March 14, 1939. C. CAMPBELL 2,150,152

CONTAINER

Filed Jan. 23, 1937

Fig. 1.

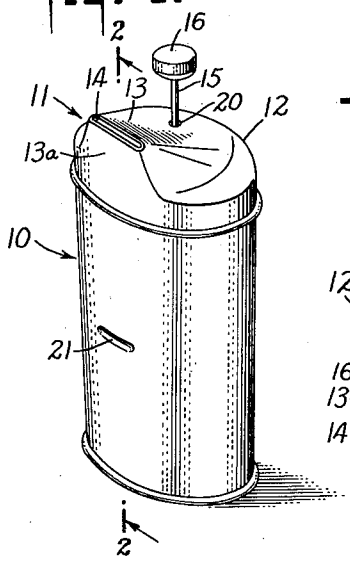



Fig. 3.

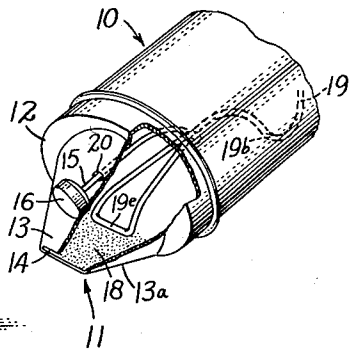



Fig. 2.

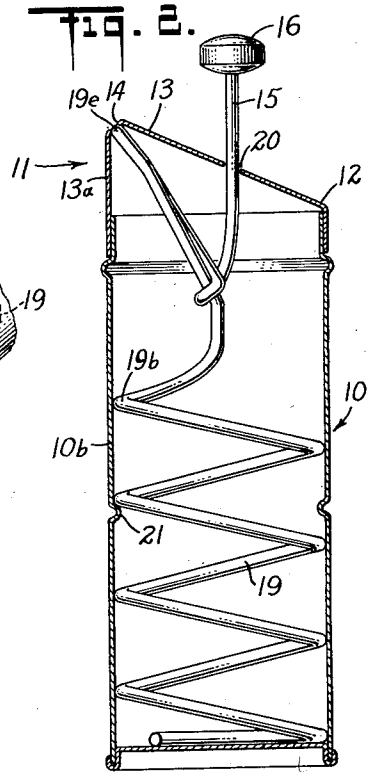



Fig. 5.

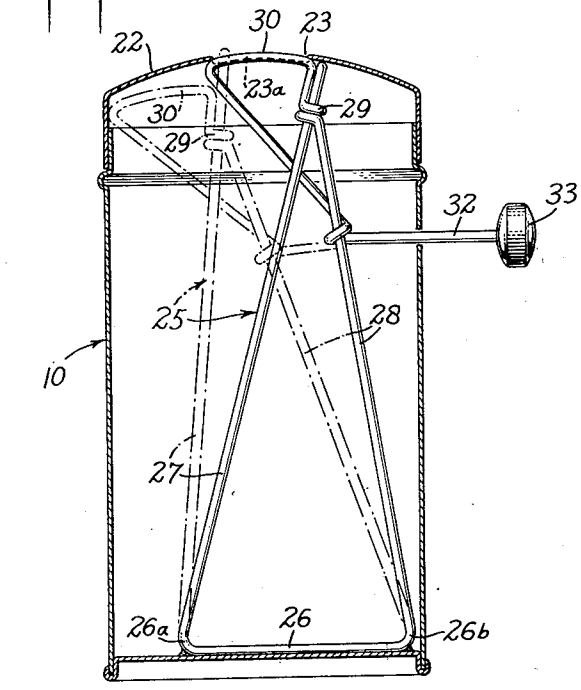
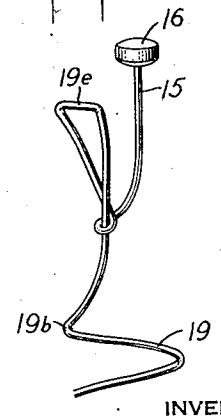



Fig. 4.




INVENTOR

Clinton Campbell

BY

Blair, Curtis & Dunne

ATTORNEYS

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# UNITED STATES PATENT OFFICE

2,150,152

## CONTAINER

Clinton Campbell, Stamford, Conn.

Application January 23, 1937, Serial No. 121,969

11 Claims. (Cl. 221—66)

This invention pertains to a method and apparatus for dispensing powdered or granular material such, for example, as tooth-powder.

One of the objects of the invention is to provide new and improved apparatus and new and improved method for dispensing such material.

In the accompanying drawing,

Figure 1 is a perspective view of a can or container provided with dispensing mechanism embodying my apparatus invention and suitable for carrying out the method of my invention;

Figure 2 is a sectional elevation taken on line 2—2 of Figure 1;

Figure 3 is a fragmentary sectional view of the can tilted to dispensing position;

Figure 4 is a fragmentary perspective view of a closure and operating arm of the dispensing mechanism; and

Figure 5 is a sectional elevation of a modification.

The problem of dispensing powdered or granular material from small containers, such as tooth-powder containers in domestic use, is complicated because of the inherent quality of the material being dispensed. If it is free-flowing, that is, without a tendency to pack and having a well-determined angle of repose, a small opening in the container is preferable so that the flow of the material as onto a tooth-brush, is readily regulated. But such a small opening easily becomes clogged as by material clinging to the moisture on the sides of the opening, or by small lumps in the mass of the material collecting across the opening. If the opening is made large to avoid these latter difficulties, the flow is not easily regulated and the material being dispensed may be wasted.

If the material is not free-flowing, which is the usual characteristic of powdered materials and which is also the characteristic of tooth-powders having soap or similar material as one of the ingredients, the material will not flow evenly through a relatively large or small opening. It is probable that the reason that even a large opening does not provide for an even regulated flow is that the angle of repose of such a powder is not well defined. It may be necessary to practically invert a can containing such powder before the powder will move from the bottom of the can. Then when the powder does move its whole mass falls to the head of the can having the opening. A part of the falling powder rushes through the opening but with such uncontrolled volume and speed that it is difficult to predetermine the path that the dispensed material will take, and more often than not it takes a course other than that desired. After the sudden flow, the powder packs around the opening stopping the flow, which may then be resumed by shaking or tapping the can, or by tipping the can to cause the powder to fall back to the bottom of the can, and then repeating the first tipping operation. Such dispensing is relatively unregulatable and it is another object of the invention to provide a method for dispensing powder from such containers in a regulated manner.

In the following method chosen to illustrate my invention the mass of powder to be dispensed, for example tooth-powder, is preferably moved to a position over an opening in a container. Subsequently a plunger is moved through the mass of powder away from the opening. The powder is then given a shake or other disturbing influence sufficient to cause it to fall into and fill the space left by the retreating plunger. The powder thus put in the path of the plunger is then extruded or urged through the opening as the plunger moves toward the opening.

Referring now to the drawing, novel apparatus is shown for carrying out the method of the invention, the apparatus thus shown itself being an embodiment of my invention.

Referring particularly to Figures 1 and 2, a container or can is generally indicated at 10 partially filled with material to be dispensed. The container has a specially designed top cover or cap 12, which forms part of the dispensing mechanism, generally indicated at 11. The cap is suitably secured to the container by a force fit or by other simple method.

The cap is preferably provided with a sloping top terminating at its upper extremities to form a nozzle 13 having an elongated opening 14 through which the powder contents 18 of the container may flow, as will be described.

Referring to Figures 2 and 4, the opening 14 is normally closed from within the can by a closure 19e extending the length of the opening and urged against its edge portion by a coil spring 19, the closure and spring being formed from a single piece of wire. As shown in Figure 2, the spring pushes against the bottom of the container. As the wire leaves the upper portion of the spring at 19b it is bent as shown in Figure 4 to form the closure 19e and an actuating lever 15 which extends through an opening 20 provided in the top of the cover. The end of the actuating lever is provided with a suitable finger piece 16. Still referring to Figure 2, the integral closure, actuating lever, and spring piece are

preferably so shaped that as the lever is depressed the closure moves down a flat vertical inner face of the cap in the plane of one edge of the opening. The actuating lever operating through hole 20 acts also as a sort of guide for keeping the depressed closure member properly positioned.

When the container and cover are so assembled, and the spring 19 is somewhat tensioned in order to urge closure 19e into the nozzle opening to close it, the second coil from the top of the spring is normally positioned just above a projection 21 provided in wall portion 10b of the container. This projection holds back normal movement of the second coil as the actuating rod and finger piece is depressed until the pressure on the second coil becomes so great as to cause it to move past the projection to permit the whole spring to assume its regular shape. The movement of the coil past the projection, however, occurs with an abrupt jump sufficient to give the entire spring and container walls a slight shake. The projection is preferably more beveled on its bottom side than on the top side so that the spring returns without such a jerk or shake as the combined closure and plunger moves toward the nozzle opening.

I have found that the container and dispensing mechanism thus described is particularly adapted to carry out the method of my invention as in dispensing tooth-powder, although it is to be understood that it is adapted for dispensing other types of powdered or granular material. To use a can thus equipped to put tooth-powder on a tooth-brush, the can is preferably held with the thumb and last three fingers of the hand embracing the can, leaving the index finger free to press finger piece 16. After tilting the can (Figure 3) to align the nozzle above a tooth-brush and to cause the mass of powder to slide into the cover 12, cover nozzle 13 and largely rest on the flat portion 13a of the cover over which the closure 19e works, finger piece 16 is depressed pushing the closure 19e away from the opening 14 and back through the mass of powder lying just inside the nozzle. The second coil of the spring, momentarily held against movement until closure e (now acting as a plunger) has been moved appreciably from the opening, suddenly jumps over the projection 21 and releases energy sufficient to disturb the powder to cause it to shake or fall into the space left by the retreating movement of the closure or plunger 19e. When the finger piece is now released (preferably gradually) the plunger moves toward the opening pushing powder that has just fallen in front of it through the opening 14 and onto the tooth-brush.

This operation of a combined plunger and closure working from within the container has an additional advantage, even when used in connection with dispensing free-flowing material, of breaking up or forcing through any material which might lodge across the mouth of the nozzle.

The movement of the spring 19 within the mass of powder also has an additional advantage of stirring or loosening the powder in the event that it for some reason or other tended to immovably pack within the can.

Referring now to Figure 5 in which a modification is shown, the container 10 is provided with a suitable top or cover 22 having an elongated slot or opening 23 formed in the upper portion thereof. The slot has inwardly extending sides 23a extending along its long sides and coacts with dispensing mechanism generally indicated at 25 and mounted within the container 10 to dispense powdered material. The dispensing mechanism in this modification is also formed from a single piece of wire. It comprises a base portion suitably secured as by solder or the like to the bottom of the container. Extending upwardly from the left end of the base is a scraper or powder-distributing rod 27 whose upper end normally lies adjacent the righthand end of the nozzle opening 23. This scraper or powder-disturbing member extending as it does from the point 26a, located beneath the left end of the nozzle and displaced from the axis of the curvature of the top 22, moves across and further into the nozzle as it is actuated. The depending sides of the nozzle guide the rod 27 as it moves into and out of the opening and keep it aligned with the opening.

The wire extending upwardly from the right end of the base 26 and preferably from an effective pivot point 26b (displaced to the right of the axis of the curvature of the nozzle top) forms a lever 28. The wire is looped at 29 around the upper end of scraper 27 to move it, and thence is bent to form a combined closure and pusher 30. Extending downwardly from closure 30 the wire is looped about portion 28 to reinforce the structure and forms a lever 32 extending through a suitable opening in the side wall of container 10. On the free end of this lever is mounted a finger piece 33.

When the dispensing mechanism 25 is in its righthand position (the full line position shown in Figure 5) closure 30 is urged by the spring pressure into the nozzle opening to close it. As finger piece 33 is pushed in the various parts of the dispensing mechanism are forced into the dotted line position shown in Figure 5, uncovering nozzle 23 and passing the powder disturber 27 across the nozzle.

To dispense powder from a can provided with this dispensing mechanism the can is first tilted so that the mass of powder covers the top of the can and nozzle. The thumb piece 33 is then pressed in, moving the combined closure and plunger away from the nozzle, thus leaving an open space in the mass of powder. However, simultaneously with the retreating movement of the closure, the scraper disturbs the powder sufficiently to cause powder to move into the space left by the plunger and when the thumb piece is released the plunger pushes the powder in front of it through the nozzle opening. Under some conditions of operation the scaper itself may serve to force some powder through the nozzle as it moves across the nozzle.

I claim:

1. Method of dispensing powdered material from a container having a restricted dispensing opening which comprises moving a mass of powdered material over said opening, moving a pusher through said mass of powder away from a position covering the opening, disturbing the powder to cause it to move into the space vacated by the retracted pusher to pack over said restricted opening, and moving the pusher toward said restricted opening to push the powdered material before it through said opening.

2. In combination, a powder dispenser comprising a container having an outlet, closure means inside the container normally biased to close said outlet, means for pushing said closure means back from its outlet-closing position back into

the container to open said outlet and including an operating handle extending from said container independently of said outlet.

3. A powder dispenser comprising a container having an elongated outlet so restricted in area that the powder is not free-flowing through the outlet, closure means inside the container normally biased to close said outlet, and means for retracting said closure means in said container to uncover said outlet and for pushing powder through said outlet when returning to outlet-closing position.

4. In combination with a container for holding and dispensing powdered or granular material, a top for said container having an elongated nozzle opening and a surface within said container terminating at said nozzle opening and lying in a plane at an appreciable angle to the plane of said opening, dispensing mechanism mounted within said container comprising means adapted to open and close said opening and a powder pusher for coacting with said surface to push powder thereover through said opening.

5. In combination with a container having an opening, combined powder pushing and closure means for said opening mounted within said container and adapted to move in the body of powder in the container, said means comprising a single piece of wire coiled at one end to form a spring adapted to react against the bottom of the container, and bent at its other end to form a loop having a section shaped to enter and close said opening, and a projection extending from the side of the container adapted to momentarily retard movement of one of the coils of said spring as the loop portion is retracted from the opening.

6. For use with a container having an opening, combined powder pushing and closure means for said opening adapted to be mounted within said container and adapted to move in the body of powder in the container, said means comprising a single piece of wire coiled at one end to form a coil spring adapted to react against the bottom of the container, and bent at its other end to form a loop, having a section shaped to enter and close said opening, and an extension shaped to extend through the top of said container for compressing said spring and moving the loop portion away from the opening.

7. A dispensing cover for a container comprising a portion for securing the cover to the container, and a nozzle portion having an elongated opening and shaped internally to provide a surface terminating at said opening and lying in the plane of one side of the container and another surface terminating at the other side of said opening and extending diagonally across the top of said container.

8. In combination with a container having an elongated opening therein, means for dispensing powdered material from the container through said opening comprising a spring-pressed closure for said opening pivotable about a point appreciably displaced from the plane of said opening and operable from a finger piece extending from the container, and powder disturbing means movable across said opening as said closure is moved therefrom.

9. In combination with a container having an elongated opening therein, means for dispensing powdered material from the container through said opening comprising a spring-pressed closure for said opening pivotable about a point appreciably displaced from the plane of said opening and operable from a finger piece extending from the container, and powder-disturbing means movable across said opening as said closure is moved therefrom, said closure and powder-disturbing means being formed from a single piece of wire secured to the bottom of the container.

10. In combination with a container having an elongated opening therein, means for dispensing powdered material from the container through said opening, comprising a spring-pressed closure for said opening pivotable about a point appreciably displaced from the plane of said opening and operable from a finger piece extending from the container, powder-disturbing means movable across said opening as said closure is moved therefrom, said closure and powder-disturbing means being formed from a single piece of wire secured to the bottom of the container, and means for keeping said closure and powder-disturbing means aligned with said opening.

11. Method of dispensing pulverulent material through an elongated orifice so restricted in area that the pulverulent material if not free-flowing through the orifice, comprising piling the pulverulent material above the orifice and moving an actuating member back and forth across the orifice and through the material.

CLINTON CAMPBELL.