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54 Flexible container to be filled with bulk material and method for its manufacture.

57 The present invention relates to flexible containers to be filled with bulk material, and their manufacture. The container has at least one lifting loop (6) which is gathered in a lifting loop having a permanent lifting handle (10) comprising the lifting loops (6) folded or pressed together and joined by means of glue or a seam in a lifting area (4). The lifting handle (10) may comprise a piece of material (5) which at least covers the lower part of the lifting area (4) which has a width $< 1/6$ of the container's circumference. The container is made from a flat-woven or round-woven base material (1) which is joined for forming at least one integrated lifting loop (6). Those parts of the base material (1) which shall form the lifting loop (6) are folded to at least one lifting area (4). It might possibly be fastened to a piece of material (5) to at least the lower part of the area (4). By joining of the area (4) and/or fastening the piece of material (5) there is formed a permanent lifting handle (10). The piece of material (5) which is fastened around the area (4) can be in form of a sleeve and have the same width as this area.

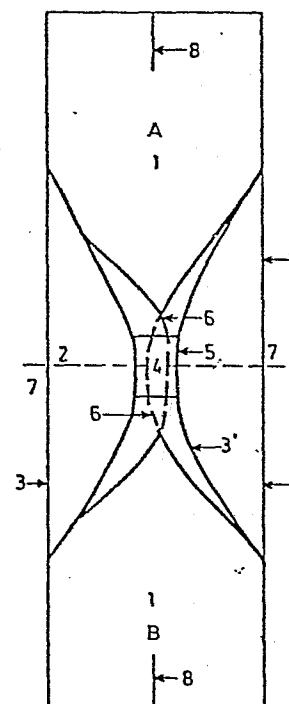


FIG. 1

The present invention relates to flexible containers to be filled with bulk material, and the containers comprise integrated lifting loops. The invention also comprises a method for manufacturing such containers from flat-woven or round-woven base material which are joined together for forming at least one integrated lifting loop.

Containers of the above mentioned type have been used for some time and been found to be suitable for several purposes. Usually they comprise an inner bag or liner of impervious material. The container is usually first blown up by air before it is filled with free-flowing bulk material. Such a container is described in US Patent No. 4.136.723. This container has a double bottom and is preferably equipped with two integrated lifting loops having a total width substantially equal to half of the container's circumference such that the lifting loops comprise all of the longitudinal fibres of the container. The container can be filled by using an apparatus described in GB-Patent No. 1.505.583, and it will then be standing on a floor or the like without any extra support. Its lifting loop can be placed on a hook or the like before the container is blown up and filled with bulk material. The container can then be made ready for further transport, and this process might comprise closing the inner bag and joining the lifting loops by pressing them together and secure them in this position such that one obtains a suitable loop which easily can be placed on a hook or some other lifting means.

If a broad hook is applied to hang the lifting loops on during the filling operation, the wide loops will be pressed together to a few cm and can be kept in this position by means of a tape. One will then obtain a well-defined loop which makes the container well suited for further transport, and this is described in EP-application No. 81108748,5 (publication No. 54145).

However, it has been found that the above mentioned process for making the container ready beforehand also has certain disadvantages. Also when the container's lifting loops are made ready after filling it implies some drawbacks. Thus the capacity of the filling apparatus will be reduced because of the time it takes for the operator to place the lifting loops onto a hook which will press them together. If this operation is carried out after the container is filled in order to improve the capacity of the apparatus, then the total filling operation will be more labour-consuming because an extra operator is needed for making the container's loops ready. Further, the container's form itself implies that it is necessary to use filling apparatuses of a special type in order to obtain an efficient filling and an effective process for making such containers ready. The fact that such special filling apparatuses are not available everywhere where filling of such containers can take place, has accordingly hindered a widespread use of the container.

The lifting loops, which may have a total width corresponding to half the container's circumference, implies that the process of joining together the loops to one lifting loop becomes somewhat labour-consuming. The wide loops also result in certain disadvantages when the container shall be placed up on the filling apparatus or connected to it. Accordingly, there has been a need for making these operations easier and less labour-consuming.

One would like to continue having some form of lifting loops because of the good experience with integrated lifting loops which after filling of bulk material in the container were joined together by tape for making a lifting loop. During further transport of the container such lifting loops had been found to be suitable for placing lifting hooks, forks and other means used for lifting and transporting the container into the lifting loop.

When fork trucks shall be used, one should apply special lifting devices whereupon the lifting loop is placed. This device is connected to the forks. It has further been found that the tape applied in certain cases can be damaged during the further lifting and transport of the container, especially if there in this connection are applied lifting forks having sharp edges, the load-carrying fibres of the lifting loop can be damaged.

In such cases there is therefore a need for a better protection of the fibres in the lifting loop and a way of joining which can endure the strain when lifting forks are applied.

The object of the present invention was to arrive at lifting loops having a permanent lifting handle which could endure the strain they would be exposed to during application of the flexible container. Another object was to be able to apply all types of filling apparatuses and lifting devices such that application of the container would not be limited by the need for special equipment. A further object was to arrive at a rational way of making flexible containers with integrated lifting loops equipped with a permanent lifting handle.

Manufacture of the lifting handle itself by joining the lifting loops at the filling station had been found to be rather labour-consuming and additionally it required special hooks on the filling apparatus. To start with one desired to

make a lifting handle in order to be independent of special lifting hooks, and the inventors soon found that it would be easiest to make the lifting handle at the same place as the container itself was made.

If the empty container is equipped with lifting loops having a permanent lifting handle, the transport of such empty containers will be more expensive than for the usual containers because of the larger volume to be transported. But it was found that the filling operation itself became so much easier when one used containers having permanent lifting handle that the advantages would be far greater than the disadvantages of transporting empty containers.

The problem now was how the permanent lifting handle could be formed most appropriately. It was found that the method would vary somewhat according to what kind of base material the container was made from. For containers having integrated lifting loops it can be generally said that one has two types of base material, i.e. flat-woven or round-woven textile. The round-woven textile can be joined together in different ways. For instance such that one either attains lifting loops having a seam or lifting loops without a seam, but then containers with side seams. It was surprisingly found that it was possible to make the lifting handle principally in the same way for the different types of base materials. That part of the base material which will form the lifting loops, was during manufacture of the flexible container folded or placed together in several layers, depending on the width of the container, against the centre and joined in this position at a specially defined area with glue, tape or at least one seam. The width of the lifting loops is hereby reduced to a suitable dimension for forming a lifting loop with a lifting handle. It was further found that the total width of the lifting loop at least should be reduced so much that the width of the lifting area became maximum $1/6$ of the container's circumference. One

would then obtain a lifting loop with a lifting handle which was appropriate and advantageous for all operations as filling, handling, lifting, transport and discharge of the container. In certain cases one desires to avoid wear on the load-carrying fibres of the lifting loop formed in this way. In that case the lifting handle itself is equipped with an extra piece of material. This piece of material should at least cover the lower part of the lifting handle, that means that part which will lie against the lifting device, for instance a lifting fork, a hook or the like, when the flexible container is lifted and/or transported. This extra piece of material can also be in the form of a sleeve such that it surrounds the lifting handle. Said piece of material must be made from a strong material which can endure the strains it is exposed to and which can be joined to the material of the lifting loops such that a permanent lifting point is obtained. This piece of material will preferably consist of woven material, for instance of the same type which is used in the container itself.

The special features of the invention are stated in the following claims.

The invention will now be further explained with reference to the drawings.

Figure 1 shows a flat-woven base material for a flexible container.

Figure 2 shows a round-woven base material for a flexible container having lifting loops comprising a seam.

Figure 3 shows a round-woven base material for a flexible container having lifting loops without seams.

Figure 4 shows a lifting loop with a lifting handle seen from above.

Figure 1 shows a base material 1 consisting of two halves A and B, and with side edges 3 and a cut 8 which makes it possible to form a container having a double bottom. The piece of material 1 is first folded against the centre such that those parts which later on shall form the lifting loops 6 are collected in the middle of a folding line 2 in an area 4 which is less or like $1/6$ of the container's circumference. In most cases it will be an advantage to have a lifting area which is less than $1/10$ of said circumference.

The side edges 3 will now be placed as shown by the reference number 3'. The area 4 marked out on the lifting loops 6 is then joined by means of glue or preferably at least one seam. One can fasten a piece of material 5 over the area 4, for instance by means of a seam. The piece of material 5 can be fastened around the area 4 such that it gets the form of a sleeve. The material 1 is folded over the line 2 such that the halves A and B cover each other. Thereupon the container is sewn along the side edges 3 and at the bottom, whereby a completely finished container with lifting loops 6 and a lifting handle 10 comprising the protecting piece of material 5. The piece of material 5 can be of woven material, for instance of the same type as that used in the container itself, or of some other suitable material which is strong enough to endure the strains it will be exposed to during further handling of the container. The piece of material 5 might have a special colour such that the lifting point is clearly marked out, and it can for instance be applied as colour code for the type of container used or the material which shall be transported. On figure 5 there is shown application of an extra piece of material 5, but the permanent lifting handle 10 can as previously mentioned also be made without this piece of material, that is by just joining together the area 4.

Figure 2 shows a round-woven base material 1. This must first be joined in its upper part by seams 11 for forming at least one lifting loop 6. Thereupon there is made a cut in the upper

part of the piece of material for forming openings 7 in which lifting devices as a hook or fork can be placed, and which also can be used as filling opening for the bulk material which shall be transported or stored in the container. The lifting area 4 is then formed by folding together the loops 6 and joining by means of glue or at least one seam. A piece of material 5 can then be fastened to the area 4 in the same way as described in connection with figure 1, and one gets the permanent lifting handle 10. The container's bottom can be formed in known manner, and the container is then ready for being filled.

In figure 3 it is also shown a round-woven base material 1, but here one has already made the lifting loops 6 ready beforehand, and the lifting area 4 can be formed by bending or folding together these as described above. The container's side edges are then joined by seams 11 which terminate somewhat below the lifting loops such that openings 7 are formed. Unless one desires to make the container with a special bottom, the container will now be ready for filling.

In figure 4 is a lifting loop 6 with lifting handle 10 shown seen from above. The piece of material 5 which here is only fastened at the lower part of the lifting handle, is not visible on the figure, but the seams 9 for fastening the piece of material 5 to the area 4 is shown. The openings 7 are here shown equally large, but if so desired the opening which shall be used as filling opening can be made somewhat larger than the other one.

A container made according to the invention is ready for being connected directly to the filling apparatus. The filling pipe is put into one of the openings 7, and the container can be blown up by air and thereupon filled with free-flowing material. During the filling operation the lifting loops can be placed on a hook on the filling apparatus, but strictly

speaking this is not necessary. It has in fact been found that the blown up container can stand freely and without substantial support sideways during the filling operation. As soon as the container is filled it is just to close its inner bag, and then it is ready for being transported.

By the present invention one has obtained a rational manufacture of a container with lifting loop having a permanent lifting handle. Filling of such readymade containers can be carried out quickly and easily with fewer operators than usually is necessary when one has to form the lifting point at the filling station. The filling operation itself will accordingly be strongly simplified, as placement of the container on special lifting hooks or forming of lifting handles will not be necessary. The container will thereby be ready for further transport as soon as it is filled and the inner bag is closed. The capacity of the filling apparatus can be utilized maximally, and the total operation for filling and making the container ready for further transport will be less labour-consuming.

An essential advantage which is obtained by the present invention is that one is not dependent on complicated or special filling apparatuses or lifting devices. Thus one can use lifting forks which easily can be put in under the well-defined lifting handle, which is thus strongly made that it can endure several handling operations of the filled container without damaging the lifting handle or the lifting loop by the handling devices. Even when especially rough lifting devices are used, the lifting handle according to the invention comprising the protecting piece of material 5 will secure the fibres in the lifting loop against wear.

Claims

1. Flexible container to be filled with bulk material and comprising integrated lifting loops, characterized in that the lifting loop or loops (6) are joined together in at least one lifting loop having a permanent lifting handle (10) comprising lifting loops (6) folded or pressed together and joined together at a lifting area (4) by means of glue or at least one seam.
2. Flexible container according to claim 1, characterized in that the permanent lifting handle (10) comprises a piece of material (5) which at least covers the lower part of the lifting area (4).
3. Flexible container according to claims 1 and 2, characterized in that around the lifting area (4) there is fastened a piece of material (5) in the form of a sleeve, preferably of woven material.
4. Flexible container according to claims 1-3, characterized in that the lifting loop or loops (6) are joined together in a lifting area (4) having a width being less than or equal to $\frac{1}{6}$ of the container's circumference.

5. Method for making a flexible container according to claims 1-4, and made from flat-woven or round-woven base material (1) which is joined to form at least one lifting loop (6),
c h a r a c t e r i z e d i n t h a t
that part of the base material (1) which shall form the lifting loops (6) are folded or pressed together to at least one lifting area (4) to which there possibly is fastened a piece of material (5) to at least the lower part of the area (4), whereby a permanent lifting handle (10) is formed.
6. Method according to claim 5,
c h a r a c t e r i z e d i n t h a t
the part of the base material (1) to be folded or pressed together is first joined, and then the piece of material (5) is fastened to or around a lifting area (4), preferably by sewing for forming the lifting handle (10).
7. Method according to claims 5-6,
c h a r a c t e r i z e d i n t h a t
the base material (1) comprising two halves A and B first are foldes together against the centre of the material (1) for forming the lifting loops (6) in a small area on each side of the folding line (2), whereupon this area is joined together to the lifting area (4) and that it thereto is fastened a piece of material (5) having the same width as the area (4) and having a length which at least is long enough to make the material (5) cover the lower part of the lifting area (4) and that the material (1) then is folded over the line (2) such that the halves A and B cover each other, and whereupon the container's side and bottom seams are sewn.

8. Method according to claims 5-7, characterized in that the base material (1) consists of a round-woven piece of material that is first joined at the upper part by means of a seam (11) for forming lifting loops (6), then openings (7) are formed at the upper part of the side edges (3), and the lifting loops (6) are joined in at least one lifting area (4) which is joined by gluing or sewing, whereupon a piece of material (5) that covers at least the lower part of the lifting area (4) if desired is fastened to the lifting area (4), then the lower part of the piece of material (1) is joined for forming of the container's bottom.

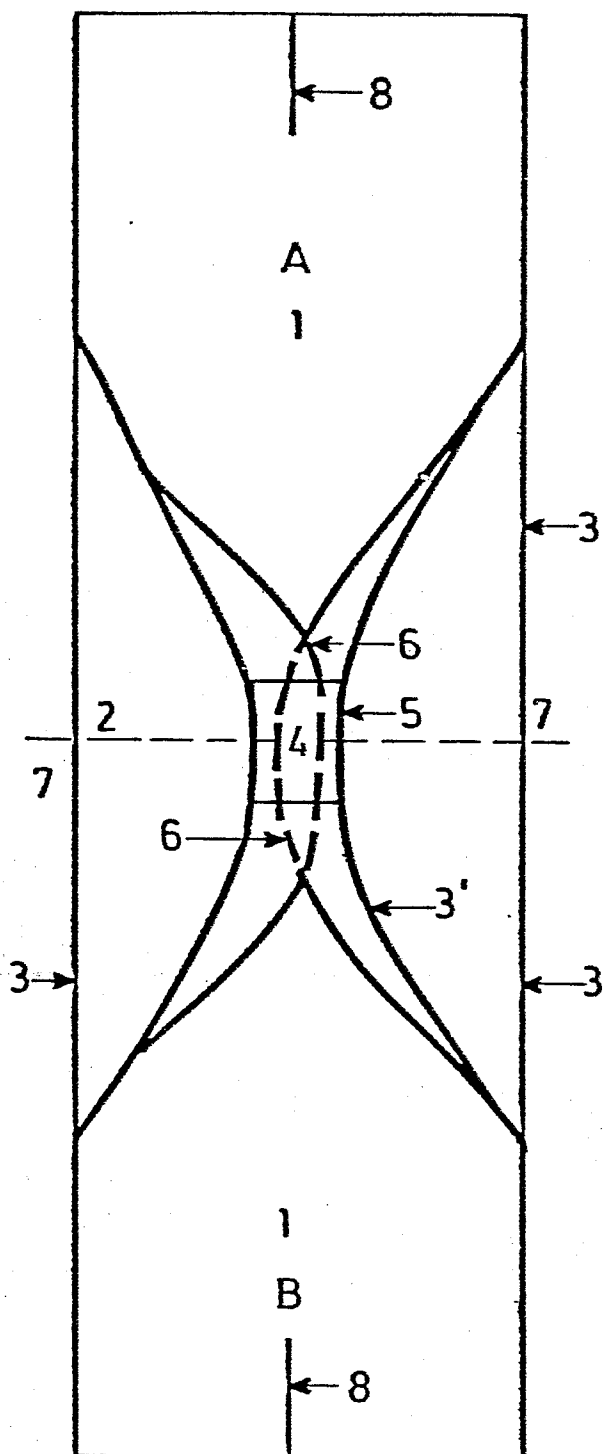


FIG. 1

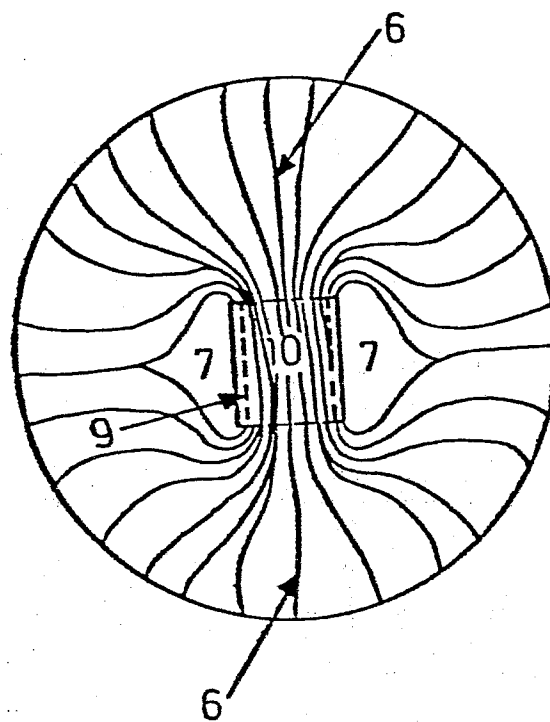


FIG. 4

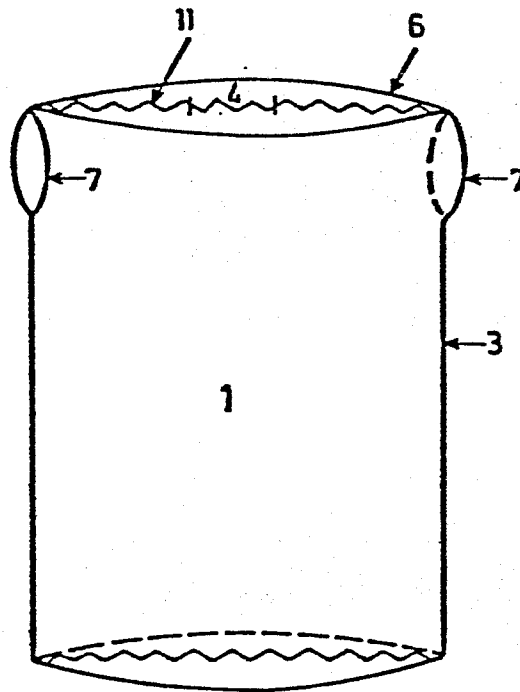


FIG. 2

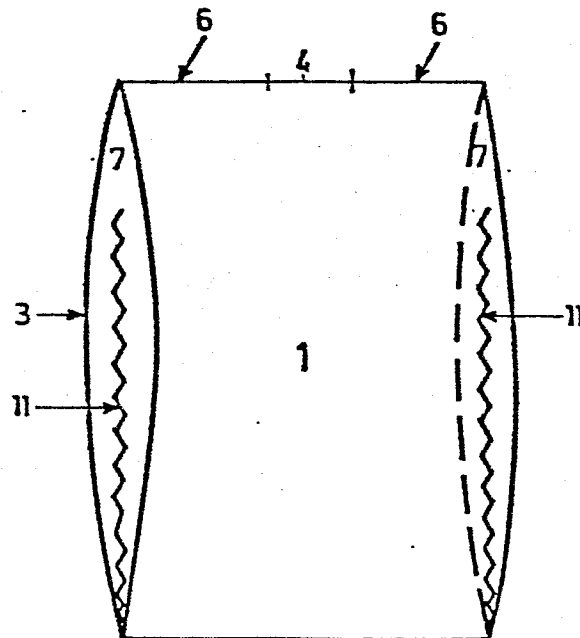


FIG. 3