United States Patent

Kassravi

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[54] CARGO CONTAINERS

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Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 728,987, May 14, 1968, Pat. No. 3,570,705.

[30] **Foreign Application Priority Data**

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[52] **U.S. Cl.**.....**220/63 R**, 220/85 B, 280/5 R

[51] **Int. Cl.**.....**B65d 25/18**, B65p 3/22

[58] **Field of Search**.....220/1.5, 5 R, 5 A, 63 R, 85 B; 280/5 R; 150/0.5

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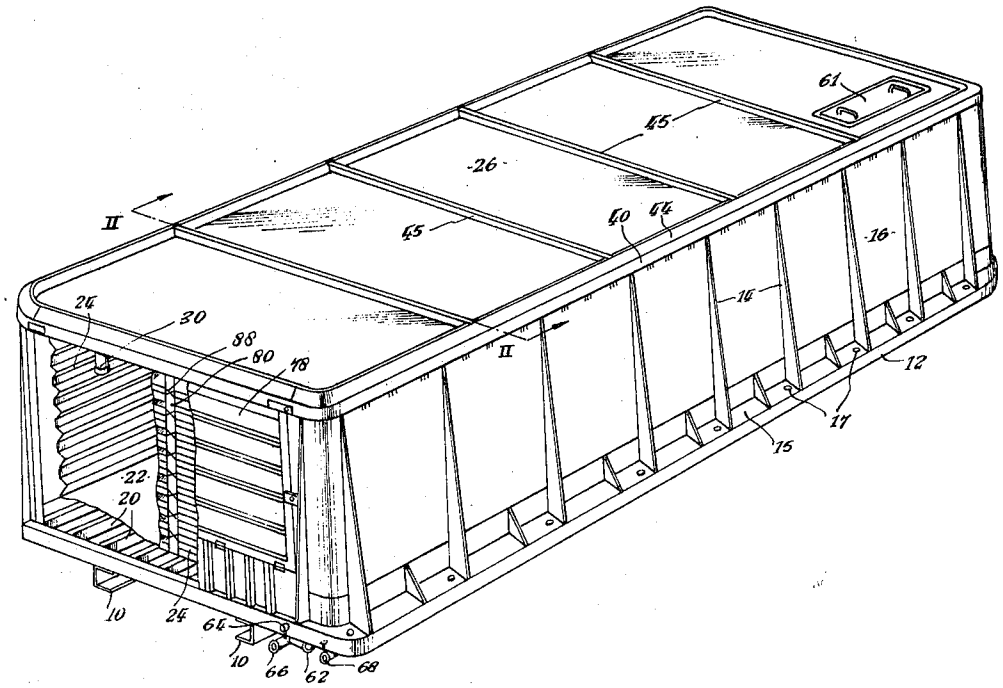
Primary Examiner—George E. Lowrance
Attorney—Jones & Lockwood

[57] **ABSTRACT**

A cargo container comprises a rigid walled structure within which is a movable shield. A flexible corrugated sleeve is connected peripherally to the shield and to a fixed rigid wall of the container to form an expansible vessel. The fixed rigid wall and/or the shield has a peripheral channel with a constricted opening which receives one end of the sleeve and an inflatable member which retains said one end in the channel to form a fluidtight seal. The sleeve has flexible tie belts to cause smooth uniform extension of the sleeve on movement of the shield. The shield can be locked in a number of positions relative to the rigid walled structure. The rigid walls support the sleeve against internal pressure and protect it from external damaging influences.

10 Claims, 12 Drawing Figures



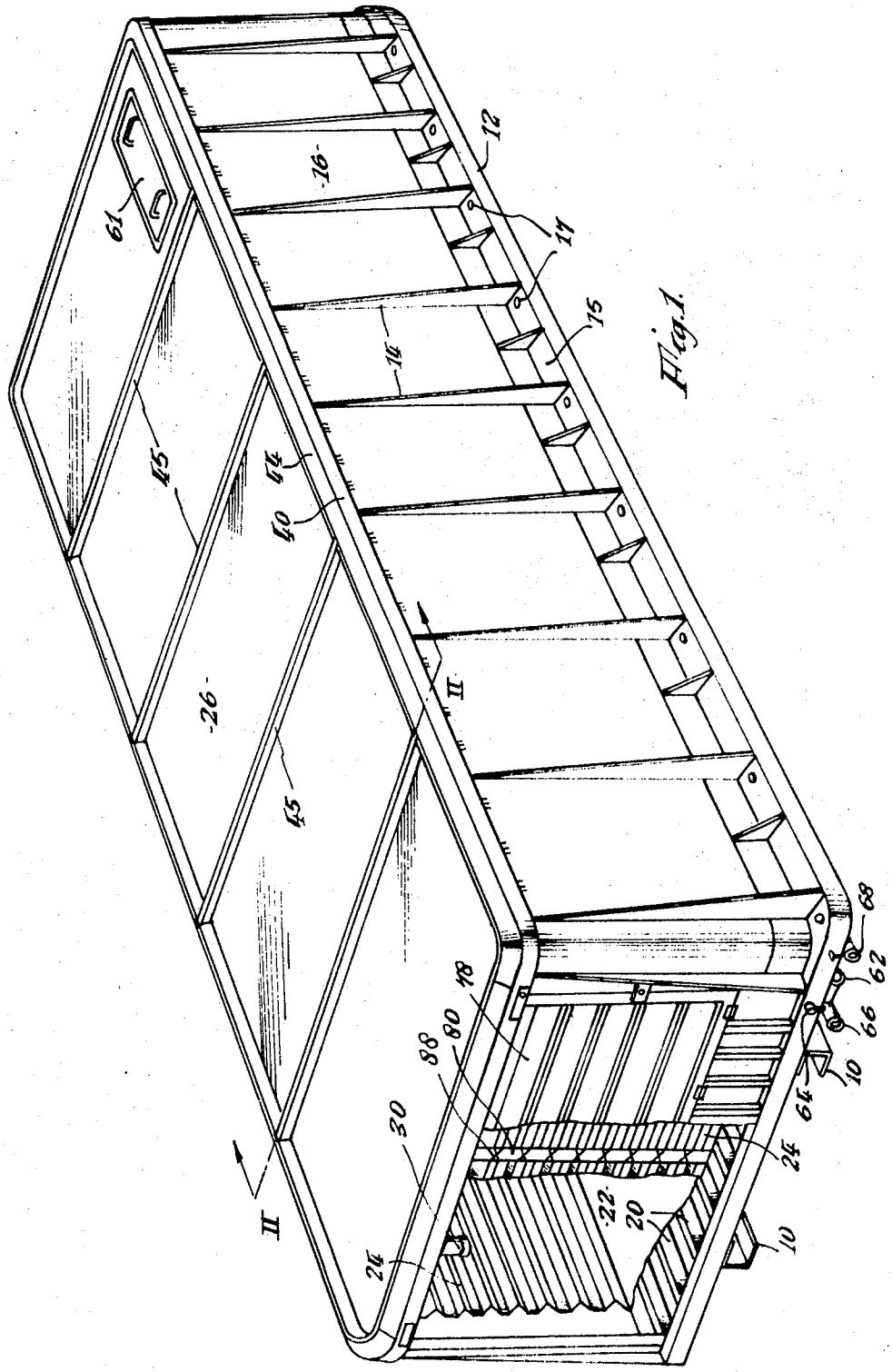

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Fig. 1.

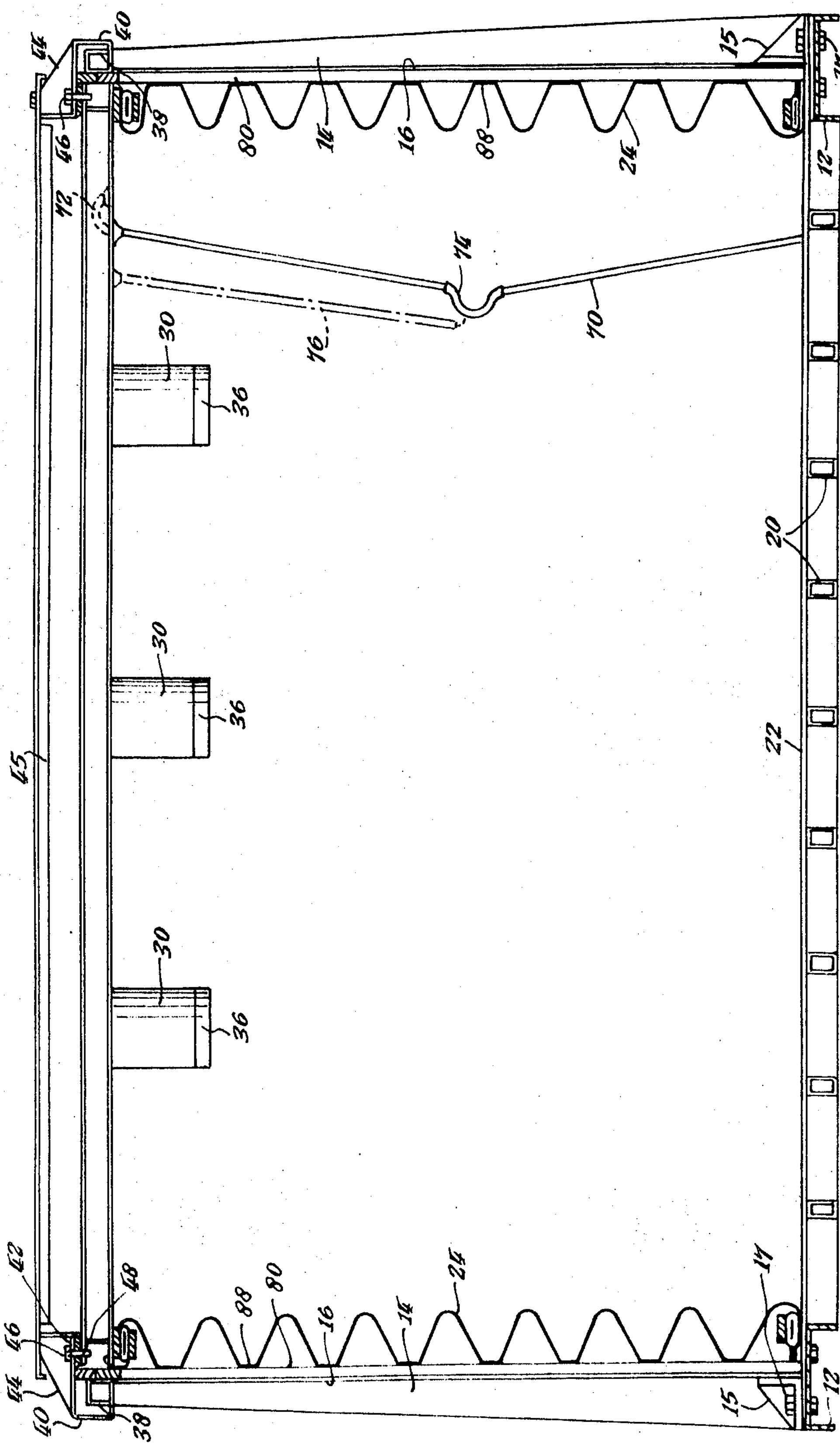

Fig. 2

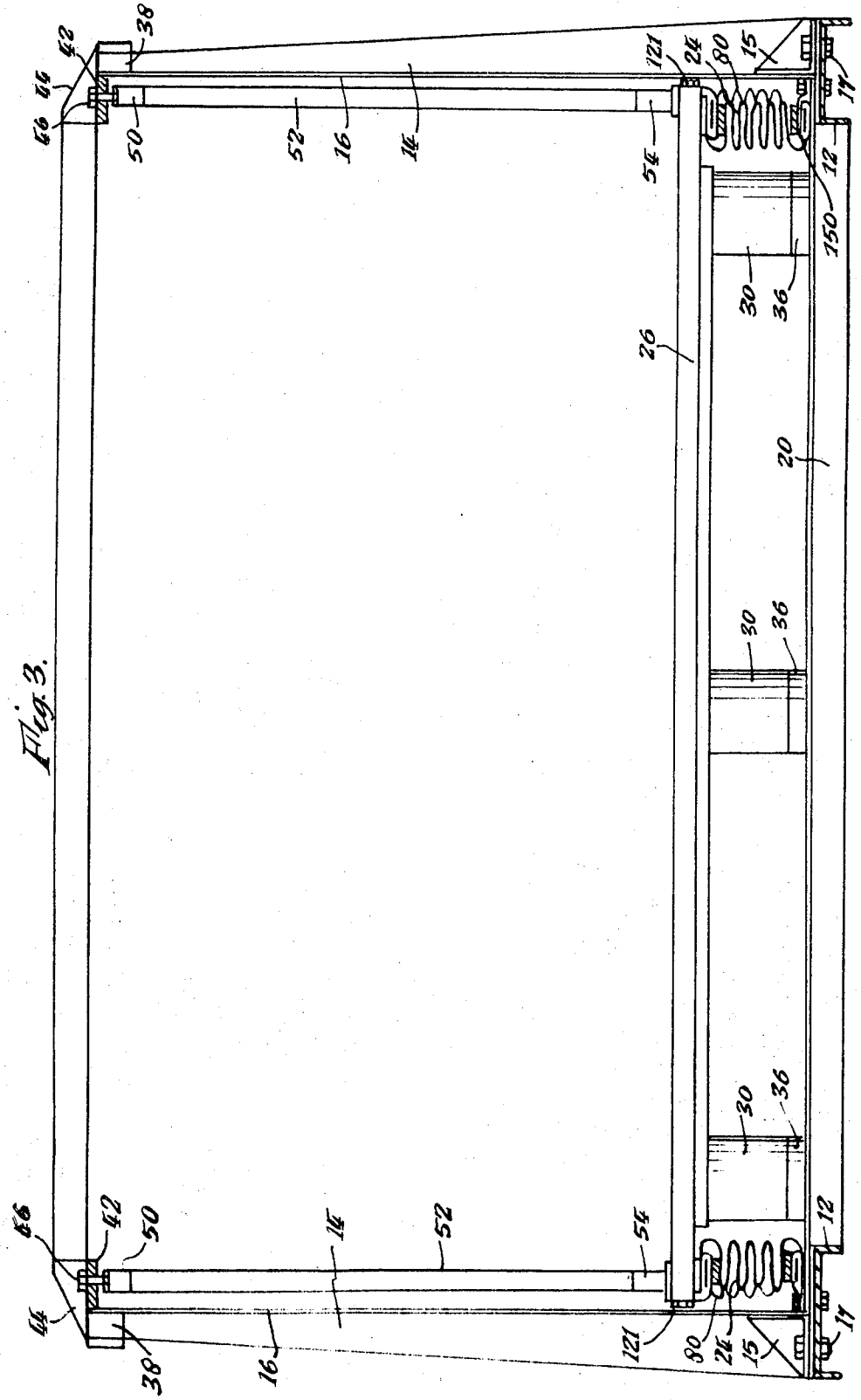
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Fig. 3.

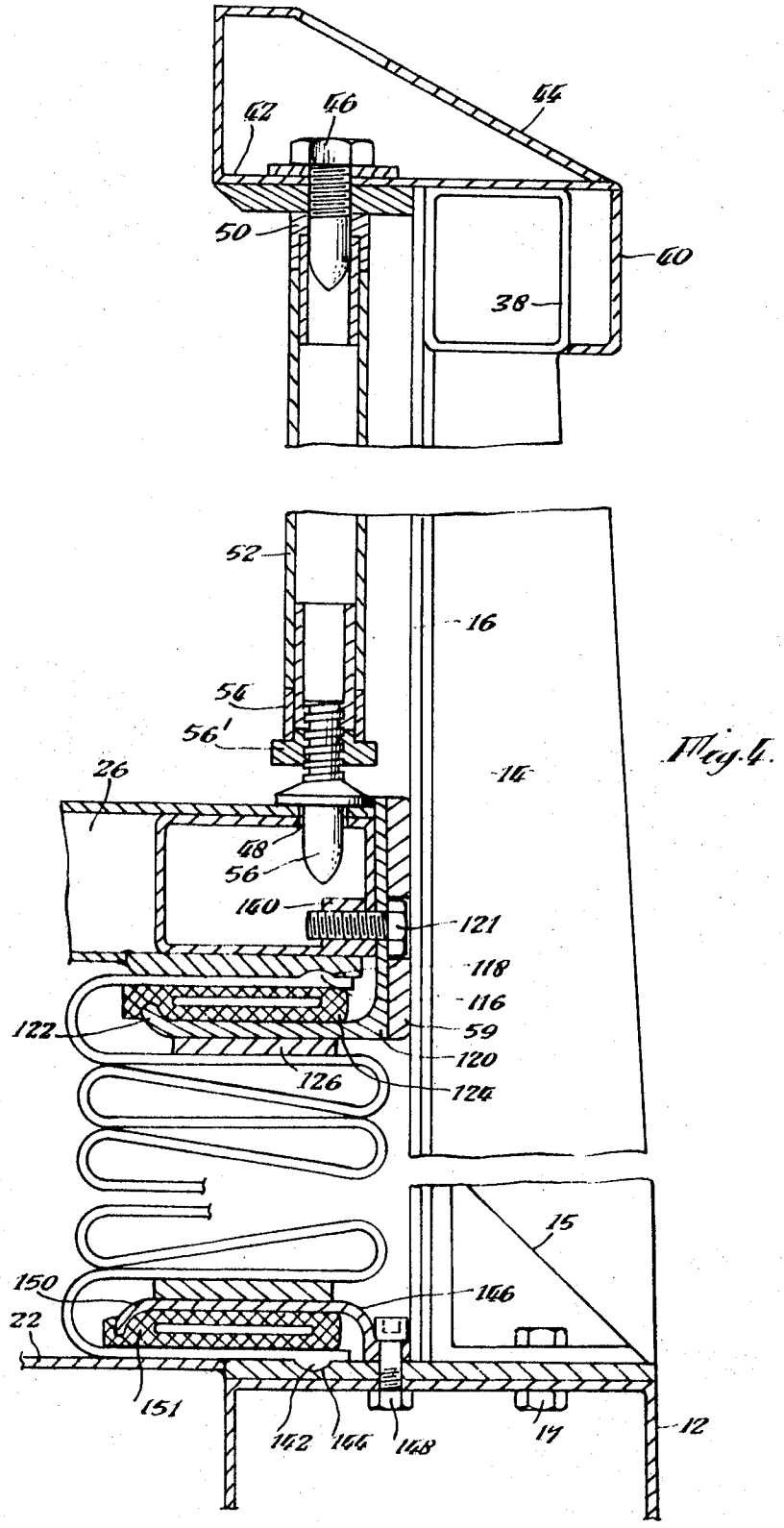
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Fig. 4.

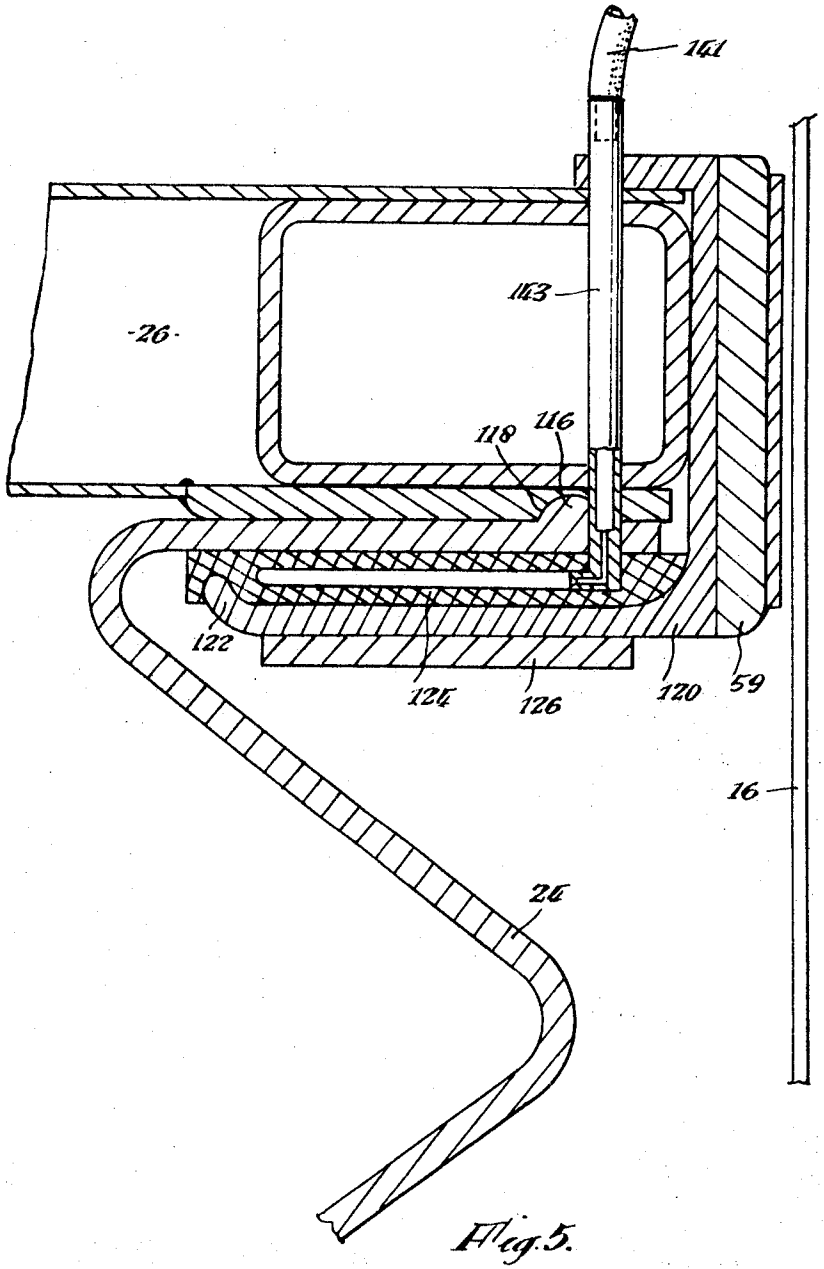

Fig. 5.

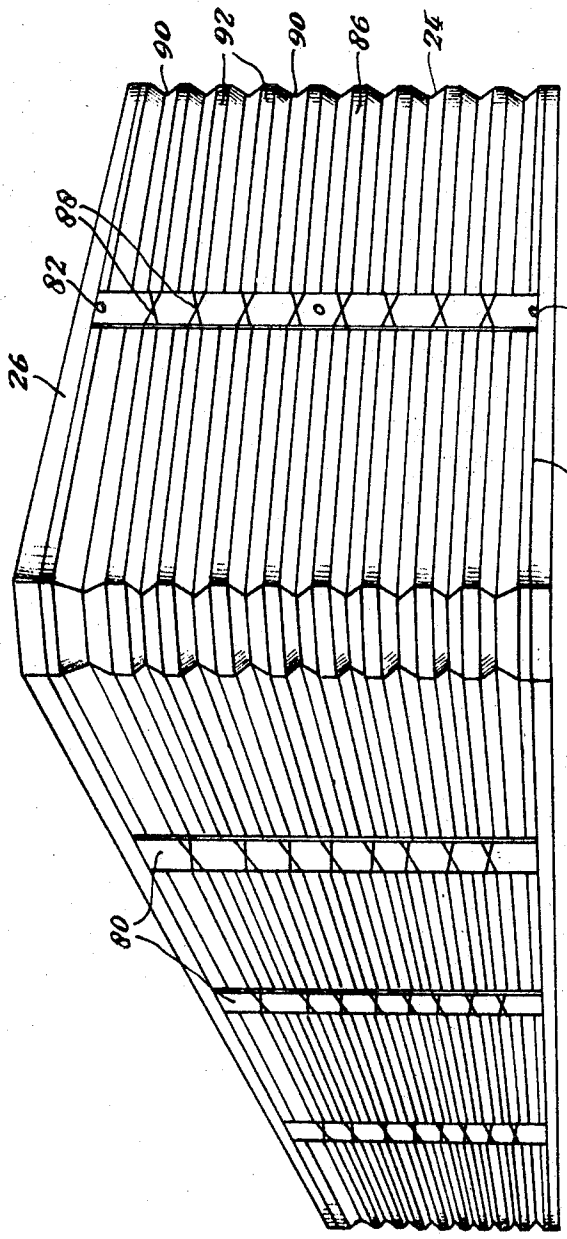

Fig. 6.

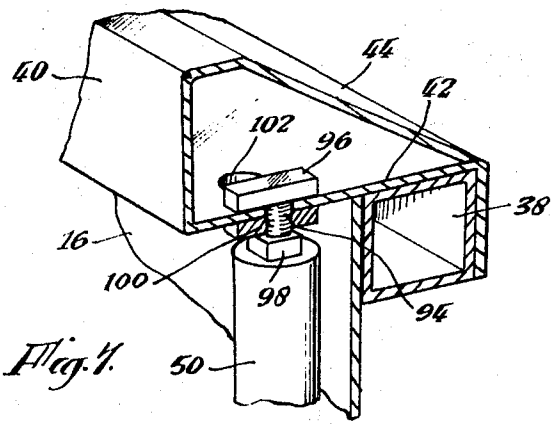
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Fig. 7.

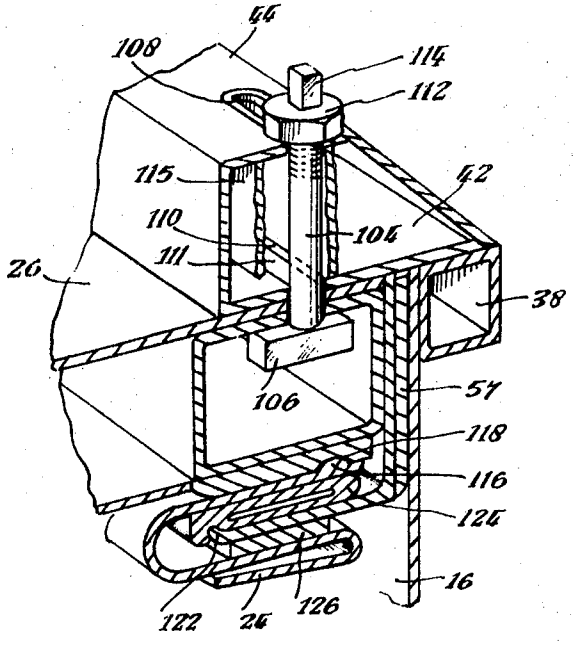
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Fig. 8.

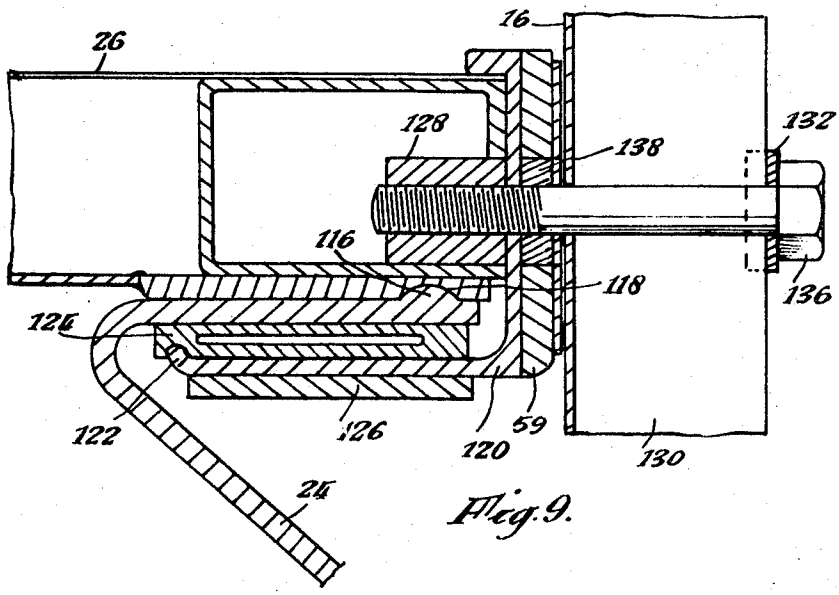

Fig. 9.

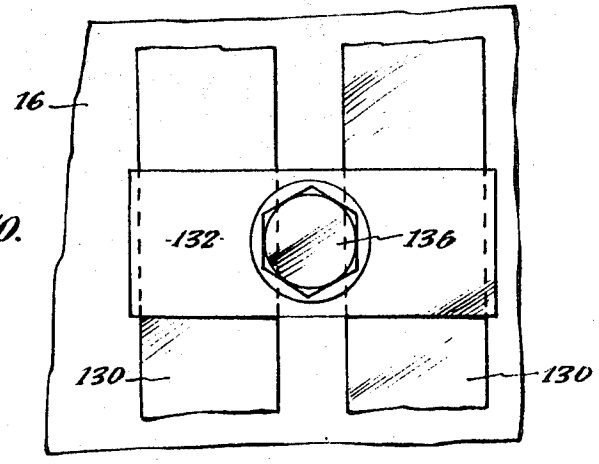

Fig. 10.

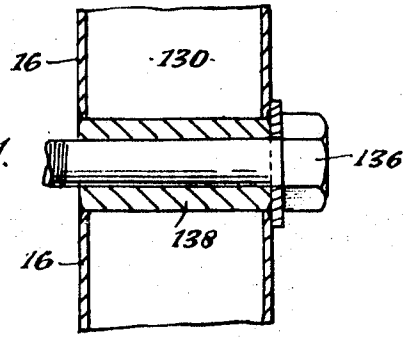

Fig. 11.

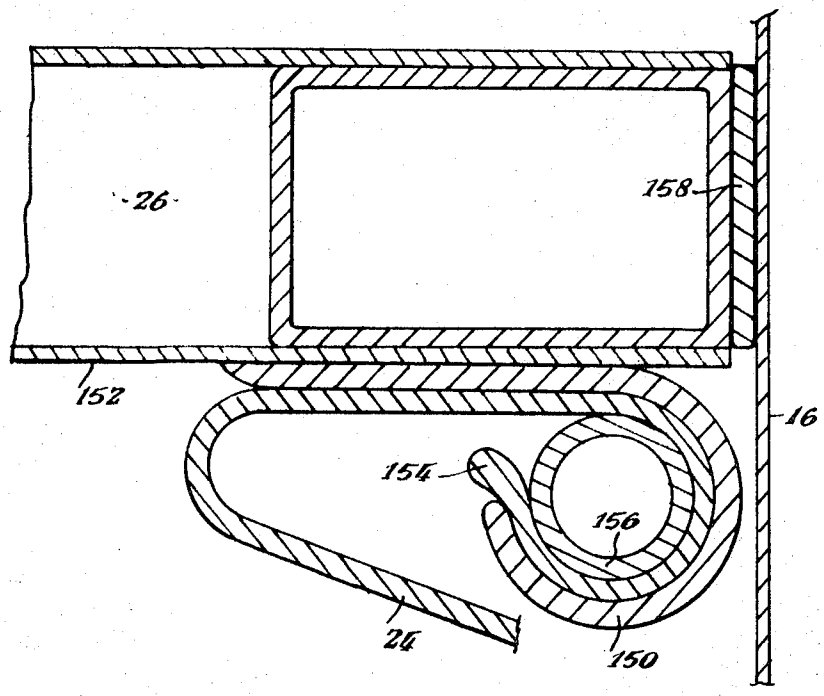

Fig. 12.

CARGO CONTAINERS

This application is a continuation-in-part of my earlier filed application, Ser. No. 728 987, filed on May 14, 1968, now U.S. Pat. No. 3,570,705.

This invention relates to cargo containers.

Liquids are normally transported in bulk, where the use of a pipe line is impracticable, in vehicles, aircraft, or ships fitted with rigid tanks. One of the major factors contributing to the expense of transporting liquids in bulk in such specially constructed tankers is that, once having delivered their loads, whether by sea, by air, by road or by rail, they must usually make the return trip empty.

Various proposals have been made for constructing a container which can be used either for carrying a liquid cargo or for carrying a load of solid material after the liquid has been discharged from the container. Thus such proposals have included a rigid walled container with a movable platform inside it which is attached to the top of a thin walled flexible vessel. Such a container is described in Italian Pat. No. 540 876 (Rinck). Other forms of collapsible containers have included a rigid platform, a thin walled flexible tank and a series of bulky hinges to establish the fold lines of the flexible tank as the tank collapses. Examples of such tanks are described in U.K. Specifications Nos. 832 409 and 1 032 656.

It is an object of this invention to provide an improved cargo container capable of carrying a liquid cargo on one trip and of carrying a solid cargo on another trip, for example a return trip.

According to the present invention a cargo container comprises

a. a first rigid member,

b. a second rigid member, substantially coextensive with said first rigid member and movable towards and away from said first rigid member between an inner position relatively close to said first rigid member and an outer position relatively far from said first rigid member,

c. a flexible fluid impermeable sleeve having a plurality of performed corrugations therein and extensible in concertina-like fashion,

d. sleeve securing means sealingly securing said ends of said sleeve peripherally to said first and second rigid members respectively whereby said sleeve and said rigid members together form an expansible fluidtight vessel, said sleeve securing means including (i) a peripheral flange on at least one said rigid member and defining a channel having a constricted opening, which channel is adapted to receive one end of said sleeve, and (ii) an inflatable member within said channel, whereby on inflation of said inflatable member said one end is sealed in fluidtight fashion peripherally to said rigid member,

e. continuous rigid outer walls fast with said first rigid member and adapted to guide said second rigid member in its movement between the said inner and outer positions, to support said sleeve against pressure within said vessel and to protect said sleeve against external damaging influences, and

f. spacer means mounted within said vessel and spaced from said rigid outer walls so as to provide between said first and second rigid members and between said spacer means and said rigid outer walls in said inner position of said second rigid member a dead space to receive said sleeve.

Conveniently said second rigid member comprises a reinforced platform movable in a substantially vertical direction between said inner and outer positions and said first rigid member forms the base of said expansible vessel.

In order that the invention may be clearly understood and readily carried into effect, several preferred embodiments thereof will now be described, by way of example only, with reference to the accompanying drawings, wherein:

FIG. 1 is a perspective view of a container in accordance with the invention,

FIG. 2 shows a cross section on the line II—II of FIG. 1,

FIG. 3 is a cross section through the container of FIG. 1 in its collapsed position,

FIG. 4 is a detail view of FIG. 3,

FIG. 5 shows another detail view of part of the container of FIG. 1,

FIG. 6 is a perspective view of the expansible vessel of the container of FIG. 1,

FIG. 7 shows a detail view of a container with a modified form of bracing means,

FIG. 8 shows a detail view of a modified form of container provided with locking means for locking the shield in its outer position,

FIG. 9 shows a cross section through another modified form of container fitted with a set of locking members for locking the shield in a position intermediate its inner and outer positions,

FIG. 10 and 11 shows further details of the container of FIG. 9 and

FIG. 12 shows a detail view of yet another form of container in accordance with the invention.

Referring to FIGS. 1 to 6 of the drawings, the cargo container is supported on a pair of longitudinal girders 10 which may form part of the chassis of a vehicle (the rest of which is not shown). The base of the cargo container consists of a frame made up of a number of longitudinal spars 20 secured at their ends to metal elements 12 of C-shape having the concavity facing downwards. Brackets 15 are bolted by means of bolts 17 to elements 12. Brackets 15 are welded to panels 16 which form the rigid outer walls of the container and welded to panels 16 are vertical members 14 to impart rigidity to the outer walls of the container.

By unbolting the bolts 17 the rigid outer walls, including the vertical members 14, the brackets 15 and the cladding panels 16 can be demounted from the rest of the container as a single unit in order to expose the outside of the expansible vessel which will be described hereafter.

A rigid flat base plate 22 is mounted on the members 12 and 20. Base plate 22 serves as the bottom plate of an expansible vessel or tank, whose side walls 24 are in the form of a sleeve of a flexible fluid impermeable material, such as oil-resisting rubber, and are pleated so as to cause the side walls 24 to collapse in concertina-like fashion. The tank has a roof which is formed by a movable platform 26 which serves as a rigid protective shield for the tank and is reinforced so as to be capable of carrying a load and, when the tank contains liquid, of resisting the pressure of the liquid within the tank. Movable platform 26 may slide up and down inside the rigid outer walls which serve to guide it. The inner surface of the outer walls is made as smooth as possible to minimize the possibility of the flexible side walls 24 being punctured by chafing during movement of the vehicle or during loading or unloading of the liquid cargo. As can be seen from the drawings, the side walls 24 retain their corrugated conformation when the platform 26 is in its upper position. In other words the sleeve of flexible material forming the side walls 24 is never fully extended even when platform 26 is in its upper position.

To the underside of the movable platform 26 are welded a number of pillars 30, which can be of round section (as shown) or square section. Pillars 30 are distributed regularly over the central part of the platform 26. At their lower ends pillars 30 are fitted with pads 36 of oil-resistant rubber. Thus, when the platform 26 is in its lower, collapsed position, it is spaced from the base plate 22 and pillars 30 rest with their rubber pads 36 on the base plate 22. These pads 36 serve to absorb shocks and minimize the vibration of the platform 26 when the vehicle is in motion.

The combined height of the pillars 30 and the rubber pads 36 permits the flexible side walls 24 to pack away in concertina-like fashion beneath the movable platform 26 (when it is in its lower, collapsed position) in the dead space between platform 26 and the base plate 22 and surrounding the pillars 30.

The top ends of the elements 14 are connected by boxsection girders 38, on top of which are secured Z-section members 40. Portions 42 of members 40 form an internal flange running around the inside of the upper edge of the rigid outer

walls. A strip 44 is welded to the members 40. Tie bars 45 are bolted to the Z-section members 40 to connect the top edges of the outer walls to brace them, particularly when the container is part empty and the platform is in an intermediate position. Tie bars 45 can be removed if desired when the container is completely empty.

At intervals around the internal flange formed by portions 42 are mounted a series of downwardly projecting pins 46 (best seen in FIG. 4). The platform 26 has a corresponding series of holes 48 around its periphery, into which the pins 46 may engage when the platform 26 is in its upper, erected position (as shown in FIGS. 1 and 2) to locate the platform 26 and limit further upward movement thereof.

A number of composite adjustable bracing members are provided for use when the tank is not full; each of these adjustable bracing members has three parts, an upper part 50 with a socket into which a pin 46 on the flange may fit, a tubular middle part 52, and a lower part 54 which incorporates a jack and has a peg 56 to fit in the hole 48 in the platform 26 corresponding to the chosen pin 46. Middle parts 52 of various lengths are provided so that the platform 26 may be secured at its lower position (with the longest middle part 52 as shown in FIGS. 3 and 4) by suitable adjustment of the jack or located at any position intermediate its erected and collapsed positions with the aid of shorter middle parts 52. The jack of lower part 54 can be extended for final adjustment of height and in order to pressurize the tank when it contains liquid by adjustment of a nut 56'. As can be seen from FIG. 4 a spigot on the bottom end of upper part 50 fits into the top end of tubular middle part 52 and a spigot on the lower part 54 fits into its bottom end so that the composite adjustable bracing member serves to locate the platform 26 and to prevent further upward movement thereof.

FIG. 4 also shows the method of effecting a seal between the flexible side walls 24 and the platform 26 and base plate 22 respectively.

Thus the upper end of side walls 24 is provided with a bead 116 which is received in a corresponding groove 118 in the underside of the platform 26. An angle member 120 is secured by bolts 121 to the edge of platform 26 to form a channel to receive the upper end of side walls 24 and rubber pads 59 are fitted to the outside edge of this to prevent the platform 26 scoring the side walls 16. Bolts 121 are received in nuts 140 welded to the platform 26. Angle member 120 is shaped so that there is a constricted opening between its lip 122 and the underside of the platform 26. An inflatable member 124 is positioned within the channel formed between the angle member 120 and the underside of the platform 26 and is inflated by means of a pipe 141 through a valve 143 (shown in FIG. 5) to a pressure of (say) 50 p.s.i.g. to seal the upper end of the side walls 24 to the platform 26. Beneath angle member 120 there is a rubber pad 126 to prevent chafing against the side walls 24 when the platform 26 is in its lower position.

The sealing arrangement between the bottom end of the side walls 24 and the base 22 is similar to that just described for sealing the top end to the platform 26.

The lower end of the side walls 24 is provided with a bead 142 received within a peripheral groove 144. An angle member 146 is secured in position by bolts 148, its lip 149 defining a constricted opening to a channel within which is received an inflatable member 151. Inflatable member 151 can be inflated through a valve (not shown) to seal the lower end of the side walls 24 to the base of the container.

Pipe 141 can be connected to a pressure gauge (not shown) on the outside of the container or, if the container is permanently mounted on a vehicle, to an instrument on the dashboard of the vehicle. In this way, in the somewhat unlikely event of the inflatable member springing a leak, warning can be had of the danger of the seal between the side walls and the platform breaking down and proper action can be taken to prevent or minimize spillage of liquid from within the tank. In a similar way a gauge may be provided to monitor the pressure in the inflatable member 151.

Both inflatable members 142 and 151 are continuous around the periphery of the sleeve 24 and are each shaped somewhat like the inner tube of a pneumatic bicycle tire.

The sealing arrangement adopted in the illustrated container has the advantage that any change in the shape or thickness of the end portions of the sleeve 24, for example by reason of permanent set if the sleeve 24 is made of rubber, does not result in leakage of the contents of the tank provided that the members 124 and 151 remain properly inflated.

As shown in FIG. 1 a man-hole 61 is provided in the platform 26 to permit of access to the inside of the tank for inspection, cleaning or repair.

The liquid inlet pipe leads up through the base plate 22 and its outer end (see FIG. 1) is fitted with a proper gate valve 62, a pressure gauge 64 and a pressure relief valve (not shown). Except while the tank is being filled or emptied, the outlet is protected by a screw-on brass cap 66. To fill the tank a hose can be coupled to the outer end of the inlet pipe and liquid (e.g. oil) pumped in.

The tank is also provided with an air vent pipe, the outlet of which is fitted with a valve 68. This air vent pipe is connected to a nipple in the base plate 22 and a flexible hose 70 leads up from the nipple to the platform 26 where it is connected to an inverted U-pipe 72, the free end of which is flush with the underside of the platform. Conveniently U-pipe 72 is mounted in the man-hole 61. At about its midpoint the flexible hose 70 passes through the short metal sleeve 74 which has an elbow bend in it; one end of a helical spring 76 is attached to sleeve 74 and the other end is attached to the underside of platform 26. This spring 76 is so positioned that when the platform 26 is in its lower, collapsed position the flexible pipe 70 is stowed between the platform 26 and the base plate 22 so however as not to be borne upon by any spacing or load bearing member, such as one of the pillars 30, and to prevent the flexible pipe 70 being damaged by being nipped between a pillar 30 and the base plate 22 or becoming entangled with the flexible side walls 24.

With tie rods 45 in position and with valves 62 and 68 open the tank can be filled through the liquid inlet pipe. When the liquid starts to run out of deairing valve 68, it shows that the air inside the tank is completely extracted. The valve 68 should then be shut and filling continued. As the tank fills the flexible walls 24 straighten and the platform 26 rises until the pins 46 engage in the holes 48 to hold the platform firmly in position. (The adjustable bracing members constituted by the parts 50, 52 and 54 are, of course, removed during the filling operation). Then more liquid is pumped in until the correct pressure is reached at which the corrugations of the flexible side walls 24 are pressed against the cladding panels 16 and are supported against pressure from within the tank by the outer walls. The gate valve 62 is then closed. If the tank is correctly filled and substantially air free, slopping and surging of liquid within the tank is minimized with the consequent minimization of the danger to the stability of any vehicle on which the container should be mounted.

When the tank vehicle with its full load reaches its destination, the contents of the tank can be discharged through the valve 62, the air release valve 68 being opened to permit the tank to be drained to the fullest extent.

Since the adjustable bracing members are provided with a variety of middle parts 52, the platform 26 can be secured at positions intermediate its upper, erected position and lower collapsed position by bracing the platform against the pressure within the tank. For example there may be three middle parts 52 which correspond to the tank being one-fourth, one-half and three-fourths full respectively. Thus a lorry fitted with the illustrated container can make a series of calls and make deliveries of liquid at each stop. After each delivery the platform can be secured in position by choosing the appropriate middle part 52 and adjusting the jack 54 and the slopping and surging of liquid in the tank can be minimized however much liquid the tank contains.

When the platform 26 is secured in its lower, collapsed position, the lorry is ready to be loaded, like any other lorry, with any desired solid material, such as copper ingots, on top of the platform 26. A door 78 in the end wall of the housing can be opened to facilitate the loading and offloading of solid material onto the lorry.

The flexible side walls 24 are made from a material chosen to suit the liquid that it is intended to transport, and they retain their corrugated conformation when the platform is in its upper position and the tank is fully loaded. Thus if, for example, the tank is intended to carry oil, the flexible side walls should be made of the best available grade of oil-resisting rubber. Alternatively, flexible side walls may be made of rubber having a flexible reinforcement or of a flexible plastics material. Alternatively the side walls may be made from flexible steel sheets. It is true that the life of the tank may be less than the life of a rigid metal tank but this disadvantage will usually be compensated by the fact that lorries may carry a useful load both on the outward and return trips and in the case of an accident the content is doubly secured.

The expansible vessel is illustrated in greater detail in FIG. 6. As already stated the side walls 24 are pre-molded or preformed with a series of corrugations 90 and 92 so that the sleeve can extend in concertina-like fashion. The outwardly directed corrugations 92 are reinforced with strips 86. A series of flexible tie belts 80 are fixed vertically by their top ends 82 to the platform 26 and at their bottom ends 84 to the base plate 22. The tie belts 80 are secured at the points 88 to the reinforcing strips 86. Thus tie belts 80 may be sewn to reinforcing strips 86 before the latter are molded into the flexible rubber walls 24. As can be seen from FIG. 6 tie belts 80 are secured to the outwardly directed corrugations 92 at the points 88, and each adjacent pair of points 88 are separated by an inwardly directed corrugation 90. With this arrangement, when the expansible vessel expands to its open position, the tie belts 80 become fully extended and control the extension of the walls 24. Because tie belts 80 are inextensible and the points 88 are uniformly spaced along the tie belts uniform opening of the corrugations of the flexible walls 24 is assured. This arrangement therefore helps to minimize uneven wearing of the flexible walls 24. Since in the absence of tie belts 80 the liquid pressure in the initial stage of filling, tends to press the lower pleats of the flexible rubber walls 24 against the rigid housing and remain folded while the higher pleats open extensively and this reduces the life of flexible wall especially at corners.

The tie belts 80 can be placed at intervals around the container, for example from 40 to 50 centimeters apart.

It will be noted from FIG. 6 that the tank is not exactly rectangular in plan but has its corners cut off. The corner may be molded in any other shape, round or exactly rectangular. The latter shape is specially employed if the corners of the tanks are to be built according to ISO Regulations.

It is envisaged that the pressure inside the tank when it is fully loaded should be about 2.5 lbs. per square inch. It is possible to test whether or not the tank has a leak in it and to check that the valves are properly closed by pressurizing the tank with air to a pressure of about 5 lbs. per square inch before it is filled with liquid; if the tank has a leak then the pressure inside the tank will gradually drop.

Although the container of FIGS. 1 to 6 is illustrated as forming part of a vehicle, it will be appreciated by those skilled in the art that it may readily be modified to provide a dismountable container, which can be carried by any appropriate form of land, sea or air transport and can be stacked.

FIG. 7 illustrates another form of container with a modified form of adjustable bracing member for securing the platform in its lower position or in positions intermediate its upper and lower positions. In this arrangement the upper end of the part 50 is provided with a threaded member 94 rotatably mounted in the top thereof. Member 94 has a T-shaped head piece 96 and integrally formed with it a nut portion 98. A nut 100 is also threaded on member 94. Portions 42 are provided with corresponding slots 102. With the jacks of the parts 54 in their unextended condition T-shaped pieces 96 are aligned with the slots 102 and inserted therethrough. With the aid of a spanner and the nut portion 98 each member 94 is then rotated so that the T-shaped head piece 96 lies across the slot 102 as illustrated in FIG. 7. While member 94 is held in this position by means of the nut portion 98 the nut 100 can then be tightened up to clamp upper part 50 firmly in place. A similar arrangement can be adopted at the bottom of the lower parts 54.

FIG. 8 shows a modified form of container having a number of locking members for locking its platform 26 in its upper position. These locking members 104 have T-shaped heads 106 and corresponding slots 108, 110 and 111 are provided in the parts 44 and 42 and the platform 26 respectively through which T-shaped piece 106 can be inserted. The upper end of member 104 is threaded and is provided with a nut 112 while the top end 114 of member 104 is shaped to receive a spanner. In use, when the platform 26 in its upper position, T-shaped piece 106 is inserted through slots 108 and 110 and member 104 is then rotated through 90° using a spanner and the shaped end 114 until the T-shaped piece 106 lies transverse to the slots 108 and 110. Nut 112 can then be tightened up to lock the platform 26 firmly in position. Sleeve 115 is aligned between slot 108 and 110 and welded in position for reinforcement purposes. It may be sufficient to provide four such members 104, one near each corner of the platform. The platform 26 may be locked in position with the members 104 either when the container is filled with liquid or when it is desired to gain access to the interior thereof.

FIGS. 9 to 11 show detailed views of another form of container in accordance with the invention.

A series of nuts 128 are welded around the periphery of the platform 26. In the container of FIGS. 9 to 11 the vertical members 14 of FIG. 1 are replaced by pairs of vertical channel members 130. At a height corresponding to some convenient position of the platform 26, for example corresponding to the position of the platform 26 when the container is empty, one-fourth, one-half or three-fourths full or completely full of liquid, bridging members 132 are provided spanning between a pair of members 130 (see FIG. 10).

Members 132 and panels 16 are pierced to allow insertion of bolts 136. When the holes in the panel 16 are not in use they can be plugged from outside with flat plugs to provide an even face with the inner surface of the panel 16 to avoid any inner unevenness.

A number of spring loaded pins (not shown) may be provided around the container at heights corresponding to the members 132, which pins click into corresponding recesses in the edge of the platform 26 somewhat after the manner of a spring loaded ball catch, to facilitate insertion of the bolts 136. The spring loaded pins do not prevent further upward or downward movement of the platform 26 but serve merely to assist in levelling the platform to facilitate insertion of the bolts 136.

When the bolts 136 are in position the platform 26 is locked in position. With this arrangement the bracing members illustrated in FIG. 3 can be dispensed with.

Alternatively the nuts 128 may be positioned so that they lie opposite a channel member 130. In this case, as shown in FIG. 11 a sleeve 138 may be welded inside the channel member 130 to facilitate insertion of the bolt 136.

FIG. 12 shows part of a container with an alternative form of sealing arrangement. A curved section member 150 is welded to a top plate 152 of the tank (forming the underside of platform 26) around its periphery. The free edge of the flexible side walls 24 is provided with an enlarged bead 154. An inflatable member 156 lies within the curved section member, 150 so that the flexible side wall 24 lies between it and the curved member 150. The inflatable member 156 is inflated sufficiently hard to press the part of the flexible side wall 24 within the curved section 150 against the walls of the curved section member 150 and so keep it in place. As before a rubber packing piece 158 is provided to prevent undue wear

by virtue of rubbing of platform **26** against the cladding panels **16**.

In the case of a container intended for carriage upon, or incorporation into, for example a railway truck, it may be more convenient to provide a door (corresponding to door **78** of the container of the drawings) in one of the longer side walls rather than in the narrower end wall or in addition to the door **78** in order to facilitate loading of the truck with solid materials.

Where a container is intended for carriage by air or for incorporation into an aircraft, the rigid parts should be made of a suitable light material such as duraluminium.

Instead of making the container with a substantially rectangular horizontal cross section it would be possible, and in some cases desirable, to make a container having a circular cross section with cylindrical outer walls and a circular platform.

For some applications it would be possible to construct a cargo container similar to the illustrated container but in which the "platform" and the "base" are arranged substantially vertically and the movement of the "platform" relative to the "base" is in a horizontal direction. In such an arrangement it would be one of the rigid outer walls that is reinforced so as to be capable of carrying a load and the "platform" (or rigid protective shield) need not be reinforced. For the avoidance of doubt it is hereby stated that it is intended that such constructions should fall within the scope of the invention.

Although the illustrated embodiments have been described with particular reference to the carriage of oil, it will be appreciated that any liquid may be carried provided that suitable materials are chosen for the expansible vessel. As examples of other liquids that may be stored or transported in a container in accordance with the invention, there may be mentioned petrol, milk, liquid fertilizer, liquid chemicals and water. With some modification to the base other commodities like cement, flour, and grain can be carried inside the container instead of liquid.

To comply with the ISO Regulations for freight containers, the container can be manufactured in international dimensions e.g. 8 ft. × 8 ft. × 20 ft. or 8 ft. × 8 ft. × 40 ft. and with slight modification in the top and bottom frame the standard corner pieces can be fixed to conform in outer shape and dimensions exactly to the internationally approved regulations for freight containers for ship, road, rail trucks and trailers.

The collapsible element i.e. platform **26**, base plate **22** and the flexible wall **24** fixed together can be put in an ordinary standard container with walls that are smooth on the inside to make it a double purpose container i.e. a solid/liquid carrier. Such an element can have a relatively lightly constructed base plate **22** as it will be bolted to the base plate of the container which is strong enough to stand pressure.

What is claimed is:

1. A cargo container comprising

a. a first rigid member,

b. a second rigid member, substantially coextensive with said first rigid member and movable towards and away from said first rigid member between an inner position relatively close to said first rigid member and an outer position relatively far from said first rigid member,

c. a flexible fluid impermeable sleeve having a plurality of preformed corrugations therein and extensible in concertina-like fashion,

d. sleeve securing means sealingly securing said ends of said sleeve peripherally to said first and second rigid members respectively whereby said sleeve and said rigid members together form an expansible fluidtight vessel, said sleeve securing means including

i. a peripheral flange on at least one said rigid member and defining a channel having a constricted opening, which channel is adapted to receive one end of said sleeve, and

ii. an inflatable member within said channel, whereby on inflation of said inflatable member said one end is sealed in fluidtight fashion peripherally to said rigid member,

e. continuous rigid outer walls fast with said first rigid member and adapted to guide said second rigid member in its movement between the said inner and outer positions, to support said sleeve against pressure within said vessel and to protect said sleeve against external damaging influences, and

f. spacer means mounted within said vessel and spaced from said rigid outer walls so as to provide between said first and second rigid members and between the said spacer means and said rigid outer walls in said inner position of said second rigid member a dead space to receive said sleeve.

2. A cargo container according to claim **1** and further comprising flexible means secured to said sleeve at points which are spaced along said sleeve in the direction in which it is extensible, which points are separated one from another by at least one said corrugation, whereby, as said vessel expands to an expanded condition upon movement of said second rigid member towards its outer position, the extension of said sleeve is controlled by said flexible means.

3. A cargo container according to claim **1** and further comprising air vent pipe means adapted to enable substantially all the air within the vessel to be expelled on filling it with liquid, said pipe means being flexible and arranged to stow behind said second rigid member, when the vessel is in its collapsed condition, so as not to be borne on by any spacing or load bearing member.

4. A cargo container according to claim **1** wherein said sleeve is made of oil-resisting rubber, wherein a door is provided in said rigid outer walls and wherein a man-hole is provided in said second rigid member to facilitate access to the interior of said vessel.

5. A cargo container according to claim **1** wherein a flange is provided on said rigid outer walls, said flange being adapted to cooperate with said second rigid member in its outer position to prevent further movement thereof away from said first rigid member and wherein a plurality of locating pins are provided to locate said second rigid member in its outer position.

6. A cargo container according to claim **1** wherein a flange is provided on said rigid outer walls, said flange being adapted to cooperate with said second rigid member in its outer position to prevent further movement thereof away from said first rigid member and wherein a plurality of adjustable bracing means are provided to brace said second rigid member in a position intermediate its inner and outer positions against said flange.

7. A cargo container according to claim **1** wherein a flange is provided on the said rigid outer walls, said flange being adapted to cooperate with said second rigid member in its outer position to prevent further movement thereof away from first said rigid member, wherein said second rigid member and said flange are each provided with a plurality of aligned apertures and wherein there are further provided a plurality of locking members lockingly engageable in said apertures to lock said second rigid member in its outer position to said flange.

8. A cargo container according to claim **1** wherein a flange is provided on said rigid outer walls, said flange being adapted to cooperate with said second rigid member in its outer position to prevent further movement thereof away from said first rigid member, wherein said second rigid member and flange are each provided with a plurality of of aligned apertures and wherein there are further provided a plurality of adjustable bracing means adapted to engage lockingly with said slots to lock said second rigid member in a position intermediate its inner and outer positions to said flange.

9. A cargo container according to claim **1** in which said rigid outer walls are pierced with a plurality of apertures disposed at locations corresponding to position of said second rigid

member intermediate its inner and outer positions and further comprising a plurality of bolts threadably engageable with said second rigid member to lock said second rigid member in said intermediate position.

10. A cargo container according to claim 1 wherein said first rigid member comprises the base of said container, wherein said second rigid member comprises a reinforced platform movable in a substantially vertical direction and wherein said rigid outer walls are dismountable from said container to permit of access to the outside of said expansible vessel.

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