Nov. 10, 1925. 1,560,689

W. HOLT ET AL

COMBINED OUTLET NOZZLE AND MEASURING VALVE

Filed April 4, 1924

Fig. 1

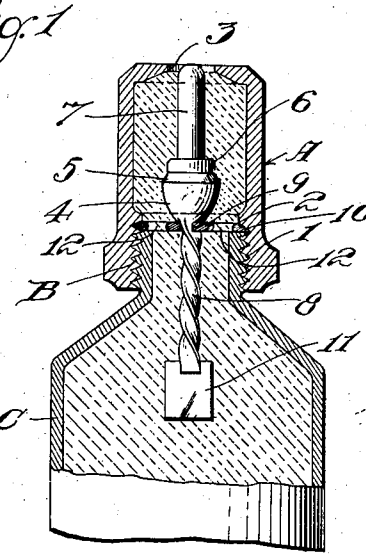


Fig. 2

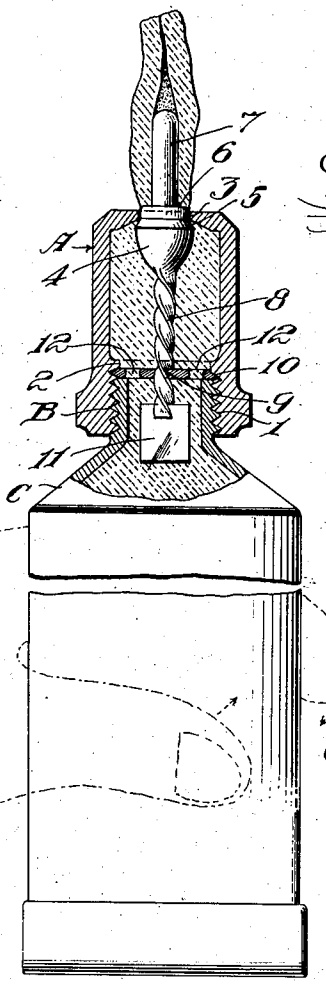


Fig. 3

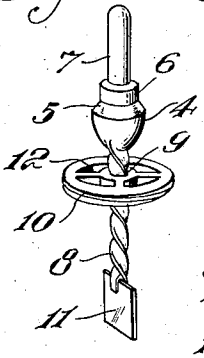


Fig. 4

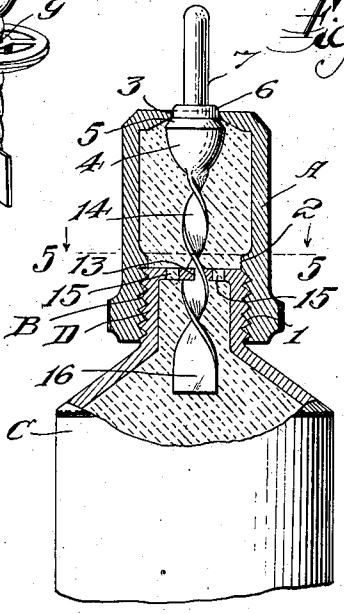


Fig. 5

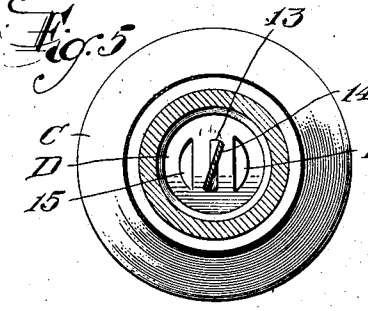
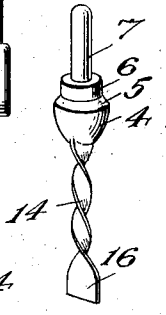


Fig. 6



INVENTORS
William Holt
and Raymond B. Holt,
BY Everett W. Cook, ATTORNEYS.

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UNITED STATES PATENT OFFICE.

WILLIAM HOLT, OF PATERSON, AND RAYMOND B. HOLT, OF BLOOMFIELD, NEW JERSEY.

COMBINED OUTLET NOZZLE AND MEASURING VALVE.

Application filed April 4, 1924. Serial No. 704,122.

To all whom it may concern:

Be it known that we, WILLIAM HOLT and RAYMOND B. HOLT, both citizens of the United States, and residents, respectively, of Paterson, in the county of Passaic, in the State of New Jersey, and Bloomfield, in the county of Essex, in the State of New Jersey, have invented new and useful Improvements in Combined Outlet Nozzles and Measuring Valves, of which the following is a specification.

This invention relates in general to a self closing measuring valve, and more particularly to an outlet or nozzle valve for containers for pasty or semi-fluid materials, for instance, for collapsible tubes in which is sold tooth paste, shaving cream, etc., which will serve as a closure for the container and also permit the ejection of a predetermined amount of the material therefrom when desired.

One object of the invention is to provide a combined cap or nozzle and measuring outlet valve for containers embodying novel and improved features of construction whereby the valve serves as a closure for the outlet and may be manually opened by a simple pushing operation without the necessity of removing or unscrewing a cap or closure, and automatically closed by flow of the material from the container, closing movement of the valve being retarded with relation to the outflow of the material so that a predetermined amount of the material may be ejected before the valve closes.

Another object is to provide a device of this character particularly designed to take the place of the screw cap commonly used on collapsible tubes for tooth paste and the like, the device comprising a nozzle casing adapted to be secured to the neck of a collapsible tube and formed with an outlet controlled by a manually opened and automatically closed valve.

Further objects are to provide such a device which can be removably connected to a collapsible tube so as to be capable of repeated use with a number of tubes as the supply of material therein becomes exhausted; to provide a combined cap or nozzle and outlet measuring valve which shall be inexpensive in construction and simple in operation, and to obtain other results and advantages as may be brought out by the following description.

Referring to the accompanying drawings, in which the same characters of reference designate corresponding and like parts throughout the several views,

Figure 1 is a vertical longitudinal sectional view through the outlet end of a collapsible tube and an outlet nozzle and measuring valve embodying the invention, the valve being shown in open position;

Figure 2 is a view similar to Figure 1 with the outlet valve shown in closed position immediately after a portion of the material has been ejected from the tube;

Figure 3 is a detached perspective view of the valve shown in Figures 1 and 2;

Figure 4 is a view similar to Figure 2 showing a modified form of the invention;

Figure 5 is a horizontal sectional view, taken on the line 5—5 of Figure 4, and

Figure 6 is a detached perspective view of the valve shown in Figure 4.

Specifically describing the embodiment of the invention shown in Figures 1–3 inclusive, the reference character A designates a nozzle which is substantially tubular in form and has one end interiorly threaded at 1 to fit upon the exteriorly threaded neck B of a collapsible tube C of known form, such as those in which is sold tooth paste and the like. The interior of the nozzle A is formed at the inner ends of the threads 1 with a shoulder 2, and the end of the nozzle opposite the threads is formed with an outlet opening 3, preferably coaxial with the nozzle.

The valve proper comprises a valve head 4 having a frusto-conical valve seat 5 adapted to cooperate with the inner edges of the outlet opening 3 to close said opening, the valve head being formed adjacent the seat 5 with a cylindrical portion 6 adapted to snugly fit the opening 3; and the extremity of the valve head is provided with a reduced coaxial projection 7 which is substantially smaller than the opening 3. The valve head 4 is carried by a stem or guide rod 8 which is preferably rectangular in cross-section and twisted into the form of a helix, said stem being fixedly connected to the end of the head 4 opposite the projection 7 and coaxial therewith. The stem 8 is slidably mounted in a rectangular opening 9 in a spider or perforated disc 10 adapted to be fitted into the threaded end of the nozzle and clamped between the end of the neck B

of the collapsible tube and the shoulder 2 of the nozzle. The extremity of the stem 8 opposite the valve head 4 fixedly carries a strip of sheet material 11 which acts as a paddle or blade. The perforations 12 of the spider 10 when the nozzle is applied to the collapsible tube, are so arranged as to permit the material to flow from the tube through the openings into the nozzle A.

The normal position of the valve is shown in Figure 2 with the valve seat 5 engaging the inner edges of the opening 3 and the cylindrical portion 6 substantially filling said opening, whereby the outlet opening 3 of the nozzle is closed. It will be noted that the reduced projection 7 extends a substantial distance beyond the end of the nozzle. To open the valve the end of the projection 7 is pushed inwardly of the nozzle by means of a tooth brush, the finger or the like, whereby the valve head is disengaged from the opening 3, as shown in Figure 1. The tube C is then squeezed in the usual manner which causes a flow of the material therein through the openings 12 of the spider outwardly into the nozzle. The material thus flowing outwardly into the nozzle engages the valve head 4 so as to push the valve head outwardly toward the opening 3. This movement of the valve head 4 is retarded with relation to the flow of material by the simultaneous rotation and longitudinal movement of the stem 8 due to the helical formation thereof, and the movement of the valve head is also retarded by frictional engagement of the blade 11 with the material in the tube as the plate is rotated. Some of the material flowing through the nozzle thus passes the valve head and flows outwardly through the opening 3 around the reduced projection 7, so that a predetermined amount of material is ejected through the opening 3 before the valve seat 5 engages the inner edges of the opening, as shown in Figure 2. Obviously, the amount of material ejected will depend upon the distance and speed of movement of the valve head 4. The blade 11 also agitates the material in the tube so as to facilitate its flow through the openings 12 of the spider. It will thus be seen that the valve is manually opened by a simple pushing action on the projection 7, and is automatically closed by the flow of material outwardly through the nozzle A. The cylindrical portion 6 substantially closes the opening 3 so that all of the material is ejected from the opening.

A modification of the invention is shown in Figures 4–6 inclusive, in which the spider 10 may be eliminated and the stem and blade made as an entity. In accordance with this form of the invention, the end of the neck D of the collapsible tube may be formed with a slot 13, and the stem of the valve may comprise a strip 14 of sheet metal twisted into helical form and longitudinally slidably mounted in said slot 13. The end of the neck D is provided at opposite sides of the slot 13 with other slots 15 which permit the flow of material from the tube outwardly into the nozzle A. One end of the stem 14 is connected to the valve head, while the other end may be left flat and straight, as at 16, to form a paddle or blade corresponding to the blade 11 shown in Figures 1–3 inclusive.

The operation of this form of the invention is similar to that of the construction shown in Figures 1–3 inclusive, the flow of material through the outlet slots 15 automatically closing the valve, and the valve being retarded by simultaneous rotation and longitudinal movement of the stem 14 due to the helical form of the latter. The straight and flat end 16 of the stem 14 acts in the same manner as does the plate 11.

The outlet nozzle and measuring valve might be formed integral with the container and is adapted for use with other containers than collapsible tubes in connection with which it has been described. With the removability of the nozzle from the container, as herein described, the nozzle and valve are adapted for repeated uses with a number of containers as the material therein becomes exhausted. The operation of the valve is extremely simple, the valve being opened by a simple pushing operation and automatically closed by and simultaneously with the ejection of material from the container. It will be noted that as illustrated and described, the nozzle constitutes a casing which has an inlet at the threaded end and an outlet through the opening 3, the valve being arranged between the inlet and the outlet and actuated toward a closed position by flow of material from the inlet to the outlet.

We are aware that many devices have been utilized for measuring the discharge of contents from a container, and that devices for eliminating or to take the place of screw caps on collapsible tubes have been produced, and we do not intend to broadly claim such constructions. However, the invention is susceptible of embodiment in various other detail constructions than that shown and described, without departing from the spirit or scope of the invention. Therefore, we do not desire to be understood as limiting ourselves except as required by the following claims when construed in the light of the prior art.

Having thus described the invention, what we claim is:

1. A device of the character described including a casing having an opening, a valve in said casing movable by material flowing through the casing to said opening to con-

trol said opening, and means for causing relative movement of said valve and the material toward said opening to permit a predetermined amount of said material to flow through said opening.

2. A device of the character described including a casing having an opening, a valve in said casing movable by material flowing through the casing to said opening to control said opening, a helical stem fixedly connected to said valve, and means for mounting said stem in said casing to cause simultaneous rotation and longitudinal movement of said stem, whereby movement of said valve toward said opening is retarded relatively to the movement of said material.

3. A device of the character described, comprising a casing having an inlet and an outlet, a valve in said casing to control said outlet, said valve being movable to close said outlet by material flowing through said casing, and means for retarding movement of said valve relatively to the flow of said material.

4. A device of the character described, comprising a casing having an inlet and an outlet, a valve in said casing to control said outlet including a valve head adapted to close said opening and movable to closing position by material flowing through said casing, a helical stem fixedly connected to said valve head, and means for mounting said stem in said casing to cause simultaneous rotation and longitudinal movement thereof, whereby movement of said valve head toward said outlet is retarded relatively to movement of said material.

5. A device of the character described, comprising a casing having an inlet and an outlet, a valve in said casing to control said outlet and movable to close said outlet by material flowing through said casing, said valve being formed with a helical coaxial stem, and said casing being formed with an opening coaxial with said outlet corresponding in cross section with said stem to slidably receive said stem.

6. A device of the character described, comprising a casing having an inlet and an outlet, a valve in said casing to control said outlet and movable to close said outlet by material flowing through said casing, said valve being formed with a helical coaxial stem having a flat blade-like end portion, and said casing being formed with an opening coaxial with said outlet corresponding in cross-section with said stem to slidably receive said stem.

7. A device of the character described, comprising a casing having an inlet and an outlet, a valve in said casing to control said outlet and movable to close said outlet by material flowing through said casing, said valve being formed at one end with a projection adapted to loosely extend outwardly through said outlet when the valve is in closing position and at the other end with a helical coaxial stem, said casing being formed with a guide opening coaxial with said outlet of a cross-section corresponding with said stem to slidably receive said stem.

8. The combination with a container having a neck formed with a plurality of openings, of a casing adapted to be secured to said neck and formed with an outlet opening coaxial with one of said openings in said neck, a valve in said casing to control said outlet and movable to close said outlet by material flowing from said container into said casing, said valve being formed with a helical stem of a cross-section corresponding with said first-mentioned opening in said neck and slidable therein, whereby movement of said valve toward said outlet is retarded with relation to movement of said material through said casing.

9. A device of the character described, comprising a casing having an inlet and an outlet, a valve in said casing to control said outlet including a valve head adapted to close said opening and movable to closing position by material flowing through said casing, a helical stem fixedly connected to said valve head, and a spider secured in said casing and formed with an opening coaxial with said outlet and of a shape corresponding to the cross-section of said stem, said stem being slidably mounted in said opening, whereby movement of said valve toward said outlet is retarded with relation to movement of said material through said casing.

WILLIAM HOLT.
RAYMOND B. HOLT.