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 Amended claims in accordance with Rule 137(2) EPC.

(54) **Modular structure for working spaces, in particular laboratories, adaptable to different volumes and installations**

(57) Modular structure for working spaces, in particular laboratories, adaptable to different volumes and utilities, which comprises columns (20) and a substructure (10) that is arranged supported on the columns (20) and which is adapted to house utilities (30). The substructure (10) comprises transverse supports (11) that are ar-

ranged supported on the columns (20), and longitudinal supports (12) that are arranged substantially transversally and supported on the transverse supports (11), the longitudinal supports (12) being passed through by the utilities (30) and the longitudinal supports (12) being adapted to support and guide the utilities (30).

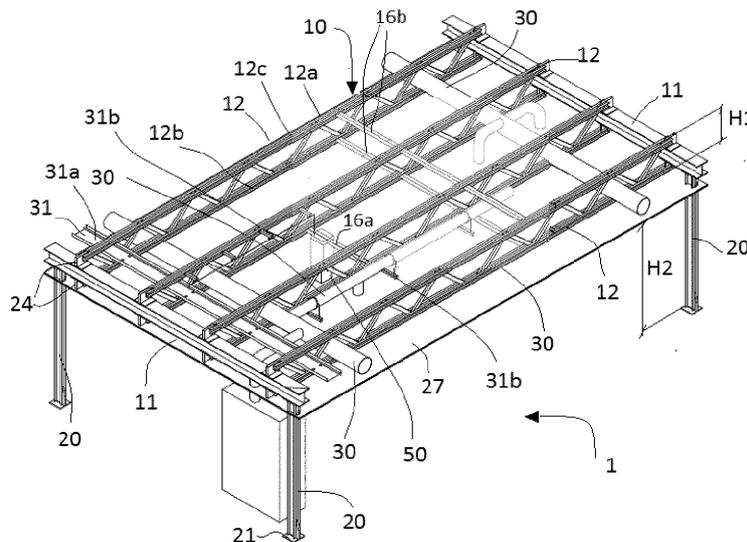


FIG. 1

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Description

TECHNICAL FIELD

[0001] This invention relates to a modular structure for working spaces, adaptable to spaces of different volumes and different installations or utilities, working spaces being mainly understood as scientific areas such as laboratories, although they also include offices.

PRIOR ART

[0002] In the construction sector prefabricated modular constructions or structures that are transported to their destination and then assembled with other similar structures for the purpose of forming a building are known.

[0003] For example, US2010/0107517A1 describes a structural support for transporting a prefabricated house from the place of manufacture to the place of installation.

[0004] US2005/0108957A1 addresses the high costs involved in the in situ construction of buildings and their utilities, putting forward as a solution, flexible modules integrating everything necessary.

[0005] Additionally, document US2006/0277838A1 addresses, among other problems, the problem of the in situ manufacture of the structures and utilities, particularly in hotels, proposing as a solution a structure that comprises a housing, pre-installed utilities throughout the housing, and at least one amenity pre-installed in the housing.

[0006] Finally, document WO99/9956367A1 discloses a prefabricated construction that comprises a prefabricated column that comprises the necessary technological systems and which supports the prefabricated modules that also contain the utility conduits and lines.

BRIEF DISCLOSURE OF THE INVENTION

[0007] The object of the invention is to provide a modular structure for working spaces, in particular laboratories, adaptable to spaces of different volumes and to any kind of utilities according to the claims.

[0008] The modular structure of the invention comprises columns and a substructure that is arranged supported on the columns and which are adapted to house utilities.

[0009] The substructure comprises transverse supports that are arranged supported on the columns and longitudinal supports that are arranged substantially transversally and supported on the transverse supports. The longitudinal supports are passed through by the utilities and are adapted to support and guide said utilities.

[0010] As a result, a compact and flexible modular structure is obtained, given that besides of arranging with a substructure capable of housing and supporting the necessary utilities in the working space for which said modular structure is adapted, said substructure is capable of being easily and quickly adapted to present and

future requirements with regard to the utilities of said working space.

[0011] These and other advantages and characteristics of the invention will be made evident in the light of the drawings and the detailed description thereof.

DESCRIPTION OF THE DRAWINGS

[0012]

Figure 1 shows a view in perspective of an embodiment of a modular structure.

Figure 2 shows another view in perspective of the modular structure shown in Figure 1.

Figure 3 is a front view of the modular structure shown in Figure 1, in which a technical ceiling and assembled lateral facades are shown.

Figure 4 is a side view of the modular structure shown in Figure 1, in which a technical ceiling and assembled lateral facades are shown.

Figure 5 is a side view of a transverse support comprised in the modular structure shown in Figure 1.

Figure 6 is a detailed view of the connection of a longitudinal support to a transverse support, both comprised in the modular structure shown in Figure 1.

Figure 7 is a front view of a column comprised in the modular structure shown in Figure 1.

Figure 8 is a side view of a column comprised in the modular structure shown in Figure 1.

Figure 9 is a cross-section of the column shown in Figure 7.

Figure 10 shows a building that comprises the modular structures shown in Figure 1.

DETAILED DISCLOSURE OF THE INVENTION

[0013] Figures 1 to 10 show a modular structure for working spaces, according to the invention, adaptable to different volumes and utilities. A closed space is understood as any kind of scientific laboratory used for teaching or research, waste storage rooms, offices and housing for animals.

[0014] The modular structure 1, shown in Figures 1 to 4, comprises columns 20 and a substructure 10 supported on the columns 20 and adapted to house utilities 30, utilities being understood as any kind of utilities required in said working space, such as electrical utilities, bathroom fittings, gas supply, ventilation, air conditioning,

heating and gas and/or fluid evacuation utilities etc.

[0015] The substructure 10 comprises transverse supports 11 that are arranged supported on the columns 20, and longitudinal supports 12 that are arranged substantially transversally and supported on the transverse supports 11.

[0016] The longitudinal supports 12 are passed through by the utilities 30, being adapted to support and guide the utilities 30. The weight of the longitudinal supports 12 along with that of the utilities 30 is transmitted to the columns 20 by means of the transverse supports 11.

[0017] The substructure 10 enables, on the one hand, all the necessary utilities 30 to be housed in the working space, and on the other, to distribute them in an ordered manner in accordance with the needs of said working space.

[0018] For this purpose, each longitudinal support 12 has a lattice structure, as shown in Figures 1 to 4. The longitudinal support 12 thus comprises a lower bar 12a, an upper bar 12b and a plurality of sloping bars 12c. In the embodiment shown in the figures, each longitudinal support 12 comprises two lower bars 12a and two upper bars 12b, each of the sloping bars 12c being fixed between the two lower bars 12a and the two upper bars 12b, as shown in Figure 3. In particular, each bar 12a is a substantially C-shaped cross-sectional beam, being arranged facing each other with the result that the two lower bars 12a form a substantially H-shaped cross-sectional beam. Similarly, in the embodiment shown, each upper bar 12b is a C-shaped cross-sectional beam, being arranged in such a way that the two upper bars 12b form a substantially H-shaped cross-sectional beam. For its part, the sloping bars 12c have a substantially rectangular section, each sloping bar 12c being fixed to the upper 12b and lower 12a bars by means of screwed connections. In other embodiments not shown in the figures, the upper 12b, lower 12a and sloping 12c bars may be fixed by other known fixing means.

[0019] Generally speaking, the utilities 30 pass through the longitudinal supports 12, being arranged supported on the lower bars 12a, as shown in Figures 1 to 4, and/or being arranged housed in support means 31 that are arranged fixed to the longitudinal supports 12 and which guide in an ordered manner the utilities 30 in the substructure 10.

[0020] The utilities 30 and the support means 31 extend transversally to the longitudinal supports 12 and/or in a parallel manner to said longitudinal supports 12 according to the path the utilities 30 must follow.

[0021] The utilities 30 are arranged fixed to the lower bars 12a by means of flanges or other known fixing means

[0022] The support means 31 comprise at least one first profile 31a in which are housed the utilities 31, and/or at least one second profile 31b that supports the corresponding utility 31. In the embodiment shown in the figures, the first profile 31a has a substantially C-shaped

cross-section, the utilities 30 being arranged fixed to the first profile 31a. The fixing of the utilities 30 to the first profile 31a is performed by means of clamps or other known fixing systems. The first profile 31a extends transversally to the longitudinal supports 12 and/or in a parallel manner to said longitudinal supports 12 according to the path that the utilities 30 housed in it must follow.

[0023] In other embodiments not shown in the figures, the first profile 31a may be arranged supported on the lower bars 12a. The first profile 31a may comprise a metal mesh with a substantially C-shaped section, defining a tray-type structure that is arranged supported on the lower bars 12a and which passes through the longitudinal supports 12.

[0024] Additionally, each second profile 31b is arranged fixed to the corresponding longitudinal support 12, substantially orthogonally. In the embodiment shown, each second profile 31b is arranged fixed projecting in relation to the longitudinal support 12. The support for the utilities 31 comprises several second sections 31b arranged parallel to each other. Each second profile 31b has a substantially rectangular cross-section, and is arranged screwed to the upper bar 12b or to the lower bar 12a of the longitudinal support 12 through holes 17a, 17b comprised respectively in the lower bars 12a and in the upper bars 12b. The corresponding utility 30 is arranged fixed to the second profile 31b. The fixing of the utility 30 to the second profile 31b is performed by means of clamps or other known fixing systems.

[0025] In other embodiments not shown in the figures, the second profile 31b may be arranged fixed between two longitudinal supports 12 arranged in an adjacent manner. The second profile 31b may have cross-sections that are substantially C-shaped or have other prismatic geometric shapes.

[0026] In other embodiments not shown in the figures, depending on the transverse dimensions of the utilities 30, said utilities 30 may be arranged supported on the sloping bars 12c.

[0027] On the other hand, the modular structure 1 is adaptable to working spaces of different volumes. The longitudinal support 12 is defined by an adjustable height H1, adaptable to the different dimensions of the utilities 30, which also allows it to adjust a height H2 of the working space. The lower bars 12a and the upper bars 12b respectively comprise the longitudinally distributed holes 17a, 17b, shown in Figure 3 and partially in Figures 6 and 8, with the result that in accordance with the required height H1 of the longitudinal support 12 each sloping bar 12c is fixed in the corresponding holes 17a, 17b.

[0028] Additionally, the modular structure 1 comprises vertical braces, not shown in the figures, that are arranged substantially parallel to the columns 20, and each one of which is arranged fixed at one end to the corresponding lower bar 12a. Each vertical brace is fixed at the other end to a technical ceiling 27. The fixing of each vertical brace to the lower bar 12a and to the technical ceiling 27 is performed by threads. Depending on the

required height H2 of the working space a vertical brace of greater or smaller length is arranged. The modular structure 1 may thus be quickly adapted to the height H2 requirements of a specific working space, thereby avoiding unnecessary heights that result, for example, in having to recirculate a greater volume of air comprised in the working space defined by the modular structure 1, with the subsequent energy cost.

[0029] Additionally, the substructure 10 comprises at least one first horizontal brace 16a that is arranged substantially orthogonal to the longitudinal supports 12 and which supports at least one projecting utility 50, and at least one second horizontal brace 16b arranged substantially orthogonal to the longitudinal supports 12, which strengthens the substructure 10. The utility 50 may be fixed in any position along the first horizontal brace 16a by means of known fixing means.

[0030] Each first horizontal brace 16a and each second horizontal brace 16b are arranged substantially orthogonal to the longitudinal supports 12, between two lower bars 12a corresponding to two longitudinal supports 12 arranged adjacent to each other or between two upper bars 12b corresponding to two longitudinal supports 12 arranged adjacent to each other. Each horizontal brace 16a, 16b is arranged screwed to the upper bars 12b or to the lower bars 12a, through the corresponding holes 17a, 17b comprised in the lower bars 12a or in the upper bars 12b. The horizontal braces 16a, 16b shown in the figures have a substantially rectangular cross-section. In other embodiments the horizontal braces 16a, 16b may be substantially cylindrical threaded bars.

[0031] Furthermore, each transverse support 11, shown in detail in Figures 5 and 6, comprises a beam with a substantially I-shaped section, the transverse support 11 being fixed to the corresponding columns 20 by means of respective first connection members 23. Each first connection member 23 includes a base 23a that is fixed to a wing of the transverse support 11 and a lateral support 23b that extends substantially orthogonal to the base 23a, the lateral support 23b being housed inside an internal housing 22b, shown in Figures 7 and 9, defined in each column 20. The connection of the first connection member 23 to the transverse support 11 and to the column 20 is performed by means of screwed connections, although in other embodiments other known connection means may be used.

[0032] In addition, each longitudinal support 12 is fixed to the transverse support 11 by means of at least one second connection member 24. As with the first connection member 23, each second connection member 24 includes a base 24a that is fixed to the wing of the transverse support 11 and a lateral support 24b that extends substantially orthogonal to the base 24a, the lateral support 24b being housed partially inside a corresponding gap 12d, shown in Figure 4, defined between each upper bar 12b of a longitudinal support 12. The connection of the second connection member 24 to the transverse support 11 and to the longitudinal support 12 is performed

by means of screwed connections, although in other embodiments other known connection means may be used. In the embodiment shown in the figures, each longitudinal support is fixed to the respective transverse support 11 by means of two second connection members 24, each one of which is arranged fixed to a wing of the transverse support 11 and to the upper bar 12b or to the lower bar 12a.

[0033] Depending on the working space and the utilities 30 required, a distance L1 of separation may be adjusted between two longitudinal supports 12 arranged in an adjacent manner by screwing the longitudinal supports 12 to the transverse support 11 at the necessary distance.

[0034] Additionally, each column 20, shown in detail in Figures 7 to 9, comprises a base 21 and beams 22 arranged facing each other and connected to the base 21. Each base 21 comprises a first part 21a to be supported on a floor and a second part 21b that extends, substantially orthogonally, from the support surface 21a, both beams 22 being fixed to the base 21 by the second part 21b, by means of any type of known fixing means, preferably by means of screwed connections.

[0035] Each beam 22 has a substantially C-shaped cross-section and includes longitudinally distributed holes 22c. In the embodiment shown in the figures, the beams 22 are arranged with the result that they form a column 20 with a substantially H-shaped cross-section. The beams 22 are arranged separate from each other by a distance, delimiting the internal housing 22b in which the second part 21b of the base 21 is housed. The second part 21b of the base 21 is fixed to the column 20 by means of screwed connections through the corresponding holes 22c. The utilities 30 may be housed and may be guided towards the substructure 10 by the outside of the column 20, in particular, by an external housing 22e defined on each beam 22 with a C-shaped cross-section or by the internal housing 22b comprised between the beams 22. In the embodiment described, the fixing means, not shown in the figures, are screwed connections, although in other embodiments they may include any other type of fixing means.

[0036] In other embodiments not shown in the figures, the beams 22 are arranged facing each other with the result that they form a column 20 with a substantially rectangular section.

[0037] Additionally, the beams 22 are arranged at a height H3 of the base 21, shown in Figures 8 and 9, in particular of the first part 21a, with the result that the utilities 30 that are guided through the column 20 exit to the floor.

[0038] In addition, the substructure 10 may support a false floor, not shown in the figures, and/or the technical ceiling 27.

[0039] The concepts of transverse support 11 and longitudinal support 12 are intended to be relative concepts rather than absolute ones, and in other embodiments it may be the case that the longitudinal supports 12 are

transverse supports and vice versa.

[0040] Finally, work tables, shelves, cupboards and other equipment not shown in the figures may be fixed to the columns 20 through the holes 22c by means of screwed couplings. It is also possible to fix modular facades 29, shown in Figures 3 and 4, to said columns 20, said columns 20 being the ones that support the weight of the modular facades 29.

[0041] Figure 10 shows a building that comprises various modular structures 1 fixed to each other, adapted to working spaces with substantially equal areas.

[0042] The resulting modular structure 1 offers great flexibility, as it is adaptable to the working space required at each point. Said modular structure 1 may be assembled in the factory or directly at its place of installation. It supports and houses the utilities, including the projecting utilities or even the workbenches, the assembly and maintenance of the utilities being much simpler.

Claims

1. Modular structure for working spaces, in particular laboratories, adaptable to different volumes and utilities, which comprises columns (20) and a substructure (10) that is arranged supported on the columns (20) and which is adapted to house utilities (30), **characterised in that** the substructure (10) comprises transverse supports (11) that are arranged supported on the columns (20) and longitudinal supports (12) that are arranged substantially transversally and supported on the transverse supports (11), the longitudinal supports (12) being passed through by the utilities (30) and the longitudinal supports (12) being adapted to support and guide the utilities (30).
2. Modular structure according to the preceding claim, wherein each longitudinal support (12) has a lattice structure.
3. Modular structure according to the preceding claim, wherein the longitudinal support (12) has an adjustable height (H1).
4. Modular structure according to claims 2 or 3, wherein each longitudinal support (12) comprises at least one lower bar (12a), at least one upper bar (12b) and a plurality of sloping bars (12c), each longitudinal support (12) being adapted to support the utilities (30) directly or by means of support means (31) that are arranged fixed to the respective longitudinal support (12), guiding the utilities (30) in the substructure (10) in an ordered manner.
5. Modular structure according to the preceding claim, wherein each upper bar (12b) and each lower bar (12a) comprise a plurality of holes (17a,17b) distributed longitudinally.
6. Modular structure according to the preceding claim, wherein each longitudinal support (12) comprises two lower bars (12a), two upper bars (12b) and a plurality of sloping bars (12c), which are arranged fixed respectively between the two lower bars (12a) and the two upper bars (12b).
7. Modular structure according to the preceding claim, wherein each upper bar (12b) and each lower bar (12a) is a substantially C-shaped cross-sectional beam, each pair of upper bars (12b) and lower bars (12a) being arranged in such a way that they respectively form a beam with a substantially H-shaped section.
8. Modular structure according to any of claims 5 to 7, wherein the substructure (10) comprises at least one horizontal brace (16a) to fix at least one projecting utility (50) in any position along the brace (16a), each horizontal brace (16a) being arranged substantially orthogonal to the longitudinal supports (12), fixed to two lower bars (12a) or to two upper bars (12b) corresponding to two longitudinal supports arranged adjacent to each other.
9. Modular structure according to the preceding claim, wherein the plurality of holes (17a,17b) comprised in the longitudinal support (12) enable the horizontal brace (16a) to be fixed in a certain position in relation to the longitudinal support (12).
10. Modular structure according to any of claims 5 to 9, wherein the support means (31) extend transversally and/or longitudinally to the longitudinal supports (12), comprising at least one first profile (31a) in which the utilities (31) are housed and at least one second profile (31b) that supports the corresponding utilities (31).
11. Modular structure according to the preceding claim, wherein the first profile (31a) has a substantially C-shaped cross-section, inside which are housed the utilities (30) arranged fixed to the first profile (31a).
12. Modular structure according to claims 10 or 11, wherein each second profile (31b) is arranged fixed to the corresponding longitudinal support (12), substantially orthogonal and fixed to at least one longitudinal support (12), the corresponding utility (31) being arranged fixed to said second profile (31b).
13. Modular structure according to any of the preceding claims, wherein each column (20) comprises a base (21) and beams (22) adapted to guide the utilities (30) along at least one housing (22b,22e) defined in said beams (22).
14. Modular structure according to the preceding claim,

wherein each column (20) comprises two beams (22), each one of which has a substantially C-shaped cross-section that delimits a housing (22e), both beams (22) being arranged facing each other to form a column (20) with a substantially H-shaped section, the beams (22) being arranged separated at a distance that delimits another housing (22b).

15. Modular structure according to the preceding claim, wherein the beams (22) are separated a height (H3) from the base (21) to enable the utilities (30) that are guided through the beams (22) to exit.
16. Modular structure according to any of the preceding claims, wherein the substructure (10) supports a technical ceiling (27) and a false floor.
17. Building that comprises various modular structures according to any of the preceding claims, coupled to each other.

Amended claims in accordance with Rule 137(2) EPC.

1. Modular structure for working spaces, in particular laboratories, adaptable to different volumes and utilities, which comprises columns (20) and a substructure (10) that is arranged supported on the columns (20) and which is adapted to house utilities (30), the substructure (10) comprises transverse supports (11) that are arranged supported on the columns (20) and longitudinal supports (12) that are arranged substantially transversally and supported on the transverse supports (11), the longitudinal supports (12) being passed through by the utilities (30) and the longitudinal supports (12) being adapted to support and guide the utilities (30) **characterized in that** each longitudinal support (12) has a lattice structure and an adjustable height (H1).

2. Modular structure according to the preceding claim, wherein each longitudinal support (12) comprises at least one lower bar (12a), at least one upper bar (12b) and a plurality of sloping bars (12c), each longitudinal support (12) being adapted to support the utilities (30) directly or by means of support means (31) that are arranged fixed to the respective longitudinal support (12), guiding the utilities (30) in the substructure (10) in an ordered manner.

3. Modular structure according to the preceding claim, wherein each upper bar (12b) and each lower bar (12a) comprise a plurality of holes (17a, 17b) distributed longitudinally.

4. Modular structure according to the preceding claim, wherein each longitudinal support (12) com-

prises two lower bars (12a), two upper bars (12b) and a plurality of sloping bars (12c), which are arranged fixed respectively between the two lower bars (12a) and the two upper bars (12b).

5. Modular structure according to the preceding claim, wherein each upper bar (12b) and each lower bar (12a) is a substantially C-shaped cross-sectional beam, each pair of upper bars (12b) and lower bars (12a) being arranged in such a way that they respectively form a beam with a substantially H-shaped section.

6. Modular structure according to any of claims 3 to 5, wherein the substructure (10) comprises at least one horizontal brace (16a) to fix at least one projecting utility (50) in any position along the brace (16a), each horizontal brace (16a) being arranged substantially orthogonal to the longitudinal supports (12), fixed to two lower bars (12a) or to two upper bars (12b) corresponding to two longitudinal supports arranged adjacent to each other.

7. Modular structure according to the preceding claim, wherein the plurality of holes (17a, 17b) comprised in the longitudinal support (12) enable the horizontal brace (16a) to be fixed in a certain position in relation to the longitudinal support (12).

8. Modular structure according to any of claims 3 to 7, wherein the support means (31) extend transversally and/or longitudinally to the longitudinal supports (12), comprising at least one first profile (31a) in which the utilities (31) are housed and at least one second profile (31b) that supports the corresponding utilities (31).

9. Modular structure according to the preceding claim, wherein the first profile (31 a) has a substantially C-shaped cross-section, inside which are housed the utilities (30) arranged fixed to the first profile (31 a).

10. Modular structure according to claims 8 or 9, wherein each second profile (31b) is arranged fixed to the corresponding longitudinal support (12), substantially orthogonal and fixed to at least one longitudinal support (12), the corresponding utility (31) being arranged fixed to said second profile (31b).

11. Modular structure according to any of the preceding claims, wherein each column (20) comprises a base (21) and beams (22) adapted to guide the utilities (30) along at least one housing (22b, 22e) defined in said beams (22).

12. Modular structure according to the preceding claim, wherein each column (20) comprises two

beams (22), each one of which has a substantially C-shaped cross-section that delimits a housing (22e), both beams (22) being arranged facing each other to form a column (20) with a substantially H-shaped section, the beams (22) being arranged separated at a distance that delimits another housing (22b).

13. Modular structure according to the preceding claim, wherein the beams (22) are separated a height (H3) from the base (21) to enable the utilities (30) that are guided through the beams (22) to exit.

14. Modular structure according to any of the preceding claims, wherein the substructure (10) supports a technical ceiling (27) and a false floor.

15. Building that comprises various modular structures according to any of the preceding claims, coupled to each other.

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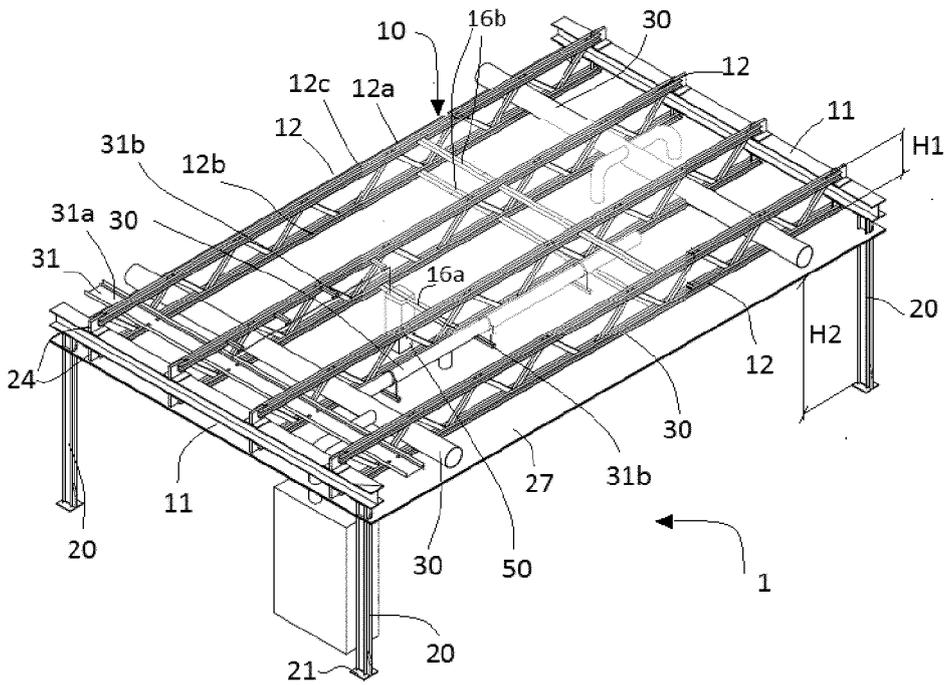


FIG. 1

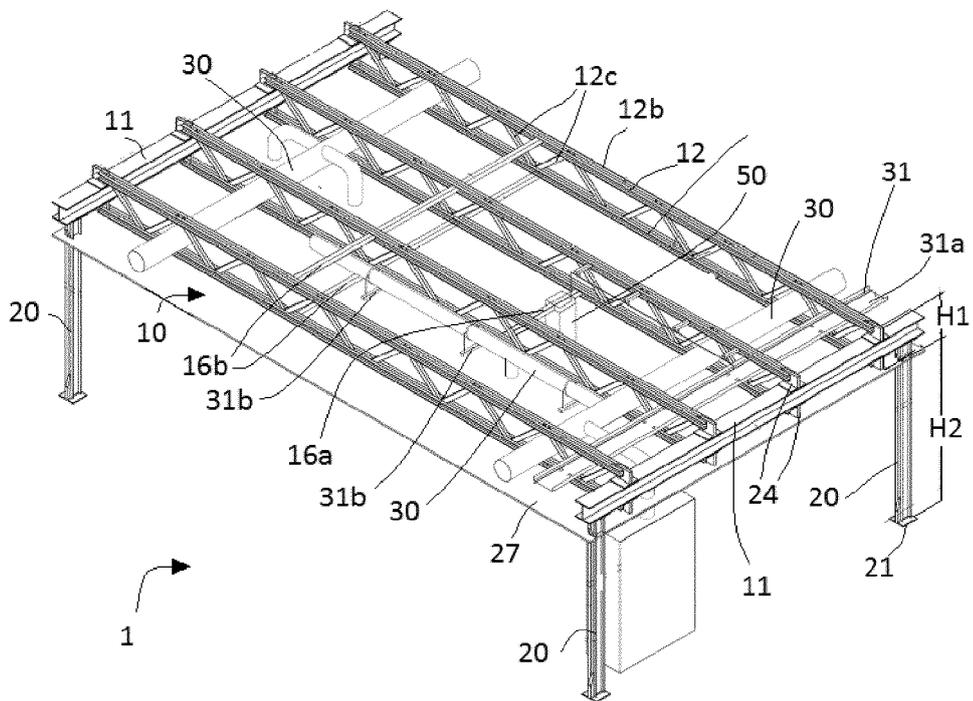


FIG. 2

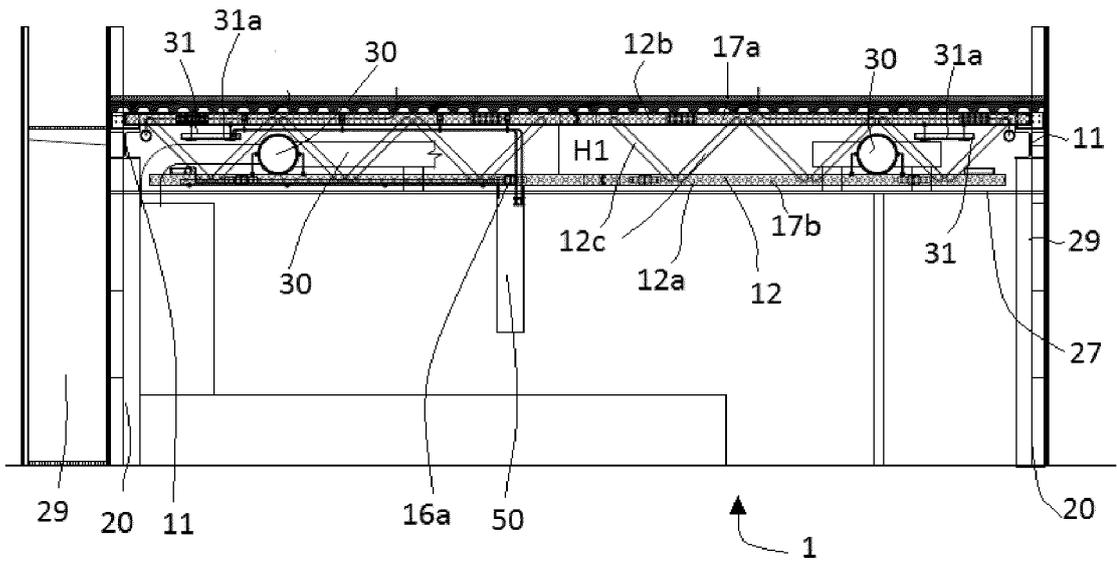


FIG. 3

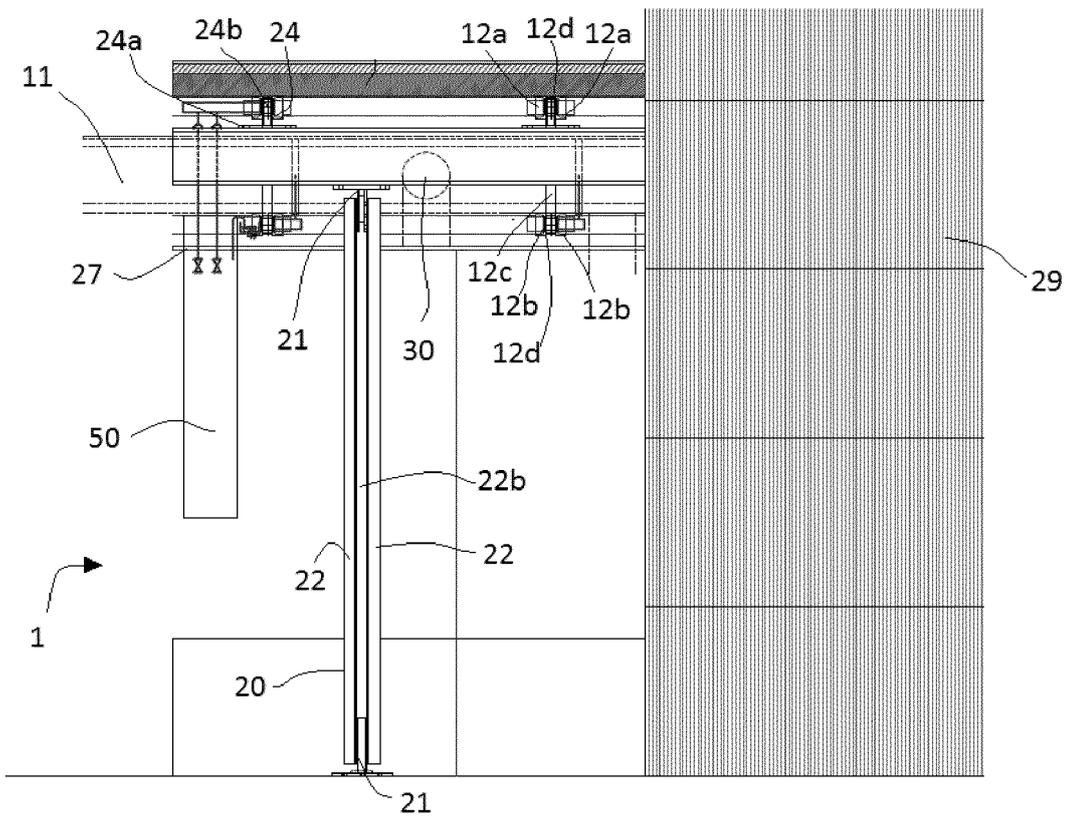


FIG. 4

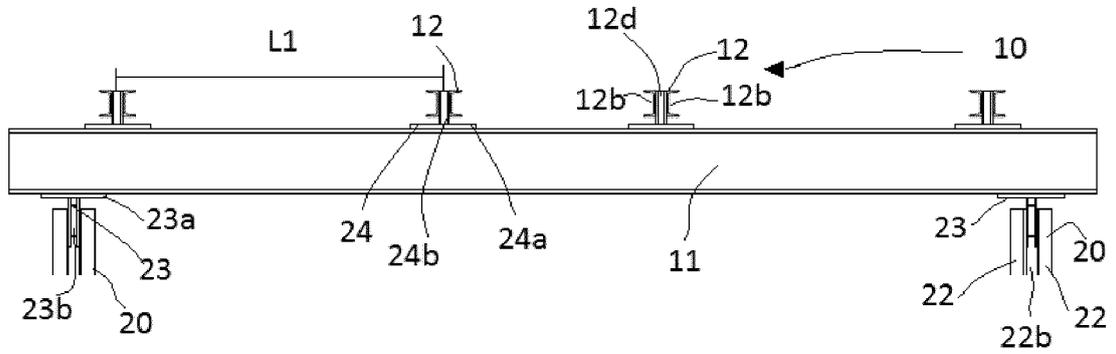


FIG. 5

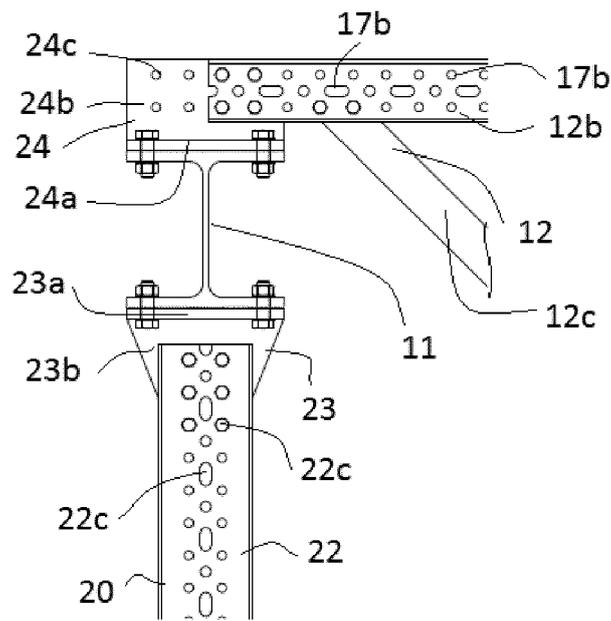


FIG. 6

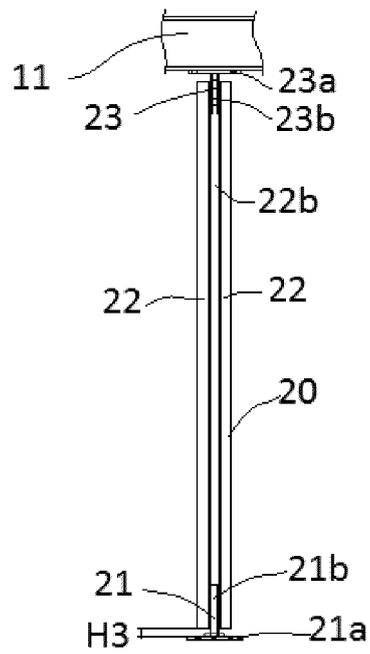


FIG. 7

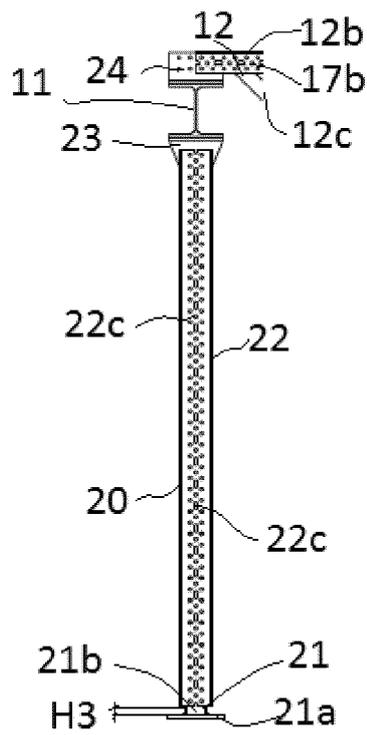


FIG. 8

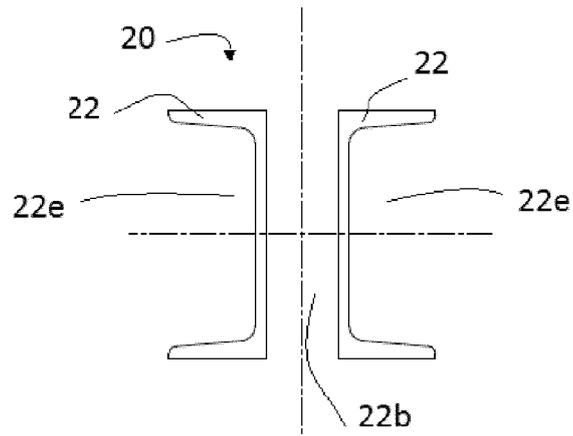


FIG. 9

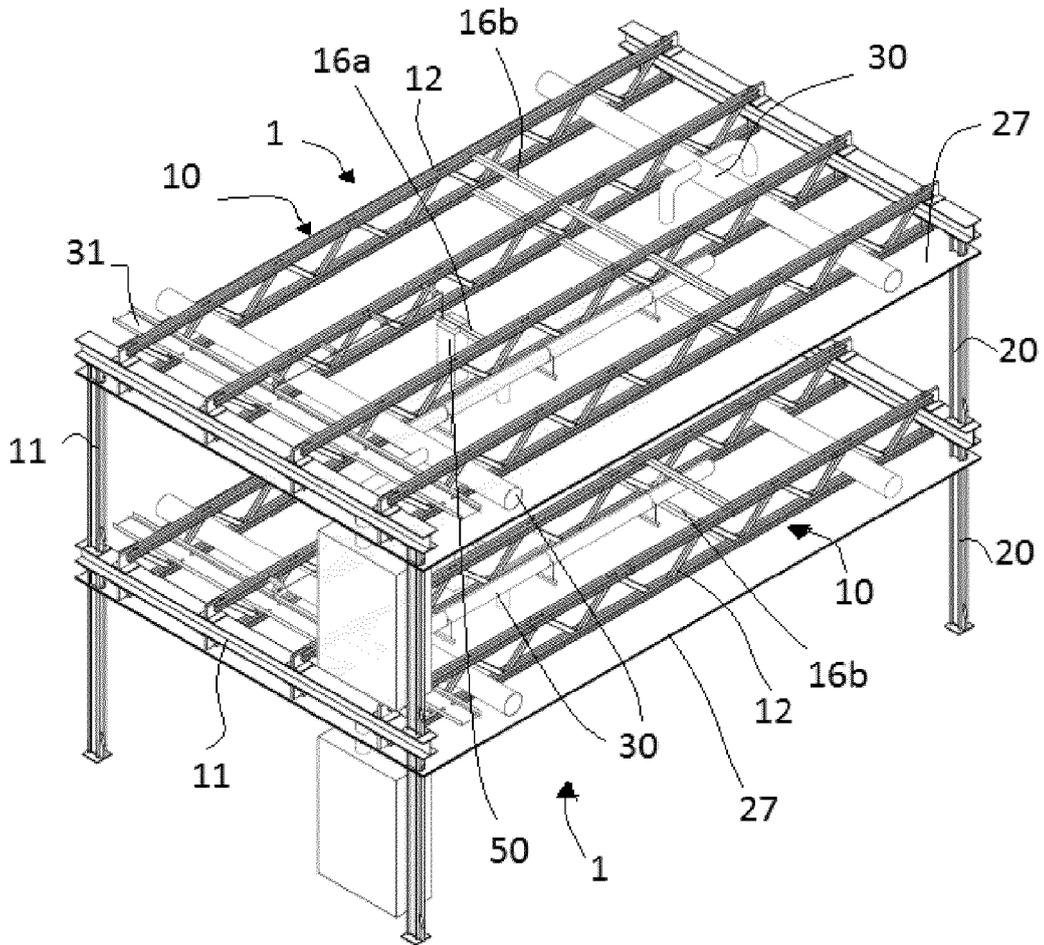


FIG. 10



EUROPEAN SEARCH REPORT

Application Number
EP 11 38 2373

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 A	DE 22 63 326 A1 (MENERINGHAUSEN MAX) 4 July 1974 (1974-07-04) * page 1, lines 1-4 * * page 1, line 28 - page 2, line 32 * * page 8, line 25 - page 11, line 32; figures 1-5 * -----	1,2, 13-17 3-12	INV. E04H3/08 E04H5/02 E04B1/19 E04B1/24 E04B1/348
X A	GB 2 118 592 A (SPINELLI ALBERTO; KOZELKIN TATIANA) 2 November 1983 (1983-11-02) * page 1, lines 5-26 * * page 2, lines 27-115; figures 1-5 * -----	1,2,16, 17 3	
X A	GB 2 164 969 A (TARTAN BUILDINGS LIMITED) 3 April 1986 (1986-04-03) * figures 1-4, 8 * -----	1,13,17 3	
X	DE 24 04 108 A1 (KRIETSCH HANS JOACHIM) 31 July 1975 (1975-07-31) * page 1 - page 3, line 5 * * page 6, line 21 - page 10, line 10; figures 4, 1.01, 1.13, 3.01-3.07 * -----	1,13,17	
X	WO 2007/033821 A1 (LUEDI & CO AG GAS UND ENERGIES [CH]; LUEDI HANSJUERG [CH]) 29 March 2007 (2007-03-29) * page 1, lines 5-24 * * page 2, lines 3-25 * * page 5, line 14 - page 7, line 12 * * page 9, lines 14-16; figures 1-4 * -----	1,17	
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (IPC) E04H E04B
1	Place of search Munich	Date of completion of the search 4 May 2012	Examiner Decker, Robert
CATEGORY OF CITED DOCUMENTS X: particularly relevant if taken alone Y: particularly relevant if combined with another document of the same category A: technological background O: non-written disclosure P: intermediate document		T: theory or principle underlying the invention E: earlier patent document, but published on, or after the filing date D: document cited in the application L: document cited for other reasons &: member of the same patent family, corresponding document	

EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.

EP 11 38 2373

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