



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
07.10.2015 Bulletin 2015/41

(51) Int Cl.:
B65D 19/38 (2006.01) B65G 1/02 (2006.01)

(21) Application number: **14163645.6**

(22) Date of filing: **04.04.2014**

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME

(72) Inventor: **Lourier, Alfonsus Joannes Gerardus**
4891 AB Rijsbergen (NL)

(74) Representative: **Doolaar, Frans**
Inaday Patent B.V.
Hengelsestraat 141
7521 AA Enschede (NL)

(71) Applicant: **Erfo B.V.**
4836 LK Breda (NL)

(54) **Support structure for supporting a big-bag**

(57) The invention relates to a support structure (1) for supporting a big-bag (20), which support structure (1) comprises:

- a U-shaped base frame (2, 3, 4) comprising two legs (2, 4) connected by a base part (3);
 - a U-shaped top frame (5, 6, 7) comprising two legs (5, 7) connected by a base part (6);
 - at least two first uprights (9, 10) arranged between the free ends of the U-shaped base frame (2, 3, 4) and the free ends of the U-shaped top frame (5, 6, 7),
 - at least two second uprights (11, 12) arranged to the base part (3) of the U-shaped base frame (2, 3, 4) extending vertically to the base part (6) of the U-shaped top frame (5, 6, 7),
- wherein the distance between the legs (2, 4) of the U-shaped base frame (2, 3, 4) increases with increasing distance to the base part (3) of the U-shaped base frame (2, 3, 4).

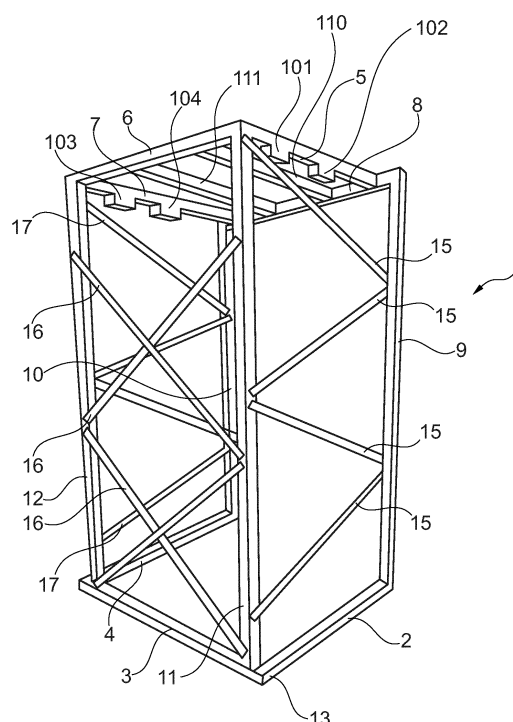


Fig. 4

Description

[0001] The invention relates to a support structure for supporting a big-bag.

[0002] Big-bags are typically used for storing and transporting bulk material, like sand, gravel and forage. The size of such big-bags is usually one cubic meter and sometimes two cubic meter having a foot print of about one square meter.

[0003] For handling, the big-bags are provided with loops at the top edge of the big-bag, such that the big-bags can be lifted. However, attaching the loops to a hoisting device is time consuming, so often, the big-bags are placed on a pallet, such that the big-bags can be lifted by a forklift.

[0004] When handling big-bags, for example in a warehouse, it is important, that the bags are not damaged. Any cut in the bags can cause instability of the big-bag, such that the bulk material could flow out of the big-bag. Especially, when the big-bags are handled by a forklift, the forks or the corners of a pallet could puncture a big-bag. To prevent this as much as possible, one has to maintain a safe spacing between big-bags when storing them in for example a warehouse.

[0005] Another disadvantage of big-bags is that they cannot be stacked. As the top surface of the big-bag is formed by the bulk material, there is no level surface available onto which a next big-bag could be placed. Also, the support strength has to be provided mainly by the big-bag material, as the bulk material typically has no internal consistency, which could contribute to the support strength. So, if a second big-bag would be stacked on top of a first big-bag, the material of the first big-bag needs to be twice as strong to also support the second big-bag.

[0006] Accordingly, it is known to provide support structures. These support structures provide a second floor over the floor on which a first row of big-bags is provided.

[0007] GB 2187934 discloses a support structure for storing goods. The structure has frame work, which can be placed on a floor over goods and provides a second floor level for storing additional goods. The frame work has horizontal rails connecting a front assembly with a rear assembly. Although the description discloses nesting of support structures, in the context of this publication, it means interlocking adjacent support structures which are each positioned on a floor, such that they cannot shift relatively to each other.

[0008] However, when using the support structure of GB 2187934 in a warehouse, it is important to align the big-bags with the frame rather precisely to make sure before inserting the big-bags underneath the frame. In practice in most cases the big-bags are placed on a pallet to form goods and the goods (i.e. the pallets with the big-bags) are handled by a forklift. If a pallet is not correctly aligned with the support structure, it may frontally hit the uprights of the support structure or the ends of the hori-

zontal rails at the base of the support frame running from the front to the back of the support frame. In such a case the pallet with the big-bag will need to be retracted and repositioned for a new attempt. It requires skill and good judgement to place the goods with the goods with only few attempts.

[0009] Accordingly it is an object of the invention to reduce or even remove the above mentioned disadvantages.

[0010] This object is achieved with a support structure for supporting a big-bag according to the invention, which support structure comprises:

- a U-shaped base frame comprising two legs connected by a base part;
- a U-shaped top frame comprising two legs connected by a base part;
- at least two first uprights arranged between the free ends of the U-shaped base frame and the free ends of the U-shaped top frame,
- at least two second uprights arranged to the base part of the U-shaped base frame extending vertically to the base part of the U-shaped top frame,

wherein the distance between the legs of the U-shaped base frame increases with increasing distance to the base part of the U-shaped base frame.

[0011] Because the distance between the legs of the U-shaped based frame increases with increasing distance to the base part of the U-shaped base frame, when loading the support structure with goods from the side of the free ends of the legs, the legs of the U-shaped base frame function as guide rails to center the goods with respect to the support structure.

[0012] The skilled person will understand that in practice the support structure is chosen such that it is tall enough such that the top frame is not in the way when loading or unloading the goods.

[0013] In a preferred embodiment, the distance between the at least two first uprights is larger than the distance between the legs of the U-shaped base frame at the base part of the base frame.

[0014] The advantage of this embodiment is that the chances that the at least two first uprights are hit by goods when loading are lowered.

[0015] In a preferred embodiment, the at least two second uprights are arranged at a distance of the corners that connect the legs to the base of the U-shaped base frame and the distance between the at least two first uprights is larger than the maximal distance occupied by the at least two second uprights.

[0016] With the support structure according to the embodiment, it is possible to nest several support structures, by sliding one support structure over the other support structure from the back.

[0017] This is possible, because the second uprights are arranged at a distance from the corners, which makes that the legs of the U-shaped base frame from the one

support structure can be positioned over the legs of the U-shaped base frame from the other support structure. Because the first uprights are far enough apart, i.e. their distance is larger than the maximum distance occupied by the second uprights, they can be slid passed the second uprights.

[0018] Depending on the thickness of the U-shaped base frame and the U-shaped top frame, of a topmost support frame, either of them or both will rest on the corresponding frame of a support frame under the topmost support frame.

[0019] In a preferred embodiment of the support structure according to the invention a support beam is arranged between the free ends of the U-shaped top frame.

[0020] The support beam provides additional strength to the support structure and provides additional locations for supporting goods on top of the support structure.

[0021] The top frame can be further strengthened by additional support beams extending in the plane of the top frame.

[0022] Preferably an additional support beam connects the base of the U-shaped top frame and the support beam.

[0023] In this embodiment, the additional support beam is aligned with the direction in which goods are moved above the support structure for placement onto the support structure. Therefore, there the chances that the additional support beam is hit when loading (or unloading) are minimized.

[0024] In yet another embodiment of the support structure according to the invention the at least two first uprights are arranged to the support beam at a distance from the free ends of the U-shaped top frame.

[0025] By arranging the first uprights to the support beam at a distance from the free ends of the U-shaped top frame, the direction of the legs of the U-shaped top frame does not depend on the position of the at least two first uprights. This provides freedom to produce a stronger support structure. Preferably, the two legs of the U-shaped top frame are parallel.

[0026] If the two legs of the U-shaped top frame are parallel, nesting the support frames and thereby supporting U-shaped top frames onto each other is easier and doesn't require that the support frames are nested with a certain distance.

[0027] In yet another embodiment of the support structure according to the invention, the support structure comprises distance holders arranged to support the support structure when nested.

[0028] When the support structure is nested and supported by the distance holders, the base of the top frame of a second support structure is at a distance from the base of a top frame of a first support structure, that is underneath the second support structure. Therefore it is easier to lift the second support structure with a forklift by introducing the fork in the space between the base of the top frame of the second support structure and the base of the top frame of the first support structure.

[0029] Yet another embodiment of the support structure according to the invention further comprises a number of cross linked pull bars arranged between adjacent uprights, when seen along the path of the U-shaped base frame.

[0030] By adding the cross linked pull bars, a true truss structure is obtained providing optimal strength, while minimizing the weight.

[0031] In still a further preferred embodiment of the support structure according to the invention the cross linked pull bars arranged between an upright extending from a free end of the U-shaped base frame and an upright extending from the corner of the U-shaped base frame, are arranged on the inside of the upright extending from the free end and are arranged on the outside of the upright extending from the corner.

[0032] The cross linked pull bars will converge somewhat from the first uprights to the second uprights. This will facilitate positioning objects, like a big-bag, within the support structure.

[0033] These and other advantages of the invention will be elucidated in conjunction with the accompanying drawings.

Figure 1 shows a perspective view of an embodiment of a support structure according to the invention.

Figure 2 shows a perspective view of a number of nested support structures according to the invention.

Figure 3 shows the embodiment of figure 1 in use.

Figure 4 shows a perspective view of an example of the support structure according to the invention

[0034] Figure 1 shows a perspective view of an embodiment of a support structure 1 according to the invention.

[0035] This support structure 1 has U-shaped base frame 2, 3, 4 with two legs 2, 4 and a base part 3 connecting the legs 2, 4.

[0036] The support structure 1 furthermore has a U-shaped top frame 5, 6, 7 with legs 5, 7 and base part 6.

[0037] The free ends of the legs 5, 7 are connected by a support beam 8.

[0038] Two first uprights 9, 10 extend from the free end of legs 2, 4 towards the support beam 8 next to the free ends of the legs 5, 7.

[0039] Two second uprights 11, 12 are arranged at a distance from the corners 13, 14 of the U-shaped base frame 2, 3, 4 and extend upwards to the base 6 of the U-shaped top frame 5, 6, 7.

[0040] The base part 3 of the U-shaped base frame and the base part 6 of the U-shaped top frame are parallel.

[0041] Both the U-shaped base frame and the U-shaped top frame as well as the two first uprights and the two second uprights are made from straight pipes and all have a rectangular cross section with equal dimensions.

[0042] The legs 2, 4 of the base frame are not parallel;

the further the distance from the base part 3, the larger the distance between the legs 2,4.

[0043] The first uprights 9,10 are welded onto the free ends of the legs 2,4 of the base frame such that the first uprights 9,10 do not stand wider apart or less wide apart than the free ends of the legs 2,4 they are welded to. This and the fact that the distance between the legs 2,4 increases with increasing distance to the base part 3 of the base frame, makes that the distance between the first uprights is larger than the distance between the legs of the U-shaped base frame at the base part 3.

[0044] To further strengthen the support structure 1, cross linked pull bars 15, 16, 17 are arranged in three of the four vertical sides of the structure 1. As can be seen, the pull bars 15, 17 are arranged on the inside of the first uprights 9, 10 and on the outside of the second uprights 11, 12.

[0045] Figure 2 shows a perspective view of a number of nested support structures 1 according to the invention. Clearly can be seen that each base frame of a support structure 1 rests on top of a base frame of an adjacent support structure 1. This is made possible, because the second uprights 11, 12 are arranged at a distance from the corners 13, 14. In addition, the distance between the at least two first uprights is larger than the distance between the surfaces of the two second uprights facing away from each other. The distance between the surfaces of the two second uprights facing away from each other is equal to the maximal distance occupied by the at least two second uprights.

[0046] Figure 3 shows an embodiment of a support structure 1 in use. The support structure 1 is positioned over a big-bag 20 filled with a bulk material and placed on a pallet 21 for easy handling by a forklift. On top of the support structure 1 a second pallet 22 is placed on which a second big-bag 23 filled with bulk material is arranged.

[0047] A variant of the example described above comprises additional elements. This variant is shown in figure 4. According to the variant, the support structure 1 comprises a number of distance holders 101, 102, 103, 104. Two distance holders 101,102 are attached to a surface of a leg of U-shaped top frame, the two other distance holders 103,104 are attached to a surface of the other leg of U-shaped top frame. The surfaces to which the distance holders are attached face towards the U-shaped base frame.

[0048] According to the variant, the support structure 1 also comprises two additional beams 110, 111 that run from the base part of the U-shaped top frame to the support beam 8. The two additional beams and the legs of the U-shaped top frame are parallel and run perpendicular to the base part of the Y-shaped top frame. The additional beams 110, 111 are made from straight pipes and have rectangular cross sections with equal dimensions as the pipes of the base frame.

Claims

1. Support structure for supporting a big-bag, which support structure comprises:

- a U-shaped base frame comprising two legs connected by a base part;
- a U-shaped top frame comprising two legs connected by a base part;
- at least two first uprights arranged between the free ends of the U-shaped base frame and the free ends of the U-shaped top frame,
- at least two second uprights arranged to the base part of the U-shaped base frame extending vertically to the base part of the U-shaped top frame,

wherein the distance between the legs of the U-shaped base frame increases with increasing distance to the base part of the U-shaped base frame.

2. Support structure according to claim 1, wherein the distance between the at least two first uprights is larger than the distance between the legs of the U-shaped base frame at the base part of the base frame.
3. Support structure according to claim 1 or 2, wherein the at least two second uprights are arranged at a distance of the corners that connect the legs to the base part of the U-shaped base frame and the distance between the at least two first uprights is larger than the maximal distance occupied by the at least two second uprights.
4. Support structure according to claim 1,2 or 3, wherein a support beam is arranged between the free ends of the U-shaped top frame.
5. Support structure according to claim 4, wherein an additional support beam connects the base part of the U-shaped top frame and the support beam.
6. Support structure according to claim 4 or 5, wherein the at least two first uprights are arranged to the support beam at a distance from the free ends of the U-shaped top frame.
7. Support structure according claim 3, 4, 5 or 6, comprising distance holders arranged to support the support structure when nested.
8. Support structure according to any of the preceding claims, further comprising a number of cross linked pull bars arranged between adjacent uprights, when seen along the path of the U-shaped base frame.
9. Support structure according to claim 8, wherein the

cross linked pull bars arranged between an upright extending from a free end of the U-shaped base frame and an upright extending from the corner of the U-shaped base frame, are arranged on the inside of the upright extending from the free end and are arranged on the outside of the upright extending from the corner.

5

10

15

20

25

30

35

40

45

50

55

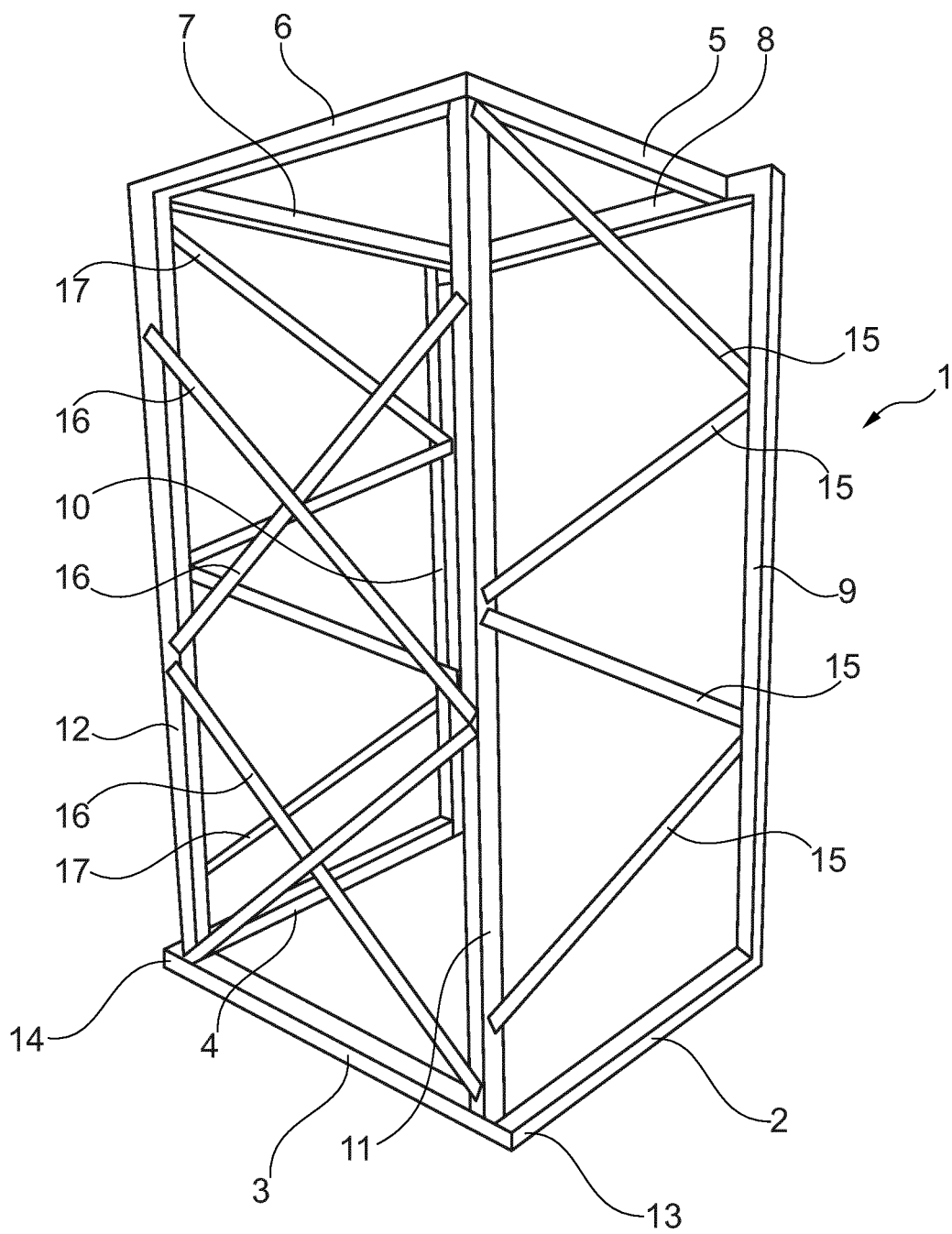


Fig. 1

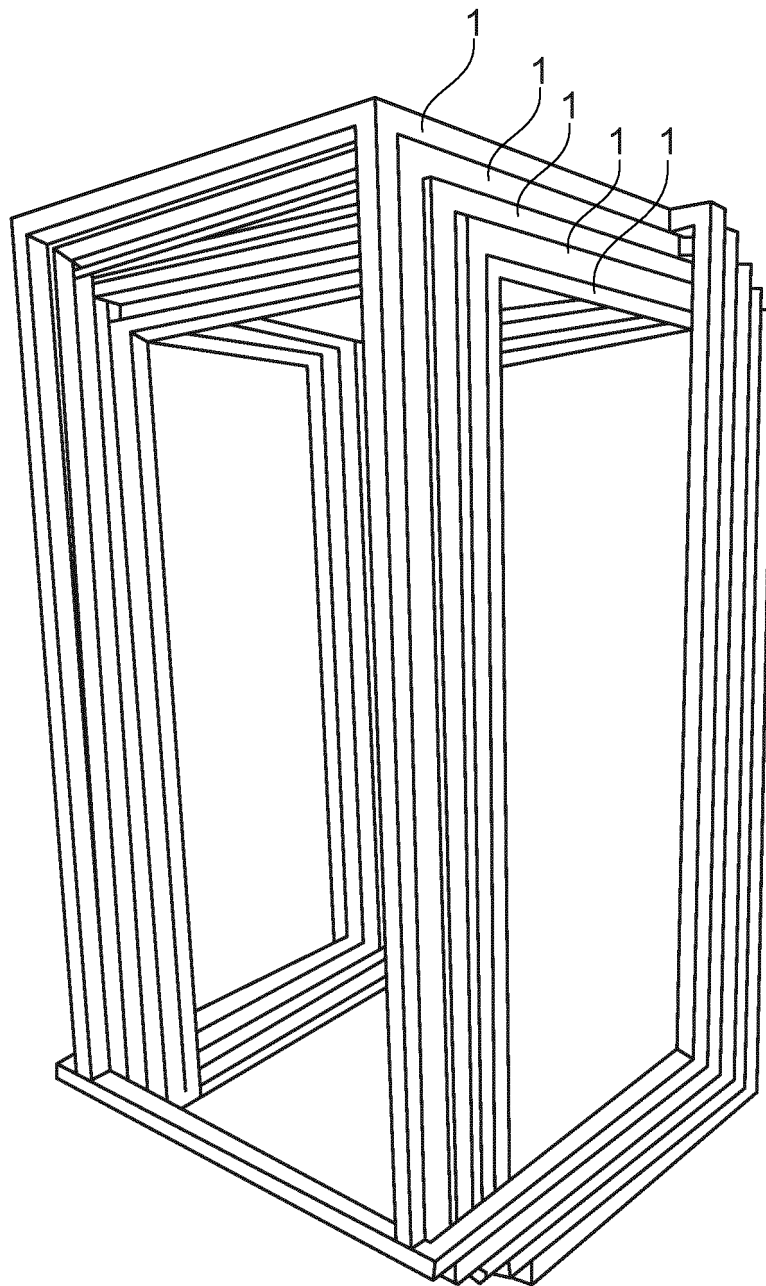


Fig. 2

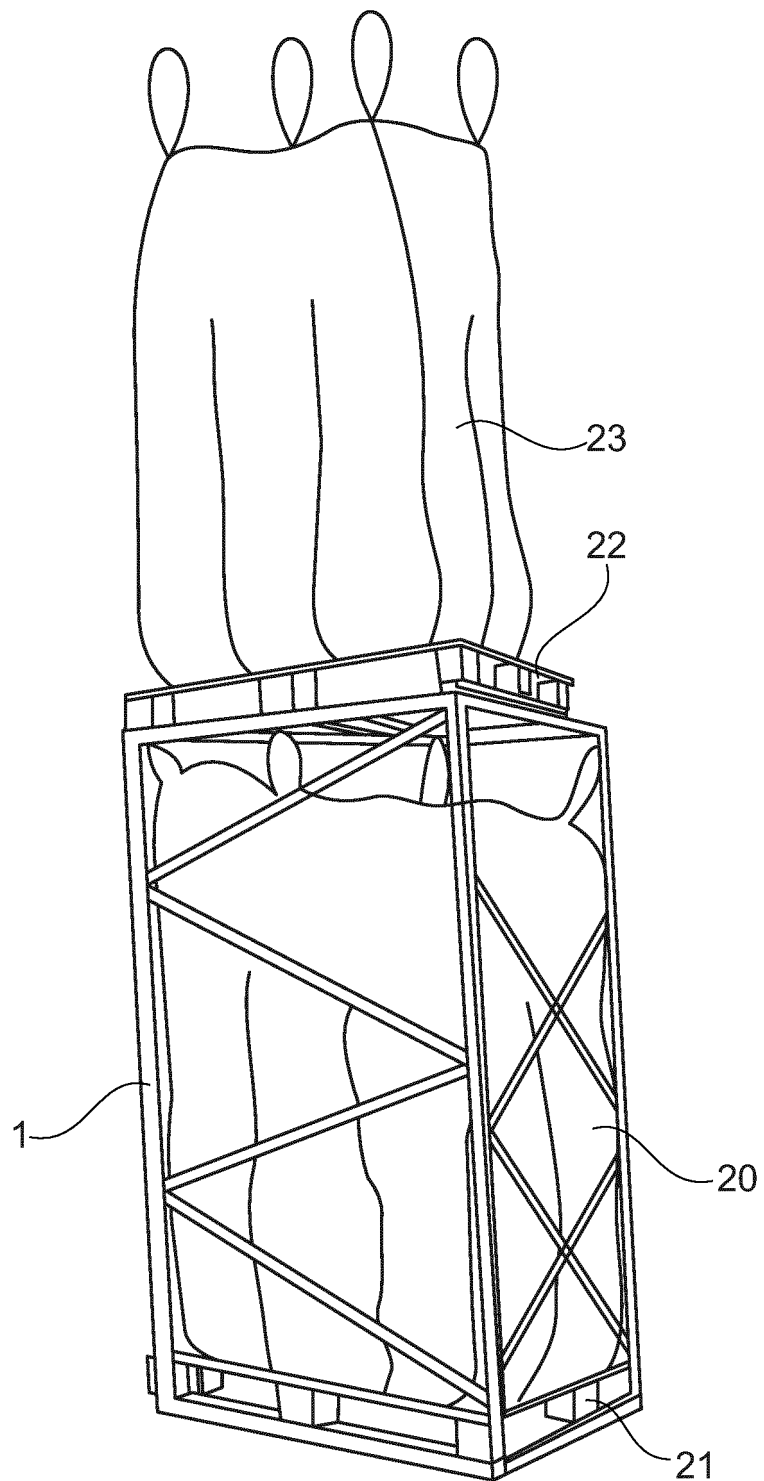


Fig. 3

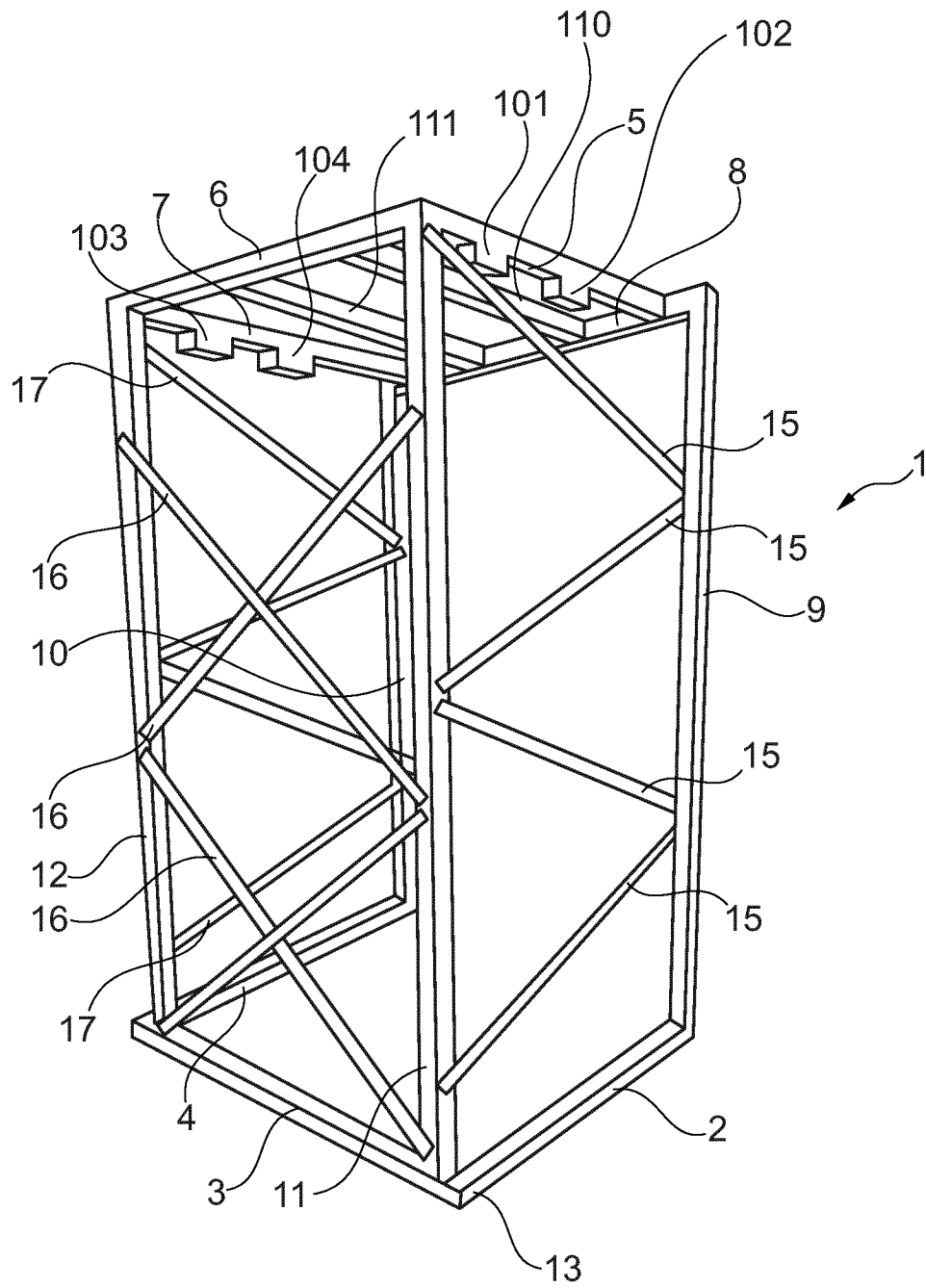


Fig. 4



EUROPEAN SEARCH REPORT

Application Number
EP 14 16 3645

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	CH 334 567 A (REINHARD GOTTFRIED [CH]) 15 December 1958 (1958-12-15) * page 1, lines 22-66 * * figures 1, 2 *	1-9	INV. B65D19/38 B65G1/02
X	JP 2006 176195 A (MARUYAMA HIDEJIRO) 6 July 2006 (2006-07-06) * abstract; figures 1-8 *	1-9	
X	DE 71 09 795 U (CORDES WERNER [DE]) 22 July 1971 (1971-07-22) * page 8, paragraph 2 - page 11, paragraph 2 * * figures 1-4 *	1-4,6-8	
X	JP S61 164124 U (?) 11 October 1986 (1986-10-11) * figures 1-15 *	1-3,7	
A	GB 2 488 544 A (RESEP LTD [GB]) 5 September 2012 (2012-09-05) * abstract; figures 1-14 *	1	TECHNICAL FIELDS SEARCHED (IPC) B65D B65G A47B
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 9 September 2014	Examiner Piolat, Olivier
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 03.02 (P04C01)

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

EP 14 16 3645

5

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

09-09-2014

10

Patent document cited in search report		Publication date	Patent family member(s)		Publication date
CH 334567	A	15-12-1958	NONE		

JP 2006176195	A	06-07-2006	NONE		

DE 7109795	U	22-07-1971	NONE		

JP S61164124	U	11-10-1986	JP H0226824 Y2		20-07-1990
			JP S61164124 U		11-10-1986

GB 2488544	A	05-09-2012	NONE		

15

20

25

30

35

40

45

50

55

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- GB 2187934 A [0007] [0008]