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(54) A hinge for twin-opening metal door and window frames

(57) The present invention relates to a hinge (1) for metal door and window frames which includes two half-hinges (2, 3), with means for attachment respectively to a first section of a fixed frame (5) and a second section of a mobile frame (6), their pivot being a cylindrical pin (4) which can be inserted in a cylindrical seat (7) which extends longitudinally for a first value (L7) and is defined by corresponding longitudinal cylindrical cavities in the half-hinges (2, 3); the pin (4) extends longitudinally for a second value (L4) greater than the first value (L7), so that one of its ends (8) protrudes from the seat (7) and fixing means (9) are envisaged for fixing the end (8) to the first section of the fixed frame (5).

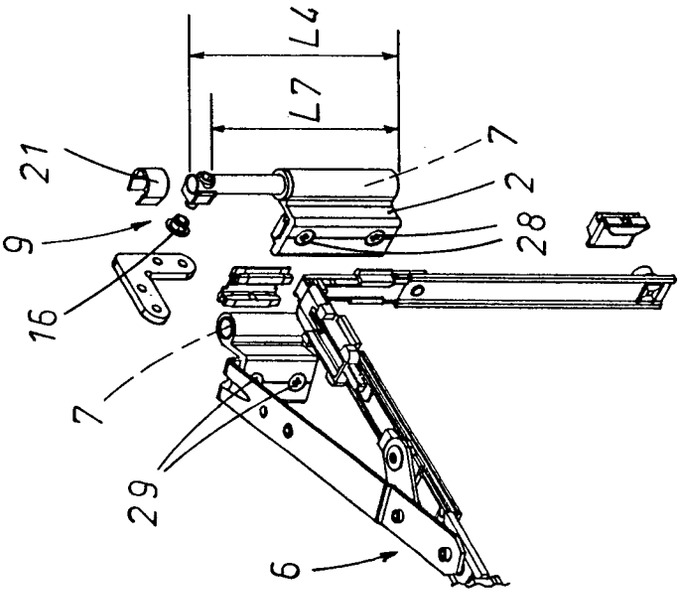

FIG 1

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Description

The present invention relates to a hinge for metal door and window frames, in particular for doors and windows with tilt-and-turn twin opening.

In the metal door and window frame sector, window wings are normally divided into those with conventional opening, which turn about a vertical axis which passes through the hinge supporting the wing (turn opening) and those with tilt opening, that is to say, with a horizontal axis of rotation and the mobile part of the window producing an opening at the top. Doors and windows with twin opening, both tilt and turn, are increasingly found in this sector; however, for this purpose, both the fixed and mobile parts of the doors and windows must be equipped with a series of accessories (tie rods, rods which limit opening, twin movement handles, etc.) which allow the passage from one configuration to the other following operation of the handle.

Whatever the accessories used, the basic element is always the hinge, which can assume two different configurations as a result of the construction policies implemented by the manufacturer.

The first consists in always using the same type of hinge, for both wings with conventional opening and wings with tilt-and-turn twin opening; this favours standardisation of the hinges, so that the difference between various portions of the door and window frames used are not evident, especially when fitted in very long walls, where any difference in appearance between the two types of hinges used would be more obvious.

The second construction policy is, in the case of tilt-and-turn twin opening doors and windows, to use a hinge in which the part of the pin attached to the mobile frame is held, on two sides, by two parts of hinge which can be attached to the fixed frame, so that the part which supports the mobile part of the hinge (i.e.: attached to the mobile part of the door or window) is not inserted over the pin and resting on the lower fixed part, thus increasing the possibility of supporting large, heavy doors and windows. However, from an aesthetic viewpoint, where windows with conventional and twin opening are alternated, this may give rise to unacceptable discontinuity.

The two tendencies, the first with hinges which are always of the same, two-part, type for light loads and consist of two half-hinges only, the second with two types of hinges, that is to say, a two-part hinge for conventional opening wings and hinges in three parts (also known in the sector as "return" hinges or "fixed" on both sides), have pros and cons which render them interchangeable depending on specific assembly requirements. Obviously, from the manufacturer's viewpoint, it would be preferable, for evident reasons related to costs, production and warehousing, to use a single hinge, of the conventional, simplified two-part type, even for very heavy doors and windows upon which the standard hinge could not safely be used for lengthy periods.

The object of the present invention is, therefore, to overcome the afore-mentioned disadvantages by creating a hinge with components which also make it suitable for use as a "return" type hinge, that is to say, suitable for very heavy wings, keeping production down to one type of hinge and minimising the negative aesthetic effects arising from the alternate use of hinges both of the standard two-part type and the "return" type. The present invention relates to a hinge with a pin which extends for a value greater than the length of the corresponding pivot seat defined by two half-hinges which form the hinge and in which means for fixing the part of the pin protruding from the hinge to the fixed frame are envisaged.

The technical features of the present invention, in accordance with the aforesaid objects, are clearly illustrated in the claims herein, and the advantages of the said features are more clearly described in the detailed description below, with reference to the accompanying drawings, which illustrate an embodiment by way of example only, and in which:

- figure 1 is a perspective schematic view of a possible application of the invention disclosed;
- figure 2 is an exploded perspective view of an embodiment of the invention disclosed;
- figure 3 is a plan view, with some details in cross-section, of an embodiment of the invention disclosed attached to a section of door or window frame. With reference to the accompanying drawings, the hinge disclosed is intended in particular, as can also be seen in figure 1, for metal door and window frames and includes a first half-hinge 2 and a second half-hinge 3.

The first half-hinge 2 has means for its attachment to a first section of a fixed frame 5, said means being the screws 28 in the figure.

The second half-hinge 3 can be attached to a second section of a mobile frame 6. In figure 1, the mobile frame 6 is schematically represented by the parts for connection to the frame itself. Moreover, again in figure 1, other components which are not strictly part of the present invention are not numbered.

The two half-hinges pivot respectively about a cylindrical pin 4 which may be inserted in a relative cylindrical seat 7 which extends longitudinally for a first value L7.

The seat 7 is defined by corresponding longitudinal cylindrical cavities in the two half-hinges 2, 3.

The pin 4, advantageously, extends longitudinally for a second value L4, greater than the first value L7.

One end 8 of the pin 4 protrudes from the seat 7 and fixing means 9 are envisaged to fix the end 8 to the first section of the fixed frame 5.

In particular, the end 8 of the pin 4 has a first through-hole 10 and the fixing means 9 include an ele-

ment 11 for fixing to the fixed frame 5, said element having a shank 12 which can be inserted into the through-hole 10 and fixed to the fixed frame 5, and a head 13 with diameter D13 greater than the diameter D10 of the through-hole 10, so as to attach the pin 4 to the fixed frame 5 with a second attachment, in addition to that defined by the first half-hinge 2 with the screws 28.

A cradle element 14 with a second through-hole 15 and a section of concave cylindrical surface which complements the shape of the pin 4 is envisaged. When the cradle element 14 is inserted between the pin 4 and a face of the first section of the fixed frame 5, the fixing element 11 can be inserted in the second through-hole 15.

A bushing 16 is envisaged for fixing to the fixed frame 5. Said bushing can be inserted in a corresponding circular seat 17 in the fixed frame 5 and has a cylindrical connecting portion 18, to the exterior of which the cradle element 14 may be attached, and into the interior of which the shank 12 of the fixing element 11 can be stably fitted.

If the fixing element 11 is a screw, and the shank is, therefore, threaded, the interior of the cylindrical connecting portion 18 is threaded in such a way as to complement the thread of the shank 12, as shown in the accompanying drawings.

As is better shown in figures 2 and 3, the cylindrical connecting portion 18 has a groove 19 and, at the second through-hole 15, the cradle element 14 has a series of teeth 20 which can be inserted in the groove 19 so as to stably fix the cradle element 14 to the bushing 16 once attached to the cylindrical connecting portion 18.

A cover element 21 is envisaged to cover the upper end of the pin 4 and the fixing means 9 as well as to level the upper part of the hinge with the remaining part consisting of the two half-hinges 2, 3.

The cover element 21 has an internal cavity 23 which complements the fixing means 9 in their active configuration (that is to say, when they are attached to the pin 4 and the fixed frame 5) and an external surface whose shape and size depends upon the corresponding external or visible surfaces of the half-hinges 2, 3.

In particular, the cover element 21 consists of a substantially tubular open body and the internal cavity 23 has a pair of longitudinal grooves 25 which define a pair of guides.

Similarly, the cradle element 14 has a pair of longitudinal tabs or ribs 24, which can be stably inserted in the longitudinal grooves 25 of the cover element 21.

Moreover, on the face 27 opposite the fixed frame 5, the cradle element 14 has a series of pointed protrusions 26, designed to interact with the face of the fixed frame 5 so as to lock the cradle element 14 to the fixed frame 5.

When fitting the hinge 1, a hole must be made in the fixed frame 5 to define the circular seat 17, into which the bushing 16 is inserted, from inside to outside.

Thus, the cradle element 14 is attached to the cylindrical portion 18 of the bushing 16, remaining integral with the bushing 16 and the fixed frame 5.

Once the end 8 of the pin 4 rests on the concave cylindrical portion of the cradle element 14, the fixing element 11 is inserted in the first hole 10 and second hole 17, screwing into the thread inside the bushing 16.

Finally, the cover element 21 is positioned, finishing the hinge.

The present invention, thus designed for the said objects, may be subject to numerous variations, all encompassed by the original design concept, and all components may be replaced with technically equivalent parts.

Claims

1. A hinge for metal door and window frames including a first and a second half-hinge, respectively with means for attachment to a first section of a fixed frame and a second section of a mobile frame, their pivot being a cylindrical pin which may be inserted in a relative cylindrical seat extending longitudinally for a first value and being defined by corresponding longitudinal cylindrical cavities in the said half-hinges, characterised in that the pin (4) extends longitudinally for a second value (L4) which is greater than the first value (L7), one of its ends (8) protruding from the seat (7), said seat having fixing means (9) for fixing the said end (8) to the first section of the fixed frame (5).

2. The hinge as described in claim 1, characterised in that the end (8) of the pin (4) has a first through-hole (10) and the fixing means (9) include an element (11) for fixing to the fixed frame (5), said element having a shank (12) which may be inserted into the through-hole (10) and fixed to the fixed frame (5), and a head (13) with diameter (D13) greater than the diameter (D10) of the through-hole (10), so as to attach the pin (4) to the fixed frame (5) with a second attachment, in addition to that defined by the first half-hinge (2).

3. The hinge as described in claim 2, characterised in that a cradle element (14) having a second through-hole (15) and a concave cylindrical section of surface which complements the shape of the pin (4) is envisaged and, once the cradle element (14) is inserted between the pin (4) and a face of the first section of the fixed frame (5), the fixing element (11) may be inserted into the second through-hole (15).

4. The hinge as described in claim 3, characterised in that it has a bushing (16), which may be inserted into the circular seat (17) in the fixed frame (5), and having a cylindrical connecting portion (18), to the exterior of which the cradle element (14) may be

attached and into the interior of which the shank (12) of the fixing element (11) can be stably fitted.

5. The hinge as described in claim 4, characterised in that the said shank (12) is threaded and the interior of the cylindrical connecting portion (18) is threaded in such a way as to complement the thread on the shank (12).

6. The hinge as described in claim 4, characterised in that the cylindrical connecting portion (18) has a groove (19) and the second hole (15) of the cradle element (14) has a series of teeth (20) which can be inserted into the said groove (19), so as to stably fix the cradle element (14) to the bushing (16) once attached to the cylindrical connecting portion (18).

7. The hinge as described in claim 1, characterised in that it has a cover element (21) for the said pin end (8) and fixing means (9), said cover element having an internal cavity (23) which complements the fixing means (9) in their active configuration attached to the pin (4) and fixed frame (5), and an external surface whose shape and size depend on the corresponding external or visible surfaces of the half-hinges (2, 3).

8. The hinge as described in claim 3, characterised in that it has a cover element (21) for the said pin end (8) and fixing means (9), said cover element consisting of a substantially tubular open body having an internal cavity (23) shaped so as to complement the fixing means (9) in their active configuration attached to the pin (4) and fixed frame (5), and having a pair of longitudinal grooves (25) which define a pair of guides, and having an external surface whose shape and size depend on the corresponding external or visible surfaces of the half-hinges (2, 3), and in that the cradle element (14) has a pair of longitudinal tabs or ribs (24) which may be stably inserted in the said longitudinal grooves (25) of the cover element (21).

9. The hinge as described in claim 3, characterised in that, on the face (27) opposite the fixed frame (5), the cradle element (14) has a series of pointed projections (26) designed to interact with the face of the fixed frame (5) so as to fix the cradle element (14) to the fixed frame (5).

FIG3

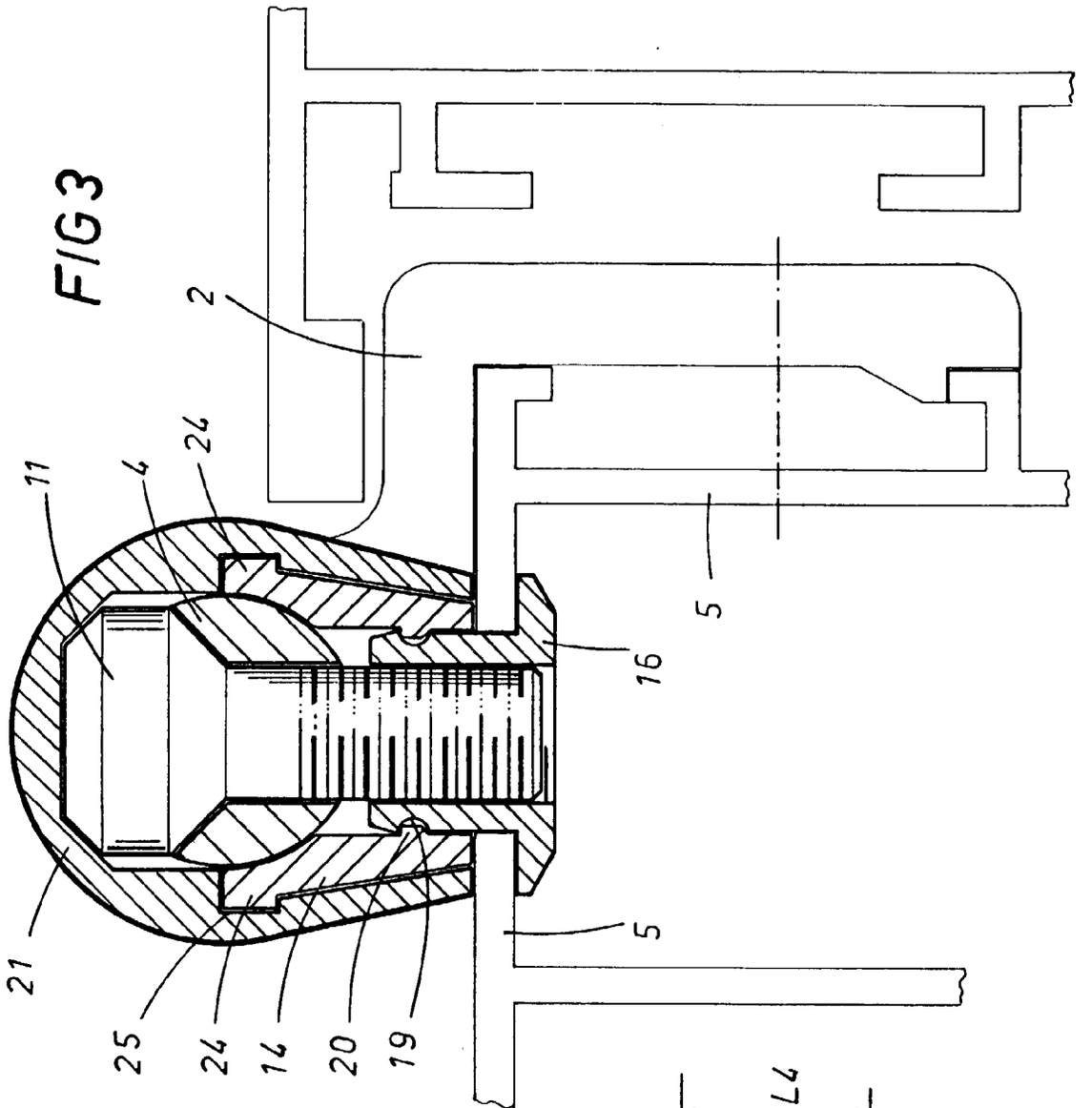
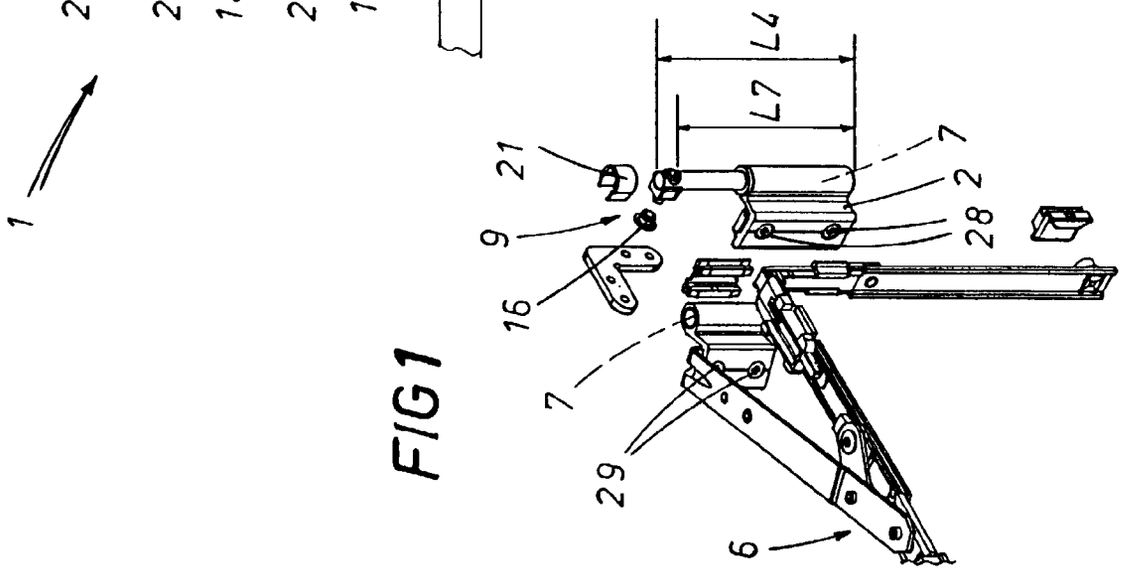


FIG1



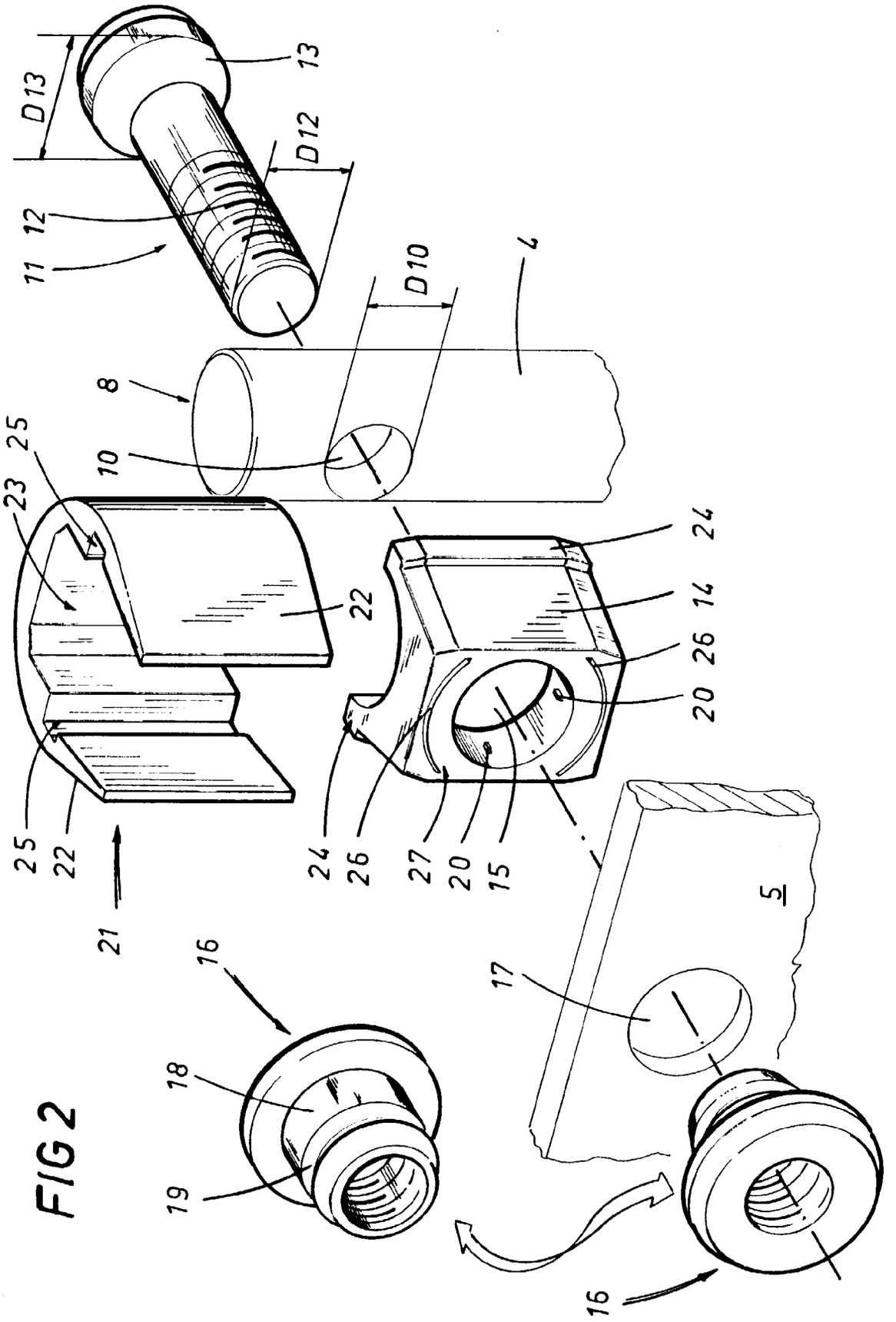

D13
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FIG 2

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 96 83 0138

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)
X	DE-U-92 15 565 (DR. HAHN & CO) * claim 1; figures 1,2 * ---	1	E05D5/12 E05D15/52
X	DE-C-43 02 599 (AUGUST BILSTEIN & CO) * column 2, line 5 - line 27; figure 1 * -----	1	

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	1 July 1996	Guillaume, G

CATEGORY OF CITED DOCUMENTS

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