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(71) Applicant: **CINETTO F.LLI S.R.L.**
**35030 Rubano (IT)**

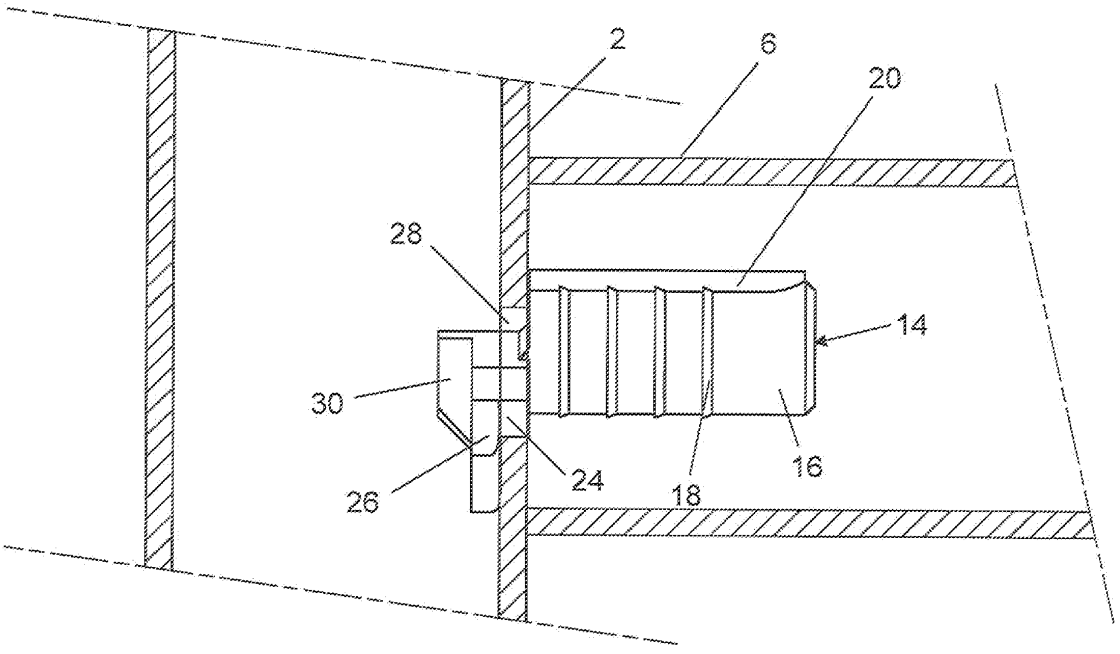
(72) Inventor: **Cinetto, Gianfranco**
**35030 Rubano (IT)**

(74) Representative: **Piovesana, Paolo**
**Via F. Baracca, 5/a**
**30173 Venezia-Mestre (IT)**

(54) **Coupling element for crosspieces of metal frames for doors and/or door leaves**

(57) A coupling element for crosspieces of metal frames, in particular for doors and/or door leaves, said frames consisting of two uprights (2) connected together by two stringers (4), characterised by comprising a body (14) insertable by pressure into the crosspiece (12) and provided with an appendix (24) projecting by a portion corresponding to the thickness of the upright, said appendix extending into a block (26) of overall size substantially corresponding to the diameter of a hole (28) provided in the upright, said block being longitudinally out of alignment with the axis of the pressure-insertable body.

FIG. 4




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## Description

**[0001]** The present invention relates to a coupling element for crosspieces of metal frames for doors and/or door leaves.

**[0002]** Metal frames for doors and/or door leaves are known consisting substantially of two uprights connected together at their ends by double angle stringers and defining a space which is generally filled with panelling of glass or other material.

**[0003]** In order to stiffen the structure, or if using panelling formed from materials of different type/colour, the two uprights are connected together along the centre line by a crosspiece.

**[0004]** The crosspiece is formed from a tubular profile provided internally with two curved longitudinal projections which overall form a cylindrical seat. The crosspiece is also provided externally with a T-profile acting as a support for the panelling.

**[0005]** The connection between the crosspiece and the upright is made by forming a hole in the facing walls of the uprights, inserting a threaded pin through these, applying the crosspiece to the threaded pin and locking the crosspiece to the threaded pin by means of a grub screw which engages them both.

**[0006]** However this solution presents certain drawbacks, and in particular;

- laboriousness in fixing the pin into the hole and the grub screw to the pin,
- cost increase due to the components (insert, grub screw) and the operations involved in threading the various components, or the use of threaded inserts within the hole.

**[0007]** Another system consists of applying to the ends of the uprights a threaded pin which also engages in the circular seat of the crosspiece.

**[0008]** A further system consists of fixing the crosspiece to the upright by means of a screw, by making a through hole in both sides of the upright.

**[0009]** However such solutions have the drawback of an unpleasant outer appearance, in the case both of sliding doors and of swing doors, due to the presence of the exposed holes or fixing screws.

**[0010]** An object of the invention is to eliminate these drawbacks by providing a coupling element which can be easily applied to the upright and/or to the crosspiece and is of low cost.

**[0011]** Another object of the invention is to provide a coupling element which enables the upright and crosspiece to be easily connected together and be rapidly disassembled.

**[0012]** These and other objects which will be apparent from the ensuing description are attained according to the invention by a coupling element for metal frame crosspieces as described in claim 1.

**[0013]** A preferred embodiment of the present invention is further clarified hereinafter with reference to the accompanying drawings, in which:

Figure 1 is a frontal view of a frame using the coupling element of the invention,
Figure 2 is a perspective view of the coupling element of the invention,
Figure 3 shows it during its insertion into the crosspiece,
Figure 4 is a longitudinal section through the frame at the upright-crosspiece connection region,
Figure 5 shows a variant of a crosspiece,

**[0014]** As can be seen from the figures, the coupling element of the invention is applied in metal frames consisting of two uprights joined together by angle stringers 4, to connect the central crosspiece 6 to the facing surfaces of the upright 2.

**[0015]** The crosspiece 6 consists of a tubular profile of substantially rectangular cross-section provided internally with curved projections 8 which form overall a cylindrical seat 10, and provided externally with a T-profile 12 for fixing the panelling.

**[0016]** The coupling element of the invention, indicated overall by 14, comprises substantially a plastic or metal cylindrical body 16, provided with a plurality of circumferential ribs 18 and a tang 20 the width of which corresponds substantially to the distance between the facing edges of the curved projections 8.

**[0017]** The cylindrical body 16 extends at one end into a second body 22 consisting substantially of a first semicylindrical stepped portion 24, a second cylindrical portion 26 the diameter of which corresponds to the diameter of the hole 28 of the upright 2, and an abutment portion 30.

**[0018]** The coupling element of the invention is used in the following manner: it is inserted with its cylindrical body 16 into the seat 10 such that the tang 20 is disposed between the facing edges of the projections 8.

**[0019]** In this manner the body 16 is unable to undergo any rotational movement.

**[0020]** This insertion operation is carried out by striking against the portion 30 with a hammer to cause forced insertion, which is resisted by the presence of the ribs 18 within the seat 10.

**[0021]** Two holes of diameter corresponding substantially to the diameter of the portion 28 are then made in the facing surfaces of the uprights 2.

**[0022]** Then after securing an upright to the two stringers, the cylindrical portion is inserted through the hole formed therein, and after passing beyond the thickness of the upright it rests by gravity with the portion 26 on the edge of the hole 28.

**[0023]** A similar operation is then carried out with the other coupling element provided at the other end of the crosspiece,

**[0024]** From the aforegoing it is apparent that the coupling element of the invention presents numerous advantages and in particular:

- it enables the crosspiece and upright to be easily connected together without the use of screws or other blocking members,
- it enables the crosspiece to be mounted, demounted and then remounted,
- it can also be used in middle crosspieces of passage doors without using hole covers for the mounting screws or exposed holes for inserting the grub screw.

## Claims

1. A coupling element for crosspieces of metal frames, in particular for doors and/or door leaves, said frames consisting of two uprights (2) connected together by two stringers (4), **characterised by** comprising a body (14) insertable by pressure into the crosspiece (12) and provided with an appendix (24) projecting by a portion corresponding to the thickness of the upright, said appendix extending into a block (26) of overall size substantially corresponding to the diameter of a hole (28) provided in the upright, said block being longitudinally out of alignment with the axis of the pressure-insertable body.

2. A coupling element as claimed in claim 1, **characterised in that** the pressure-insertable body is of substantially cylindrical shape for its insertion into a corresponding seat (10) provided in the crosspiece.

3. A coupling element as claimed in claim 1, **characterised in that** the lateral surface of the cylindrical body is provided with a plurality of circumferential ribs (18).

4. A coupling element as claimed in claim 2, **characterised in that** the lateral surface of the cylindrical body (14) is provided with a tang (20) for blocking the axial rotation of the body.

5. A coupling element as claimed in claim 1, **characterised in that** the block (26) is of substantially cylindrical shape.

6. A coupling element as claimed in claim 1, **characterised in that** the pressure-insertable body (14) is made of metal.

7. A coupling element as claimed in claim 1, **characterised in that** the pressure-insertable body (14) is made of plastic material.

FIG. 1

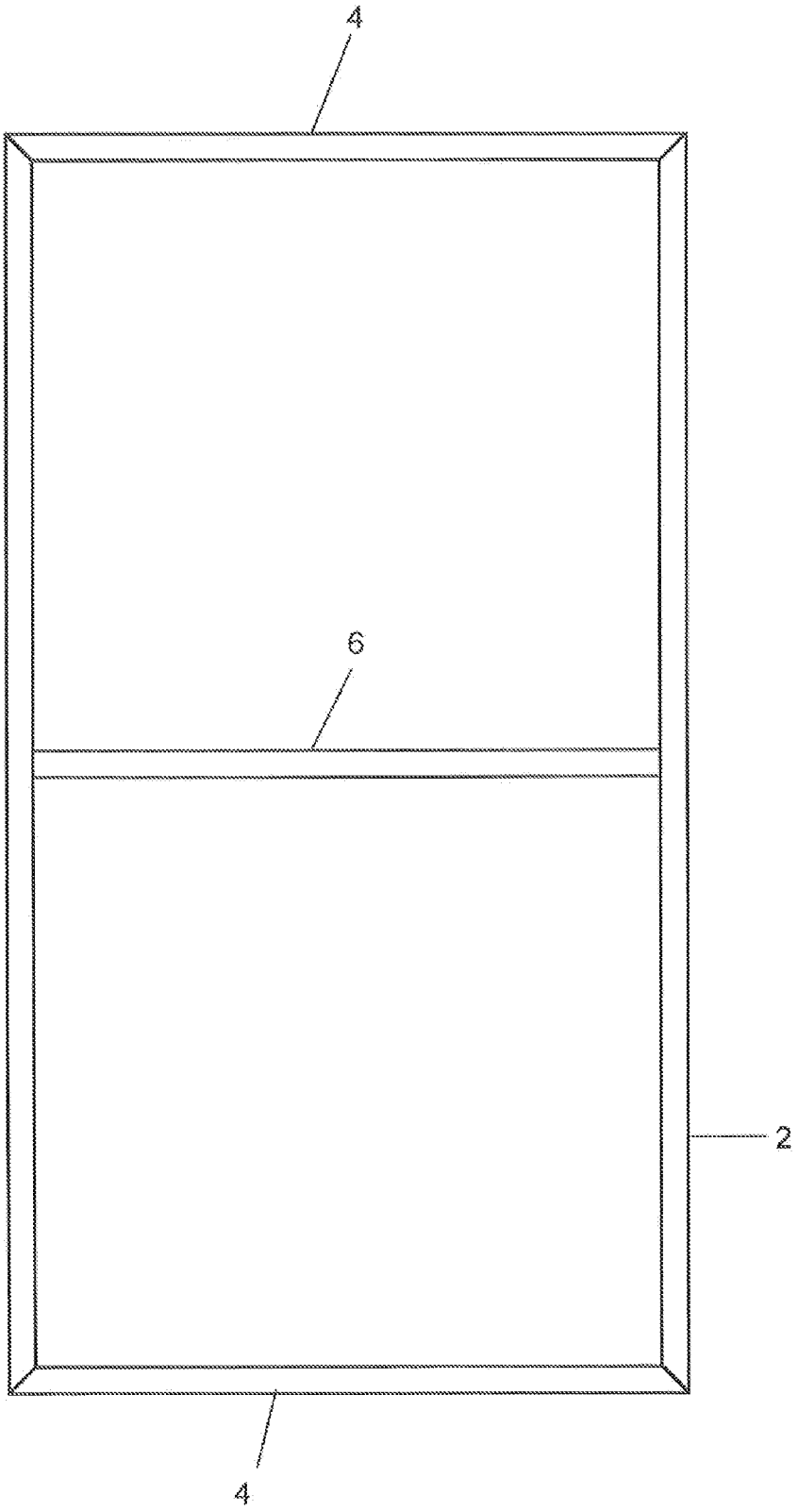


FIG. 2

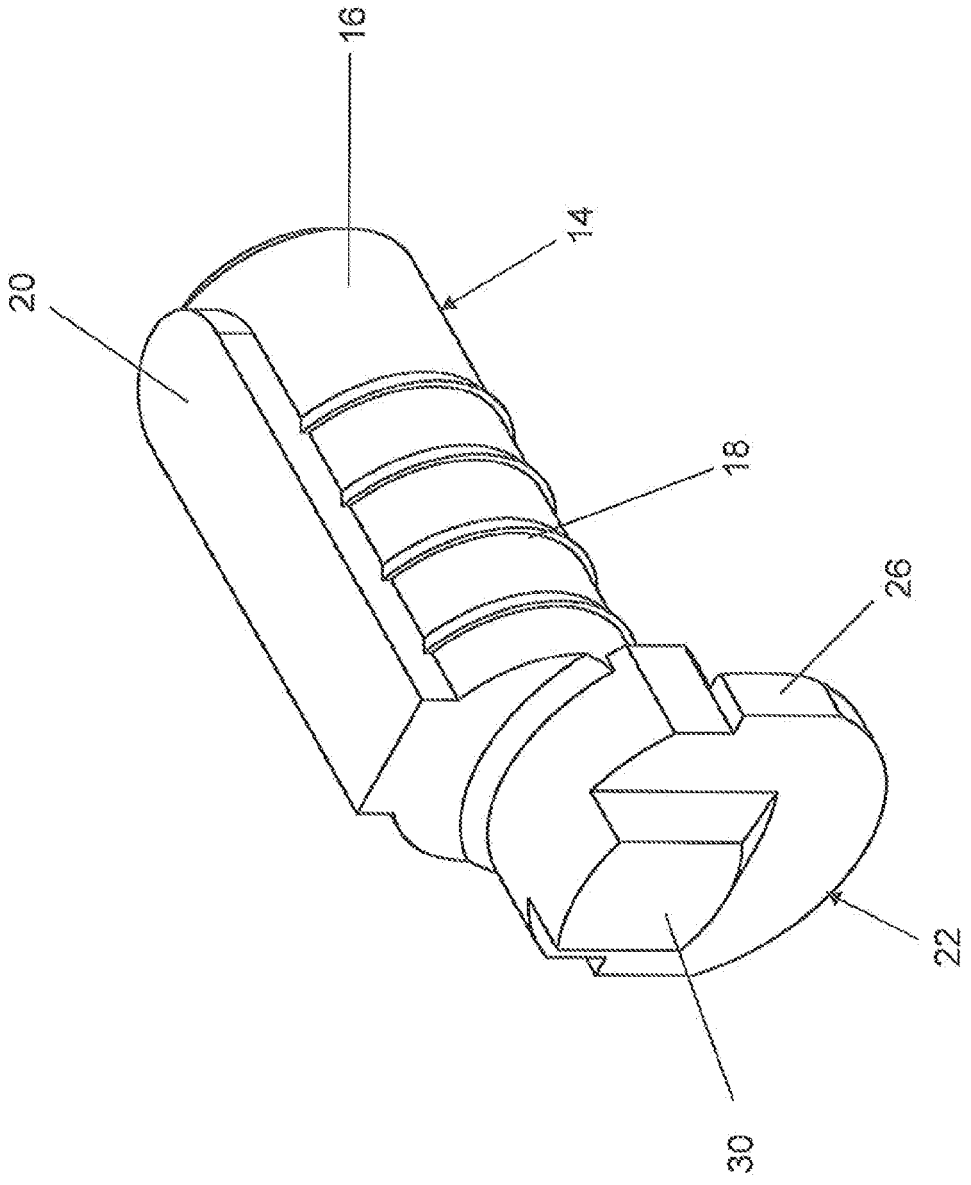


FIG. 3

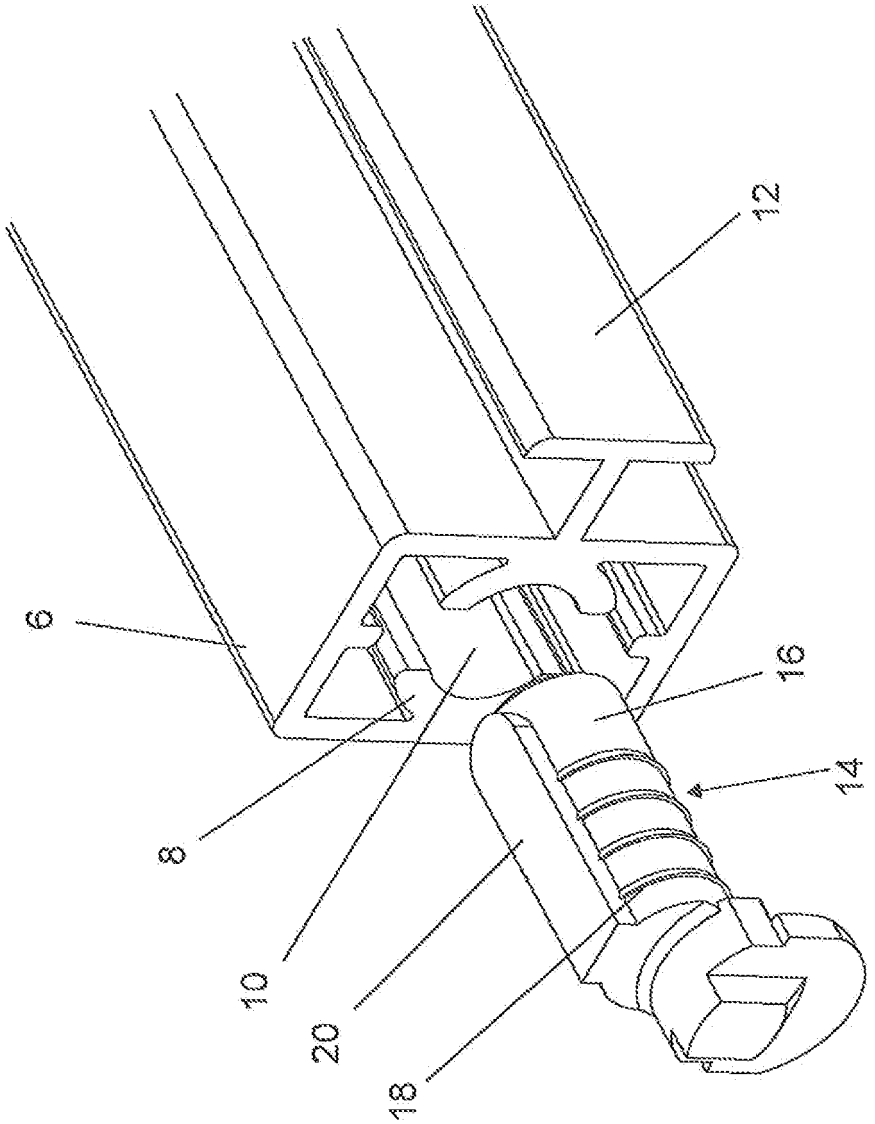


FIG. 4

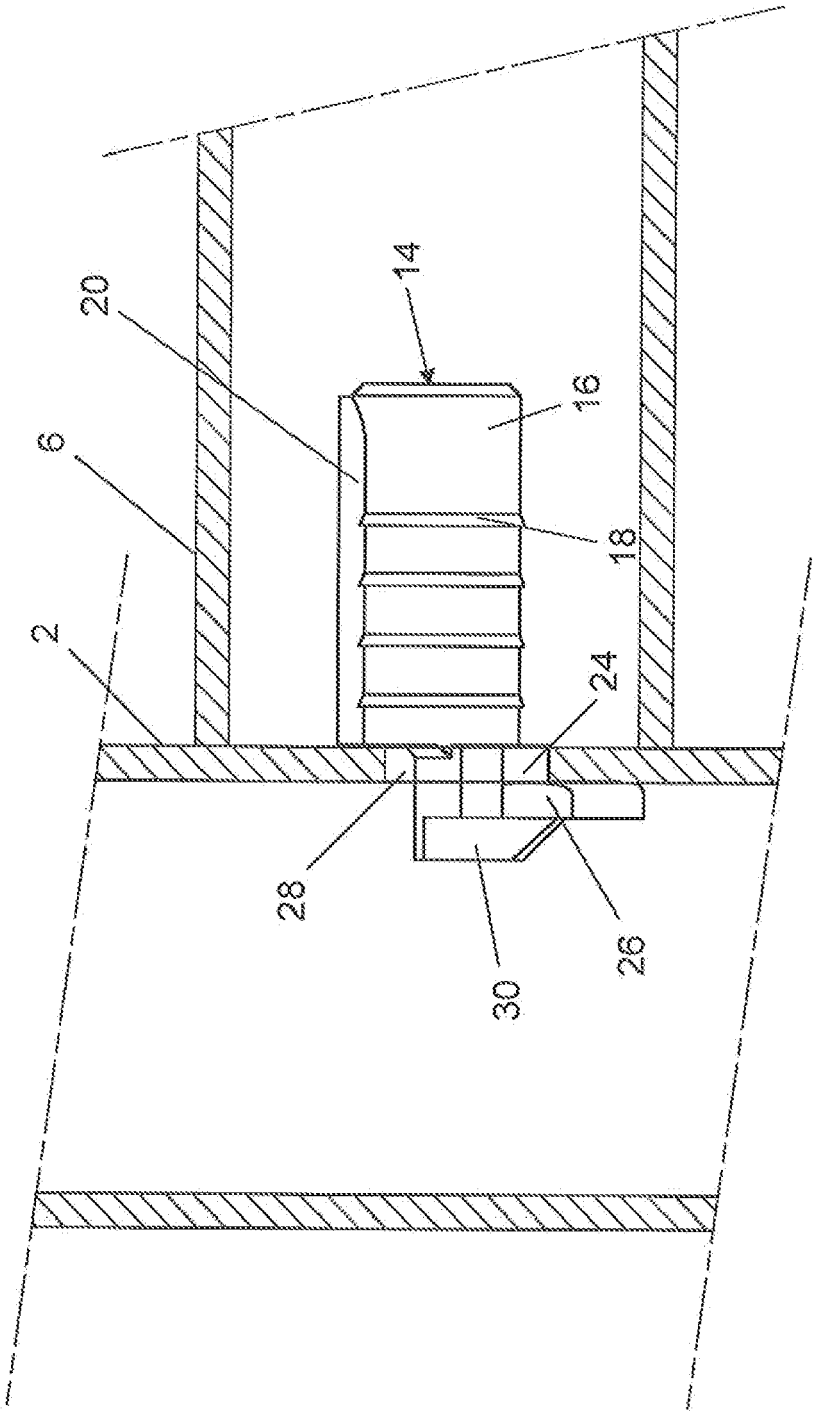


FIG. 5

