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(71) Applicant: **G&G Partners S.r.l.**
25018 Montichiari, Brescia (IT)

(72) Inventor: **GNECCHI, Massimo**
I-25018 Montichiari, BRESCIA (IT)

(74) Representative: **De Lorenzo, Danilo**
Jacobacci & Partners S.p.A.
Piazza della Vittoria, 11
25122 Brescia (IT)

(54) **QUICK ASSEMBLY FIELD TENT, EXOSKELETON-TYPE FIELD TENT AND MOUNTING KIT**

(57) A quick assembly field tent (1), comprises a plurality of arch frames (10, 11, 12) each comprising at least one structural element (100) having a pair of first channels with an open annular section (150, 151) which extend along a prevailing direction of the structural element. The field tent (1) further comprises at least one outer sheet (2), comprising at least one enlarged edge portion (21) received in a channel of the pair of first channels with an open annular section (151) of the structural element. An inner sheet (3) is shaped so as to comprise a roof portion (31) and vertical side walls (32) joined to the roof portion (31), said inner sheet (3) being arranged internally to the outer sheet (2) and at least partially spaced from the outer sheet (2). The inner sheet (3) comprises a hooking portion (33) for its installation.

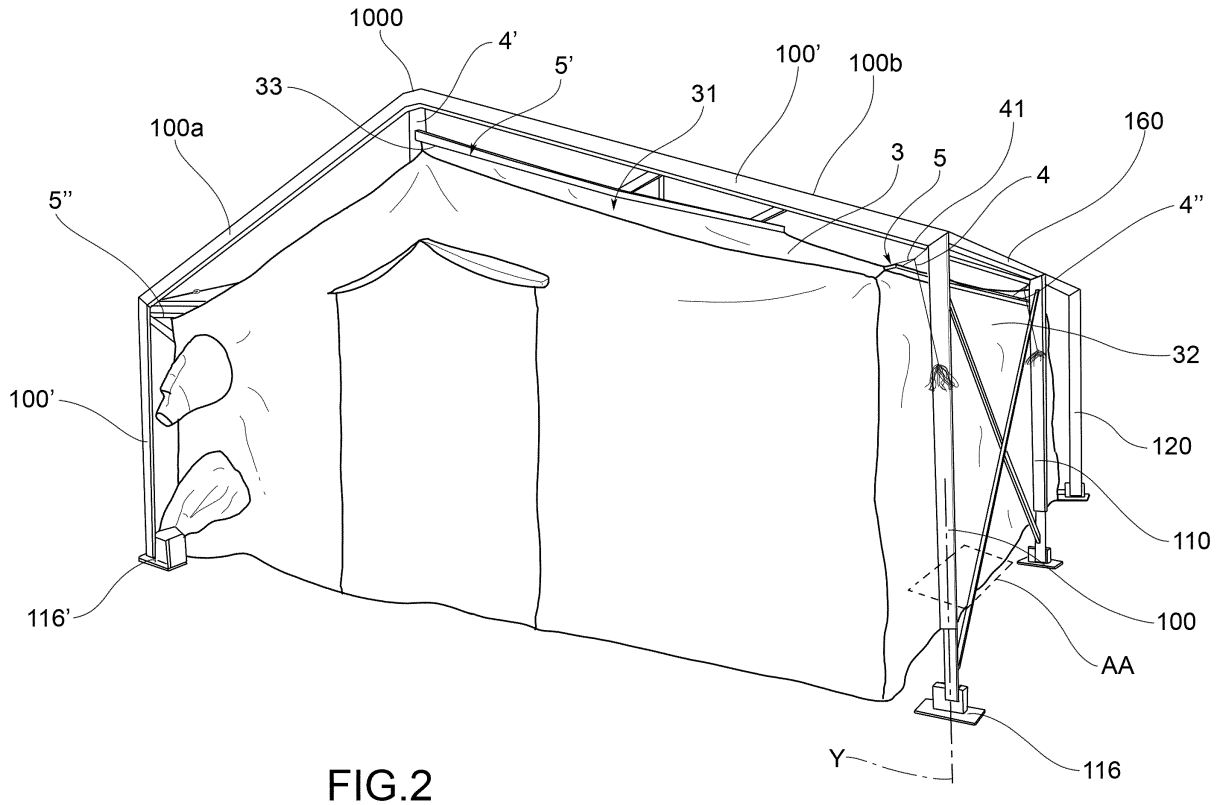

FIG.2

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Description

[0001] The present invention relates to a field tent, and a relative tent mounting kit.

[0002] Field tents which are transportable for civil defense or military camps or for field hospitals are known in the art.

[0003] In particular, the medium-sized residential tents of the background art, intended for medium-long term use, for example, tents with dimensions of about six meters by six meters, require a long time for the unfolding thereof, even up to 45 minutes. Such timings, in certain situations, may be excessive.

[0004] Quick unfolding tents exist in the background art, in which an outer load-bearing structure supports an inner tent which is attached to the structure by means of special tie rods and pulleys. Such type of tent allows for a quick unfolding, even over a time span of about ten minutes.

[0005] Unfortunately, even though such quick unfolding tents allow to obtain a first shelter from bad weather, they do not allow the maintenance of the structure in the medium to long term, due to the poor load-bearing capacities and the low insulation capacity in cold temperatures and under atmospheric agents. Furthermore, to maintain the structure for a certain period of time, it is necessary to install special tie-rods that allow to increase the load-bearing features.

[0006] The need is therefore felt for a quick assembly field tent capable of being assembled quickly and which is capable of maintaining both the load-bearing features and the thermal insulation degree of tents with a medium-long term duration.

[0007] One of the objects of the present invention is to propose a field tent and a mounting kit capable of overcoming the aforesaid drawbacks of the background art.

[0008] Such objects are achieved by means of a field tent and a kit in accordance with the attached independent claims. The dependent claims describe preferred or advantageous embodiments.

[0009] The features and advantages of the field tent and of the kit in accordance with the invention will however be evident from the following description of preferred embodiments thereof, given by way indication and not by way of limitation, with reference to the attached Figures, in which:

Figure 1 shows an axonometric view of a field tent in accordance with an embodiment of the invention;
Figure 2 shows an axonometric view of a field tent in accordance with an embodiment of the invention in which the outer sheet is not present;
Figure 3 shows a front elevation view of the field tent in accordance with an embodiment of the present invention;
Figure 4 shows a sectional view along the section plane AA of Figure 2 of a structural element in accordance with an embodiment of the present invention;
Figure 5 shows an enlargement of a detail of Figure 3.

[0010] With reference to the aforesaid Figures, reference numeral 1 generally indicates a quick assembly field tent. It is clear that field tent means any tent adapted to be used in the military sector or by civil defense operators to set up temporary hospitals or for temporary hospitalization as personal accommodation or as a command center, meeting room, field office, club or meeting recreational tent or laundry. From now onwards, for simplicity, the field tent 1 will be indicated simply with the term tent.

[0011] The tent 1 comprises a plurality of arch frames 10, 11, 12 which extend vertically by a predefined height H with respect to a supporting surface P. The arch frames 10 are arranged in a mutually spaced-apart manner along a longitudinal direction X perpendicular to the vertical direction and lying on the supporting surface P. Each arch frame 10, 11, 12 comprises one or more structural elements 100, each having a pair of first channels 150, 151 with an open annular section which extend along a prevailing direction (Y) of the structural element.

[0012] The plurality of arch frames is therefore arranged to form the arch of the tent 1.

[0013] The tent 1 comprises at least one outer sheet 2, comprising at least one enlarged edge portion 21 received in a channel 151 of the pair of first channels 150, 151 with an open annular section of the structural element. The outer sheet 2 is arranged so as to form an outer cover of the tent 1, for example the most external cover directly subjected to atmospheric agents.

[0014] The tent 1 comprises at least an inner sheet 3, shaped so as to comprise a roof portion 31 and vertical side walls 32 joined to the roof portion 31. Such inner sheet 3 is arranged internally to the outer sheet 2 and at least partially spaced from the outer sheet 2.

[0015] Furthermore, the inner sheet 3 comprises a hooking portion 33 which is enlarged with respect to the thickness of the inner sheet 3. Such hooking portion 33 is arranged on the side of an outer side 300 of the inner sheet 3, i.e., facing towards the outer sheet 2 (or on the opposite side from the accessible inner volume V of the tent).

[0016] The hooking portion 33 mainly extends along a direction parallel to the longitudinal direction X.

[0017] In accordance with the invention, the tent 1 comprises a plurality of pulling cables 4, 4', 4", in which each pulling cable 4, 4', 4" comprises at a first end 41 thereof a hooking device 5, 5', 5" comprising a seat with an open annular section 51 in which the hooking portion 33 is slidably inserted in a direction parallel to the longitudinal direction X. The hooking portion 33 is inserted in the seat with an open annular section 51 so that the hooking portion 33 is constrained to remain in the open annular seat 51 when stressed in the other directions of the space perpendicular to the longitudinal direction X.

[0018] The pulling cable 4 is therefore subjected to ten-

sion, for example, by means of special pulleys fastened to the arch frame 10, to support the inner sheet 3 in the unfolded configuration thereof to form the accessible inner volume V of the tent, which provides a shelter. When the pulling cable 4 is subjected to tension, the hooking portion 33 remains inside the open annular seat 51.

[0019] Preferably, the arch frame 10 is constructed with a plurality of structural elements including vertical legs 100, 100' which define the vertical walls of the tent, a plurality of ridges 100a, 100b which extend at an angle with respect to the legs 100, 100' and which meet at the vertex 1000 of the tent 1. A plurality of purlins 160, which extend longitudinally, extend between the arch frames 10.

[0020] The arch frame 10 is preferably a free-span tent frame without inner poles.

[0021] Preferably the legs 100, 100' are assembled on feet 116, 116' which rest on the surface P on which the tent 1 is built. Preferably, during installation, the feet 116 allow the legs 100, 100' to be rotated from a horizontal position to a vertical position.

[0022] Furthermore, preferably, the tent 1 may comprise strands 118 in predetermined positions which extend between the various structural elements to provide greater support and stability to the structure.

[0023] In a preferred embodiment, for example, shown in Figure 4, the structural element 100 is preferably with a quadrangular section, for example, it is an empty-box-shaped element. Preferably, the structural element 100 is formed from extruded metal, and more conventionally from extruded aluminum.

[0024] Preferably, near the corners of the quadrangular shape, the channels 150, 151, 152, 153 with an open annular section or in a C-shape are formed, which extend along the entire length of the structural element 100.

[0025] Preferably, the pair of first channels with an open annular section 150, 151 is arranged at two corners of the quadrangular section and a pair of second channels with an open annular section 152, 153 is arranged at the other two remaining corners of the quadrangular section.

[0026] "Open annular shape" or "C-shape" means a shape or an arrangement which has a mouth leading towards an enlarged cavity. The mouth is narrowed with respect to the enlarged cavity and provides an undercut arrangement so that an enlarged object within the enlarged cavity may not be pulled, without deformation, through the mouth.

[0027] The channels 150, 151, 152, 153 are used to engage the enlarged edge portion 21.

[0028] Preferably, the enlarged edge portion 21 and/or the enlarged hooking portion 33 is formed by folding an edge portion of the fabric of the sheet backwards on itself to form a pocket which receives a piece of cable to produce the enlarged or bulb-shaped cross-section, as shown in Figure 4 or in Figure 5. The enlarged edge portion 21 and/or the enlarged hooking portion 33 is axially inserted in one of the channels with an open annular section to respectively fasten the sheet to the structural element or to the hooking device 5.

[0029] Preferably, the enlarged hooking portion 33 is a channel formed with the fabric of the sheet inside which a cable is inserted, preferably a cable of plastic or elastomeric material more rigid than the sheet material or a metal cable.

[0030] A particular example of such a type of enlarged edge portion 21 or enlarged hooking portion 33 is the "Two Flap" Keder design, produced by the American company Keder, Inc. of Rindge, N.H.

[0031] In accordance with an embodiment of the invention, therefore, the structural element 100 also comprises a pair of second channels with an open annular section 152, 153 which extend along a prevailing direction of the structural element. Furthermore, at least one second sheet 2', comprising at least one second enlarged edge portion 22 received in a channel 152 of the pair of second channels with an open annular section 152, 153 of the structural element, said second sheet 2' being arranged in a spaced manner with respect to the outer sheet 2 in the direction that proceeds from the outside of the tent 2 towards the inside of the tent.

[0032] It is clear that, preferably, further respective enlarged edge portions 21', 22' of further respective sheets are inserted in the remaining channels 150 and 153 of the structural element.

[0033] Preferably, the enlarged edge portion 21 and the channel of the pair of first open annular section channels 151 form a kedler-type coupling.

[0034] Preferably, the enlarged coupling hooking portion 33 and the open annular seat 51 form a kedler-type coupling.

[0035] In an advantageous embodiment of the invention, the tent 1 comprises at least one second inner sheet 3', joined to and arranged inside the inner sheet 3. Preferably, therefore, a double inner sheet is formed.

[0036] Preferably, the second inner sheet 3' is joined to the inner sheet 3 only in some joining regions 300, 300', 300" and is at least partially internally spaced from the inner sheet 3 in the remaining regions internally, i.e., it is spaced towards the interior of the inner volume V. This allows to create a further layer of thermal insulation with the outside. Preferably, the second inner sheet 3' is joined to the inner sheet 3 by means of hooking means, preferably ogives.

[0037] In a preferred embodiment, shown for example in Figures 2 and 5, the hooking device 5, 5', 5" is a metal section bar, preferably an aluminum section bar, which extends longitudinally substantially over the entire length of the inner sheet 3.

[0038] According to an advantageous embodiment of the invention, the enlarged hooking portion 33 is arranged at the joining portion between the roof portion 31 and the vertical side walls 32. This allows to obtain well laid out vertical side walls 32, minimizing the risk of them forming a catenary shape between an arch frame and the next one, therefore increasing the internal work vol-

ume of the tent and improving the overall aesthetics.

[0039] Furthermore, preferably, the enlarged hooking portion 33 is arranged at the vertex of the roof portion 31, obtaining further volumetric and aesthetic advantages.

[0040] Furthermore, preferably, the hooking portion 33 extends substantially longitudinally over the entire length of the inner sheet 3.

[0041] It is apparent that it is also an object of the present invention a mounting kit for a tent 1 described in the previous paragraphs. The kit comprises a plurality of structural elements 100, 100', 100a, 100b, each having a pair of first channels with an open annular section 150, 151 which extend along a prevailing direction of the structural element. Furthermore, the kit comprises at least one outer sheet 2, comprising at least one enlarged edge portion 21 adapted to be received in a channel of the pair of first channels with an open annular section 151 of the structural element. The external sheet 2 is adapted to be arranged so as to form an outer cover of the tent 1.

[0042] The kit further comprises an inner sheet 3, shaped so as to comprise a roof portion 31 and vertical side walls 32 joined to the roof portion 31. Such inner sheet 3 is adapted to be arranged internally to the outer sheet 2 and at least partially spaced from the outer sheet 2.

[0043] Preferably, the inner sheet 3 is therefore a large sack, in the shape of a tent, which only needs to be unfolded.

[0044] As previously described, the inner sheet 3 further comprises a hooking portion 33 which is enlarged with respect to the thickness of the inner sheet 3. Such hooking portion 33 is arranged on an outer side 300 of the inner sheet 3.

[0045] The kit further comprises a plurality of pulling cables 4, 4', 4", wherein each pulling cable 4, 4', 4" comprises at a first end 41 thereof a hooking device 5, 5', 5" comprising an open annular seat 51 in which the hooking portion 33 is suitable for being slidably inserted.

[0046] Preferably, all the components of the kit have shapes and dimensions such as to be inserted in a container for transport, for example, an ISO 20' container, or in standard 463 L air-transportable pallets.

[0047] According to an aspect, it is a further object of the present invention, a quick assembly exoskeleton-type field tent, i.e., a tent without the outer sheet 2 and only comprising the arch frames and the inner sheet 3 and/or the second inner sheet 3'. For example, a tent shown in Figure 2.

[0048] Preferably, therefore, the technical features described above with reference to the inner sheet 3 and to the second inner sheet 3', to the hooking device 5, to the pulling cables and to the arch frames are also applicable to the exoskeleton-type field tent.

[0049] In particular, the exoskeleton-type field tent comprises a plurality of arch frames (10, 11, 12), optionally made as described in the previous paragraphs, which extend vertically by a predefined height (H) with respect to a supporting surface (P) and arranged in a mutually spaced-apart manner along a longitudinal direction (X) perpendicular to the vertical direction and lying on the supporting surface (P). Such plurality of arch frames is arranged to form the arch of the tent (1).

[0050] The exoskeleton-type field tent comprises at least one inner sheet 3, shaped so as to comprise a roof portion 31 and vertical side walls 32 joined to the roof portion 31. The inner sheet 3 is arranged internally to the plurality of arch frames 10, 11, 12 and at least partially spaced from the arch frames 10, 11, 12. The inner frame 3 is installed so as to leave the arch frames totally visible to an observer.

[0051] The inner sheet 3 comprises a hooking portion 33 enlarged with respect to the thickness of the inner sheet 3, arranged on an outer side 300 of the inner sheet 3, i.e., turned towards the arch frames 10, 11, 12. The enlarged hooking portion 33 mainly extends along a direction parallel to the longitudinal direction X, as in the case of the field tent described above.

[0052] Furthermore, as for the field tent, a plurality of pulling cables 4, 4', 4" supports the inner sheet 3 in a hanging manner. I.e., each pulling cable 4, 4', 4" is subjected to a tension to support the inner sheet 3 in the unfolded configuration thereof to form an accessible inner volume V of the tent. Each pulling cable 4, 4', 4" comprises at a first end 41 thereof a hooking device 5, 5', 5" comprising a seat with an open annular section 51 in which the hooking portion 33 is slidably inserted in a direction parallel to the longitudinal direction X. Thereby, the hooking portion 33 is constrained to remain in the open annular seat 51 when stressed in the other directions of the space perpendicular to the longitudinal direction X, said pulling cable (4) being.

[0053] As for the field tent, the hooking device 5, 5', 5'' is a metal section bar, preferably an aluminum section bar, extending longitudinally substantially over the entire length of the inner sheet 3 so as to provide a kedler-type coupling between the enlarged hooking portion 33 and the open annular seat 51.

[0054] Innovatively, the quick assembly tent and the kit according to the present invention allow to solve the drawbacks associated with the background art. In particular, the tent according to the present invention allows to obtain very quick inner sheet unfolding and assembly times, and, at the same time, it ensures the possibility of easily obtaining a tent with a medium-long term duration, by virtue of the possibility of installing on the same load-bearing structure also one or more outer sheets, typical of medium-long term tents.

[0055] Therefore, by virtue of the present invention, the load-bearing features of medium-long term duration tents are maintained, and at the same time the possibility of a rapid installation of a tent with the inner sheet alone or with inner sheet and second inner sheet, i.e., with double inner sheet, is ensured.

[0056] Furthermore, by virtue of the presence of an outer sheet and of an inner sheet, the insulation features

of the medium-long term tents are ensured.

[0057] Furthermore, advantageously, by virtue of the possibility of simply installing a further inner sheet and/or a further outer sheet, for a total of four sheets, the thermal insulation features of the tent are further improved compared to any tent of the background art.

[0058] Furthermore, advantageously, the use of a load-bearing structure, conventional in medium-long term tents, avoids the use of tie rods outside the tent.

[0059] Furthermore, by virtue of the presence of an aluminum section bar arranged near the junction region between the vertical side walls and the walls of the roof of the inner sheet, a tent is obtained with vertical walls, not deformed, with an optimal inner working volume. I.e., it applies to both the field tent and the exoskeleton-type field tent.

[0060] It is clear that, preferably, the exoskeleton-type field tent has a double inner sheet, i.e., the inner sheet which is directly subjected to the atmospheric agents and the second inner sheet 3' arranged internally to the inner sheet 3 which has a thermo-insulating function.

[0061] Still advantageously, by virtue of the possibility of mounting an outer sheet directly on the arch frame which supports the inner sheet, it allows to install a shading outer sheet without the need for further modifications, therefore improving the summer use features.

[0062] A person skilled in the art, in order to satisfy specific needs, may modify the embodiments of the tent and of the kit according to the present invention, or replace elements with others functionally equivalent.

[0063] Such variants are also included in the scope of protection as defined by the following claims.

Claims

1. Quick assembly field tent (1), comprising:

- a plurality of arch frames (10, 11, 12) which extend vertically by a predefined height (H) with respect to a supporting surface (P) and arranged in a mutually spaced-apart manner along a longitudinal direction (X) perpendicular to the vertical direction lying on the supporting surface (P), each arch frame (10, 11, 12) comprising at least one structural element (100) having a pair of first channels with an open annular section (150, 151) which extend along a prevailing direction of the structural element, said plurality of arch frames being arranged to form the arch of the tent (1);
- at least one outer sheet (2), comprising at least one enlarged edge portion (21) received in a channel of the pair of first channels with an open annular section (151) of the structural element, said outer sheet (2) being arranged s as to form an outer cover of the tent (1);
- at least one inner sheet (3), shaped so as to comprise a roof portion (31) and vertical side walls (32) joined to the roof portion (31), said inner sheet (3) being arranged internally to the outer sheet (2) and at least partially spaced from the outer sheet (2), said inner sheet (3) comprising a hooking portion (33) enlarged with respect to the thickness of the inner sheet (3), said hooking portion (33) being arranged on an outer side (300) of the inner sheet (3), i.e. facing the outer sheet (2), and extending mainly along a direction parallel to the longitudinal direction (X);
- a plurality of pulling cables (4, 4', 4"), wherein each pulling cable (4, 4', 4") comprises at a first end (41) thereof a hooking device (5, 5', 5") comprising an open annular seat (51) in which the hooking portion (33) is slidably inserted in a direction parallel to the longitudinal direction (X) and so that the hooking portion (33) is constrained to remain in the open annular seat (51) when stressed in the other directions of the space perpendicular to the longitudinal direction (X), said pulling cable (4) being subjected to tension to support the inner sheet (3) in its unfolded configuration to form an accessible inner volume (V) of the tent.

2. Field tent (1) according to claim 1, wherein the at least one structural element (100) also comprises a pair of second channels with an open annular section (152, 153) which extend along a prevailing direction of the structural element,
and wherein the tent further comprises at least one second sheet (2'), comprising at least one second enlarged edge portion (22) received in a channel (152) of the pair of second with an open annular section (152, 153) of the structural element, said second sheet (2') being arranged in a spaced manner with respect to the outer sheet (2) in the direction that proceeds from the outside of the tent (1) towards the inside of the tent.

3. Field tent (1) according to any one of the preceding claims, comprising at least one second inner sheet (3'), joined to the inner sheet (3).

4. Field tent (1) according to claim 3, wherein the second inner sheet (3') is joined to the inner sheet (3) only in some joining regions (300, 300', 300") and is at least partially internally spaced from the inner sheet (3) in the remaining regions internally, i.e. it is spaced towards the interior of the inner volume V.

5. Field tent (1) according to any one of the preceding claims, wherein the enlarged hooking portion (33) is a channel formed with the fabric of the sheet inside which a cable is inserted, preferably a cable of plastic or elastomeric material more rigid than the sheet material or a metal cable.

6. Field tent (1) according to any one of the preceding claims, wherein the enlarged hooking portion (33) and the open annular seat (51) form a kedler-type coupling.

7. Field tent (1) according to any one of the preceding claims, wherein the enlarged edge portion (21) and the channel of the pair of first open annular section channels (151) form a kedler-type coupling.

8. Field tent (1) according to any one of the preceding claims, wherein the structural element (100) is a metallic element with a quadrangular section, wherein the pair of first channels with an open annular section (150, 151) is arranged at two corners of the quadrangular section and the pair of second channels with an open annular section (152, 153) is arranged at the other two remaining corners of the quadrangular section.

9. Field tent (1) according to any one of the preceding claims, wherein the hooking device (5, 5', 5") is a metal section bar, preferably an aluminum section bar, which extends longitudinally substantially over the entire length of the inner sheet (3).

10. Field tent (1) according to any one of the preceding claims, wherein the enlarged hooking portion (33) is arranged at the joining portion between the roof portion (31) and the vertical side walls (32).

11. Field tent (1) according to any one of the preceding claims, wherein the enlarged hooking portion (33) is arranged at the vertex of the roof portion (31).

12. Field tent (1) according to any one of the preceding claims, wherein the hooking portion (33) extends longitudinally substantially over the entire length of the inner sheet (3).

13. Exoskeleton-type quick assembly field tent, comprising:

- a plurality of arch frames (10, 11, 12) which extend vertically by a predefined height (H) with respect to a supporting surface (P) and arranged in a mutually spaced-apart manner along a longitudinal direction (X) perpendicular to the vertical direction and lying on the supporting surface (P), said plurality of arch frames being arranged to form the arch of the tent (1);
- at least one inner sheet (3), shaped so as to comprise a roof portion (31) and vertical side walls (32) joined to the roof portion (31), said inner sheet (3) being arranged internally to the plurality of arch frames (10, 11, 12) and at least partially spaced from the arch frames (10, 11, 12), said inner sheet (3) comprising a hooking portion (33) enlarged with respect to the thickness of the inner sheet (3), said hooking portion (33) being arranged on an outer side (300) of the inner sheet (3), i.e. facing the arch frames (10, 11, 12), and extending mainly along a direction parallel to the longitudinal direction (X);
- a plurality of pulling cables (4, 4', 4"), wherein each pulling cable (4, 4', 4") comprises at a first end (41) thereof a hooking device (5, 5', 5") comprising an open annular seat (51) in which the hooking portion (33) is slidably inserted in a direction parallel to the longitudinal direction (X) and so that the hooking portion (33) is constrained to remain in the open annular seat (51) when stressed in the other directions of the space perpendicular to the longitudinal direction (X), said pulling cable (4) being subjected to tension to support the inner sheet (3) in its unfolded configuration to form an accessible inner volume (V) of the tent.

14. Field tent according to claim 13, wherein the hooking device (5, 5', 5") is a metal section bar, preferably an aluminum section bar, extending longitudinally substantially over the entire length of the inner sheet (3) so as to provide a kedler-type coupling between the enlarged hooking portion (33) and the open annular seat (51) .

15. Mounting kit for a tent according to any one of the preceding claims, comprising:

- a plurality of structural elements (100), each having a pair of first channels with an open annular section (150, 151) which extend along a prevailing direction of the structural element;
- at least one outer sheet (2), comprising at least one enlarged edge portion (21) suitable for being received in a channel (151) of the pair of first channels with an open annular section of the structural element, said outer sheet (2) being suitable for being arranged s as to form an outer cover of the tent (1);
- at least one inner sheet (3), shaped so as to comprise a roof portion (31) and vertical side walls (32) joined to the roof portion (31), said inner sheet (3) being suitable for being arranged internally to the outer sheet (2) and at least partially spaced from the outer sheet (2), said inner sheet (3) comprising a hooking portion (33) enlarged with respect to the thickness of the inner sheet (3), said hooking portion (33) being arranged on an outer side (300) of the inner sheet (3);
- a plurality of pulling cables (4, 4', 4"), wherein each pulling cable (4, 4', 4") comprises at a first end (41) thereof a hooking device (5, 5', 5") comprising an open annular seat (51) in which the

hooking portion (33) is suitable for being slidably inserted.

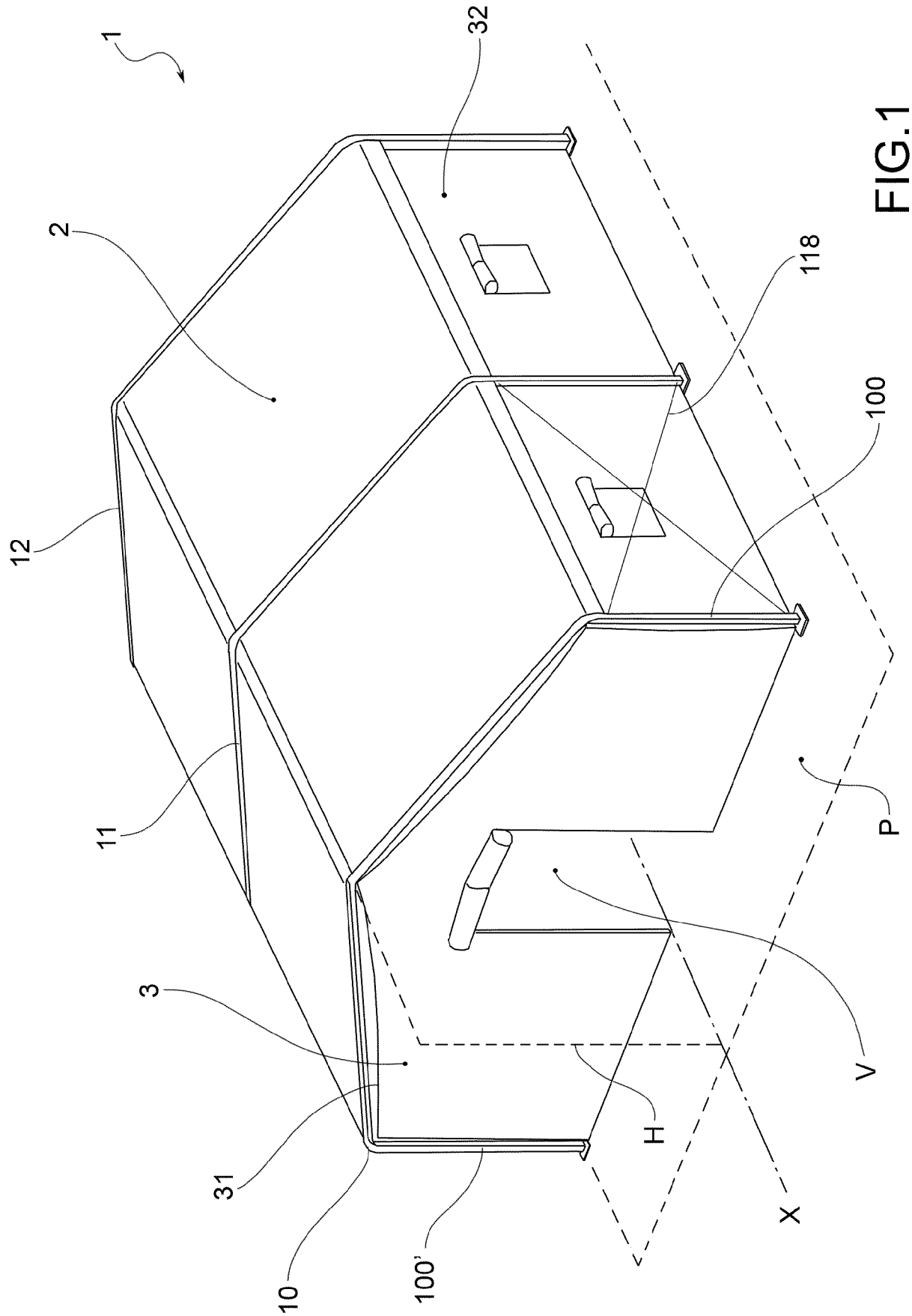
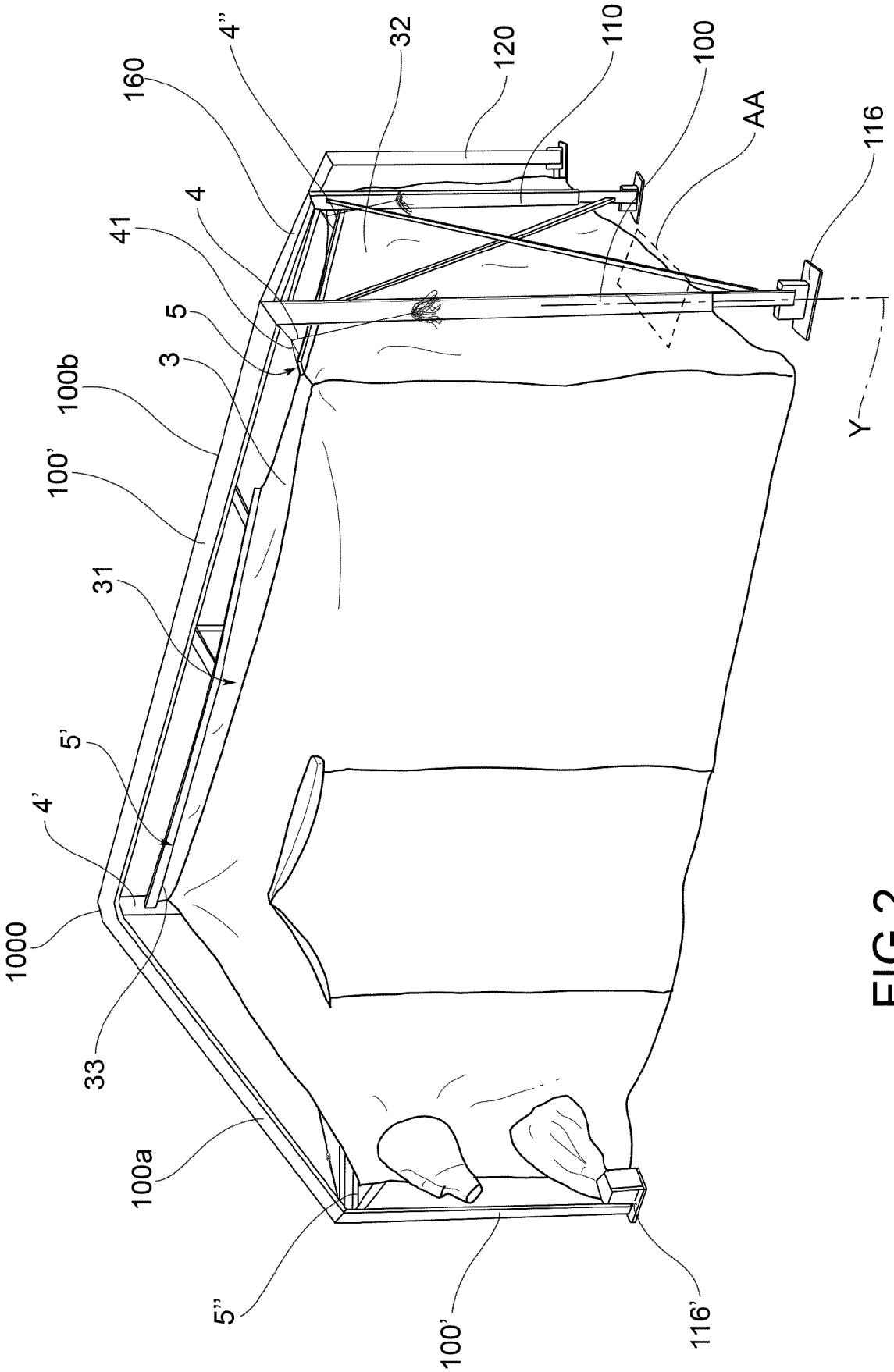


FIG.1


160
4''
32
120
110
100
AA
116
41
4
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3
100b
100'
31
5'
4'
1000
33
100a
5''
100'
116'
Y

FIG.2

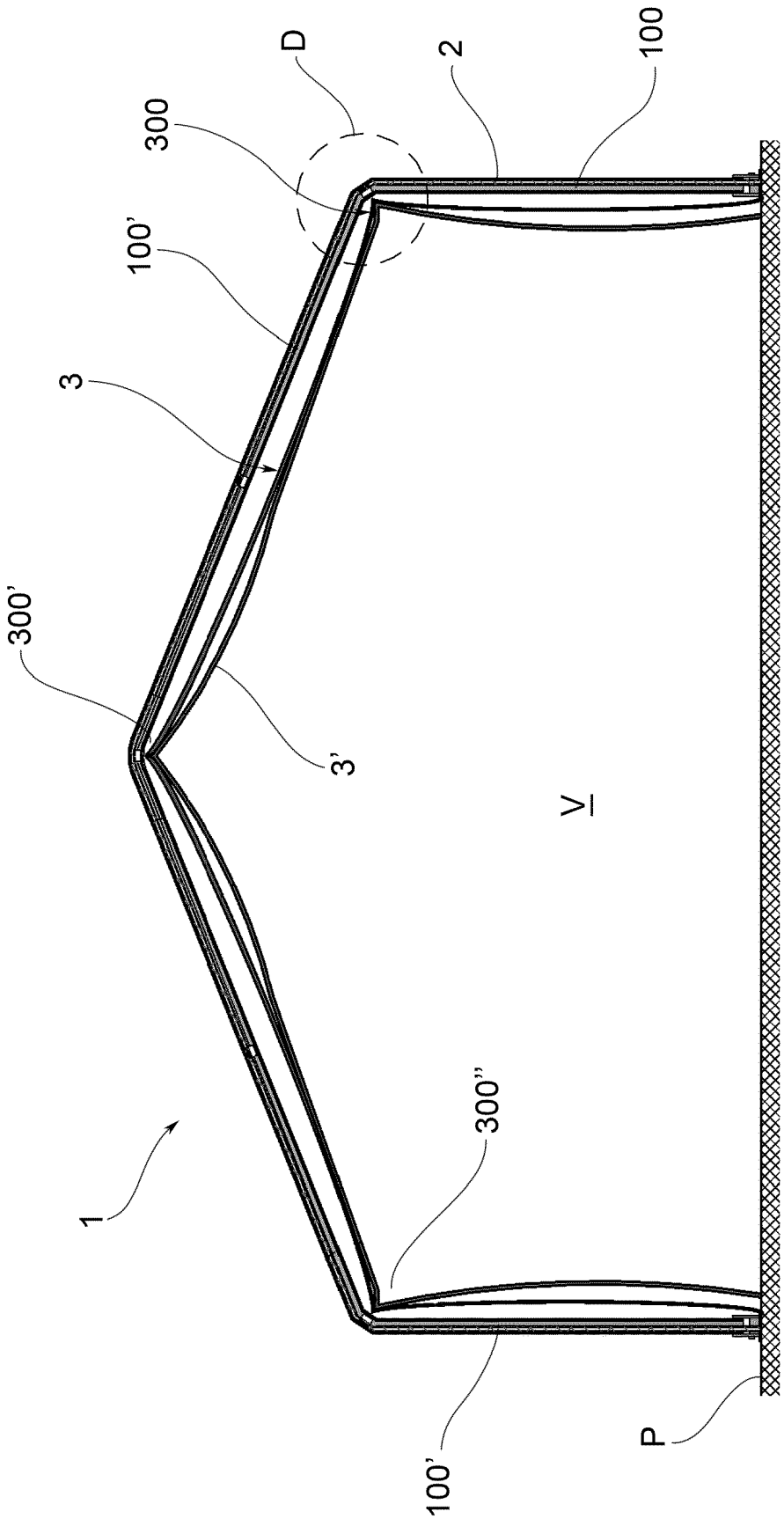

FIG.3

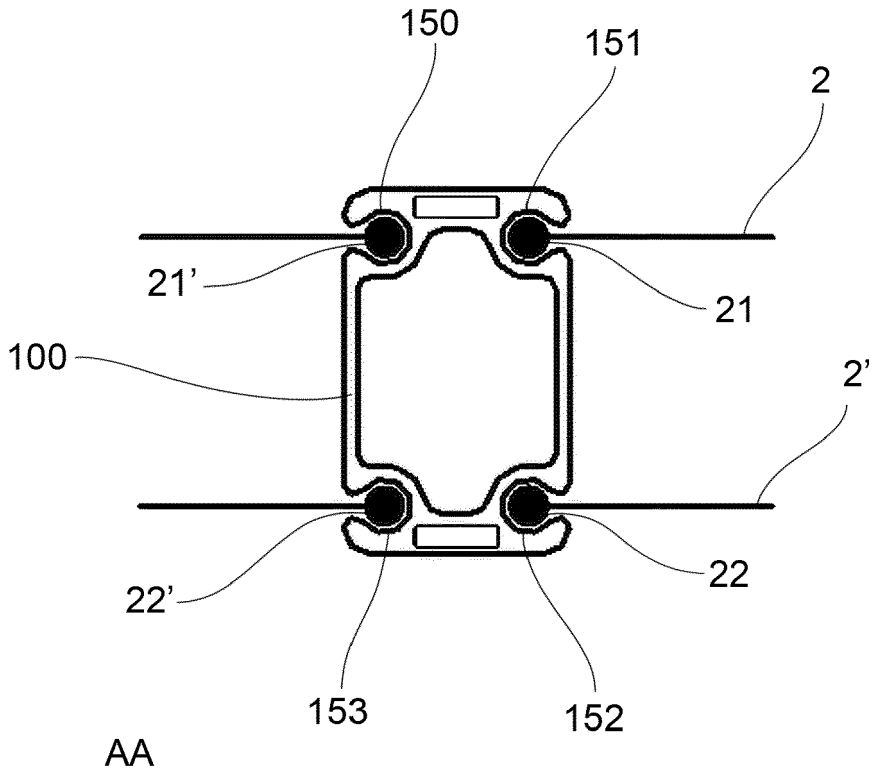

FIG.4

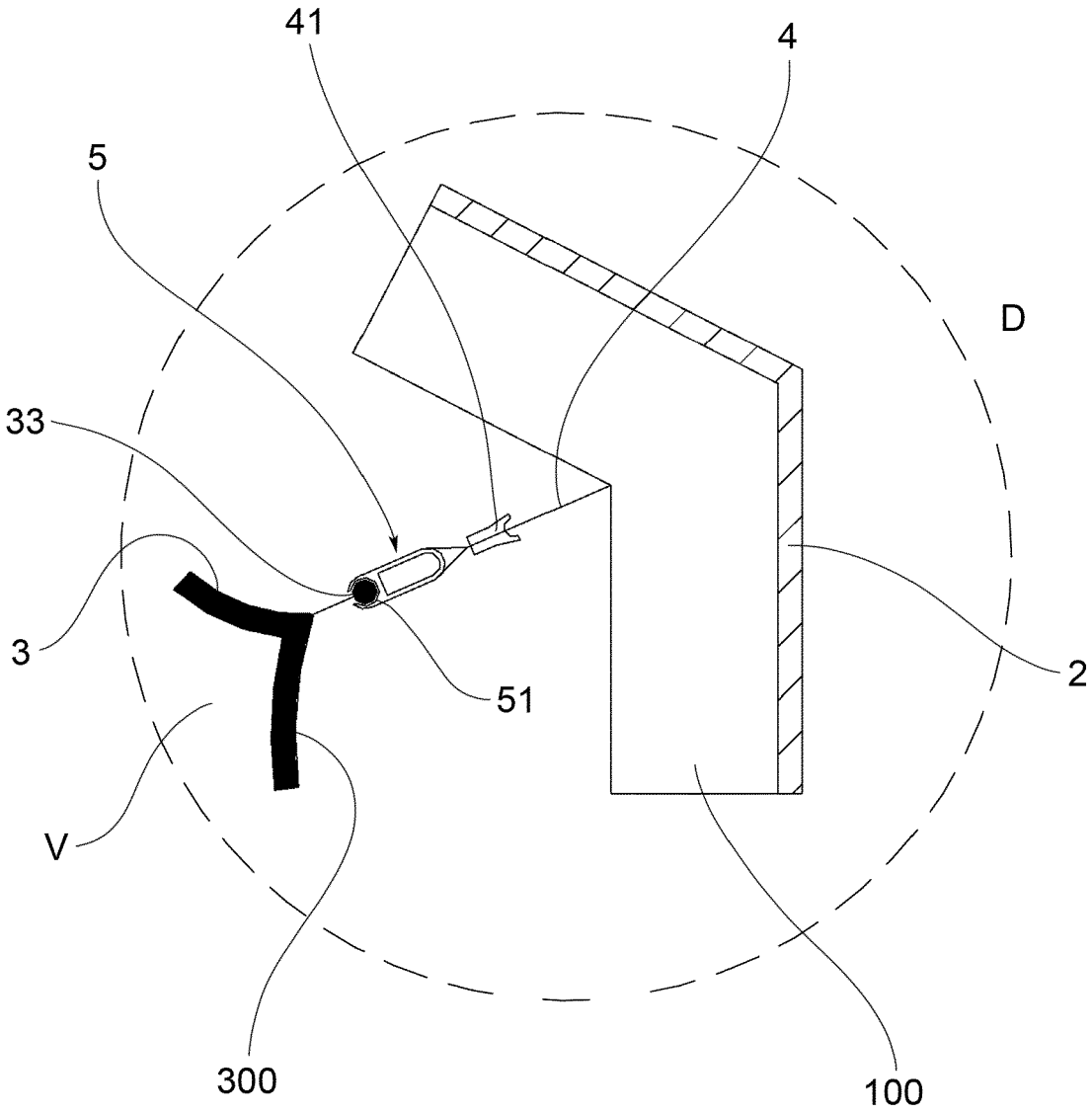

FIG.5

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EUROPEAN SEARCH REPORT

Application Number
EP 20 17 8269

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	DE 86 10 010 U1 (DEUTER) 13 August 1987 (1987-08-13) * page 6, line 5 - page 7, line 33; figures 1-4 *	1-15	INV. E04H15/18 E04H15/36 E04H15/64
A	EP 0 547 542 A1 (INC COMPONENTI PREFAB [IT]) 23 June 1993 (1993-06-23) * claim 1; figure 12 *	1-15	
A	US 2013/174883 A1 (JIN KI HO [CN]) 11 July 2013 (2013-07-11) * claim 1; figures 5-7B *	1-15	
A	WO 2015/127569 A1 (POLARMOND AG [CH]) 3 September 2015 (2015-09-03) * claim 1; figure 4 *	1-15	
A	FR 2 775 310 A1 (ALBON PLASTIQUES [FR]) 27 August 1999 (1999-08-27) * abstract; claim 1; figure 1 *	1-15	TECHNICAL FIELDS SEARCHED (IPC)
A	EP 0 007 580 A1 (FEILHAUER GEB WIESE INGRID [DE]) 6 February 1980 (1980-02-06) * page 7, paragraph 1; claim 1; figures 1,11 *	1-15	E04H

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	29 October 2020	Rosborough, John

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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