Nov. 10, 1970 P. EISLER 3,539,772

HEATABLE PACKAGE WITH DISPLACEABLE FLUENT SUBSTANCE

Original Filed Nov. 17, 1967 3 Sheets-Sheet 1

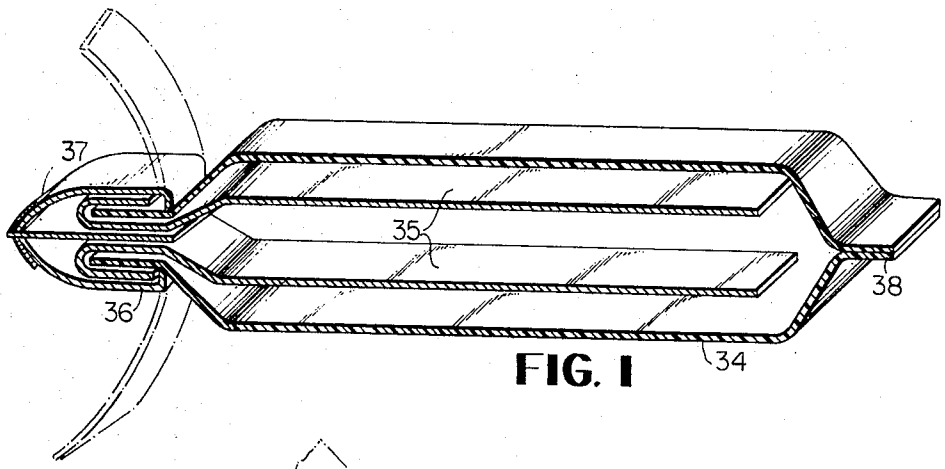

FIG. 1

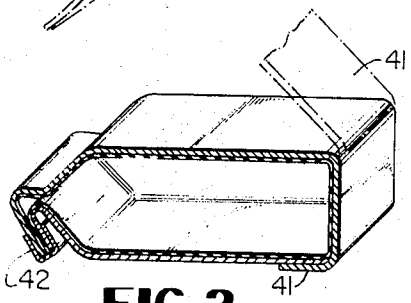

FIG. 2

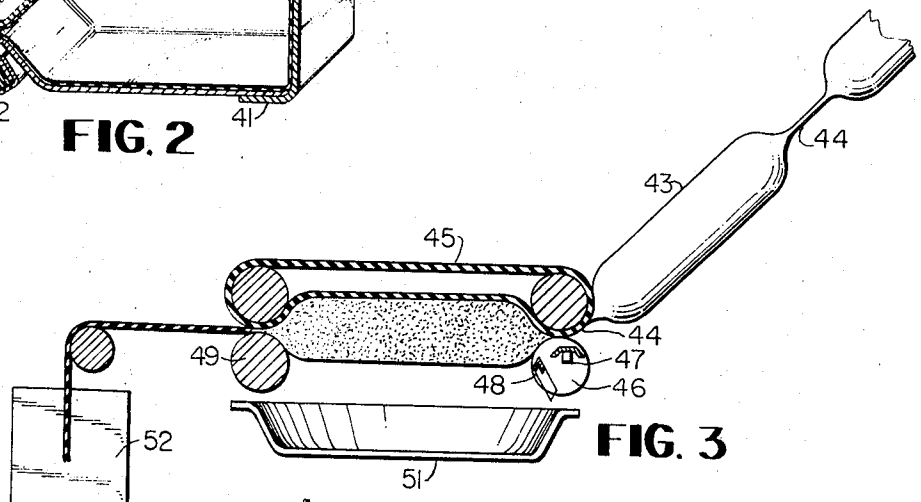

FIG. 3

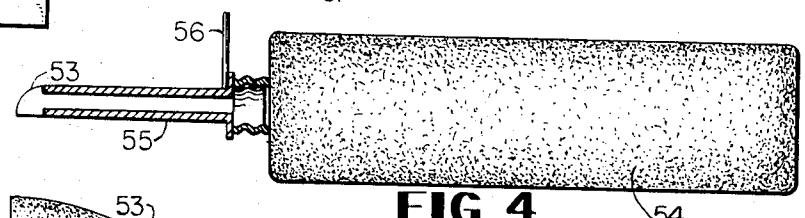

FIG. 4

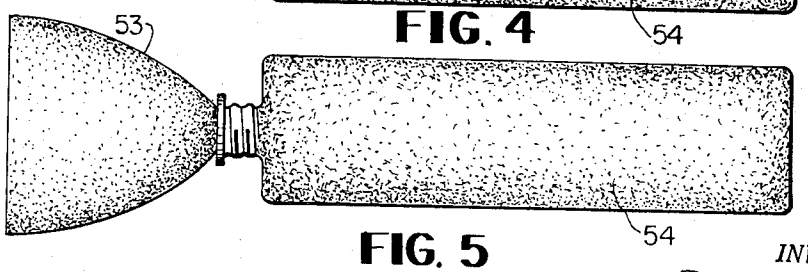

FIG. 5

INVENTOR.
Paul Eisler
BY
Laurence R. Brown
ATTORNEY

Nov. 10, 1970 P. EISLER 3,539,772

HEATABLE PACKAGE WITH DISPLACEABLE FLUENT SUBSTANCE

Original Filed Nov. 17, 1967 3 Sheets-Sheet 2

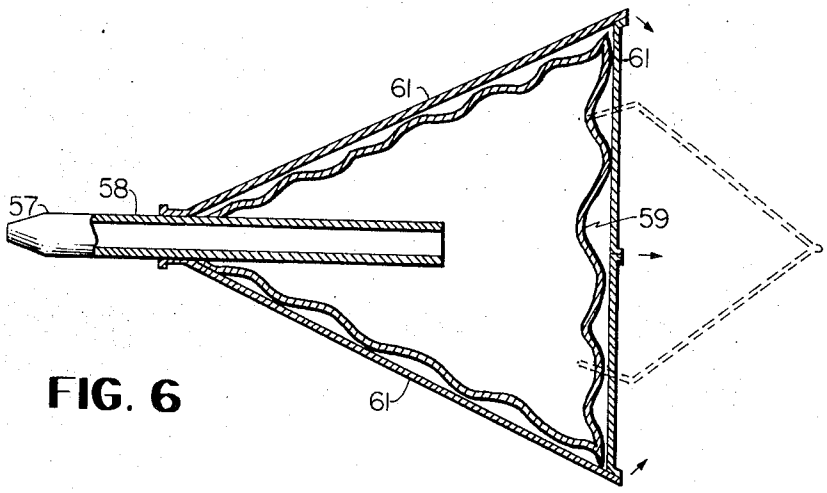

FIG. 6

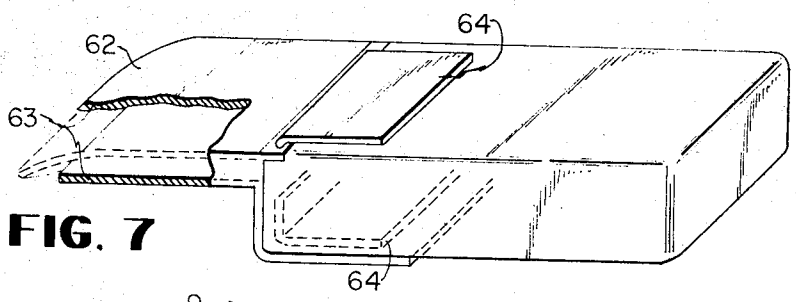

FIG. 7

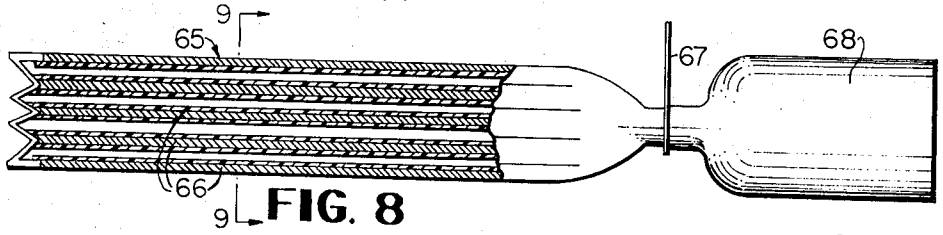

FIG. 8

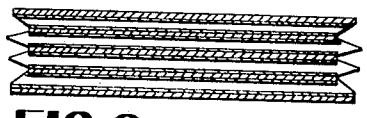

FIG. 9

FIG. 10

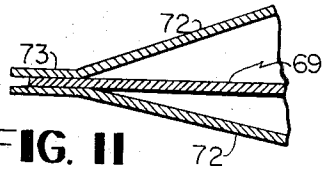

FIG. 11

INVENTOR.
Paul Eisler
BY
Laurence R. Brown
ATTORNEY

Nov. 10, 1970 P. EISLER 3,539,772

HEATABLE PACKAGE WITH DISPLACEABLE FLUENT SUBSTANCE

Original Filed Nov. 17, 1967 3 Sheets-Sheet 3

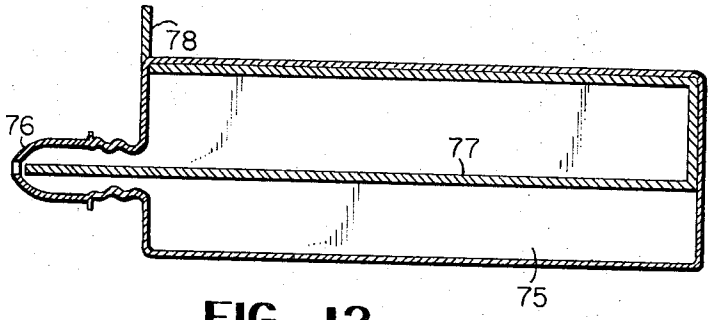

FIG. 12

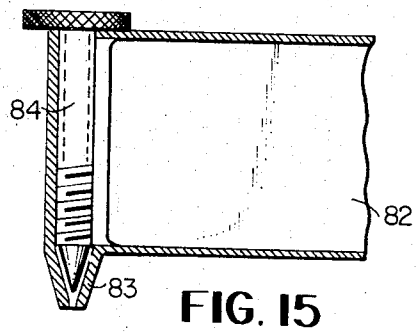

FIG. 15

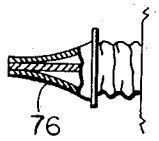

FIG. 13

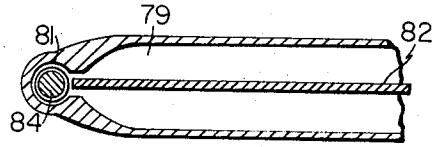

FIG. 14

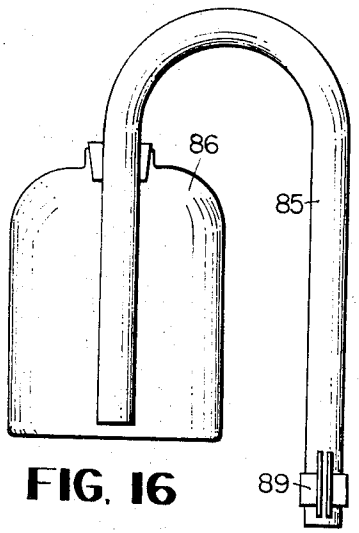

FIG. 16

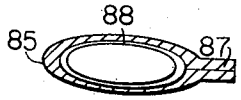

FIG. 17

INVENTOR.
Paul Eisler
BY
Laurence R. Brown
ATTORNEY

United States Patent Office 3,539,772 Patented Nov. 10, 1970

3,539,772

HEATABLE PACKAGE WITH DISPLACEABLE FLUENT SUBSTANCE

Paul Eisler, 57 Exeter Road, London, WC. 2, England

Original application Nov. 17, 1967, Ser. No. 684,068. Divided and this application Aug. 28, 1969, Ser. No. 853,892

Int. Cl. F27d *11/02*; H05b *3/34*

U.S. Cl. 219—386 11 Claims

ABSTRACT OF THE DISCLOSURE

Dispensible containers are disclosed with a dispensible heating film arranged to heat displaceable fluent contents which are discharged in a flow path in intimate contact with the heating film. The containers may be deformable to squeeze contents out a nozzle portion. Separate compartments may contain different substances mixed at the nozzle. The container structure may have special construction features to squeeze out all the contents through the discharge flow path.

This application is a division of copending application entitled Heating Package, Ser. No. 684,068 filed Nov. 17, 1967, by the same inventor and now Pat. No. 3,483,358, issued Dec. 2, 1969, which is a continuation of Ser. No. 102,820 filed Apr. 13, 1961, now abandoned. The disclosure of the copending application is incorporated herein by reference.

The present invention relates to packages of substances in dispensible containers which are required to be heated, and now particularly, it relates to disposable packages heated by dispensible low-voltage type heating film means.

Foodstuff is one type of fluent substance to which the invention applies where it is desired to heat the substance immediately prior to use. The invention combines three elements; firstly, a dispensible container; secondly, dispensible low-voltage type heating film means for electrically heating the substance and, thirdly, pressure controlled discharge or manipulating means for displacing the substance in the container from its resident position across a discharge flow path contacting the heating film.

In the present invention, the heating film means is not only associated with the food or other substance and the package in a manner to transmit heat to the substance from its entire surface, but is also associated with a device or manipulating provision which may, for example, facilitate the handling of the film either during the heating or afterwards, when it is being disassociated from the food.

Some varieties of combination of dispensible container, heating film means and manipulating means, are described in greater detail hereinafter with reference to examples illustrated in the accompanying diagrammatic drawings, in which:

FIGS. 1 and 2 are perspective views partly cut away of two container embodiments of the invention,

FIG. 3 illustrates an application of the invention to a vending machine,

FIG. 4 is a side view, partly in section, of a collapsible container,

FIG. 5 is a plan view of another embodiment of collapsible container,

FIG. 6 is a section view, partly in phantom, of a collapsible container embodiment,

FIG. 7 is a perspective view, partly cut away, of yet another embodiment with a collapsible container,

FIG. 8 is a side view, partly in section, of an embodiment in which a heating container is supplied from a collapsible tube,

FIG. 9 is a cross section on the line 9—9 of FIG. 8.

FIG. 10 is a longitudinal and FIG. 11 a detail section of an embodiment with a multiple compartment collapsible container,

FIG. 12 is a longitudinal section and FIG. 13 is a detail section of another embodiment with a multiple compartment collapsible container,

FIG. 14 is a longitudinal section and FIG. 15 a longitudinal section at right angles to FIG. 14 of yet another embodiment with a multiple compartment collapsible container, and

FIG. 16 is a side view and FIG. 17 a detail cross section of an embodiment in the form of a flexible tube associated with a bottle.

In FIG. 1 the container is a flexible bag **34** with, for example, two heating films **35** within it. The terminals are folded over and before use covered by slotted boards **36**, the edges of which are covered by an easily torn seal **37**. For use the seal is torn and the boards bent up to the chain line position in which access can be had to hold the terminals by a spring clip connector. The other end of the bag is sealed by a thermoplastic bond at **38** which releases when the food is hot. The boards **36** can then be bent still further and used to compress the bag to squeeze the contents out at the other end, the bag being held in the spring clip during this operation.

In FIG. 2 a flexible bag is lined with a heating film flap **41** incorporating the terminals being lapped over to close the end of the bag. The flap is opened to the chain line position for connections for heating and when the contents are heated a stiffener **42** on the other end of the bag assists in rolling up this end to express the contents at the open end. This embodiment is suitable where it is desirable that the package should be opened before heating.

A collapsible tube construction is also convenient for use in a coinfreed or similar vending machine, in which case a long tube **43** FIG. 3 may be subdivided by unfilled necks **44** into lengths each constituting one portion. The heating film not shown presents terminals at the necks. Feed is effected by the aid of a belt **45** suitably of synthetic rubber. At the entry end of the machine, a roller **46** is vertically movable as well as rotatable and carries terminals **47** and a knife **48**. At the other end, the tube **43** passes between squeezing rollers **49**.

During one operating cycle a plate **51** is placed in position and the roller **46** is brought against the neck **44** and rotated to bring the terminals **47** into contact with the terminals in the neck **44**. At the end of heating (which may be determined manually or under automatic temperature control) the roller **46** is rotated sufficiently to disconnect the terminal and cause the knife **48** to cut the tube **43**. The roller is then displaced downwardly and the rollers **49** rotated to feed the tube **43** to the left during which operation the action of the rollers squeezes the heated food through the cut into the plate while a new length of tube comes into position. The downward displacement of the roller **46** permits the tube **43** to run over the guide roller for the belt **45**. The plate **51** with the heated food can now be removed, while the squeezed tube passes into a waste vessel **52**. The mechanical operations are readily affected by the aid of cams or similar means by a mechanism which automatically goes through a single cycle each time it is set in action as by the insertion of a coin.

Cases arise in which it is desirable to heat a substance packaged in a collapsible container not before it is squeezed out, but during squeezing out or even after. For such cases the invention provides for the heating film to be held in a nozzle or in separate container to which the collapsible container is attached.

Thus, in FIGS. 4 and 5 a nozzle **53** is provided intended to be used in spreading the contents of a collapsible tube **54** in a thin layer. The heating film **55**, provided with terminals **56**, is on the inside wall of the nozzle which is supplied for screw attachment to the collapsible tube **54** by the user who removes the ordinary screw cap when he wishes to heat the substance in the tube while squeezing it out. It will be clear that instead of the nozzle being shaped to spread the substance in a thin layer, other forms of nozzle are quite practical which are modelled on extrusion dies to enable a substance to be squeezed out with a corresponding cross section while being heated.

This arrangement is very suitable in cases where only a moderate heating effect is required, as for example various edible spreads, syrups or the like which are not very deeply frozen, but which need to be heated a little to enable them to be spread thinly on soft bread or cake.

FIG. 6 illustrates a squeeze pack in which a nozzle **57** heated by the aid of a heating film **58** is immersed deeply in the substance so that it not only heats the substance just flowing through it, but also at least softens the substance around it. In order to ensure that even the last residue of the substance can be forced through the open inner end of the long tubular nozzle and not pressed forward into a blind end of the container, the container is made up of a flexible lining **59** and side walls **61** which are hinged but stiff, or are operated by a stiff lever arrangement. The chain lines indicate the movement in the course of squeezing.

FIG. 7 illustrates a squeeze pack with an integral or push-on nozzle **62** with heating film **63** extending over the full width of the container. If it is a push-on nozzle it may be fixed on the container by side flaps **64** of the container at which the container is opened passing through slots in the nozzle structure and being folded over. The push-on portion of the nozzle is made of flexible material to enable the container to be squeezed right to the end.

FIGS. 8 and 9 illustrate the attachment of the collapsible tube to a separate container. Here a separate container **65** contains several layers **66** of heating film with terminals **67** and is attached by the user to a squeeze pack **68** containing, for example, a pancake mixture which is pressed by the user into the pre-heated or cold separate container. Each layer of the mixture is heated from both sides. Anti-stick wrapping films, for example, of regenerated cellulose material, are interposed between the heating films and the pancakes in order to ensure trouble free removal of the cakes after heating.

Room-temperature curing compounds are frequently prepared as "two pot mixes." Neither of the two components cures on its own, but when mixed, the mixture will cure. The difficulty has been to devise a mixing process where they can be mixed without being exposed to frictional or other heat which causes cure to start in the mixing vessel.

The packages illustrated in FIGS. 10 to 15 are examples of applications of the present invention to the solution of this problem by the provision of two impermeably separated compartments in a collapsible container, which are heated by one or more layers of heating film, the container having an opening or nozzle through which both compartments discharge.

The separating wall extends into the tip of the nozzle so that the substances in the two compartments can be squeezed through the nozzle at the desired temperature in the desired quantity relation only meeting and thoroughly mixing at the very tip of the nozzle.

FIGS. 10 and 11 show a squeeze pack of triangular longitudinal section with a heating film forming or carried by an impermeable wall between two unequal compartments, flexible bottom ends **71** and rigid walls **72** for manipulation, these walls leading to a nozzle at **73** almost to the tip of which the wall **69** extends and against which the nozzle walls can be pressed as in FIG. 11 for closing the container without leaving any mixed substances behind

or even leaving any minute pathways between the two compartments. The terminals of the film project at **74** to enable connection to be made.

FIGS. 12 and 13 show a simple squeeze pack **75** with a screw cap nozzle **76**, an impermeable wall **77** carrying or constituted by the heating film separating the two compartments and extending almost to the very tip of the nozzle which is flexible and for cleaning and storage purposes can be squeezed to fit tightly against the partition as in FIG. 13.

In this example, the heating film extends not only along the partition but also along the inside wall of the larger compartment and has terminals **78** extending through the wall of the pack.

FIGS. 14 and 15 show a similarly partitioned double squeeze pack **79** terminating in a transverse passage **81** immediately adjoining the partition wall **82** and feeding a nozzle **83**. The cross section of the passage is substantially filled by a screw **84** and the mixing of the substances occurs in the thread groove of the screw which can be withdrawn when the pack is closed by a pressure clip (not shown).

It is possible to extend the principle illustrated in FIGS. 10 to 15 to packs with more than two compartments but this is usually unnecessary for moulding compounds. In all three examples shown in FIGS. 10 to 14 the two substances in the pack are scrupulously separated during storage but are thoroughly mixed during ejection in the tip of the nozzle. With suitable compounds they can immediately be given their final shape as no volatiles need to evaporate. If desired, the heating films can be arranged so that the two substances can be separately and differently heated.

Another embodiment which incorporates a flexible tube and may be described at this point is shown in FIGS. 16 and 17. This is a dispenser for liquids heated in or flowing out through an oval sectioned flexible tube **25** which is inserted in a bottle **86** and incorporated heating film with terminals **87**. A helical wire insert **88** in the tube allows it to be bent without flattening, and its end is opened or closed by the aid of a clamp **89**. If the bottle is rigid, liquid is sucked into the tube and siphoned out by lowering the outside tube below the level in the bottle. If the bottle is of flexible material, the liquid can be squeezed out of it through the heated tube. Practically, any beverage or any easily flowing liquid can be dispensed hot in this way in quantities just as needed. For chemicals, or pharmaceutical use the tube is preferably graduated, and being itself flexible liquid can be discharged from the tube alone by squeezing it.

What is claimed is:

1. A package comprising a flexible dispensible closed container with discharge outlet means and a fluent substance resident therein requiring to be removed from the container and requiring to be heated, a dispensible low-voltage electrically operated film positioned relative to said container to receive said substance in intimate heating contact therewith and pressure controlled discharge means for displacing said resident fluent substance from its resident position in said container through said discharge outlet contacting said heating film thereby to heat said fluent substance.

2. A package as defined in claim **1**, wherein the heating means is disposed within said container.

3. A package as defined in claim **1**, wherein the heating means comprises a dispensing nozzle attached to said container.

4. A package as defined in claim **1**, wherein said pressure controlled discharge means comprises a deformable structure constituting part of said container.

5. A package as defined in claim **4**, wherein said deformable structure constitutes a portion of the container which is not ruptured by applied discharge pressure.

6. A package as defined in claim **4**, wherein the deformable structure is constructed to squeeze said substance off said heating film in said discharge flow path.

7. A package according to claim 1, wherein the container is constructed to separate the substance from the heating film, and the discharge means is constructed to move the substance on to the film for the purpose of heating the substance.

8. A package according to claim 2 having terminals for said film extending from said package, removable means covering the terminals, and structure on said removable means for opening said container to permit said substance to be removed therefrom.

9. A package according to claim 1 in which the container is constructed to dispose said heating film to heat only a portion of said container so that at least a part of the external surface of the complete package remains cool after the heating operation thereby permitting convenient handling of the package.

10. A package according to claim 3, wherein the container is collapsible and is constructed to squeeze said substance through said nozzle when collapsed.

11. A package according to claim 2, wherein the container is flexible and includes partition means dividing it into compartments extending to the tip of the nozzle to keep substances contained in the compartments separated until they are moved into the nozzle.

References Cited

UNITED STATES PATENTS

2,174,319	9/1939	Gastrow	222—146
2,844,695	7/1958	McLean	219—473
2,879,367	3/1959	McLean	219—385
3,100,711	8/1963	Eisler	99—171
3,197,076	7/1965	Chamblee	222—146
3,210,199	10/1965	Schlaf	99—171
3,281,576	10/1966	Cooper et al.	222—146 X
3,296,415	1/1967	Eisler	219—385
3,347,419	10/1967	Brandt et al.	222—107

FOREIGN PATENTS

231,306	6/1944	Switzerland.

VOLODYMYR Y. MAYEWSKY, Primary Examiner

U.S. Cl. X.R.

99—171, 356; 219—521, 536, 541; 222—107, 146