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(54) **FRAME-LIKE ELEVATOR SHAFT STRUCTURE**

(57) The invention relates to a frame-like elevator shaft structure comprising a plurality of constructional elements, the constructional elements being adapted in such a way that a first constructional element (10;14) brought into releasable engagement with a second constructional element (12;16) is no longer disengageable from the second constructional element when a third constructional element (26, 25;30) is brought into engagement with the first constructional element (10;14) and/or the second constructional element (12;16).

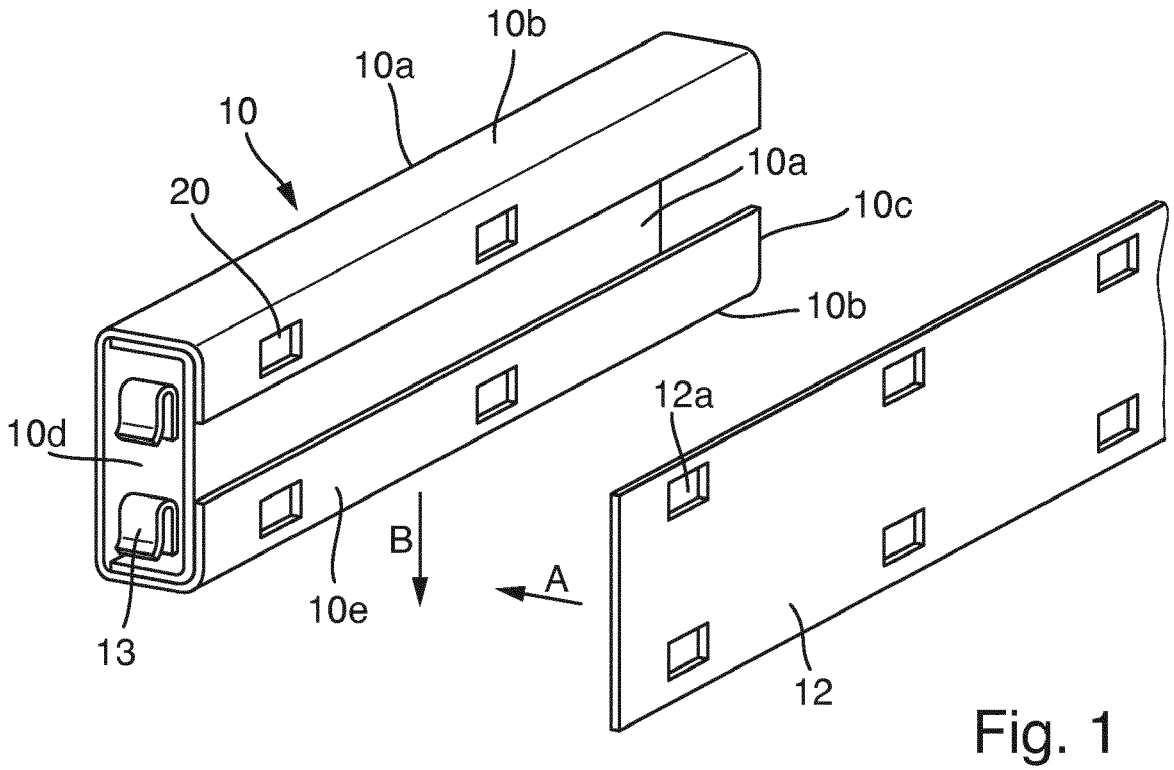

Fig. 1

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Description

Field of the invention

[0001] The inventions pertains to the field of frame-like elevator shaft structures.

Background of the Invention

[0002] Frame-like elevator shaft structures are known in the art. They usually comprise metallic constructional elements, which are screwed and/or riveted together in order to provide an elevator shaft frame.

[0003] The necessity of providing numerous screws and/or rivets makes the logistics involved in such a construction complicated. On the other hand, merely bringing constructional elements of such a frame-like elevator shaft into engagement with one another, without securing this engagement, leads to potentially unstable shaft structures as and thus hazardous.

[0004] The invention seeks to simplify the logistics involved in the construction of a frame-like elevator shaft structure comprising a plurality of constructional elements.

[0005] This is achieved by a frame-like elevator shaft structure comprising the features of claim 1, as well as a corresponding method for assembly of such a frame-like elevator shaft structure comprising the features of claim 7.

[0006] The structure according to the invention minimizes the requirement of screws and/or rivets, and thus simplifies logistics. Also, such a structure can be assembled faster and more efficiently than previous solutions. Herein, the constructional elements interact in such a way that assembly can only be achieved in a certain order, this order having to be specifically reversed for disassembly. Constructional elements brought into engagement with previously assembled constructional elements thus, in a form-fitting manner, block disassembly of previously assembled constructional elements. Thus, for example, the function of preventing unwanted disassembly which in previous solutions was performed by screws and/or rivets, can now be performed by further constructional elements. This greatly reduces the number of parts required for the construction. Preferably, after a final element, for example the roof element of the shaft, is assembled, no other constructional element can be disassembled, without first disassembling this final element.

[0007] The frame-like elevator shaft structure according to the invention comprises a plurality of constructional elements, the constructional elements being adapted in such a way that a first constructional element brought into releasable engagement with a second constructional element subsequently becomes disengageable from the second constructional element after a third constructional element is brought into engagement with the first constructional element and/or the second constructional element.

[0008] Preferably, the constructional elements are provided as profiled beams and/or panels and/or plates. Such elements can be easily manufactured from suitable metallic materials.

[0009] Preferably, the constructional elements comprise hook like members and/or openings into which the hook like members of other constructional elements can be inserted. Hook like elements can be easily provided, for example by cutting and bending sections of the constructional elements. Openings can also be easily provided for example by cutting or punching the constructional elements.

[0010] According to a preferred embodiment, the hook like members and the openings are adapted such that constructional elements can be engaged with one another by means of a first displacement, during which a hook like member of one constructional element is inserted into a corresponding opening of the another constructional element, and a subsequent second displacement in a second direction, which is different from the first direction, especially perpendicular to the first direction, by means of which the hook like member of the one constructional element engages a portion of the other constructional element, especially a rear side portion, adjacent to the opening.

[0011] Preferably, the constructional elements are provided as metallic elements, although other suitable materials may also be used.

[0012] It is also possible that at least some constructional elements are fixed to one another by screws and/or rivets. This measure is especially possible to fix a final part to the structure such that or other constructional elements, which had previously been assembled without any screws and/or rivets are then disengageable.

[0013] It should be noted that the previously mentioned features and the features to be further described in the following are usable not only in the respectively indicated combination, but also in further combinations or taken alone, without departing from the scope of the present invention.

[0014] The invention will now be further described with reference to the accompanying figures.

Figure 1 shows a schematic perspective view of two constructional elements according to a first embodiment of the invention in a state of non-engagement,

Figure 2 shows a part sectional view of the engagement mechanism of the two constructional elements of Figure 1,

Figure 3 shows the constructional elements of Figure 1 in a state of engagement, again in a schematic view,

Figure 4 shows further constructional elements, in part in a state of engagement, according to a further embodiment of the invention,

Figure 5 shows similar constructional elements as those of Figure 1 and Figure 4 according to a second embodiment of the invention in a more detailed view,

Figure 6 shows the constructional elements of figure 5 in an assembled state.

[0015] The principle of the invention can be realised in a plurality of ways. For example, with suitable constructional elements, it is possible to use only one type of element, i.e. such that for example the first, second and third elements essentially have the same shape. However, preferred embodiments of the invention will be described in the following, in which the first, second and third elements differ from one another in shape and/or function. Thus, a frame-like elevator shaft structure according to the now described preferred embodiments of the invention comprises various constructional elements of different shape.

[0016] As examples, Figures 1, 2 and 3 show, as constructional elements, C-beam elements 10 and panel elements 12, which are engageable with one another.

[0017] In Figure 4, these constructional elements 10, 12 are shown in a state of engagement together with further exemplary constructional elements, namely V-beams 14, V-shaped panels 16 and block plates 18.

[0018] These figures are schematically simplified. More details are shown in Figures 5 and 6.

[0019] A complete frame-like elevator shaft structure can be constructed, for example, from an appropriate number of vertically extending corner elements respectively formed of V-beams 14, V-panels 16 and block plates 18, joined together by an appropriate number of horizontally extending frame members, each comprising e.g. an C-beam 10 and a panel 12. Obviously, a frame-like elevator shaft structure can be provided in other forms, for example comprising non-horizontally extending C- or H-beams etc.

[0020] Referring back to Figure 1, constructional element 10 is provided as an C-beam, comprising a profile with a rear side 10a, upper and lower sides 10b, and front side 10c. Sides 10a, 10b, 10c are integrally formed as a continuous C-shaped profile.

[0021] Front side 10c comprises two sections, i.e. an upper and lower section, each respectively extending at an angle of 90 degrees from the upper and lower section 10b respectively. Both sections comprise an outer side 10e, especially visible in Figur 1, and an inner side 10f, indicated in Figure 2.

[0022] Upper and lower sections of front side 10c are each provided with a plurality of openings 20.

[0023] According to a first embodiment, at least at one end constructional element or C-beam 10 is provided with an end wall 10d, in which a plurality of hook shaped members 13 are provided. These hooks are adapted for interaction with openings in further constructional elements, as will be expanded on below. According to a second embodiment, end wall 10d can be provided with holes for interaction with screws and further constructional elements, as will be expanded on with reference to figure 5 below.

[0024] Constructional element 12 is formed as a panel member, and dimensioned so that the area it covers essentially corresponds to that defined by front side 10c of element 10, i.e. the area of the upper and lower sections and the area in between, or, in other words, the area of rear side 10a.

[0025] Constructional element 12 is provided with a number of hook like elements 12a (especially visible in Figure 2), also referred to as hooks in the following, the number of which corresponds to that of openings 20 in upper and lower portions of side 10c.

[0026] The hooks 12a are adapted and dimensioned for engagement with the openings 20 of element 10. As can especially be taken from Figure 1, this engagement is achieved by first displacing element 12 in a first direction A relative to element 10 (i.e. towards element 10), so that the hooks 12a penetrate the openings 20. Subsequently, a relative movement of element 12 (and thus hooks 12a) in a direction B (parallel to front side 10c) is performed, so that the hooks engage the inner sides 10f of the upper and lower portions of side 10c of element 10. Hereafter, the elements 10 and 12 are in a state of engagement such that a disengagement merely by a movement in a direction reverse to direction A is not possible. This can especially be taken from Figure 2.

[0027] Constructional elements 10 and 12 in this state of engagement form an essentially O-shaped beam, which is designated 15 in the following (see especially Figure 3).

[0028] Obviously, without any further measures, constructional elements 10 and 12 would still be disengageable by performing both relative relative displacements A, B described above in reverse order and direction. In order to prevent such a disengagement and provide a stable structure, according to the invention further constructional elements are used.

[0029] In Figure 4, such further constructional elements are shown. Be it first referred to a constructional element 25 provided as a V-shaped beam 25. Beam 25 can be provided with a constructional element 14 provided as an essentially V-shaped profile member, engageable by a constructional element 16 provided as a V-shaped panel. These can be provided for example by bending constructional elements 10 and 12 along their respective lengths.

[0030] The mechanism for bringing elements 14 and 16 into engagement essentially corresponds to that described above for bringing elements 10 and 12 into engagement, i.e. element 16 is provided with a number of hooks, which are inserted into openings provided in element 20 by a displacement of element 16 in a third direction C, so that the hooks penetrate corresponding openings in element 16, and brought into engagement with element 20 a by relative displacement in a fourth direction D perpendicular to the third direction C.

[0031] Beam 25 is provided with side faces 26 (formed by side faces of constructional element 14), in which a number of openings 28 are formed. These openings 28 are adapted for engagement with the hooks 13 provided in the end walls 10d of element 10 forming part of O-shaped beam 15. This engagement is achieved by first displacing O-shaped beam 15 in a fifth direction E relative to beam 25, so that hooks 13 penetrate openings 28, followed by a relative displacement in a sixth direction F which corresponds to fourth direction D, so that hooks 13 engage the inner side of side faces 26.

[0032] In the completed construction, a beam 25 is positioned at both ends of beam 15. The end walls 10d of element 10 and the edges 12d of element 12 abut side faces 26 of beam 25 at both ends (only one end being shown in figure 4), so that a relative displacement of elements 10 and 12 in or against direction E is no longer possible.

[0033] In order to prevent a relative movement of beam 15 as a whole in a direction G opposite to direction F) further measures are required. For example, the engagement of hooks 13 with side faces 26 can be so tight that a relative displacement in direction G can not be achieved manually. A preferred means to prevent such a relative displacement of beam 15 n direction G relative to beam 25 will be described further below referring to figure 5.

[0034] A relative displacement of members 14 and 16, which together form beam 25, is still possible in this state of engagement. In order to prevent such a relative displacement, a block plate member 30 is provided, which is fixedly attached to the upper and/or lower end of beam 25, for example by means of screws or rivets. The shape of block plate member 30 corresponds to the profile shape or cross section of beam 25. After fixedly attaching block plate member 30 to at least one end of beam 25, disengagement of elements 14 and 16 is no longer possible.

[0035] According to a preferred embodiment of the invention, elements 10, 12 are provided such that in the state of engagement with beam 25 a relative displacement between elements 10 and 12 and a relative displacement between beam 15 as a whole and beam 25 as a whole is prevented. This aspect will now be described referring to Figures 5 and 6, which shows a second embodiment of the invention.

[0036] As already mentioned, elements 10, 12, 16, 26 are shown in greater detail in figures 5 and 6.

[0037] In figure 5, elements 10, 12, 16 and 26 are shown in a state before engagement with one another. In this embodiment, the vertical beam comprises number of beams 25, which abut at their ends (see especially Figure 6). Also provided is a joining element 50, which is to be arranged in the region where two elements 26 abut. The joining element 50 is provided with a profile which can be inserted into the profiles of elements 26. Be it noted that joining element 50 is optional.

[0038] According to this preferred embodiment, end wall 10d of element 10 (for ease of reference shown outside of element 10 in figure 5) is provided with two holes 10h, which for assembly are aligned with holes 26h provided in element 26. Joining element 50 is also provided with holes 52, which at assembly come into alignment with holes 10h and 26h. By means of screws 40, which engage holes 10h holes 26h and 52, element 10 can be fixed to joining element 50 and element 26. In this state, elements 12 and 16 are not yet in engagement with elements 10 and 26 respectively.

[0039] Subsequently, as also described above with reference to figure 1, element 12 is brought into engagement with element 10, thus forming horizontal beam 15. According to this preferred embodiment, the length of element 12 in its longitudinal direction is slightly larger than that element 10, so that after engagement of elements 10 and 12 the edges 12d of element 12 project over end walls 10d at both ends of beam 15. In case element 26 is provided with a corresponding shoulder, end wall 10d can engage element 26 as described with reference to figure 5, while edge 12d abuts shoulder 26s, as can be seen from figure 6. Be it noted in this connection that according to this embodiment the relative movement of elements 10 and 12 to achieve engagement is first in direction A, and then in a direction B', corresponding to the longitudinal direction of these elements 10, 12. Thus, hooks 12a' of element 12 are adapted for engagement with element 10 in direction B'.

[0040] Figure 6 shows the situation in which elements 12 and 16 have been brought into engagement with the already assembled elements 10 and 26. Figure 6 thus shows the final state of assembly of these elements, i.e. horizontal beams 15 with vertical beams 25. Be it noted that in this state of assembly joining element 50 is not visible as it is covered by the profiles of elements 16 and 26.

[0041] Thus, in the wording of the claims, a first constructional element (e. g. element 10) can be brought into engagement with a second constructional element (e. g. element 12). In this state of engagement, the first and second constructional elements are easily disengageable. Only when a third constructional element (e. g. element 26 or beam 25) is brought into engagement with the first and/or second constructional element (O-shaped beam 15, comprising elements 10 and 12) is a disengagement of the first and second constructional elements no longer possible. Especially, the third constructional element can be brought into engagement with the first constructional element before the first constructional element and the second constructional element are brought into engagement with one another.

[0042] Similarly, the V shaped profile member 14 of beam 25 can be considered a first constructional element in the above sense, the V-shaped panel 16 a second constructional element, and block plate member 30 a third constructional element.

Claims

1. Frame-like elevator shaft structure comprising a plurality of constructional elements, the constructional elements being adapted in such a way that a first constructional element (10; 14) brought into releasable engagement with a second constructional element (12;16) is disengageable from the second constructional element when a third constructional element (26, 25;30) is brought into engagement with the first constructional element (10;14) and/or the second constructional element (12;16).

2. Structure according to any one of the preceding claims, wherein the constructional elements are provided as profiled beams (10,14,15, 25) and/or panels (12, 16) and/or plates (30).

3. Structure according to any one of the preceding claims, wherein the constructional elements comprise hook like members (12a, 13) and/or openings (20, 28) into which the hook like members of another constructional element can be inserted.

4. Structure according to any one of the preceding claims, wherein the hook like members (12a, 13) and the openings (20, 28) are adapted such that constructional elements can be engaged with one another by means of a first displacement, during which the hook like members of one constructional element are inserted into the openings of another constructional element, and a second displacement in a second direction, which is different from the first direction, especially perpendicular to the first direction, by means of which the hook like members of the one constructional element engage a portion of the other constructional element, especially an inner side portion (10f) adjacent to the opening.

5. Structure according to any one of the preceding claims, wherein the constructional elements are provided as metallic elements.

6. Structure according to any one of the preceding claims, wherein at least some constructional elements are fixed to one another by means of screws and/or rivets.

7. Method for assembly of a frame-like elevator shaft structure comprising a plurality of constructional elements, wherein a first constructional element is releasably engaged with a second constructional element, and subsequently a third constructional element is releasably or non-releasabley engaged with the first and/or the second constructional element such that the first constructional element can no longer be disengaged from the second constructional element.

8. Method according to any one of preceding claim 7, wherein the constructional elements are provided as metallic elements.

9. Method according to any one of preceding claims 7 to 8, wherein the constructional elements are provided as profiled beams and/or panels and/or plates.

10. Method according to any one of preceding claims 7 to 9, wherein engagement and/or disengagement of the constructional elements comprises displacement of the constructional elements relative to each other.

11. Method according to any one of preceding claims 7 to 10, wherein engagement and/or disengagement of the constructional elements to or from another is achieved by a first relative displacement, by which hook like members of one constructional element are inserted into openings of another constructional element, followed by a second relative displacement in a second direction, which is different from the first direction, especially perpendicular to the first direction, by means of which the hook like members of the one constructional element engage a portion of the second constructional element, especially an inner side portion, adjacent to the opening.

12. Method according to any one of preceding claims 7 to 11, wherein at least some constructional elements are fixed to one another by means of screws and/or rivets.

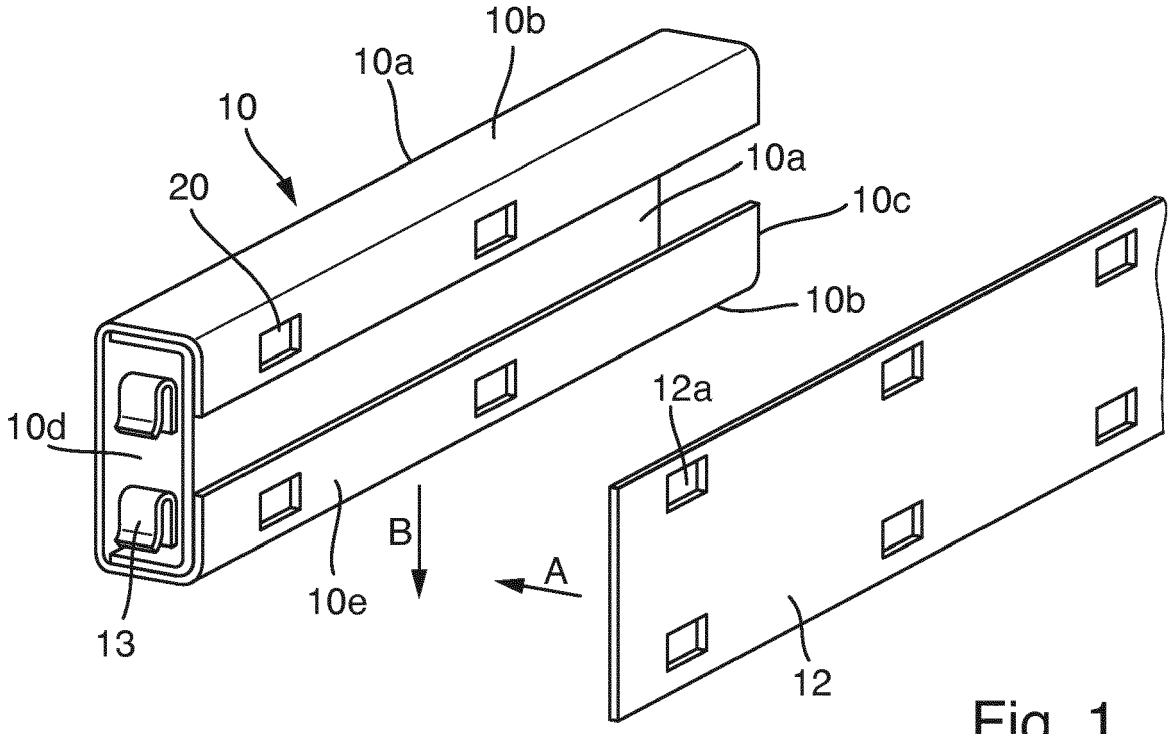

Fig. 1

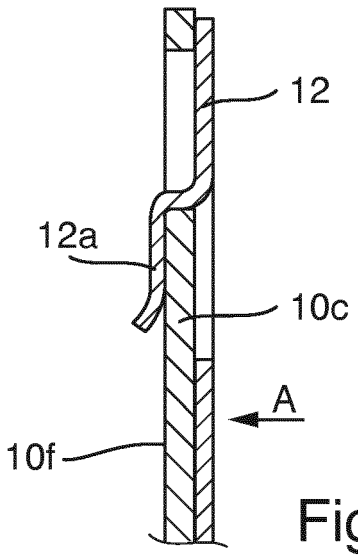

Fig. 2

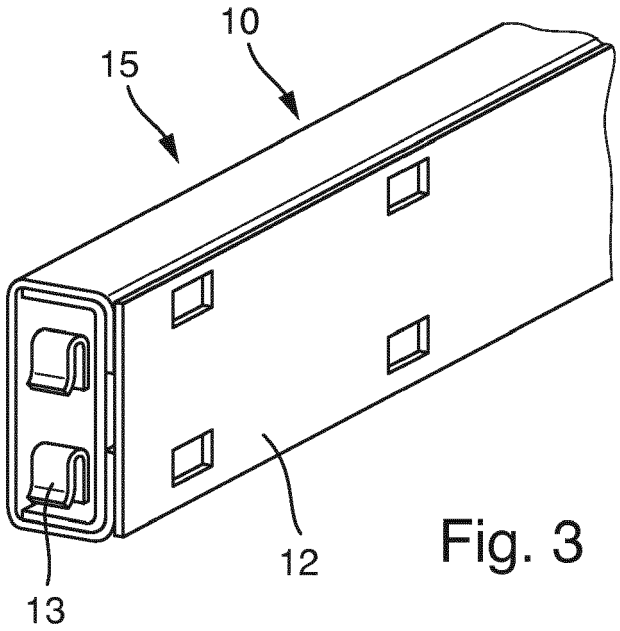

Fig. 3

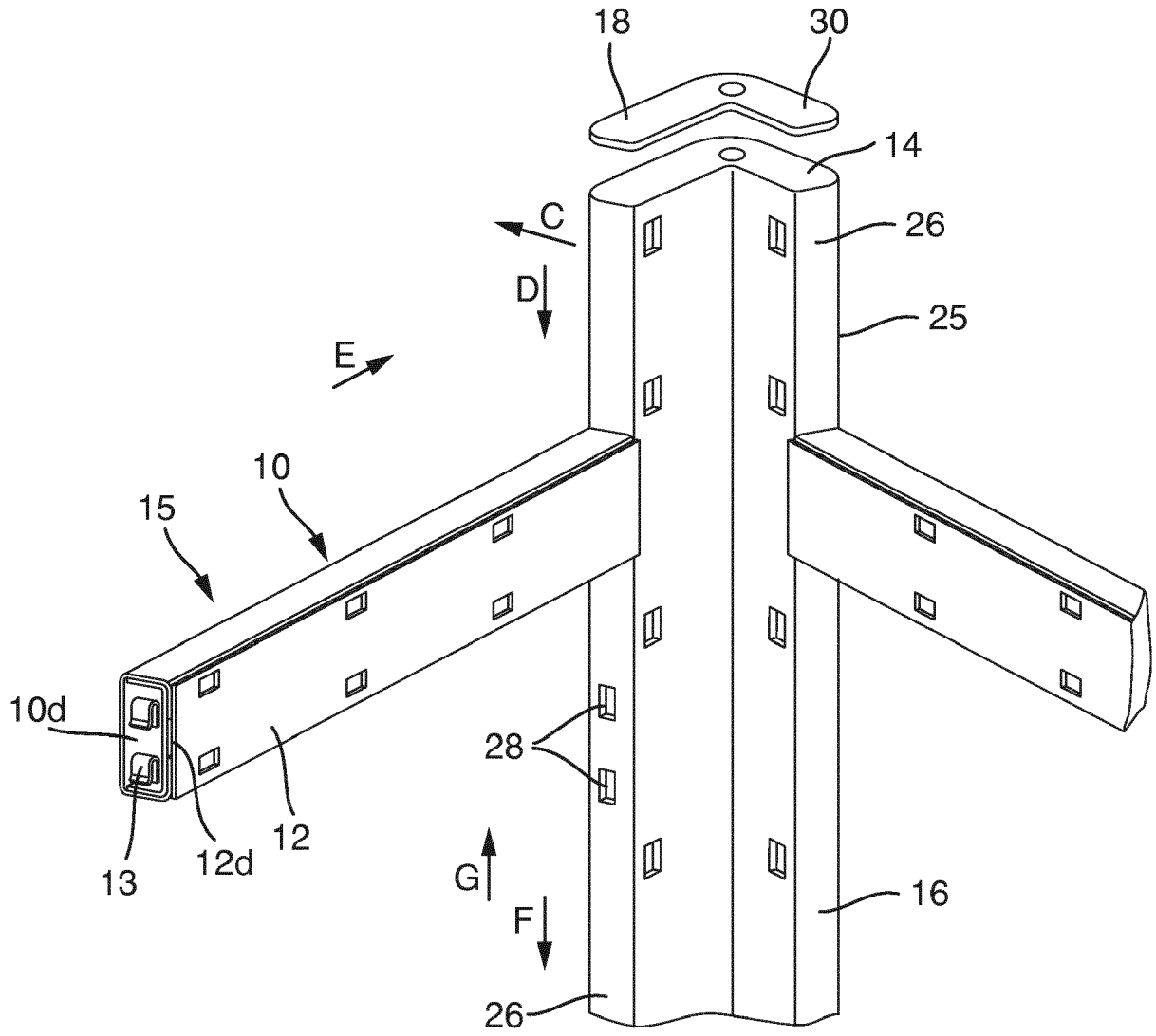

Fig. 4

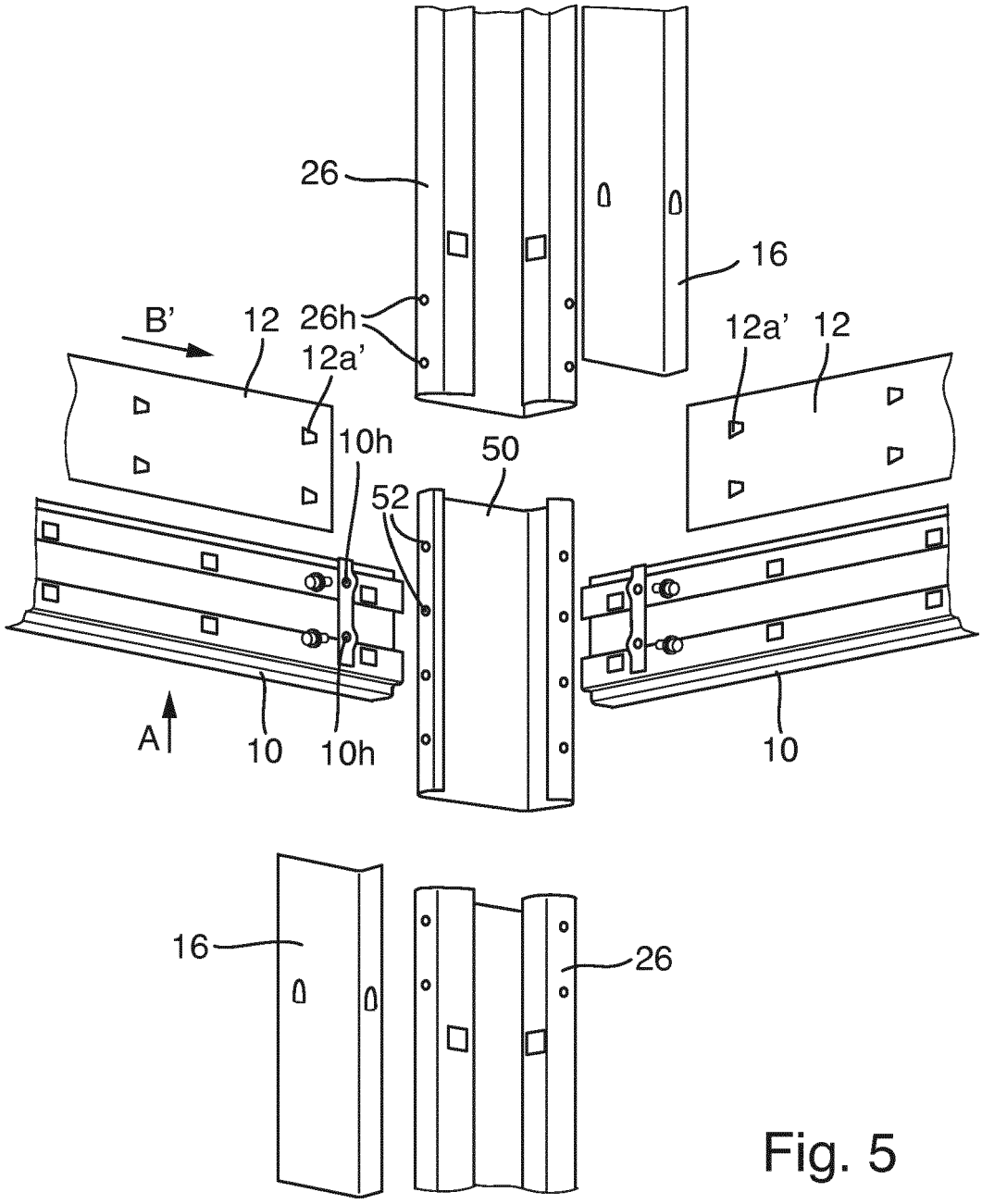

Fig. 5

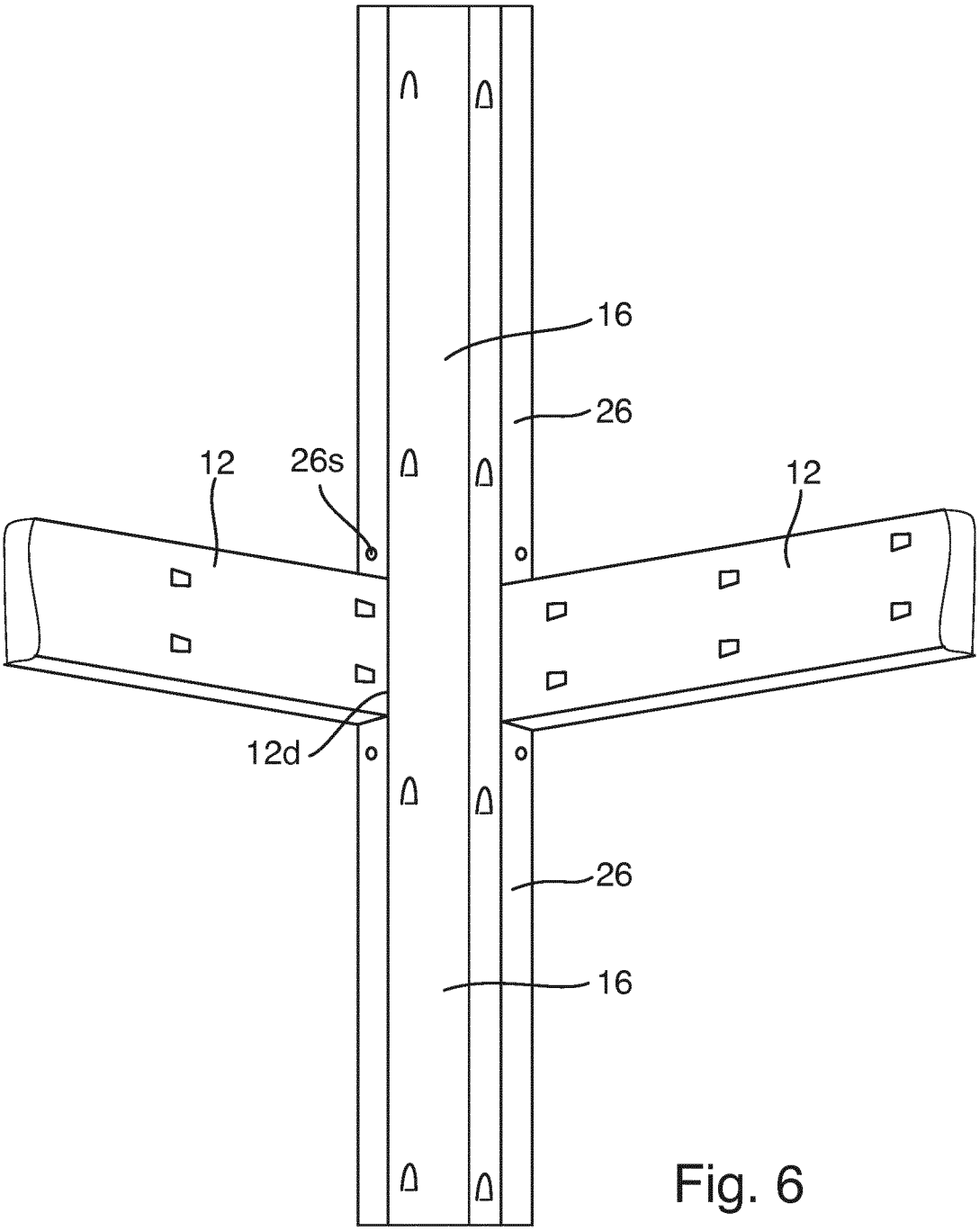

Fig. 6

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EUROPEAN SEARCH REPORT

Application Number
EP 16 16 1691

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	WO 2014/040941 A1 (DALDOSS ELEVETRONIC S P A [IT]) 20 March 2014 (2014-03-20) * claims 1-6; figures 1-4 *	1-12	INV. B66B11/00 E04F17/00
X	US 3 395 501 A (DAVIDSON JR FREDERIC A ET AL) 6 August 1968 (1968-08-06) * column 5, line 55 - column 6, line 30; figures 1,6,8,9 *	1,2, 5-10,12	
A	EP 1 801 063 A1 (INVENTIO AG [CH]) 27 June 2007 (2007-06-27) * abstract; figures 1-4 *	1-12	
			TECHNICAL FIELDS SEARCHED (IPC) B66B E04F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	5 September 2016	Janssens, Gerd

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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05-09-2016

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