Aug. 10, 1943. F. GETTELMAN 2,326,137

DOUBLE WALLED CONTAINER

Filed March 22, 1939 2 Sheets-Sheet 1

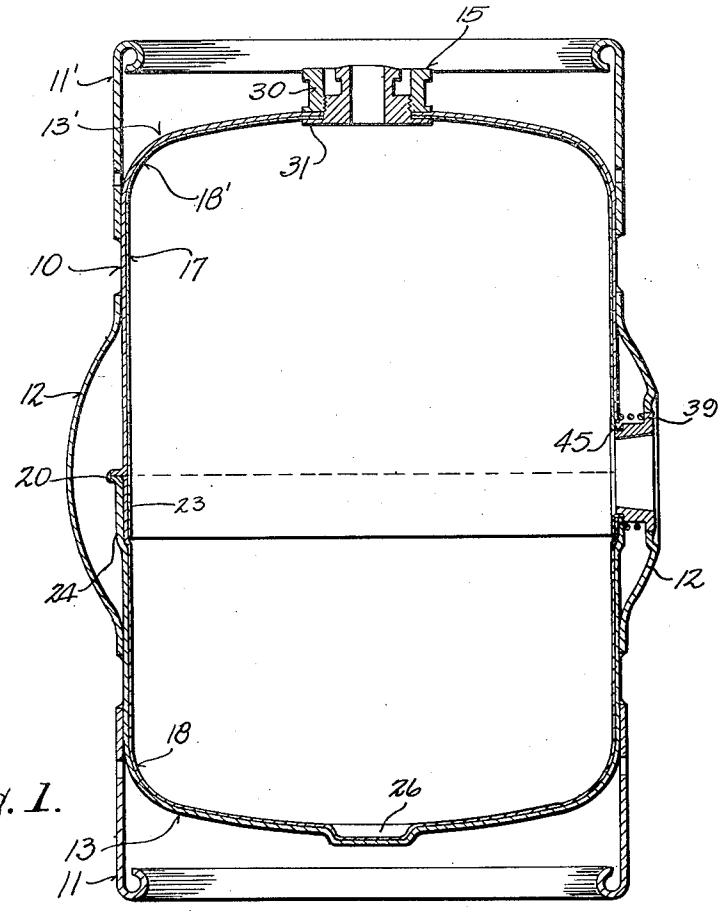


Fig. 1.

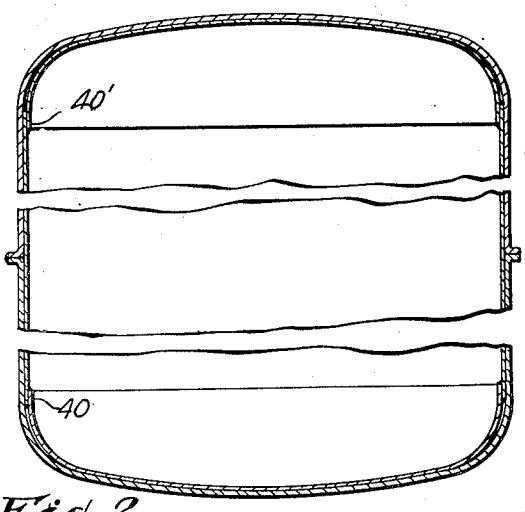


Fig. 2.

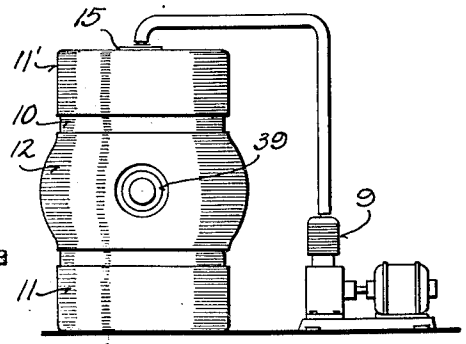


Fig. 3.

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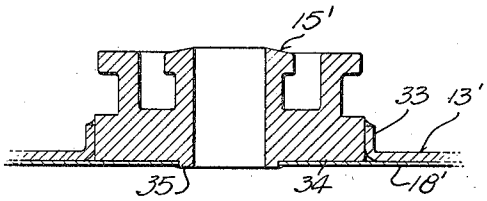


Fig. 4.

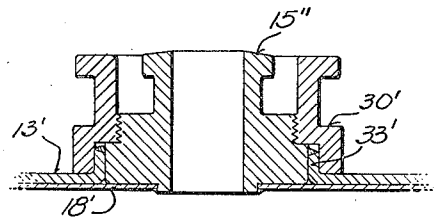


Fig. 5.

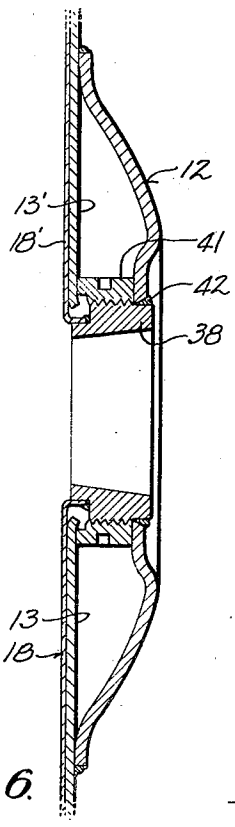


Fig. 6.

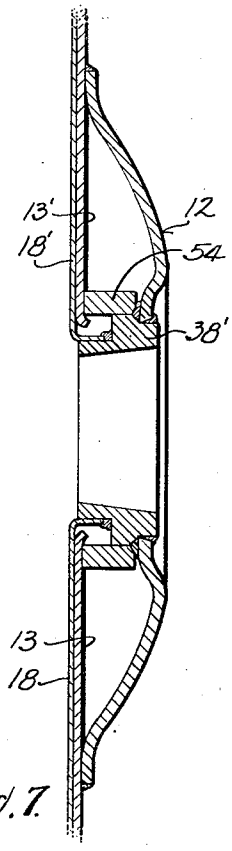


Fig. 7.

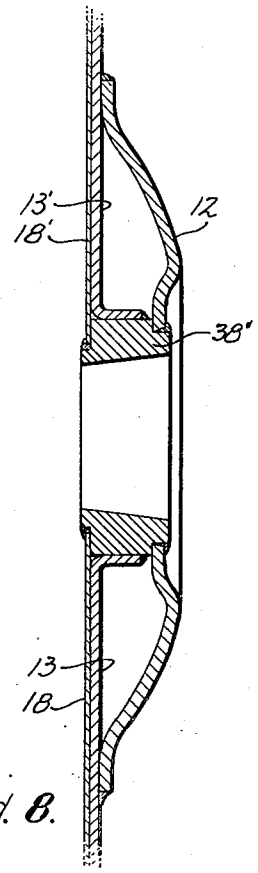


Fig. 8.

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UNITED STATES PATENT OFFICE

2,326,137

DOUBLE WALLED CONTAINER

Fredrick Gettelman, Milwaukee, Wis.

Application March 22, 1939, Serial No. 263,380

7 Claims. (Cl. 220—63)

My invention relates to improvements in double walled containers—particularly metal barrels and casks requiring a protective inner coating.

There have been objections to beer barrels made of iron or steel on the ground that such containers, if unlined, are attacked by the beer or other contents sufficiently to impart flavor to the contents. Various kinds of liner coatings have been attempted. Vitreous and plated linings afford adequate protection to the contents while unruptured, but are expensive to apply, require great care to completely coat all exposed portions of the container, and are apt to crack or chip under the hard treatment to which such containers are subject. To make the entire container of some non-corrodible material such as stainless steel would involve prohibitive expense, and no practical means for providing such containers with a non-adhesive protective liner, not subject to rupture by shock or deformation of the outer wall, has heretofore been devised. Accordingly, metal containers or barrels now in use are commonly coated with the conventional pitch or similar coatings as previously used on wooden barrels.

It is my object to provide a barrel or other container with a separate inexpensive inner wall of non-corrodible material, which will not be subject to rupture by reason of shocks applied to the outer wall, and which will be sufficiently flexible to conform to the inner surface of the container under pressure of the contents, and dependent upon the outer wall for support against such pressure.

My preferred lining is only slightly heavier than foil, being just sufficiently strong to maintain itself against collapse and still so flexible as to conform to every dent or deformation of the barrel without being secured in any manner to the interior surfaces of the barrel except at the bung and tap fittings, where the liner is sealed to the fitting in order to provide a continuous protective surface, capable of preventing the contents from contacting the outer wall or becoming interposed between the walls.

A further object of the invention is to provide a novel and improved means for connecting the bung and tap fittings to such a liner to preclude contact between the barrel contents and the outer wall.

Another object of the invention relates to the preferred method of constructing a barrel in accordance with this invention to assure a complete conformation of the liner to the barrel.

Other objects will be made apparent to those skilled in the art by the detailed disclosure of the invention which follows.

In the drawings:

Figure 1 is an axial cross sectional view of a metal barrel incorporating my invention.

Figure 2 is a fragmentary axial sectional view of a further embodiment of my invention showing an alternate lining construction.

Figure 3 is a view in elevation of the barrel showing the method whereby fluid pressure is applied to the interior container to force the inner lining against the outer shell to provide an intimate contact.

Figures 4 and 5 are fragmentary sectional views showing alternate tap fitting structures.

Figures 6, 7 and 8 are fragmentary sectional views showing alternate bung assembly structures.

Like parts are identified by the same reference characters throughout the several views.

By my improved method, I separately form the outer wall and the inner or liner wall of the container, each in connectible sections, and provide tap and bung openings in positions for registry of the openings in the liner with the openings in the outer wall when the parts are assembled. I form the liner wall of thin flexible material such as metallic alloy, copper, stainless steel, aluminum, flexible glass, or semi-plastic material, preferably of material capable of sustaining its own weight against deformation. For some purposes lead foil may be used. The material should be resistant to chemical combination with the materials which the container is designed to receive. Copper or tin, or a tinned surface, are preferred to other metals where the container is to be filled with beer, since conventional bung and top fittings are of tinned iron, and tests show a minimum of electrolytic action in beer when such metals are used.

The margins of the sections or members of the liner are preferably cemented, brazed or soldered, or welded together or formed to telescope, interlap, or otherwise engage in a manner to form a sealed joint when subjected to pressure. The liner point will ordinarily be brazed or welded if material is used which can be brazed or welded, and if the sections are to be assembled before applying the outer covering.

If the sections of the inner wall have a lapped or telescopic joint, one of the outer wall members may have a circumferential zone pressed outwardly or expanded to form an interior groove for registry with such joint. The outer wall members may also be provided with mar-

ginal outwardly or radially extending flanges to be welded, brazed or soldered together upon assembly, and the joints of the outer and inner wall members will preferably be relatively offset.

If the inner wall members are to be welded to each other to the tap and bung fitting, I provide one of the sections with all of the openings, and then apply an outer wall section thereto with its openings in registry with the openings in the inner wall section. Thereupon I insert the tap and bung fittings and weld, braze or otherwise secure them to the inner section in sealing relation thereto to completely close the openings in the inner section. Thereafter I assemble the other inner section with the one which carries the tap and bung fittings and weld, braze, solder, or otherwise fasten the joints. If material is used which cannot be welded, but which can be sealed by telescoping the sections, I apply pressure thereto. I may telescope the parts during assembly and subsequently apply internal pressure after enclosing them by applying the remaining outer wall section or sections. The latter are then secured together in any suitable manner. The outer wall will ordinarily be formed of material which can be welded.

If the sections of the inner wall are composed of material which can be sealed by applying pressure to the joint between the sections, it will then be possible to provide openings in both sections of the inner wall, and after assembling the fittings to the separate sections and the corresponding outer wall sections, the sections of the inner wall may be telescoped while the outer wall sections are being brought into contact with each other, and after securing the outer wall sections together, internal fluid pressure may be applied to seal the telescopic joint. This latter mode of procedure is principally available when the inner wall is composed of plastic or semi-plastic material, capable of fusion under pressure, and which solidifies with age or temperature reduction.

But whether the joints are welded or otherwise sealed, I apply internal pressure to force the lining member into conformity and pressure contact with the outer wall, after which the pressure applying fluid may be withdrawn, leaving the container ready for use, with an interior lining wall unconnected with the outer wall except by the fittings. The fittings serve to prevent relative shifting of one wall upon the other, and therefore the two walls maintain their intimate contact regardless of irregularities in the contacting surfaces, either at the time of manufacture or subsequently, in case the walls are more or less deformed by impacts. Material such as stainless steel, copper, and in fact, most metals and semi-plastic materials, may be stretched to some extent without rupture, and the outer wall should be of sufficient strength to resist any ordinary shocks tending to deform the wall to a sufficient extent to rupture the lining. The materials composing the inner wall should be sufficiently inelastic to prevent it from separating from the outer wall by a resilient reaction.

Referring to Figure 1, it will be seen that the receptacle portion of the barrel is comprised of an outer and relatively heavy load supporting shell 10 and a relatively very light inner shell lining 17. The outer shell may be comprised of drum sections 13 and 13', section 13 herein termed the bottom section and section 13' the top section. The margins of said sections are preferably provided with outwardly drawn annular flanges joined and welded at 20. Contained within the outer shell is an inner and relatively light shell or lining comprising drum sections 18 and 18', said sections fitting snugly against the inner wall of the outer shell and telescopically welded or otherwise sealed. The outer shell may be annularly expanded, as indicated at 24, to form a recess to receive the joint 23. An alternate construction of this inner shell is shown in Figure 2, with joints at 40 and 40'. The recess 26 is provided in the head of the bottom drum section to provide a sump to receive the tap rod. The head sections are preferably interiorly concave so that all portions of the barrel will drain toward any portion thereof that happens to be the lowermost.

Projecting beyond each head of the barrel at the ends thereof is a beaded chine 11 and 11'. Located centrally at the head of the top section is a threaded tap fitting 15, flanged at 31 to engage the surface of the liner. The tap fitting is provided with a nut 30 screwed on to the fitting in clamping engagement with the exterior of the barrel head. Alternate embodiments of my invention are disclosed in the tap fittings shown in Figures 4 and 5. Figure 4 shows a one-piece fitting 15' which is disposed within and welded to an outwardly projecting annular flange 33 of the barrel head exterior 13'. Inner lining 18' is secured to the bottom of the tap fitting 34 about annular shoulder 35.

If a girth band is employed to protect the bung fitting, as described in my copending application, Serial No. 689,592, filed September 15, 1933, for Metal barrels, and now matured into Patent No. 2,161,155, I apply the girth band after assembly of the wall members as above described, and spring it into place over the bung.

Figure 5 shows a threaded tap fitting 15'' disposed within annular flange 33' and held in clamping engagement therewith by means of nut 30'. The interior lining 18' is secured to the top fitting in the same manner as in Figure 4. The tap fitting will ordinarily be assembled and secured to the associated drum section before connecting the other drum section.

The bung fitting hereinafter described is welded to the girth band 12, and is in this manner strongly supported and protected against damage. As shown in Figure 1, the bung fitting has its inner end exteriorly reduced to receive the outturned flange 45 of the lining, to which the fitting is brazed, welded or otherwise sealed. A coiled compression spring is preferably interposed between outer flange 39 of the bung fitting and the exterior wall of the drum to serve as a shock absorber, whereby to prevent a rupture of the drum walls if the fitting is subjected to a violent blow.

Figures 6, 7 and 8 disclose further embodiments of girth band supported bung structures. These structures may be welded to the barrel before the girth band is applied. Figure 6 shows a two-piece bung structure, comprising an exteriorly threaded member 38 to which the inner barrel lining is sealed, as heretofore described with reference to Figure 1, and a nut 41 is screwed to member 38 in clamping engagement with the exterior of the barrel, after which girth band 12 is applied and welded to member 38, as indicated at 42.

The embodiment shown in Figure 7 differs from

the disclosure of Figure 6, in that the clamping collar 54 serves in place of nut 41, said collar being welded to member 38'.

Figure 8 shows a bung structure 38'', which is secured to the barrel in the same manner as is tap fitting 15', Figure 4, and welded to girth band 12 substantially as is element 38, Figure 7. In this structure the outer wall of the barrel has an outturned flange fitted to the bung member 38'', and preferably welded thereto. The girth band is then applied, as heretofore described.

After the barrel is completely assembled, an air-tight plug is securely fastened in the bung or tap opening and fluid pressure is introduced in the barrel through the other fitting, Figure 3. This may be accomplished by piping an air compressor or hydraulic pump 9 to said fitting and building up a relatively high fluid pressure in said barrel which will force outwardly the inner shell and close any gap existing between said inner shell and the outer shell 10, thus providing an intimate contact between the barrel walls throughout. While I do not consider it necessary that any adhesive material be applied between the inner and outer wall, it may be readily seen that when desirable such an adhesive material may be easily applied during the construction of the barrel.

I claim:

1. A barrel comprising an inner container having light, flexible copper walls incapable of supporting their form under load, an access fitting hermetically connected with one of said walls and provided with an opening with which said wall has an aperture in communication, and a supporting housing having rigid form-sustaining walls in intimate contact with said copper walls substantially throughout their extent and provided with an opening in immediate proximity to the copper wall through which said access fitting extends free of direct connection with said form sustaining walls, said fitting being provided with means independently connecting it mechanically with the walls of said housing elsewhere than in immediate proximity to the hermetic connection between said fitting and copper wall and providing for slight relative movement at the aforesaid opening in the form-sustaining wall.

2. A metal barrel comprising the combination with a heavy and substantially rigid outer metallic shell consisting of a plurality of sections having their respective margins butt welded together at a joint between said sections, a lining shell of highly flexible material and consisting of a plurality of sections in telescopically sleeved connection adjacent the joint of said outer shell sections, the sections comprising the lining shell being directly connected with each other independently of connection to the sections of the outer shell, and at least one access fitting penetrating the outer shell at least one of the outer shell sections contiguous to the said welded margins having its inner periphery larger than that of the other outer shell section to an amount substantially equal in the thickness of the lining to receive the outer telescopic portions of the lining shell, and in sealed connection with the lining shell, said lining shell being sufficiently flexible to be conformed under pressure with said outer shell and being wholly dependent thereon for support and form during use.

3. A double walled barrel, comprising the combination with a complete form sustaining outer wall and an annular girth band peripherally encircling said outer wall intermediate the ends of the barrel and convex in cross section whereby the center of said girth band is spaced from said outer wall about its middle point, said girth band and outer wall having registering apertures, an inner lining providing a complete inner wall for said barrel and having an aperture aligned with the apertures of the outer wall and the girth band, a bung fitting in sealed connection with said lining at the aperture therein and free of the registering opening with the outer wall for relative movement with respect thereto and a rigid connection between the outer end of said bung fitting and the girth band about the aperture of the girth band, and means providing supplemental support for said bung fitting from said outer wall at a point spaced from that portion of the outer wall through which said bung fitting projects into sealed connection with said lining.

4. The combination with an outer form-sustaining and pressure-resistant shell provided with an aperture, of a relatively light and flexible liner shell contained therein, a bung fitting extending through the aperture of the outer shell and yieldably movable inwardly with respect thereto, said bung fitting being in sealed connection with the inner shell, and a resilient means intervening between an outer portion of the bung fitting and the wall of the outer shell and adapted to accommodate and oppose inward displacement of the fitting with respect to the outer shell.

5. In a double walled container, the combination with a lining shell and an outer shell having registering openings of different diameters, the outer shell having the larger opening, of an access fitting having its inner end extending through the opening in the outer shell and free of direct connection therewith, said inner end of the access fitting being in sealed connection with the inner shell about the opening therein such connection being effected through the outer shell opening free of direct connection between the access fitting and the outer shell adjacent the connection to the inner shell and providing thereby for relative movement between the fitting and the outer shell, and means connecting the access fitting to the outer shell at a point other than the inner end of the access fitting, said means including a girth band extending peripherally about the container and apertured in registry with the apertures of the said shells, said girth band having its margins about its said aperture connected to the outer end of the access fitting, the sides of the girth band being positioned on the outer shell at a point remote from said fitting.

6. In a double walled container, the combination with a lining shell and an outer shell having registering openings of different diameters, the outer shell having the larger opening, of an access fitting having its inner end in sealed connection with the inner shell about the opening therein, such connection being effected through the opening in the outer shell and free of direct connection therewith, and means connecting the access fitting to the outer shell at a point other than the inner end of the access fitting, said means including a girth band extending peripherally about the container and apertured in registry with the apertures of the said shells, said girth band having its margins about its said aperture connected to the outer end of the access fitting, the sides of the girth band being positioned on the outer shell at a point remote from said fitting and said fitting being provided with a collar held by said girth band in pressure engagement with the outer shell.

7. A barrel comprising in combination an inner container having walls of thin flexible corrosion-resisting material requiring support under load, said inner container comprising two sections circumferentially joined telescopically, the marginal wall portions of one of said sections being sleeved into larger diametered marginal wall portions of the other of said sections to provide two wall plies at said joint; together with a complementary form-sustaining outer container having relatively rigid walls fitted closely to the walls of the first mentioned container substantially throughout their extent, said outer container comprising circumferentially joined sections having marginal portions in butt joint connection, the outer wall ply of the telescopic joint of the inner container sections being substantially butted against the margin of one of the outer container sections and fitted within the other outer container section, the latter being larger than the inner periphery of the marginal portions of the first section of the outer container by an amount substantially equal to the thickness of the outer wall ply of the joint between sections of the inner container, whereby to accommodate the said telescopic joint of the inner container while providing full support for the wall of such container.

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