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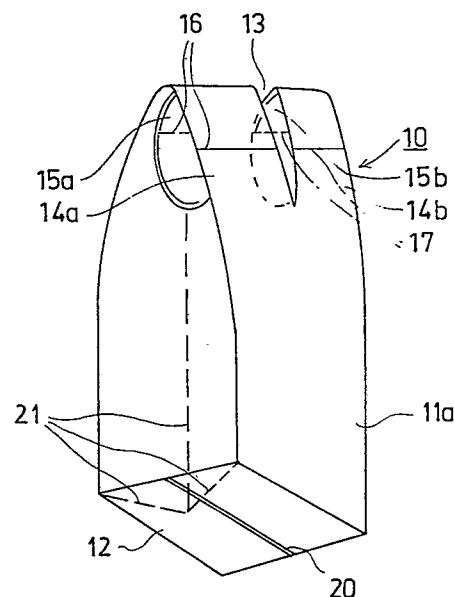
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⑤④ **Flexible container for transporting and storing bulk goods.**

⑤⑦ A flexible container (10) for transporting and storing bulk goods, comprising a shell (11a), bottom (12) and filling aperture (13) and provided with lifting loops (14a, 15a, 14b, 15b), these loops having been formed of strip-like parts (14a, 14b, 15a, 15b) constituting straight extensions of the upper part of the shell and joined together by one or several seams (16, 17), wherein with a view to affording adequate strength to said loops the strip-like parts are pleated, presenting a lower and upper plane and have been overlapped. The pleated strip-like parts to be joined together may be inserted one in the fold of the other. The connecting seam may be located substantially in the central region of the lifting loop.



The present invention concerns a flexible container for use in transporting and storing bulk goods, comprising a shell, a bottom and a filling aperture, and said container being provided with lifting loops for lifting the container, and on said container the lifting loops having been formed of strip-like parts which are straight extensions of the upper part of the shell, and said strip-like parts being joined together by at least one connecting seam.

Containers of this type, or large-size bags, are used for transporting and storing bulk goods, and the quantity of bulk goods is usually from a few hundred kilograms to several tons. Such large-size bags have previously been manufactured in that a piece of material has been folded double and the doubled piece of material has been united by a seam in its upper part, which at the same time constitutes the lifting loop or loops of the large-size bag. Since in such large-size bags the seam is exactly at the point where the large-size bag is subjected to highest stresses for instance when being lifted, a large-size bag of this kind is susceptible to rupturing along the seam in the lifting loops.

The flexible container, or large-size bag, may also be formed, as known in the art, of a tubular blank, of which the upper part - and the lower part too, of course - consists of unbroken unitary material. A large-size bag of this type requires vertical seams, with the result that the structure is inferior in its strength owing to this circumstance. A problem solution of this kind is for instance encountered in the Finnish patent application No. 771681. In order that very big large-size bags could also be made of such a tubular blank having an unbroken upper end, such a tubular blank is also required to have a very large diameter. But on modern machines turning out woven polypropylene fabric for instance only a given diameter size and no larger can be achieved. Therefore this is a clear limitation on the manufacturing of a large-size bag from such a tubular blank.

In the Finnish patent application No. 793029 is disclosed a flexible container for transporting and storing bulk goods. On this container the lifting loops have been formed of strip-like parts which are straight extensions of the upper part of the container's shell. Such strip-like parts have been joined by connecting seams with each other so that said connecting seams have been disposed to run at a distance from the central

area of the lifting loop. Such strip-like parts have furthermore been disposed to be mutually overlapping so that the lower margin of one strip-like part has been joined by a connecting seam to the upper margin of the other strip-like part. If required, the upper margin of the first-mentioned strip-like parts of one hand may be moreover joined by a connecting seam to the lower edge of said other strip-like parts.

It is achieved by this design of prior art that the lifting loops tolerate in relatively reliable manner those high stresses which may in conditions of practice bear upon the lifting loops. Owing to the location of the connecting seams, however, the automated manufacturing of flexible containers is exceedingly difficult to carry out as regards the lifting loops. Moreover, the said mode of manufacturing uses an unnecessary quantity of material because the connecting seams lie at a considerable distance from the central area of the lifting loops.

The object of the invention is to provide a flexible container which can be formed of a tubular blank in such manner that the lifting loops of the flexible container can be made on modern automatic sewing machines in simplest possible way. Still one object of the invention is to provide a flexible container where the lifting loops endure in a reliable manner also stresses higher than the usual stresses.

The object of the invention is attained with a flexible container which is mainly characterized in that the strip-like parts are pleated strip-like parts presenting a lower plane of the pleat and, correspondingly, an upper plane of the pleat, and that said pleated strip-like parts have been disposed to overlap. The other characteristic features of the container of the invention are readable in claims 2 and 3.

The invention is described in detail with reference being made to certain advantageous embodiments of the invention, presented in the figures of the attached drawing, but to which the invention is not meant to be exclusively confined.

Fig. 1 presents in elevational view the blank, having the shape of a cut length of tube.

Fig. 2 is an axonometric presentation of the blank of Fig. 1.

Fig. 3 presents, in axonometric presentation, the flexible container made of the blank of Figs 1 and 2.

Fig. 4 presents, in axonometric presentation, an advantageous embodiment of the lifting loop structure of the invention.

Fig. 5 shows the section carried along the line V-V in Fig. 4.

Fig. 6 presents another favourable embodiment of the lifting loop design of the invention, in axonometric presentation.

In the embodiments of Figs 1 to 3, the flexible container 10 has been made of a tubular blank 11, which is open both at its upper and lower end. At the upper end of the blank 11, substantially in the centre, has been made a cut for the filling aperture 13. Moreover, at the upper end of the blank have been made cuts 18 which confine strip-like parts 14a, 14b, 15a and 15b. The lower margin of the tubular blank 11 is indicated with the reference numeral 19.

The tubular blank of Figs 1 and 2 is processed into a flexible container as shown in Fig. 3, having a shell 11a, bottom 12, substantially central filling aperture 13, and lifting loops 14a, 15a and 14b, 15b. The bottom 12 of the container is closed by a connecting seam 20, known in itself in the art, closing the open lower margin 19 of the tubular blank 11. The connecting seam 20 is then located substantially in the central region of the bottom 12. As can be seen in Fig. 3, the flexible container 10 is in this embodiment a so-called pleated container in the shell part of which, 11a, two mutually opposed pleats have been formed. Only one of the pleats is visible in Fig. 3, this pleat being formed as indicated by the interrupted line 21; in other words, the lower part of the pleat 21 has been folded to lie in the plane of the bottom 12 of the container 10.

In accordance with the fundamental insight of the invention, the strip-like parts 14a and 15a, and 14b and 15b, respectively, shown in Fig. 4 are pleated strip-like parts presenting a lower plane 22 of the pleat and, similarly, an upper plane 23 of the pleat. In this embodiment the mutually

opposing planes 22 and 23 of the pleat have substantially equal width and they hang together at one lateral edge 24 of the pleat. The pleated strip-like parts 14a and 15a, and 14b and 15b respectively, have been disposed so as to overlap in requisite amount; and the strip-like parts 14a and 15a, and 14b and 15b respectively, have been joined by the connecting seam 25. It should be particularly noted that owing to the pleated structure of the strip-like parts 14a and 15a, and 14b and 15b respectively, the connecting seam 25 may also be located at a substantial distance from the central region of the lifting loops, as is suggested by the connecting seams indicated with 16 and 17 in Fig. 3.

As can be seen in Fig. 5, in the lifting loop design of Fig. 4, the lifting loops consist in this embodiment of the quadruple material thickness throughout the whole lifting loop structure. Naturally, the pleated structure of the strip-like parts 14a, and 15a respectively, may also be such that one opposing plane of the pleat, e.g. the lower plane 22, is less in width and only extends across part of the breadth of the upper plane 23. In that case, a certain part of the structure of the lifting loop construction will consist of the quadruple material thickness and a certain part, of double thickness material.

In the embodiment of Fig. 6, the pleated strip-like part 15a, respectively 15b, has been disposed to be inside the pleated strip-like part 14a, or 14b respectively. In other respects, the embodiment depicted in Fig. 6 is the same as that of Fig. 4.

In tests in actual practice the surprising observation has been made that the pleated lifting loop structure of the invention tolerates stresses which are about 20 to 30% higher than those tolerated by the lifting loop structure disclosed in the Finnish patent application No. 793029, the fact notwithstanding that in the lifting loop structure of the invention the connecting seam 25 may be located substantially in the central region of the lifting loops. This mode of manufacturing also saves raw material, depending on the length of the blank, between 5 and 15%. However, the greatest advantage of the lifting loop structure of the invention lies in the fact that when flexible containers conforming to the invention are being made, the connecting seam 25 of the lifting loops can be accomplished with the aid of one single automatic sewing machine.

The flexible container fitted with lifting loops according to the invention is in no way critical as regards the remaining part of the container. When using a flexible container in the shell of which pleats have been formed of which the lower parts have been folded to be complanar with the bottom of the container, it is to advantage to use the bottom design disclosed in the Finnish patent application No. 802555, where the free lower margin of the tubular blank has been closed with a bottom seam known in itself in the art, located substantially in the central region of the container's bottom, and where the upper plane of the pleat folded into the container bottom's plane has been affixed by a connecting seam to the lower plane. Hereby a very high-strength bottom structure is also obtained.

In the foregoing only some advantageous embodiments of the invention have been presented, and it is obvious to a person skilled in the art that these may be modified in numerous different ways within the scope of the inventive idea stated in the claims following below.

Claims

1. Flexible container for transporting and storing bulk goods, said container (10) comprising a shell (11a), a bottom (12) and a filling aperture (13), said container (10) being provided with lifting loops for lifting the container (10), and in said container (10) the lifting loops having been formed of strip-like parts (14a,15a and 14b,15b respectively) which are straight extensions of the upper part of the container's (10) shell (11a), and said strip-like parts (14a,15a and 14b,15b respectively) having been joined together by at least one connecting seam (16,17,25), characterized in that the strip-like parts (14a,15a and 14b,15b respectively) are pleated strip-like parts presenting a lower plane (22) of the pleat and similarly an upper plane (23) of the pleat, and that said pleated strip-like parts (14a,15a and 14b,15b respectively) have been disposed to overlap.
2. Container according to claim 1, characterized in that one pleated strip-like part (15a, and 15b respectively) has been inserted in the fold of the other pleated strip-like part (14a,14b).
3. Container according to claim 1 or 2, characterized in that the connecting seam (25) is located substantially in the central region of the lifting loops.

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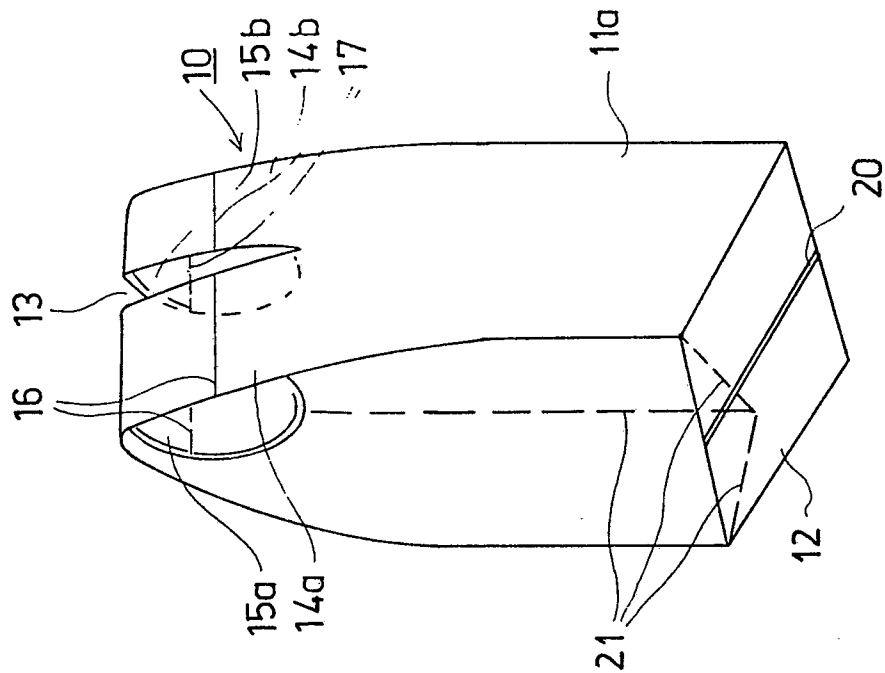


FIG. 3

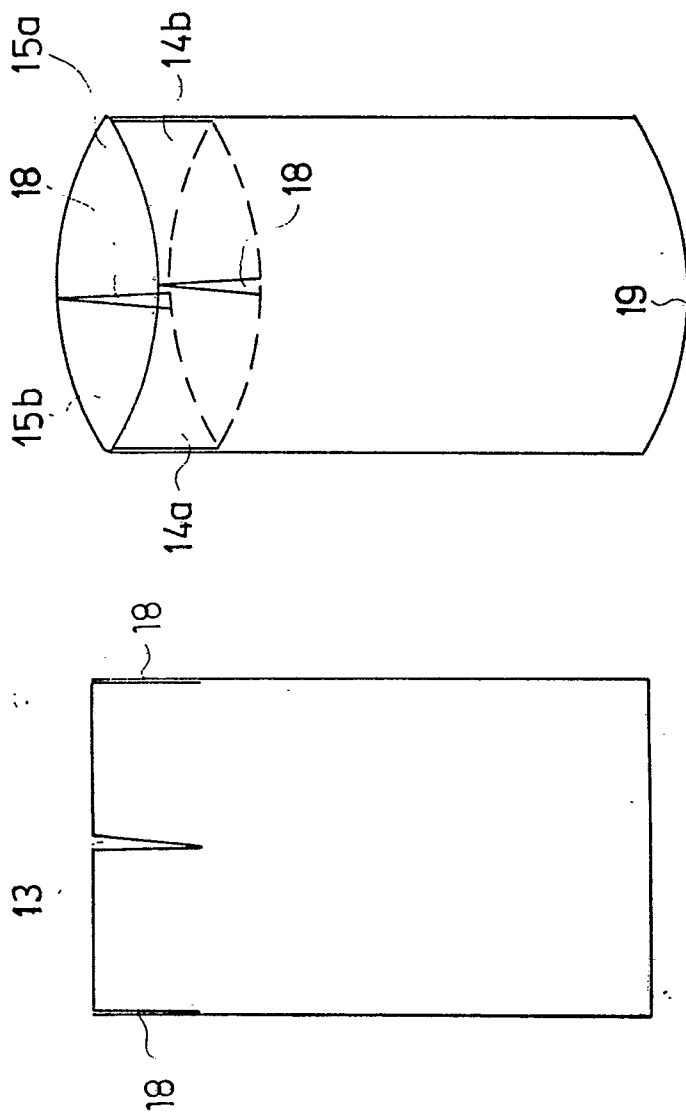


FIG. 2

FIG. 1

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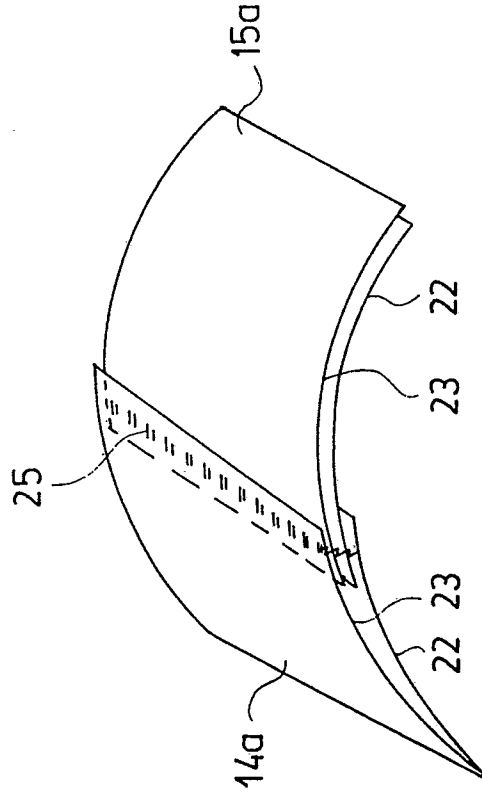


FIG. 6

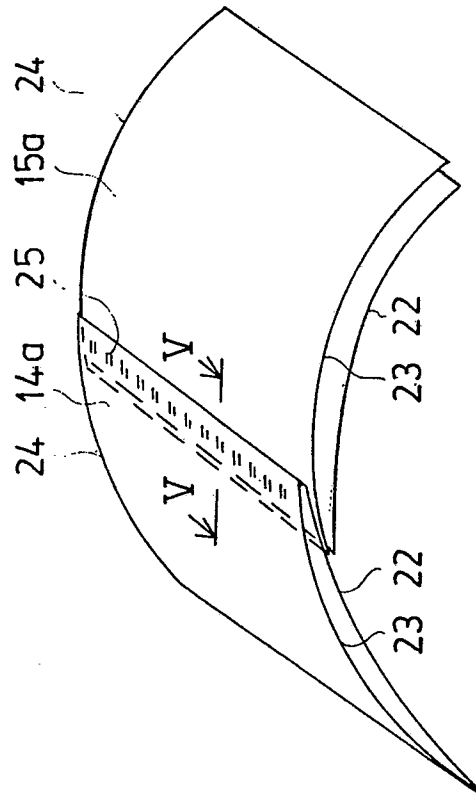


FIG. 4

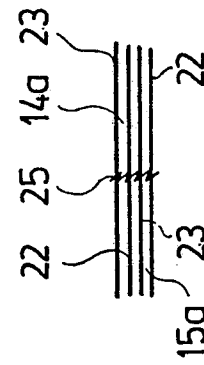


FIG. 5



European Patent
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EUROPEAN SEARCH REPORT

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Application number
EP 81105952.6

DOCUMENTS CONSIDERED TO BE RELEVANT			CLASSIFICATION OF THE APPLICATION (Int. Cl.)
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	
D, A	US - A - 4 136 723 (SKAADEL et al.) & FI-A-77.1681 -----		B 65 D 88/16 B 65 D 33/14
			TECHNICAL FIELDS SEARCHED (Int. Cl.)
			B 65 D 30/00 B 65 D 33/00 B 65 D 88/00
			CATEGORY OF CITED DOCUMENTS
			X: particularly relevant A: technological background O: non-written disclosure P: intermediate document T: theory or principle underlying the invention E: conflicting application D: document cited in the application L: citation for other reasons
X	The present search report has been drawn up for all claims		&: member of the same patent family, corresponding document
Place of search VIENNA		Date of completion of the search 12-11-1981	Examiner MELZER