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(54) Procedure for filling aerosol containers

(57) The procedure entails the introduction through the mouth of the container of the base product and the propellant, made up of solid CO_2 at -75° to -85°C, and then, clamping the valve onto the container.

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Description

[0001] The present invention relates to an aerosol filling procedure whereby both the product intended for the user, namely the base product, and the one used for creating the internal or impelling pressure, are inserted through the mouth of the container before closing the valve.

[0002] Procedures are known for filling aerosol containers which consist, in the first place, in inserting, through the container's upper mouth and prior to its closure, the base product. i.e. lacquer, deodorant, insecticide, lubricant or foam, followed by hermetic closure by means of a valve and subsequent filling with propellant, i.e. CO_2. Freon, butane, propane, alon or any other standardized product. A machine tool with a head in the form of a round pincer hermetically closes the container by applying a cup-shaped cap fitted with a valve on its base and seals, clamps the cap to the walls of the container's circular mouth. A dosing machine is used for supplying the propellant, aided by a pincer-shaped tool installed at the end of a conduct designed to press the valve tap in order to allow the required amount of product to pass.

[0003] These procedures present the following drawbacks:

a) the dosing machine involves considerable economic investment since highly flammable products must be handled which might easily explode when compressed, and thus requires a sophisticated safety system to prevent possible accidents;
b) it is hazardous to operators and service personnel, because possible failures may affect not only the large number of the safety protection devices of the dosing machine but also the containers being fed to the machine. In view of this, factories using these procedures require large isolated facilities installed in independent locations and preferably at a certain distance, with the consequent additional economic cost;
c) in addition to this, the task of filling the propellant in the form of liquid gas into a hermetically closed container is a complicated and trying operation in view that the valve rod must be forced without causing damage which may result in leakage;
d) furthermore, the container's usable space, namely the one occupied by the base product, acts to the detriment of the space occupied by the propellant, which, being a liquid gas, occupies 30% to 90% of the space, depending on the nature of the base product;
e) because of their high cost, these facilities are not cost effective when applied to small production quantities, thus impairing the handling of custom orders, product ranges and small company brands;

[0004] Other procedures are known for the filling of aerosol containers, by cooling, which consist in the introduction, in through the mouth of the container, of the base product and the propellant as a liquid, and, then, the valve is placed onto the mouth of the container and it is hermetically closed by means of the valve by using an adequate tool machine.

[0005] This type of procedures has the following drawbacks:

a) it requires the cooling of the liquid propellant to a temperature such that, on the one hand, does not cause any important losses of the propellant gas due to evaporation and, on the other hand, evaporation takes place in an amount sufficient for the removal of air from the bottle, which requires adequate means for the cooling of the propellant and its preservation;
b) it requires the previous cooling of the base product before adding the cooled propellant, but to a temperature above that of the propellant, which requires adequate means for the cooling of the base product and its preservation;
c) due to the low working temperature, this type of procedure is not applicable to concentrates which can be altered by cooling, such as aqueous media, which solidify by freezing, or other media which can cause the crystallisation of the dissolved substances by decreasing the solubility of the same along with temperature.
d) it is dangerous when flammable propellants are used, which requires important investments concerning safety; and
e) it is very difficult to dose small amounts of propellant.

[0006] These problems are solved by the present invention, which provides a procedure for the filling of every kind of aerosol containers, of the type which entails the introduction both of the base product and of the propellant in through the mouth of the container before setting the valve onto the container, characterised in that said propellant is carbon dioxide [CO_2] in the solid state, at a temperature of -75° to -85°C approximately, producing, as a consequence of the temperature increase inside the container due to its stabilisation towards room temperature, a change in the physical state of solid CO_2 to gas CO_2 which causes an internal pressure in the container which, when the valve is pressed, expels the base product under pressure.

[0007] More specifically, the present invention provides a procedure for filling all kinds of aerosol containers and into which the base product - for instance, deodorant, lacquer, insecticide, lubricant, cleaner, perfume, foam, snow, streamer, paint or any other product liable of being packed or distributed as aerosols - is filled in an adequate proportion through the container's mouth, followed by the insertion, through said mouth, of solid CO_2 at a temperature of -75°C to -85°C in an adequate

quantity and weight, and subsequently the container is plugged by fitting the valve to the mouth. A closing machine tool with a circular pincer-shaped head adapted to the valve's external cylindrical portion then opens in a circular manner and traps or clamps the lower part of the cylinder to the circular walls of the container mouth, and the gasket which seals the valve to the mouth. As the -75°C to -85°C temperature stabilises towards room temperature, the solid CO_2, commonly known as dry ice, changes its physical state from solid to gas and creates an internal pressure in the container which, upon acting on the valve, causes the base product to be expelled under pressure.

[0008] In an alternative embodiment, the possibility of placing, without clamping on, the valve to the mouth of the container after inserting the base product inside of the container but before inserting the propellant, in which case, the clamping of the valve onto the container is carried out after the insertion of the propellant.

[0009] Loaded and sealed containers undergo air tightness tests consisting, for instance, in immersing the containers inside of a hot water bath, at about 50°C approximately, for 3 minutes, from which the ones which show a defective sealing are removed.

[0010] Dry ice, CO_2 in the solid state at -75°C to -85°C is obtained, for instance, by expanding liquid CO_2 at atmospheric pressure, which changes physical states and is transformed into carbonic snow (solid) which is compacted by means of some special presses acquiring the adequate shape and size, for instance, small cylinders (pellets or nuggets) which allow easy handing and dosing of the product.

[0011] The handing of dry ice must be done taking the due safety precautions, for instance, using a thick globe in order to avoid cold burns. Dry ice can be preserved, insulated, inside of an adequate freezer or refrigerator until it is used.

[0012] The following stand out among the advantages provided by the procedure for the filling of aerosol containers of the invention compared to conventional procedures:

a) important machinery investment saving, since neither the liquid gas dosing nor the extraordinary safety measures required by the latter and the containers are required;

b) a significant gain in terms of safety, since the product used is not a flammable and explosive gas but solid CO_2, a safe, non-flammable, non-explosive, non-toxic, totally safe product, with the sole exception that extended contact with the skin must be avoided because of its extremely low temperature;

c) a gain in terms of net base product content, since solid SO_2 takes up less space than liquid gas;

d) small aerosol orders, adapted to the needs of small companies or to a diversity of product ranges, may be profitably processed because of the small investment involved and the simplicity of the filling operation.

Claims

1. Procedure for filling aerosol containers of the type which entails the insertion both of the base product and the propellant in through the mouth of the container before clamping the valve onto the container, characterised in that said propellant is carbon dioxide [CO_2] in the solid state, at a temperature of -75° to -85°C.

2. Procedure according to claim 1, characterised in that said base product is deodorant, lacquer, insecticide, lubricant, cleaner, perfume, foam, snow, streamer, paint or any other product liable of being packed as aerosols.

3. Procedure according to claim 1, characterised in that said valve is placed onto the mouth of the container after introducing the base product and the propellant into the container.

4. Procedure according to claim 1, characterised in that said valve is placed, but not clamped, onto the mouth of the container after introducing the base product into the container but before inserting the propellant.

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EUROPEAN SEARCH REPORT

Application Number
EP 98 50 0271

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
X	FR 1 205 297 A (BRADLEY) 2 February 1960 * page 3, column 1, paragraph 4 - paragraph 5; figure 4 *	1-3	B65B31/10
X	FR 1 323 823 A (RAMIS) 3 July 1963 * the whole document *	1,2	

TECHNICAL FIELDS SEARCHED (Int.Cl.6)

B65B
B65D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	17 March 1999	Claeys, H

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
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L : document cited for other reasons

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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 98 50 0271

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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17-03-1999

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
FR 1205297 A	02-02-1960	NONE	
FR 1323823 A	03-07-1963	NONE	

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82