May 23, 1950 J. DE SWART 2,508,939

DISPENSER FOR POWDERED MATERIAL

Filed Feb. 12, 1945

Fig. 1

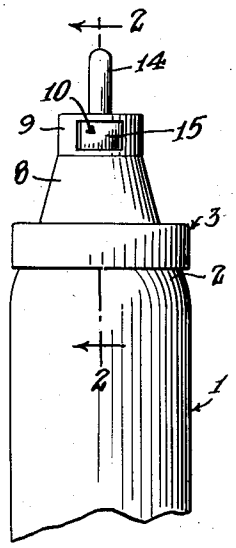


Fig. 2

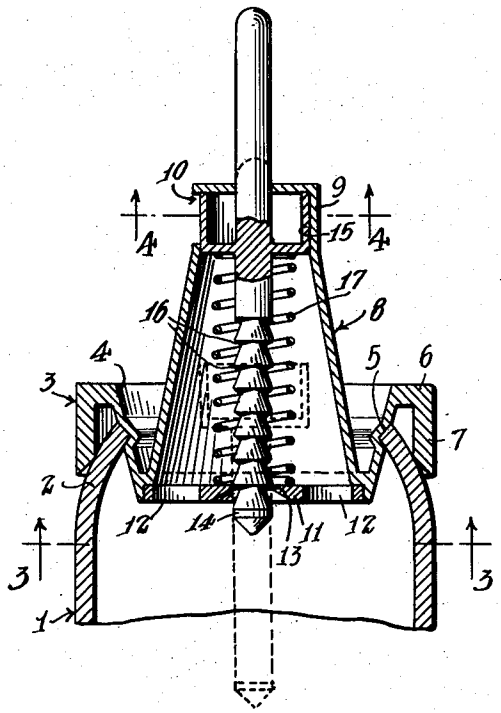


Fig. 4

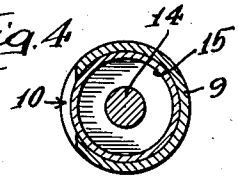


Fig. 5.

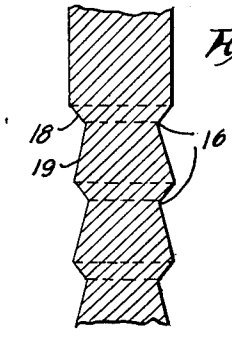
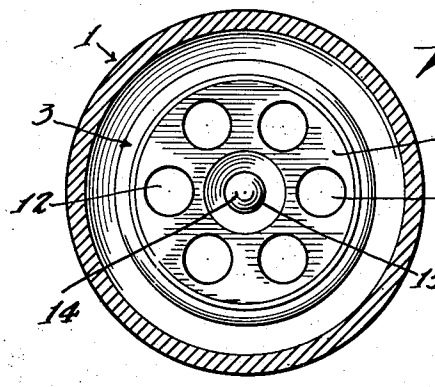


Fig. 3



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DISPENSER FOR POWDERED MATERIAL

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Application February 12, 1945, Serial No. 577,493

5 Claims. (Cl. 222—196)

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My invention relates to dispensers for powdered materials, and among the objects of my invention are:

First, to provide a dispenser which is particularly suited for the dispensing of powdered materials which tend to clog or do not readily flow from ordinary dispensers, for example, tooth powder.

Second, to provide a dispenser which incorporates means whereby the dispensing region is vibrated as the dispenser is opened in order to agitate the powdered material contained therein and facilitate its flow.

Third, to provide a dispenser which may be made entirely of plastic material.

Fourth, to provide a dispenser which is easily operated by one hand.

With the above and other objects in view as may appear hereinafter, reference is directed to the accompanying drawings, in which:

Fig. 1 is a fragmentary view of a closure with my dispenser shown installed thereon.

Fig. 2 is an enlarged sectional view of the dispenser taken through 2—2 of Fig. 1, showing the container fragmentarily.

Fig. 3 is a transverse sectional view through 3—3 of Fig. 2.

Fig. 4 is a transverse sectional view through 4—4 of Fig. 2.

Fig. 5 is a partial longitudinal section of the agitator stem.

My dispenser may be suitably incorporatd in any type of container cap or closure. Preferably, however, it is incorporated in the closure which forms the subject matter of my copending application, Serial No. 577,494, filed February 12, 1945, which has since become abandoned. For purposes of illustration the accompanying drawings show my dispenser incorporated with my closure and special container.

The container designated 1 is tubular and provided with an inturned end 2. A closure body 3 having tapered sealing walls 4 is adapted to be forced into the inturned end 2. The sealing walls are sufficiently flexible to yield as the body is forced into position, and form a groove or channel 5 accommodating the extremity of the inturned end 2 forming therewith a fluid-tight interlocking joint. The outer end of the conical sealing walls 4 is provided with a reinforcing rim 6 and a depending skirt 7 which, when the closure body is in position, may bear against the inturned end 2.

A dispensing spout 8 of frusto-conical form extends axially outwardly from the inner or

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smaller ends of the sealing walls 4. The dispensing spout is preferably molded integrally with the closure body 3, and is provided at its outer or smaller end with a short cylindrical portion 9. One side of the cylindrical end portion 9 is provided with an arcuate discharge slot 10, as shown best in Fig. 4.

At the axially inner end of the closure body 3 and dispensing spout 8 there is secured a vibration ring 11. The vibration ring reinforces the closure body and is provided with a series of planetary ports 12 and a central opening 13. The margins of the central opening 13 are preferably beveled so that the edges of the opening are relatively sharp.

A stem 14 is slidably mounted in the central opening 13 and protrudes through a hole in the extremity of the cylindrical end 9. The stem 14 is provided with a valve 15 which fits within the cylindrical portion 9 and is adapted when the stem is in its extended position to close the discharge slot 10 as shown by solid lines in Fig. 2. Between the valve 15 and the short central opening 13 the stem 14 is provided with a series of annular serrations 16 and a spring 17. The serrations 16 are preferably saw-toothed in profile and point in the direction of the vibration ring 11. The serrations 16 are formed by a series of adjacent converging surfaces 18 and 19 which taper toward the longitudinal axis of the stem 14. The surface 18 faces outwardly towards the dispensing end of the spout 8 and has a less gradual degree of taper than the surface 19 which faces inwardly of the discharge end of the spout 8, so that the serrations tend to catch on the margins of the central opening 13 when the stem is urged axially inward, but freely ride through the opening when the stem moves axially outward. A spring 17 is interposed between the vibration ring 11 and and the valve 15.

Operation of the dispenser is as follows: The container is held by the fingers and palm of the hand in a downwardly inclined position so that the discharge slot 10 is lowermost. The forefinger is pressed against the protruding extremity of the stem 14, moving the valve to its dotted line position shown in Fig. 2. This movement is accompanied by vibration ring 11 and the stem 14 as the serrations 16 catch on the margins of the central opening 13. Such vibration loosens the powedered contents of the container and facilitates its flow from the slot 10.

It should be noted that the stem 14 may have a fairly loose fit within the central opening 13, and that proper engagement between the serra-

tions and the margins of the opening is accomplished by the application of a nominal amount of side thrust applied by the forefinger on the protruding end of the stem 14. Actually it is difficult to push the stem without exerting a slight amount of side thrust, so that even without instruction a person using the dispenser cannot fail to produce the desired vibration or agitation of the powdered contents.

It should be noted that the spring 17 may, if desired, be formed of plastic. In such case it is possible to make the entire dispenser out of plastic material if the nature of the powdered material is such that it might attack metals.

It will be noted that the serrations define sawtooth-like annular projections or rib members having converging tapered surfaces. The annular surfaces which form the rib-like members taper inwardly relative to the longitudinal axis of the stem, and the surface 18 which faces outwardly towards the discharge end of the spout 8 is provided with a substantially greater taper than the inwardly facing surface 19. The underside of the plate or ring 11 is beveled or cut away around the opening 13. This arrangement enables the stem to return readily by spring action to its outer position wherein the valve closes the port 10. Thus, normally the lateral discharge port or opening 10 remains closed and is automatically closed as soon as one's finger is removed.

The valve 15 is preferably a cup-shaped piston with cylindrical walls and its open end directed axially outwardly so that any powder which does not fall out and lies above the valve, is entrapped therein for later discharge rather than compacted between the valve and end of the spout.

Many other embodiments of the invention may be resorted to without departing from the spirit of the invention.

I claim:

1. A dispenser for powdered materials, comprising: a discharge spout having a laterally directed discharge opening at its extended portion; a slide valve within said spout for controlling said opening; a stem connected with said slide valve and protruding from said spout for moving said valve to an open position; a perforated partition within said spout, the inner portion of said stem extending through said partition; and a plurality of closely spaced annular rib formations on the inner portion of said stem engageable with said partition to vibrate said stem and partition during movement of said stem thereby to agitate the contents of said spout.

2. A dispenser for powdered materials, comprising: a discharge spout having a discharge opening at its extended portion; a slide valve within said spout for controlling said opening; a stem connected with said slide valve and protruding from said spout for moving said valve to an open position; a perforate partition within said spout, the inner portion of said stem extending through said partition; a series of annular adjacent projections axially spaced on said stem, said partition provided with an opening accommodating said stem, the projections on said stem engageable with the edges of the partition forming said opening as said stem is reciprocated to vibrate said stem and partition thereby to agitate powdered material contained in said discharge spout.

3. A dispenser for powdered materials, comprising: a discharge spout having a discharge opening at its extended portion; a slide valve within said spout for controlling said opening; a stem connected with said slide valve and protruding from said opening for moving said valve to an open position; a perforate partition within said spout, the inner portion of said stem extending through said partition; a plurality of axially spaced annular members on the inner portion of said stem engageable with said partition to vibrate said stem and partition during inward movement of said stem thereby to agitate the contents of said spout; and resilient means between said valve and partition for urging said valve to its closed position.

4. A dispenser for powdered materials comprising a discharge spout having a laterally directed discharge opening at the outer end thereof, a slide valve within said spout for controlling said opening, a stem connected with said slide valve and protruding from the outer end of said spout for moving said valve to an open position, yieldable means tending to move said valve to closed position, said stem being provided with a plurality of adjacent annular serrations, and vibrateable apertured means in the other end of said spout, said stem extending through an aperture in said vibrateable means and the serrations on said stem engaging said means during movement of said valve to open position to vibrate the contents of said spout.

5. A dispenser as recited in claim 2 wherein the axially spaced annular projections on said stem define outwardly projecting rib-like members having converging surfaces tapering toward the longitudinal axis of said stem, the taper on the surface facing inwardly from the outer end of the stem being substantially greater than the taper on the surface facing outwardly thereof.

JAN DE SWART.

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