Sept. 27, 1955 W. L. KIMBALL 2,718,987

POWDER DISPENSING AND APPLYING DEVICE

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Fig. 1

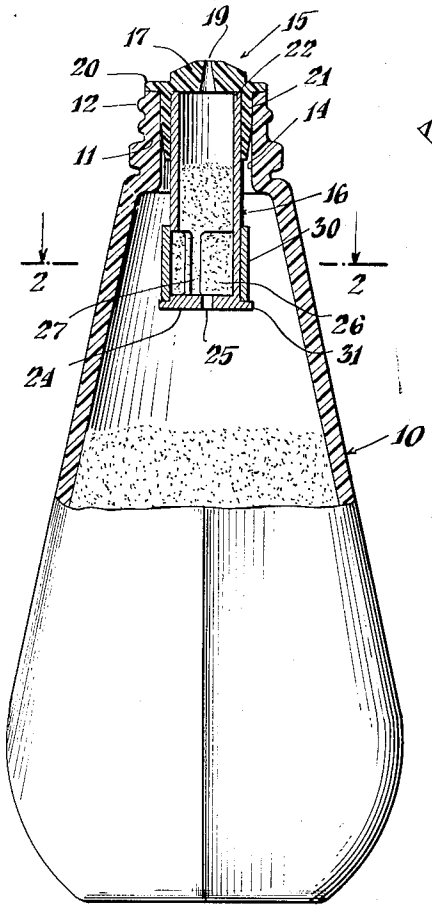


Fig. 4

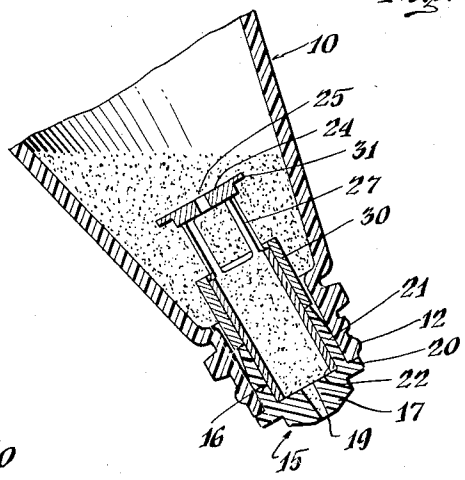


Fig. 3

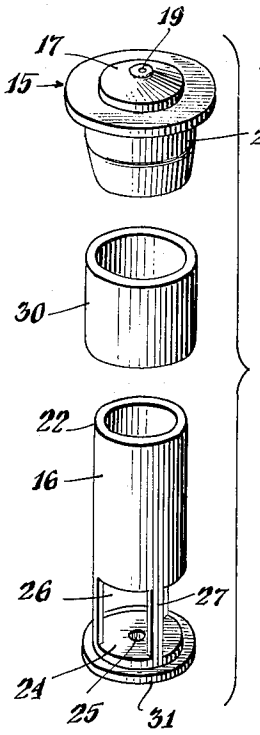
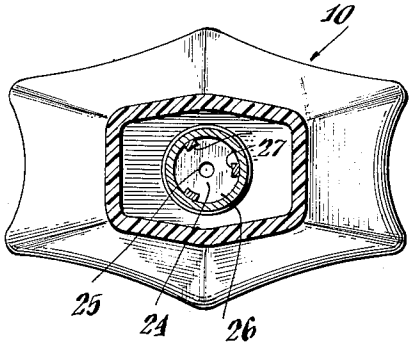


Fig. 2



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POWDER DISPENSING AND APPLYING DEVICE

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10 Claims. (Cl. 222—193)

The present invention relates to dispensing devices, and, more particularly, to a device for dispensing and applying powdered materials, such as talcum powder and the like.

The present invention aims to provide an improved device of the foregoing character which is in the form of a sealed package essentially comprising a compressible container, such as a bottle formed of plastic for storing the powder, and an insert positioned in the outlet of the bottle for segregating a quantity of the powder to facilitate dispensing and applying the same while the bottle is in a generally upright position as well as while the bottle is in a generally inverted position.

Accordingly, an object of the present invention is to provide such a device wherein a quantity of the powder can be segregated in an extremely rapid and convenient manner and the powder dispensed in a uniform stream.

Another object is to provide such a device which does not require an eduction tube extending to the bottom of the bottle and likely to cause difficulties in assembling or closing of the package by interfering with the powder in the bottle.

Another object is to provide a simple, practical and economical insert which is constructed of a minimum number of parts adapted to be readily manufactured and assembled.

Another object is to provide such an insert which can be positioned in the bottle outlet by automatic machinery or manually without resorting to any special operations.

A further object is to provide a package of the foregoing type which does not require the use of any specially constructed bottle, whereby the bottle is adapted to be filled by standard filling machines now in use.

A still further object is to provide such a package wherein the utilitarian features thereof do not mar its attractive appearance.

Other and further objects will be obvious upon an understanding of the illustrative embodiment about to be described, or will be indicated in the appended claims, and various advantages not referred to herein will occur to one skilled in the art upon employment of the invention in practice.

In accordance with the present invention, the foregoing objects are accomplished by providing a powder dispensing device in sealed package form which comprises a compressible container having an outlet passage; insert means secured in the passage providing a chamber having a discharge aperture at one end thereof and an opening adjacent the other end thereof in direct communication with the interior of the container and of a size to permit powder to flow freely therethrough under the influence of gravity into the chamber; and valve means structurally associated with the insert means for movement with respect thereto and arranged to close the opening when the container is in a generally upright position and to unclose the opening when the container is in a generally inverted position. The insert means has an aperture for providing communication between the interior of the container and the interior of the chamber, this aperture having a much smaller effective area than the opening and serving primarily as an air inlet for pressurizing the chamber upon compression of the container and having a slightly larger effective area than the discharge aperture to enable pressure to be built up in the chamber.

In a preferred embodiment of the invention about to be described, the insert means include a closure plug in the container outlet passage having a cover portion formed with a discharge aperture and having a tubular skirt; and a sleeve having an open end connected with the skirt of the plug, with a wall at its opposite end formed with the chamber pressurizing aperture and having the opening in its side adjacent the end wall for admitting powder to the chamber. The valve means constitutes a second sleeve in telescoping relation with the first sleeve and is mounted for sliding movement with respect thereto for closing and unclosing the opening, and is supported by a portion of the end wall when the container is in a generally upright position.

A preferred embodiment of the invention has been chosen for purposes of illustration and description as is shown in the accompanying drawing, forming a part of the specification, wherein:

Fig. 1 is a side elevational view of a package in accordance with the invention with the upper portion thereof shown in longitudinal section to illustrate the position of the valve means when the package is in upright position.

Fig. 2 is a sectional view taken along the line 2—2 on Fig. 1.

Fig. 3 is an enlarged exploded perspective view of the elements constituting the insert and valve means apart from the container.

Fig. 4 is a fragmentary longitudinal sectional view of the upper portion of the package illustrating the position of the valve means when the package is tilted to a generally inverted position.

Referring to the drawing in detail and more particularly to Figs. 1 and 2 thereof, there is shown a sealed package for storing, dispensing and applying powder which generally comprises a container **10**, and insert and valve means described in detail hereinafter.

The container **10** is a compressible bottle formed of resilient plastic material, such as polyethylene, and the like, which is adapted to be partially collapsed by squeezing the same and is adapted to return to its initial shape upon being released. The bottle is of a standard construction and is provided with a tubular neck portion **11** having threads **12** on the exterior thereof for securement of a bottle cap (not shown) and having an outlet passage **14** extending therethrough.

The insert means, as shown in the illustrative embodiment, include a closure plug **15** and a hollow tubular sleeve **16** cooperating with the plug to provide a powder segregating chamber in the manner as will become apparent from the ensuing description.

The plug **15** comprises a cover portion **17** formed with a central discharge aperture **19** converging towards the outlet end thereof to serve as a nozzle for producing a stream of powder, a flange **20** overlying the rim of the bottle to prevent the plug from being pushed into the bottle, and a tubular depending skirt **21** fitted into the outlet passage **14** of the bottle and cooperating with the flange **20** to form an airtight seal about the rim of the bottle. The plug preferably is formed of a rubber-like material to facilitate securement to the bottle and provision of the aforementioned seal and to enable the bottle cap (not shown) when screwed upon the bottle neck to slightly compress the cover portion **17** and seal the aperture **19** in the customary manner.

The sleeve **16** has a hollow tubular open upper end section **22**, which is fitted into the skirt **21** of the plug to provide an airtight seal therebetween, has a lower end wall **24** formed with a central aperture **25** communicating with the interior of the bottle, and has an opening in its side adjacent the wall **24** which is illustrated herein as a series of enlarged slots **26** having an area almost equal to the area of the lower end section of the sleeve, except for the area of the narrow strips **27** connecting the end wall **24** to the upper section of the sleeve, whereby powder can flow freely from the interior of the bottle to the interior of the sleeve. As will be noted, these slots have a much greater effective area than the aperture **25**, which is rather small in comparison and will not permit any appreciable quantity of powder to flow therethrough. This sleeve element can be constructed in an economical manner by molding the same of plastic material.

To complete the insert assembly, the elements of which are shown in detail in Fig. 3, valve means are structurally associated with the sleeve **16**, which valve constitutes a second sleeve **30** shorter than the sleeve **16** and arranged thereon in telescoping relation for sliding movement to close the opening slots **26** when the bottle is in a generally upright position (Fig. 1) and to unclose the opening slots when the bottle is in a generally inverted position (Fig. 4). The sleeves **16** and **30** are formed to provide a fairly tight fit to prevent powder from passing therebetween when the chamber is pressurized by squeezing the bottle, but to provide sufficient clearance to enable the sleeve **30** to slide freely on the sleeve **16** as the bottle is moved from one position to another. Sliding movement of the sleeve **30** may further be assured by adjusting the weight thereof so that the sleeve will overcome frictional resistance, to sliding. This may be accomplished by making the sleeve **30** of a heavy metal or a plastic containing a heavy metallic filler.

In the illustrative embodiment, the sleeve **30** surrounds the sleeve **16** and is supported in its lower position (Fig. 1) by a laterally extending portion of the sleeve **16** and the wall **24**, for example, a narrow flange **31**. However, it will be appreciated that the sleeve **30** could be inserted into the sleeve **16** and supported by the upper surface of the wall **24**. It will also be appreciated that the aperture **25** need not be formed in the wall **24** but could be formed in the sleeve **30**.

In order to pressurize the powder segregating chamber to produce a powder stream projected from the aperture **19**, the aperture **19** at its discharge end is of smaller area than the aperture **25**. Thus, air under pressure enters the chamber through the aperture **25** more rapidly than it could be discharged through the aperture **19** at the same pressure and the smaller aperture **19** retards the flow of air and powder to build up a pressure which is effective to project the powder stream a considerable distance. It is also within the inventive concept herein to provide several apertures **19** and/or **25**, provided of course the combined or effective area of the aperture or apertures **25** is greater than the combined or effective area of the aperture or apertures **19**. While not shown herein, it is obvious that a plurality of minute apertures **25** having a combined area to permit air to enter the chamber may have an advantage over a single larger aperture **25** of an equivalent area because powder segregated in the chamber will thereby be prevented from flowing back into the bottle under the influence of gravity or suction established as the bottle returns to its initial shape after squeezing the same. This enables a substantial number of applications of powder to be discharged by successive squeezing of the bottle without inversion of the bottle to refill the chamber after each application of powder.

As illustrated herein, it is apparent that the elements constituting the insert means are extremely simple in design to facilitate their manufacture and assembly and securement to the bottle. These elements are assembled by slipping the sleeve **30** over the sleeve **16** and inserting

the upper section **22** of the sleeve into the skirt **21** of the closure plug. These operations may be performed by the manufacturer of the insert assembly to enable the same to be shipped to the bottler in this condition or may be performed by the bottler prior to assembly of the package.

The package illustrated herein likewise can be assembled in a rapid and convenient manner. The bottle **10**, apart from the insert assembly may be filled with powder by conventional automatic machinery, the insert assembly may be secured in the bottle passage **14** by automatic equipment which may be associated with the filling machine, and finally the bottle cap (not shown) may be applied by conventional screw capping apparatus which may also be associated with the filling machine or insert assembly applying equipment.

In using the device in accordance with the invention, the bottle cap is removed and the bottle is moved into a generally inverted position, for example, tilted downwardly as shown in Fig. 4, whereby the sleeve **30** slides downwardly to unclose the opening slots **26** and rests alongside the lower edge of the skirt **21**. Powder then flows freely from the bottle through the slot **26** into the powder segregating chamber while the discharge aperture **19** by reason of its converging contour prevents powder from flowing freely therefrom. While the device may be used in this position to project a stream of powder by squeezing the bottle, it is primarily designed for use with the sleeve **30** closing the slots **26**, the sleeve **30** being adapted to move under the influence of gravity to such position by returning the bottle to an upright or generally upright tilted position, whereby the aperture **19** is positioned for the upward projection of a stream of powder suitable, for example, for underarm application.

With the sleeve **30** in its slot closing position, and a quantity of powder trapped in the chamber, the bottle is squeezed gently but firmly to partially collapse the same and compress the air therein. The compressed air enters the chamber by way of the aperture **25** and pressurizes the same causing powder to be forced upwardly through the aperture **19** and be projected in a stream for a considerable distance. By slowly continuing the squeezing of the bottle without interruption, a steady flow of compressed air is provided which causes a continuous stream of powder to be projected from the aperture **19** for a period of considerable duration thus insuring more even and more rapid application of the powder than by the use of a device operating on an intermittent powder pressurizing principle. It will, of course, be understood that the present device could also be operated in such an intermittent manner if desired simply by effecting pulsating compression of the air in the bottle by short successive interrupted compressions of the bottle.

After the device has been used in the aforementioned manner, the cap is again applied to seal the contents of the bottle against deterioration.

From the foregoing description, it will be seen that the present invention provides an improved powder dispensing and applying device which is practical in operation and is constructed of elements adapted to be manufactured and assembled in a simple and economical manner. The insert assembly is light in weight, comprises a minimum number of parts and is fully capable of withstanding such rough and continued usage to which it may be subjected.

As various changes may be made in the form, construction and arrangement of the parts herein, without departing from the spirit and scope of the invention and without sacrificing any of its advantages, it is to be understood that all matters are to be interpreted as illustrative and not in any limiting sense.

What is claimed is:

1. A device for spraying powder comprising a compressible container having an outlet passage, means including a sleeve secured in said passage providing a chamber having a discharge aperture at one end thereof and an open-

ing adjacent the other end thereof in direct communication with the interior of said container and of a size to permit powder to flow freely therethrough under the influence of gravity into the chamber, and valve means including a second sleeve telescopically associated with said first sleeve for sliding movement with respect thereto and arranged to close said opening when said container is in a generally upright position and to unclose said opening when said container is in a generally inverted position, said first means having an aperture providing communication between the interior of said container and the interior of the chamber.

2. A device according to claim 1, wherein said last mentioned aperture has a greater effective area than the effective area of said first mentioned aperture.

3. A device for spraying powder comprising a compressible container having an outlet passage; a closure plug in said passage having a cover portion formed with a discharge aperture and having a tubular skirt; a sleeve having an open end connected with said skirt, said sleeve having a wall at its opposite end formed with an inlet aperture and having an opening in its side adjacent said end wall of a size to permit powder to flow freely therefrom under the influence of gravity; and a second sleeve in telescoping relation with said first sleeve and mounted for sliding movement with respect thereto for closing said opening when said container is in a generally upright position and for unclosing said opening when said container is in a generally inverted position.

4. A device according to claim 3, wherein said second sleeve surrounds said first sleeve, and said end wall has a portion extending laterally outwardly beyond said first sleeve to provide a support for said second sleeve when said container is in a generally upright position.

5. A device according to claim 3, wherein said inlet aperture has a greater effective area than said outlet aperture.

6. A powder dispensing insert for the outlet passage of a compressible container comprising means including a sleeve providing a chamber having a discharge aperture at one end thereof and having an enlarged opening adjacent the other end thereof, and valve means including

a second sleeve telescopically associated with said first sleeve for sliding movement with respect thereto and arranged to close said opening when said aperture faces upwardly and to unclose said opening when said aperture faces downwardly, said first means having an inlet aperture therein for permitting compressed air to enter said chamber from within said container and force powder out through said discharge aperture when said container is compressed.

7. An insert according to claim 6, wherein said inlet aperture has a greater effective area than said outlet aperture.

8. A powder dispensing insert for the outlet passage of a compressible container comprising a closure plug having a cover portion formed with a discharge aperture and having a tubular skirt; a sleeve having an open end connected with said skirt, having a wall at its opposite end formed with an inlet aperture and having an enlarged opening in its side adjacent said end wall including a series of slots of much greater effective area than said inlet aperture; and a second sleeve in telescoping relation with said first sleeve and mounted for sliding movement with respect thereto for closing said opening when said outlet aperture faces upwardly and for unclosing said opening when said outlet aperture faces downwardly.

9. An insert according to claim 8, wherein said second sleeve surrounds said first sleeve, and said end wall has a portion extending laterally outwardly beyond said first sleeve to provide a support for said second sleeve when said outlet aperture faces upwardly.

10. An insert according to claim 8, wherein said inlet aperture has a greater effective area than said outlet aperture.

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