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(54) Container bag

(57) A method is disclosed of attaching a top cover to a flexible intermediate bulk container having a side wall structure (12) of flexible circular woven fabric, a base (16) closing a lower open end of the side wall structure and a plurality of lifting loops (14) at the upper end of the side wall structure, each loop having a bight and two spaced legs, each leg being affixed by stitching to the side structure, a multi-layer band (20) formed by folding the top of the side wall extending circumferentially around at least the upper part of the side wall structure, and each leg (14) being stitched to the multi-layer band (20), the layers of the multi-layer band being stitched together by stitching (24) that comprises at least two substantially parallel rows of chain stitching passing through all layers of the multi-layer band and extending circumferentially around the upper part of the side wall structure *characterised* by forming the multi-layer band with one layer (22) of greater length than the other layer or layers so that it stands proud of the band (20), stitching the layers of the band together and the lifting loops thereto, and then attaching the top cover (26) to the layer (22) standing proud.

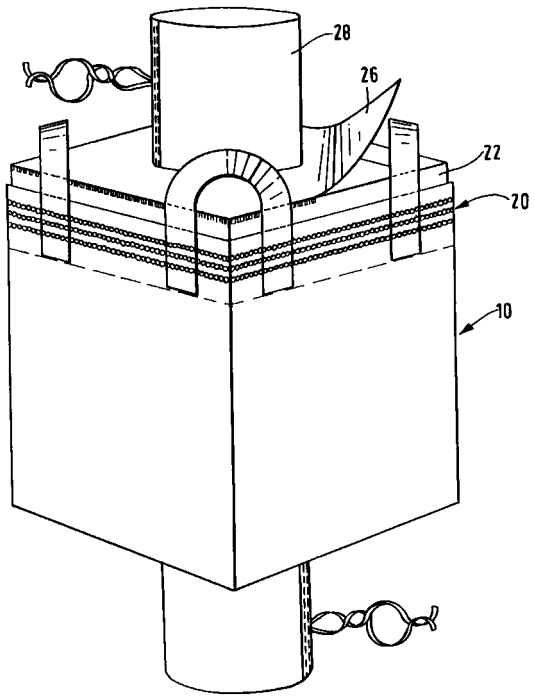

FIG. 2.

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Description

[0001] This invention relates to container bags and in particular flexible intermediate bulk container bags such as are used in the storage and transport of materials in granular, powder or particulate form.

[0002] Such containers are generally in the form of large bags or sacks which are often required to carry loads of one tonne or more with a considerable safety margin above this working load. The containers are commonly made from woven fabric particularly woven polyethylene or polypropylene, or other suitable synthetic material.

[0003] Our European patent publication 0 505 447 describes a flexible intermediate bulk container which comprises a side wall structure of flexible circular woven fabric, a base closing a lower open end of the side wall structure and a plurality of lifting loops at the upper end of the side wall structure, each loop having a bight and two spaced legs, each leg being affixed by stitching to the side structure, a multi-layer band formed by folding the top of the side wall extending circumferentially around at least the upper part of the side wall structure, and each leg being stitched to the multi-layer band, characterised in that the layers of the multi-layer band are stitched together by stitching that comprises at least two substantially parallel rows of chain stitching passing through all layers of the multi-layer band and extending circumferentially around the upper part of the side wall structure. A structure in accordance with this design provides a remarkably strong container having advantages in use and manufacture, especially in connection with improved stress distribution into the side wall structure of forces transmitted through the lifting loops.

[0004] The manufacture of the bag is facilitated and the bag has gained wide acceptance in the market place.

[0005] However, in manufacturing the bag it is usually necessary to attach a top cover, often having an integral filling spout. Attachment of the top cover in the bag of our above mentioned European patent publication requires the fabric of the cover to be stitched through the multi-layer band and the lifting loops, that is to an area which is already thick and has already been stitched with at least two circumferential rows of chain stitching. The invention seeks to provide a method of manufacturing a bag similar to that mentioned in our above European patent publication improved in this respect.

[0006] According to the present invention there is provided a method of attaching a top cover to a bag of the general type described which comprises forming the multi-layer band with one layer of greater length than the other layer or layers so that it stands proud of the band, stitching the lifting loops thereto with at least two substantially parallel rows of chain stitching passing through all the layers of the multi-layer band and extending circumferentially round the upper part of the side wall structure, and then attaching the top cover to the layer standing proud.

[0007] By this method, the top cover need only be stitched to a single layer. Moreover this layer, standing proud from the multi-layer band, is a single layer of fabric and generally does not have attachments or stitching passing through it, and so the method of the invention enables the cover to be attached much more easily and with less sewing than hitherto.

[0008] The woven fabric from which the bag of the invention is formed may comprise a base fabric and reinforcing bands woven integrally into the base fabric, each reinforcing band extending from the upper end to the lower end of the side wall structure, and each leg of each lifting loop being stitched to the multi-layer band in the region of a reinforcing band. Such a reinforced bag is described in our UK patent no. 1591091.

[0009] In the preferred embodiment the multi-layer band and each leg of each lifting loop extend partially down the side wall structure by a substantially equal distance. This is a very effective relationship both from a strength and materials usage stand-point.

[0010] The multi-layer band desirably comprises three layers of side wall fabric formed by folding the fabric into a substantially "S"-shaped formation around the upper part of the side wall structure. It is usually unnecessary to use more than three layers. In order to provide for a layer standing proud of the band it will not normally be possible to use less than three layers and in any event this leads to a less strong construction. Each leg of each lifting loop may conveniently be received between two adjacent layers of the folded fabric. Again, this improves the appearance of the bag, and also has advantages during manufacture of the container.

[0011] Preferably, the side wall structure is a continuous tube formed from a circular woven material. Use of a circular woven fabric, i.e. having no side seam or side seams, improves the stress distribution of load into the side wall structure. It also prevents the seam forming a potential weak spot.

[0012] The number of rows of chain stitching will be chosen according to the required strength. For containers rated up to 0.5 tonne load then two rows may be sufficient. For containers rated up to 1 tonne, and designated for single trip use, then four rows of stitching will be preferred. For multi-trip containers rated up to 1 ton six rows of stitching may be desirable. In one particular preferred arrangement, the stitching may comprise a first pair of parallel rows of stitching formed by a twin needle machine and a second pair of parallel rows of stitching also formed by a twin needle machine, the two pairs of rows being spaced one above the other. Obviously, additional pairs of two parallel rows may be used as necessary. The stitching is desirably continuous from one pair of rows to the next in order to expedite manufacture and to gain maximum strength advantages.

[0013] The denier of the thread used for the stitching will again generally depend on the rated load of the con-

tainer and may also depend on the numbers of rows of stitching used. A smaller run row or rows may demand a heavier thread while a large number of rows may make possible the utilisation of a lighter thread. The preferred minimum weight for the needle yarn is 4000 denier, but a minimum of 5000 denier is more preferred. A needle yarn of 6000 denier has given excellent results, and the desired range may be from 5000 to 6000 denier. The thread used for the loop yarn may be lighter in weight than the needle yarn and may be for example for 2000 to 4000 denier but more preferably from 3000 to 4000 denier.

[0014] As is normal in the FIBC art, the bottom of the bag may be formed with any suitable discharge arrangement. If required, the container may be formed with an inner impervious liner within which the load is contained to give added protection against the ingress of moisture and also to prevent fine materials escaping from the container. Similar protection may be given by a coating applied to the fabric of the side wall structure, additionally or alternatively.

[0015] The invention will now be described further, by way of example, with reference to the accompanying drawings in which:

Figures 1 to 3 are perspective views of an FIBC at different stages during its manufacture in accordance with the invention.

[0016] Referring to the drawings, a flexible intermediate bulk container (FIBC) generally designated 10 comprises side walls 12, lifting loops 14, and a base 16. The base 16 is provided with a discharge spout 18 as is normal in the art.

[0017] A multi-layer band, generally designated 20, comprises a "S"-shaped fold in the top of the bag fabric to give three layers. In accordance with the invention, the third layer of the multi-layer band 20, being in this case the inner layer, is of greater extent than the other two layers and so has a portion 22 which stands proud of the top of the band 20.

[0018] The legs of four lifting loops 14 are sandwiched between the layers of the multi-layer band 20 after which the layers of the multi-layer band 20 and the legs of the lifting loops 14, are stitched together by three parallel rows of chain stitching 24 passing through all the layers of the multi-layer band and the legs of the lifting loops.

[0019] Turning now to figure 2, a top cover 26 having a filler spout 28 as is known in the art, is attached to the portion 22 by means of stitching. Since this stitching need only pass through the single layer 22, rather than the whole of the multi-layer band 20, less stitching may be employed and the attachment of the top is rendered much easier and less expensive.

[0020] Figure 3 illustrates the completed FIBC.

[0021] The method of the invention produces a bag which has all of the advantages of the bag described in our above mentioned European patent publication but in a simpler and more economical fashion. Moreover, and more importantly, it has been found that excessive stitching through the legs of the lifting loop webbing actually weakens the webbing and thus lowers the strength of the bag as a whole. Thus the method of the invention actually leads to a stronger bag in comparison with the current method of attaching the top.

Claims

1. A method of attaching a top cover to a flexible intermediate bulk container having a side wall structure of flexible circular woven fabric, a base closing a lower open end of the side wall structure and a plurality of lifting loops at the upper end of the side wall structure, each loop having a bight and two spaced legs, each leg being affixed by stitching to the side structure, a multi-layer band formed by folding the top of the side wall extending circumferentially around at least the upper part of the side wall structure, and each leg being stitched to the multi-layer band, the layers of the multi-layer band being stitched together by stitching that comprises at least two substantially parallel rows of chain stitching passing through all layers of the multi-layer band and extending circumferentially around the upper part of the side wall structure *characterised* by forming the multi-layer band with one layer of greater length than the other layer or layers so that it stands proud of the band, stitching the layers of the band together and the lifting loops thereto, and then attaching the top cover to the layer standing proud.

2. A method as claimed in claim 1 wherein the said one layer is a single layer of fabric.

3. A method as claimed in the multi-layer band and each leg of each lifting loop extend partially down the side wall structure by a substantially equal distance.

4. A method as claimed in any of claims 1 to 3 wherein the multi-layer band comprises three layers of side wall fabric formed by folding the fabric into a substantially "S"-shaped formation around the upper part of the side wall structure.

5. A method as claimed in claim 4 wherein each leg of each lifting loop is received between two adjacent layers of the folded fabric.

6. A method as claimed in any of claims 1 to 5 wherein the side wall structure is a continuous tube formed from a circular woven material.

7. A method as claimed in any of claims 1 to 6 wherein

the number of rows of chain stitching is three or more.

8. A method as claimed in any of claims 1 to 7 wherein The denier of the thread used for the stitching 4000 denier or more.

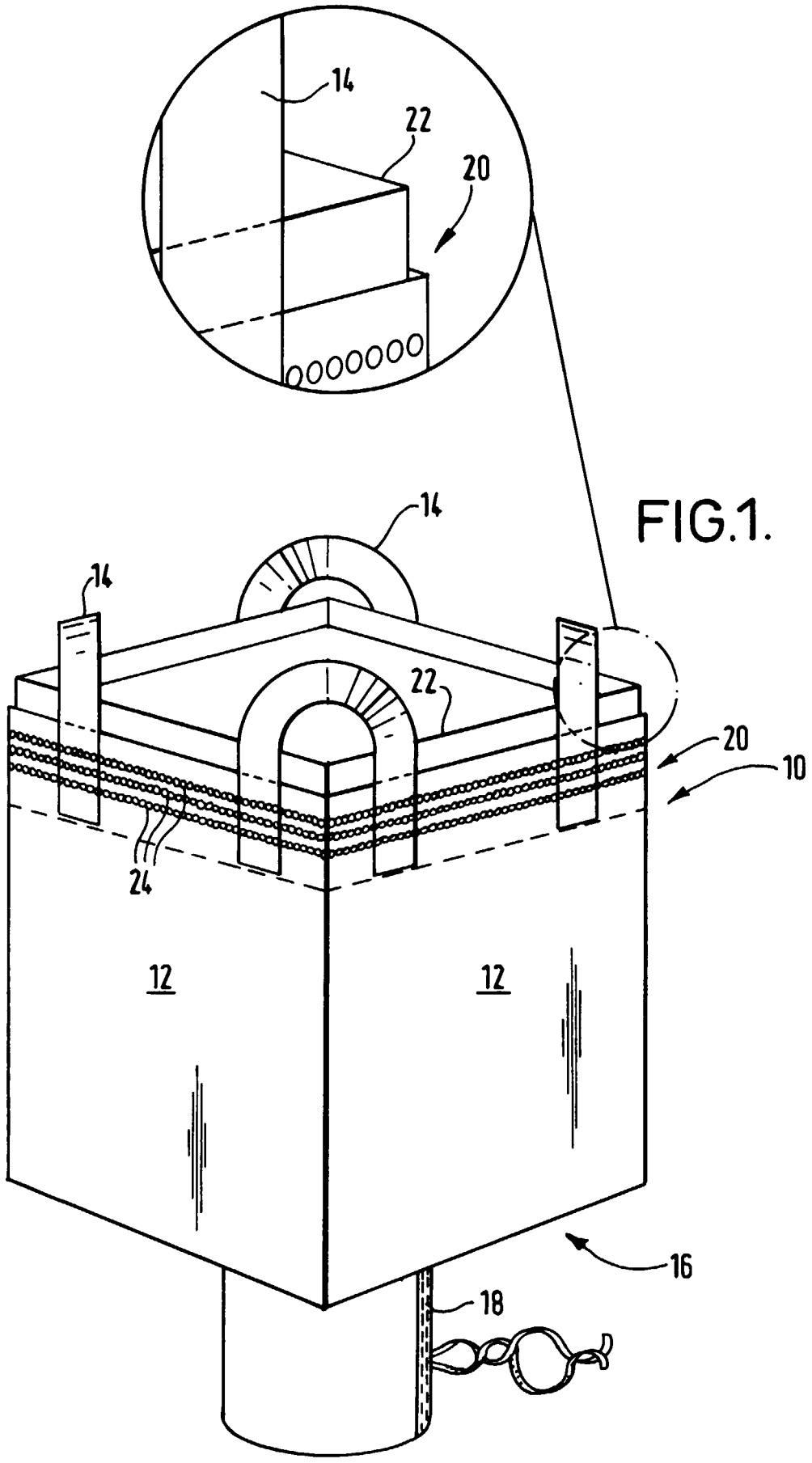

FIG.1.

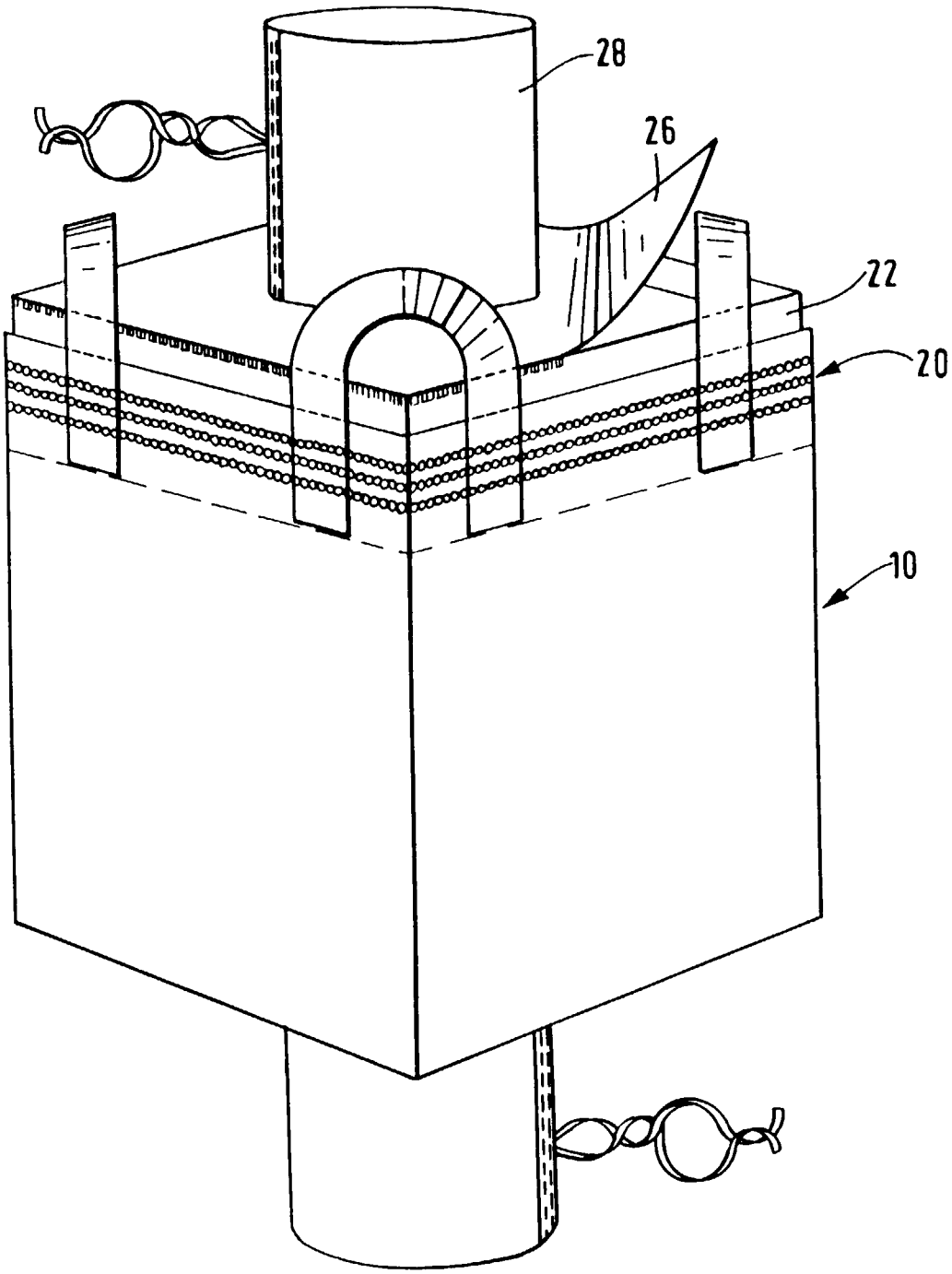

FIG. 2.

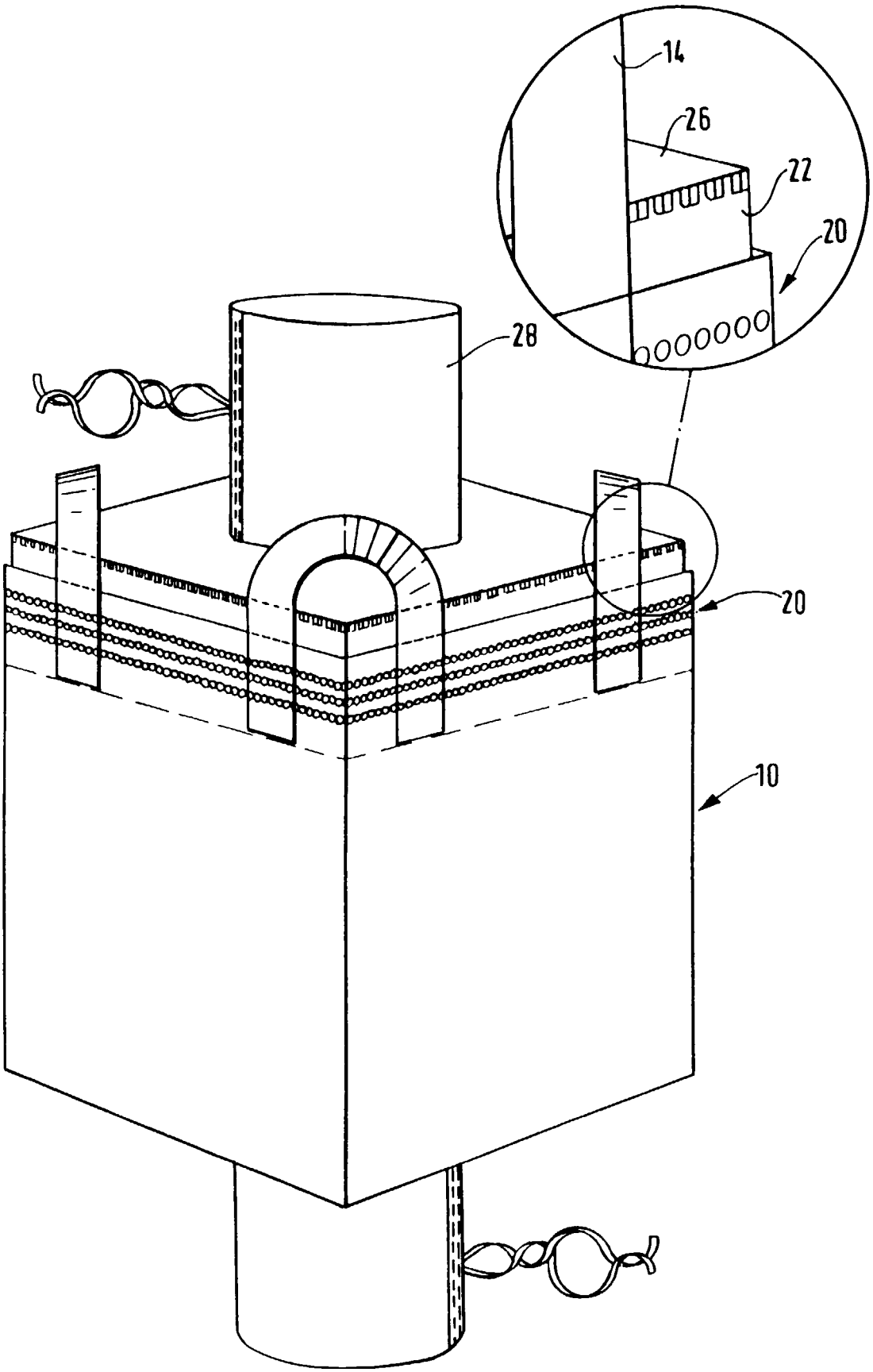

FIG.3.

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EUROPEAN SEARCH REPORT

Application Number
EP 99 20 1886

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
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A	US 4 822 179 A (NATTRASS PETER J) 18 April 1989 (1989-04-18) * column 5, line 12 - line 42; claims; figures *	1,3,5	
A	US 3 961 655 A (NATTRASS FRANK ET AL) 8 June 1976 (1976-06-08) * column 2, line 57 - column 3, line 5; figures *	1	
A	GB 2 241 219 A (NATTRASS MARK ANDREW) 28 August 1991 (1991-08-28) * claims; figures *	1,3-5	
A	US 4 301 848 A (BEAVEN JOHN P ET AL) 24 November 1981 (1981-11-24) * claims; figures *	1	

TECHNICAL FIELDS SEARCHED (Int.Cl.7)

B65D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	12 October 1999	Van Rolleghem, F

CATEGORY OF CITED DOCUMENTS

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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 99 20 1886

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
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