United States Patent [19]

Lowy et al.

[11] **3,710,538**

[45] **Jan. 16, 1973**

[54] METHOD FOR FILLING PRESSURIZED PACKAGES AND AEROSOL DISPENSERS

[76] Inventors: **Lawrence Lowy; William O. Wurtz,** both of 36 West 40th Street, New York, N.Y. 10017

[22] Filed: **Jan. 31, 1969**

[21] Appl. No.: **795,560**

[52] **U.S. Cl.** .....**53/22 R,** 53/36, 99/189, 141/31

[51] **Int. Cl.** **B65b 31/02**

[58] **Field of Search** 53/21, 22, 36; 141/3, 20; 99/79, 189

[56] **References Cited**

UNITED STATES PATENTS

3,232,324	2/1966	Sokol	141/3
3,502,118	3/1970	Assalit	141/20

FOREIGN PATENTS OR APPLICATIONS

987,322	3/1965	Great Britain	141/3

Primary Examiner—Travis S. McGehee
Attorney—Blum, Moscovitz, Friedman & Kaplan

[57] **ABSTRACT**

A method and apparatus for filling pressurized packages and aerosol dispensers. The product which is to be dispensed is initially whipped or beaten in a suitable pressurized beating machine so that minute gas bubbles are incorporated into the product. The gas used for pressurizing the beating machine may be the same as the propellant gas which is used in the dispenser. With the product thus initially treated it is pumped, while maintained under pressure, into a suitable canister which is itself maintained in a pressurized atmosphere of the propellant gas, and the pump will, with minimum work exerted on the product, displace a predetermined quantity thereof into the canister which is in the pressurized atmosphere. While this canister is still in the pressurized atmosphere it is capped so that it becomes closed with a conventional valve release, and then the thus-closed canister is removed from the pressurized atmosphere. Thereafter, the valve of the canister can be actuated to release the product therefrom, with the product expanding in volume as it discharges out of the canister.

1 Claim, 2 Drawing Figures

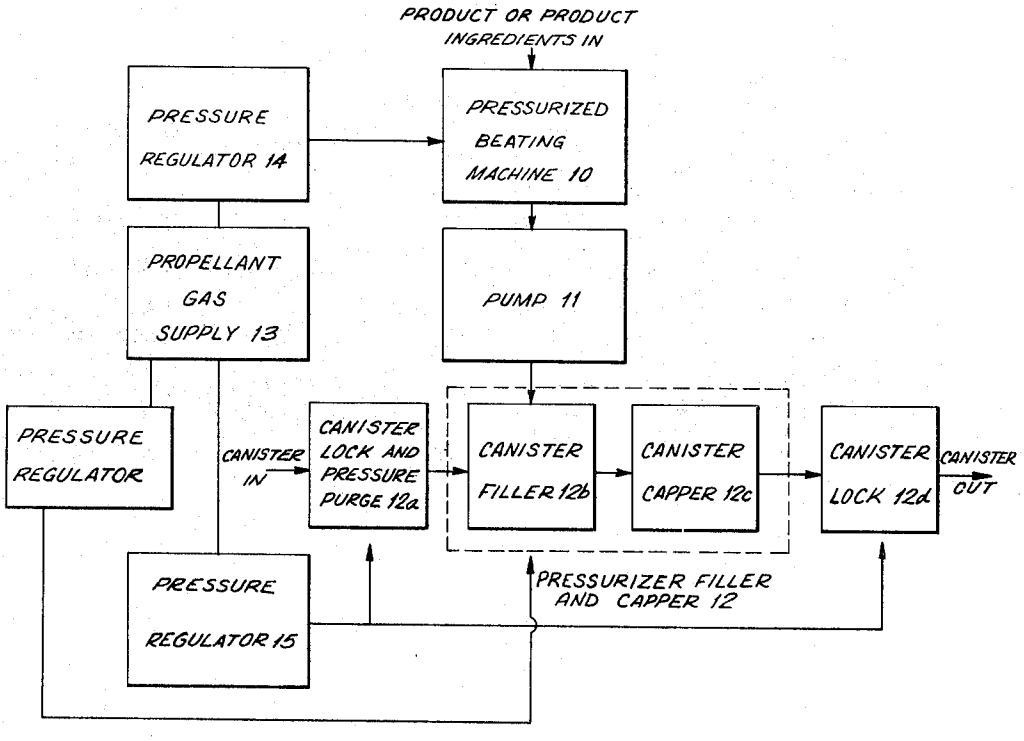


FIG. 1

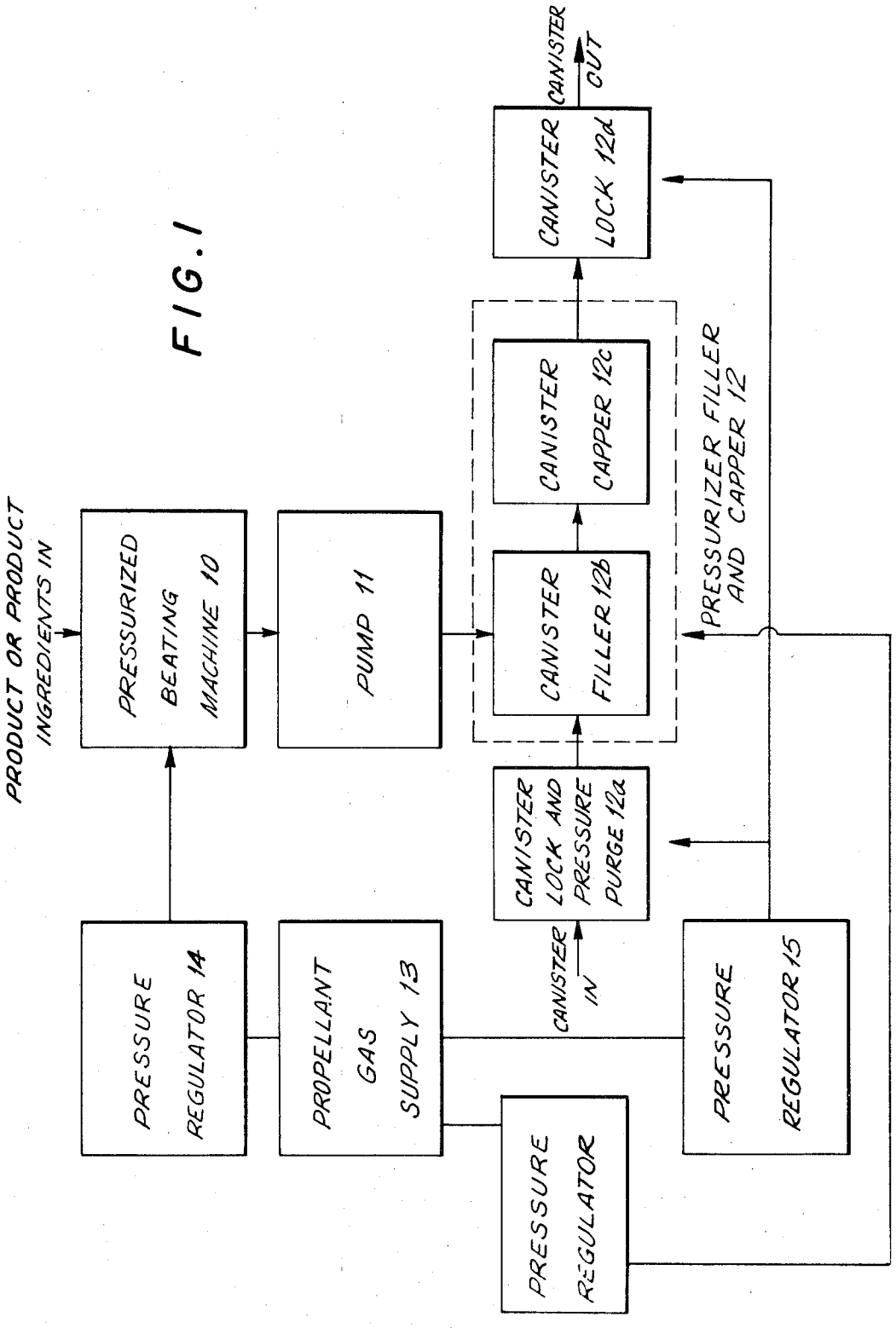
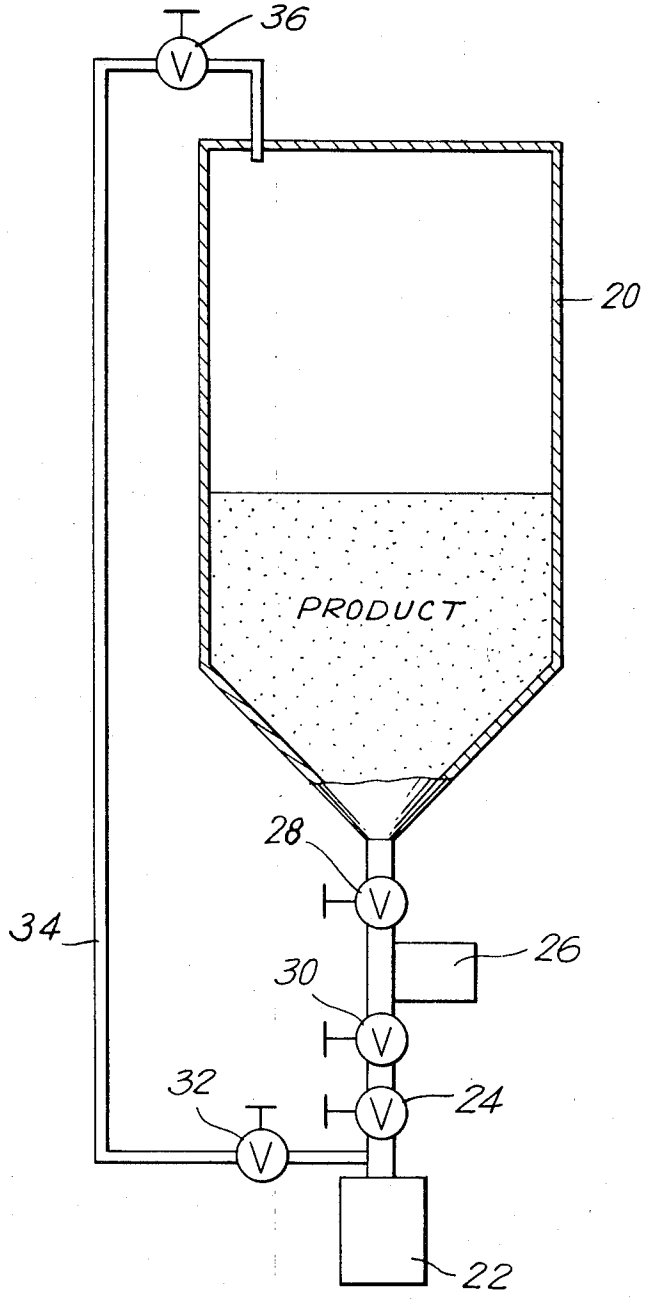

PRODUCT OR PRODUCT INGREDIENTS IN
PRESSURIZED BEATING MACHINE 10
PUMP 11
CANISTER FILLER 12b
CANISTER CAPPER 12c
CANISTER LOCK 12d
CANISTER OUT
PRESSURIZER FILLER AND CAPPER 12
CANISTER LOCK AND PRESSURE PURGE 12a
CANISTER IN
PRESSURE REGULATOR 14
PROPELLANT GAS SUPPLY 13
PRESSURE REGULATOR
PRESSURE REGULATOR 15

FIG. 2



METHOD FOR FILLING PRESSURIZED PACKAGES AND AEROSOL DISPENSERS

BACKGROUND OF THE INVENTION

The present invention relates to a method and system of apparatus for filling pressurized packages and aerosol dispensers. More specifically, the present invention relates to method and apparatus for filling of pressurized packages and aerosol dispensers with viscous liquids, creams or pastes, after incorporating a normally gaseous propellant, either soluble, partially soluble or insoluble in the liquids, creams or pastes. More particularly, the present invention relates to a method and system of apparatus for filling pressurized packages and aerosol dispensers where the viscous liquids, creams or pastes become foam or aerated goods through a pressure beating process and are filled into pressurized packages under pressurized conditions so that expansion of the product does not take place until the pressure is relieved.

In recent years, the pressurized package industry has experienced rapid growth because of the ease of dispensing and the convenience of pressurized packages and aerosol dispensers. Many medicinal, cosmetic and food products are available in the form of aerosol sprays. The processes for filling spray type products are well established. Because there is a market for convenience foods and easily dispensed products, there has been a trend toward the pressurized packaging or more viscous fluids.

Containers have been developed for these products which separate the product and propellant by means of movable piston, or collapsible plastic bag. In view of this rapid growth of the market for pressurized packages, aerosol products and convenience foods, considerable attention has been devoted to the development of new products, new techniques, and apparatus for the filling of pressurized packages and aerosol dispensers.

However, very little or no work has been done in the area of pressure aerated products. Pressure aerated materials consist of a group of materials which are mixed in a pressurized beating machine and where pressurized gas can be incorporated into the material without substantially changing its specific weight until the pressure is relieved and the gas allowed to expand. These foams and aerated materials would have sufficient viscosity to hold their shape until used directly or further processed by such steps as baking, frying or folding into other ingredients. These products could include but are not limited to such food items as whipped creams, whipped toppings, meringues, whipped butter, mayonnaise, batters such as cake batters, pancake batters and waffle batters, marshmallow toppings, icings, cheese, snacks, salad dressings, mousse, chiffon pie fillings, souffles, aerated desserts, cheese cakes and aerated desserts such as ice cream, ice milk, frozen custard and other frozen desserts. It would also apply to products in other industries such as shaving foam, shampoo, cream deodorants, tooth paste and cosmetic creams and lotions.

The method and apparatus for filling pressurized packages with pressure aerated material therefore represents an entirely new concept in pressurized packaging. So that the advantages of this invention may be seen, typical conventional methods for filling pressurized packages are generally as outlined below. In one conventional method for filling aerosols, the desired amount of liquid product is metered into the aerosol canister. The open canister is then generally purged of air by the introduction of a stream of gas. Usually the purging gas is the same as the gas which is to be used as the propellant in the final product. The canister is then fitted with a valve closure which is ordinarily crimped in place over the open mouth of the canister. Next, the canister is advanced to a propellant filling head where a gaseous propellant, usually soluble in the liquid product, is forced through the valve into the canister.

As an alternate to this method, the propellant can be liquified by reducing its temperature. The liquified propellant is metered into the aerosol canister following the product file, under atmospheric conditions. The canister is then capped.

Since the propellant gases do not immediately dissolve in the product, the dispenser is intermittently shaken during the propellant introduction until enough propellant is introduced to provide excess gas in the head space in the canister under a head pressure of about 100 psig. It is to be noted in both of the above conventional methods, the product is loaded under atmospheric conditions followed by pressurizing the canister. The methods are also generally limited to light viscosity liquids, generally under 50 cps and definitely under 2000 cps.

While there is a method for pressure loading liquid and product through the valve of a closed canister, this method is not practical for viscous fluids and therefore has limitations. In this method a liquid saturator loads the liquid product with propellant gas, much in the same manner as bottling soda water, and then is pumped to a filling head under extremely high pressures of 400 to 700 psig.

None of the above methods is suitable for handling aerated material. To meet the demand for pressurized packaging of viscous fluids, creams and pastes, the piston type can or collapsible bag canister was developed. Generally these pressurized packages consist of a standard metal aerosol canister in which a special plastic bag or plastic piston has been inserted. The product is packed on the inside of the bag or on the top of the piston. This is done under atmospheric conditions. The can is capped with a valved closure and propellant is injected into the can from the bottom. By pressing the actuator, the propellant pressure on the bag or piston dispenses the product through the valve. This type of canister has been used for cheese spreads, cleansing creams, putty and dessert toppings. However, these canisters are not suitable for use with aerated or beaten products which are characterized by high viscosity and low specific weight, because of the inability to fill the container with sufficient product. Also, since the canister is loaded under atmospheric conditions, pressure aerated products can not be loaded into these canisters.

SUMMARY OF THE INVENTION

The usual method of aerating a confection such as marshmallow or other aerated products is to incorporate a very large number of extremely small air bubbles into it by means of a beating or whipping process.

In many cases the recipe for the product must always allow for inclusion of a small proportion of a whipping agent which modifies the physical properties of the product in such a way that it can retain the air bubbles in a finely divided form, often so small as to be invisible. The beating process is usually performed in a vertical beater of the planetary motion type, since this type of machine is easily provided with a multi-speed gear box and interchangable stirrers, enabling one machine to be used for mixing as well as beating. There are also processes in which aeration is achieved by other means, such as the action of bicarbonate of soda for instance. In this case the raising or proofing of batters is accomplished by expansion of the carbon dioxide formed when cooling or baking, or in the presence of heat. An alternate method is a batch type pressure beating process as compared to beating under atmospheric conditions. Essentially, an ordinary beating machine is pressurized. Because the ingredients or products are handled under a pressurized system, this type of equipment is preferred for use in this invention. The pressure beater is essentially an extension of the principle of the horizontal marshmallow beater except that the bowl is pressurized and provided with a supply of compressed air or gas. The whole mixing and beating operation is performed under pressure. Expansion of the aerated product only takes place when the pressure is released. When the product is released to atmospheric conditions and when air is used as the aerating material the theoretical change in specific weight is proportional to the change in absolute pressure (gauge pressure plus 14.7 lbs. per sq. inch). Thus, if the pressure of beating is 14.7 lbs. per sq. inch the aerated material will double its volume on expansion (half the specific weight). If the pressure of beating is 29.4 lbs. per sq. inch the product will triple its volume (one-third of the original weight).

Although there are continuous beating processes available, the batch type pressure beater is preferred and can be arranged for a uniform batching process, since the machine can be equipped with such accessories as jackets, pressurized dry or liquid feeding equipment for additives, and controlled so that every batch is made under the uniform conditions of temperature, pressure and humidity. One such machine which is available in capacities from 10 qts. to 200 gallons is marketed under the trade name of "Lowy Whippersnapper Pressure Beating Machine" by Lawrence Lowy Associates, 36 West 40th Street, New York, New York.

Since the invention relates to a method and apparatus for filling pressurized packages with pressure aerated materials directly from a pressure beating machine, all of the product advantages resulting from pressurized beating and aeration are maintained. These advantages include, but are not limited to, longer shelf life for baked goods, stability of foams such as whipped toppings which can maintain their shape from 1 to 2 days at room temperatures without collapsing, the reduction or elimination of leavening agents in raised and backed goods, such as poundcake and angelcake.

When one compares the highly efficient beating method of incorporating microscopic air or gas bubbles into a product under pressure with the inefficient method of charging a canister with propellant and product and then intermittently shaking to mix, one can readily appreciate the disadvantages of the inefficient shaking method which generally results in a collapsing of the gas cell with resulting collapsing of the whipped, beaten or aerated product in a considerably shorter time than that made under pressure aeration conditions. Also, none of the above known conventional methods are practical for pressure aerated products since a pressure aerated product should be loaded under pressure conditions into the canister to take full advantage of reducing the size of the canister. In addition, since the produce is under pressure in the canister, no separation will take place.

Accordingly, it is an object of the present invention to provide a method and apparatus for filling pressurized packages in a manner which meets the demand for new products and new methods, particularly pressure aerated or pressure beaten products.

Another object of the invention is to provide a method and apparatus for filling pressurized containers or aerosol dispensers with viscous liquids, creams, or pastes with propellant gases partially soluble or insoluble in the same materials.

Another object is to provide a method and apparatus for filling pressurized packages and aerosol dispensers with pressure aerated product.

Another object of this invention is to provide a method and apparatus for filling pressurized packages with pressure aerated material where the propellant can be a low cost propellant such as air or nitrogen as compared with higher cost propellants such as freon.

Another object of the present invention is to provide a method and apparatus for filling aerosol pressurized packages with pressure aerated materials, which on expansion will maintain their quality from a consistency standpoint from the beginning to the end of the dispensing.

Another object of the present invention is to provide a method and apparatus for filling pressurized packages which maintain all the advantages inherent in the pressurized aerating or beating processes, namely superior foam stability, longer shelf life for baked goods and lower specific weights without collapsing.

Still another object of the present invention is to provide a method and apparatus for filling packages with a pressurized product that does not require manual shaking by the user prior to dispensing, and can be dispensed in any position.

Another object of the present invention is to provide a method and apparatus for filling a package with a pressurized product in any size container from a fluid ounce to 50 gallons for use commercially, industrially or on an institution basis.

Another object of the present invention is to provide a method and apparatus for filling a pressurized package with a pressurized product using many different types of valves of substantially higher capacities since the foaming or expansion of the product is not related to the rate of flow through the valve or the differential pressure across the valve.

Another object of the present invention is to provide a method and apparatus for filling a pressurized package with a pressurized product in various size containers which will lead itself to commercial, industrial or institutional use for semi-automated or completely

automated systems to depositors, cooking machines or the like.

According to the invention the product which is to be packaged is initially whipped in a pressurized beating machine to which the propellant gas is supplied so that minute, miscroscopic bubbles of the propellant gas are incorporated into the product. Thereafter by way of a suitable displacement pump the pressurized product which has been aerated to incorporate the propellant bubbles is pumped, with a minimum of work on the product itself so that it remains in its whipped condition, into a canister with the pump displacing a predetermined amount of the product into the canister and with the latter maintained under pressure in a pressurized atmosphere of the propellant gas. After the predetermined quantity of the product has thus been situated within the canister it is capped while still in the pressurized atmosphere, and the cap which fluid-tightly closes the canister has a suitable release valve. The canister is introduced into and removed out of the pressurized atmosphere through suitable locks which maintain the pressurized atmosphere while permitting the canister to be introduced into and removed from this atmosphere. Before entering the pressurized atmosphere the canister is located in a chamber where it is purged and placed in an atmosphere matching that of the atmosphere in which the canister is filled and capped. The package may have a canister in which a piston or flexible bag is incorporated, and when the valve is opened to release the product it will expand in accordance with the pressure under which it was packaged, as set forth above.

BRIEF DESCRIPTION OF DRAWINGS

The manner in which the above noted objects and many other highly desirable objects and the advantages of the invention are achieved will be fully apparent in light of the following detailed description of the invention and the accompanying drawing which forms part of the application and represents, by way of example, preferred embodiments of the present invention.

FIG. 1 is a flow diagram of the process of the invention and is a schematic representation of the system of apparatus employed for carrying out the process.

FIG. 2 is a schematic representation of a laboratory test set up for the present invention.

DESCRIPTION OF PREFERRED EMBODIMENTS

In general, the present invention comprises the charging of a pressurized beating machine with the product or product ingredients, mixing the product in the presence of a compressed gas which will become a propellant, beating and dispersing the gas into the product with high speed beaters, discharging the product under pressure to a filling head also under pressure, filling the canisters under pressure, and, while still under pressure, capping the canisters with a conventional valve closure, or with any other capping device such as a quick-opening lid or a break-away cap. Expansion of the pressure aerated material will only take place when the product is dispensed through the valve closure of the canister to atmospheric conditions.

Referring to FIG. 1 for a more detailed understanding of the invention, it will be seen that the system comprises a pressurized beating machine **10** for mixing and beating the product ingredients or product. Compressed gas from a propellant gas supply **13** is admitted through a pressure regulator **14** into the pressurized beating machine while the beating machine is in operation. The gas is finally dispersed into the product under pressures ranging from ½ psig to 125 psig, the specific pressure being selected on its basis of compatability with the product and on its expansion characteristics.

After beating for a period of time sufficient to incorporate the pressurized gas, which would be generally from 2 to 10 minutes, the beating machine is turned off and the gas supply pressure to the beating machine is increased up to double that which was originally set so that the pressure aerated material can be discharged from the machine with a minimum of work applied to the product. Pump **11** is equipped with quick acting pneumatically operated ball valves of the same size and opening as the discharge line from the pressure beater. Pump **11** is a piston or plunger-operated displacement pump with valves operating in sequence to fill and discharge a specific quantity of product. As the inlet valve opens, the pump piston is retracted, and the aerated product is charged into the pump. The inlet ball valve closes and the discharge ball valve opens. A slow moving piston pumps a specific quantity of pressure aerated material to the pressurized filler and capping machine **12**. The pump stroke length is adjustable to handle a variety of canisters of different volumes. Pump **11** is also capable of multiple strokes which are counted to meet the demand of containers of large volume. Ball valves are used to insure little pressure drop across the valve so that pressure changes do not affect the pressure-aerated product.

The pressurized filler and capper **12** consists of a canister inlet lock and pressure purge **12*a***, canister filler **12*b*** and canister capper **12*c*** which consists of conventional aerosol type filling and capping equipment built into the pressurized vessel so as to maintain the same pressure in the pressurized filler and capper as the pressure of the gas which is in finely divided form in the product. Canister lock **12*d*** allows the cans to be discharged from pressurized filler and capper **12** to atmospheric conditions.

The canisters are admitted through canister lock **12*a*** which is continuously purged with the propellant gas. The canister lock consists of two ball valves and a canister receiving chamber between the two valves. In a preferred embodiment of the system, use is made of a piston type can such as that made by American Can Co. After purging the lock and closing the inlet valve, pressure up to 25 lbs. is admitted into the lock. Since the container piston is made out of flexible plastic, it will collapse slightly allowing the pressurized gas to bypass and be admitted underneath the piston as well as in the canister itself. The open can is then admitted to the pressurized filler and capper **12** through the second ball valve.

The canister filler **12*b*** is simply a filling station where the open can is positioned under a filling nozzle. The filling nozzle will have a diameter of at least ¾ inch or more so that pressure-aerated material of a viscous nature can be pumped into the can. The canister is then advanced to a conventional capper and crimper **12*c*** where a valve cap is placed on the can opening and crimped with a standard pneumatic aerosol type

crimper. The can exits from the pressurized filler and capper **12** through canister lock **12***d* which is also continuously purged with propellant.

As may be seen from FIG. **1**, there are additional pressure regulators **15** in lines which deliver the propellant gas from the supply source **13** to the pressurized filler and capper **12** as well as to the inlet and outlet locks **12***a* and **12***d* which are continuously purged with the propellant.

There are differences between a pressure-aerated product and products which are presently packaged in pressurized packages using the aforementioned conventional methods. When a pressure-aerated product is loaded under pressure into a pre-purged container, then capped, the product retains its approximate initial volume and specific weight and contains microscopic air or gas bubbles efficiently dispersed in the material. The pressure-aerated product is above the container piston while the same gas used to aerate the product is contained below the piston at the same pressure.

When the container valve is opened, the propellant pressure, both within the product and under the piston, is partially reduced, partially expanding the propellant, and forcing product through the valve. The gas in the product and that under the piston remain in equilibrium and the piston assumes a new position closer to the valve.

On passing through the valve, the entrapped gas further expands until atmospheric pressure is reached. Since the gas was efficiently dispersed into the product, the expanded gas still remains finely divided and forms an extremely stable cell structure resisting collapse in products such as whipped cream or whipped toppings. This cell structure also holds moisture and prevents watering or weeping of the product. In the case of batters, such as pancake, waffle and cake batters, the moisture is retained in the cooked or baked product making it more palatable and increasing its keeping qualities. Also, in the case of raised products such as batters, leavening agents such as baking powder can be reduced or eliminated. Again, the cell structure of the baked product is more uniform since the raising is not wholly dependent on the expansion of carbon dioxide gas formed when the baking powder reacts.

Upon continued dispensing of the product, the pressure within the container is continually reduced, the piston continues to assume a new position closer to the valve until atmospheric pressure is reached. At this point, depending on the design of the piston, at least 98 percent of the product has been discharged and the piston is in its final position adjacent to the underside of the dispensing valve.

Using conventional methods for light viscosity fluids, the foaming or expansion takes place outside of the valve after hand shaking to assure that uniform proportions of gas and product will be dispensed. The mixing and expansion is substantially less efficient than the pressure-aerated method, and poor cell structure results with such products as whipped cream,etc.

Also when utilizing a piston or bag-in-can conventional method for viscous products, the product is discharged in the same form it had when loaded, thus limiting the volume and making it impractical to package low specific weight beaten products since they have to be beaten under atmospheric conditions and loaded into the canister in their expanded state, not in the unexpanded state as in the present invention.

As an alternate to using the piston can, or bag-in-can with an aerosol type valve, many products such as ice cream, batters, or icings can be packaged in canisters having no valve or piston but merely having a quick opening lid. When the lid is removed the product will immediately expand into say a baking pan and the last volume is removed from the canister with a spatula.

Also, because of the keeping qualities of some of the aforementioned products, particularly those that require freezing to assure their shelf life, a canister with a quick opening lid would be used. The pressure beaten product is frozen in the can and removed from the can in its frozen state. Expansion of the product takes place while the product thaws.

When a quick opening lid is used, it is also possible to take advantage of another feature of the aforementioned "Lowy Whippersnapper Pressure Beating Machine," namely the ability to handle solids such as nut meats, fruit, citron, without breakage. This is accomplished by using a pressurized hopper on the pressure beating machine for the solids and the low speed of 60 rpm for folding the solids into the pressure beaten material. As described previously, in transferring the pressure beaten product to the canister, there are no obstructions since ball valves are used instead of check valves in the pumping operation.

Tests were conducted on a laboratory basis using a laboratory set up as shown in FIG. **2**., a laboratory size pressure beating machine **20** and filling one canister **22** at a time. A commercially available laboratory aerosol canister **22**, with screw on top **24** and threaded fittings, was arranged with a filling connection and a pressure relief connection. The filling connection was connected to a shut off valve and to an air-operated piston pump **26** with manually operated ball valves **28** and **30**. The pressure relief connection was fitted with a check valve and shut off valve **32** and was piped through gas relief line **34** and back pressure valve **36** to the top of the pressure beating machine so that the displaced gas in the canister would return to the beating machine.

In operation, all valves were opened and the pressure beating machine **20** was pressurized with nitrogen gas to approximately 22 psig. Since all valves were open the entire system was pressurized. A bleed valve was opened to purge air from the system and then closed. All valves, except valve **32**, were shut and liquid ingredients for a whipped topping were pumped into the pressure beating machine **20**, using a positive displacement rotary food pump. The pressure beater was turned on for 2–½ minutes at a speed of 240 rpm, then stopped. The gas pressure in the beater was increased to 25 psig to assure flow into the piston pump chamber. The inlet ball valve **28** was opened and the air-operated piston retracted, thus filling the pump cylinder. The inlet valve was closed filling the pump cylinder. The inlet valve was closed and the discharge valve **30** opened as well as the valves on the aerosol canister. The pump piston discharged a preset quantity of topping into the canister by developing sufficient pressure to displace the pressurized gas in the canister through the open valve **32** and relief line **34** to the beating machine. Valves **30** and **32** were manually closed and the canister was uncoupled from the system.

By opening the filling valve of the can 22, the topping was discharged and the microscopic gas bubbles expanded to atmospheric pressure exactly duplicating products which are discharged directly from the pressure beating machine to atmospheric pressure. Volume was 2–½ times that of original liquid ingredients. The cell structure was substantially stronger than whipped toppings now available in pressurized packages and did not collapse after standing 48 hours at room temperature.

A cake batter was prepared in a similar manner using 30 percent less baking powder than called for in the recipe. Mixing was 2–½ minutes at 15 psig. A portion of the batter was discharged into a small baking pan and baked. The canister was then frozen for 2 days, and another cake of the same weight was baked. The second cake did not shrink after baking and was identical to the first in all respects.

As stated, the product can be discharged in any position under continued conditions of uniform quality. Since mixing and beating are performed under constant conditions of temperature, pressure, speed, time and hydration, products can be produced with high quality control as compared to mixing or beating under atmospheric conditions with changes in humidity and temperature. Since they can be shipped and stored in varying sizes without affecting quality, products lend themselves to commercial, industrial or institutional use. For example, a 1 gallon container, containing whipped topping under a pressure of 45 psig, is fitted with a removable goose-neck type dispensing valve. The container is placed in a refrigerated receptacle in a confectionery store and enables 4 gallons of whipped topping to be dispensed onto sundaes and sodas without handling the container, but rather merely operating the valve. If desired, a 5 gallon container of whipped topping can be arranged to discharge through a suitable valve to a standard commercial depositor for applying 20 gallons of whipped topping or fillings to pies.

Pancake batter could be automatically dispensed on command from a control device to an endless stainless steel griddle of the belt type.

Changes, modifications and variations may be made without departing essentially from the spirit of the invention or the scope of the claims. For example, various pressures may be used in the pressurized beating machine to accomplish different degrees of expansion dependent upon the characteristics desired in the aerated product. Also, the invention is not limited to low cost gases such as air and nitrogen or carbon dioxide but may also be employed with other cages commonly used for aerosol dispensing and pressurized packaging, namely nitrous oxide, freon and other low boiling point gases. The pump 11 can comprise of any method for metering the product to the filling station as long as little work is performed on the product itself to insure against product breakdown or reducing pressures and prematurely expanding the pressurized product. If desired, additional gas at any pressure, even including higher pressure, can be injected below the piston and it may or may not become agglomerated with the fluid, thus minimizing the size of the piston.

The present invention is not limited to food, cosmetic or pharmaceutical products but covers an entire range of foamed or aerated material which can be handled in the above described manner.

What is claimed is:

1. In a method of filling a container from which a pressurized product is to be discharged to the outer atmosphere, the steps of beating the product in a pressurized atmosphere to an extent sufficient to incorporate minute gas bubbles into the product from the pressurized atmosphere, displacing the thus-treated product in a given quantity into the pressurized interior of a container, maintaining the pressurized interior of the container in communication with the pressurized atmosphere where the beating of the product takes place so that gas displaced out of the container during filling thereof will be directed to the atmosphere where the product is beaten, and after a given quantity of the product is introduced into the container, removing the latter in closed condition so that the container can thereafter be opened to release the pressurized product.

* * * * *