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(54) **Container for transport, storing and handling of liquids.**

(57) The present invention relates shortly to a container (1) having a pipe-shaped wall (2) of sheet material and a bottom (4) which is loose in relation to said wall (2). The container (1) is intended to be supported upon a load transport platform (3) to which the bottom (4) may be secured. A lid (5) closes preferably the end of the pipe-shaped wall (2) which is faced upwards. The pipe-shaped wall (2) is combined of at least two cylinder shaped walls (8, 9) which are loose in relation to each other and which are placed one within the other so that the pipe-shaped wall (2) is at least double walled. An insert in the shape of a sack (6) is located in the compartment delimited by the pipe-shaped wall (2) and the bottom (4) and has preferably a shape corresponding to the shape of said compartment.

Container for transport, storing and handling of liquids

The present invention relates to containers for transport, storing and handling of liquids, and more closely to a container shaped as a cylinder and made of sheet material, placed edgeways on a load transporting platform and containing a liquidproof insert in the form of a plastic sack or similar.

The basic type of container to which the present invention refers is clear from e.g. Swedish patent specification Ser.No. 347.716. This known container consists of a cylinder of sheet material such as fibre board, cardboard, plastic or similar which cylinder is placed edgeways on a load transporting platform such as a pallet, around a bottom located upon this platform. A conventional lid closes the end of the cylinder faced upwards.

Although it has been suggested in said specification that such a known container should be possible to use also for handling of liquids, it has, however, been obvious that this involves not expected problems and up to now, the known container has not successfully been useful for liquids. It has namely been realized that the shock impacts which appear when the liquid within the container is subjected to movements during the transport of the container, are so powerful that the thin cylinder cannot resist such impacts but breaks.

A container of the type mentioned is cheap and is of a low weight empty, it is good for the environment and can easily be refused e.g. by firing. If any portion of the container is broken such as by outer mechanical damages this portion can easily be substituted without any special measures or tools while remaining portions of the container can be further used in the condition in which they are. Regardless of whether the container is used as a container of disposable type or a container to be used several times it is of such evident advan-

tages that an enlargement of the use thereof is highly desirable.

The problem of handling liquids within the container of the
5 type mentioned is, accordingly, to get the cylinder wall to resist the shock impacts appearing when the liquid within the container is subjected to movements. The unsophisticated solution of this problem would apparently be a reinforcement of the cylinder wall in some way, such as by increasing the
10 thickness of the wall, by stretching a band around the cylinder or by arranging reinforcing ridges.

However, it has been shown that none of the mentioned measures has given the desired result but either given rise to other
15 problems such as difficulties in forming the thicker material to a cylinder or also been too expensive to be a useful alternative.

The object of the present invention is to remove the above
20 problems. This object is reached by a container of the type referred to in the claims from which claims also the especially characterizing features of the invention are clear.

The invention is closer described in the following with
25 reference to the attached drawing showing a partly sectioned view of a container in accordance with the invention.

The container 1 shown in the drawing consists of a cylinder 2 of sheet material, preferably fibre sheet or fibre board,
30 which is placed edgewise around a bottom 4 on a load transporting platform 3 in the shape of a pallet. A lid 5 closes the upper end of the cylinder 2 and an insert 6 in the shape of a plastic sack for containing the liquid for which the container 1 is to be used is mounted in the cylinder 2.

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The bottom 4 is in the shown embodiment constituted by a

circular plate of plywood, fibre board or similar material and around the periphery thereof there is a profile which is L-shaped in cross section, the one leg of which extends under the bottom 4 and the other leg of which extends upwards a distance above the upper plane of the bottom 4. In order to avoid displacement of the container 1 on the pallet 3 the bottom 4 is preferably attached thereto e.g. by nailing.

The cylinder 2 consists of double walls, an inner wall 8 and an outer wall 9 both of which are of fibre board having a thickness of between 2 and 5 mm. The starting material is a rectangular sheet which has been bent or shaped to a cylinder and the overlapping edge portions of which are locked to each other by stapling, riveting, screwing or the like. The inner cylinder wall 8 has, in this connection, an inner diameter which is substantially the same as the outer diameter of the bottom 4 so that it easily can be threaded over the L-shaped profile delimiting the periphery of the bottom 4.

The outer cylinder wall is formed in the same way as the inner one but it is so much bigger that it without play worth mentioning can be threaded outside the inner cylinder wall 8. In order to avoid the laps from gripping each other and giving rise to damages of the cylinders during the movements of the walls in relation to each other when the container is in use the laps must be displaced a distance from each other. Further, in order to obtain such a good strength as possible in the cylinder the laps ought to be displaced so much from each other that the shock impacts which might appear can act only against one lap at a time. In this connection, the laps should neither be located opposite each other but a displacement between 45 and 90° between the laps is suitable.

The lid 5 consists of a plate 10 preferably of the same structure as the bottom 4 but having a diameter corresponding to the outer diameter of the cylinder 2. A L-shaped profile 11 is

extended around its periphery having one leg extending in over the plate 10 and the other leg down around the cylinder 2.

In the shown embodiment a plane plastic sack 6 is inserted in the container 1 which sack in a conventional way has its upper portion tied. However, it is sometimes suitable to have the insert especially adapted for the actual container and for the material which it is intended to contain. Such an insert sack may be provided with a sleeve which is folded down over the upper edge of the inner cylinder wall 8 and in this connection, the sleeve is clamped between the two cylinder walls 8 and 9 and depending on the material in the sleeve as well as the distance it extends inwards in the interspace it can add to keep the friction low between the abutting walls. In the same way a skirt may exist at the bottom of the insert sack, which skirt is clamped between e.g. the upwards extending leg of the L-shaped profile 7 and the internal side of the inner cylinder wall 8.

An emptying valve, not shown, may be arranged in the bottom of the container and this valve opens then preferably in the most central space 12 in the pallet 3 where the portions of the valve are well protected for damage.

As is clear from what is stated above the container in accordance with the present invention differs from previously known containers of similar type primarily by the fact that the cylinder 2 is constituted by a double wall. As mentioned in the preamble it would be normal to increase the thickness of the wall or to provide the wall with reinforcements in order to increase the strength of the wall. Tests in that direction have, however, not given the desired result. One is in this connection neither allowed to disregard the advantages residing in the fact that it is possible to make use of a material which is relatively easy to shape and which is of low weight in comparison with the strength thereof.

Hence, suitable material for the cylinder walls are different types of sheet material such as fibre board, board consisting of several layers of cardboard and similar, like such boards as glass fibre reinforced fibre board.

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For certain types of use it might also be preferable to have more than two cylinder walls and it is neither necessary to have such boards made from one and the same material but one may be made from e.g. glass fibre reinforced fibre board while
10 the other or the rest may be made from cardboard containing several layers or not reinforced fibre board.

However, what is surprising in the present invention is the unexpected strength which the container obtains due to such a
15 simple measure as making the cylinder wall from two or more layers. Then, that a container constructed in this way is useful for handling liquids having the special problems which relate to such handling and which have been previously mentioned is completely unexpected. The unexpected strength
20 which the present structure gives rise to emanates most likely from the fact that the combined wall may move in a more flexible way than a corresponding wall of homogeneous type. Due to the fact that the separate walls of the combined wall can be kept thin there appear neither any stresses therein
25 worth mentioning when they are shaped to a cylinder or a pipe which, on the contrary, is the case in connection with thicker walls. Reinforcements such as ridges, bands and similar give easily rise to indications of fractures as the wall obtains different bending and tensioning strength in different portions.
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Further to the fact that the initial tensions in the wall are equally spaced and that added stresses are distributed substantially equal in the wall, the fact that the stresses moves
35 in steps from wall to wall in the combined wall appears to add

to the increased strength simultaneously as the separate walls are movable in relation to each other.

Most likely also the fact that the cylinder walls 8, 9 are
5 loose not only in relation to each other but also in relation
to the bottom 4 and the lid 5 adds to the good strength. This
gives rise to the fact that there are no points which are _
fixed and which, accordingly, may constitute the reason to
fractures which otherwise easily starts from such fixed
10 points. Such fixed points might exist if the lid was fastened
to the cylinder wall 2 and if said wall in turn was fastened
to the bottom 4. The fact that all portions are loose in rela-
tion to each other is, hence, an important feature of the
invention.

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In order to keep the portions of the container 1 together
there is preferably used some type of bundle straps. Such
bundle straps may extend into and through the pallet 3 and up
along the cylinder wall 2 and above the lid 5, the bundle
20 straps crossing each other under the bottom 4 and upon the lid
5.

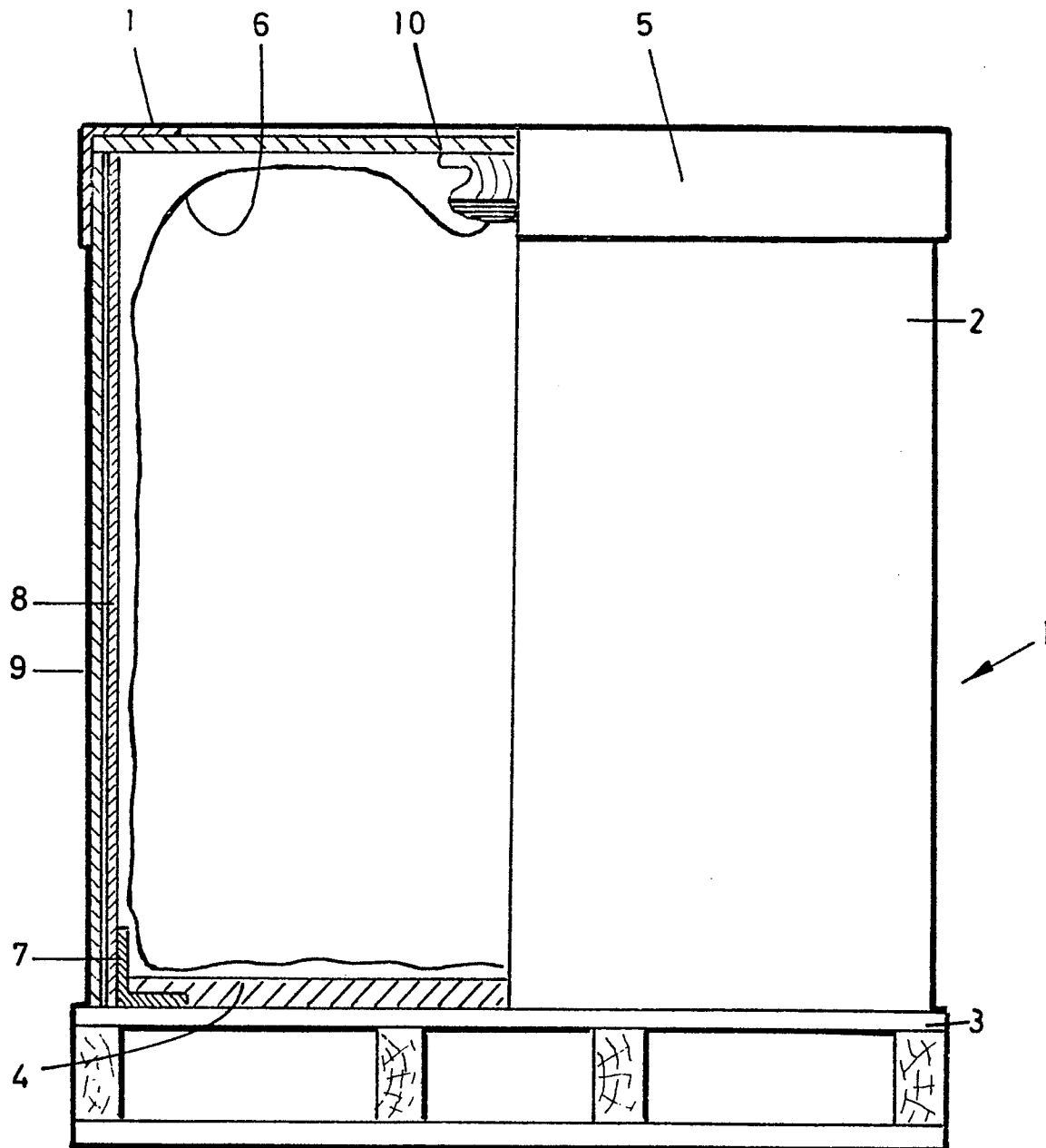
As is clear from the above the problems mentioned in the
preamble have been removed by the present invention and an
25 extremely simple and effective packing means has been
obtained. For the men skilled in the art it is, however, clear
that the invention can be modified in some details, such as in
connection with the shaping of the insert and the connection
between the bottom and the lid to the cylinder wall as well as
30 the cross sectional shape of the cylinder wall but such modi-
fications are fully within the scope of the invention as it is
defined in the attached claims.

CLAIMS

1. Container (1) including a pipe-shaped wall (2) of sheet material and a bottom (4) which is loose in relation to the pipe-shaped wall (2), the bottom (4) and the pipe-shaped wall (2) being intended to be supported upon a load transporting platform (3), characterized by the fact that the pipe-shaped wall (2) consists of at least two in relation to each other loose cylinder-shaped walls (8, 9) located one within the other.
2. Container in accordance with claim 1, characterized by the fact that an insert (6) of flexible material is arranged in the compartment delimited by the pipe-shaped wall (2) and the bottom (4).
3. Container in accordance with claim 2, characterized by the fact that the insert is constituted by a sack (6) of at least one layer which is adapted to the shape of said compartment.
4. Container in accordance with claim 2 or 3, characterized by the fact that the insert is provided with a sleeve which extends over the upper edge of the inner wall (8) of the pipe-shaped wall (2) and into the space between two adjacent walls (8, 9).
5. Container in accordance with claim 2, 3 or 4, characterized by the fact that the insert (6) is provided with a skirt extending in between the bottom (4) and the adjacent wall (8).

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EP 83 85 0265

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. 3)
X	US-A-4 165 024 (L.M. OSWALT) * Figure 2; column 2, lines 43-50; column 3, lines 34-42 *	1-3	B 65 D 77/06
A	GB-A-2 079 254 (IMI MARSTONS LTD.)		
A	US-A-3 383 025 (M. FERRY) * Column 2, lines 38-50; column 3, lines 66-75 *		
A	US-A-3 717 296 (K.A. FELLBRINK)		
A	US-A-3 036 752 (C.I. ELLIOT) * Column 1, lines 14-24 *		TECHNICAL FIELDS SEARCHED (Int. Cl. 3) B 65 D
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 11-01-1984	Examiner BERRINGTON N.M.
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	