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(54) Title: RELEASE AND TURN AROUND MECHANISM FOR EMPTYING FIBCS

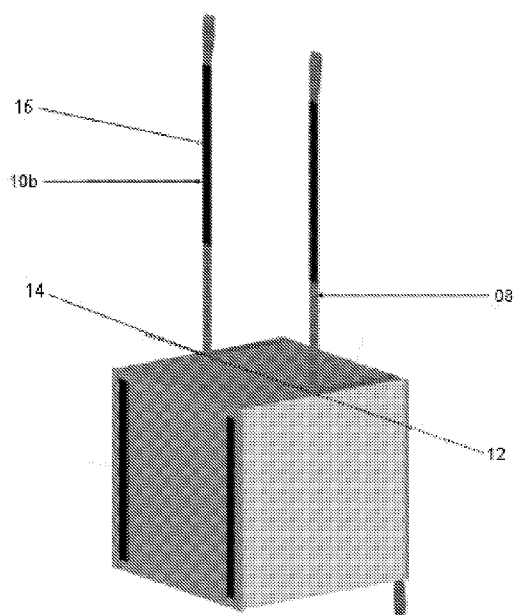


Figure 3

(57) Abstract: The present invention relates to a Flexible Intermediate Bulk Container, FIBC, 01 with a bag body with a bag base 02 and at least one sidewall 03. A plurality straps 08 each including a loop portion 05 and an attachment portion 14, is attached to the FIBC 01. At least one of the plurality straps 08 includes a releasable portion 15 between the loop portion 05 and the attachment portion 14. A release assembly 13 releasably holds at least one of the plurality of straps at a portion adjacent the loop portion 05 at least to an upper portion of the at least one sidewall 03. The attachment portion 14 is secured to the bag body at a location on or adjacent the bag base 02.



Release and turn around mechanism for emptying FIBCs

Background

[0001] A flexible intermediate bulk container (FIBC), jumbo, bulk bag, super sack, big bag, or ton bag is an industrial container made of flexible fabric that is designed for storing and transporting dry, flowable products, such as sand, fertilizer, and granules of plastic.

[0002] Transporting and loading is done by lifting the FIBC from the loop portions. Bags are normally made with either one, two or four lifting loop portions. Emptying is made easy by a special opening in the bottom such as a discharge spout, of which there are several options, or by simply cutting it open.

[0003] There are different types of FIBC – i.e. circular, u-panel, four-panel, baffle, two lift loop portions, four lift loop portions, cross corner lift loop portions. The present invention is applicable to all know types.

[0004] Emptying a FIBC in order to process its contents is normally performed with the lifted FIBC, normally on a station specifically designed for this purpose. Emptying is then made easy by a special opening in the bottom such as a discharge spout, of which there are several options, or by simply cutting it open.

[0005] Simply cutting the FIBC open results normally in destroying the FIBC and making it impossible to reuse the FIBC.

[0006] As this is standard (state of the art) emptying, may different types be in use. A special type is disclosed in JP2008302958A which provides a container bag that can be safely opened, having a foldable discharge cylinder at the bottom, members to open and close the discharge cylinder.

[0007] CN204957407U relates to the technical field of container bags, in particular to a bulk turnover bag using Velcro on the discharge.

[0008] Hundreds of millions of large FIBC which today are cut into pieces at the bottom and thrown away or burnt afterwards can be replaced by this solution which means that the container can be used again and again. Conventional and existing solutions for lifting bags are used as normal when lifting this bag.

Summary of the invention

[0009] The invention solves the problem that the FIBC according to the invention can be reused many times as all to do is put the straps together with the FIBC after use by pressing the hook and loop fasteners together between the two parts.

[0010] Accordingly, the present invention concerns a Flexible Intermediate Bulk Container, FIBC, comprising: a bag body with a bag base and at least one sidewall, a plurality straps each including a loop portion and an attachment portion, attached to the FIBC, whereof at least one of the plurality straps includes a releasable portion between the loop portion and the attachment portion. A release assembly releasably holds at least one of the plurality of straps at a portion adjacent the loop portion, at least to a sidewall upper part. The attachment portion is secured to the bag body at a location on or adjacent the bag base.

[0011] The attachment portion may be secured to the bag body between a bottom edge of the at least one sidewall and the bag base.

[0012] The first part and the second part of the release assembly may have equal lengths, and the second part may extend a total height of the sidewall, and wherein the attachment portion is permanently fixed to the base of the bag body in an area between a centre of the bag base and the bottom of the at least one sidewall.

[0013] There the release assembly may be a hook and loop fastener.

[0014] The fastener assembly may be one of a magnetic fastener, where one part (+/-) is permanently fixed to the sidewall and optionally to the base, and the respective other part (-/+) is permanently fixed to the strap, or a zip fastener.

[0015] The FIBC may be a four-panel FIBC.

[0016] The straps and the corresponding releasable fasteners may be located along the edges of the four panels of a four-panel FIBC.

[0017] The straps and the corresponding releasable fasteners may be located along edges of the panels and may extend from the bag base at a distance from an edge of the panels in a range between 5 and 20% of the width of the panel.

[0018] The FIBC may be a circular-type FIBC, or a u-panel FIBC, comprising at least two loop portions where at least one is attached to a detachable strap.

[0019] The FIBC may include at least one of a discharge spout and a top skirt.

[0020] The FIBC, may include at least one of: three straps whereof one with a releasable portion, three straps whereof two with a releasable portion, three straps

whereof all with a releasable portion, four straps whereof two with a releasable portion and four straps whereof all with a releasable portion.

[0021] The release assembly may include a first part releasably secured to a second part, wherein the first part is secured to the releasable portion of the strap, and the second part is secured to the bag body.

[0022] Furthermore, the invention concerns a method for discharging a FIBC with an FIBC as described above comprising the steps of lifting up the FIBC by all loop portions a height, releasing at least one of the loop portions to trigger the release assembly, and thereby turning the bag around and discharging the content.

[0023]

Brief description of the figures

Figure 1 schematically shows a state-of-the-art FIBC.

Figure 2 schematically shows a preferred embodiment of a FIBC according to the invention.

Figure 3 schematically shows a preferred embodiment of a FIBC according to the invention.

Figure 4 schematically shows a preferred embodiment of a FIBC according to the invention.

Figure 5 schematically shows the steps of the preferred method for emptying the FIBC according to the invention.

Figure 6 is a schematic representation in perspective view of a FIBC in an alternative embodiment of the invention with a circular layout.

Figure 7 is a schematic representation in perspective view of a FIBC in an alternative embodiment of the invention with a release assembly surrounding the straps.

Reference list

- 01 flexible intermediate bulk container (FIBC)
- 02 bag base
- 03 sidewall(s)
- 04 top area
- 05 loop(s)
- 06 discharge spout
- 07 top skirt
- 08 straps

- 09 sidewall edge, height of the sidewall
- 10 hook and loop fasteners 10a, 10b
- 11 bag base edge, length of the lower edge, wide of the bag side
- 12 perpendicular bisector of the base 02
- 13 release assembly
- 14 attachment portion
- 15 releasable portion
- 16 sidewall upper part

A, B, C, D sidewall A, B, C, D

Detailed description of the invention

[0024] In a first aspect of the invention, it is described a FIBC.

[0025] For a better understanding of the invention and the features the main, state of the art, and standard parts of the invention are shown and described in figure 1, showing a state-of-the-art FIBC.

01 is the flexible intermediate bulk container (FIBC), made of flexible fabric that is designed for storing and transporting.

02 is the bag base. Emptying is normally made easy by a special opening in the bag base 02, such as a discharge spout **06**, or by simply cutting it open.

03 are the sidewalls of the FIBC.

04 is the top area of the FIBC. Charging is normally done via the top area 04, usually provided with top shirt **07**.

05 are the loop portions. Transporting and loading is done by lifting the FIBC from the loop portions 05. The loop portions are attached to the sidewalls 03 with straps 08. Normally the straps extend to the top edge of the FIBC and form the loop portions. The straps are sewn to the edges of the state-of-the-art FIBC.

[0026] Figure 2 shows a preferred embodiment of an FIBC 1 according to the invention. Straps 08, each with a releasable portion 15 is detachably attached on the sidewall 03 with a hook and loop fasteners 10a, 10b forming a release assembly, where a second part is permanently fixed to the sidewall, and a respective first part is permanently fixed to the strap 08. Figure 2 also exemplifies the embodiment where the straps 08 are permanently fixed with their lower ends forming an attachment portion 14 of the strap 08, to a lower edge 11 of the FIBC at the bag base 02. In a further embodiment (not visualized in figure 2) of the embodiments as shown in figure 2 and in order to guarantee

that the FIBC supports high loads/weights, the straps are permanently fixed at their lower ends to a lower edge 11 of the FIBC but are going further round the bag (via the base 02) and might be permanently fixed to the base 02 as well. The straps 08 form a loop 05 at the strap end.

[0027] As mentioned above, in the state-of-the-art FIBC, the straps are normally sewn (placed) to the edges. The present invention also works with this configuration – straps sewn (placed) to the edges. In a preferred embodiment, as shown in figure 2, the straps are placed lateral to the edges.

[0028] Figure 3 shows a preferred embodiment of an FIBC according to the invention. Figure 3 exemplifies the embodiment where the straps 08 are permanently fixed (for example sewn) with their attachment portion 14 at their lower ends to the base 02 of the FIBC, approximately at the perpendicular bisector 12 of the base 02 or in the range between the perpendicular bisector 12 of the base 02 and the edges 11. This attachment position at the center of the bottom of the FIBC allows the FIBC to be turned completely upside down.

[0029] If the straps are placed lateral, as shown in the figures, the embodiments are performed in such a way that two of the four loop portions/straps are conducted on one sidewall and the other two loop portions/straps are conducted on the opposite sidewall. In the embodiment according to figure 2 and 3, the loop portions/straps are conducted lateral with approximately the same distance from the edges 11.

[0030] Figure 4 shows a preferred embodiment of an FIBC according to the invention.

[0031] Figure 4 exemplifies the embodiment where the straps 08 are permanently fixed (for example sewn) at their attachment portions 14 at their lower ends to the base 02 of the FIBC, approximately at the perpendicular bisector 12 of the base 02 or in the range between the perpendicular bisector 12 of the base 02 and the edges 11, in the same way as shown in figure 3. As opposed to the embodiment of figure 3, are four loop portions/straps detachably attached to the FIBC. The straps are placed lateral, performed in such a way that two of the four straps are conducted on one sidewall and the other two loop portions/straps are conducted on the opposite sidewall, where the straps (08A in figure 4) on one side (A in figure 4) are conducted lateral and a bit closer to the edges 11 as the straps (08B in figure 4) on the opposite side (B). The straps 08A with loop portions 05A extend along side A of the FIBC and the straps 08B with loop portions 05B extend along side B of the FIBC. The straps 08A and 08B are in one piece that is attached at the strap attachment portion 14 to the FIBC at the middle of the base. In this embodiment, each strap includes a loop portion 05 at each end, a releasable portion 15 adjacent each loop portion 05, and a strap attachment portion 14 at the middle. A bottom portion without a releasable portion may be provided between the releasable

portion 15 and the attachment portion 14 both on the embodiment with a one-piece strap and the embodiment with a two piece strap. In the embodiment shown in figure 4, the straps are permanently fixed (for example sewn) at their lower ends to the base 02 of the FIBC, approximately at the perpendicular bisector 12 of the base 02 or in the interval between the perpendicular bisector 12 of the base 02 and the edges 11, but in another embodiment (according to figure 4 but not shown), the straps are permanently fixed with their lower ends to the lower edge (11) of the FIBC.

[0032] In the embodiments according to figure 4, emptying is preferably via side A or side B, in fact but not preferably via all four sides. For emptying one specific side, the two proximal (nearest) straps must be detached.

[0033] In a second aspect of the invention, it is described a method to use the FIBC according to the first aspect of the invention.

[0034] As mentioned above, the FIBC 01 is equipped with hook and loop fasteners 10, extending along the height 09 of the sidewall of the container 01, and is lifted on all the straps 08 until it is to be emptied by releasing parts of the straps from the lifting equipment so that the fastener mechanism 10 is triggered on the unreleased straps and the bag is turned around and emptied of its contents. To release parts of the straps from the lifting equipment on load quick release hooks are preferably used.

[0035] The invention is based on using a fastener, preferably hook and loop fasteners 10 as a release and turning mechanism on the container. The FIBC is preferably still filled from the top 04, but the new mechanism means that instead of emptying it at the bottom, the bag is turned upside down (around) and emptied via the top 04.

[0036] In a preferred embodiment of the method the FIBC is lifted on two of the hooks/straps 08 – at least these two straps are i) performed with detachable fasteners 10 according to the first aspect of the invention, ii) adjacent to each other, iii) preferably on one side (A or B) of the container. The fasteners, the hooks and loops respectively, will separate from each other by the weight of the load. The strap then detaches from the respective wall and the container will turn 180 degrees and empty.

[0037] The container can be emptied both when they are standing on the ground, as described before, or when they are hanging in the air. Selected lifting equipment and the functionality of this equipment determine how the emptying itself will take place. This is described below with some examples of lifting equipment that already exists today or that can easily be supplemented and further developed from a professional in the art.

[0038] Use of forklift or tractor with fork:

The container with, for example, 4 straps is driven by the truck or tractor, which has the straps/hooks attached to the fork with two straps on each fork, preferably where one of

the respective two straps at one fork is attached to one side (for example A) of the container and the other strap is attached to the opposite side (in the example, B) of the container, and both straps are close to one (the same) side (for example side C) of the container. The container is placed on the ground and the truck/tractor backs up so that only the two straps (one on each fork) at the back (for example side A) are left on the fork– step a. The tower on the fork is raised and the fasteners on the remaining straps are loosened, step b, by the weight of the load so that the bag turns 180 degrees, step c, and is emptied. This is schematically shown in figure 5.

[0039] The examples shown in figures 2-5 show an embodiment forming a cube with four discrete panels forming sides A, B, C, D and a bottom with a bottom panel. Clearly the application is similarly applicable all types of FIBC's including circular-type FIBC's and u-panel FBIC's. Similarly, is also the invention applicable to FIBC's with another number of loops such as three loops and five loops. The term at "least one sidewall" is used to cover all such embodiments as a circular-type FIBC could be interpreted to include only one sidewall.

[0040] The application is also applicable to solutions with normal attached loops of the prior art in combination with a loop with a releasable portion of the present invention.

[0041] Use of a forklift or tractor with a fork and use of an extra strap:

The FIBC with, for example, 4 straps are driven by the truck/tractor, which has the straps attached to the fork with one strap (the straps from side A according to the figures) on each fork. The two other straps (the straps from side B according to the figures) are attached to an additional strap, or similar, which is tied together to a ring which is pulled through the two straps and attached to the fork instead. The FIBC is raised high, and the additional strap is cut so that the two front straps 08 are loosened by the weight of the load and the FIBC is emptied of its contents when the fastener loosens on the two remaining straps – step b.

[0042] Use of a forklift or tractor with equipment where hooks are used to hold the bag: A device with 2 hooks attached to two rails is applied to the forks of the truck or tractor, which is applied to the forks where the hooks hang at the front. The truck or tractor drives forward so that all 4 straps enter the fork. The two front straps are attached to the hooks instead of the fork. These two hooks (for example and preferably onload quick release hooks) can be released electronically, mechanically or manually while the load is hanging high. The two rear straps with the fasteners are fixed in the fork and the bag turns and empties.

[0043] Use of a crane truck or large crane with lifting hooks that cannot be released: On one of the hooks, a small strap is attached to a loop. This loop is first pulled through the straps on the bag that are to be detached from the hook before it is attached to the

hook. The other two straps hang from another hook. When the bag hangs in the air, a long-handled knife is used to cut this loop. The straps loosen and the fastener mechanism on the two straps that hang back ensure that the bag is turned around and emptied. The method is also applicable when the FIBC is on the ground. When the knife has been used to cut the loop, the bag is raised by the crane and the fastener mechanism is released on the remaining straps.

[0044] Use of a crane truck or other large crane with hooks that can be released: The crane is equipped with hooks that have a release mechanism where you can release the hook manually, mechanically, or electronically (for example and preferably on load quick release hooks). The crane has also fitted hooks that cannot be released. The bag is attached with, for example, 2 straps to a hook that can be released and 2 straps to a hook that cannot be released. When release occurs, two of the straps loosen and the fastener mechanism on the straps that do not loosen ensures that the bag is turned around and emptied.

[0045] Use of a crane with a lifting cross that has 4 hooks:

[0046] The crossing usually has 4 hooks. The crossing is fitted with 2 hooks that can be triggered mechanically or electronically. When these 2 hooks are released, 2 straps loosen. The fastener mechanism on the two remaining straps causes the bag to be turned around and emptied.

[0047] Four-panel FIBC's include a bag body with a base, four sidewalls, and four loop portions (05), attached to the sidewalls with straps (08), and may include a discharge spout (06), and a top skirt (07), where at least one, preferably two adjacent, more preferably all four of the straps (08) extend along the total height (09) of the respective sidewall, are detachably attached on the sidewall with a hook and loop fasteners 10a, 10b, where one part (10a or 10b) is permanently fixed to the sidewall, and the respective other part (10b or 10a) is permanently fixed to the strap (08), and are permanently fixed with their lower ends to the lower edge (11) of the FIBC.

[0048] FIBC (01), where two adjacent, optionally the two adjacent and the two opposite adjacent straps (08) extend along the total height (09) of the respective sidewall, and further down to the base (02), are detachably attached on the sidewall with a hook and loop fasteners 10a, 10b, where one part (10a or 10b) is permanently fixed to the sidewall and optionally to the base, and the respective other part (10b or 10a) is permanently fixed to the strap (08), and are permanently fixed with their lower ends to the base (02) of the FIBC, preferably in the range between the perpendicular bisector (12) of the base (02) and the edges (11).

[0049] FIBC (01), where the straps (08) and the corresponding hook and loop fasteners (10) are placed at the edges of the bag.

[0050] FIBC (01), where the straps (08) and the corresponding hook and loop fasteners (10) are placed lateral to the edges.

[0051] FIBC (01), where fixing means (12), at least in the upper range of the sidewalls, secure medium-termly permanently the detachably attached straps (08).

[0052] FIBC (01), where the fastener is not a hook and loop fasteners, but a different type, such for example a magnetic fastener, where one part (+/-) is permanently fixed to the sidewall and optionally to the base, and the respective other part (-/+) is permanently fixed to the strap (08), or a zip fastener.

[0053] The FIBC (01), may be a four-panel FIBC, a circular-type as shown in Fig. 6, or a u-panel type, comprising at least two loop portions (05) where at least one is attached to a detachable strap (08).

[0054] As mentioned above is the present invention equally applicable to circular-type FIBC's as shown i (01) in Fig. 06. In Fig. 6 are the straps (08) with the loops (05) attached to the cylindrical sidewall (03) surrounding the circular base (02) with release assembly (13) in the form of hook and loop fasteners (10) along the cylindrical sidewall (03) and the straps (08). The release assembly (13) in the form of hook and loop fasteners (10) holds the straps (08) with the loops (05) attached to the cylindrical sidewall (03) including to the sidewall upper part (16).

[0055] Fig. 7 shows a four panel FIBC (01) with four release assemblies (13) secured to the sidewall (03), two for each strap (08). Two of the four release assemblies (13) are secured to the sidewall upper part (16). In the embodiment of fig. 7 are the release assemblies (13) surrounding the straps (08) and can be made as separate bands with hook and loop fasteners securing the band to itself to form a loop surrounding the straps (08). In this embodiment may the hook/loop fasteners along the straps (08) and the sidewall (03) be omitted. The straps (08) will be released from the sidewall (03) in two steps with the shown two release assemblies for each strap (08)

[0056] The method for discharging a FIBC (01), may include the steps of: a) lifting up the FIBC on all loop portions, preferably at least a height 09, b) releasing parts of the loop portions/straps to trigger the hook and loop fasteners mechanism on the unreleased straps, and thereby c) turning the bag around and discharging the content.

[0057] The method for discharging a FIBC (01), may include the steps of: lifting the FIBC on at least one, preferably on to adjacent loop portions/straps, and thereby, trigger the hook and loop fasteners mechanism on these straps, and thereby, turning the bag around and discharging the content.

CLAIMS

1. A Flexible Intermediate Bulk Container, FIBC, (01) comprising:
a bag body with a bag base (02) and at least one sidewall (03), a plurality straps (08) each including a loop portion (05) and an attachment portion (14), attached to the FIBC (01), whereof at least one of the plurality straps (08) includes a releasable portion (15) between the loop portion (05) and the attachment portion (14);
a release assembly (13) releasably holding at least one of the plurality of straps at a portion adjacent the loop portion (05), at least to a sidewall upper part (16); and
wherein the attachment portion (14) is secured to the bag body at a location on or adjacent the bag base (02).
2. The FIBC (01) according to claim 1, wherein the attachment portion (14) is secured to the bag body between a bottom edge (11) of the at least one sidewall (03) and the bag base (02).
3. The FIBC (01) according to claim 1 or 2, where the first part and the second part of the release assembly (13) have equal lengths, wherein the second part extends a total height (09) of the sidewall (03), and wherein the attachment portion (14) is permanently fixed to the base (02) of the bag body in an area between a centre of the bag base (02) and the bottom (11) of the at least one sidewall (03).
4. The FIBC (01), according to one of the claims 1-3 where the release assembly (13) is a hook and loop fastener (10a, 10b).
5. The FIBC (01), according to one of the claims 1-3, where the release assembly (13) is one of a magnetic fastener, where one part (+/-) is permanently fixed to the sidewall and optionally to the base, and the respective other part (-/+) is permanently fixed to the strap (08), and a zip fastener.
6. The FIBC (01), of one of the claims 1-5, wherein the FIBC is a four-panel FIBC.
7. The FIBC (01) according to one of the claims 1-5, where the straps (08) and the corresponding releasable fasteners (10) are placed along the edges (11) of the four panels of the bag.
8. The FIBC (01) according to one of the claims 1-6, where the straps (08) and the corresponding releasable fasteners are located along edges of the panels and extending from the bag base (02) preferably at a distance from the edge in the range between 5 and 20% of the width of the panel.

9. The FIBC (01), of one of the claims 1-7, wherein the FIBC is a circular-type FIBC, or a u-panel FBIC, comprising at least two loop portions (05) where at least one is attached to a detachable strap (08).
10. The FIBC (01), of one of the claims 1-7, wherein the FIBC (01) includes at least one of a discharge spout (06), and a top skirt (07).
11. The FIBC (01), of one of the preceding claims including at least one of: three straps (08) whereof one with a releasable portion (15), three straps (08) whereof two with a releasable portion (15), three straps (08) whereof all with a releasable portion (15), four straps (08) whereof two with a releasable portion (15) and four straps (08) whereof all with a releasable portion (15).
12. The Flexible Intermediate Bulk Container, FIBC, (01) of one of the preceding claims wherein the release assembly (13) includes a first part releasably secured to a second part, wherein the first part is secured to the releasable portion (15) of the strap (08), and the second part is secured to the bag body (03)
13. Method for discharging a FIBC (01) with an FIBC (01) according to one of the claims claim 1-12, comprising the steps of:
 - a) lifting up the FIBC by all loop portions, to a height (09)
 - b) releasing at least one of the loop portions (05) to trigger the release assembly (13), and thereby
 - c) turning the bag around and discharging the content.

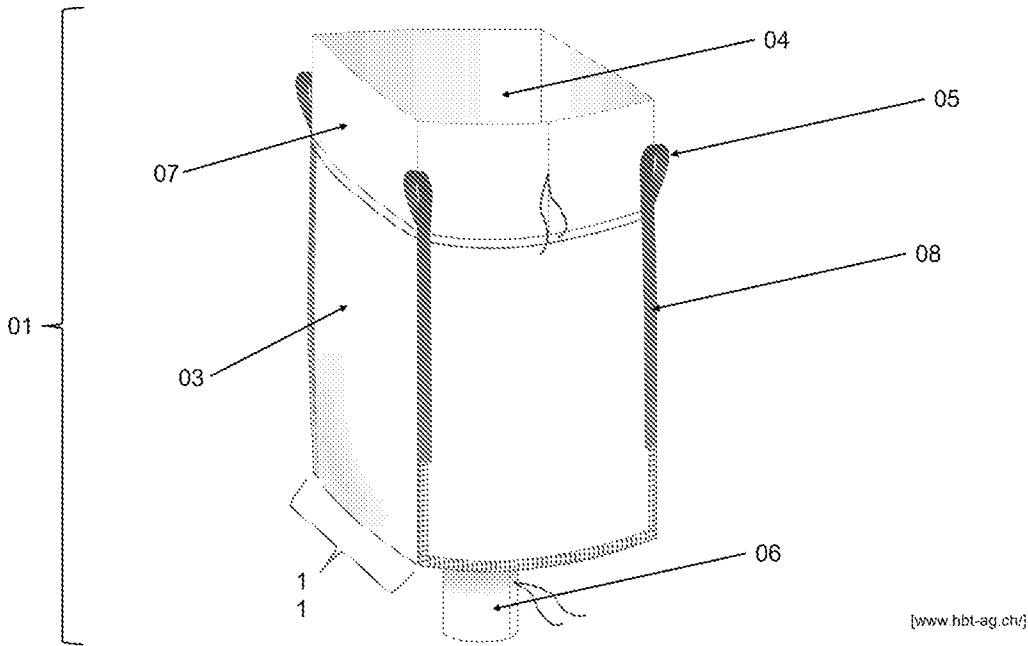


Figure 1

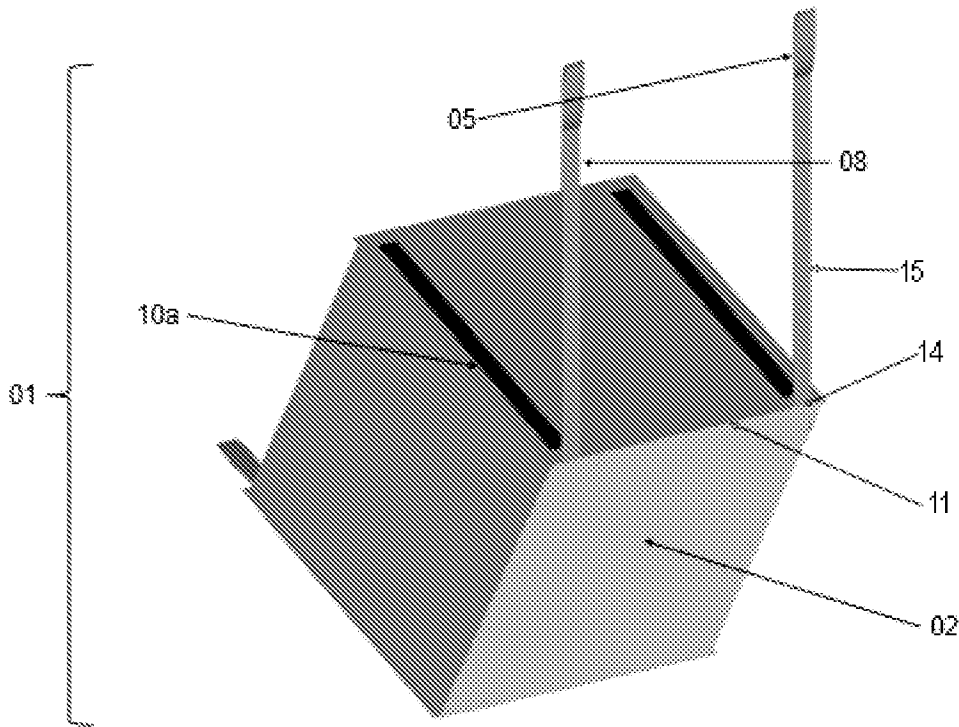


Figure 2

2/4

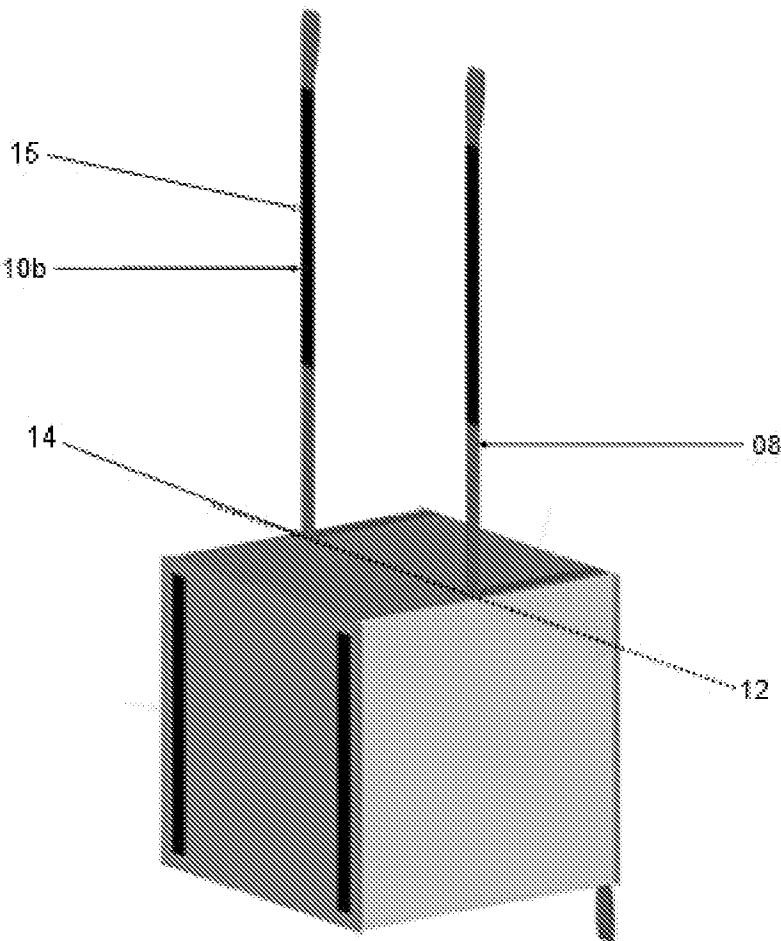


Figure 3

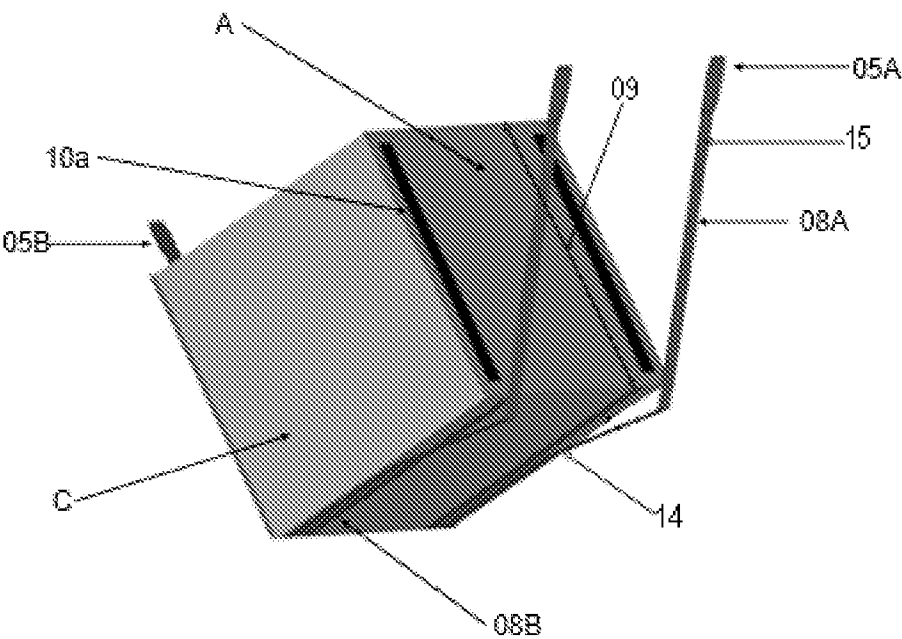
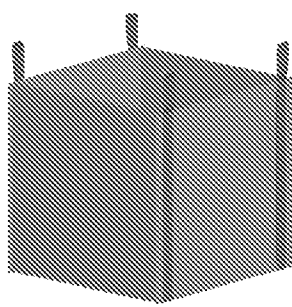
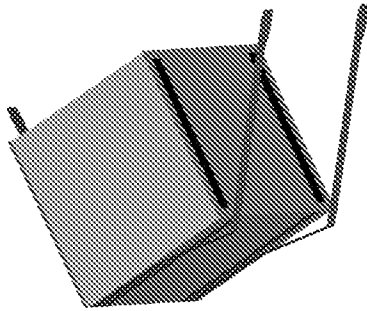


Figure 4

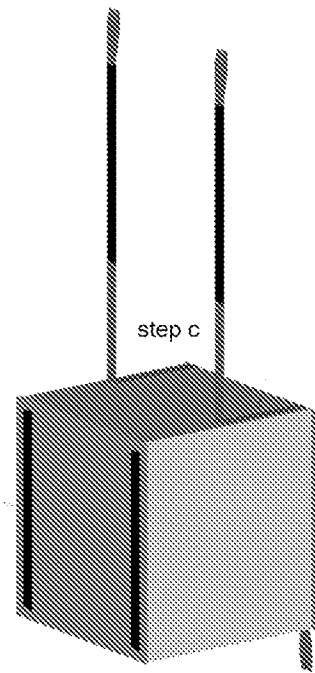
3/4



step a



step b



step c

Figure 5

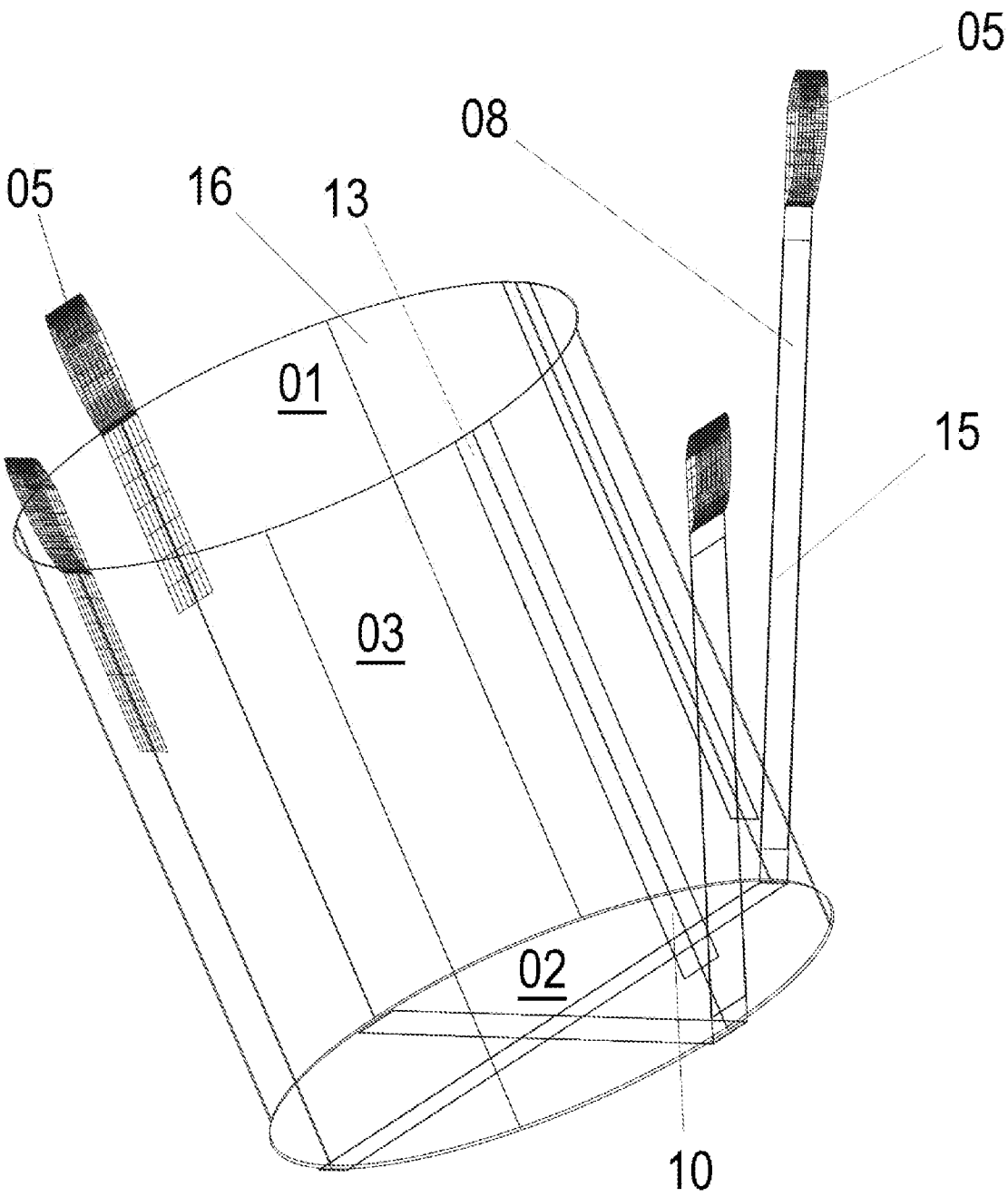


Fig. 6

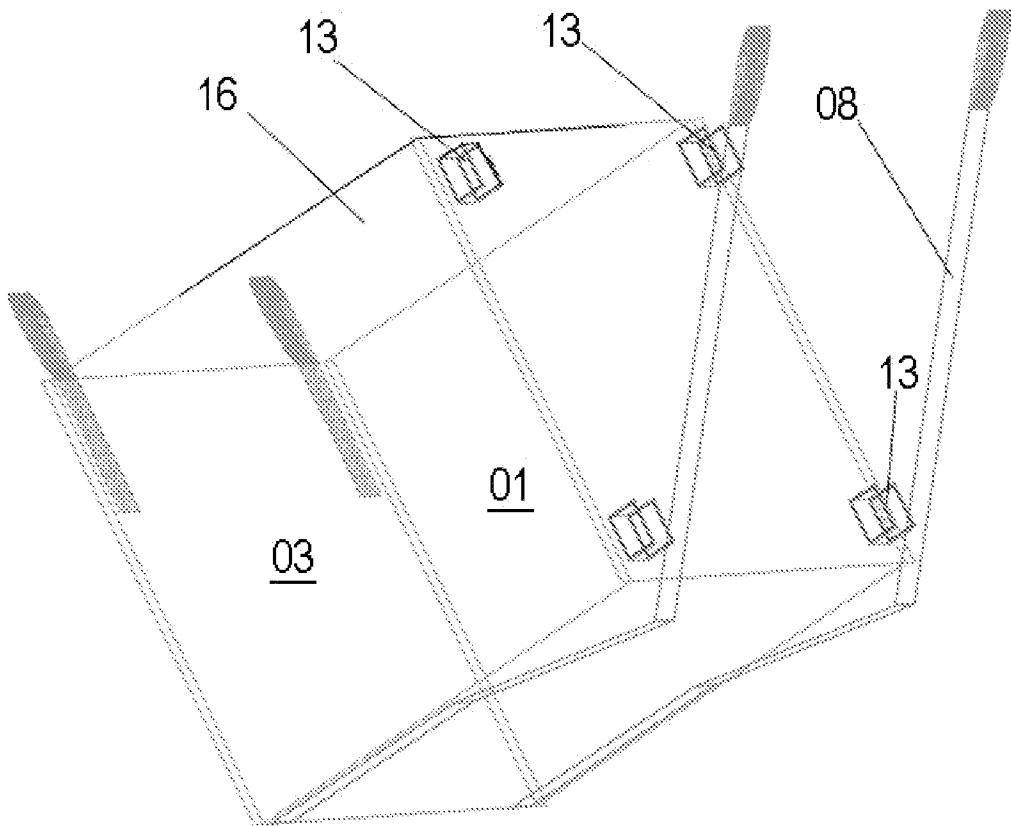


Fig. 7

INTERNATIONAL SEARCH REPORT

International application No.

PCT/NO2024/050244

A. CLASSIFICATION OF SUBJECT MATTER*B65D 88/16*(2006.01); *B65G 65/23*(2006.01)

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

B65D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

DK, NO, SE, FI: Classes as above.

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

Patent full text via AbS in English, French and German, COMPDX, INSPEC, XPI3E, XPAIP, XPESP, XPIOP

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 1754673 B1 (BAG CORP) 06 August 2008 (2008-08-06) Whole document	1-13
A	US 9174810 B1 (DISPAZIO PAUL G) 03 November 2015 (2015-11-03) Whole document	1-13
A	GB 2515898 A (CHAPMAN LANCE ANDREW) 07 January 2015 (2015-01-07) Whole document	1-13
A	KR 20190073894 A (SON SANG MIN) 27 June 2019 (2019-06-27) EPO machine translation, and drawings	1-13
A	US 6206568 B1 (WURR EGON) 27 March 2001 (2001-03-27) Whole document	1-13



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents:

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“P” document published prior to the international filing date but later than the priority date claimed

“T” later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

“X” document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

“Y” document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

“&” document member of the same patent family

Date of the actual completion of the international search

14 January 2025

Date of mailing of the international search report

15 January 2025

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INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/NO2024/050244

Patent document cited in search report			Publication date (day/month/year)	Patent family member(s)			Publication date (day/month/year)
EP	1754673	B1	06 August 2008	EP	1754673	A2	21 February 2007
				EP	1754673	A3	28 February 2007
US	9174810	B1	03 November 2015	NONE			
GB	2515898	A	07 January 2015	GB	201408974	D0	02 July 2014
				GB	201402928	D0	02 April 2014
KR	20190073894	A	27 June 2019	KR	101994349	B1	28 June 2019
US	6206568	B1	27 March 2001	DE	29818049	U1	12 May 1999