J. J. MENDENHALL.

HEAT INSULATING CONTAINER.

APPLICATION FILED APR. 3, 1917.

1,269,197.

Patented June 11, 1918.

3 SHEETS—SHEET 1.

Fig. 1.

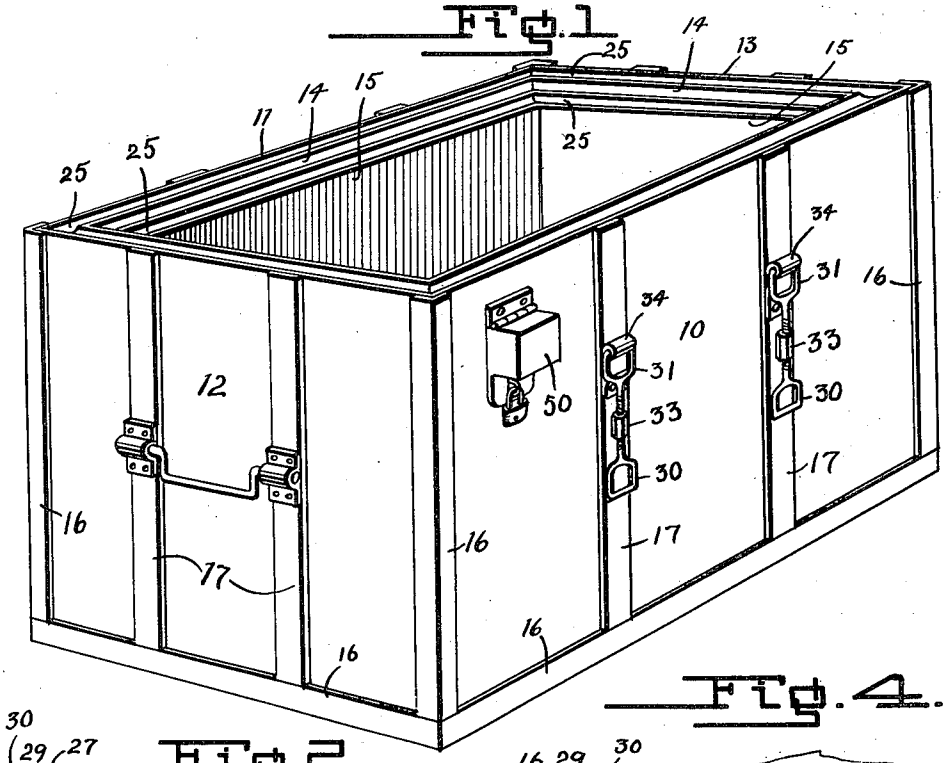


Fig. 4.

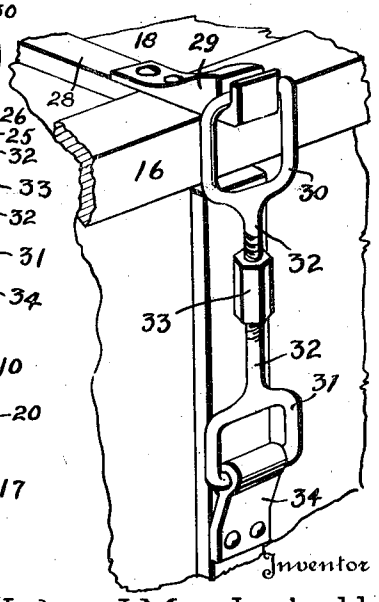
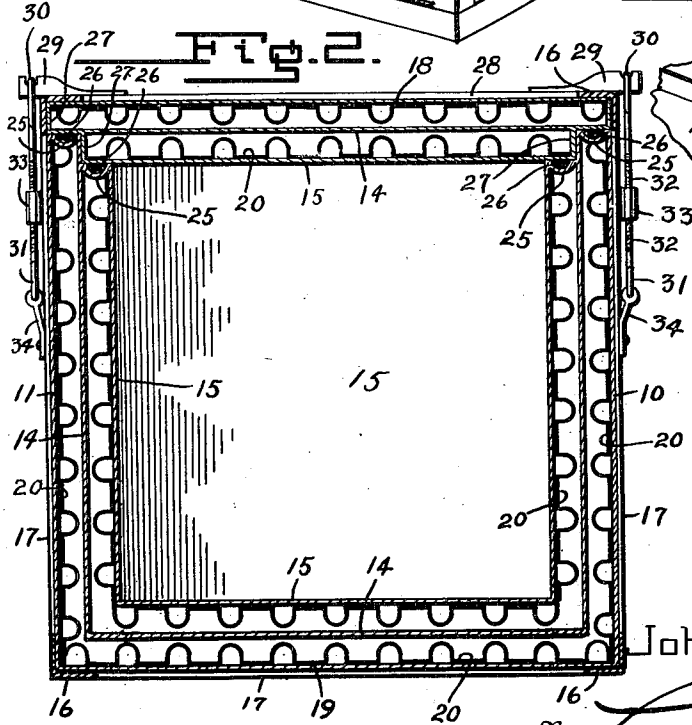


Fig. 2.



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Fig. 3.

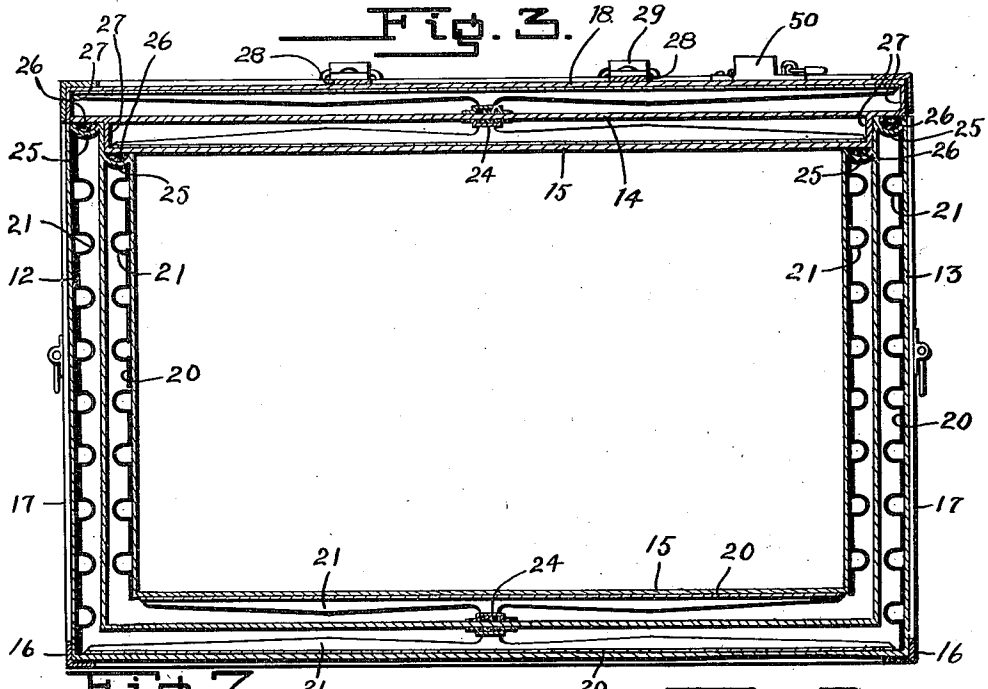


Fig. 7.

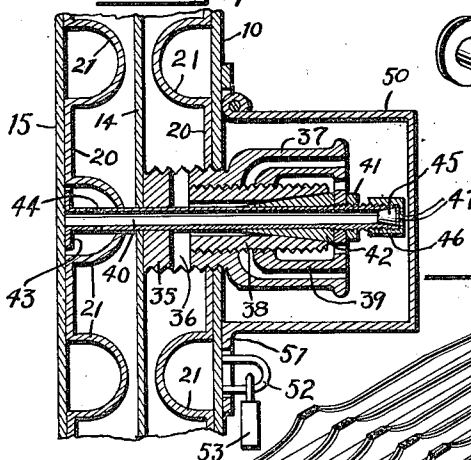


Fig. 6.

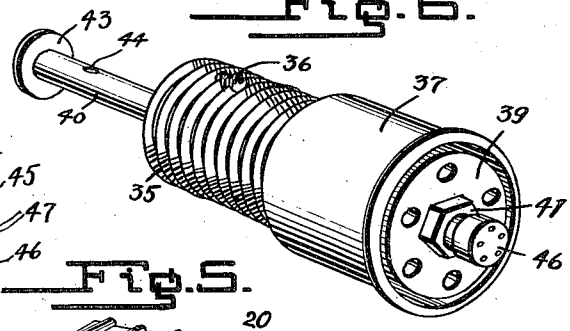
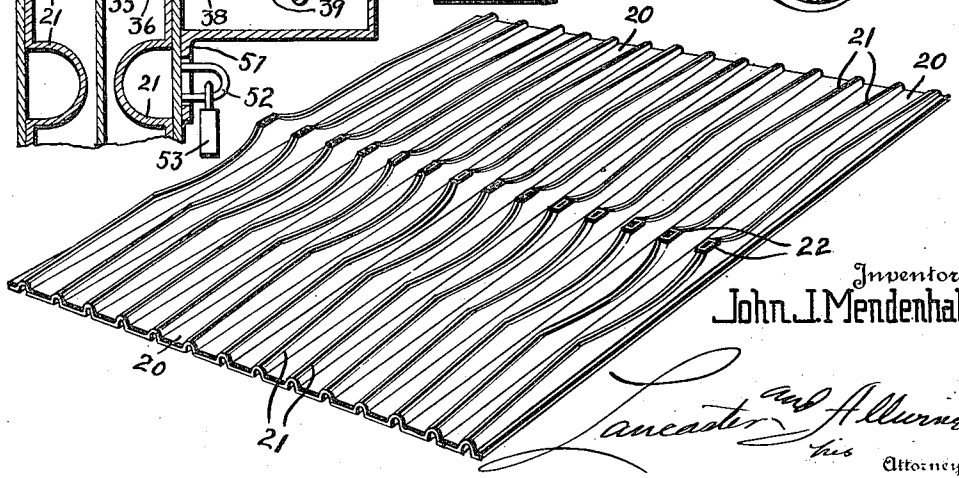


Fig. 5.



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3 SHEETS—SHEET 3.

Fig. 8.

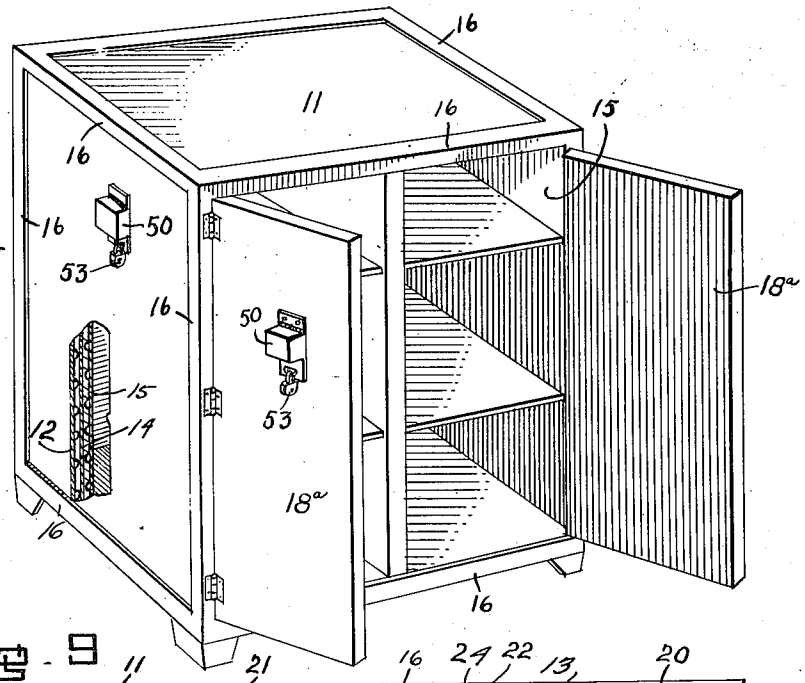


Fig. 9

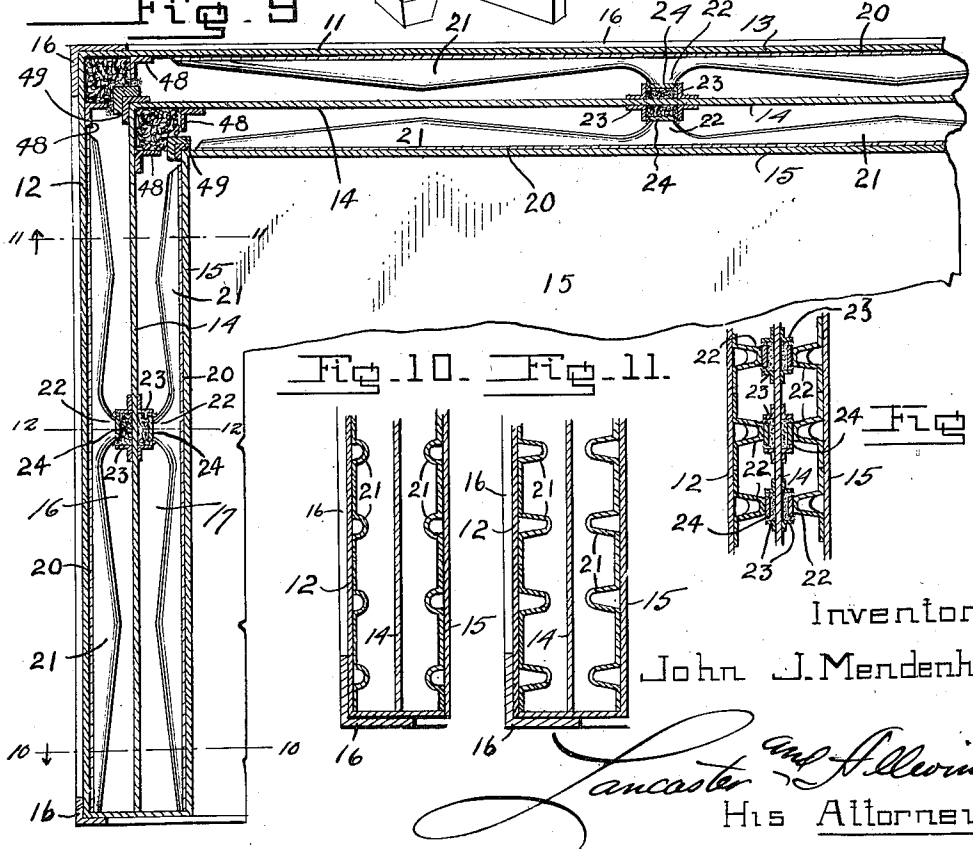


Fig. 10.

Fig. 11.

Fig. 12

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HEAT-INSULATING CONTAINER.

1,269,197. Specification of Letters Patent. Patented June 11, 1918.

Application filed April 3, 1917. Serial No. 159,459.

To all whom it may concern:

Be it known that I, JOHN J. MENDENHALL, a citizen of the United States, and a resident of Raiford, in the county of Bradford and State of Florida, have invented a certain new and useful Improvement in Heat-Insulating Containers, of which the following is a specification.

The present invention relates to containers, and more particularly to that type adapted to prevent heat exchange through the walls thereof.

An object is to provide a container of this character which is so constructed that it may be adapted to packing boxes for carrying fruit, vegetables and the like to protect the same against deterioration as the result of subjection to heat during transit, and which may be embodied in a refrigerator, or in larger or smaller structures.

The invention aims at the provision of a container having hollow walls, and a novel heat-insulating bracing structure for supporting the walls against collapsing, and a novel valve device through which the air between the walls may be exhausted and which is adapted to maintain the desired seal of the space between the walls.

The above, and various other objects and advantages of this invention will be in part described, and in part understood, from the following detailed description of the present preferred embodiment, the same being illustrated in the accompanying drawings wherein:

Figure 1 is a perspective view of a container constructed according to the present invention, the cover being removed.

Fig. 2 is an enlarged transverse section taken substantially centrally through the container.

Fig. 3 is a longitudinal vertical section through the container.

Fig. 4 is a fragmentary perspective view, enlarged, of the container with the cover thereon, disclosing one of the cover-securing devices.

Fig. 5 is a detail perspective view of one of the reinforcing plates used in the construction of the walls.

Fig. 6 is a detail perspective view, enlarged, of the exhausting and seal-maintaining valve.

Fig. 7 is a transverse section, enlarged, through a portion of the wall of the container, showing in longitudinal section the said exhausting valve applied thereto.

Fig. 8 is a perspective view of a modified form of the container, the same being embodied in a refrigerator construction, and showing parts broken away.

Fig. 9 is a horizontal section taken through one corner of the container, enlarged, showing the vertical corner braces.

Fig. 10 is a detail transverse section through the wall on the line 10—10 of Fig. 9.

Fig. 11 is a similar view taken on the line 11—11 of Fig. 9.

Fig. 12 is a fragmentary transverse section taken on the line 12—12 of Fig. 9, showing the connecting means for the opposed strut members.

Referring to these drawings, wherein like parts are designated by similar characters of reference throughout the several views, and referring first to the form disclosed in Figs. 1 to 7, inclusive, the container is disclosed in the form of a substantially rectangular box or receptacle provided with the side walls 10 and 11, and the opposite end walls 12 and 13. These walls 10, 11, 12 and 13 are the exterior walls of the container, and the same are preferably constructed from sheet metal. Each of these walls is provided with an intermediate section or sheet 14 which is spaced inwardly from the adjacent walls, and a second section or sheet 15 which comprises the inner section, and which is spaced inwardly from the intermediate section 14.

The meeting edges of the walls 10, 11, 12 and 13 are reinforced by the provision of angle strips 16 which protect and reinforce the exterior angle portions of the container. If desired, additional bracing strips 17 may be placed at suitably spaced-apart intervals against the exterior surfaces of the side and end walls for bracing the same and reinforcing the container. The container is provided with a cover or removable wall 18 which is of substantially the same construction as that of the side and end walls above

described, the cover 18 being provided with the intermediate and inner sections 14 and 15 suitably spaced apart. It will also be noted, from Figs. 2 and 3 of the drawings, that the container is provided with a bottom wall 19 of similar construction, the same being provided with the intermediate and inner wall sections 14 and 15. These intermediate and inner sections 14 and 15 are arranged concentrically within the outer shell or frame of the container, and provide substantially annular inner and outer chambers at the opposite sides of the intermediate sections 14 throughout all of the walls of the container. The inner walls 14 form supports for spacing devices hereinafter set forth.

The inner and outer sections of the wall are held against collapsing, and are suitably reinforced against crushing under impact, by the provision of reinforcing plates 20. The reinforcing plates 20 are preferably formed from sheet metal which is corrugated to provide a plurality of closely spaced-apart ribs 21 arranged in parallelism with each other, the ribs 21 being pressed upwardly from one side of the plates 20, and the latter being adapted to be secured in any suitable manner against the inner opposite faces of the outer and inner wall sections. As shown in Figs. 5 and 9 of the drawings, the ribs 21 are of double truss form, the same being pressed outwardly intermediate their ends to provide abutments or rests 22 adapted to extend toward the intermediate section 14, the ribs being raised or bulged intermediately of each end portion, as shown in Fig. 11, to reinforce the bracing plate 20 against bending or buckling. The intermediate section or partition 14 is provided at opposite sides with and supports longitudinally extending rows of packing boxes being of greater cross-sectional area than that of the projections or rests 22. The boxes 23 are filled with asbestos, felt or other suitable heat-insulating material, which latter is held in place by bearing plates 24 of less cross-sectional area than that of the boxes 23 and adapted to freely slide within the same. The heat-insulating packing in the boxes 23 is adapted to expand about the edges of the plates 24 and thus insulate the same from the body of the boxes 23. The projections or rests 22 of the ribs 21 are adapted to bear against the plate 24 and press the same into the boxes 23, the heat-insulating packing forming a connection or intermediate brace member between the partition 14 and the double strut members, and holding the same in properly spaced apart relation. From Fig. 9 it will be noted that the boxes 23, and the rests 22 are arranged directly opposite each other so as to counteract pressure against the opposite sides of the partition 14. The partition 14, and the boxes 23, therefore provide a substantially direct connection between the opposed bracing plates to hold the inner and outer sections of the walls from collapsing. This construction is carried out in the formation of the sides, ends, bottom and top walls of the container, to form a substantial, rigid structure capable of withstanding rough usage, and which will not collapse or buckle when subjected to internal pressure.

At the open side or top of the container, such as shown particularly in Figs. 2 and 3, the intermediate and inner sections or sheets 14 and 15 are consecutively reduced in inwardly stepped relation, as shown, and have their upper edge portions joined and interbraced by the provision of transversely concaved flange strips 25 adapted to retain packing strips 26 of rubber, or the like against which the inwardly stepped ends of the removable side or cover 18 are adapted to seat. The packing strips 26 are of rubber, asbestos, or the like for the purpose of providing not only a suitable seal between the jointed parts or ends of the walls, but also for the purpose of preventing heat exchange through the joints. The removable wall, such as 18, has its intermediate and inner sections 14 and 15 interbraced at their opposite stepped ends by the provision of shoulder strip 27 adapted to fit against the shoulders formed upon the stepped ends of the adjacent walls.

One means of securing and holding the cover or removable wall 18 to the body part of the container is disclosed in Figs. 1 to 4, inclusive, wherein the wall 18 is provided exteriorly with a plurality of transversely extending straps or bars 28 adapted to reinforce the wall 18, and which are adapted to register with the vertically extending strips 17 arranged upon the side walls 10 and 11. One or more of the straps 28 is provided upon its opposite ends with outstanding lugs or ears 29 having transverse slots in their outer faces and adapted to receive therein the loops 30 or clamping devices which are carried upon the registering vertically extending bars 17. These fastening devices are formed of the outer loops 30, and the inner loops 31, the same having threaded shanks 32 which extend in alinement toward each other and which are connected by an internally threaded sleeve or nut 33, the structure constituting a turn buckle for contracting the fastener. The inner loops 31 of the fasteners are hingedly connected by straps 34 to the vertically extending bars 17 in suitably spaced relation from the upper ends of the bars. The fastening devices are adapted to draw the lugs 29 downwardly and thus bind the removable wall or cover 18 against the open side of the container.

The exhausting and sealing valve device is illustrated in detail in Figs. 6 and 7, and

comprises a plug 35 which is threaded through one of the exterior wall sections, such as section 10, through the adjacent bracing plate 20 secured thereto, and which abuts against the adjacent portion of the intermediate section 14. This plug 35 is provided near its inner end with a transversely extending opening 36 which communicates with the outer compartment of the wall. The plug 35 is also provided with a relatively large itnernally threaded axial opening extending from the transverse slot 36 outwardly, the plug 35 terminating in an enlarged substantially bell-shaped mouth 37. A tube 38, externally threaded throughout its entire length, is threaded at one end into the axial opening in the plug 35 and is turned up therein to lie flush with the inner wall of the transverse passage 36. The axial opening in the tube 38 communicates with the transverse opening 36, and the inner wall of the tube 38 flares at its outer end to provide an interior taper formation to the tube 38. A hollow binding nut 39 having internally threaded end openings of different diameters, is adjustably mounted at one end upon the tube 38, and has screw-threaded engagement at its opposite end with a pipe 40 which extends axially through the tube 38 and outwardly from the same. The pipe 40 is externally threaded at that portion extending beyond the tube 38, and a jam nut 41 is threaded on the tube 38 for engagement against the binding nut 39. A conical plug or check valve 42 is fitted in the outer flaring end of the tube 38 and is provided with an axial opening adapted to receive the pipe 40 therethrough. The binding nut 39 is adapted to engage at its reduced end against the outer extremity of the plug 42 for limiting the outward movement of the same, and for holding the plug 42 in binding engagement in the tube 38 when it is desired to secure the valve closed. The tube 40 extends axially through the plug 35 and through the transverse opening 36, but has no communication therewith. The tube 40 is of less external diameter than the internal diameter of the tube 38, so that an annular passage in the tube 38 is formed about the pipe 40. The pipe 40 projects through the adjacent portion of the intermediate section 14 of the wall, and has upon its inner extremity a foot flange 43 adapted to bear against the inner section 15 of the wall. From Fig. 7 it will be noted that where the tube 40 registers with the ribs 21 of the bracing plates 20, the latter are either entirely interrupted, or are apertured sufficiently to receive the tube 40 and the plug 35 therethrough. The pipe 40 is provided near its inner free end with one or more lateral openings 44 communicating with the inner chamber or compartment in the wall.

The outer end of the tube 40 is formed with an outwardly flaring axial opening into which is fitted a tapering plug 45 held within the tube 40 by means of a cap 46 having perforations in its outer portions, and which is suitably spaced from the plug 45 by projections 47 preferably formed upon the outer end of the plug 45. When the cap 46 is unscrewed to a slight extent upon the end of the pipe 40, the plug 45 is permitted to move sufficiently out of the axial opening in the pipe 40 to admit the passage of air about the plug 45, the projections 47 holding the outer end of the plug from engagement with the cap to seal the perforations therethrough. A relatively small annular space is formed between the bell-shaped mouth 37 of the plug 35 and the binding nut 39, the space being adapted to receive a hose or pipe of an exhauster which may be used for withdrawing air from the walls of the container.

The angled portions of the walls may be interbraced, as shown in Fig. 9, wherein is shown the angle construction between the exterior wall sections 11 and 12, and the adjacent intermediate and inner sections. A quantity of heat-insulating material is compressed into the angle between the sections 11 and 12, and held in such relation by the provision of angle strips 48, which form, together with the adjacent edge portions of the sections 11 and 12, a substantially rectangular packing box construction open at its inner edge or corner. The adjacent edge portions of the intermediate sections 14 are reinforced by preferably a pair of superposed angle strips 49, the outer angle strip of which is adapted to engage in the open corner or sides of the above-described packing box. The angle strips 49 are therefore nested against the quantity of heat-insulating material which is retained in the angle of the outer wall sections, thus bracing the inner wall sections in suitably spaced relation from the outer wall sections. Fig. 9 also discloses the same form of packing brace or joints between the inner sections 15 and the intermediate sections 14, wherein there is a heat-insulating connection between the outer, inner and intermediate sections, and a substantial brace or support between the sections is provided.

In the construction of the container it is preferable that the side, end, and bottom walls all intercommunicate so that but one exhausting valve, as above described, may be employed. The valve is located in any suitable side or end of the container which is substantially out of the way, and the outer projecting portions thereof are protected and sealed against unauthorized opening or adjustment by means of a hinged cap or cover 50 mounted on the adjacent exterior wall section, such as 10, at one side, and

provided with an apertured hasp portion 51 receiving a staple 52 therethrough which projects from the wall 10, and which is adapted to receive a padlock 53 or the like therethrough.

In the form disclosed in Fig. 8, the container is in the form of refrigerator which is provided with a pair of hinged closure walls or doors 18ª, which are of the construction disclosed in Figs. 2 and 3, and which are each provided with an exhausting valve and a suitable protecting cap 50 therefor.

In the practical use of the container, it is only necessary to exhaust air from the inner and outer chambers of the walls by connecting an exhauster to the valve device, the exhauster being provided with an enlarged pipe adapted to fit in the annular passage within the bell 37, for exhausting the outer chamber of the wall through the transverse passage 36 and plug 35, and may be provided with an independent small detachable pipe section adapted to fit over the cap 46 to exhaust the pipe 40 and the inner chamber of the walls when the cap is partly open. It is of course understood that the application of a large pipe to the bell 37, may be made for exhausting both of the inner and outer wall chambers simultaneously, the adjusting nut 39, and the cap 46 being prior opened. The exhausting of the air from the chambers causes the check valves 42 and 45 to automatically seat and seal the chambers when the pressure of the pump is released.

It is of course understood that various changes and modifications may be made in the details of construction of the above-specifically described embodiment of the invention without departing from the spirit thereof, and being restricted only by the scope of the following claims.

I claim:—

1. In a heat-insulating container, the combination of a plurality of spaced-apart wall sections, bracing plates secured against the inner opposite faces of said wall sections and provided with outstanding ribs for reinforcing the wall sections and having opposed inwardly extending projections, supports arranged between the opposed projections, boxings on the supports in line with the projections, a heat-insulating material in the boxings, and bearing plates in the boxings against the material and adapted to receive the projections thereagainst to brace the same against each other.

2. In a heat-insulating container, the combination of a plurality of spaced-apart wall sections, bracing plates secured against the inner opposite faces of the wall sections and provided with pluralities of registering ribs of pressed formation adapted to hold the wall sections from bending, said plates being also provided with inwardly extending projections adapted to register transversely, supports between the bracing plates and a heat-insulating material carried by the supports between said projections for holding the same in spaced-apart relation and for bracing the wall sections.

3. In a heat-insulating container, the combination of a plurality of spaced-apart wall sections, bracing plates secured against the inner opposite faces of said wall sections and being stamped to provide a plurality of raised ribs with intermediate inwardly extending projections forming truss members for reinforcing the wall sections, supporting members arranged between the projections and heat-insulating material mounted on the members to engage the projections of the opposed sections for spacing the same apart and reinforcing the wall sections.

4. In a heat-insulating container, the combination with a plurality of wall sections, of bracing plates secured against the inner opposite faces of said wall sections and provided with pluralities of inwardly crimped beads extending longitudinally of the plates and being raised intermediate their ends to provide rests and being bulged outwardly intermediate of the end portions of the beads to form truss members, and heat-insulating connections between said rests to space the plates apart and brace the wall sections.

5. In a heat-insulating container, the combination of a plurality of wall sections arranged in angular relation with each other, a quantity of heat-insulating material packed in the angles between the wall sections, means for retaining the heat-insulating material in position, said means providing inner exposed portions of the heat-insulating material, and engaging members carried upon the adjacent inner wall sections adapted to engage against said exposed portions of the heat-insulating material for supporting the angled portions of the wall sections in spaced-apart relation.

6. In a heat-insulating container, the combination of an outer wall, an inner wall, an intermediate wall, bracing plates secured against the inner sides of the inner and outer walls and provided intermediately with outstanding projections facing the intermediate wall, spacing devices carried upon the opposite sides of the intermediate wall in line with said projections, and heat-insulating material carried by said devices adapted to contact with said projections for bracing the plates against each other.

7. In a heat-insulating container, the combination of an outer wall, an inner wall, an intermediate wall arranged between the inner and outer walls, bracing plates secured against the inner sides of the inner and outer walls and provided with projections

facing the intermediate wall, boxings secured in registering relation against the opposite sides of the intermediate wall in line with the projections, heat-insulating material mounted in the boxings, and bearing plates fitting in the outer ends of the boxings adapted to bear against the projections and brace the same against each other at the opposite sides of the intermediate wall, said bearing plates being of less size than the boxing and the heat-insulating material being adapted to engage against the other marginal edges of the plate to insulate the same from the boxing.

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