DRUM FOR CONTAINING LIQUIDS

Fig. 4

Fig. 5

Fig. 6

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The present invention relates to a drum for containing liquids.

Generally, in accordance with this invention, there is provided a drum for containing liquids or semi-liquids, the body of the drum being lined with thin gage aluminum, thin-coated steel, stainless steel or the like. The drum is further provided with a sheet metal bottom and a removable cover. A poly disc is positioned between the cover and the upper end portion of the drum. In addition, the drum is provided with unusually wide top and bottom chimes to give additional strength. A compressible gasket is mounted between the cover and the upper edge portion of the drum over the aforesaid poly disc. Various novel features are incorporated in the structure and the device is such that the body portion of the drum may be formed of fiber board while the inner lining referred to prevents saturation or penetration of such body by the contained liquid. The exposed portions of the structure are provided with suitable coatings to prevent moisture from penetrating or rusting the component parts of the same.

It is, accordingly, an object of the invention to provide a novel drum structure for containing liquids and semi-liquids.

Another object of the invention is to provide, in a device of the character set forth, a novel metallic lining forming a part of the invention.

A further object of the invention is the provision of novel means for joining the edge portions of the liner material forming a part of the invention.

Still another object of the invention is the provision, in a device of the character set forth, of a novel gasket forming a part of the invention.

A still further object of the invention is the provision, in a device of the character set forth, of novel sealing means interposed between the bottom and sides of the drum forming the present invention.

Another object of the invention is the provision, in a device of the character set forth, of novel sealing means interposed between the upper portion thereof and a covering forming a part of the invention.

Other and further objects of the invention will become apparent from a reading of the following specification, taken in conjunction with the drawings, in which:

FIGURE 1 is an elevational view of an embodiment of the invention;

FIGURE 2 is an enlarged, exploded, fragmentary sectional view of the device illustrated in FIGURE 1;

FIGURE 3 is a further enlarged fragmentary sectional view, taken substantially along line 3—3 of FIGURE 2;

FIGURE 4 is an enlarged fragmentary vertical sectional view of the upper portion of a container, cover and gasket therefor, illustrating the same prior to forcing the cover into position upon the drum;

FIGURE 5 is a view similar to FIGURE 4 but illustrating the cover in locked position upon the drum and with a lock ring mounted thereover; and

FIGURE 6 is an enlarged fragmentary vertical sectional view illustrating the juncture between the bottom wall and side walls of the device of the invention;

Referring to the drawings, there is shown therein a container generally designated at 10 having side walls generally designated at 11, a bottom wall 12 and a removable cover 13.

Referring to FIGURE 2, it will be seen that side walls 11 are composed of a body 14 of a material such as fiberboard having an inner liner 15 formed of a single ply of thin gage aluminum, tin-coated steel, stainless steel or the like and having an outer coating of basic thermosetting acrylic emulsion indicated at 16.

In constructing side walls 11 of the drum, the liner 15 is first placed upon a mandrel in such a manner that the edge portions overlap for a distance of about one inch, as shown in FIGURE 3, the overlapped portion being joined by a heat and pressure sensitive adhesive 17, such adhesive preferably being a heat reactivated, nitrile rubber base, metal-to-metal sealing compound. When liner 15 has thus been assembled upon the mandrel, the fiber board plies are wound around the liner convolutoy until the desired thickness required for strength is obtained. The overlapped portion of the liner and its adhesive 17 is then subjected to heat and pressure to form a lip seal upon the liner at this joined surface. It is also contemplated that this joint, instead of being overlapped as described, may be in some cases welded or otherwise joined together in a liquid tight joint.

The upper end portion of container 10 is reinforced and shaped by a continuous upper chime 18 and the lower end portion of the container is provided with a lower chime 19, the chimes 18 and 19 being of greater than usual width to provide additional strength to the completed drum.

As shown in my co-pending application Serial No. 54,298, filed on September 6, 1960, now Patent No. 3,107,037, upper chime 18 is rolled inwardly and downwardly over the upper edge portion of cylinder walls 11 to form a bead 19' and at the same time to lock the upper edge portion of liner 15 to the fiber-board 14. Chime 18 is inwardly and upwardly crimped as indicated at 20 to produce the cover-engaging seat 21. The lower edge of chime 18 is pressed inwardly, as indicated at 22 (see FIGURE 2) both for anchoring the same to the outer surface of wall 11 and to produce a substantially flush surface therewith.

Referring to FIGURES 1, 2 and 6, it will be seen that bottom chime member 19 is employed to connect the body 12 to the bottom edge portion of the walls 11 and to reinforce the bottom member 13. Bottom 12 is provided with an inwardly and downwardly extending flange 23 terminating in a channel member 24, the lower leg of which is indicated at 25.

Chime 19 is crimped inwardly, as indicated at 26, and the upper edge of chime 19 is crimped inwardly, as indicated at 27, to anchor same to the wall structure 11.

The lower portion of chime 19 is provided with an inwardly extending wall 28 terminating in an upwardly and outwardly extending annular channel member 29, the upper leg 30 of which extends between wall 12 and flange portion 23 thereof. Annular convolutions 31 and 32 are formed in wall 28 and serve to further strengthen and rigidly the joint between wall structure 12 and wall structure 11 and the component parts thereof to thereby improve the effectiveness of the joint and the seal inherent therewith. Moreover, to more effectively provide additional bottom sealing, the inwardly extending wall 28 at the protruding portion bearing the marking "28" in FIGURE 6 of the drawing may be extended so as to carry the full weight of the loaded container.

As best shown in FIGURE 6, a sealing compound 33 having a nonhardening latex base is interposed between cover 12 and the lower portion of liner 16 and exposed lower portions of fiber-board 14. A like sealing compound (see FIGURE 4), indicated at 34, is placed between the inner face of liner 15 and that portion of bead 19 which encompasses the same.

Cover 13 is provided in its peripheral portion with a
downwardly opening channel 35 to encompass bead portion 19' of upper chime 18 and thence extends downwardly to the center portion of such cover 13, the downwardly extending portion having an annular convolution 36 (FIGURE 2) which provides two points of contact, indicated at 37 and 38, with seal 21. A poly disc 39 of flexible rubber or the like is laid over cover 13 in such manner as to encompass bead 19', the entire open upper end of the container and extends downwardly on the outer side thereof, all as indicated in FIGURE 4, prior to placing cover 13 in position upon the container 10.

An annular gasket 40 is affixed in channel 35 by an adhesive 41 and is provided on its underside with a series of radially spaced circumferentially extending annular ridges 42 and upon its upper side with a series of radially spaced, circumferentially extending annular grooves 43.

Cover 13 has integrally formed therewith in its peripheral portion a dependent flange 44 and a lock ring 45 which is adapted to encompass the peripheral portion of cover 13 and the upper portion of side wall 11 to lock the cover upon the container in conventional manner.

The exposed metal portions of the device, including long ring 45, cover 13, top and bottom chime members 18 and 19 and bottom 12 are all provided with a protective coating which is weather-resistant and preferably formed of a modified epoxy amino thermo-setting, such coating not being shown in the drawings.

It will thus be seen that there has been provided a container which is not only weather-resistant but which is adapted to contain liquids and semi-liquids such as, for example, asphalt or the like in a leakproof condition, it being apparent that the recited structure will afford sufficient strength for such purpose and that the inner lining of foil above described will prevent the contained liquid from penetrating the body of fiber board. It will also be seen that the poly disc 39 will, in itself, add to the effectiveness of the seal between cover 14 and the upper portion of the container. To further assure a liquid tight seal between the cover and the container, it will be apparent that gasket 40 would be compressed in the manner illustrated in FIGURE 5 and that when such compression takes place as indicated by the arrows in FIGURE 5, the ridges 42 will be compressed toward an arcuate shape while grooves 43 will be compressed to occupy less space, so that, when cover 13 is again removed from the container, the gasket will return to its normal condition and shape as indicated in FIGURE 4. In the compressed condition indicated in FIGURE 5, however, it will be apparent that there is provided a plurality of annularly extending pressure points to further insure against any possible leakage of the contained liquid from within the container 10.

While but one form of the invention has been shown and described herein, it will be readily apparent to those skilled in the art that many modifications may be made without departing from the spirit of the invention or the scope of the appended claim.

What is claimed is:

A drum for containing liquids comprising a cylindrical container having an annular open-ended side wall formed of multi-ply fiber-board, an inner liner of thin gauge aluminum and an outer coating of thermosetting acrylic emulsion, the edge portions of the liner being reverted and overlapped and secured by pressure sensitive adhesive and a heat seal, the upper and lower end portions of the container wall having continuous chimes thereabout, the upper chime being inwardly and downwardly rolled to form a bead and inwardly and upwardly crimped to produce an internal cover supporting seat, the lower edge of the upper chime being pressed inwardly and crimped to anchor the same in flush relation to the outer surface of the wall of the drum, a bottom member closing the open bottom of said container and including an inwardly and downwardly extending flange terminating in a channel member, the lower portion of the lower chime having an inwardly extending wall terminating in an upwardly and outwardly extending annular channel member the upper leg of which extends between the bottom member and the inwardly and downwardly extending flange thereof, said last mentioned inwardly extending wall having annular convolutions therein, a sealing compound interposed between the bottom member and the lower portion of the inner liner, an additional sealing compound between the inner face of the inner liner and the bead of the upper chime, a top cover member for closing the open top of the container and having a downwardly opening channel overlying the upper portion of the bead of the upper chime, the downwardly extending side wall of the last mentioned channel having an annular convolution thereabout, a disc of flexible rubber overlying the top of the container below the top cover and overlying the bead of the upper chime and extending downwardly about the side wall of the container, a compressible annular gasket in the downwardly extending channel of the top cover, said gasket having circumferentially extending annular ridges on its upper side and a series of circumferentially extending annular grooves on its under side, said gasket sealing on said bead of said upper chime and overlying said disc, a depending peripheral flange on the top cover overlying said upper chime, and a lock ring including an upper horizontal flange overlying the top of said downwardly extending groove of said top, a vertical portion surrounding said depending peripheral flange on said top cover, and a second horizontal flange extending inwardly into the exterior of the inwardly crimped portion of the upper chime.

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