Dec. 3, 1968 KARL-FREDRIK FELLDIN 3,414,156

COLLAPSIBLE CONTAINER FOR FLUID OR POWDER

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Fig. 1.

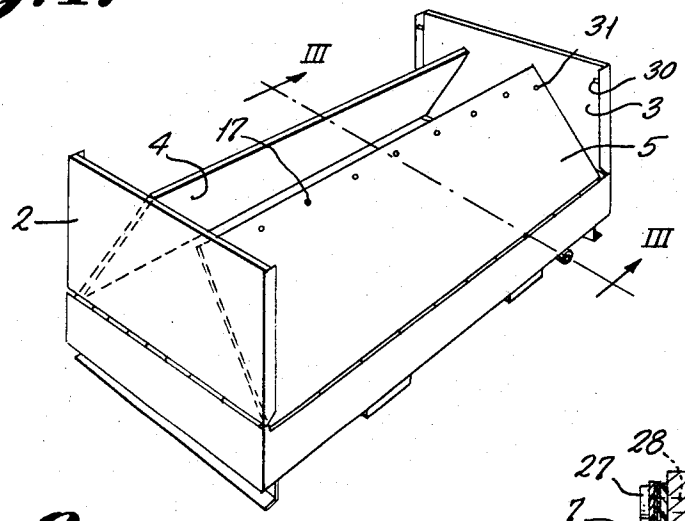


Fig. 4.

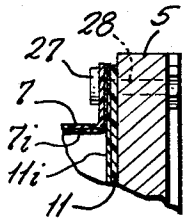


Fig. 2.

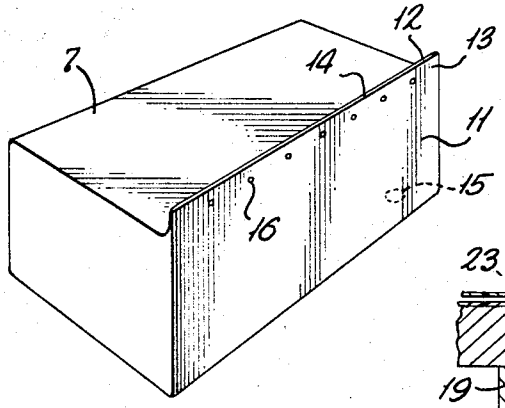
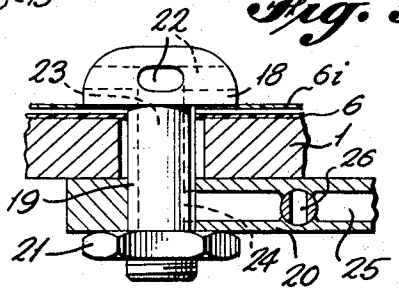


Fig. 5.



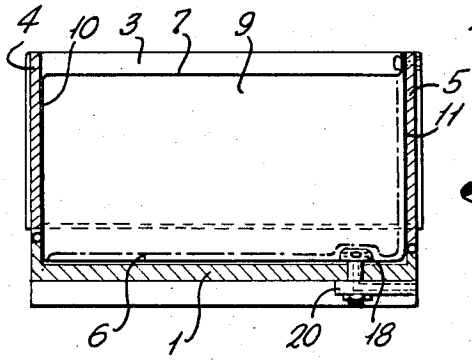


Fig. 3.

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Fig. 6.

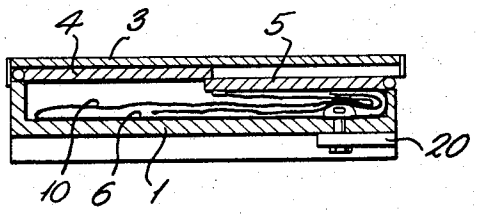


Fig. 7.

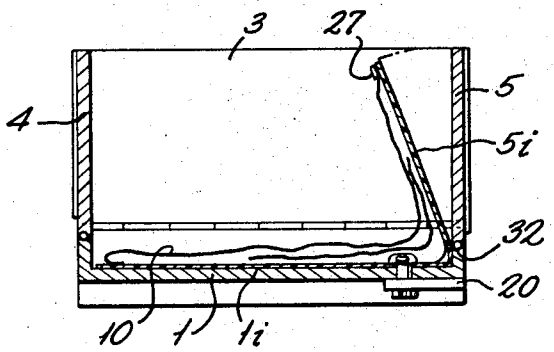
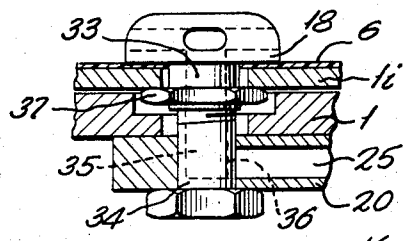


Fig. 8.



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COLLAPSIBLE CONTAINER FOR FLUID OR POWDER

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4 Claims. (Cl. 220—6)

ABSTRACT OF THE DISCLOSURE

Collapsible container for fluid or powder comprising an outer container consisting of a bottom plate having pivotable side flaps, an inner container having a top wall, bottom wall and side walls made of flexible material, and having an elongted opening along an upper horizontal edge, the portions of said inner container adjacent to said opening forming two lips pressed against each other and attached to the upper portion of one of said flaps by means of detachable attachment means, and a flanged bottom pipe sealingly pressing the portion of the bottom wall surrounding a bottom opening against the bottom plate.

In rational transports and handling of goods in factories as well as in transports from one place to another loading stools and stool-supported boxes and containers are usually used, by means of which the goods is handled in a very simple way by means of forklift trucks and loading cranes. Transports of fluid are more complicated and cannot, as a rule, be incorporated in a rational transport system together with other kinds of goods. Big fluid cargoes are usually transported in tanks fixedly mounted on ships or vehicles. Shiftings from one transporting means to another require careful time planning and are in spite of that often attached to expensive periods of waiting. Finally the fluid cargoes are often dispensed into small containers as drums and similar containers, which containers when emptied require return transports. In order to reduce the cubic measurements of such return containers it is priorly known to use bag-shaped containers made of flexible material, as rubber or plastic coated fabric, which containers when emptied are easy to flatten or roll up and which containers consequently have small cubic measurement. Such flexible containers, however, have proved to be rather damageable and cannot be easily handled by fork-lift-trucks and loading cranes.

The object of the present invention is to provide a collapsible container for fluid or powder permitting easy and convenient transport and handling of big fluid cargoes by use of all kinds of transport means as ships, wagons, vessels, etc., which cntainers are adapted for easy shifting from one transport means to another by usually available loading means as fork-lift-trucks and loading cranes, and which containers are easily collapsible and are especially suited to changing between different kinds of fluids and powders in order to increase the rate of utilization of the containers as much as possible. According to the invention the container is composed of an outer casing comprised of a bottom plate having vertical side flaps the lower edges of which being pivotally journalled on said bottom plate to be folded down over the bottom plate, and an inner lining known per se having a bottom wall, a top wall and side walls made of flexible material, said lining having an opening along an upper horizontal edge of the lining the portions of the lining adjacent to said opening forming two lips pressed against each other and attached to the upper portion of one of said side flaps by means of detachable attachment means, in addition to which the bottom wall of the lining is provided with a bottom opening in which an inlet and outlet pipe is inserted extending through an opening in the bottom plate of the outer casing and having a flange sealingly pressed against the inside of the wall portion surrounding said opening in the bottom wall of the lining.

The container according to the invention ensures many advantages. The container, filled as well as emptied, is very strong in mechanical respect and can easily be handled by means of fork-lift-trucks and loading cranes. Emptying of the container is facilitated by the fact that the walls of the lining are kept stressed during the emptying, and the folding down of the side flaps is easily performed owing to the fact that no manual adjustment of the folding of the walls of the lining is necessary. At the return transports all side flaps of the container may be folded down or, alternatively, only the side flap to which the lining is attached, in which latter case goods may be transported in the outer casing. In this case it may be suitable to have a paper or foil bag placed in the outer casing prior to placing the goods in the outer casing. It is also possible after emptying the lining to retain all the side flaps in up-right position, place a paper or foil bag in the casing and place light goods in the bag.

According to a preferred embodiment of the invention the lining is attached to the outer casing solely by means of said attachment means and said inlet and outlet pipe, thus enabling the lining to be easily detached from the outer casing, e.g. for cleaning the inside of the walls of the lining, the large opening along an upper edge of the lining permitting the lining to be turned inside out, thus facilitating the cleaning operation to a large extent. This embodiment also ensures another most important advantage, viz. the use of an insert container consisting of flexible material thinner walled than the lining and having substantially the same dimensions and shape as the interior dimensions and the shape, respectively, of the lining, mounted in the lining, attached to it and sealed by means of said attachment means and said inlet and outlet pipe. Different kinds of fluids and powder can alternatively be transported in a container without intermediate cleaning of the lining; only the insert container and in some cases the inlet and outlet pipe are to be changed, which is a much more simple and less time consuming operation than cleaning the lining per se.

According to another important embodiment of the invention the side flap to which the lining is attached comprises an inner side flap and an outer side flap, the outer one being pivotally connected to the bottom plate and the inner one being pivotally connected to an inner bottom plate freely supported by the bottom plate, said lining being attached to said inner plate and inner flap. Accordingly it is possible for an un-trained person, as occasion requires, to insert a complete lining attached to said inner plates into an outer casing or an ordinary stool-supported collapsible container provided only with a bottom opening for the inlet and outlet pipe. At return transports all the side flaps may be folded down on the collapsed inner lining. Alternatively only the inner side flap may be folded down and light goods placed on the folded down side flap. Moreover it is possible to retain all the side flaps in up-right position, lift up the lining, place heavy goods in the outer container and place the collapsed lining on the top of the goods.

The following is a more detailed description of a number of alternative forms of the invention reference being made to the accompanying diagrammatic drawings in which:

FIG. 1 is a perspective side view of an outer container or casing,

FIG. 2 is a perspective side view of an inner container or lining,

FIG. 3 is a sectional view of the filled container along the bottom line III—III in FIG. 1,

FIGS. 4 and 5 are sectional views illustrating the attachment of the inner container or lining and of an interior insert lining to a side flap and the bottom plate, respectively,

FIG. 6 is a sectional view similar to FIG. 3 and illustrating a collapsed container,

FIG. 7 is a sectional view similar to FIG. 3 of an alternative construction and

FIG. 8 is a view, partly in section, illustrating the inlet and outlet pipe used in the construction shown in FIG. 7.

The container shown in FIGS. 1 to 6 includes an outer container or casing comprised of a bottom plate **1** having upwardly projecting edges on which side flaps **2**, **3**, **4** and **5** are pivotally mounted. A substantially parallelepipeical inner container or lining made of flexible material, for example, rubber or plastic coated fabric, is mounted in the outer casing and comprises a bottom wall **6**, a top wall **7** and four side walls **8**, **9**, **10** and **11**. The top wall **7** and the side wall **11** protrude beyond the intermediate edge line of the inner container or lining, thus forming two edge portions or lips **12** and **13**, respectively, separated by an opening **14** into the interior of the lining. The bottom wall **6** is provided with an opening **15** (FIG. 2) and the bottom plate **1** is provided with a corresponding underlying opening (FIG. 5). The lips **12** and **13** and the top portion of the side flap **5** are provided with a plurality of holes **16** and **17** respectively.

The inner container or lining is attached to the outer container or casing at only two specific spots, viz. at the opening **15** and at the lips **12** and **13**. Mounting of the lining is performed by introducing a bottom pipe **19** provided with a flange or collar **18** into the lining through the opening **14**. The pipe **19** is then inserted into the opening **15**, the corresponding opening of the bottom plate **1** and a transverse bore in the valve housing **20**. By tightening a nut **21** on the end of the pipe **19**, which end is plugged, the flange **18** is pressed against the inner surface of the bottom wall portion surrounding the opening **15** which portion is pressed against the inner surface of the bottom plate **1**. The flange **18** is provided with diametric bores **22** connected to an axial bore **23** in the pipe **19**, which pipe is provided with an opening **24** connecting the bore **23** to an inlet and outlet passage **25** in the valve housing over sealing means, not shown. The passage **25** is provided with a valve body **26**.

After mounting of the pipe **19** the lips **12** and **13** are secured to the upper portion of the side flap **5** by means of a clamping bar **27** provided with mounting screws **28**, which are inserted in the holes **16** and **17**, after which the lips **12** and **13** are clamped together and against the inside of the side flap **5** by tightening nuts on the ends of the screws so that a sealing of the opening **14** is obtained.

Before filling the container with fluid the side flaps **2** to **5** are raised and locked in up-right position by means of edge plates **29** secured to the side flaps **2** and **3** and provided with locking pins **30** adapted to project into holes **31** in the side flaps **4** and **5**. An inlet hose is connected to the valve housing **20** and when the valve body **26** is opened fluid is pressed through the pipe **19** into the interior of the lining, which, upon filling, is unfolded from the empty state indicated by a dash-dotted line in FIG. 3 to the filled state indicated by the walls **7** and **10** in FIG. 3, after which the valve body **26** is closed again.

On emptying the container the top wall **7** of the lining sinks down and is successively applied against the side wall **11** of the casing. Due to a certain stiffness of the walls of the lining the discharge of fluid results in a negative pressure in the lining causing folding of the side walls **8** and **9** inwards by suction. When the lining is completely emptied the top wall **7** and the side wall **10** have the location indicated by the dash-dotted line in FIG. 3, the side walls **8** and **9** being folded inwards between the walls **8** and **9** and the bottom wall **6** and the side wall **11**, thus preventing the occurence of fluid filled pockets. The automatic folding is facilitated if the side walls **8** and **9** are provided with permanent folding lines. After closing the valve body **26** to prevent air from flowing into the container the side flap **5** and then the side flap **4** are folded down, after which the side flaps **2** and **3** are folded down upon the flaps **4** and **5** as shown in FIG. 6.

According to another embodiment of the invention the lining is provided with an interior insert lining easily exchangeable and adapted to the interior dimensions of the lining. The insert lining comprises of a plastic foil container having substantially the same shape and size as the outer lining and is partly indicated in FIGS. 4 and 5, where parts of the walls **6***i*, **7***i* and **11***i* corresponding to the walls **6**, **7** and **11** of the inner lining are shown. The possibility of using an insert lining is a result of the fact that according to the invention the inner lining is attached to the outer lining by means of the clamping means **27** and the inlet and outlet pipe **18**, **19** as well as the fact that the inner lining is provided with the large opening **14**. Owing to these facts it is possible to introduce the insert or inner lining into the outer lining and to attach the interior insert lining in the same simple manner as the outer lining by means of the clamping bar **27** and the pipe **19**.

According to another embodiment of the invention shown in FIG. 7 and 8 the side flap **5** is provided with a loose inner flap **5***i* and the bottom plate **1** of the casing is provided with a loose inner plate **1***i*, said inner flap and inner plate being pivotally joined by a pivot **32**. The outer lining (and possibly the inner lining) is attached to the inner flap **5***i* and the inner bottom plate **1***i* in a similar manner as described above. To facilitate the mounting of the outer liner into the outer casing, however, the inlet and outlet pipe preferably is made in two parts, viz. one threaded part **33** provided with the flange or collar **18** and one threaded part **34** adapted to be screwed into the part **33** and provided with an axial bore **35** and an opening **36** adjacent to the passage **25** in the valve housing **20**. The part **33** of the pipe **19** extends through the bottom opening **15** and a corresponding opening in the interior bottom plate **1***i* and, clamping the bottom portion of the bottom wall **6** surrounding the opening **15** between the flange **18** and the plate **1***i*, is secured to the plate **1***i* by means of a nut **37** on the under side of the plate **1***i*. Consequently it is possible to insert the lining mounted on the inner plate **1***i* and inner flap **5***i* into the outer casing and then connect the interior container to the valve housing **20** by the part **34** adapted to be inserted from the under side of the container through the transverse boring in the housing **20** and sealingly connect the passage **25** to the part **33** of the pipe **19**.

The invention is not limited to embodiments shown but a number of modifications are of course possible within the scope of the invention.

The dimensions of the container is suitably adapted for transports on ships, railways as well as lorries. A suitable dimension is length 1,600 mm., width 1,175 mm. and height 1,100 mm. In this case the volume of the container is about 1,600 litres, i.e. a volume corresponding to eight drums of each 200 litres. The height of the collapsed container is only 350 mm.

What is claimed is:

1. A collapsible container for fluid or powder, comprised of an outer casing having a bottom plate having vertical side flaps the lower edges of which are pivotally hinged on said bottom plate to be folded down over the bottom plate; and a lining having a bottom wall, a top wall and side walls made of flexible material, said lining having an opening along an upper horizontal edge thereof, said opening extending along substantially the entire length of said lining and being formed between the upwardly folded edge portion of the top wall thereof and the folded edge portion of a side wall thereof, detachable

means extending along the entire length of said lining pressing said edge portions together forming a seal, said bottom wall of the said lining being provided with a bottom opening in which an inlet and outlet pipe is inserted extending through an opening in said bottom plate and having a flange sealingly pressed against the inside of the wall portion surrounding said opening in the bottom wall of said lining.

2. A collapsible container as claimed in claim 1, and in which said lining is attached to the casing solely by means of said detachable pressing means and said inlet and outlet pipe.

3. A collapsible container as claimed in claim 1, and in which a second lining, interior of said first mentioned lining comprised of flexible material thinner than the material of the first lining inner container and having substantially the same dimensions and shape as the first lining is mounted in the first-mentioned lining attached to said first mentioned lining and sealed by means of said attachment means and said inlet and outlet pipe.

4. A collapsible container as claimed in claim 1, and in which said side flap, to which said lining is attached consists of an inner side flap and an outer side flap, said outer flap being pivotally connected to the bottom plate and said inner flap being pivotally connected to an inner bottom plate freely supported by the bottom plate, said lining being attached to said inner plate and said inner flap.

References Cited

UNITED STATES PATENTS

2,630,236	3/1953	Arkoosh	220—63 X
2,720,998	10/1955	Potter	220—6
3,057,509	10/1959	Bernd	220—63
3,130,850	4/1964	Oakey	220—6

FOREIGN PATENTS

943,661	12/1963	Great Britain.

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