United States Patent

Lundquist

[15] **3,685,308**

[45] **Aug. 22, 1972**

[54] **CHILLING CONSUMER SIZE FOOD PACKAGES**

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[22] Filed: **Sept. 22, 1969**

[21] Appl. No.: **859,827**

[52] **U.S. Cl.** **62/60,** 62/64, 99/198

[51] **Int. Cl.**.....**F25d 7/00**

[58] **Field of Search** 62/60, 62, 64, 384; 99/192, 99/198, 372

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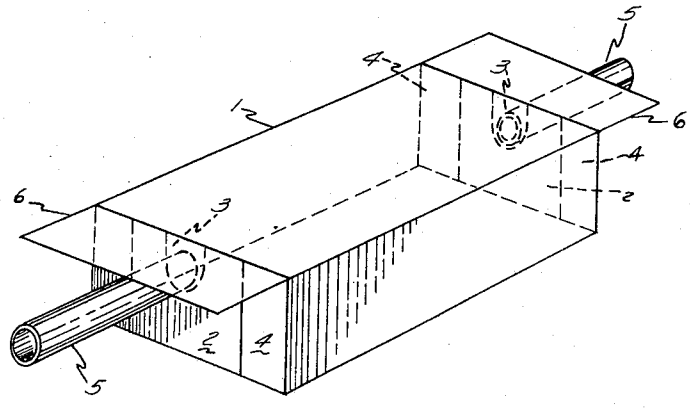
Primary Examiner—William E. Wayner

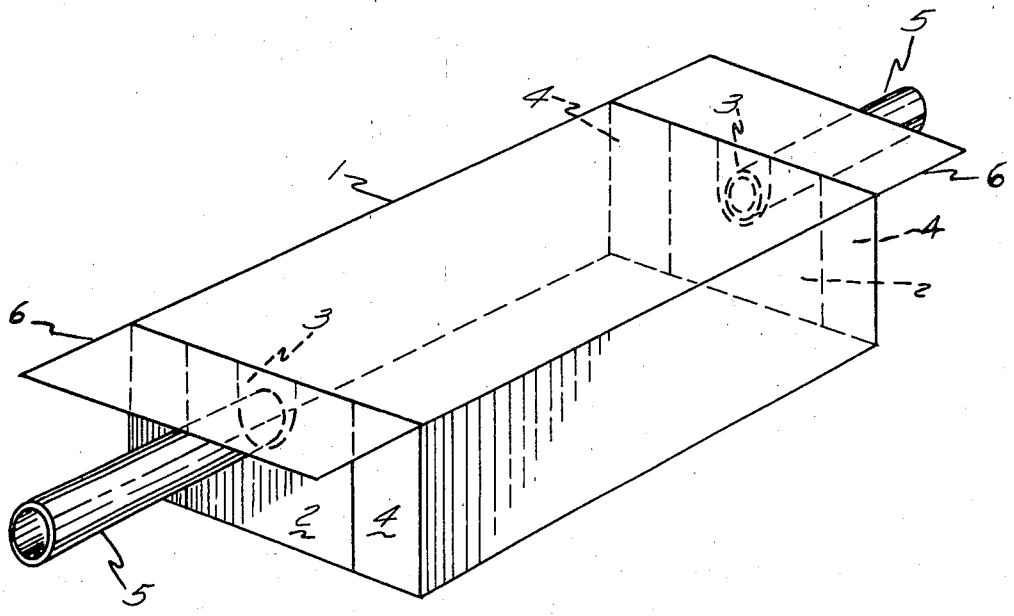
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[57] **ABSTRACT**

A method of quickly lowering the temperature of a non-insulated consumer size prepackaged unfrozen food items comprising injecting a rapidly vaporizing coolant such as liquid nitrogen, carbon dioxide snow, liquid freons or the like, into a non-insulated consumer size package containing food, and thereafter closing the package, packing in suitable containers and storing in the usual manner such as in a freezer.

10 Claims, 1 Drawing Figure





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CHILLING CONSUMER SIZE FOOD PACKAGES

This invention relates to an improved method of chilling consumer size prepackaged food items, and in particular, a method of rapidly chilling prepackaged food items by directly contacting the food with vaporizing coolants which are below about −20° to about −320° F. such as obtained with liquid nitrogen (−320° F), carbon dioxide snow (−110° F.), liquid freons (−20° F.) and the like, after it has been introduced into the usual non-insulated consumer size carton.

I propose that after the food item has been packed in the usual non-insulated consumer type carton e.g. for further wrapping, shipping and display purposes, that a suitable coolant such as liquid nitrogen, carbon dioxide snow, liquid freons or the like be sprayed into the interior of the carton and onto the unfrozen product contained therein, and that thereafter the carton be closed in the usual manner. I have found it preferable, when using end-loading cartons to introduce the coolant into both ends of the container before the end flaps are closed although it is understood that one or both end flaps may be closed prior to the injecting of the coolant. I have also found it desirable for the carton to have a special opening or openings available into which the spray nozzles may be easily introduced. In using cartons which are immediately sealed such as with a wax overlay, polyethylene coated on one or both sides or a heat-sealed plastic wrapper, it may be desirable to either delay the final sealing of the carton or to provide for a suitable vent to prevent the build up of gas pressure.

Previous methods of chilling either resulted in excessive shrink due to the evaporation of moisture, or involved the use of special equipment and/or excessive handling of the product. Slow chilling may permit the development of microorganisms which subsequently cause spoiling of the product.

Therefore it is an object of the present invention to provide an improved method for rapidly and efficiently reducing the temperature of packaged food items.

It is also an object of the present invention to provide a method for rapidly cooling prepackaged non-insulated consumer size food products without requiring special equipment or excessive handling.

Other objects and advantages of this invention will become apparent from the following description and claims.

I have illustrated my invention diagrammatically in the accompanying drawing wherein the FIGURE is diagrammatic view.

Like-parts are indicated by like characters throughout the specification and drawing.

A carton **1** is shown as a partially opened receptacle in which rapidly vaporizing coolant is being applied directly to its contents. At each end bottom flaps **2** are folded across pairs of inwardly turned side panels **4**. An opening **3** located at the top center of each bottom flap **2** has a coolant nozzle **5** extending therethrough. The product (not shown) in the package may be exposed directly to the coolant or incased within a protective cover such as a plastic liner. After injection of the coolant into the carton, top flaps **6** are closed over bottom flaps **2** thereby forming a seal over the openings **3**.

One of the top flaps **6** may be closed prior to injection of the coolant although best results are generally obtained by injecting a predetermined amount of coolant into both ends of the package. In practice the coolant may be injected into the package through a jet mounted in the pressure plate of a carton-closing machine. The package would generally be sealed and packed in a shipping container, both of which act as an insulator to provide maximum efficiency for the coolant. The end-opening package is merely illustrative of the various types of packages that may be used in practicing this invention, but such packages have been found particularly advantageous because they permit a minimum loss of the coolant through the openings **3** during the injection of the coolant.

Among the merits of the present method of operating are: handling of the product is kept to a minimum; existing equipment may be readily adapted with a minimum cost; and, the rapid cooling of unfrozen product in a relatively enclosed area substantially reduces the amount of shrink. Rapid chilling restricts the development of microorganisms and thereby assists in maintaining the quality of the product. A possible modification of the present method is that carbon dioxide snow may be deposited directly on the product in a top loading carton. The primary advantage of this modification is that it permits lower gas pressures which make the handling and control of the gas somewhat easier.

The following examples of methods of operating are given for the purpose of illustrating the present invention, but they are not intended to be limiting on the scope thereof.

EXAMPLE I

One pound of fully cooked green-link sausage was loaded into an end-loading non-insulated consumer size carton at a temperature of 80°–100° F. The carton was then moved into the carton-closing machine, the side panels were folded in, the bottom flaps of the carton were folded upward; and sufficient carbon dioxide snow (approximately −110° F.) was introduced through an opening in the bottom flaps to lower the temperature to substantially below ambient or to about 36° F., and thereafter the top end flaps were folded downward and sealed. A predetermined number of non-insulated consumer size cartons were then packed into a shipping container and moved to a freezer. It was found that the average time for reducing the temperature to 36°–40° was 5–10 minutes.

Heretofore the filled consumer size cartons are usually packed in shipping containers and are placed in a blast-clod air freezer. It takes an average of 12–16 hours to lower the temperature from 80°–110° F. to 36°–40 F. During this period of time spoilage organisms can multiply and thereby reduce storage life.

EXAMPLE II

Product was prepared in the same manner as Example I except the coolant was liquid nitrogen (approximately −320° F.) was sprayed into the package. The result was similar to that attained in Example I.

EXAMPLE III

Hot buttered peas incased in a plastic bag were treated in the same manner as Example II with the result the product was cooled to 10° F. in about 8 minutes.

It will be obvious to those skilled in the art that there are many similar rapidly vaporizing coolants such as freons which can be substituted for those shown in the aforementioned examples without departing from the scope of the present invention.

Obviously many modifications and variations of the invention as hereinbefore set forth may be made without departing from the spirit and scope thereof, and, therefore, only such limitations should be imposed as are indicated in the appended claims.

I claim:

1. A method for rapidly cooling prepackaged consumer size food products comprising:

injecting of a rapidly vaporizing coolant of below about −20° F. directly onto a unfrozen food product prepacked in a non-insulated consumer size carton, said coolant being injected through a nozzle opening provided in said carton, said coolant being of such an amount to cool the product to a temperature substantially below ambient.

sealing the carton, and

packing a predetermined number of said cartons into a shipping container whereby both the cartons and shipping container act as an insulator to provide maximum efficiency for the coolant.

2. The method of claim 1 wherein the coolant is selected from the group of liquid freon, liquid nitrogen and carbon dioxide snow.

3. The method of claim 1 wherein the temperature of the coolant ranges form about −350° to about −20° F.

4. The method of claim 1 wherein the coolant is liquid nitrogen.

5. The method of claim 1 wherein the coolant is carbon dioxide snow.

6. The method of claim 1 wherein the coolant is liquid freon.

7. The method of claim 1 wherein the prepackaged food product is encased in a plastic bag and the rapidly vaporizing coolant is brought into direct contact with said bag.

8. The method of claim 1 wherein the coolant is injected simultaneously through nozzle openings provided in each end of the consumer size carton.

9. The method of claim 1 wherein the coolant is injected through a nozzle opening in one end of the carton and the opposite end of the carton having been previously sealed.

10. The method of claim 1 wherein the shipping container is stored in a freezer.

* * * * *

UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 3,685,308 Dated August 22, 1972

Inventor(s) BURTON R. LUNDQUIST

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

The patent should show on its face that it is assigned to Swift & Company of Chicago, Illinois.

Signed and sealed this 6th day of March 1973.

(SEAL)
Attest:

EDWARD M.FLETCHER,JR.
Attesting Officer

ROBERT GOTTSCHALK
Commissioner of Patents

FORM PO-1050 (10-69)

USCOMM-DC 60376-P69
* U.S. GOVERNMENT PRINTING OFFICE : 1969 O—366-334.