Oct. 15, 1946. A. HILLER 2,409,279

REFRIGERATION APPARATUS

Original Filed May 17, 1937

Fig. 2.

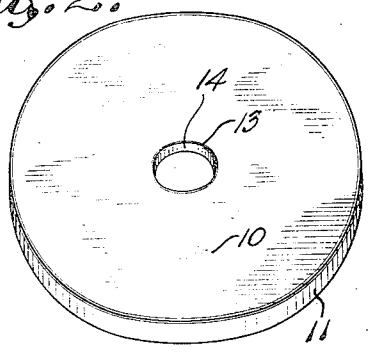
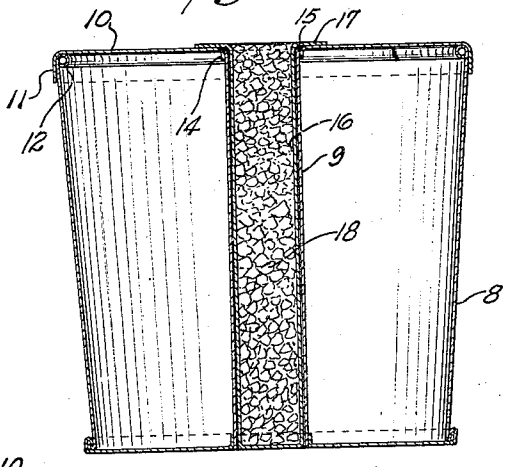


Fig. 5.



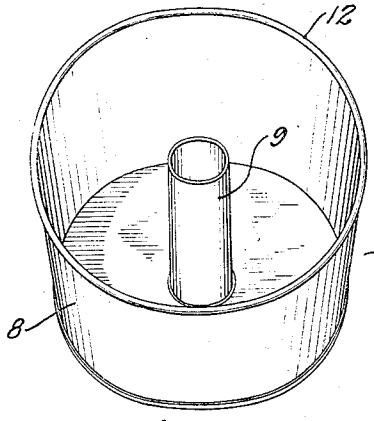


Fig. 1.

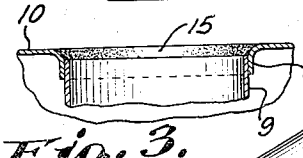


Fig. 3.

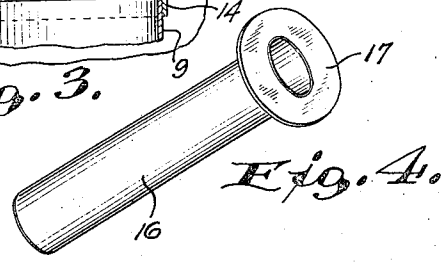
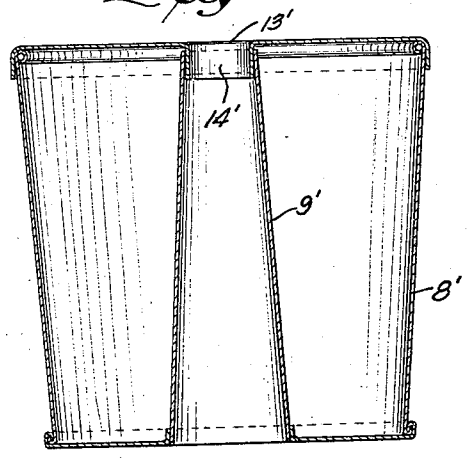


Fig. 4.

Fig. 6.



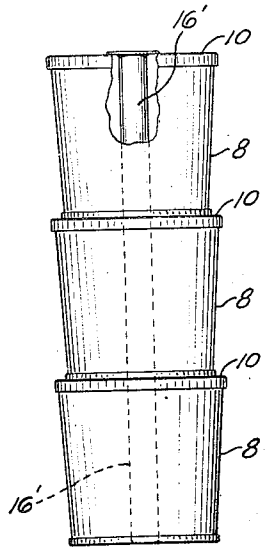


Fig. 7.

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UNITED STATES PATENT OFFICE

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REFRIGERATION APPARATUS

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4 Claims. (Cl. 62—1)

1

This invention relates to improvements in refrigeration apparatus, and more particularly to improved package assemblies for refrigerating and packing liquids or other commodities for transportation.

It is common practice to pack liquids or other perishable commodities in diverse containers, and to provide means for refrigerating the packed commodities prior to and during shipment. Heretofore, considerable difficulty has been encountered in properly refrigerating the portion of the product in the center of the container, and this has been particularly true in the case of egg liquids. Eggs are frequently shipped in liquid form to bakers and other large users of the whites and yolks, and it is customary to freeze the egg liquids in the containers prior to shipment and to endeavor to maintain the product in frozen form until it reaches its destination. Much spoilage has resulted, however, due to the fact that the portion of the product in the center of the container was not properly frozen due to the difficulty of transmitting cold to the interior of the ordinary type of can.

It is a general object of the present invention to provide apparatus for packing and refrigerating liquids and other commodities whereby the danger of spoilage in the center of the container is eliminated.

A further object is to provide an improved refrigeration apparatus for maintaining frozen commodities in wholesome condition for prolonged periods of time.

More specific objects of the invention are to provide an improved package assembly or container having a center tubular core to permit cold air or refrigerant to act upon material in the center of the container; to provide novel means for conveniently holding refrigerant which means may be readily inserted in or removed from said core; to provide means between the cover and upper end of the core for sealing said upper end of the core from the interior of the container; to provide containers having tubular cores which may be stacked with the cores in alignment whereby refrigerant may be inserted in the cores of a plurality of containers simultaneously; and to provide a container which is particularly well adapted for the packing and shipment of egg liquids, milk, and other perishable materials.

With the above and other objects in view, the invention consists of the improved container and package assembly, and all of its parts and combinations as set forth in the claims, and all equivalents thereof.

2

In the accompanying drawing forming a part of this specification and in which the same reference numerals designate the same parts in all of the views:

Fig. 1 is a perspective view looking mainly at the top of one of the improved containers with the cover removed;

Fig. 2 is a perspective view of one form of cover therefor;

Fig. 3 is a vertical sectional view through an assembled cover showing the mode of sealing the upper end of the core from the interior of the container;

Fig. 4 is a perspective view of a refrigerant holding tube;

Fig. 5 is a vertical sectional view through one of the improved containers showing a refrigerant tube inserted therein;

Fig. 6 is a vertical sectional view through a slightly modified form of container; and

Fig. 7 is an elevational view showing a plurality of containers of Fig. 5 in stacked relationship with a single refrigerant tube inserted in the aligned cores of the containers.

Referring more particularly to the drawing, the container 8 is preferably of metal, wood, fibre, plastic or the like and may be of any desired shape and size. It is, however, preferred to have the container circular in cross-section with tapering side walls. Extending upwardly from the bottom of the container is a tubular core 9 preferably open at both ends. The container cover 10 may be formed with a rim 11 cooperable with the annular bead 12 on the container proper to form a suitable closure. The center of the cover is apertured as at 13 and the aperture is formed with a depending rim 14.

When commodities such as milk, egg liquids, or the like, have been inserted in the container 8, the cover 10 is then placed in position with the upper end of the tubular core 9 projecting into the rim 14 surrounding the central opening 13 of the cover. For certain commodities, wherein a refrigerant is to be inserted in the core during shipment, it is desirable to seal the interior of the core from the interior of the container. Accordingly, a sealing material such as solder, wax or the like may be applied as at 15 (Fig. 3) to unite the upper end of the wall of the core with the rim portion 14.

The container may then be placed in a refrigerating room preparatory to shipment, or may be placed directly in a truck or railroad car and

cool air permitted to contact the sides of the container and also circulate through the tubular core 9. Thus, not only the portion of the product near the outer wall of the container is subjected to this cooling action, but also the product at the center. It is frequently, however, desirable to apply refrigerant directly to the surface of the container. With the present invention, dry ice, chipped ice, or any suitable refrigerating material may be placed directly in the tubular core while the container is being shipped; or said refrigerating material may be more conveniently inserted in a separable tube such as the tube 16 which tube is preferably closed at its lower end and provided with a flange 17 at its upper end. The tube 16 containing suitable refrigerant 18 may then be inserted in the core of a container in the manner shown in Fig. 5.

The present invention also lends itself readily to the stacking of a plurality of containers in the manner shown in Fig. 7 with the tubular cores in vertical alignment. When this method is carried out, suitable refrigerant may be inserted into the aligned cores of a plurality of containers simultaneously, or a single refrigerant-carrying tube 16' of suitable length may be readily inserted into the aligned cores of a plurality of the containers, as shown in Fig. 7.

In view of the fact that it is usually desirable to freeze egg liquids prior to shipment, the present invention lends itself particularly well to this process because of the fact that the tubular core quickens the freezing operation by permitting the refrigerated air to contact the walls of the tubular core and thereby freeze the product in the center of the package. With the ordinary type of containers, proper freezing of the material throughout took a relatively long time due to the difficulty of transmitting cold to the center of the container. Furthermore, it frequently happened that the product in the center did not get properly frozen, and spoilage resulted.

In view of the fact that egg liquids are usually frozen in the container prior to shipment, it is not essential that the upper end of the tubular core be sealed from the interior of the package. Accordingly, a container of the type shown in Fig. 6 may be employed for egg liquids, said receptacle having a central aperture 13' in its cover provided with a relatively long depending rim 14' which is insertible within the upper end of the tubular core 9' in the manner shown in Fig. 6. It is preferred to have the rim portion 14' fit snugly within the upper end of the tube.

In order to permit the convenient nesting of the containers when empty, the tubular core portion 9' may be of tapered form. Thus, due to the tapered formation of the core and to the tapered side walls of the container, a plurality of empties

may be nested to occupy a relatively small space.

It is apparent from the above that the improved container makes it possible to provide a refrigerating package including a refrigerant inserted in the core whereby the product in the center of the container is kept at a proper temperature. It is further apparent that improved refrigeration apparatus has been provided which is particularly useful for the packing of egg liquids, milk or the like, to insure the maintenance of a proper temperature both during shipment and storage.

Although only a few forms of the invention have been shown and described, it is obvious that various changes and modifications may be made without departing from the spirit of the invention, and all of such changes are contemplated as may come within the scope of the claims.

I claim:

1. A refrigerating package comprising a container having a bottom and a cover for enclosing a commodity, a tubular core formed in said container and having an end communicating with the exterior, a tubular member inserted in said core and readily removable therefrom, said tubular member being adapted to contain a refrigerant.

2. A refrigerating package assembly comprising a plurality of stacked containers each enclosing a commodity, a tubular core open at each end extending through each container, said cores of the several containers being in alignment with one another to simultaneously receive a refrigerant.

3. A refrigerating package assembly comprising a plurality of stacked containers each enclosing a commodity, a tubular core open at each end extending through each container, said cores of the several containers being in alignment with one another, a tubular member inserted in the aligned cores of said containers and readily removable therefrom, said tubular member being adapted to receive a refrigerant.

4. A container for commodities comprising a main body portion having a tubular core extending upwardly from the bottom thereof, a cover having an opening for registration with the upper end of said tubular core and having a flange surrounding said opening and cooperable with said upper end of the core, and sealing means applied between the cover opening flange and said upper end of the core to seal the interior of the core from the contents of the container while allowing the upper end of the core to communicate with the exterior, said core structure providing for refrigeration of commodities near the center of the container.

ABE HILLER.