

April 22, 1941.

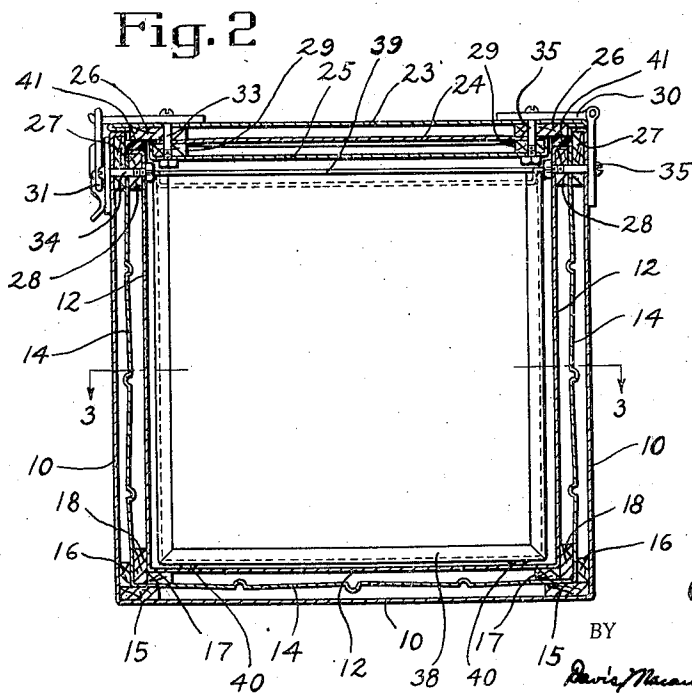
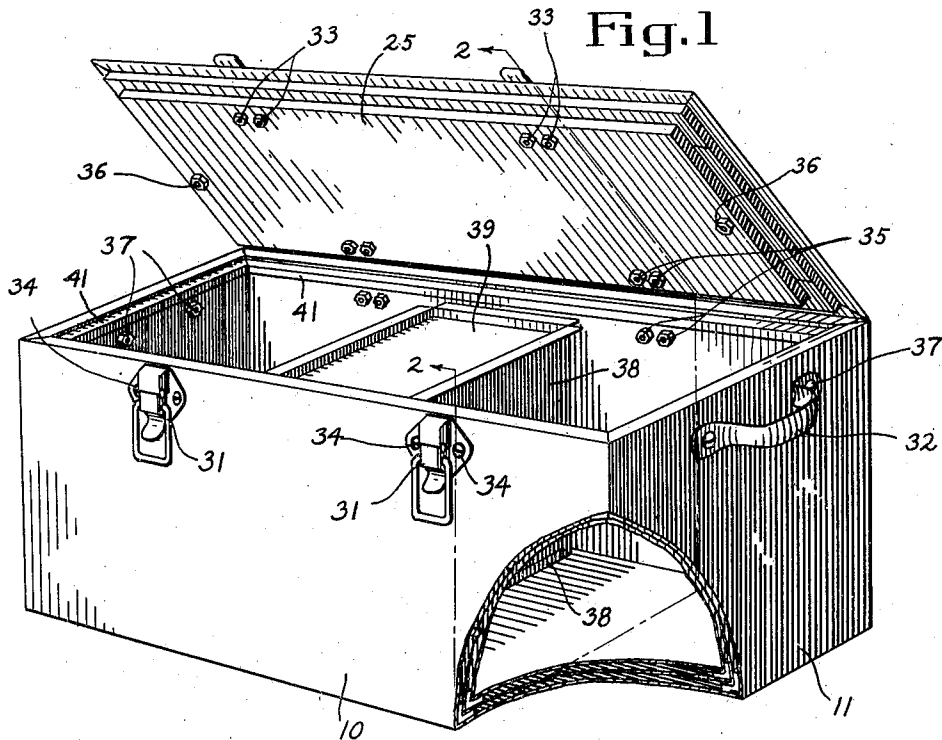
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2,239,128

PORTABLE INSULATED CONTAINER

Filed June 20, 1935

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

Fig. 3

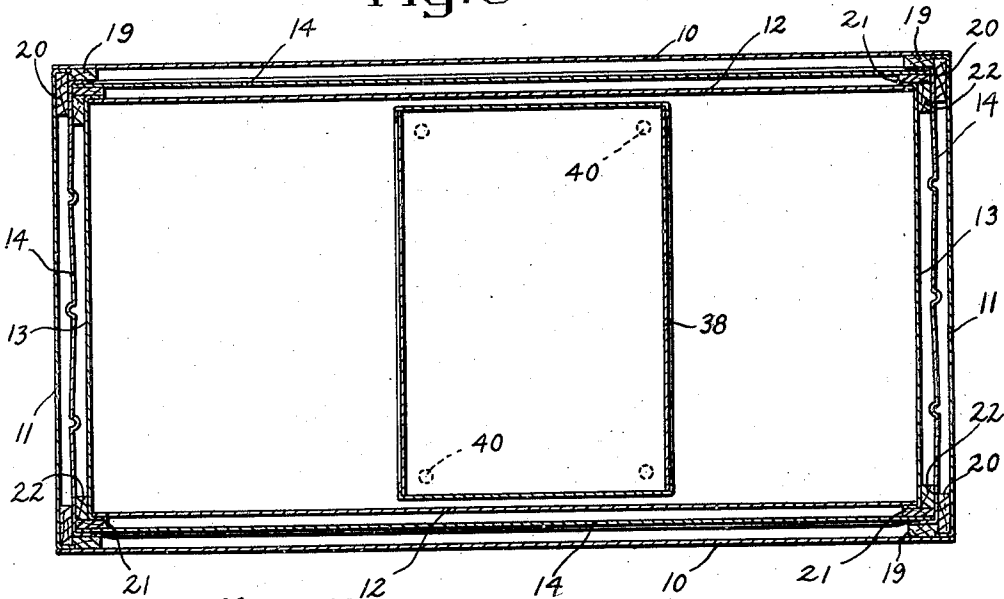


Fig. 7

Fig. 4

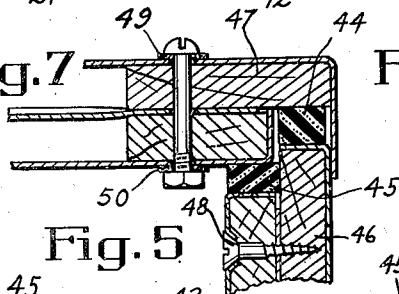


Fig. 5

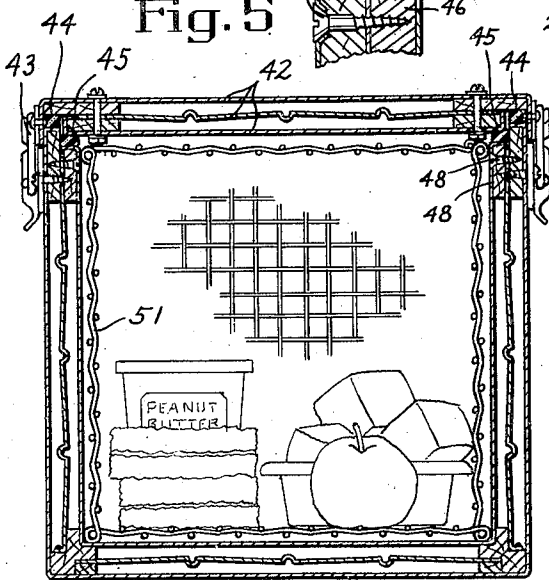
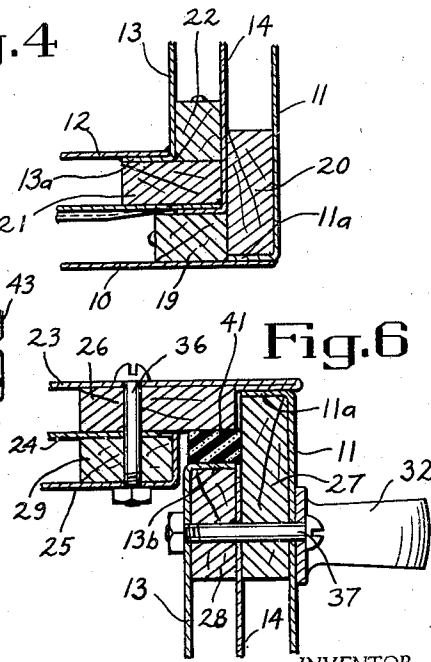


Fig. 6



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UNITED STATES PATENT OFFICE

2,239,128

PORTABLE INSULATED CONTAINER

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Application June 20, 1935, Serial No. 27,465

3 Claims. (Cl. 220—9)

This invention relates to thermal insulation and more especially to an insulated container adapted to reduce to the minimum the transfer of heat (or cold) through a space bounded by relatively higher and lower temperature areas.

An object of the invention is to provide a container having its walls completely surrounded by thermal insulation of the type using steel or other metal sheets spaced apart to provide one or more substantially dead-air spaces in each wall of the container.

Another object is to provide a container made from thermal insulation in which each wall consists of a plurality of disconnected air spaces formed from metal sheets having high reflection and low emission values at the radiation frequently predominating.

Another object is to provide means for increasing the insulating efficiency of a hollow wall container by providing fastening means for the hollow wall portions or members which means will largely or wholly eliminate heat and cold conducting paths from the inside to the outside of the container.

Another object is to provide a refrigerating container of the type disclosed with spacing and ventilating means separating the inner container walls from the container's contents.

Another object is to provide a container for the storage and transporting of dry ice, ice cream, and other cold products, with a minimum of loss due to the admission of heat from outside.

A further object is to provide a container for camping, touring, or other portable or transportable use, in which continuous sheets of box-shaped insulation are separated by wooden corners or structural members to provide a strong and rugged construction utilizing the heat insulating material itself to form the walls of the container.

Yet another object is to provide such a container with a hinged top and side members in which the fastenings for the hinges and the top clamps serve the dual purpose of also holding in assembled relation to the structural corner members the thermally insulating wall members comprising said top and sides.

Still another object is to provide a container of this character with an inner container to hold a suitable refrigerant or other temperature-changing medium, and to provide proper ventilation throughout the container and around said inner container.

A further object is to provide an all-metal heat-insulating container having high insulating

efficiency against the escape of heat or cold to the outside, yet which can be made of inexpensive material, at a minimum of labor and tool expense, and which will be rigid and durable, resistable to any ill effects from vibration, which is of low specific heat, is fireproof, is not affected by moisture and vapor, and is proof against vermin, insects, rodents, bacteria, and various gases.

All these and other objects, as suggested herebelow, are attained by the method and means now to be described, and illustrated in the accompanying drawings, in which—

Figure 1 is a perspective view of a preferred embodiment of this invention, showing the lid or top partly raised to expose the interior construction, and also showing a cut-out portion at one corner with a cross section through the walls thereof.

Fig. 2 is a vertical sectional view of the container of Fig. 1 taken through the line 2—2 of Fig. 1.

Fig. 3 is a horizontal cross-sectional view from above of said container, taken through the line 3—3 of Fig. 2.

Fig. 4 is an enlarged detailed sectional view of one form of corner construction as used in the embodiment disclosed in the previous figure.

Fig. 5 is a vertical sectional view similar to that of Fig. 2 but showing a modified form of the corner construction and top sealing and fastening means.

Fig. 6 is an enlarged detail of the corner construction of Fig. 2 but showing a cross-section through the end members of the container and their handle-attaching means.

And Fig. 7 is an enlarged detailed sectional view, similar to that of Fig. 6, but showing the upper corner construction of the modified form of container shown in Fig. 5.

Like numerals refer to like parts throughout the several views.

While this invention contemplates a thermally insulated container for any suitable use, it is shown, in one embodiment disclosed in the drawings, as adapted particularly to a food or lunch container or box adapted to be carried on an automobile for camping or touring purposes, and in another embodiment as a storage and transporting means for such materials as dry ice and ice cream. It consists essentially of a rectangular box comprising a bottom, two ends, and two sides, all formed into a unitary structure, and having a hinged lid or top fitting thereover to provide a closed space within the container

insulating heat or cold from or to the outside. In the embodiment disclosed in the first four figures of the drawings the container consists essentially of three container walls, one within another, and each spaced from one another to provide two substantially dead-air spaces in each wall.

The structure, in detail, consists of a rectangular-shaped outer container 10 having the two sides and the bottom made from a continuous piece of sheet metal, and having the two ends 11 fastened to member 10 in any suitable manner, as by soldering or welding. End members 11 have all of their peripheral edges flanged inwardly as shown at 11^a in Figs. 4 and 6, and the member 10 comprising the bottom and sides, and also the top member, are made to overliesaid flange 11^a in manner clearly disclosed.

Spaced inwardly from the outer wall of the container is an inner wall comprising a continuous member 12 forming the two sides and the bottom, and end members 13 having inward peripheral edge flanges 13^a around the sides and bottom and adapted to overlies the end portions of member 12 in manner as shown in Fig. 4. The upper edges of members 13 are flanged in a reverse or outward direction as at 13^b, Fig. 6, and their vertical dimension is somewhat less than that of the outer end members 11, as clearly shown.

The inner and outer walls of the container may be made of any suitable material but in the embodiment here described 18-gauge galvanized sheet steel is used.

Somewhat centrally disposed between the outer shell comprising members 10—11, and the inner shell comprising members 12—13 is a third wall made of thermal insulation although it can comprise merely an additional sheet of steel material. However, maximum thermal efficiency with increased rigidity and strength is attained by employing a sheet steel material fabricated to the shape shown in cross section in Figs. 2 and 3 and numbered 14. This material, known to the trade as "Ferro-Therm," is disclosed more fully in the present assignee's patent to Le Grand #1,910,703 dated May 23, 1933, on Thermal Insulation. Extensive tests have shown that material of this character, preformed into a plurality of adjacent but oppositely-slanted sections separated by embossed beads, as shown, and having a surface or surfaces with a high degree of reflectivity to infra-red or heat rays, give a maximum of thermal insulation, particularly where the air spaces on each side of such material are relatively thin, usually not exceeding ½ inch between their walls.

The insulating-wall container 14 is formed in a similar manner to the outer and inner containers by having its sides and bottom of one piece and its ends separately flanged and fastened thereto in the same manner, for instance, as heretofore described. The dimensions of the three containers comprising the walls of this invention are such that a thermally-insulated wall is formed with two air spaces sealed at the corners of each flat surface, both said spaces being of substantially equal thickness as shown.

It is now only necessary to permanently position the three container members in proper assembly to form the complete container minus its lid or top. This is accomplished by positioning non-heat-conducting strength members, such as wooden strips 15, Fig. 2, around the bottom edges of outer container 10, to which strips are affixed

other wooden strips 16 to form an angular section of a thickness equal to the desired air space between the outer container and intermediate or insulating container. Then the insulating container 14 is positioned within outer container 10 and in the angle formed by members 15—16. A second angular strip assembly 17—18 is then positioned around the inner bottom edges of container 14 and thereafter the inner container 12 is positioned in said angle to form a similar air space with the intermediate container.

The same construction is used at the ends of the combined structure where wooden strips 19—20, Figs. 3 and 4, act as the angle spacer and strength member between outer end members 11 and intermediate end members 14; and strips 21—22 serve similarly to strengthen and space members 14 and inner end members 13.

In structures of this character it is highly desirable to eliminate so far as possible all fastening means between the interior of the container and the exterior, and for that purpose the above bottom separating construction has been employed and utilizes no other fastening means. The three containers, however, after being assembled in non-moving position as described above, are then fastened along their upper edges in manner as hereafter described.

The top or lid structure of the container continues the air spaces of the side walls, the ends, and the bottom, by employing an outer steel, or other metallic, sheet 23, an intermediate sheet 24 and an inner sheet 25, Fig. 2, and wooden spacing and strength strips 26—28 to separate and fasten members 23 and 24, and similar strips 29—29 to separate and fasten members 24—25. Likewise, around the upper edges of containers 10—11, 12—13, and 14—14 are other wooden or insulating strips 27—27 and 28—28.

The container comprises this body portion, just described, together with the lid or top affixed thereto by a plurality of hinges 30 and one or more clamps 31, and there are also carrying handles 32. These various fittings are utilized to eliminate so far as possible any fastenings having direct-connecting paths for the heat between the inside and the outside of the container. To this end the bolts 33, Figs. 1 and 2, which hold the upper portion of the clamp 31 affixed to the lid also serve to permanently fasten the three top members 23, 24, and 25 through their spacing members 26—29; and likewise bolts 34 serve to fasten clamp 31 and also members 10, 14, and 12 through their spacing members 27—28. Likewise, bolts 35—35 serve to fasten hinges 30 and also members 10, 14, and 12 through spacing members 27—28. Finally, bolts 37 serve the dual purpose of fastening handles 32 to the container and also uniting the upper portions of the end members 11, 13, and 14, as more clearly shown in Fig. 6.

It then only becomes necessary to provide direct fastening means or bolts 36—36 at the ends of the structural members comprising the top, as clearly shown in Fig. 1.

It now remains to provide means for segregating the refrigerant or other temperature-changing medium from the food or other contents of the container. This is accomplished, in the present embodiment of the invention, by inserting a smaller container 38, Figs. 1, 2, and 3, within the main container walls. This smaller container 38 is also preferably made of sheet metal, preferably steel, suitably galvanized or otherwise protectively coated, and is preferably designed to be moved

to any desired position within the container or removed therefrom but is normally inserted in the position shown, in the central portion of the main container, to permit the contents to be inserted on either side thereof for more uniform and more efficient treatment of said contents by the refrigerant. The refrigerant container 38 may consist of the same construction of the main container as regards a continuous piece of metal for the two sides and the bottom and separate pieces for the ends; in this instance the side and bottom member is flanged over the outer surface of the end members as clearly shown in Figs. 2 and 3. A removable top member 38, Fig. 2, also has edge flanges adapted to snugly overlie the upper edge portion of container 38. These flanges project outwardly around lid 39 to assure the proper spaced positioning of container 38 from the side walls of the main container, or from the end walls, in case said container 38 is moved to a position adjacent either end. The bottom of container 38 is also spaced from the bottom of the main container by means of outwardly-projecting lugs or beads 40 in the bottom wall of the container 38 on which the said container rests, with its bottom substantially removed from contact with the bottom of the main container, as in Fig. 2. Container 38 being thus positioned substantially away from the inner surfaces of the main container, permits proper circulation of the air around the surfaces of container 38 and through the food or other contents within the main container, thus greatly increasing the efficiency of the device in use. Also container 38 is preferably made liquid- or fluid-tight at least as regards the lower portion of said container, in order for instance to prevent melted ice which might be used therein from moistening the contents of the main container.

The means of sealing the hinged lid or top of the main container to the container itself is shown in Figs. 1 and 2 and in enlarged detail in Fig. 6, wherein is disclosed in cross-section a strip of square sponge rubber 41 shaped when under compression somewhat as shown in Fig. 6. This strip 41 extends completely around the four sides of the upper wall portions of the container. It may be fastened in the groove of the side walls of the main container formed by its part assemblage, in any suitable manner, either utilizing the natural resiliency of the sponge rubber material of the strip to force it into place and retain it there by said resiliency, or to affix it in position as by means of an adhesive; or it may be nailed in position with small brads. The cellular structure of the sponge rubber serves as additional insulating air space to give an effect similar to that obtained in the hollow wall construction of the container itself, as here disclosed.

In the modification shown in Figs. 5 and 7, the container is designed primarily for use in storing or transporting a temperature-conditioning substance such as dry ice, or for the storage or transporting of ice cream or other pre-refrigerated material. Of course it may apply as well to pre-heated substances or materials and to materials for heating any other substance.

In this modification the lower corner construction includes the use of a slight modification in the shape and assemblage of the wooden corner strips for spacing and supporting the plurality of steel sheets forming the walls of the container, as clearly shown in Fig. 5, and also the use of a lid or cover 42 fastened to the container by clamps 43—43 positioned along both sides of said

lid and adapted to permit the lid to be entirely removed from the container.

Since a container of this character when used for example for the storage or transporting of dry ice, must necessarily be gas-tight, a double seal is desired, and so two strips 44—45 of sponge rubber or like sealing material are used and are positioned as shown clearly in Fig. 7 in cross-section. For this purpose the wooden strip 46 which corresponds with strip 27 of Fig. 6 is made somewhat narrower to provide a space between its upper edge and the lower surface of the lid strip 47 between which the sealing strip 44 is positioned. In this construction the upper plate of the lid or top is flanged downwardly, as shown in Fig. 7, to substantially overlie the edge of the upper portion of the sides of the container to form an additional metallic seal at this point, and surrounding the seal formed by the outer rubber strip 44.

It will be noted that this modification also utilizes as a fastening between the wooden strips and the plurality of steel sheets ordinary wood screws 48 which in no case extend entirely through all three sheets. These screws may be in staggered relation, some being applied through the outside sheet and some through the inside sheet. This is shown in the upper corners of Fig. 5.

To further increase the thermal efficiency of the structure, as when bolts are used to fasten the various parts thereof, washers 49—50 of suitable thermally-insulating material may be positioned under the head and nut of the bolt, as in Fig. 7, and also the bolt positioned in slightly enlarged holes in the three sheets to prevent contact therewith so far as possible.

A wire rack, 51, Fig. 5, is also preferably used inside of that modified form of the container, to hold the dry ice or packaged ice cream, for instance, out of contact with the inner wall of the container, this having been found to appreciably increase the thermal efficiency, especially where a concentrated hot or cold material is contained within.

It is to be understood that the present disclosure is for the purpose of illustration only, and that the invention is not limited thereto. To those skilled in the art, many modifications of the invention will be readily apparent, and it will also be obvious to such skilled persons that parts of the device and method may be used without other parts thereof, many such combinations readily suggesting themselves. Therefore, it should be, and is to be distinctly understood that for a definition of the limitations of the invention, reference must be had to the appended claims.

Having now described the invention, what is claimed as new, and for which Letters Patent of the United States is desired, is:

1. In a thermally insulating portable container, a body member comprising a box with an open top, the walls of said box comprising spaced substantially parallel shells of relatively rigid sheet material, a sheet of heat reflecting insulating material mounted in the space between said shells, means for locating and maintaining said shells and insulating sheet in spaced relation, manipulating members on the outside wall of said container, said manipulating members being retained in place by said maintaining means, and said maintaining means being positioned around the mouth of said container whereby the paths for heat transfer through the walls of said container are reduced to a minimum.

2. In a thermally insulating portable container, a body member comprising a box with an open top, the walls of said box comprising spaced substantially parallel shells of relatively rigid sheet material, a sheet of heat reflecting insulating material mounted in the space between said shells, means for locating said shells and insulating sheet in spaced relation, means passing through one of said shells and said insulating sheet adjacent the mouth of said container wall for maintaining said shells and sheet in said spaced relation and manipulating members on the outside wall of said container, said manipulating members being retained in place by said maintaining means whereby the number of members passing through said insulating sheet are reduced to a minimum and the paths for heat transfer through said wall are similarly reduced.

3. A readily portable heat insulating container, comprising a box-like member having insulated walls and an open top, an insulated lid for closing said open top, a container for refrigerant mounted for longitudinal sliding movement within said box, said container substantially filling the space across and vertically of said box and means comprising projections carried by the container body and flanges carried by the lid of the same to space said container slightly from the bottom, sides and top of said box in order to provide for the circulation of refrigerated air therethrough, whereby said refrigerant container may be moved from place to place within said box, but all parts of said box may be refrigerated to a greater or less degree depending upon the longitudinal position of the refrigerating container within the box.

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