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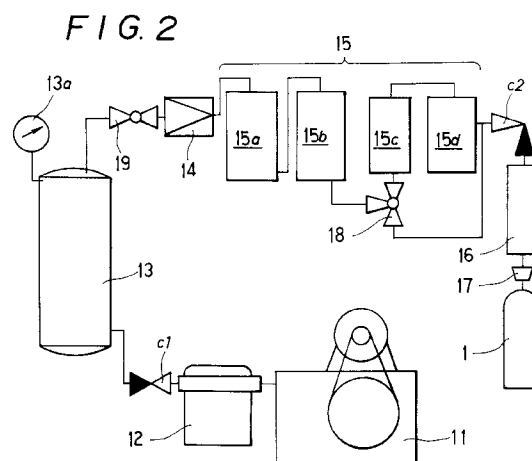
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(54) **Aerosol spray and method for manufacturing the same.**

(57) In an aerosol spray comprising a spray container (1) containing a spraying product (V2), a spray head (2) having a valve (5) which opens by pressing the spray head and a spray nozzle (7), air purified by passing through a filter device is used as a propellant (V1) for discharging the spraying product.

The propellant air (V1) may be purified by at least one dust-removing filter (15a, 15b), chemical filter (15c) and germ-removing filter (15d). The propellant (V1) of the purified air is safe to man and has no danger of causing environmental pollution and disruption.



This invention relates to an aerosol spray using purified air as a propellant and a method for manufacturing the aerosol spray by effectively purifying and charging the propelling air into a spray container.

Generally, in aerosol sprays for discharging liquid substance such as cosmetics and medicines to be sprayed (spraying product) in the form of fine particles, pressurized propellant material such as Freon, carbon dioxide gas, butane, propane, nitrogen and LPG has been charged in the state of a liquid or gas together with the spraying product. A spray container filled with the aforesaid spraying product and propellant is commonly provided with a spray nozzle head having a spray valve which opens by pressing the nozzle head to thereby discharge the spraying product from the spray nozzle of the nozzle head by the force of the propellant.

The propellant charged in the spray container is discharged in the state mixed with the spraying product, consequently to be dispersed in the air. The fact that the dispersion of the propellant of such chemical materials as noted above causes not a little environmental pollution and disruption in various forms has raised current social problems. For reasons of environment, there has been taken a measure to regulate or prohibit the use of some of the aforesaid chemical materials as the propellant, although these materials possess good mechanical properties for use in the aerosol spray.

In the case of using Freon as the propellant for discharging the spraying product such as medicines and cosmetics, which includes watery ethylalcohol, hydrogen chloride (HCl) develops in the Freon.

The hydrogen chloride, as commonly known, has an acidifying property similarly to carbon dioxide, and therefore, is inappropriate to some purposes. Also, inflammable substances such as LPG are disadvantageous in that the especial care must be taken in dealing with it.

The propellant Freon is sensitive to heat change, meaning that the pressure inside the spray container is intensified even when the temperature rises slightly.

U.S. Patent No. 3,984,034 describes a fluid and paste dispenser using compressed air as a propellant, comprising a bag containing a product, and a piston which is pressed against the bag by the compressed air charged from an air cartridge into the dispenser so as to squeeze out the product. This dispenser has an advantage in that the product and propellant can be isolated, but it is considerably complicated in structure and susceptible to mechanical trouble since intensive pressure is brought about inside the dispenser by the propellant air.

Even if the air may be contained as the propellant in the spray container together with the spraying product, the aforesaid conventional dispenser would entail a disadvantage such that the spraying

product is affected by various impurities, bacilli and germs in the air to be deteriorated in quality and denaturalized.

The present invention was made to overcome the drawbacks of the past described above. Its object is to provide an aerosol spray using a spraying propellant which is safe to man and has no danger of causing environmental pollution and disruption. Another object of the invention is to provide a method for manufacturing the aerosol spray by producing a spraying propellant which is safe to man and has no danger of causing environmental pollution and disruption and easily and reliably charging the propellant into a spray container with safety.

To accomplish the objects described above according to the present invention, there is provided an aerosol spray comprising a spray container for containing a product to be sprayed and a pressurized propellant for discharging the product, and a spray head fitted to an opening formed in the spray container and having a valve which opens by pressing the spray head, and a spray nozzle, which is characterized in that the propellant is air purified by being passed through a filter device.

The method for manufacturing an aerosol spray according to the invention comprises putting a spraying product into an aerosol container, introducing the air into an air compressor to produce compressed air, passing the compressed air through a filter device to obtain purified air, and charging the purified air into the aerosol container.

The aforesaid filter device is composed of at least one dust-removing filter, a chemical filter containing activated carbon or the like, and a germ-removing filter so as to remove dust, bacilli and germs from the introduced air to produce the purified air. The initial pressure under which the compressed air is initially charged in the spray container is so determined that the residual pressure of the compressed air of 2.2 bars or above which is left after completely discharging the spraying product from the spray container is secured.

By pressing the spray head mounted on the spray container, the spraying product is discharged from the spray nozzle in the form of fine particles by the force of the compressed air propellant which is charged into the spray container together with the spraying product. Since the air is used as the propellant, this safe aerosol spray does not adversely affect health, can be manufactured at a low cost, and does no longer cause disadvantageous environmental pollution and disruption.

One way of carrying out the invention is described in detail below with reference to drawings which illustrate only one specific embodiment, in which:-

Figure 1 is a sectional side view schematically showing one embodiment of the aerosol spray according to this invention; Figure 2 is a schematic dia-

gram showing a system for manufacturing the aerosol spray of this invention; and Figure 3 is an explanatory view schematically showing a prefilter used in the system for manufacturing the aerosol spray of this invention.

One embodiment of the aerosol spray according to this invention will be described with reference to Figure 1.

The aerosol spray comprises a spray container 1 formed of metal or reinforced plastics and having an upper opening into which a spray head 2 fitted. The spray head 2 is airtightly fixed onto the spray container 1 in such a manner that a flange 4 of the spray head is connected to a collar 3 formed around the edge of the upper opening in the spray container 1 by welding or other possible joining methods.

The spray head 2 is provided with a valve 5 retained by the flange 4. The valve 5 is kept close in its normal condition by the energizing force of a spring 6, but it opens by pressing the spray head 2. The spray head 2 further has a spray nozzle 7 which communicates with the valve 5 through a conduit pipe 8.

In the drawing, reference numeral 9 denotes a siphon tube having one end connected to the valve 5 and extending to the bottom of the spray container 1.

In the structure described above, by pressing downwardly the spray head 2 against the spring 6, the valve 5 opens to form a fluid passage from the lower end port of the siphon tube 9 to the spray nozzle 7 through the valve 5 and conduit pipe 8.

Into the spray container 1, there are charged pressurized air V1 as a propellant and substances V2 to be sprayed (spraying product). In this state, by pressing the spray head 2, the spraying product V2 is discharged in the form of fine particles from the spray nozzle 7 through the aforementioned fluid passage by the pressure P of the pressurized air V1.

The pressurized air V1 charged inside the spray container 1 is purified by removing minute dust, bacilli and germs from the air.

The initial value of the pressure P of the pressurized air V1 to be initially contained in the spray container 1 should be so determined that the residual pressure of the air which is left inside the spray container after completely discharging the spraying product is kept at 2.2 bars or above. For example, in a case where the spraying product of 70 volume % is contained in the spray container 1 having a capacity of 100 ml (i.e., V1:V2 = 30:70 %), the initial air pressure should not be lower than 7.4 bars in order to secure the residual pressure of 2.2 bars or above at last.

Next, the system capable of producing and charging the dust- and germ-free air in the spray container 1 so as to attain the pressure condition noted above will be described with reference to Figure 2.

The system for manufacturing the aerosol spray according to the present invention comprises an air compressor 11, a prefilter 12, a pressurized air tank

13, a control valve 14 for regulating the flow quantity of the pressurized air, a filter device 15, a charging cylinder 16, and a charging head 17.

The air compressor 11 serves to introduce the air and produce the pressurized air of high pressure and may be composed of a commonly known compressor.

The prefilter 12 has an inlet port A1 connected to the air compressor 11 and an outlet port A2 which is several times larger in aperture area than the inlet port A1 so that the air introduced from the inlet port A1 flows at a very low speed inside the prefilter 12, as shown in Figure 3. The interior of the prefilter 12 is kept at 0°C or below. Thus, water, oil or the like present in the air flowing slowly in the prefilter congeals to the solid state and precipitates to the bottom of the prefilter 12. Of course, the impurities such as soot as well as the water and oil in the air are removed.

The air from the air tank 13 is fed to the filter device 15 so as to remove impurities such as minute dust along with bacilli and various germs.

The filter device 15 is of multiple stages of filters, that is to say, comprises the first filter 15a to the fourth filter 15d in this embodiment. The first filter 15a is a dust-removing membrane filter formed by bundling a great number of chemical resistant hollow yarns and has a function of completely removing fine particles having a particle size larger than 0.05 to 0.03 mm. The second filter 15b is a dust-removing filter formed by laminating cellular films having chemical resistivity and serves to completely remove more fine particles of 0.02 to 0.01 mm or above in particle size from the air. The third filter 15c is a chemical filter filled with granulated absorbents such as activated carbon and can completely remove colloidal contaminant, insoluble substances and so on from the air. The fourth filter 15d is a germ-removing filter made of cellular materials having chemical resistivity and charged with static electricity so as to absorb residual floating substances, bacilli and germs in the air.

The filter device 15 is provided with a change-over valve 18 on the outlet side of the second filter 15b so that the third and fourth filters 15c, 15d can be selectively used as occasion demands.

The purified air from which all the impurities are substantially completely removed can be produced by the aforementioned four-stage filters. The purified air free from dust, bacilli and germs is once stored in the charging cylinder 16 and then charged in the spray container 1 by use of the charging head 17.

In the drawing, reference symbols c1 and c2 denote check valves, 13 a pressure meter for use in controlling the internal pressure in the air tank 13, and 19 a cock.

As is apparent from the foregoing, according to the present invention, the purified air can be produced by substantially completely removing dust and germs by use of the multi-stage filters, and safely and

reliably charged into the spray container together with the spraying product. Since the purified air is used as the propellant, the aerosol spray thus obtained is safe to health and does no longer cause environmental pollution and disruption.

Thus, this invention makes it possible to use air as a propellant for an aerosol spray, all sorts of fluid products irrespective of foods, cosmetics, paints or medicines can be contained and discharged with safety in the form of fine particles at need. In conclusion, the present invention provides a suitable aerosol spray for spraying various kinds of liquid products.

Claims

1. An aerosol spray comprising a spray container (1) for containing a spraying product (V2) and a propellant (V1) for discharging said spraying product (V2), and a spray head (2) fitted onto said spray container (1) and having a valve (5) which opens by pressing said spray head (2) and a spray nozzle (7), characterised in that said propellant (V1) is air purified by being passed through a filter device (15). 5
2. An aerosol spray according to claim 1, characterized in that said air is charged in said spray container (1) under initial pressure which is so determined that pressure left in said spray container (1) after completely discharging said spraying product (V2) is kept at 2.2 bars or above. 10
3. An aerosol spray according to claim 1, characterized in that said air is purified by at least one dust-removing filter (15a, 15b). 15
4. An aerosol spray according to claim 2, characterized in that said air is purified by at least one dust-removing filter (15a, 15b). 20
5. An aerosol spray according to claim 3, characterized in that said air is further purified by a chemical filter (15c) and/or a germ-removing filter (15d). 25
6. An aerosol spray according to claim 4, characterized in that said air is further purified by a chemical filter (15c) and/or a germ-removing filter (15d). 30
7. A method for manufacturing an aerosol spray, characterized in that propellant air passes through a filter device (15) having at least one dust-removing filter (15a, 15b), chemical filter (15c) and germ-removing filter (15d) to purify the air, and charging the purified air into a spray container (1) by use of a charging head (17). 35
8. A method according to claim 7, characterized in that said air is pressurized by an air compressor (11), and fed into said filter device (15) through a prefilter (12) and a compressed air tank (13). 40

FIG. 1

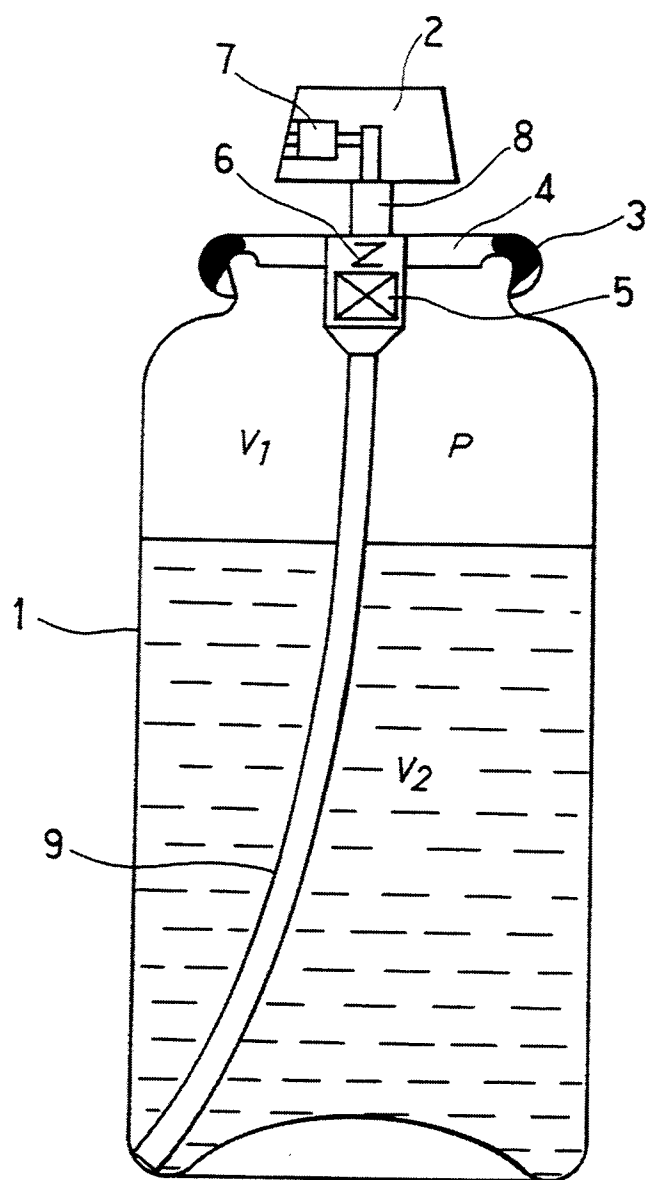


FIG. 2

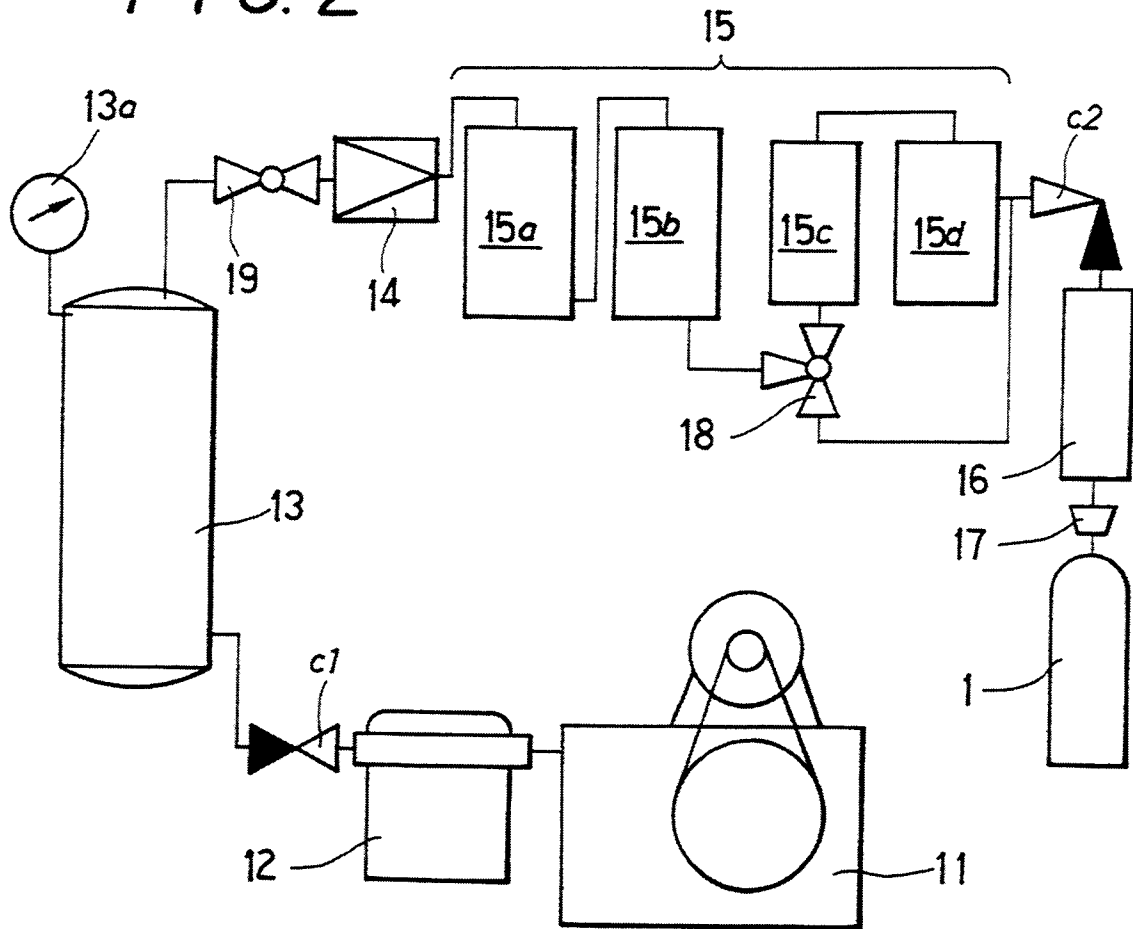
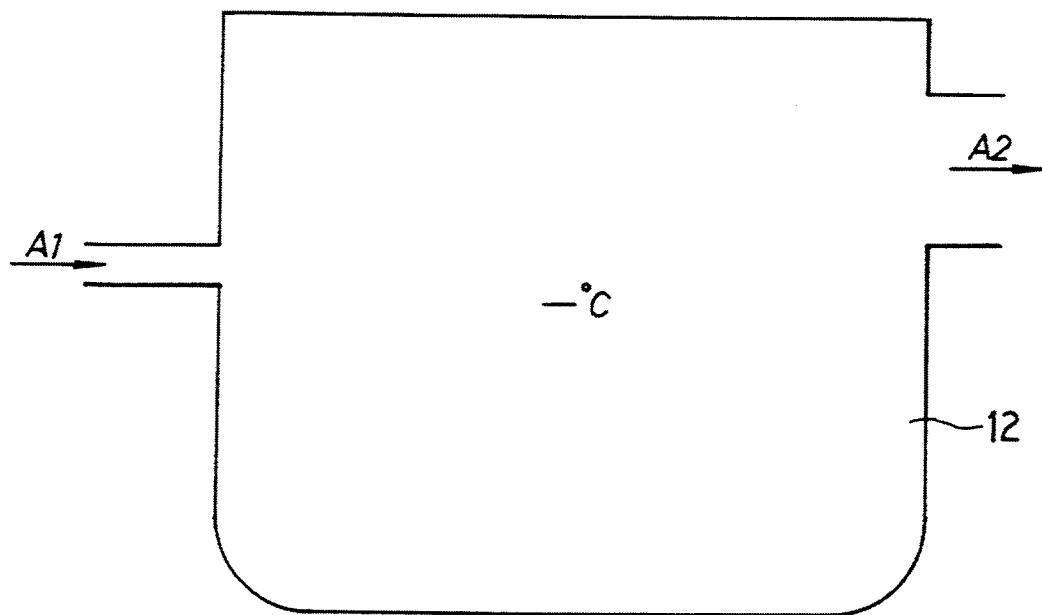


FIG. 3





European Patent
Office

EUROPEAN SEARCH REPORT

Application Number

EP 92 30 7794

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.5)
X	DE-A-3 800 194 (B. SCHECKENBACH) * column 1, line 1 - column 3, line 1; figures *	1,3	B65B31/00
A	---	5,7,8	
A	DE-U-8 808 407 (E. AICHELE) * page 5, line 11 - page 8, line 25; figures *	1,7	
A	DE-U-8 907 388 (R. STANGER) * page 4, line 5 - page 6, line 31; figures *	1,7	
A	EP-A-0 410 947 (P. CORONA) * column 1, line 1 - column 2, line 33; figures *	1,7	

The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 17 DECEMBER 1992	Examiner JAGUSIAK A.H.G.
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 D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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