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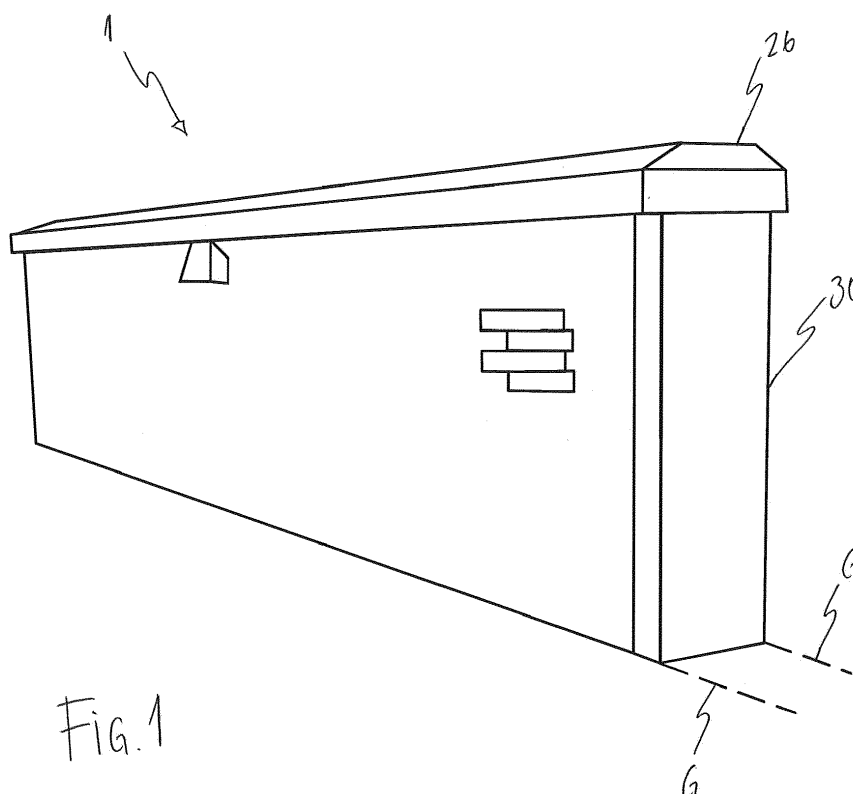
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(54) **WALL SECTION FOR CONSTRUCTING A WALL**

(57) A wall section (10) for constructing a wall (1) having a pre-fabricated L-element and a pre-fabricated wall element connected to the L-element by connecting means, such that the wall element is arranged in a substantially vertical position. The all section further has a pre-fabricated top element (26) arranged to enclose the top of the L-element and the top of the wall element. The

connecting means comprise at least a bottom positioning element, configured to position the wall element on the L-element, and a top connecting element partly arranged in an opening of the wall element and/or the L-element. The L-element, the wall element and the top element (26) define a hollow space inside of the wall section (10).



Description

TECHNICAL FIELD

[0001] The present invention relates to a wall section and to a wall constructed by such wall sections.

STATE OF THE ART

[0002] Today there are several known methods to construct a wall, e.g. by using building blocks of concrete or stone, which are stacked to desired height and length. The building blocks are often united with mortar, concrete or the like. Another type of wall is a so-called support wall including a number of L-elements arranged after each other. Despite known wall constructions there is still a desire to be able to construct a wall with less amount of time, to a lower cost but with an appealing appearance with customized features depending on its location and application.

SUMMARY

[0003] An object of the present invention is to provide improvements over prior art. This object is achieved by a technique defined in the appended independent claims; certain embodiments being set forth in the related dependent claims.

[0004] In a first aspect of the present invention, there is provided a wall section for constructing a wall including a pre-fabricated L-element, a pre-fabricated wall element, connected to the L-element by connecting means, such that the wall element is arranged in a substantially vertical position. The wall section further includes a pre-fabricated top element, arranged to enclose the top of the L-element and the top of the wall element. The connecting means include at least a bottom positioning element, configured to position the wall element on the L-element, and a top connecting element partly arranged in an opening of the wall element and/or the L-element. Also, the L-element, the wall element and the top element define a hollow space inside of the wall section.

[0005] This wall section enables an effective construction of a wall with the three main elements, the wall element, the L-element and the top element. Further, the wall section provides a flexibility for choosing features of the wall arranged in the hollow space as defined by the three elements. Such features could be electricity, water or the like. Electricity could be useful e.g. for lighting, an electrical driven gate or a security system. Water could be useful e.g. for watering the surroundings or a tap for providing water when washing the car.

[0006] In an embodiment, the L-element has a back part and thereto an integrated foot part, where the bottom positioning element is arranged on the end portion of the foot part extending away from the back part. This is advantage when it is desirable to maximize the hollow space within the wall section.

[0007] In another embodiment, an upper surface of the foot part is arranged to slant away from the back part. This is preferred to easily drain water otherwise gathering on the surface.

[0008] Further, the bottom positioning element may be substantially U-shaped, attached to the L-element and configured to receive a bottom part of the wall element, such that the wall element is positioned in a standing position. This type of bottom positioning element creates a stable foundation for the wall element.

[0009] Yet further, the top connecting element may include a first end part, arranged in an opening of the wall element or the L-element, a second end part connected to the other of the wall element and the L-element and an intermediate part extending between the first end part and the second end part. The first end part creates a strong attachment to either the wall element or the L-element, which also makes it easier to position the two elements at the right distance from each other.

[0010] The second end part may also be arranged in an opening of the other of the wall element and the L-element, preferably in a similar way as the first end part.

[0011] In a preferred embodiment, the first end part and the second end part are arranged in an opening of respective top of the wall element and the L-element. This mitigates the assembling process of the wall once the wall element and L-element is in position to be fixed in position.

[0012] In an embodiment the top connecting element is an I-beam.

[0013] In another preferred embodiment the second end part may be arranged to hook the other of the wall element and the L-element. It may in some situations be more preferred to hook the second end part to the other of the wall element or L-element. Thus, the second end part may include a first unit integrated with the intermediate part and arranged to extend over the top of the other of the wall element or L-element, and a second unit integrated with the first unit and arranged to extend substantially perpendicular to the first unit down along an outer side of the wall element or L-element.

[0014] In an embodiment the hollow space is configured to house cables, pipes, hoses, equipment for a gate, or the like. The wall section provides a flexibility for choosing features of the wall arranged in the hollow space. Such features could be electricity, water or the like. Electricity could be useful e.g. for lighting, an electrical driven gate or a security system. Water could be useful e.g. for watering the surroundings or a tap for providing water when washing the car.

[0015] In a second aspect of the invention there is provided a wall constructed by several wall sections as described above.

[0016] In a preferred embodiment the top connecting element of each wall section has a first end part, arranged in openings of two adjacent wall elements or L-elements, a second end part arranged to connect two adjacent of the other of the wall elements and L-elements, and an

intermediate part extending between the first end part and the second end part.

[0017] The second end part may either be arranged in openings of the two adjacent of the other of the wall elements and L-elements or hook the two adjacent of the other of the wall elements and L-elements.

BRIEF DESCRIPTION OF THE DRAWINGS

[0018] Embodiments of the invention will be described in the following, reference being made to the appended drawings which illustrate non-limiting examples of how the inventive concept can be reduced into practice.

Fig. 1 is a schematic perspective view of a wall according to an embodiment of the present invention arranged on an even ground level,

Fig. 2 is a schematic cross section view of the wall in Fig. 1 but arranged on a surface with a slanting ground level,

Fig. 3 is a schematic cross section view of a wall section, according to an embodiment, used to construct the wall in Fig. 1,

Fig. 4a is a schematic detailed cross section view of a top connecting element, according to an embodiment of the invention, arranged in the wall section in Fig. 3,

Fig. 4b is a top view of the top connecting element in Fig. 4a,

Fig. 4c is a side view of the top connecting element in Fig. 4a,

Fig. 4d is a top view of the top connecting element in Fig. 4a arranged between two adjacent wall sections,

Fig. 5a is a schematic detailed cross section view of a top connecting element, according to another embodiment of the invention, arranged in the wall section in Fig. 3,

Fig. 5b is a side view of the top connecting element in Fig. 5a,

Fig. 5c is a top view of the top connecting element in Fig. 5a arranged between two adjacent wall sections,

Fig. 6a is a schematic cross section view of a bottom positioning element according to an embodiment of the present invention,

Fig. 6b is a side view of two bottom positioning ele-

ments in Fig. 6a, arranged on two adjacent wall sections, and

Fig. 6c is a detailed view of the bottom positioning element in Fig. 6a.

DESCRIPTION OF EMBODIMENTS

[0019] With reference to Figs 1-3 a wall 1 and a wall section 10 constructing the wall 1 are illustrated. Depending on the length of the wall 1 more or less wall sections 10 are used. The wall 10 is preferably used to define a land area. For example, the wall 1 may be used as a decorative garden wall to define a residential area. in Fig. 1 an end piece 30 is arranged to mark the ending of the wall 1. For example, a gate (not shown) or the like can be attached to the end piece 30. Fig. 2 illustrate a cross section view of a wall 1 where the ground level G, G' differs on respective side of the wall 1. The below described wall 1 and wall section 10 can further be used as a combination of a retaining wall, which is able to control height differences in the ground level and configured to prevent the ground from moving, and a boundary wall, which is mainly configured to separate two areas from each other.

[0020] A wall section 10 includes a pre-fabricated L-element 11 which consists of a back part 12 and thereto an integrated foot part 13. The back part 12 is arranged in a substantially vertical position when constructing the wall 10 and has a thickness X1 in between 60 and 150mm, preferably 100 or 120mm. The foot part 13 extends substantially perpendicular to the back part 12 from the bottom of the back part 12. When the L-element is used for constructing the wall 1, at least the foot part 13 is arranged below the ground surface G, G'. A top surface 14 of the foot part 13 is preferably slanted, i.e. constructed to slant away from the back part 12 of the L-element 11. This provides the L-element 11 with a natural drain for water which otherwise would risk being gathered on the top surface 14 of the foot part 13. The L-element 11 acts as the main foundation of the wall 1 and may at least partly be made of concrete or stone.

[0021] The wall section 10 further includes a pre-fabricated wall element 16, with a rectangular cross section and a height to substantially match the height of the back part 12. The thickness X2 of the wall element 16 is preferably between 20 and 200mm. The wall element 16 may be made of many different types of material, such as concrete, plastic, wood or stone. Due to the application and the desired appearance of the wall 1 the material of the wall element 16 may be different. Further, the wall element 16 is connected to the L-element 11 by connecting means 18, 19. The connecting means 18, 19 are configured to arrange the wall element in a substantially vertical, standing position, parallel to the back part 12 of the L-element 11.

[0022] The connecting means includes at least a bottom positioning element 18, configured to position the

wall element 16 on the L-element 11, and a top connecting element 19 configured to connect the top 11 a of the L-element 11 with the top 16a of the wall element 16. The bottom positioning element 18 and the top connecting element 19 are also configured to position the wall element 16 on a desired distance from the back part 12 of the L-element 11 and to ensure that they are arranged in parallel.

[0023] The bottom positioning element 18, as illustrated in Figs 6a-c, is a substantially U-shaped portion but with a slanted bottom to match the inclination of the top surface 14 of the foot part 13. In order to be securely mounted to the foot part 13 the bottom positioning element 18 is provided with a protrusion 18', which preferably is an extension of one of the sides of the U-shape. The protrusion 18' is arranged in a slit 13' of the foot part 13. The bottom positioning element 18 is configured to receive the bottom 16b of the wall element 16. Preferably there are at least two bottom positioning elements 18 arranged along the extension of the foot part 13 of each L-element 11. These two bottom positioning elements 18 may be placed at the edges of the wall section 10. As shown in Fig. 6b a bottom positioning element 18 is arranged to overlap two adjacent foot parts 13a, 13b of two adjacent wall sections 10. A preferred length of the bottom positioning element 18 is between 100 and 400 mm, for example 200mm. Due to its shape, it further ensures the wall element 16 to be arranged in parallel with the substantially horizontal extension of the wall 1. In an embodiment, as illustrated in Fig. 6c, the bottom positioning element 18 includes a drain hole 25 which is configured to lead away water gathering in the bottom positioning element 18. The drain hole 25 is located near the bottom of the slanted bottom of the U-shape to which the water easily can run. An alternative shape (not shown) of a bottom positioning element could be an L-shape. Another alternative (not shown) to the bottom positioning element is a rod, protruding from the top surface of the foot part and extending into an opening in the bottom of the wall element.

[0024] The top connecting element 19, as illustrated in Figs 4a-d, is one possible embodiment which is configured to connect the top 11 a of the L-element 11 with the top 16a of the wall element 16. The top connecting element 19 has a first end part 21, a second end part 22 and an intermediate part 23 extending between the first end part 21 and the second end part 22. The first end part 21 is arranged in an opening 16a' in the top 16a of the wall element 16, which preferably has been pre-grounded out of the element 16. The second end part 22 is, in turn, arranged in an opening 11 a' in the top 11 a of the L-element 11, which also preferably has been pre-grounded out of the element 11. The top connecting element 19 is shaped as an I, where the first and second end parts 21, 22 are the top and the bottom of the I. The length X5 of the top connecting element 19 should basically represent a desired distance between the wall element 16 and the L-element 11. The height X6 of the I-shaped top con-

necting element 19 is preferably even throughout its extension as illustrated in Fig. 4c. A preferred height X6 is between 10 and 50mm, e.g. 30mm. The top connecting element 19 may preferably be made of metal having an even thickness X7 throughout the element of between 2 and 5mm.

[0025] Fig. 4d illustrate a top view of a wall 1, with the top element removed, constructed by two wall sections 10a, 10b arranged end to end adjacent each other. In order to connect the two wall sections 10a, 10b the top connecting element 19 is arranged in openings of both wall sections 10a, 10b. The top connecting element 19 is, as described above, an I-shaped element with a first end part 21 and a second end part 22. The first end part 21 has a first end portion 21 a arranged in the opening in the wall element of the first wall section 10a and a second end portion 21 b arranged in the opening in the wall element of the second wall section 10b. The first end part 21 is arranged at an optional distance from the outside of the wall element. The second end part 22 has a first end portion 22a arranged in the opening in the L-element of the first wall section 10a and a second end portion 22b arranged in the opening in the L-element of the second wall section 10b. Also, the second end part 22 is arranged at an optional distance from the outside of the L-element. The top connecting element 19 further has an intermediate part 23 extending between the first end part 21 and the second end part 22. With this feature it is preferred to arrange a top connecting element 19 in the boundary between two wall sections 10a, 10b.

[0026] The top connecting element 119, as illustrated in Figs 5a-c, is another possible embodiment, which also is configured to connect the top 11 a of the L-element 11 with the top 16a of the wall element 16. The top connecting element 119 has a first end part 121, a second end part 122 and an intermediate part 123 extending between the first end part 121 and the second end part 122. Preferably, the top connecting element 119 has an even thickness X8 of between 2 and 10mm, for example 5mm.

[0027] The first end part 21 is arranged in the opening 16a' in the top 16a of the wall element 16, similar to the previously described embodiment. The second end part 122 is instead arranged to hook the top 11 a of the L-element 11. It is of course possible to arrange the top connecting element 119 the other way around so that the first end part 121 is arranged in the opening of the top of the L-element and the second end part is arranged to hook the top of the wall element. However, the second end part 122 includes a first unit 122a integrated with the intermediate part 123. The first unit 122a is arranged to extend over the top 11 a of the L-element 11. Further, the second end part 122 includes a second unit 122b integrated with the first unit 122a. The second unit 122b extends substantially perpendicular to the first unit 122a down along the outer side of the L-element 11. The second unit 122b of the second end part 122 should however not extend down more than what the top element 26 covers so that it becomes visible from the outside of the wall

1. The first end part 121 may extend down into the wall element 16 as far as necessary, for example between 100 and 300mm.

[0028] Fig. 5c illustrate a top view of a wall 1, with the top element removed, constructed by two wall sections 10a, 10b arranged end to end adjacent each other. In order to connect the two wall sections 10a, 10b the top connecting element 119 is, as described above, arranged to connect the two wall sections 10a, 10b. The first end part 121 is arranged in the wall elements of the first and second wall section 10a, 10b. The second end part 122 is arranged to hook the L-elements of the first and second wall section 10a, 10b. The top connecting element 119 has, as described, an intermediate part 123 extending between the first end part 121 and the second end part 122. With this feature it is preferred to arrange the top connecting element 119 in the boundary between two wall sections 10a, 10b. Of course, the top connecting element, as also described above, may be arranged the other way around such that the first end part is arranged in the L-elements and the second end part is arranged to hook the wall elements.

[0029] The wall section 10 further includes a pre-fabricated top element 26 which is arranged to enclose the top 11 a of the L-element 11 and the top 16a of the wall element 16. The top element 26 has a first and a second side portion 26a, 26b which are arranged to extend in a vertical direction down along the extension of the L-element 11 and the wall element 16 respectively. Between an inner surface of the first side portion 26a and the L-element there is preferably a space. The space may have a width X3a of between 10 and 15mm, preferably 12mm. The same goes for the other side where an inner surface of the second side portion 26b and the wall element 16 are spaced, where the space may have a width X3b of between 10 and 15 mm, also preferably 12mm. The two spaces are preferred if there is a desire to for example mount a light arrangement or the like as the light arrangement may be arranged within the spaces to create a flowing light from the top of the wall 1 down along respective side.

[0030] The L-element 11, the wall element 16 and the top element 26 define a hollow space 27 inside the wall section 10. The hollow space 27 is configured to house cables, pipes, hoses, equipment for a gate, e.g. a motor, or the like and has preferably a width X4 of 30-300mm depending on the use of the wall.

[0031] Finally, although the inventive concept has been described above with reference to specific embodiments, it is not intended to be limited to the specific form set forth herein. Rather, the invention is limited only by the accompanying claims. Other embodiments than the specific above are equally possible within the scope of these appended claims. In addition, the terms "a", "an", "first", "second" etc. are not limiting features but merely provided for clarifying examples.

Claims

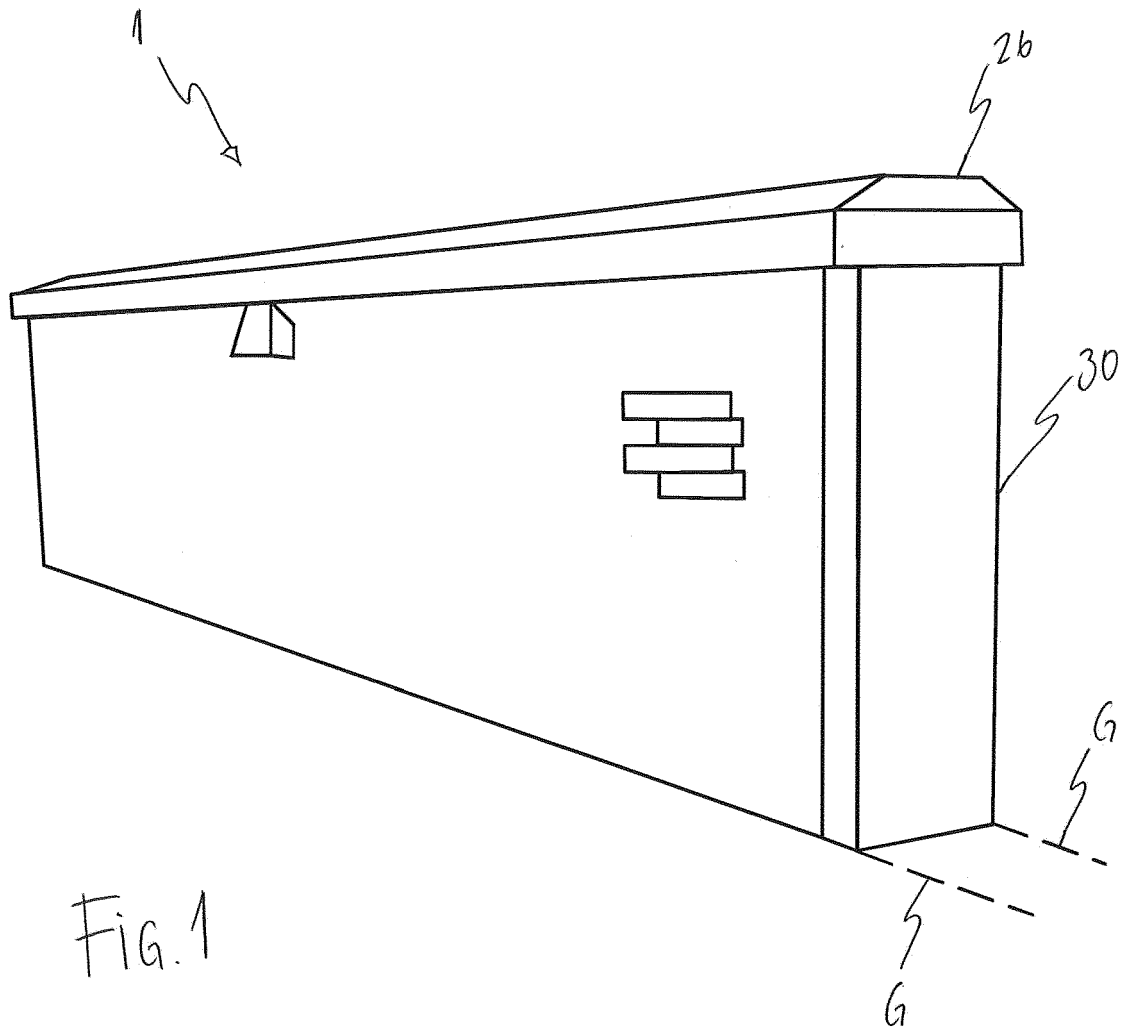
1. A wall section for constructing a wall (1) comprising a pre-fabricated L-element (11), a pre-fabricated wall element (16) connected to said L-element (11) by connecting means (18, 19), such that said wall element (16) is arranged in a substantially vertical position, and a pre-fabricated top element (26) arranged to enclose the top (11 a) of said L-element (11) and the top (16a) of said wall element (16), wherein said connecting means (18, 19) comprise at least a bottom positioning element (18), configured to position said wall element (16) on said L-element (11), and a top connecting element (19) partly arranged in an opening (11 a'; 16a') of said wall element (16) and/or said L-element (11), and wherein said L-element (11), said wall element (16) and said top element (26) define a hollow space (27) inside of said wall section (10).
2. The wall section according to claim 1, wherein said L-element (11) comprises a back part (12) and therefore an integrated foot part (13), and wherein said bottom positioning element (18) is arranged on the end portion of said foot part (13) extending away from said back part (12).
3. The wall section according to claim 2, wherein an upper surface (14) of said foot part (13) is arranged to slant away from said back part (12).
4. The wall section according to any one of the preceding claims, wherein said bottom positioning element (18) is substantially U-shaped, attached to said L-element (11) and configured to receive a bottom (16b) of said wall element (16), such that said wall element (16) is positioned in a standing position.
5. The wall section according to any one of the preceding claims, wherein said top connecting element (19) comprises a first end part (21; 121), arranged in an opening (16a'; 11 a') of said wall element (16) or said L-element (11), a second end part (22; 122) connected to the other of said wall element (16) and said L-element (11) and an intermediate part (23; 123) extending between said first end part (21; 121) and said second end part (22; 122).
6. The wall section according to claim 5, wherein said second end part (22) is arranged in an opening (16a', 11 a') of the other of said wall element (16) and said L-element (11).
7. The wall section according to claim 6, wherein said first end part (21) and said second end part (22) are arranged in an opening (11a', 16a') of respective top (11 a, 16a) of said wall element (16) and said L-

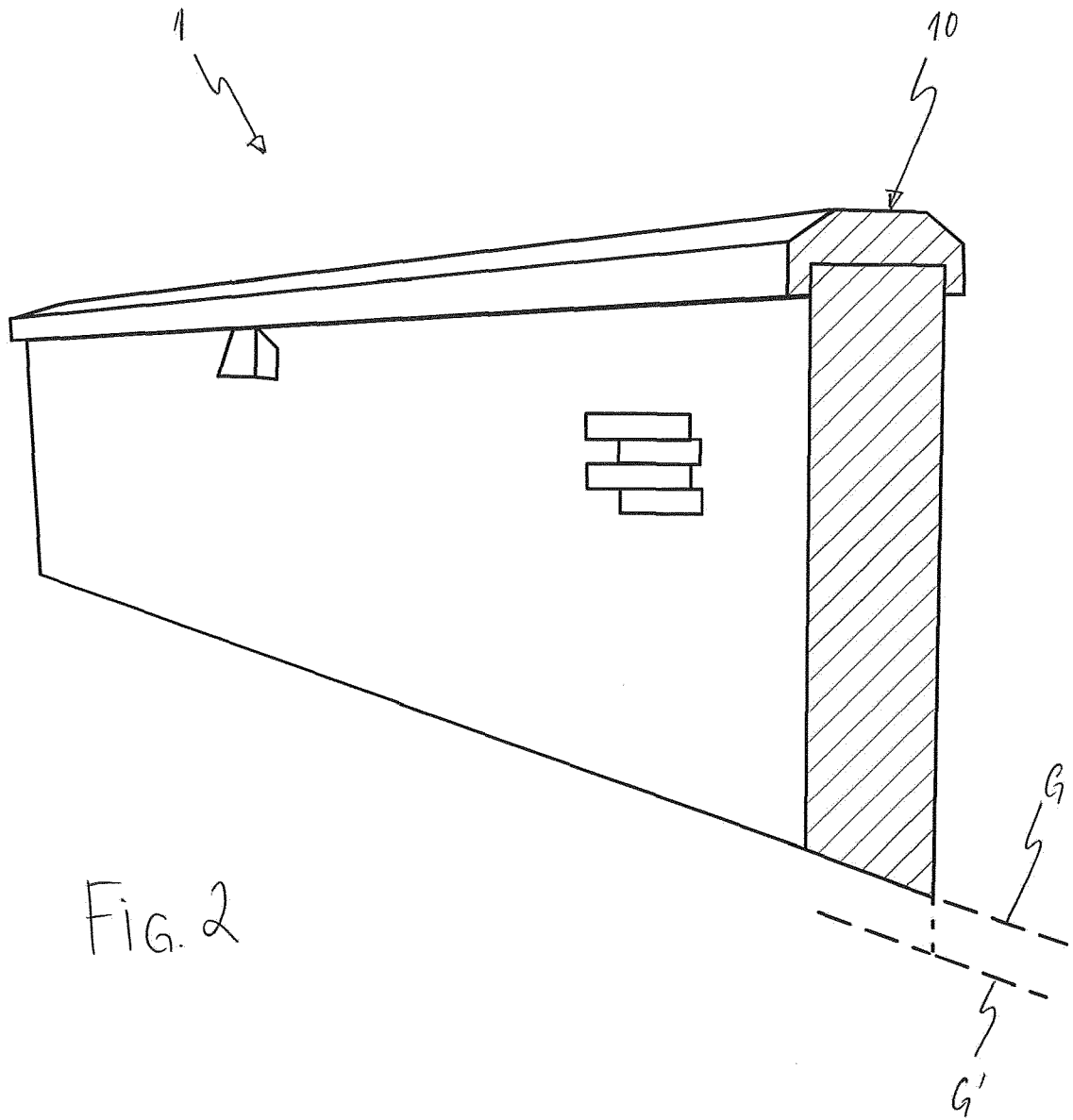
element (11).

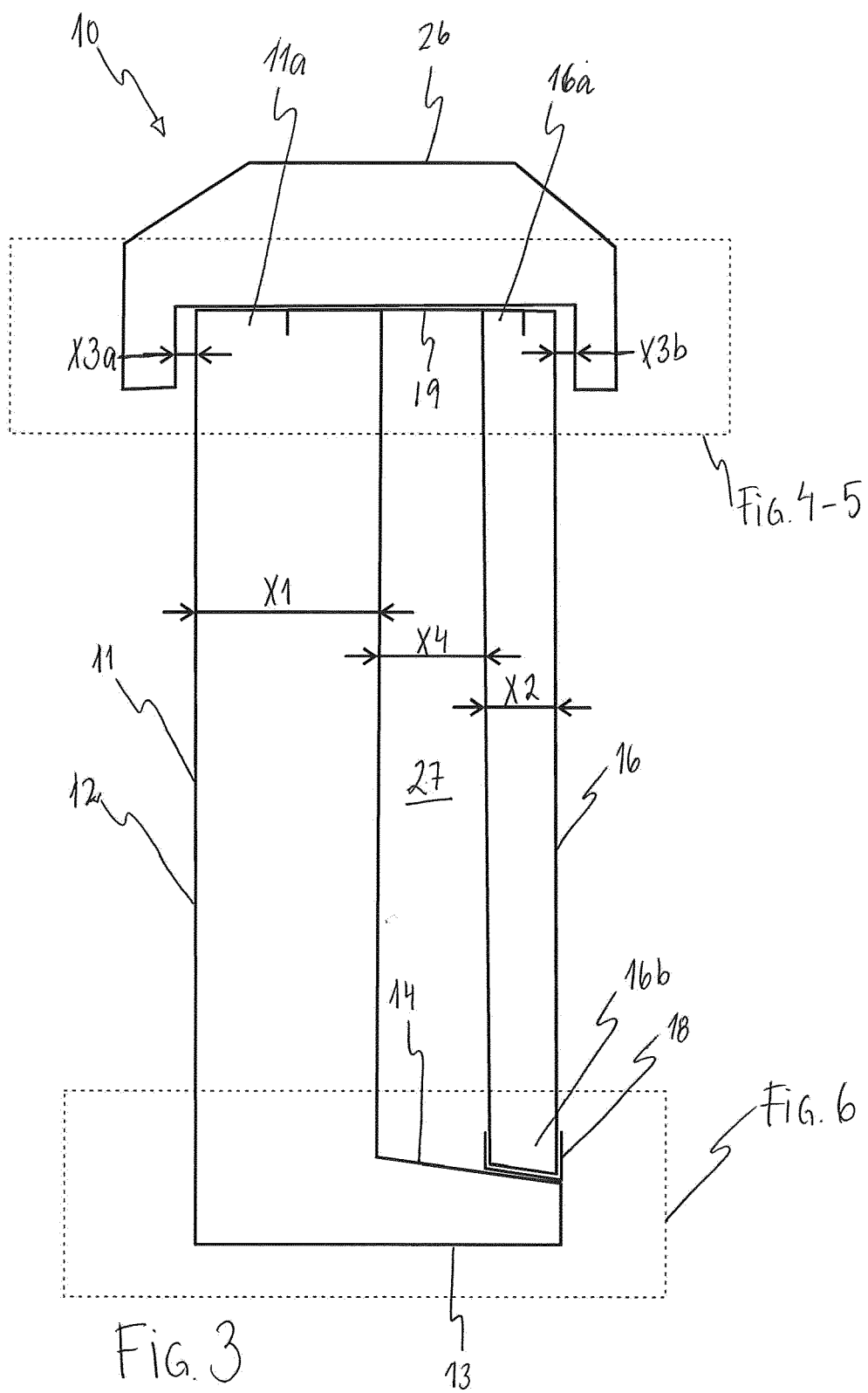
8. The wall section according to claim 6 or 7, wherein said top connecting element (19) is an I-beam. 5
9. The wall section according to claim 5, wherein said second end part (122) is arranged to hook the other of said wall element (16) and said L-element (11). 10
10. The wall section according to claim 9, wherein said second end part (122) comprises a first unit (122a) integrated with said intermediate part (123) and arranged to extend over the top (11 a; 16a) of the other of said wall element (16) and said L-element (11), and a second unit (122b) integrated with said first unit (122a) and arranged to extend substantially perpendicular to said first unit (122a) down along an outer side of said wall element (16) or L-element (11). 15
11. The wall section according to any one of the preceding claims, wherein said hollow space (27) is configured to house cables, pipes, hoses, equipment for a gate, or the like. 20
12. A wall comprising several wall sections (10; 10a, 10b) according to any one of the preceding claims. 25
13. The wall according to claim 12, wherein said top connecting element (19; 119) of each wall section (10; 10a, 10b) comprises a first end part (21; 121), arranged in openings (16a'; 11 a') of two adjacent wall elements (16) or L-elements (11), a second end part (22; 122) arranged to connect two adjacent of the other of said wall elements (16) and L-elements (11) and an intermediate part (23; 123) extending between said first end part (21; 121) and said second end part (22; 122). 30 35
14. The wall according to claim 13, wherein said second end part (22) is arranged in openings of (11 a'; 16a') said two of the other adjacent wall elements (16) and L-elements (11). 40
15. The wall according to claim 13, wherein said second end part (122) is arranged to hook said two of the other adjacent wall elements (16) and L-elements (11). 45

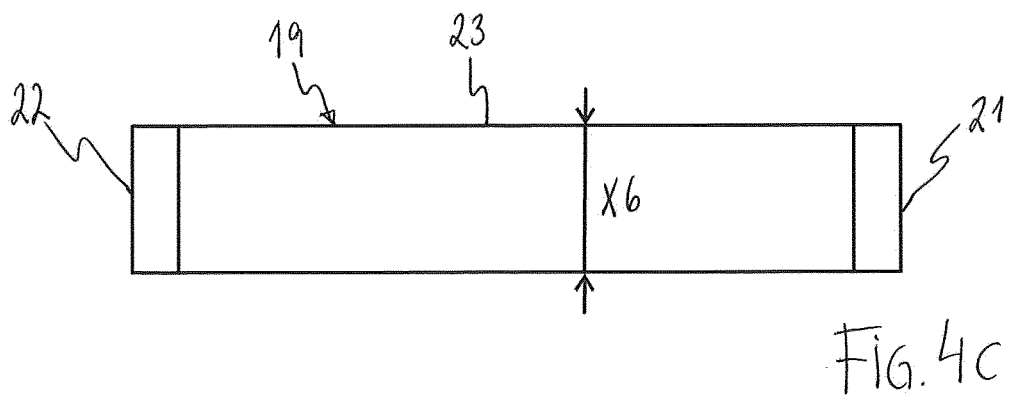
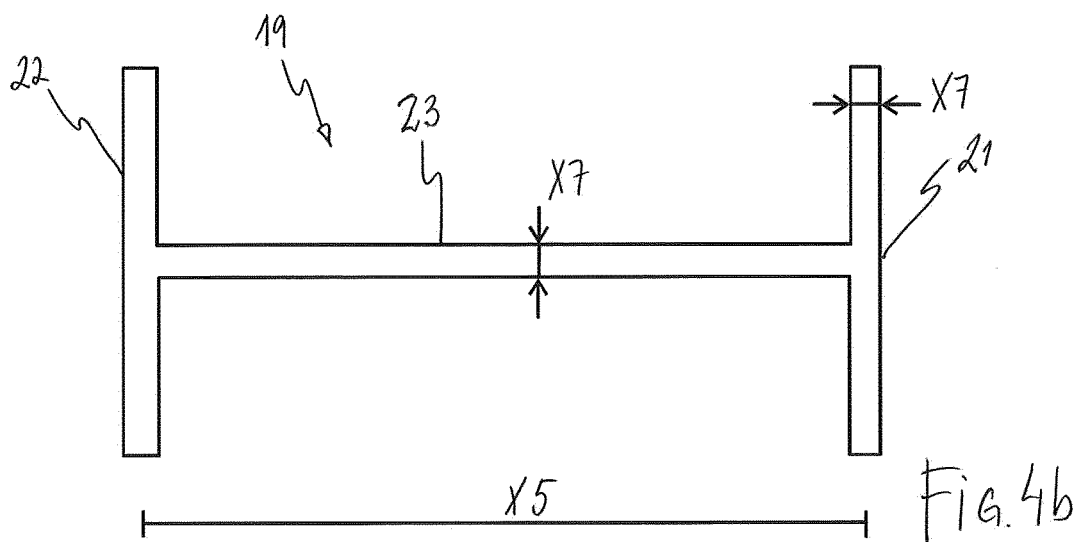
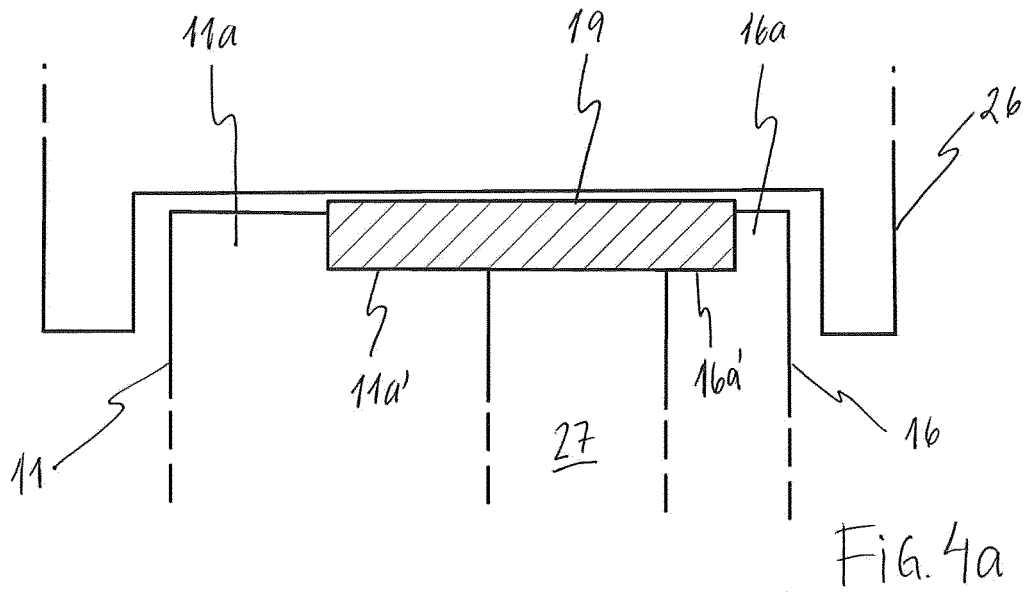
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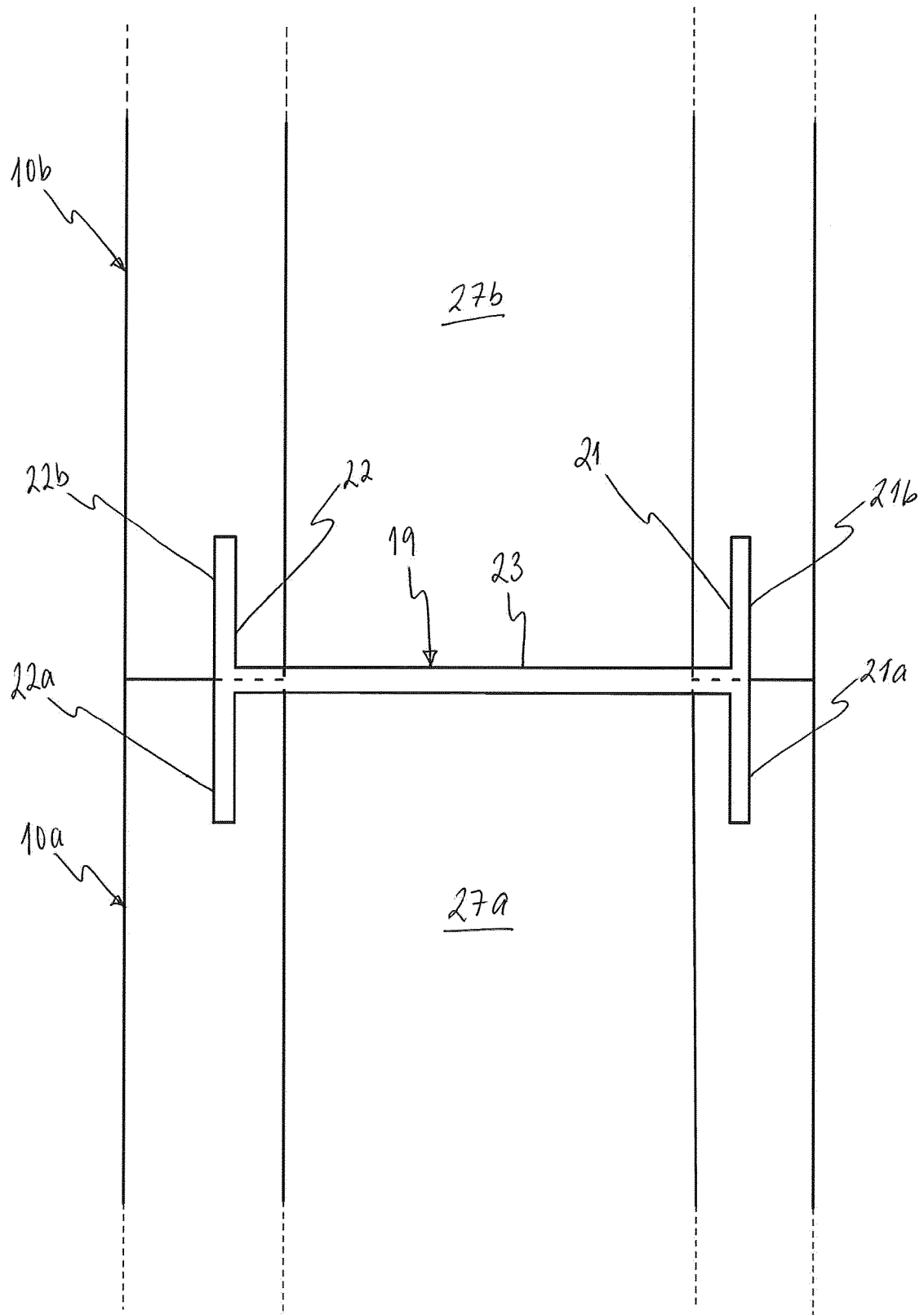


Fig. 4d

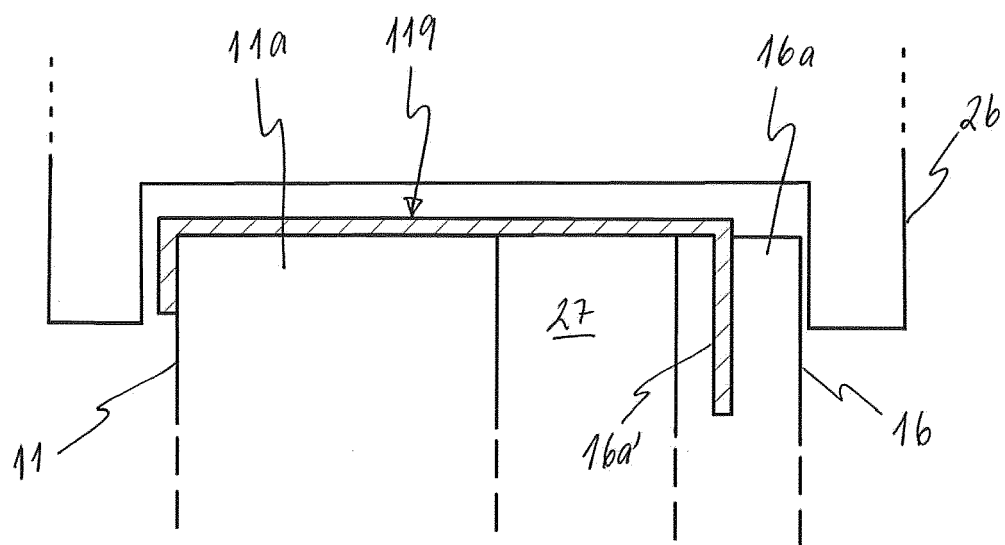


Fig. 5a

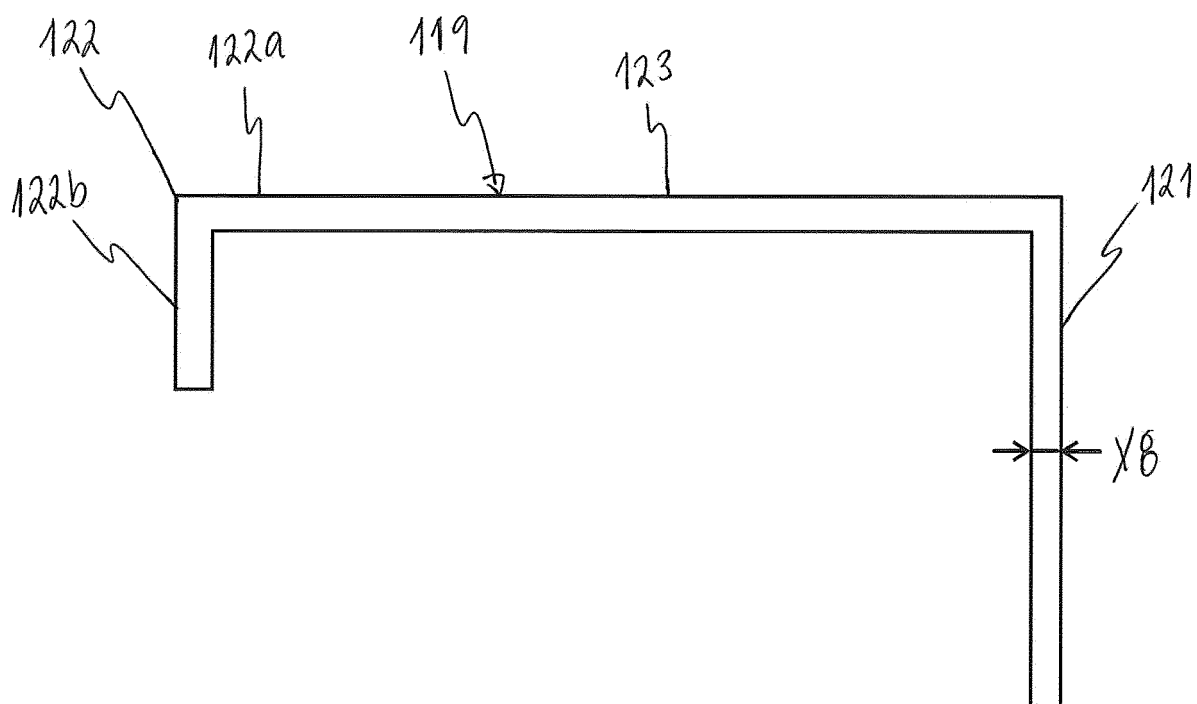


Fig. 5b

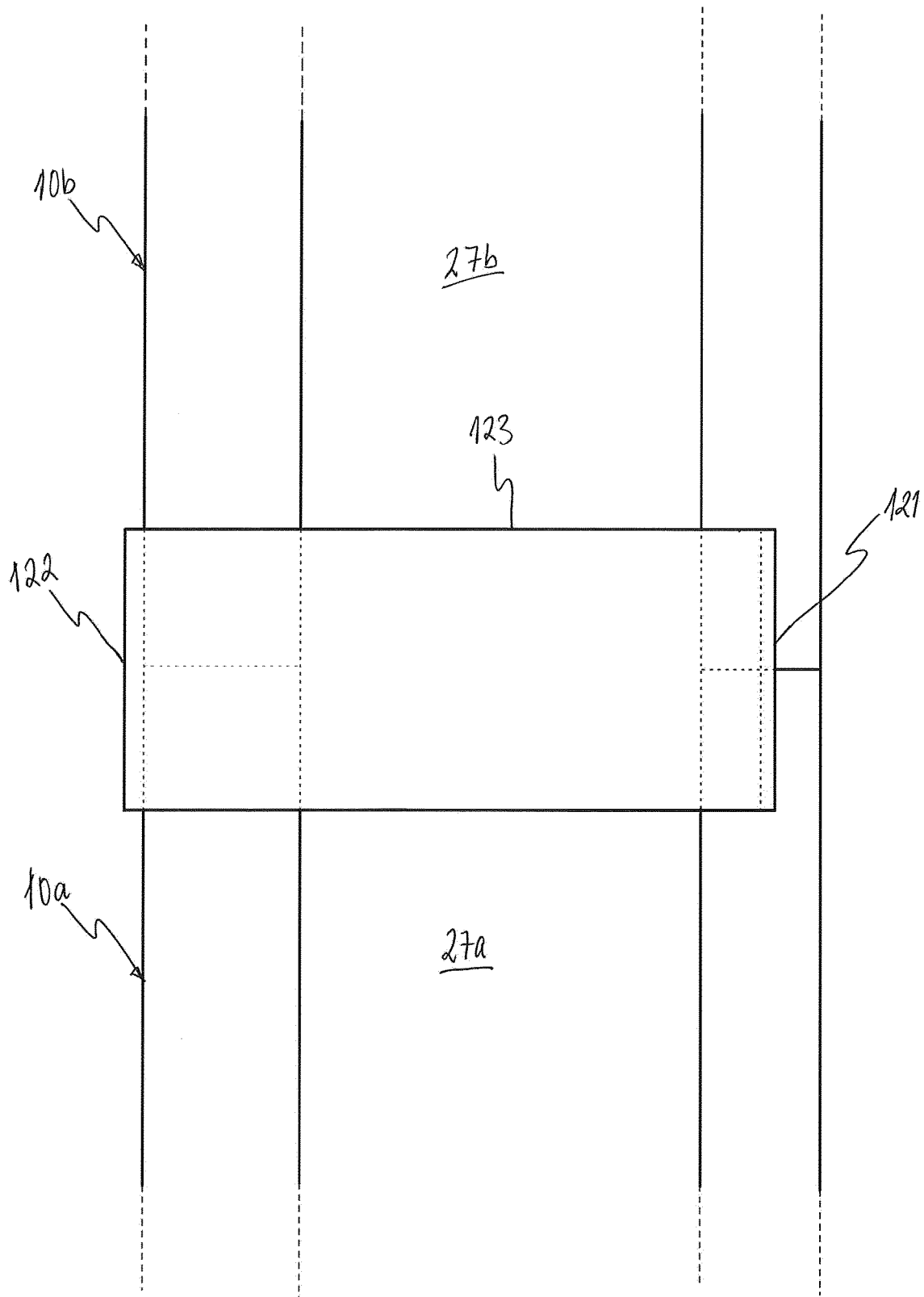
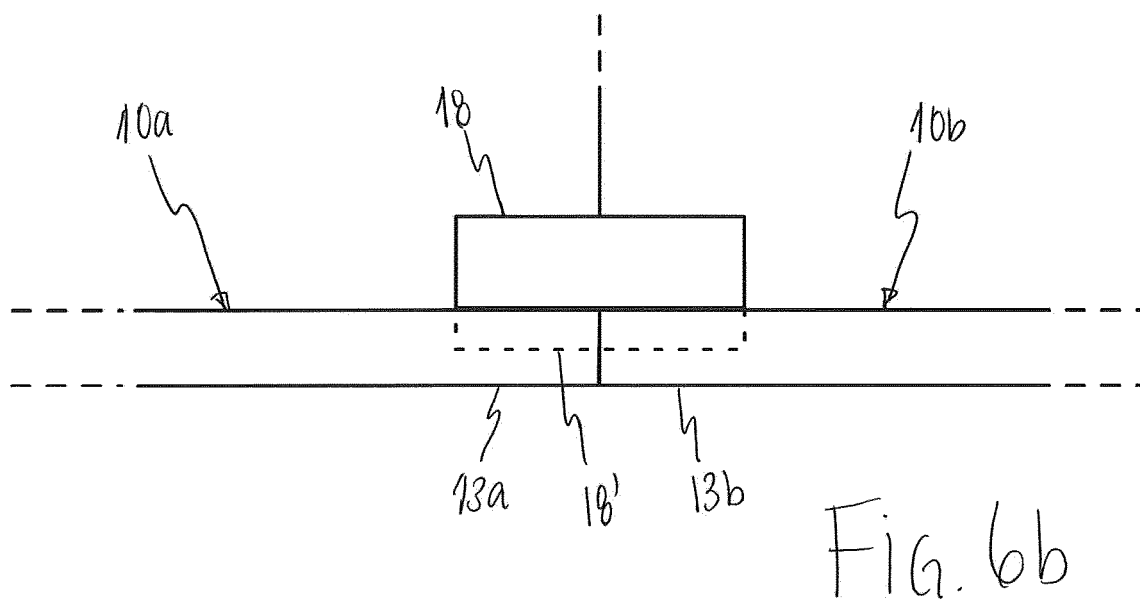
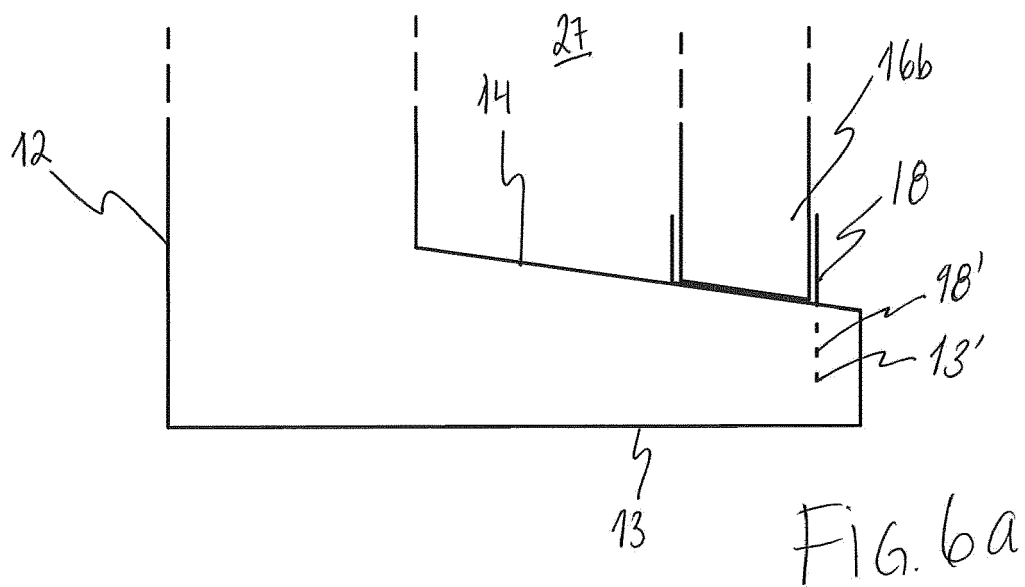


Fig. 5c



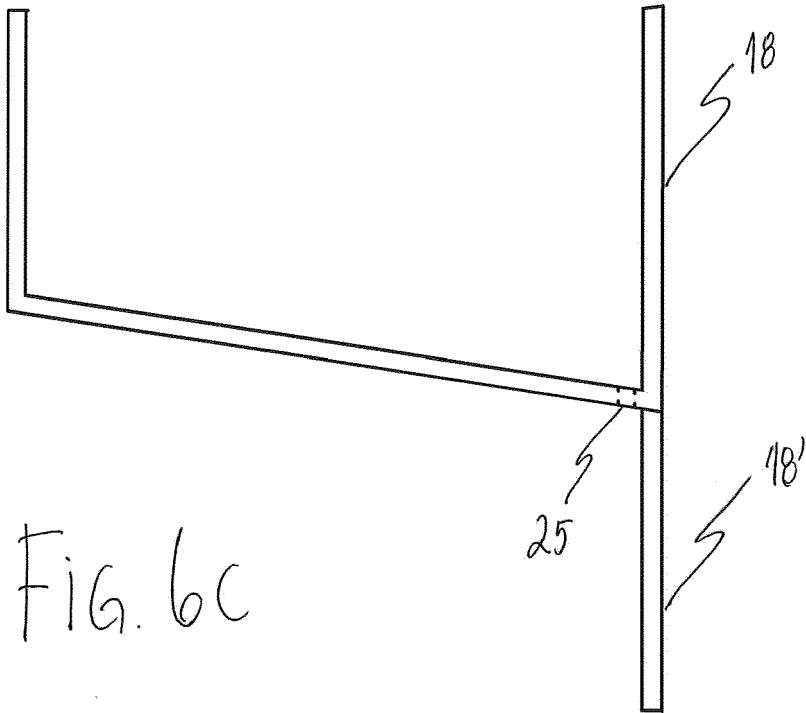


Fig. 6c



EUROPEAN SEARCH REPORT

 Application Number
 EP 18 16 2276

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DOCUMENTS CONSIDERED TO BE RELEVANT			
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Y	* page 11, line 20 - page 22, line 6 *	4	E04C2/06
A	* figures *	5-10, 13-15	E01F8/00 E04H17/14 E04B1/04 E02D27/01
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	* page 6, last paragraph - page 7, paragraph 1 *		
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	* paragraph [0039] - paragraph [0111] *		
	* figures *		
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
The Hague		13 September 2018	López-García, G
CATEGORY OF CITED DOCUMENTS			
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EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
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