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FOOD PRESERVATION AND STORAGE

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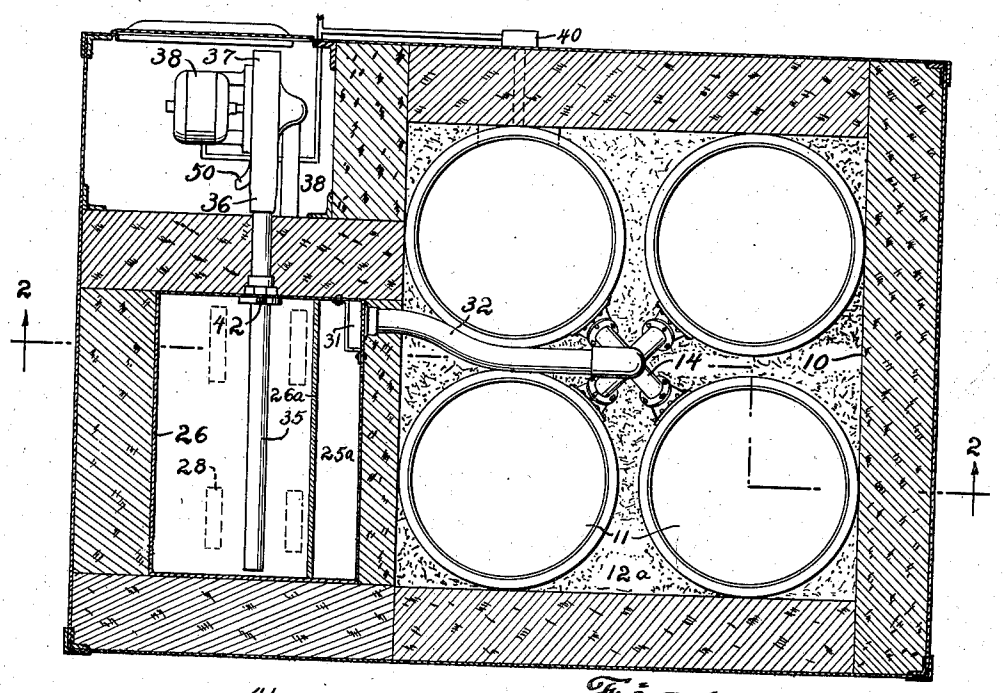


Fig. 1

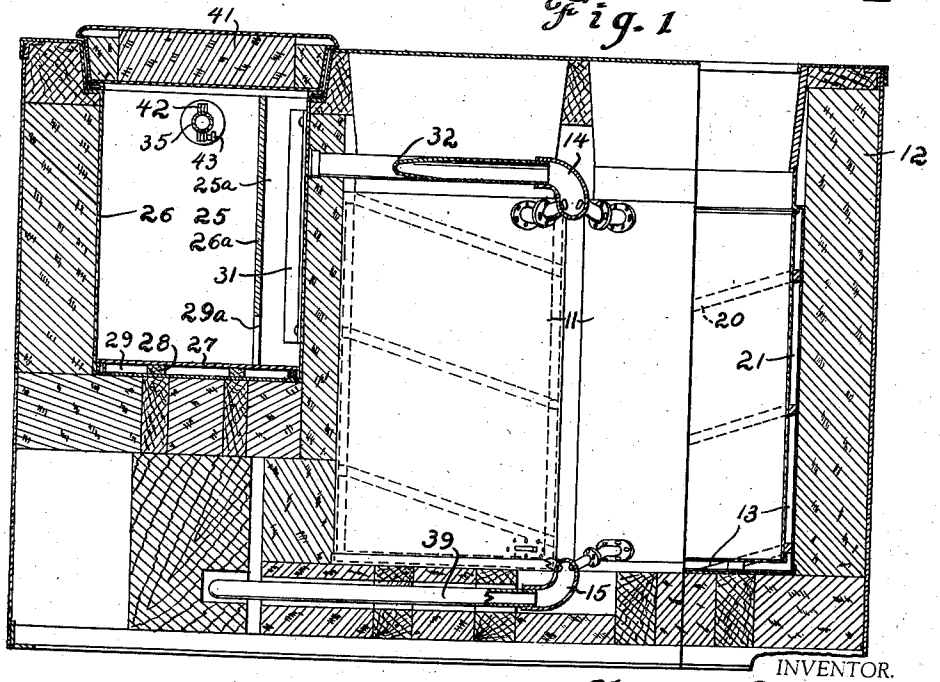


Fig. 2

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FOOD PRESERVATION AND STORAGE

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6 Claims. (Cl. 62—91.5)

The present invention relates to food preservation and storage and more specifically to the preservation and storage of ice cream, being directed to so-called "Ice cream cabinets" and their operation.

Among the objects of the invention is to overcome the objectionable features of both the mechanically refrigerated and the ice refrigerated cabinets now being widely used, and greatly simplify the construction and service as well as to obtain superior results.

Another object is a cabinet in which the refrigerating effect is obtained through the use of solidified carbon dioxide, commonly called "dry-ice", in a manner in which the refrigeration is under complete control.

Another object is to so conduct the process of refrigeration, using dry-ice, as to retard the sublimation of this material at such times as active refrigeration is not going on and to stimulate sublimation at other times.

Still other objects and advantages will be apparent from the following description, wherein reference is made to the accompanying drawing illustrating a preferred embodiment of the invention, and wherein similar reference numerals designate similar parts throughout the several views.

In the drawing:

Figure 1 is a horizontal section through a four hole cabinet involving the present invention; and

Figure 2 is a vertical section on line 2—2 of Figure 1.

A cabinet involving the present invention is illustrated in the drawing as comprising a main compartment 10 of a size to accommodate the required number of containers, there being four shown as at 11. While four are shown, however, the number may be varied according to requirements and the invention is equally applicable to any number from one up.

This main compartment 10 is within a suitably built cabinet structure, heat insulated, preferably with a thick layer of cork board as indicated at 12, and the spaces between the containers suitably packed as indicated at 12a.

The containers 11 are of the proper size to receive each a removable can or other carrier (not shown) containing the ice cream to be stored, and, for the greater portion of their height and also on their bottoms, are jacketed as indicated at 13, to which jackets are connected, at top and bottom respectively, the manifolds 14 and 15. And, within the jackets 13 there is preferably provided a spiral partition 20 extending around the container several times so as to provide a long rather narrow path 21 from one manifold connection to the other.

At one side of the main compartment 10 is a smaller gas tight compartment 25, well heat-insulated and lined with metal as at 26 or other suitable material, shown as provided with a false bottom 27, suitably spaced as by the blocks 28. Spaced a short distance from that wall of compartment 25 adjacent the containers 11, is a partition 26a which extends from the top of the compartment to near the bottom being spaced from the latter or cut away to provide a passage 29a under the partition into the small chamber 25a. Further, within chamber 25a is a still smaller open top chamber 31 with which near its top communicates the duct 32. Chamber 31 is closed at its bottom and serves as a catch basin or settling chamber for any snowy material passing thereinto over the upper edge which is located somewhat below the top of compartment 25 and partition 26a.

Leading into compartment 25 and extending across the upper part thereof is a pipe 35, closed at its end and provided with a plurality of perforations along its under side. This pipe 35 is connected to discharge outlet 36 of a housing 37 containing a suitable blower or fan (not shown) operated by a motor 38 and to the inlet of the fan housing is connected a tube or pipe 39 connected to the manifold 15. Operation of the fan, it will be noted, will produce a circulation of the contained atmosphere through the compartment 25, pipe 32, manifold 14, spaces 21, manifold 15, pipe 39 and fan housing 37.

The fan motor 38 is supplied with current from a suitable source and its operation will preferably be thermostatically controlled by a conventional control apparatus, indicated at 40, applied to one of the containers 11.

The apparatus just described is, as indicated, intended for the storage and preservation of ice cream and the latter will be placed in the containers 11 in suitable removable receptacles. In operation, a suitable cake or block of solid carbon dioxide, dry-ice, will be placed in the compartment 25 and the latter closed tightly as by the door 41.

With the ice cream containers loaded and properly closed by suitable lids (not shown) and with a suitable block of dry-ice in compartment 25, a too high temperature on thermostat control 40 will cause the blower to draw gas from the jackets 13 and force it into compartment 25

upon the tops of the dry-ice block. Such operation obviously cools this gas but also stimulates sublimation of the solid carbon dioxide, so that cold gas passes from the compartment **25** under partition **26***a* into space **25***a* and out through chamber **31** and into the upper ends of jackets **13**.

It is of course obvious that the volume of circulating gases is increased by the sublimation process and that relief means must be provided. Such means is shown at **50**, being a small discharge pipe leading from the delivery side of the fan and of a size to permit a suitable proportion of the gases to pass off rather than be blown back into the circulatory system.

While it is preferred to so arrange the manifolds and their connections as to divide equally the gas as supplied to the jackets **13**, it is equally obvious that these connections could be so arranged as to produce differing temperatures in the several containers **11** if desired, either by using different sizes of connecting members or by the use of valves.

Further, by reducing the amount of insulation between compartment **25** and that container **11** nearest to it, it is possible to maintain a lower temperature in that container than in the others even with equal distribution of gas from manifold **14**.

Attention is directed to the fact that, when the blower is not in operation, the block of dry ice is completely enveloped in extremely cold carbon dioxide and that, therefore, sublimation is retarded to a point where it practically ceases, to start again only when the blowers begin to operate.

Now having described the invention and the preferred embodiment, it is to be understood that said invention is to be limited, not to the specific details herein set forth, but only by the scope of the claims which follow:

What I claim is:

1. The process of refrigerating a container which comprises substantially enveloping said container in an atmosphere of carbon dioxide gas sublimated from solid carbon dioxide, positively withdrawing by mechanical means said gas from the container and passing a portion thereof into contact with a body of solid carbon dioxide to thereby stimulate sublimation and to replace that withdrawn and not re-used and carrying on said withdrawal only when the temperature within the container exceeds a predetermined point.

2. The process of refrigerating a container which comprises substantially enveloping said container in an atmosphere of carbon dioxide gas sublimated from solid carbon dioxide, positively withdrawing by mechanical means said gas from the container and passing a portion thereof into contact with a body of solid carbon dioxide to thereby stimulate sublimation and to replace that withdrawn and not re-used, then passing said gas into heat transfer relation but out of contact with the body of solid carbon dioxide before returning it to the container and carrying on said withdrawal only when the temperature within the container exceeds a predetermined point.

3. A food cabinet comprising a heat-insulated cabinet, a jacketed container therein, a compartment in said cabinet but heat-insulated from said container and adapted to receive a body of solid carbon dioxide, a duct leading from the upper portion of said compartment to the jacket of said container, a second duct leading from another portion of said jacket into said compartment, circulating means in said second duct and baffle means for substantially preventing passage of gases directly from said second duct to said first duct.

4. A food cabinet comprising a heat-insulated cabinet, a jacketed container therein, a compartment in said cabinet but heat-insulated from said container and adapted to receive a body of solid carbon dioxide, a duct leading from the upper portion of said compartment in heat transfer relation with said body of solid carbon dioxide and to the upper portion of the jacket of said container, a second duct leading from the lower portion of said jacket into said compartment, circulating means in said second duct and baffle means for substantially preventing passage of gases directly from said second duct to said first duct.

5. A food cabinet comprising a heat-insulated cabinet including two compartments heat insulated from each other, a plurality of individually jacketed containers in one of said compartments, each jacket having therein a spiral partition from top to bottom, a gas supply pipe leading into the upper portion of each jacket and a gas withdrawal pipe leading from the bottom of each jacket, a supply manifold connected to the supply pipes and a second manifold connected to the withdrawal pipes, a duct connecting said first manifold to the second compartment and a second duct leading from the second manifold also to said second compartment, and a circulating device for withdrawing gas from said second manifold and discharging at least a portion thereof into said second compartment.

6. In a food cabinet, a heat insulated solid carbon dioxide compartment having a false bottom, a duct connecting the upper part of said compartment with the space under said false bottom, a second duct leading from said space to near the top of the compartment but closed thereto, a jacketed container, a pipe connecting said second duct to said jacket, a second pipe leading from said jacket, a circulating device, to the inlet side of which said second pipe is connected, a discharge outlet for said device connected so as to discharge partly into said compartment and partly out of the system.

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