Oct. 14, 1958 R. S. KNAPP 2,856,092

THERMAL INSULATED CONTAINER CONSTRUCTION

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Fig. 1

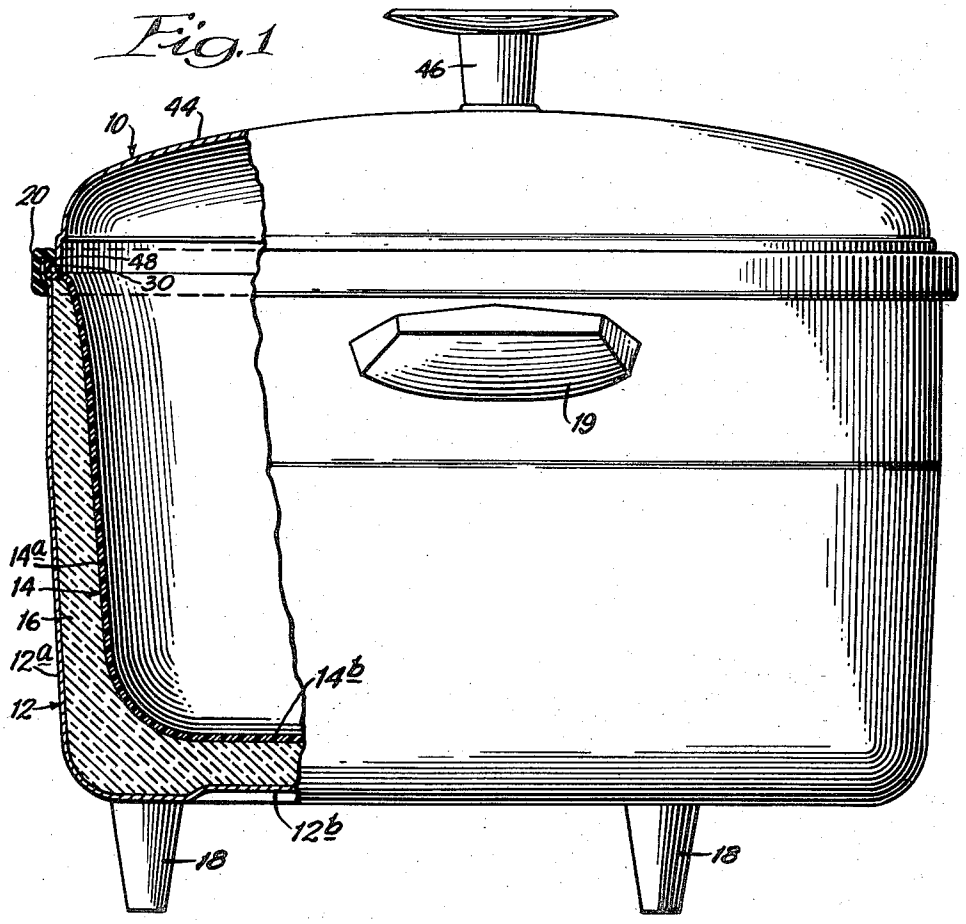


Fig. 3

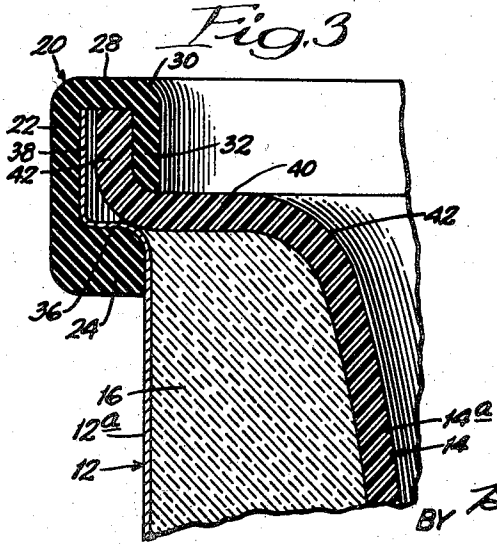
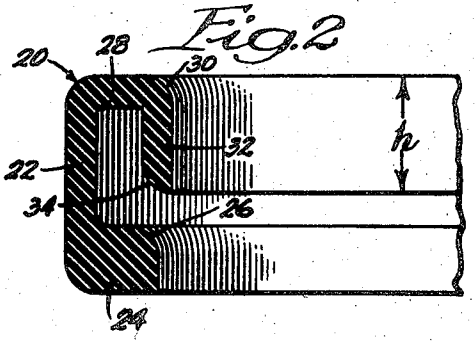


Fig. 2



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THERMAL INSULATED CONTAINER CONSTRUCTION

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5 Claims. (Cl. 220—10)

This invention relates generally to a container assembly, and more particularly to an insulated container construction and novel mounting seal for an inner liner within an outer shell.

In the design and construction of insulated containers, and particularly ice buckets and the like, it is necessary to dispose an inner liner in spaced relation within an outer shell, the volume therebetween being filled with a suitable heat transfer barrier. It has been found that a very efficient container may be constructed with very low cost materials comprising an inner liner of plastic and an outer shell of relatively thin gauge metal. Such materials, however, present a particular assembly problem in sealingly attaching the plastic liner to the metal shell. The present invention is directed to a solution of this problem in a novel manner permitting reliable yet low cost methods of assembly.

It is a primary object of this invention, therefore, to provide a thermal insulated container comprising a sheet metal outer shell and a plastic inner liner disposed within the shell and removably secured thereto in a water-tight sealing manner.

It is another object to provide a container structure of this type, wherein a particularly shaped annular gasket of resilient material is employed to secure the liner to the shell.

It is a further object of this invention to provide a thermal insulated container construction enabling a novel method of assembly which eliminates all need for heat or adhesive sealing, while enabling water-tight mounting of a plastic body in spaced relation within a metal shell in a removable manner.

With these and other objects in view, my invention consists in the construction, arrangement and combination of the various parts my thermal insulated container construction, whereby the objects contemplated are achieved as hereinafter more fully set forth, pointed out in my claims, and illustrated in the accompanying drawing wherein:

Figure 1 is a side elevational view, partly broken away and in vertical cross section, showing the details of internal construction and assembly in accordance with the features of the present invention;

Figure 2 is a vertical cross sectional view, on an enlarged scale, taken through a sealing rim gasket of the type employed in the practice of the present invention; and

Figure 3 is another vertical cross sectional view, similar to Figure 2, showing the sealing assembly of the inner liner and the outer shell by means of the rim gasket.

Referring now more particularly to Figure 1 of the drawing, I have indicated generally by the numeral **10** a thermal insulated container of a type intended for use as an ice bucket or the like and embodying the features and principles of the present invention. The container **10** comprises an outer shell **12** formed of drawn sheet metal, and having a generally cylindrical side wall **12***a* and a closed bottom wall **12***b*. An inner liner **14** formed

of plastic is disposed within the outer shell **12**, and provides a generally cylindrical side wall **14***a* and a closed bottom wall **14***b*. The inner liner **14** is formed as a unitary element by the "vacuum forming" process, wherein a sheet of thermo-plastic material is placed in a heated and softened state over a cavity having the shape of the final element, and a vacuum is drawn between the cavity walls and the plastic sheet to effect a forming of the liner in exact conformity with the mold intricacies. Thereafter cooling and trimming operations are performed to provide the element in its final shape. Such a process employing relatively inexpensive sheet plastic serves to provide an inner liner having the advantages of low thermal loss, while at the same time eliminating the use of any expensive molding dies or costly injection molding equipment. In addition, ornate designs for trademark wording or emblems may be readily formed on the liner bottom wall in a convenient and inexpensive manner.

As clearly seen in Figure 1 of the drawing, the liner side wall **14***a* is of substantially smaller diameter than the shell side wall **12***a* and of lesser height so as to dispose the liner and shell side walls and bottom walls in relatively spaced relation, thereby defining a confined volume therebetween. This volume is filled with a suitable heat barrier material or insulation **16** such as fibreglass or the like.

Legs **18** and side handles **19** are directly attached to the outer shell **12** by means of suitable screws or bolts, for supporting the assembly, and facilitating manual handling.

The assembly of the liner **14** within the shell **12** is a highly important feature of this invention. The attachment of these parts cannot be effected in a permanent and reliable manner by the use of adhesives or glue. The use of screws, bolts or rivets are also undesirable because of the leakage problems which they present. The different nature of the plastic and metal materials precludes the use of any heat sealing techniques. Still further, the fragile nature of the plastic liner **14**, and problems of heat expansion and contraction relative to the metal shell **12**, render it essential that some form of resilient interconnection be provided. I have found a solution to these problems and requirements through the novel use of a particularly formed annular gasket ring **20** adapted to cooperate with particular predetermined structural contours of the liner **14** and the shell **12**.

As best seen in Figure 2 of the drawing the gasket **20**, formed of resilient material such as rubber or the like, provides a particular cross sectional shape defining an outer side wall **22**, a bottom wall **24** having a rounded upper edge **26**, a top wall **28** having a rounded upper edge **30**, and an inner lip **32** having a rounded lower edge **34**. The height of the lip **32** is designated at *h*.

As best seen in Figure 3, the upper peripheral edges of both the inner liner **14** and the outer shell **12** are particularly formed to effect a nested engagement of the inner liner in relatively snug relation within the outer shell, while at the same time maintaining substantially deep spaced separation of the liner side wall **14***a* relative to the shell side wall **12***a*. For this purpose, the shell side wall **12***a* terminates in a stepped upper flange portion **36** having an upwardly projecting annular rim **38**. Similarly, the liner side wall **14***a* provides a stepped upper flange **40** terminating in an upwardly projecting annular rim **42** disposed concentrically within and closely adjacent to the shell rim **38**. A curved inner edge portion **42** intermediate the liner side wall **14***a* and the flange **40** serves to define a large central opening for the container **10**.

The gasket **20** is preferably formed by an extrusion process in relatively continuous straight lengths. Predetermined measures of such extruded gasket material may

then have its ends cemented or otherwise sealed together to form a unitary annular ring shape.

A cover or lid **42** having a hand knob **46** is adapted to be seated upon the liner and shell assembly in the manner of a sealing closure. For this purpose, the cover **44** terminates in a downwardly extending annular rim **48** having a dimension so as to snugly engage and sealingly cooperate with the gasket lip **32** when inserted within the liner **12** in rested position upon its flange **40** (see Figure 1).

The method of assembling the various parts of the structure disclosed above will now be described in detail. The metal outer shell first is provided with legs **18** and handles **19**, by suitable attachment means such as screws or bolts. The insulation material **16** is nested within the shell across its bottom **12***b* and upwardly about its side wall **12***a*, in the general configuration and in a quantity approximately equal to the full volume to be occupied between the shell and the liner. The plastic inner liner **14** is then lowered into a place upon the insulation material **16** so as to nest its stepped flange portion **40** in seated relation upon the shell flange portion **36**. The resilient rim gasket **20** is then placed over the shell and liner rims **38** and **42**, and forced downwardly so as to position the bottom wall portion **24** beneath the shell flange **36** in snug engagement thereagainst, and to position the inner lip **32** against the inner wall portion of the liner rim **42** in snug relation thereagainst. In this way, the inner lip **32** will serve as a resilient buffer between the cover rim **48** and the liner rim **42**, thereby effecting a tight seal therebetween and preventing marring of the cover or liner finish during repeated use of the container. The height *h* of the inner lip **32** is of a predetermined height so as to fully engage and confirm with the surface contour of the liner rim **42**, thereby insuring that no liquid leakage will be permitted to enter the space between the rims **38** and **42** and contaminate the insulation material **16** therebelow.

This assembly of parts serves to tightly secure the liner in fixed position within the shell in a water tight sealing manner. Such an assembly permits relative expansion between the parts due to temperature changes, and provides a neat and trim appearance both externally and internally. It will be apparent that the construction may be readily disassembled by forcefully withdrawing or "snapping-off" the annular rim gasket **20** and lifting out the liner **14** from the shell **12** and the overlying insulation material **16**.

Some changes may be made in the construction and arrangement of the parts of my Thermal Insulated Container Construction without departing from the real spirit and purpose of my invention, and it is my intention to cover by my claims any modified forms of structure or use of mechanical equivalents which may reasonably be included within their scope.

I claim as my invention:

1. A thermal insulated container comprising a sheet metal outer shell having an outwardly stepped upper rim having an upstanding terminal flange and defining a central opening, a plastic inner liner having an outwardly stepped upper rim having an upstanding terminal flange and defining a central opening, said liner being disposed within said shell and having its upper rim nested within and engaging said shell rim, and a preformed, integral resilient gasket of a shape to overlie and engage the upper reaches of said upstanding flanges on said shell and liner and to engage the inner side of the inner liner and engage the outer side of the outer shell and to engage the underside of said rim on the outer shell for securing said shell and liner rims together and operating to clamp said rims together and providing a water-tight seal.

2. A thermal insulated container comprising a sheet metal outer shell having an outwardly stepped upper rim defining a central opening, a plastic inner liner having an outwardly stepped upper rim defining a central opening, said liner being disposed within said shell and having its upper rim nested within and engaging said shell rim, resilient gasket means securing said shell and liner rims together and operating to clamp said rims together and providing a water-tight seal including an upright inner lip portion disposed inwardly of said liner rim, and a cover having an upright peripheral rim adapted to seat upon said liner rim and in sealing engagement with said gasket lip portion.

3. A thermal insulated container comprising a sheet metal outer shell having an outwardly stepped upper rim having an upstanding terminal flange and defining an annular central opening, a plastic inner liner having an outwardly stepped upper rim having an upstanding terminal flange and defining an annular central opening, said liner being disposed within said shell and having its upper rim nested within and engaging said shell rim, and an annular resilient gasket tightly overlying the upstanding terminal flanges on both said shell and liner rims to secure them together and operating to clamp said rims together and provide a water-tight seal therebetween.

4. A thermal insulated container comprising a sheet metal outer shell having side and bottom walls, said shell side wall terminating in an outwardly stepped upper rim having an upstanding flange and defining a central opening, a plastic inner liner having side and bottom walls, said liner side wall terminating in an outwardly stepped upper rim having an upstanding flange and defining a central opening, said liner being disposed within said shell and having its upper rim nested within and engaging said shell rim and having its side and bottom walls spaced from said shell side and bottom walls to define a fully enclosed insulating space therebetween, and a preformed, integral, annular, resilient gasket of a shape to overlie and engage the upper reaches of said upstanding flanges on said shell and liner and to engage the inner side of the inner liner and engage the outer side of the outer shell and to engage the underside of said rim on the outer shell for securing said shell and liner rims together and operating to clamp said rims together and providing a water-tight seal.

5. A thermal insulated container comprising a sheet metal outer shell having side and bottom walls, said shell side wall terminating in an outwardly stepped upper rim defining an annular central opening, a plastic inner liner having side and bottom walls, said liner side wall terminating in an outwardly stepped upper rim defining an annular central opening, said liner being disposed within said shell and having its upper rim nested within said shell rim and having its side and bottom walls spaced from said shell side and bottom walls to define a fully enclosed space therebetween, thermal insulating material filling said space, an annular resilient gasket tightly overlying said shell and liner rims to secure them together and provide a water-tight seal therebetween, said gasket having an annular inner lip portion disposed within said liner rim, and a cover having a peripheral annular rim adapted to seat upon said liner rim in sealing engagement with said gasket lip portion.

References Cited in the file of this patent

UNITED STATES PATENTS

2,545,733	Hatfield	Mar. 20, 1951
2,581,892	White	Jan. 8, 1952
2,690,853	Kircher	Oct. 5, 1954
2,771,754	Winkler	Nov. 27, 1956

FOREIGN PATENTS

538,795	Germany	Nov. 21, 1931