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(54) **Profiled bar for frames and corresponding frame**

(57) The invention relates to a profiled bar (4) with a "T" section comprising a rib (24) and a plate (28). The profiled bar (4) has, on at least one end (12,16), an attachment element (20) suitable for engaging with a further profiled bar (4'') The rib comprises at least one coupling aperture (36) shaped to house said attachment element (20), which comprises a base (40) for fixing to the rib, projecting at least partially from the profiled bar (4) with one free end (44), and a tongue (48) flexibly elastic and coupled to the fixing base. The tongue (48) is bent towards the fixing base at the free end (44), so as to form an angle of incidence with the fixing base and is provided with a pair of recesses (51,52) which define an attachment head (50). The coupling aperture (28) defines a first pair of projections (31,32) suitable for engaging with the recesses (51,52) to hold the attachment head (50) to the rib.

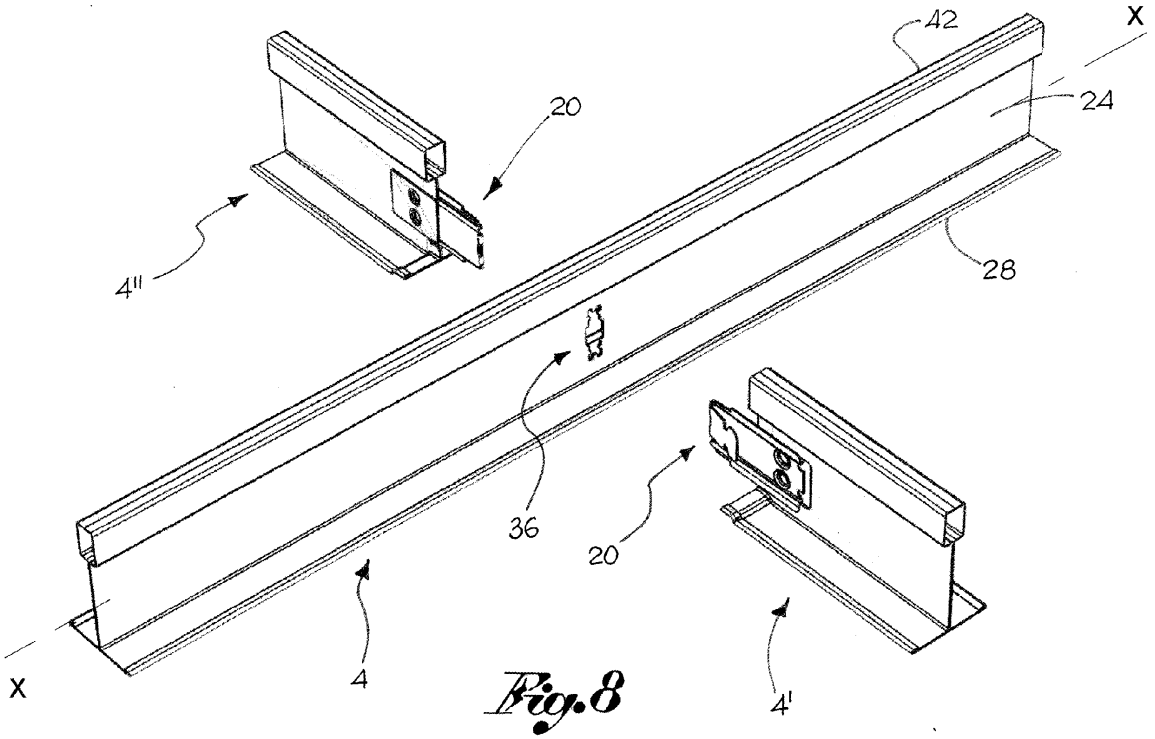

Fig.8

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Description

DESCRIPTION

Field of application

[0001] The present invention relates to a profiled bar for frames, and a relative frame.

[0002] The profiled bar according to the invention is used in particular to make frames to support false ceilings. State of the art

[0003] It is known of in the art to make frames for false ceilings comprising a plurality of profiled bars mechanically coupled to each other.

[0004] The profiled bars of the prior art have a "T" profile comprising a central rib, a plate perpendicular to the central rib, and attachment elements positioned on the lateral ends of the rib. One or more shaped apertures are made on the central rib.

[0005] The frames are assembled by mechanically engaging the attachment elements of one profiled bar in the apertures made on the central rib of other profiled bars so as to form a reticular structure. Such reticular structure is generally suspended, for example by steel cables or tie-rods, to the ceiling. Panels, slats or other elements needed to form the false ceiling are laid on the wings defined by the plate of the "T" profiled bar, facing downwards.

[0006] Generally, the attachment elements comprise flexible tongues, which project from the longitudinal ends of the profiled bars to engage in the aforesaid apertures. Each tongue is provided with a central tooth, destined to engage the rib of the profiled bar for holding it once the attachment element has been inserted into the said aperture after elastic bending of the tongue.

[0007] Profiled bars with attachment elements of this type are described, for example, in the international patent applications WO 2004/042162 A1 e WO 2006/100068 A1.

[0008] The solutions of profiled bars for frames described above, despite being efficient, do not however permit an adequate mechanical distribution of the stresses in the points of reciprocal connection. The connection of the profiled bars is in fact entrusted substantially to a single retention tooth which, in addition, presses in the centreline area of the rib, that is the mechanically the weakest point of the profiled bar itself.

Presentation of the invention

[0009] Consequently, the purpose of the present invention is to overcome the drawbacks of the prior art mentioned above, by making available a profiled bar which offers a more resistant and safer mechanical connection.

[0010] A further purpose of the present invention is to make available a profiled bar which is simple and economical to produce.

Brief description of the drawings

[0011] The technical characteristics of the invention, according to the aforesaid purposes, are clearly evident from the claims below and the advantages of the same will be clearer from the following description made with reference to the appended drawings, showing one or more embodiments by way of non-limiting examples, wherein:

[0012] figure 1 shows a side view of a profiled bar according to one embodiment of the present invention;

[0013] figure 2 shows a side view of the profiled bar in figure 1, from the side of the arrow II in figure 1;

[0014] figure 3 shows a cross-section view of the profiled bar in figure 1, along the section plane III-III in figure 2;

[0015] figure 4 shows a view of a frame comprising profiled bars according to the present invention;

[0016] figure 5 shows a cross-section of the frame in figure 4, along the section plane V-V in figure 4;

[0017] figure 6 shows a cross-section view of the frame in figure 4, along the section plane VI-VI in figure 4;

[0018] figure 7 shows a perspective view of the profiled bar illustrated in figure 1;

[0019] figure 8 shows a perspective view of three profiled bars according to the invention in an assembly position.

Detailed description

[0020] The elements or parts of elements common to the embodiments described below will be indicated using the same reference numerals.

[0021] With reference to the aforesaid figures, reference numeral 4,4',4" globally denotes a profiled bar, in particular for frames 8, having a main longitudinal extension X-X from a first to a second end 12,16.

[0022] The profiled bar 4 has, on at least one of said ends 12, 16, an attachment element 20 suitable for engaging with a further profiled bar 4' or 4''.

[0023] The profiled bar 4 comprises a rib 24 and a plate 28 positioned perpendicular to the rib 24 so as to form together a "T" section.

[0024] Preferably the rib 24 comprises a longitudinal stiffening element 42 positioned on the side opposite the plate 28.

[0025] As illustrated in particular in Figure 1, the profiled bar 4 may be made from a single sheet by bending and shaping. The sheet defines the longitudinal stiffening element 42 as a box-like body and extends then in two distinct flat portions alongside each other to form the central rib 24. The two flat portions end with two orthogonal appendages, coplanar to each other and connected by a small connection plate, so as to define the plate 28.

[0026] The rib 24 comprises at least one coupling aperture 36, shaped to house said attachment element 20 in a holding relationship and positioned between said first and second ends 12, 16.

[0027] The attachment element 20 comprises a fixing base 40 to the rib 24 which projects at least partially from the profiled bar 4 with a free end 44, and a tongue 48 flexibly elastic and coupled to the fixing base 40.

[0028] For example, the fixing base 40 is attached to the rib by riveting, welding, gluing and/or threaded coupling devices.

[0029] As may be seen in particular in Figures 1 and 2, the fixing base 40 is connected to the central rib 24 in a specially lowered area which acts as attachment seat. In particular, such lowered area may be obtained by removing a corresponding portion from one of the two flat neighbouring portions which define the rib of the profiled bar.

[0030] Alternatively, the fixing base may be made in one piece with the rib of the profiled bar.

[0031] The tongue 48 is bent towards the fixing base 40, at said free end 44 so as to form an angle of incidence with the fixing base 40.

[0032] The tongue 48 is provided with a pair of recesses 51, 52 which define an attachment head 50. The coupling aperture 36 in turn defines a first pair of projections 31, 32 suitable for engaging with the aforesaid recesses 51, 52 to hold the attachment head 50 to the rib 24. Such projections 31, 32 are positioned in opposite positions to a longitudinal centreline plane L-L of the rib 24.

[0033] In particular, as shown in Figure 6, the first pair of projections 31, 32 define inside the coupling aperture 36 a first groove 38 having a width substantially equivalent to the width of the necking defined on the flexible tongue 48 by the aforesaid two recesses 51, 52. Operatively, as will be described further below, when the attachment element is inserted into the coupling aperture, the tongue engages the coupling aperture with the necking positioned inside the aforesaid first groove 38.

[0034] Preferably, the projections 31, 32 are positioned in symmetrical positions to the aforesaid longitudinal centreline plane L-L of the rib 24.

[0035] According to one embodiment, the coupling aperture 28 has a first pair of guides 60 positioned on opposite sides to the aforesaid longitudinal centre line plane L-L of the rib 24, and said attachment element 20 has a first pair of tabs 64 jutting out from the fixing base 40. The guides 60 cooperates slidaby in conjunction with the tabs 64 to guide the coupling of the attachment element 20 inside the coupling aperture 36.

[0036] Operatively, the free end 44 of the fixing base 40 is inserted inside the coupling aperture with the tabs 64 which engage the pair of guides 60 so as to slide. Gradually, as the free end 44 penetrates inside the aperture, the flexible tongue 48 is progressively pushed by the rib 24 against the fixing base, until the attachment head 50 has completely traversed the rib 24 and the two projections 31, 32 have engaged the two recesses 51, 52. At this point, the necking area engages in the first groove 58 with the tongue which snaps back into the uncompressed condition, keeping the attachment head 50 pressed onto the rib 24.

[0037] Thanks to the invention, unlike the solutions of the prior art considered, as may be observed in Figure 4 the connection between the profiled bars is not located in a single point but two separate and distanced holding points are provided, corresponding to the two projections, thereby enabling an improved distribution of the mechanical stresses.

[0038] Moreover, again thanks to the invention, the attachment element does not press in the centre line area of the rib (i.e. in the weakest point of the profiled bar), but rather presses on two portions of the rib distanced from the centreline area and therefore positioned respectively beside the plate 28 and the longitudinal stiffening element 42 (i.e. in the strongest and most rigid points of the profiled bar).

[0039] According to a further embodiment, illustrated in particular in Figure 6, the coupling aperture 36 defines at least a second pair of projections 33, 34, opposite the first pair of projections 31, 32 in relation to a centre line plane M-M of the aperture, orthogonal to the main longitudinal extension X-X of the profiled bar, to enable the contemporary holding of two attachment elements 20 of two separate profiled bars 4', 4".

[0040] Advantageously, the coupling aperture 36 has a second pair of guides 72 positioned on opposite sides in relation to the longitudinal centre line plane L-L of the rib 24, to permit the guided coupling of two attachment elements 20 of two separate profiled bars 4', 4" .

[0041] Preferably, as illustrated in Figure 6, the centreline plane M-M is also a plane of symmetry for the coupling aperture 36.

[0042] According to a preferred embodiment, illustrated in detail in Figure 6, the coupling aperture 36 has a symmetrical profile to the centreline plane M-M and has a specular groove 58, which is made astride the longitudinal centreline plane L-L of the rib and is defined by two steps corresponding to the aforesaid two projections 31, 32 and 33, 34. Laterally to each projection a seat is made corresponding to one of the aforesaid guides 60, 72. Such seat is respectively defined by a first tooth 73, which extends perpendicular towards the centreline plane M-M and by a second tooth 74 aligned on such centreline plane M-M.

[0043] Preferably, the free end 44 of the fixing base 40 has a pair of shoulders 76 which define an end stop in the insertion of the attachment element 20 inside the coupling aperture 36.

[0044] Operatively, such shoulders 76 abut on the rib 24, once the attachment head 50 has engaged the rib 24 so as to hold it. This way lending further stability to the coupling.

[0045] The free end 44 may have a pair of draft bevels 80 to facilitate insertion of the attachment element 20 inside the coupling aperture 36.

[0046] The profiled bars 4, 4', 4" of the present invention may advantageously be assembled to each other to form a frame 8, in particular to support false ceilings. As illustrated in Figures 4 and 6, the frame 8 comprises a

plurality of profiled bars 4, 4', 4" mechanically coupled to each other so that the attachment element 20 of one profiled bar 4' engages in the coupling aperture 36 of a second profiled bar 4" .

[0047] As may be appreciated from the description, the profiled bar according to the invention makes it possible to overcome the drawbacks presented in the prior art.

[0048] In particular, the profiled bar ensures more resistant and stable mechanical connection, characterised by an improved distribution of the stresses. This guarantees greater reliability and stability of the frame obtained by the interconnection of such profiled bars.

[0049] Lastly, the profiled bar is economical and simple to produce, inasmuch as obtainable by cutting and bending operations.

[0050] A person skilled in the art may make numerous modifications and variations to the sections described above so as to satisfy contingent and specific requirements, all contained within the sphere of the invention as defined by the appended claims.

Claims

1. Profiled bar (4, 4' , 4") , in particular for frames (8), having a main longitudinal extension (X-X) from a first and a second end (12,16), the profiled bar (4, 4', 4") having, on at least one of said ends (12,16), an attachment element (20) suitable for engaging with a further profiled bar (4"), and comprising a rib (24) and a plate (28) positioned perpendicular to the rib (24) so as to form together a 'T' section, the rib (24) comprising at least one coupling aperture (36) shaped to house said attachment element (20), the coupling aperture (36) being positioned between said first and second end (12,16), **characterised by** the fact that
   the attachment element (20) comprises a base (40) for fixing to the rib (24), which projects at least partially from the profiled bar (4, 4', 4") with one free end (44), and a tongue (48) flexibly elastic and coupled to the fixing base (40), the tongue (48) being bent towards the fixing base (40), at said free end (44), so as to form an angle of incidence with the fixing base(40), the tongue (48) being provided with a pair of recesses (51, 52) defining an attachment head (50), the coupling aperture (28) defining a first pair of projections (31, 32) suitable for engaging with the recesses (51, 52) to hold the attachment head (50) to the rib 24, said projections (31, 32) being positioned in opposite positions to a longitudinal centre line plane (L-L) of the rib (24).

2. Profiled bar according to claim 1, wherein said projections (31, 32) are positioned symmetrically to the longitudinal centre line plane (L-L) of the rib (24).

3. Profiled bar (4) according to claim 1 or 2, wherein the coupling aperture (36) has a first pair of guides (60) positioned on opposite sides to the longitudinal centre line plane (L-L) of the rib (24) and said attachment element (20) has a first pair of tabs (64) jutting out from the fixing base (40), said first guides (60) sliding in conjunction with the first tabs (64) to guide the coupling of the attachment element (20).

4. Profiled bar (4) according to claim 1, 2 or 3, wherein the coupling aperture defines at least a second pair of projections (33, 34), opposite the first pair of projections (31, 32) in relation to a centre line plane (M-M) of the aperture, orthogonal to the main longitudinal extension (X-X), to enable the contemporary holding of two attachment elements (20) of two separate profiled bars (4', 4").

5. Profiled bar (4) according to claim 4, wherein said centre line plane (M-M) is also a plane of symmetry for the coupling aperture (36).

6. Profiled bar (4) according to claim 3, 4 or 5, wherein the coupling aperture (36) has a second pair of guides (72) positioned on opposite sides in relation to the longitudinal centre line plane (L-L) of the rib (24), to permit the guided coupling of two attachment elements (20) of two separate profiled bars (4' , 4") .

7. Profiled bar (4) according to any of the previous claims, wherein the fixing base (40) is attached to the rib (24) by rivets, welding, gluing and/or threaded coupling devices.

8. Profiled bar (4) according to any of the previous claims, wherein the free end (44) of the fixing base (40) has a pair of shoulders (76) which define an end stop in the insertion of the attachment element (20) inside the coupling aperture (36), said shoulders (76) abutting on the rib (24).

9. Profiled bar (4) according to any of the previous claims, wherein the free end (44) has a pair of draft bevels (80) to facilitate the insertion of the attachment element (20) inside the coupling aperture (36).

10. Profiled bar (4) according to any of the previous claims, wherein said rib (24), on the side opposite the plate (28), comprises a longitudinal stiffening element (42).

11. Frame (8), in particular for the support of suspended ceilings, comprising a plurality of profiled bars (4, 4', 4") according to one or more of the previous claims, wherein said profiled bars (4, 4', 4") are mechanically coupled to each other so that the attachment element (20) of a first profiled bar (4') couples into the coupling aperture (36) of a second profiled bar (4") .

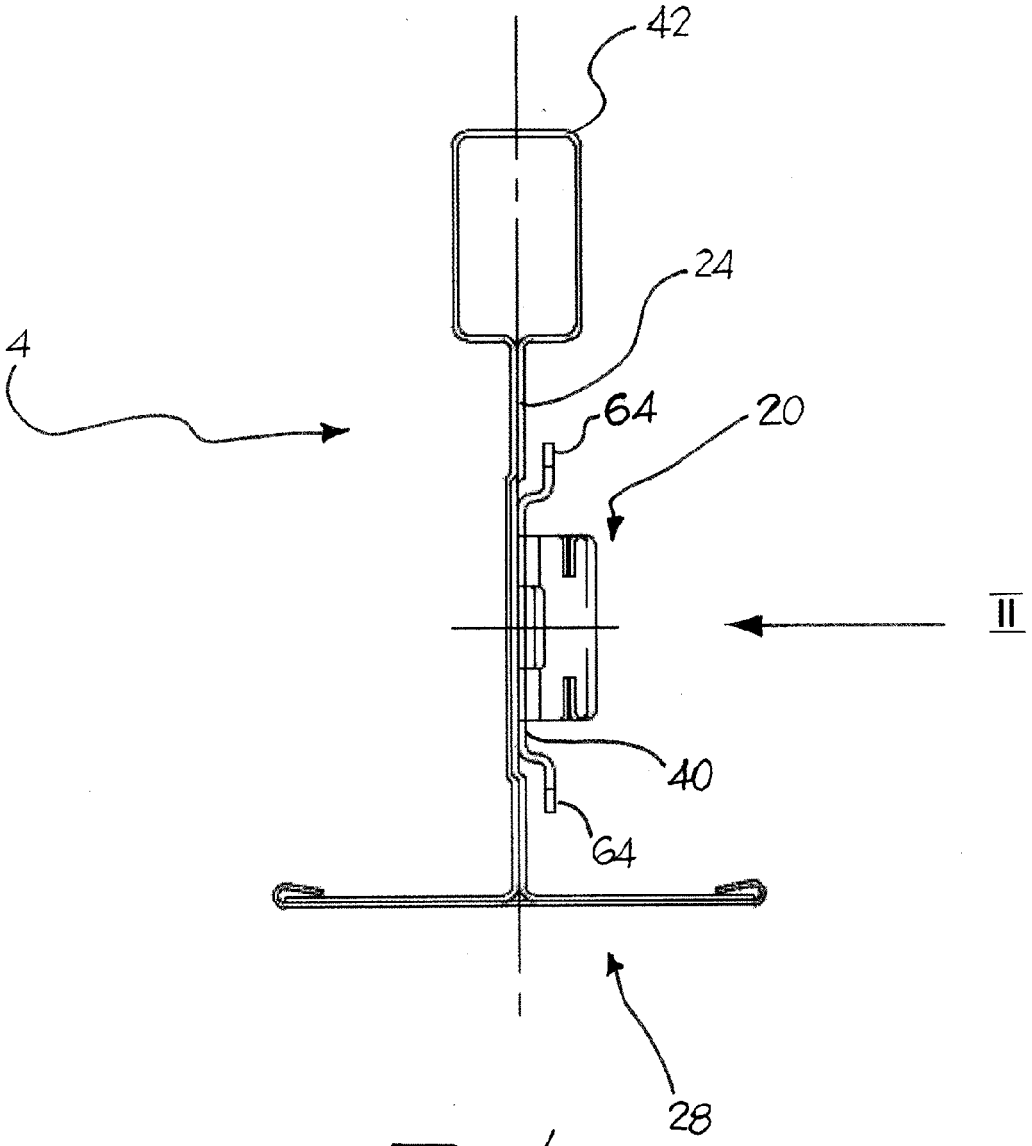

Fig.1

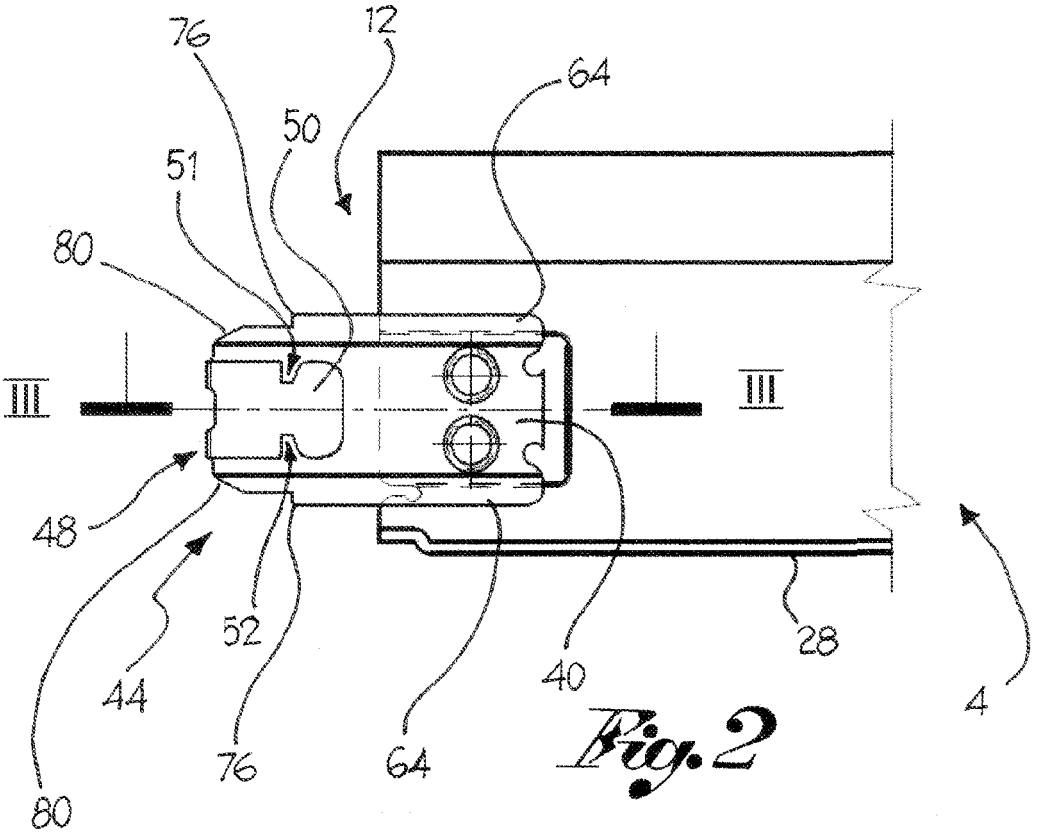
76
12
64
50
51
80
III
III
48
52
44
76
64
40
28
4
80

Fig.2

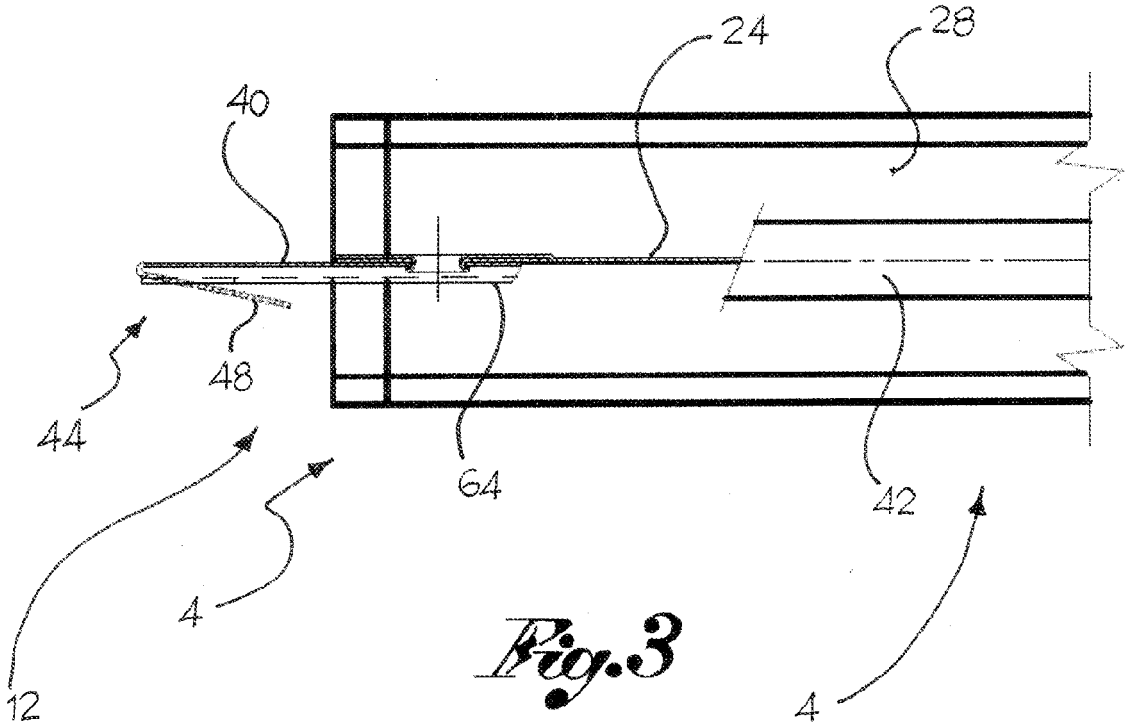
24
28
40
48
44
64
42
4
12
4

Fig.3

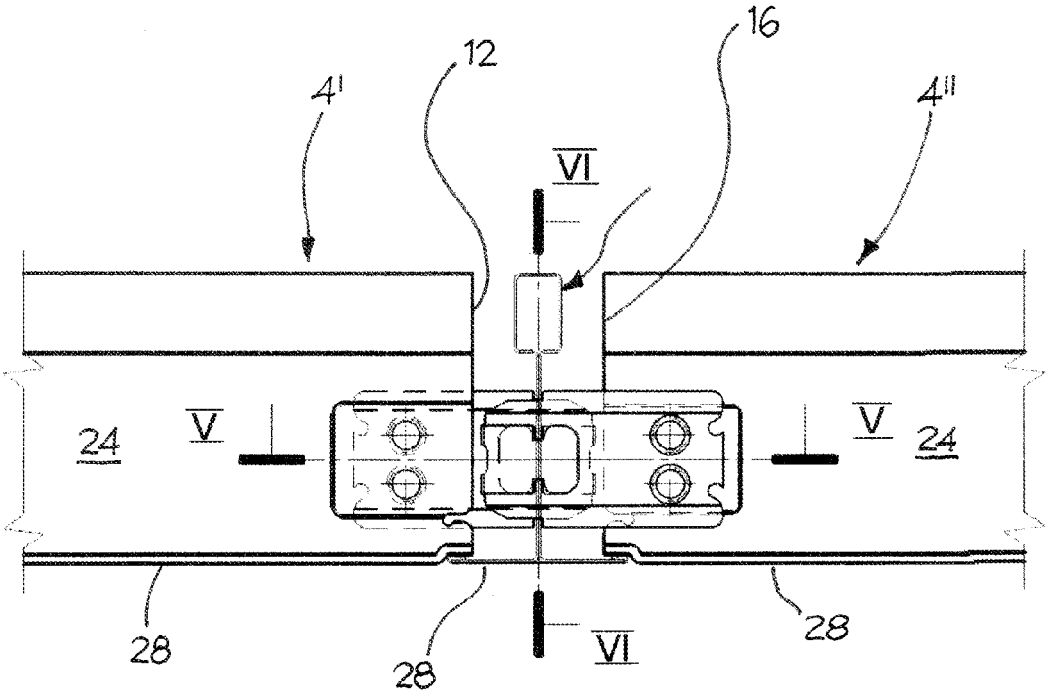

Fig. 4

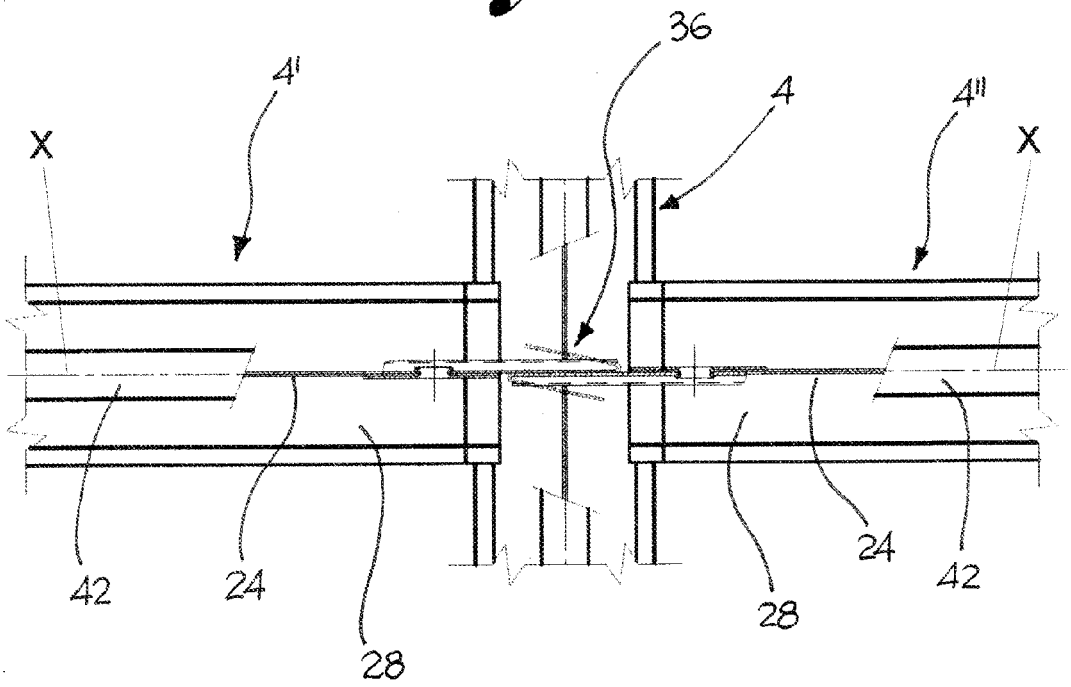

Fig. 5

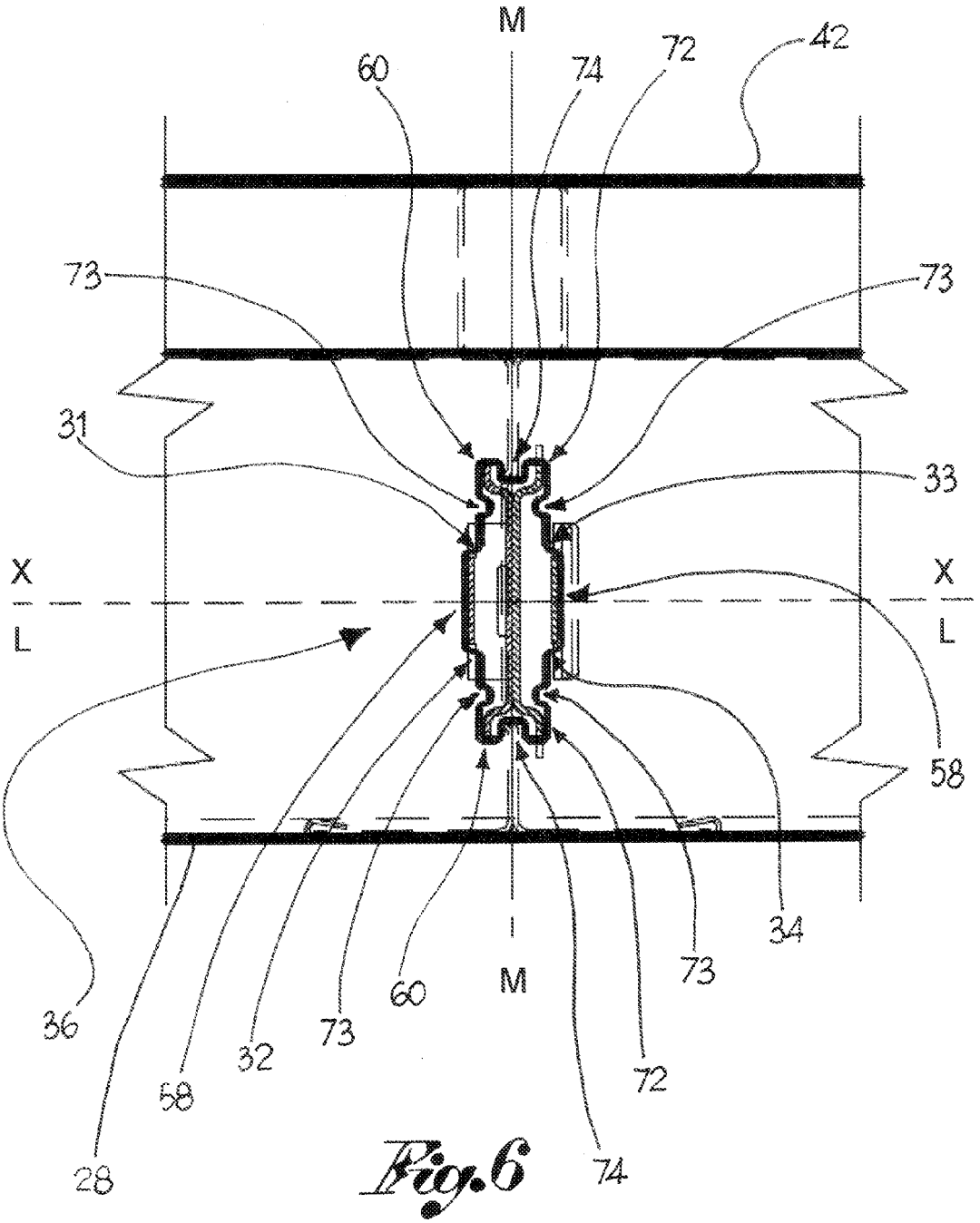

Fig. 6

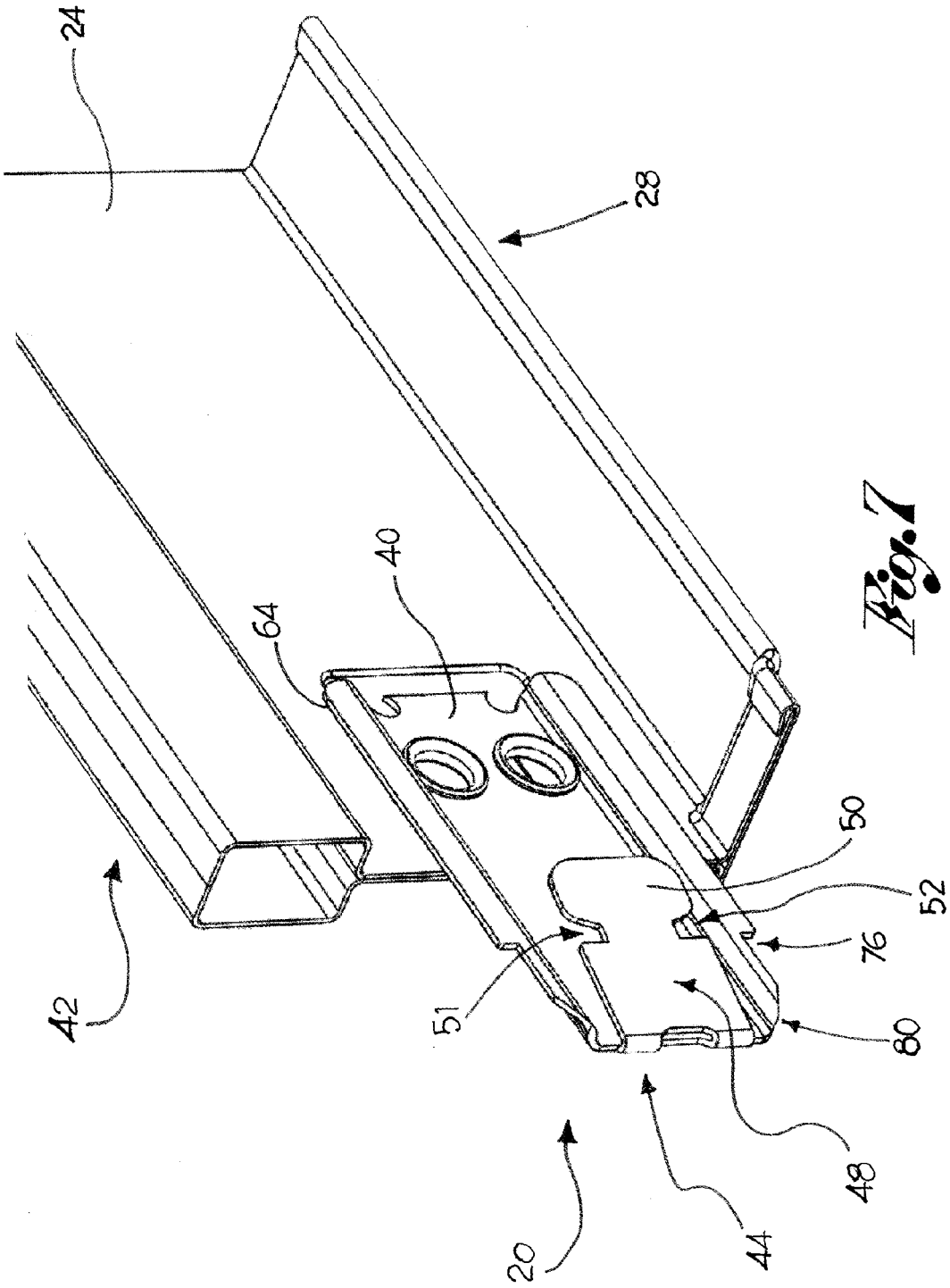

Fig.7

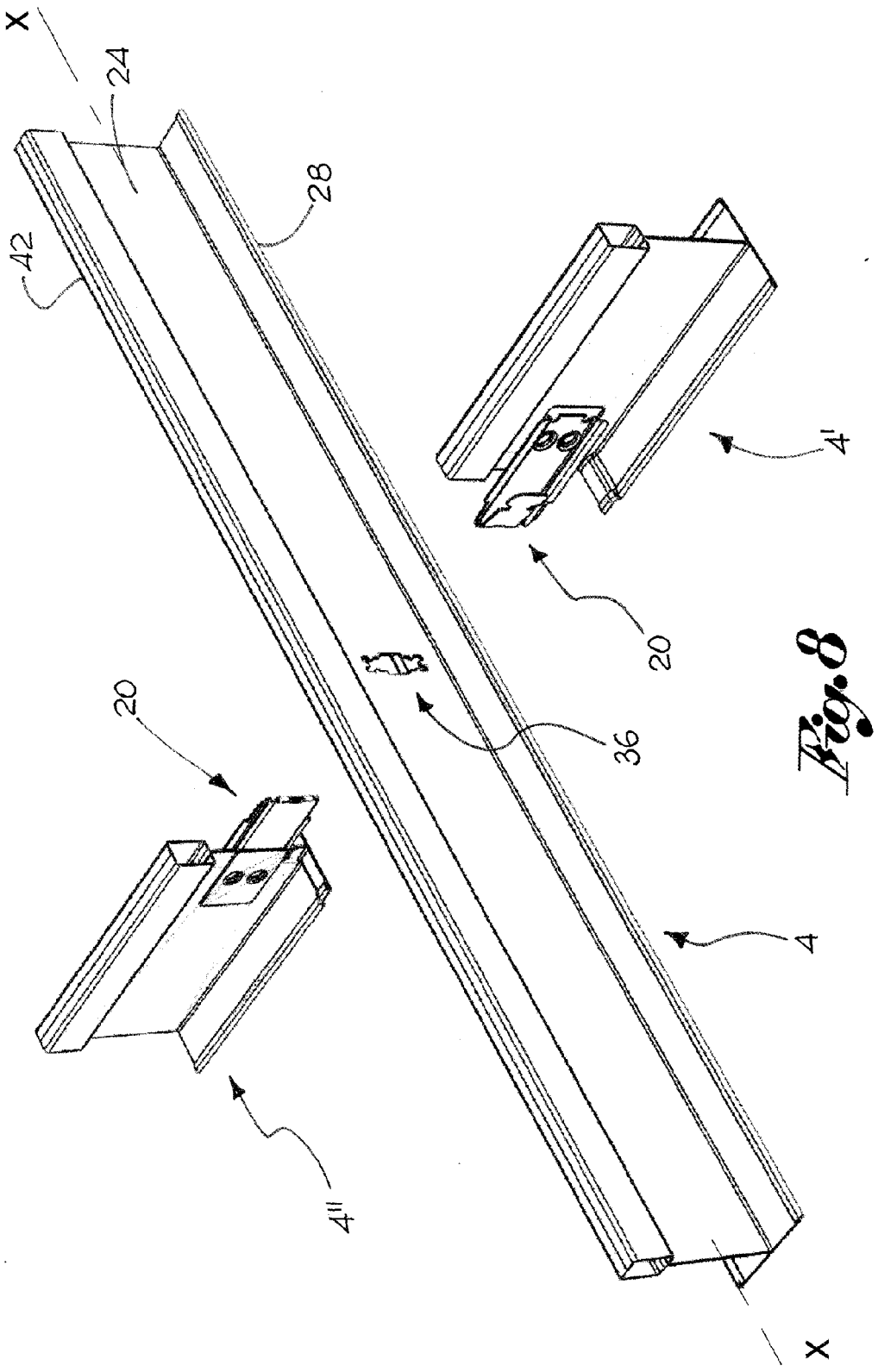

Fig.8

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EUROPEAN SEARCH REPORT

Application Number
EP 11 16 0689

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 2004/159064 A1 (OKUMURA MASAHIRO [JP]) 19 August 2004 (2004-08-19) * paragraphs [0076] - [0079]; figures 22,23 *	1-11	INV. E04B9/12
A	US 3 675 957 A (LICKLITER ROBERT PAUL ET AL) 11 July 1972 (1972-07-11) * column 3, lines 16-19; figures 1-6 *	9	
A	US 3 093 221 A (PURDY BURL O) 11 June 1963 (1963-06-11) * figure 4 *	1-11	

TECHNICAL FIELDS SEARCHED (IPC)
E04B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	21 July 2011	Rosborough, John

CATEGORY OF CITED DOCUMENTS

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21-07-2011

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REFERENCES CITED IN THE DESCRIPTION

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- WO 2004042162 A1 **[0007]**
- WO 2006100068 A1 **[0007]**