rotation relatively thereto about an axis which, in use, extends across the thickness of the panel, each cam member having a cam surface facing the carrier, whereby an element engaged by said cam surface will be urged towards the carrier by rotation of the cam member in one direction, means being provided for rotation of the cam members.

Each cam member preferably comprises an enlarged head portion carried on the end of a narrower neck portion extending axially away from the carrier, said cam surface being formed on the part of the head portion facing the carrier. The head portion of each cam member may be generally oblong, the width thereof, as viewed axially, being substantially the same as the diameter of the neck portion. Each cam surface may comprise a generally part-helical surface extending around the axis of rotation of the cam member.

In a preferred embodiment the cam members are provided on the opposite ends of a single locking element rotatably mounted on the carrier, whereby rotation of the single locking element effects simultaneous rotation of both cam members.

Where a device according to the invention is used for securing glazing beads to a door panel in the general manner described above, rotation of the single locking element serves to clamp both glazing beads simultaneously to the panel. Also, by suitable selection of the shape of the cam surface on each cam member, the arrangement may be such that clamping is achieved by less than one whole rotation of the locking element and, as will be described, the extent of rotation required may be only 90°.

The carrier may be in the form of a housing having a cylindrical, or part-cylindrical, bore in which a cylindrical main body part of the locking element is ro-

tatable.

The locking element may include a location device which operates to locate and retain the locking element at a predetermined rotational position, representing the desired limit of its rotation in said one direction. The location device may comprise an inter-engaging projection and recess formation on the locking element and carrier.

The means for effecting rotation of the cam members may comprise a formation on the locking element adapted for engagement by a manipulating tool. The formation may comprise two opposed parallel flats on opposite sides of a part of the locking element which is exposed from said carrier.

The carrier may be formed with abutments to limit the movement of the manipulating tool to a range consistent with the desired range of rotation of said cam members. Said range of rotation may be substantially 90°.

The carrier may be provided with projecting formations for engagement with elements to be secured to the panel, in order to locate said elements prior to operation of the clamping device.

The invention includes within its scope a kit of parts comprising a panel, at least one clamping device of any of the kinds referred to above, and at least two elements to be secured to the panel by the clamping device, said elements being shaped to receive the cam members of the clamping device when the elements are in engagement with opposite faces of the panel, and having surfaces engageable by the cam surfaces on the cam members.

The kit of parts may comprise a door panel formed with a rectangular aperture and two sets of four glazing beads, each set adapted to frame and partly overlap one side of the aperture, and at least four clamping devices of any of the kinds referred to above, each clamping device being adapted to clamp to the door panel a pair of glazing beads on opposite faces of the door panel along one side edge of the aperture in the door panel.

The following is a more detailed description of an embodiment of the invention, by way of example, reference being made to the accompanying drawings in which:

Figure 1 is an exploded perspective view of a clamping device in accordance with the invention and of the door components which it is to clamp together,

Figure 2 is a vertical section through the clamping device and components in an assembled condition, and

Figures 3 and 4 are end views of the clamping device showing respectively the unclamping and clamping positions.

Referring to Figure 1, the clamping device 10 is for clamping two extruded aluminium glazing beads 11 and 12 along opposite sides of one edge of a rectangular glazing aperture in a door panel 13 comprising a central composition core 14 faced with aluminium sheets 15. The edge of the panel facing into the rectangular glazing aperture is indicated at 16 and part of a conventional double glazed unit, for mounting in the aperture, is indicated at 17.

The extruded glazing beads 11 and 12 are each formed with a longitudinal groove 18 which is of generally T-shaped cross section so as to provide spaced opposed flanges 19.

The clamping device comprises a generally rectangular housing 20 formed with a circular cross-section cylindrical bore 21 which is partly open into one face of the housing. The bore 21 receives a rotatable locking element 22. The element 22 comprises a main body part 23, which is a close rotating fit in the bore 21, and a manipulating portion 24 formed with two parallel opposed flats 25 at one end of the main body part. The housing 20 is cut away in the region of the manipulating part 24 to provide two inclined abutment surfaces 26 and 27 disposed at right angles to one another.

As best seen in Figure 2, the overall width of the housing 20 is generally the same as the thickness of the panel 13. The locking element 22 is formed with two cam members 28 and 29 which project beyond the width of the panel 13 and are carried by narrower neck portions 30 and 31 respectively. Each cam member is formed with a generally part-helical cam surface 32, 33 facing the housing 20. Each cam member 29 is generally oblong as viewed in the direction of the axis of the locking member 22, as may be seen from Figures 3 and 4, and the width of each cam member is generally the same as the diameter of the adjacent neck portion.

The main body part 23 of the locking element is formed with a projection 34 which in one rotational position of the locking element snaps into engagement with a recess 35 in the peripheral wall of the bore 21 in the housing 20.

One side of the housing 20 is integrally formed with spaced parallel projecting ridges 36 which are so disposed as to be received between the spaced flanges 19 on the extruded bead 12. The housing 20 is also formed with integrally formed hooked spring clips 37 which are shaped to engage between the flanges 19 on the bead 11 and to snap into engagement behind those flanges.

The housing 20 and locking element 22 may conveniently be moulded from plastics material, but the invention does not exclude arrangements where the clamping device, or any part thereof, is formed from other material, such as metal.

To assemble the components the desired number of clamping devices are assembled together, with the locking elements 22 within the housings 20, and are clipped to respective beads 11 by means of the spring clips 37. The clamping devices rest on the

edges 16 of the door panel which face into the glazing aperture, as shown in Figure 2, and in this position the beads 11 partly engage the surface of the panel 13 and partly overlap the periphery of the glazing aperture.

The double glazed unit 17 of suitable size is located in the aperture, being engaged by a resilient sealing strip 38 mounted on the bead 11 in known manner.

The locking element 22 of each clamping device is initially in the orientation shown in Figures 1 and 3 so that the cam member 28 can pass into the groove 18 in the extruded bead 11.

The beads 12 are then located around the glazing aperture on the opposite side of the door panel 13 to the beads 11, being located by the ridges 36 on the housings 20 and by the cam members 29, which pass between the flanges 19 on each bead 12.

A suitably shaped spanner 39 is then inserted between the double glazed unit 17 and the bead 12 and engaged with the flats 25 on the locking element 22, as shown in Figure 3. The flats 25 are disposed at 45° to the cam member 29 so that when the cam member is parallel to the groove in the bead 12 the spanner 39 must also extend at 45°. The spanner is therefore guided into engagement with the flats 25 by the inclined abutment surface 26 on the housing 20.

The spanner 39 is then rotated through 90° to the position shown in Figure 4. This brings the cam member 29 to a position where it extends at right angles to the groove in the bead 12, and similarly brings the cam member 28 to a position where it extends at right angles to the groove in the bead 11. The desired 90° movement of the spanner 39 is limited by its engagement with the inclined abutment surface 27, and when it reaches this position the projection 34 on the locking element snaps into the recess 35 in the housing to serve to retain the locking element in the clamping position.

During the 90° rotation of the two cam members 28 and 29, the part-helical cam surfaces 32 and 33 bear against the inner surfaces of the flanges 19 and urge those flanges towards the housing 20, thus pressing the beads 11 and 12 firmly against the opposite faces of the door panel 13 around the glazing aperture.

Finally, a further resilient sealing strip 40 is pressed into the space between the glazing beads 12 and the surface of the double glazed unit 17.

If it is required to remove the double glazed unit 17 at any time, this may be simply effected by removing the sealing strip 40 and rotating the locking element of each clamping device, with the spanner, back to the position shown in Figure 3, whereupon the glazing beads 12 may be removed allowing the double glazed unit to be withdrawn. It will be appreciated that, in use, the arrangement should be such that the sealing strips 40 are on the interior side of the door panel, so as to prevent the possibility of unauthorised removal of the double glazed unit from outside the house to permit access by an intruder.

In the described arrangement, the locking element of the clamping device is adapted to be rotated by means of a separate spanner. In a modified form of the device, however, the locking element may be provided with an integral manipulating part, such as a lever, enabling it to be rotated by hand without the use of a separate spanner or other tool. It will be appreciated that, in such an arrangement the final position of the integral lever or other manipulating part must be such that it is not visually or operatively obtrusive.

It is preferred that the cam members 28, 29 are integrally formed as parts of a single locking member 22, so that they are both rotated simultaneously, as described. However, in an alternative arrangement the cam members may be separately rotatably mounted on a carrier, each cam member then being formed with a separate manipulating formation, similar to the flats 25, so that the cam members may be individually rotated into their respective locking positions In this case each cam member should be so rotatably mounted in the carrier that it is located against axial movement, whereby rotation of its cam surface with the respective glazing bead urges the bead towards the panel.

Although the device illustrated by way of example is specifically designed for clamping extruded aluminium glazing beads to an aluminium-faced composition door panel, it will be, appreciated that devices according to the invention may be used for many other similar purposes, not only for door panels and glazing beads of different materials, but also for other applications where it is desired to clamp components to opposite faces of a panel.

Claims

1. A clamping device for securing two elements (11, 12) to opposite faces of a panel (13), comprising a carrier (20) which, in use, lies wholly or mainly within the thickness of the panel, and two locking members (28, 29) projecting from opposite sides respectively of the carrier and mounted for rotation relatively thereto about an axis which, in use, extends across the thickness of the panel, each locking member (28, 29) engaging a respective element (11, 12) so that rotation of the locking members secures the elements to the panel, characterised in that each locking member comprises a cam member (28, 29) having a cam surface (32, 33) facing the carrier (20), whereby the element (11, 12) engaged by each cam surface will be urged towards the carrier by rotation of the respective cam member in one direction.

2. A clamping device according to Claim 1, characterised in that each cam member (28, 29) comprises an enlarged head portion carried on the end of a narrower neck portion (30, 31) extending axially away from the carrier (20), said cam surface (32, 33) being formed on the part of the head portion facing the carrier.

3. A clamping device according to Claim 2, characterised in that the head portion of each cam member (28, 29) is generally oblong, the width thereof, as viewed axially, being substantially the same as the diameter of the neck portion (30, 31).

4. A clamping device according to any of Claims 1 to 3, characterised in that each cam surface (30, 31) comprises a generally part-helical surface extending around the axis of rotation of the cam member.

5. A clamping device according to any of Claims 1 to 4, characterised in that the cam members (28,29) are provided on the opposite ends of a single locking element (22) rotatably mounted on the carrier (20), whereby rotation of the single locking element (22) effects simultaneous rotation of both cam members (28, 29).

6. A clamping device according to Claim 5, characterised in that the carrier (20) is in the form of a housing having a cylindrical, or part-cylindrical, bore (21) in which a cylindrical main body part (23) of the locking element (22) is rotatable.

7. A clamping device according to Claim 5 or Claim 6, characterised in that the locking element (22) includes a location device (34, 35) which operates to locate and retain the locking element at a predetermined rotational position, representing the desired limit of its rotation in said one direction.

8. A clamping device according to any of Claims 5 to 7, characterised in that the means for effecting rotation of the cam members comprises a formation (24, 25) on the locking element (22) adapted for engagement by a manipulating tool (39).

9. A clamping device according to Claim 8, characterised in that the carrier is formed with abutments (26, 27) to limit the movement of the manipulating tool (39) to a range consistent with the desired range of rotation of said cam members.

10. A clamping device according to any of Claims 1 to 9, characterised in that the carrier (20) is provided with projecting formations (36) for engagement with elements (11, 12) to be secured to the panel, in order to locate said elements prior to operation of the clamping device.

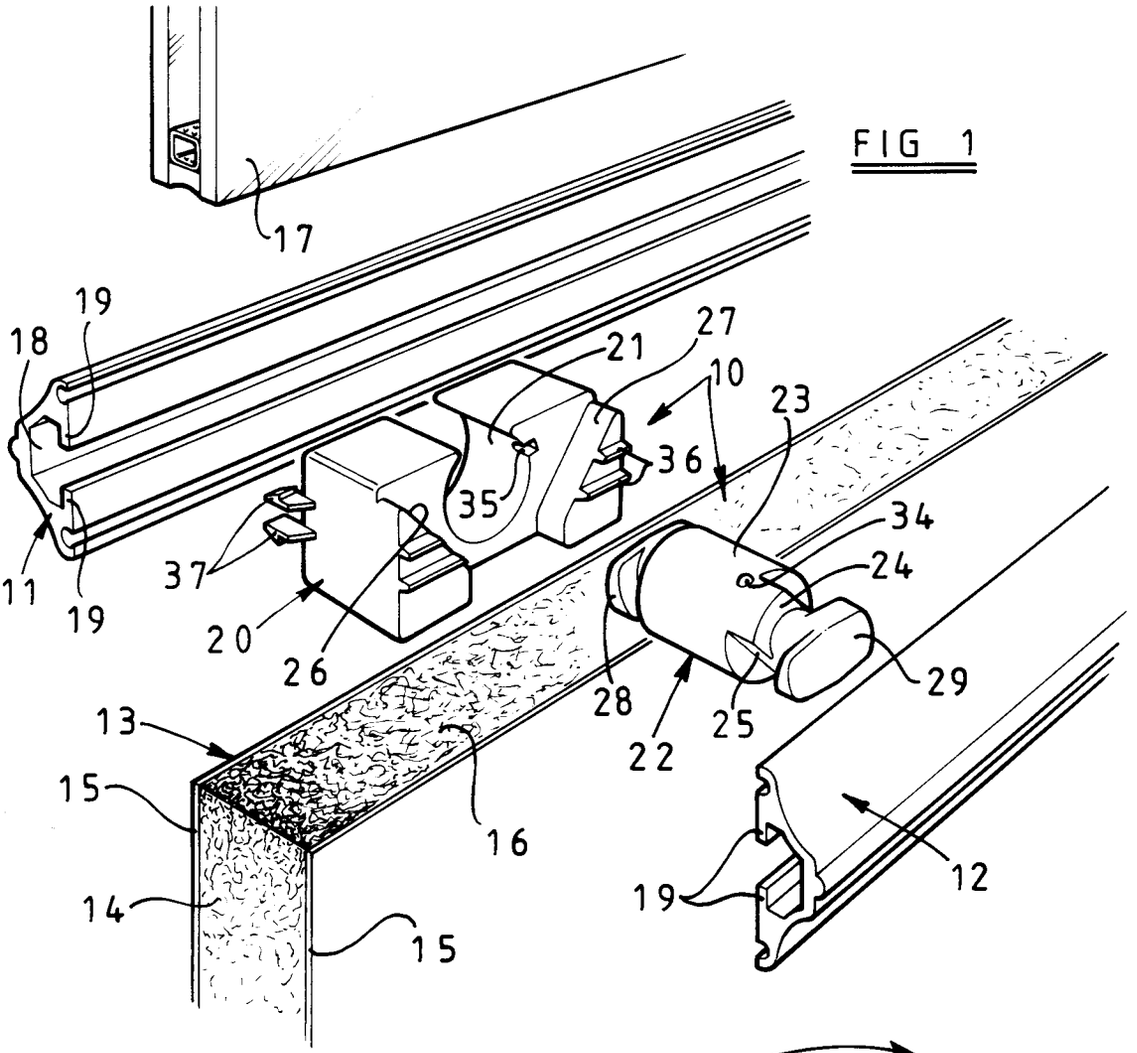

FIG 1

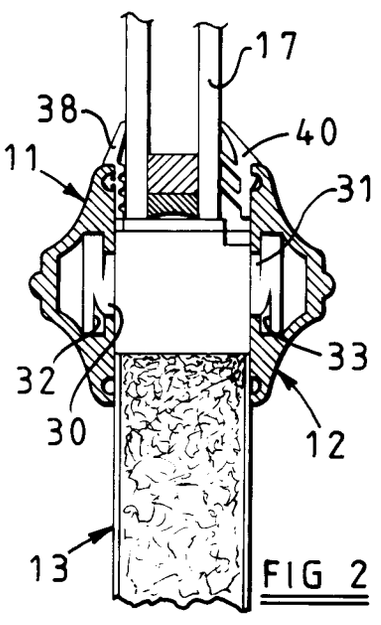

FIG 2

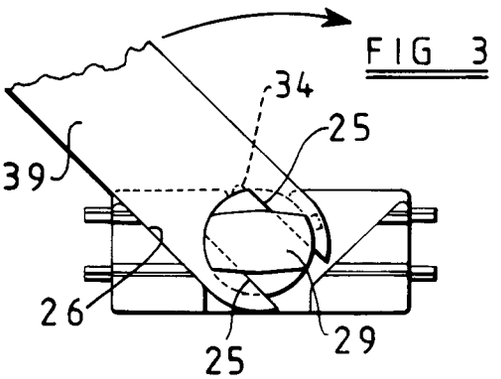

FIG 3

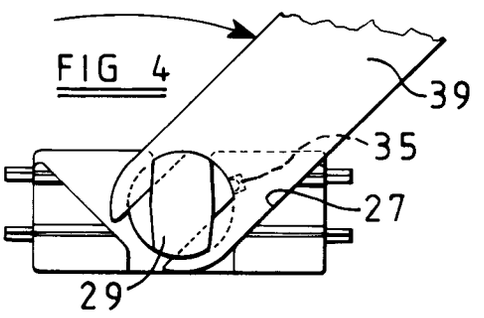

FIG 4

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 92 31 1178

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 A	EP-A-0 425 788 (HARTWIG + FÜHRER) * column 2, line 9 - line 47; figures *	1-4,10 8	E06B3/58 E06B7/30
Y A	FR-A-2 516 122 (ZAPP) * page 4, line 8 - line 36 * * page 5, line 27 - page 10, line 9 * * figures *	1-4,10 5,7	
A	DE-A-3 420 395 (RIETH & CO) * page 9, paragraph 1 - page 11, paragraph 2; figures *	1-4,7,8	
A	DE-A-2 454 438 (ERNST SCHWEIZER) * page 3, line 21 - page 6, line 28; figures *	1-3,7,8	
A	FR-A-2 303 906 (ALUMINIUM SUISSE) * page 1, line 31 - page 2, line 16 * * page 2, line 32 - page 4, line 6 * * figures *	1-3,8,10	
A	US-A-4 006 571 (BURSK)		TECHNICAL FIELDS SEARCHED (Int. Cl.5) E06B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	15 MARCH 1993	DEPOORTER F.

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

EPO FORM 1503 03.82 (P0401)