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2,865,767

METHOD OF PACKAGING FOOD ITEMS

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8 Claims. (Cl. 99—171)

This invention relates to packaging. More particularly it relates to a method of producing skin tight coverings on items packaged therein.

Various thermoplastic films are used extensively for wrapping and packaging. In the protective packaging of foods particularly for poultry, meats, and meat food products for frozen storage or storage under refrigerating conditions the covering must be skin tight so that there will be substantially no pockets of entrapped air between the covering and the surface of the packaged item.

Bags made of shrinkable films of unvulcanized rubber and certain types of saran provide tight coverings on items inserted therein. In use the item was inserted in the bag and after the open end had been sealed the package was subjected to a temperature of 100° C. or less as by immersion in boiling water for a short interval of time.

The aforementioned materials became brittle at the temperatures required for frozen storage or storage under refrigerating conditions and frequently split with the consequence that the desired results were not maintained during the life of the package.

Polyethylene film because of its chemical and physical properties is extensively used for wrapping and packaging. Because of its excellent low temperature durability it is admirably suited as a protective packaging material for foods such as poultry, meat, and meat food products for frozen storage or storage under refrigerating conditions. However, in general, polyethylene film exhibits little or no shrinkage when subjected suddenly to boiling water. Recently there has been produced a polyethylene film which does shrink when suddenly subjected to boiling water, but for some applications a greater shrinkage is desired. In addition, the bubbling action of the boiling water caused wrinkling of the film.

An object of this invention is to provide a new and novel method of shrinking polyethylene film.

Another object of this invention is to utilize the aforementioned method in producing protective skin tight coverings.

Other and additional objects will become apparent hereinafter.

The objects of the invention are accomplished in general by inserting the item to be packaged in a polyethylene bag and after closing the open end shrinking the bag by suddenly immersing the package in a liquid medium, more fully described hereafter, at a temperature above 100° C. but below the melting point of the polyethylene. Preferably before the open end of the bag is closed, the interior of the bag is evacuated.

In the preferred embodiment of the invention, an aqueous solution of propylene glycol constitutes the liquid medium in which the shrinking of the bag is obtained. The proportion of propylene glycol depends on the temperature at which the solution is to be used. Thus, if the shrinking operation is to be carried out, for example, at 105° C., the solution can consist of 80 parts of propylene glycol and 20 parts of water. If the shrinking

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operation is to be performed at 102° C., the solution can consist of 60 parts of propylene glycol and 40 parts of water. It is, of course, to be understood that a solution capable of use at a higher temperature can also be used at lower temperatures. Also, propylene glycol, alone and without water, can be used provided the desired temperature is maintained.

The temperature of the liquid medium to which the bag is subjected as previously mentioned is above 100° C. but below the melting point of the polyethylene film of which the bag is made. The precise shrinking temperature used depends on the film constituting the bag and can be determined by empirical experiments. Usually the shrinking temperature is approximately 8 degrees (C.) lower than that at which the film will lose its birefringence when observed under crossed Nicol prisms on a hot stage microscope.

The shrinking of the bag is effected in a relatively short period of time. In general, immersion of the package in the shrinking liquid for a period of 5 to 10 seconds will be sufficient. However, satisfactory results have been obtained by maintaining the package immersed in the shrinking liquid for approximately 2 to 3 seconds.

The liquid media contemplated by this invention can be heated to and maintained at the desired temperature (above 100° C. and below the melting point of the polyethylene film constituting the bag) without any bubbling or surging thereof. Because of the quiescent state of the shrinking liquid at the shrinking temperature, the film constituting the bag will not wrinkle during the shrinking operation and a smooth skin tight covering substantially free of wrinkles will be obtained. By the use of the shrinking liquid herein contemplated, no dulling salt film is formed on the surface of the bag. Moreover, it is non-toxic and does not in any way deleteriously affect the film.

The shrinkable bag contemplated by this invention can be made by appropriately sealing one open end of seamless or seamed thin walled tubing with or without gussets as desired. Polyethylene tubing having a wall thickness within the range of .0005" to .0040" or more and preferably within the range of 0.0018" to 0.0022" have been used.

The dimensions of the bags are such as will permit quick and ready insertion of the item therein and upon shrinking will intimately conform to the item and form a protective skin tight covering substantially free of wrinkles.

In the preferred embodiment, the selected item is inserted into a bag made of seamless polyethylene tubing, such as that produced by the method disclosed in co-pending application of William Ernest Henderson, Serial No. 486,263, filed February 4, 1955, which comprises melt-extruding film forming polyethylene through an annular orifice and blowing said tube while in the plastic formative stage in accordance with the formula

$$\text{Orifice opening} = K (\text{below ratio})^2$$

wherein "orifice opening" is the difference between the radii of the inner and outer lips of the die and is at least .007 inch, K has a value, in inches, not greater than .0018, and "blow ratio," defined as

$$\frac{\text{Flat width of flattened tubing}}{\text{Outer diameter of orifice}}$$

is within the range of 3.5 to 8. After evacuating the interior of the package the open end of the bag is closed and the package suddenly immersed in a solution of 60 parts propylene glycol and 40 parts water at 102° C. for 2 to 3 seconds.

To more fully describe the invention, an illustrative

application thereof for the packaging of eviscerated turkeys will now be described.

After evisceration and chilling, excess moisture is permitted to drain off the turkey which is then squatted, either in a squatting machine or by hand, to broaden the breast of the bird and to free-up the tendons in the hocks and wings so that appendages will lie close to the body of the bird and not protrude at awkward angles which cause bridging and sometimes breakage of the packaging film. The ends of the hocks are then fastened down close to the tail of the bird usually by tying with wire, cord, rubber bands, etc.

The bird prepared as just described is then inserted into a loose fitting bag made of polyethylene film produced by the method of the copending application previously referred to either by the use of a loading horn or chute or manually pulling the bag over the bird as a pillow case is pulled over a pillow. The breast of the bird is toward the sealed end at the bottom of the bag. The resulting package is then evacuated of air on standard evacuating equipment. As the air is evacuated, care is taken to insure the film is pulled in to conform to the body of the bird. The neck of the air evacuated package is twisted by spinning before removal from the air evacuator. The twisted neck is then secured in a closed position by means of a metal clip or other appropriate tie. The excess bag stock beyond the clip or tie is then clipped off.

The package prepared as described immediately before is then suddenly immersed in a solution at 215° F. (102° C.) and consisting of 60 parts propylene glycol and 40 parts of water for 2 to 3 seconds. The immersion may be by hand, basket dip or any other convenient manner or equipment. Upon removal from the solution, the package is weighed and then subjected to quick freezing at the end of which the frozen bird is stored under appropriate conditions.

The bag intimately conforms to the contour of the bird and is smooth and substantially free of wrinkles. The surface of the bag has a higher gloss than before the shrinking operation.

The invention is admirably suited for the packaging of other eviscerated poultry such as chickens, ducks, geese, pheasant, etc. for frozen storage as well as meat food items such as whole meat loaves, smoked butts, whole pieces of sausage, whole cooked hams, smoked picnics (shoulder hams), bone-in and boneless smoked hams, sliced luncheon meats, sliced ham, sliced bacon, sliced sausage, whole slices or wedges of cheese, whole meat carcasses, fresh meat cuts such as chops, steaks, etc. for storage under refrigerating conditions.

The principles of this invention are also applicable to bags made of other thermoplastic films such as Pliofilm, saran, polymer modified vinyl copolymers, polyethylene terephthalate ("Mylar"), polymer plasticized or liquid plasticized polyvinyl chloride, etc. which exhibits little or no shrinkage upon sudden exposure to temperatures at or below 100° C. or to obtain a greater shrinkage than obtained upon sudden exposure to temperatures at or below 100° C. In connection with the aforementioned films, satisfactory results were obtained by suddenly submerging bags made thereof in a liquid medium of the nature hereinbefore described at 102° C. for 2 to 3 seconds.

Herein and in the claims the proportions are by volume.

Since it is obvious that various changes and modifications can be made in the above description without departing from the nature and spirit thereof, this invention is not restricted thereto except as set forth in the appended claims.

I claim:

1. In a method of packaging food items with a skin tight covering the steps which comprise inserting the item to be packaged in a bag made of a plastic film and shrinking the bag to conform to the contour of said item by suddenly immersing the bag and contents in a liquid medium comprising propylene glycol at a temperature above 100° C. but below the melting point of the plastic and maintaining said bag and contents in said liquid medium until shrinkage has been effected.

2. In a method as set forth in claim 1 wherein the liquid medium consists of water and such quantity of propylene glycol as will produce a solution which at the temperature of use is in a quiescent state.

3. In a method as set forth in claim 1 wherein the liquid medium consists of 80 to 60 parts of propylene glycol and correspondingly 20 to 40 parts of water.

4. In a method as set forth in claim 1 wherein the liquid medium consists of 60 parts of propylene glycol and 40 parts of water at a temperature of 102° C.

5. In a method of packaging food items with a skin tight covering the steps which comprise inserting the item to be packaged in a polyethylene bag and shrinking the bag to conform to the contour of said item by suddenly immersing the bag and contents in a liquid medium comprising propylene glycol at a temperature above 100° C. but below the melting point of polyethylene and maintaining said bag and contents in said liquid medium until shrinkage has been effected.

6. In a method as set forth in claim 5 wherein the liquid medium consists of water and such quantity of propylene glycol as will produce a solution which at the temperature of use is in a quiescent state.

7. In a method as set forth in claim 5 wherein the liquid medium consists of 80 to 60 parts of propylene glycol and correspondingly 20 to 40 parts of water.

8. In a method as set forth in claim 5 wherein the liquid medium consists of 60 parts of propylene glycol and 40 parts of water at a temperature of 102° C.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 2,865,767

December 23, 1958

Robert A. Gore

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 2, line 58, for "(below ratio)²" read -- (blow ratio)² --.

Signed and sealed this 31st day of March 1959.

(SEAL)

Attest:

KARL H. AXLINE

Attesting Officer

ROBERT C. WATSON
Commissioner of Patents