

Dec. 23, 1952

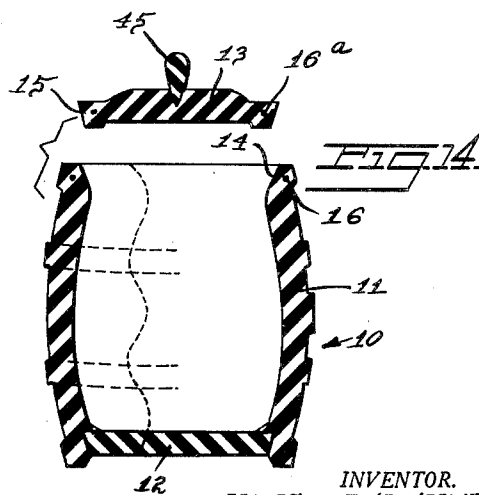
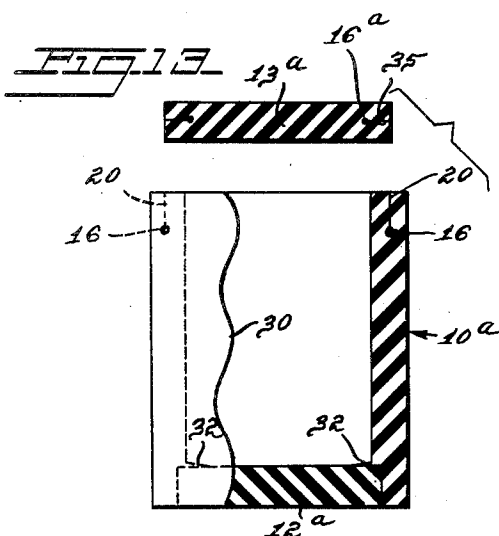
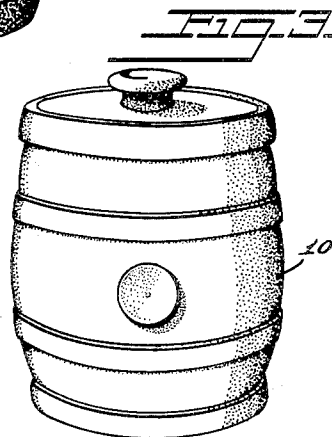
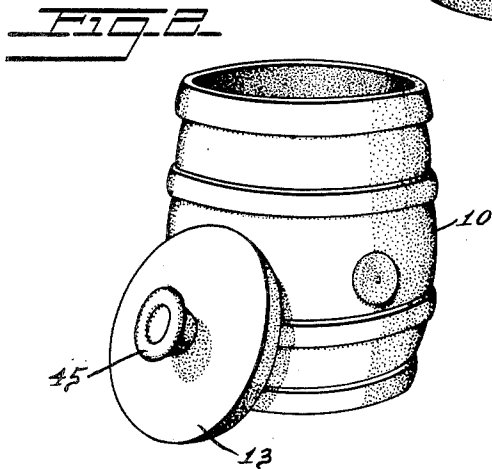
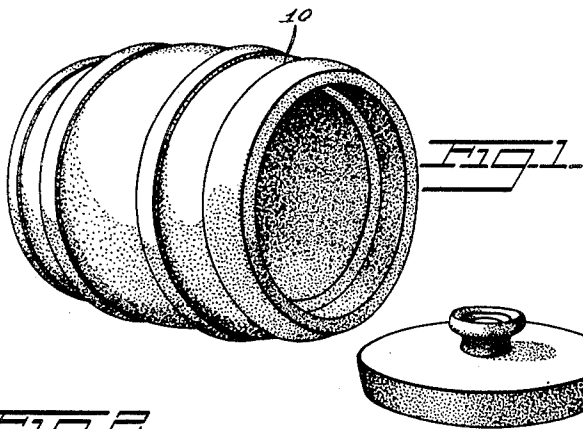
H. PFLEUMER

2,622,645

EXPANDED RUBBER CONTAINER AND METHOD OF MAKING SAME

Filed Feb. 25, 1949

2 SHEETS—SHEET 1



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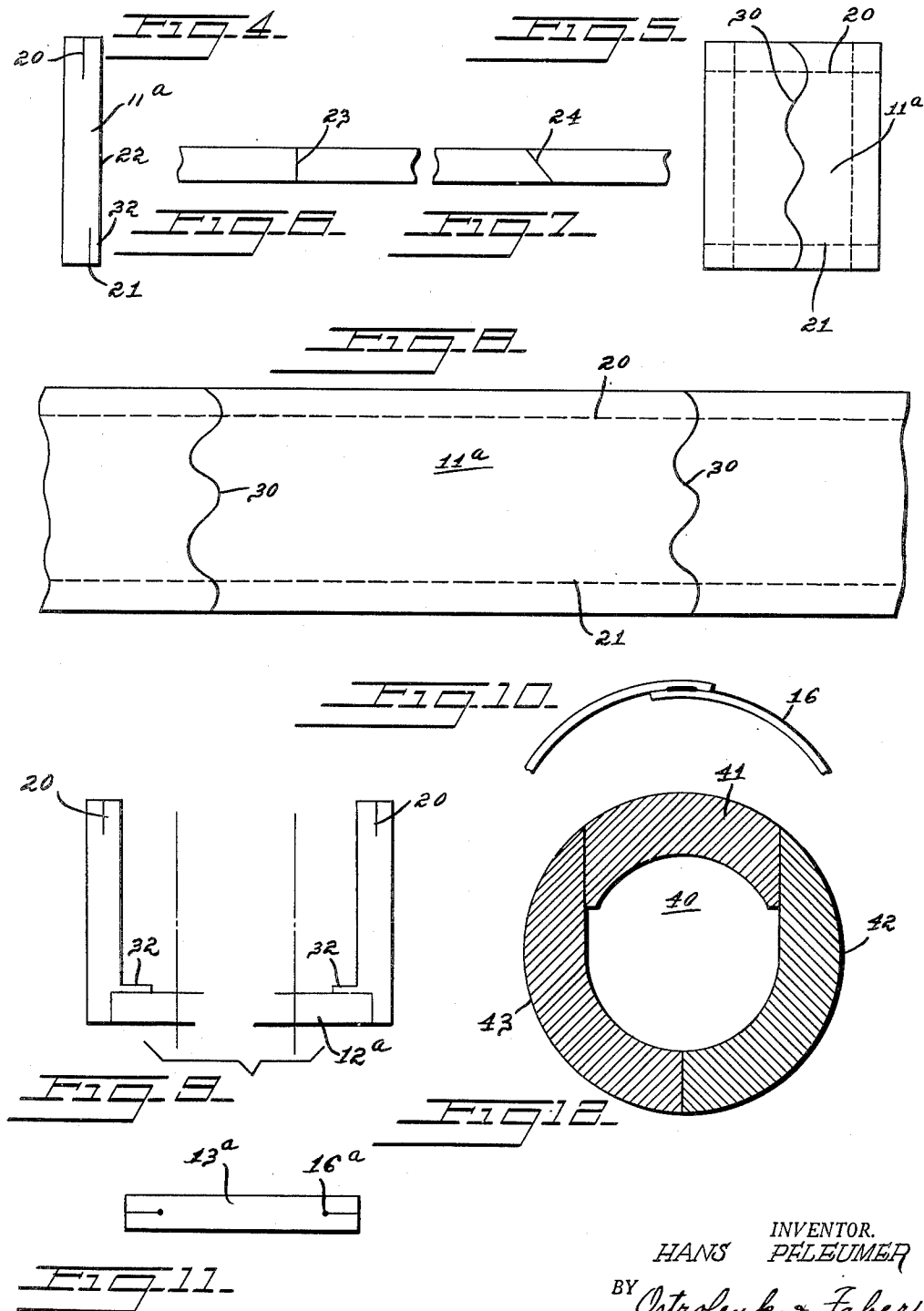
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2 SHEETS--SHEET 2



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UNITED STATES PATENT OFFICE

2,622,645

EXPANDED RUBBER CONTAINER AND
METHOD OF MAKING SAME

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4 Claims. (Cl. 150—2.1)

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My present invention relates to insulating containers of closed cell cellular material preferably of expanded rubber, rubber substitutes or plastics of the type wherein a multiplicity of minute non-communicating cells are formed.

Thus, my novel container is intended to be made by the processes generally described in Patents Re. 21,245, 2,299,593, and 2,268,621. Many attempts have been made to construct insulating containers intended to maintain the temperature differential between the interior and the exterior of the container for an extended period of time. These attempts have resulted for the most part in hollow wall vessels in which the hollow wall is either evacuated or filled with a material of low thermal conductivity.

An object of my invention is to make an insulating container with an apparently solid homogeneous wall which may be flexible but which may nevertheless utilize the full insulating value of the expanded cellular material of which the container is made.

A further object of my invention is the provision of a novel method for making the flexible insulating container.

Another object of my invention is the reinforcement of the open mouth and lid of a flexible cellular rubber barrel.

The foregoing and many other objects of the present invention will be apparent from the following detailed specification when taken in connection with the accompanying drawings in which

Figure 1 is a perspective view of my novel container and lid, the container lying on its side.

Figure 2 is a perspective view of my novel container and lid with the lid removed.

Figure 3 is a perspective view of my novel container with the lid in place.

Figure 4 is an end view of a sheet of rubber or other similar material prepared for use in connection with the process of forming my novel container.

Figure 5 shows a preferred method of making the vertical joint or seam between separate sheets to form my novel container.

Figures 6 and 7 show other methods of forming the vertical joint or seam.

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Figure 8 is a plan view of sheets of rubber trimmed in accordance with the views of Figures 4 and 5 and laid up to form a single sheet which will eventually form the barrel of my novel container.

Figure 9 is a schematic view showing the manner in which the vertical sheet is arranged in connection with the bottom wall of the container prior to formation thereof.

Figure 10 is a fragmentary view of the soldered end of a wire reinforcing loop to be used in connection with my novel container.

Figure 11 is a schematic view of the piece of rubber intended to form the lid of my novel container.

Figure 12 is a horizontal cross-section through the core of the mold in which my novel container is vulcanized.

Figure 13 is a cross-sectional view through the sheets which are to form the container as they are laid up and cemented prior to insertion in the mold.

Figure 14 is a vertical cross-sectional view through my novel completed container.

Referring first to Figures 1, 2, 3 and 14, my novel insulating container 10 comprises a substantially circular barrel-shaped vertical wall 11 secured to a base 12 and provided with a lid 13. The wall 11, the base 12, and the lid 13 are made preferably of closed cell cellular expanded flexible rubber material and have all of the insulating characteristics of such material.

The upper end of the interior of wall 11 is flared at 14 to receive the corresponding inwardly flared portion 15 of the lid. A wire loop 16 is embedded around the flared opening 14 of the barrel 10 in order to reinforce the same. A similar wire loop 16a is also embedded circumferentially in the lid 13 correspondingly to reinforce the same. Such reinforcing loops 16 and 16a are necessary to maintain a permanent dimension which will always ensure a tight closure of the flexible container.

In forming my novel container, the solid precured rubber sheets which are eventually to form the expanded cellular material are appropriately cut and trimmed and laid together to form the generally barrel-shaped structure shown in Figure 13. The vertical sheet 11a of Figure 4 is slit at 20 along its top edge sub-

stantially centrally thereof and at 21 along its lower edge adjacent the surface 22 which is to form the inner surface of the container.

Heretofore, when a tubular structure was to be formed, a vertical sheet was cut either straight through as at 23 of Figure 6 or diagonally as at 24 of Figure 7 where some additional surface was required. I prefer that the edges of the sheets 22 which are to meet in order to complete the barrel be cut along the matching irregular line 30 of Figures 5 and 8 so that additional cementing surface will be provided. This line may be sinusoidal, zig-zag or of any other irregular shape.

The sheet 11a or the plurality of sheets 11a which are to form a substantially cylindrical vertical wall of the barrel are thus laid up and cemented together along the irregular line 30 and thereby formed into the barrel shape 10a shown in Figure 13.

The inner annular flap 32 of Figure 13 formed by the slit 21 is bent up to form a ledge for the bottom wall piece 12a and the bottom wall piece 12a is cemented in place as shown in Figures 9 and 13. A soldered wire loop 16 is then pressed down in the annular slit 20 at the top edge and the slit is closed by cement.

In order to reinforce the cover 13, a piece of rubber 13a, Figures 11 and 13, which is to form the cover, is also annularly slit at 35 and a reinforcing wire loop 16a is placed in the slit and the remainder of the slit is closed by cement. The wire loop 16a is, of course, of smaller radius than the wire loop 16 of the barrel.

The complete barrel of Figure 13, which is formed of rubber that is already pre-cured and partially expanded to closed cell cellular rubber, is placed in a mold having an inner surface indented to correspond with the outer surface which the barrel of Figures 1, 2, 3 and 14 is to assume. In order to maintain a smooth inner surface, a three piece core 40, Figure 12, comprising the removable parts 41, 42 and 43 is placed on the inside of the formed barrel 10a when it is in the mold.

The rubber material of which the pre-cured barrel 10a is formed is in the pre-cure stage so that only a final cure and blow is needed to expand it fully against the mold wall to adopt the shape of the mold wall.

The rubber is heated in the mold to a temperature at which it is vulcanized to a final soft rubber consistency and flexibility. The sulphur at slit 20 migrates across the slit during the final vulcanization so that the loop 16 is sealed in.

The lid member 13a is similarly molded to form the lid 13 and an appropriate handle 45 is secured thereto in any suitable manner. Various pigments may, of course, be introduced into the rubber to produce a desired color in the rubber container.

After the rubber container is completed, it may otherwise be decorated as by flocking or in any other suitable manner to complete the ornamental appearance thereof.

If desired, a wire loop 16 may be similarly embedded adjacent the closed end of the container.

By this means, therefore, a simplified insulating container is formed having a homogeneous construction. The softness of the container wall is determined, as is well-known in the rubber art, by the relative quantity of sulphur which is included in the rubber mix. A relatively smaller quantity of sulphur in the rubber mix

will produce a soft final product and a relatively larger quantity up to 50% sulphur by weight will produce a hard cellular wall of rubber.

It is preferred in the present construction that the rubber wall be made as soft as possible consistent with proper vulcanization thereof so that the container will be resilient and will not chip or crack.

In the foregoing I have described my invention solely in connection with specific illustrative embodiments thereof. Since many variations and modifications of my invention will now be obvious to those skilled in the art, I prefer to be bound not by the specific disclosures herein contained but only by the appended claims.

I claim:

1. An open ended insulating container having a bottom wall, a flexible generally barrel-shaped self-supporting side wall, said walls being formed wholly of soft homogeneous expanded closed cell cellular rubber material, a stiff reinforcing member embedded in said side wall adjacent the open end thereof and extending around the circumference thereof to substantially prevent deformation of said open end, and an inwardly extending lip formed integrally with said side wall adjacent said bottom wall, said lip being vulcanized to the bottom wall to seal said open container at said bottom wall thereof.

2. An open ended insulating container having a bottom wall, a flexible curved self-supporting side wall, said walls being formed wholly of soft homogeneous expanded closed cell cellular rubber material, a lid adapted to fit snugly within said open end and being formed of the same material, the inner surface of said side wall adjacent said open end thereof and the mating surface of said lid having complementary flares, and means for substantially preventing deformation of said flared portions of said side wall and said lid, said last mentioned means comprising a stiff reinforcing member embedded in the flared portion of said lid and extending around the circumference thereof and a like member embedded in the flared portion of said side wall.

3. An open ended insulating container having a bottom wall, a flexible generally barrel-shaped self-supporting side wall, said walls being formed wholly of soft homogeneous expanded closed cell cellular rubber material, a lid adapted to fit snugly within said open end and being formed of the same material, the inner surface of said side wall adjacent said open end thereof and the mating surface of said lid having complementary flares, means for substantially preventing deformation of said flared portions of said side wall and said lid comprising a stiff reinforcing member embedded in the flared portion of said lid and extending around the circumference thereof and a like member embedded in the flared portion of said side wall, and an inwardly extending lip formed integrally with said side wall adjacent said bottom wall, said lip being vulcanized to said bottom wall to seal said container at said bottom wall thereof.

4. The method of making an insulating container having a bottom wall and a generally barrel-shaped side wall of soft homogeneous expanded closed cell cellular rubber material comprising the steps of cutting a slit in a first edge of an expandable thermally workable sheet which is to form the side wall, connecting the ends of the sheet normal to said first edge, said connecting ends having matching irregular con-

figurations, bending up from the slit of said first edge a flap directed inwardly of the container, inserting another sheet against said flap to form said bottom wall normal to said first sheet; cutting a second slit in the first sheet at the edge opposite the first edge, said second slit extending around the circumference of said first sheet, inserting a generally circular reinforcing member in said second slit; placing the composite unit in a mold and applying heat thereto to unite and vulcanize the composite unit into a unitary self-supporting structure.

HANS PFLEUMER.

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