

Nov. 27, 1956

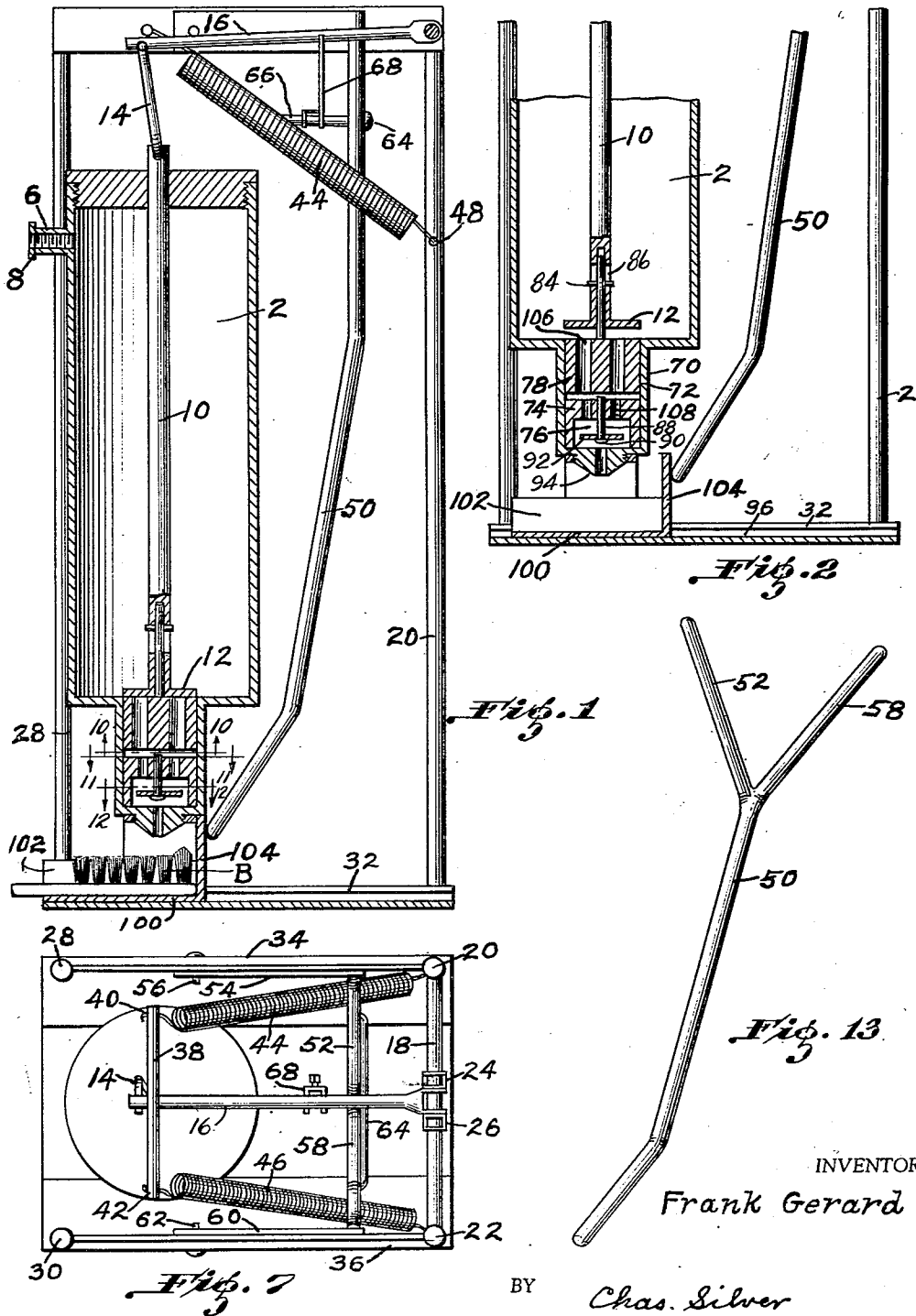
F. GERARD

2,772,033

VALVE MECHANISM FOR TOOTH PASTE DISPENSER

Filed June 10, 1954

3 Sheets-Sheet 1



INVENTOR

Frank Gerard

BY

Chas. Silver

ATTORNEY

Nov. 27, 1956

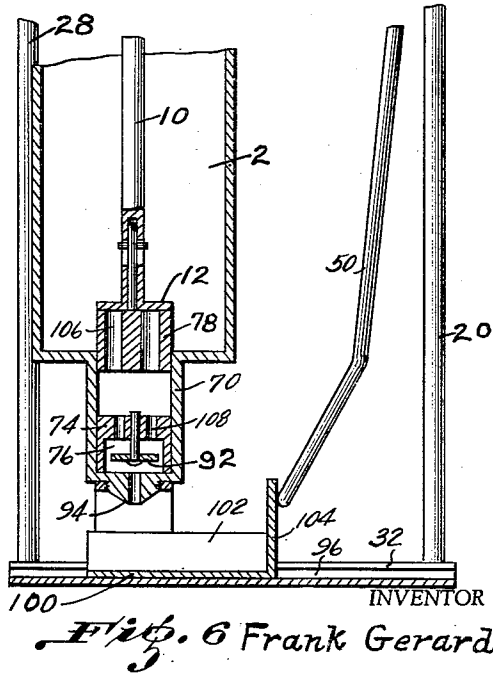
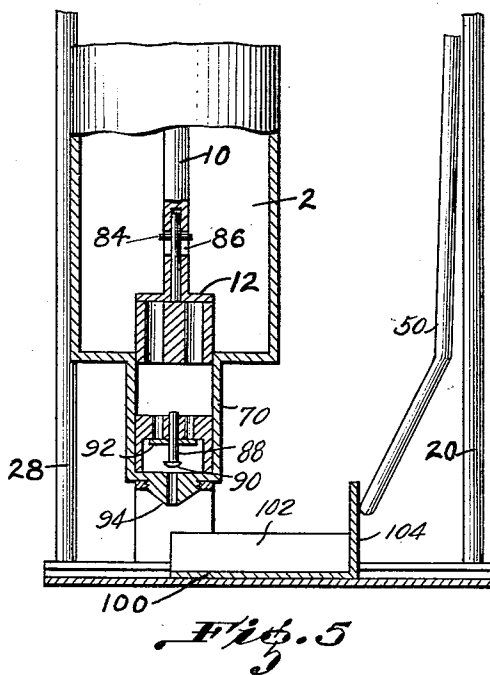
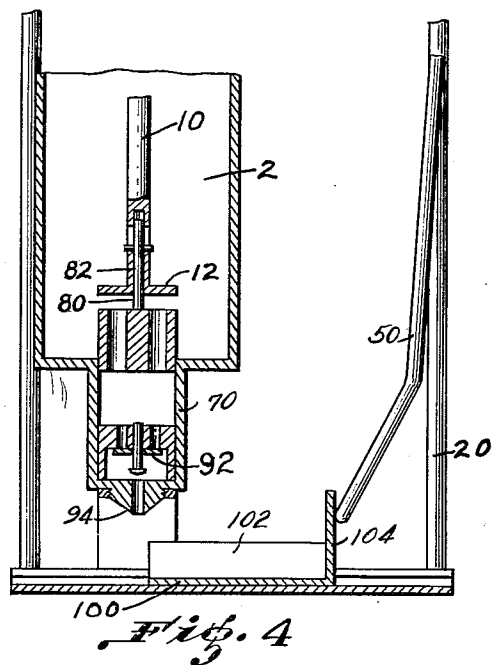
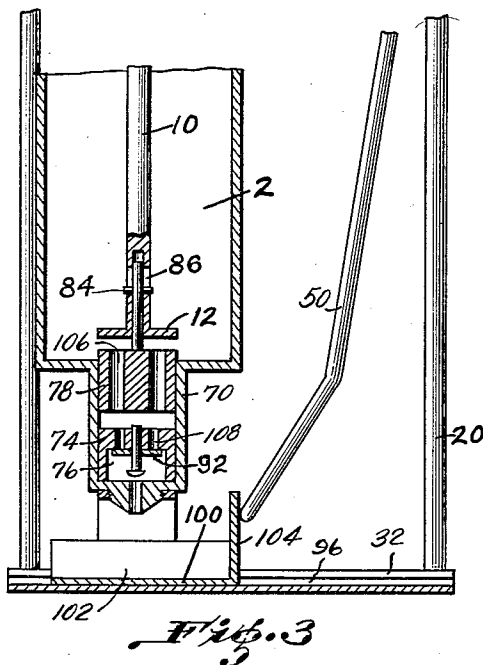
F. GERARD

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VALVE MECHANISM FOR TOOTH PASTE DISPENSER

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BY Chas. Silver

ATTORNEY

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F. GERARD

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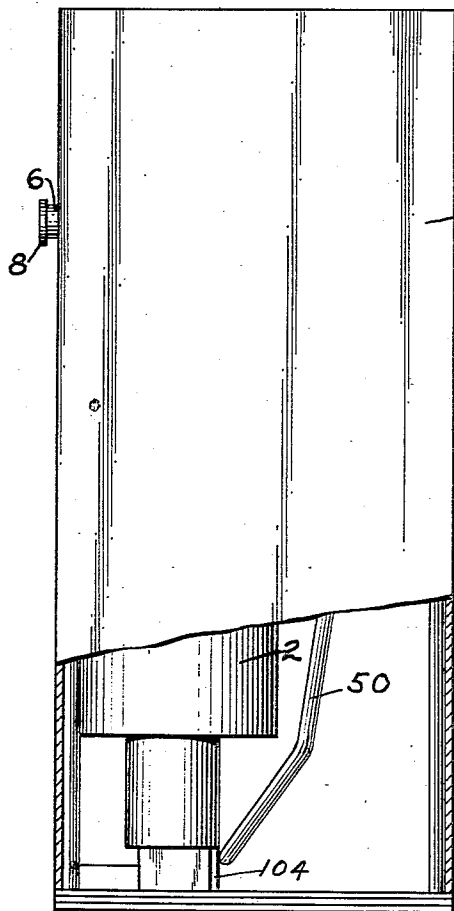


Fig. 8

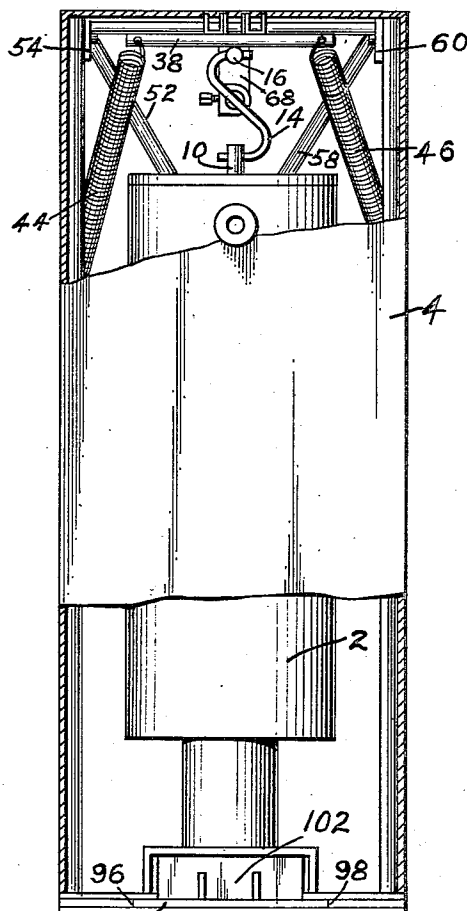


Fig. 9

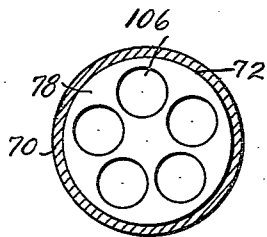


Fig. 10

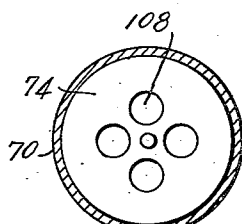


Fig. 11

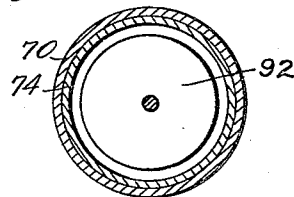


Fig. 12

INVENTOR

Frank Gerard

BY

Chas. Silver

ATTORNEY

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2,772,033

VALVE MECHANISM FOR TOOTH PASTE DISPENSER

Frank Gerard, Baltimore, Md.

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4 Claims. (Cl. 222—340)

This invention relates to devices for dispensing tooth paste upon tooth brushes and to the valve control mechanism for delivering the desired amount of the dentifrice upon the brush at the desired time.

Tooth or dental paste is marketed chiefly in collapsible metal tubes having screw caps. The paste extrudes from the tube when the latter is pressed or squeezed. Withdrawal of the paste from the tube by such squeezing has been found disadvantageous and unsatisfactory from certain standpoints, such as the unsightly distortion of the tube after some of the paste is withdrawn, the difficulty of withdrawing all of the paste from the tube, the loss or misplacement of the cap, etc.

Among the objects of this invention is the provision of a dispensing device for tooth paste whereby the disadvantages incident to the dispensation of tooth paste from the collapsible tube are overcome and also the provision of means responsive to the movement of the tooth brush whereby the paste from a reservoir is forcibly expelled and deposited upon the brush.

A more specific object of this invention is the provision of a novel valve mechanism whereby a desired amount of tooth paste is delivered to the brush and deposited on the bristles from the inner handle end to the outer free end.

Other, further and more specific objects of this invention will become readily apparent to persons skilled in the art from a consideration of the following description when taken in conjunction with the accompanying drawings wherein:

Fig. 1 is a side elevation of the paste dispenser without its covering, portions of the device being broken away to show the interior of the paste reservoir and the valve mechanism. In this view are shown the positions of the valves, piston and certain valve actuating means when the valve rod is at the lowermost point of its stroke.

Figs. 2 to 6 are fragmental views partly in elevation and partly in section showing the positions of the valves, piston and certain valve actuating means when the valve rod is at points other than the lowermost point of its stroke.

Fig. 7 is a top plan view of the paste dispenser shown in Fig. 1.

Fig. 8 is a side elevation of the paste dispenser, with a portion of the covering broken away.

Fig. 9 is a front elevation of the paste dispenser, with portions of the covering broken away.

Fig. 10 is a cross-section through the piston chamber along line 10—10 of Fig. 1.

Fig. 11 is a cross-section through the piston chamber along line 11—11 of Fig. 1.

Fig. 12 is a cross-section through the vestibule along line 12—12 of Fig. 1.

Fig. 13 is a detail perspective view of the bifurcated lever forming part of the valve actuating mechanism.

The paste reservoir compartment 2 within the housing or covering 4 has the paste inlet 6 provided with a screw cap 8. The valve rod 10 in the reservoir 2 has a valve

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flange 12 at its bottom and is connected at the top through the S-link 14 to the rocker arm 16 disposed to swing upon the crossarm 18, which is supported by the uprights 20 and 22. The stops 24 and 26 on the arm 18 limit longitudinal movement of the rocker arm 16 on crossarm 18.

The uprights 20 and 22 as well as the uprights 28 and 30 rest upon the base 32. The uprights 20 and 28 are connected at the top by the bar 34, and the bar 36 similarly connects the uprights 22 and 30. The rod 38 secured to rocker arm 16, preferably by being welded thereto, has the eyes 40 and 42 for engagement with one end of the springs 44 and 46, respectively, the other end of spring 44 engaging the eye 48 in upright 20 while the other end of spring 46 engages a similarly disposed eye in upright 22.

A bifurcated lever 50, forming part of the actuating mechanism, has a branch 52 integral with the bracket 54 which has an eye to receive the headed pin 56. The other branch 58 of lever 50 is integral with the bracket 60 which has an eye to receive the headed pin 62. The pins 56 and 62 are disposed to pass through eyes in bars 34 and 36, respectively, when these pins are in the eyes of their respective brackets, and thus constitute the pivots about which the lever 50 can be swung.

A tie rod 64, secured to the branches 52 and 58 at a distance below rocker arm 16, has a projecting stem 66, substantially at right angle thereto and substantially in vertical alignment with rocker arm 16. This stem 66 carries the adjustable fulcrum 68, which is notched and bears against the rocker arm 16.

The paste reservoir 2 has a downwardly projecting neck 70, preferably cylindrical, which provides the piston chamber 72 and holds the perforated partition 74 that separates the piston chamber 72 from the vestibule 76. The perforated piston 78, which fits closely in piston chamber 72 and which reciprocates therein as will be hereinafter described, has the external spindle 80 which reciprocates in the bore 82 of the valve rod 10. This reciprocation is limited by the pin 84, connected to the spindle 80, and the slots 86 in valve rod 10 wherein the pin 84 moves, as well as by the adjustment of fulcrum 68 on stem 66. A shaft 88, connected to and extending downwardly from the perforated partition 74, has the head or stop 90 and supports the loose valve disc 92 that operates between this stop 90 and the bottom of partition 74, as will be described later on. The discharge orifice 94 communicates with the vestibule 76. This orifice is located above and spaced from the base 32 which has guides 96 and 98 for the slider 100. This slider 100 has a channel 102 for reception of tooth brush B and also has the upwardly extending rear flange 104 for engaging the lever 50.

In operating this paste dispenser, with paste in reservoir compartment 2, ports or perforations 106 of piston 78, ports or perforations 108 of partition 74 and vestibule 76, and with the slider 100, valve disc 92, piston 78, valve flange 12 and valve rod 10 in their respective positions as shown in Fig. 1, a tooth brush is inserted in the channel 102 of slider 100. By pushing the brush forward, slider 100 being in engagement, by its flange 104, with the lever 50 will move the lever against the tension of springs 44 and 46 and communicate such movement by leverages, including projecting stem 66, fulcrum 68, and rocker arm 16, to the valve rod 10, causing valve rod 10 to rise.

As slider 100 moves to the position shown in Fig. 2, the valve rod 10 will move upward and slide along spindle 80 until pin 84 is at its lowermost position in slots 86 of valve rod 10. Valve flange 12 will now be above piston 78, which will not have moved from the position shown in Fig. 1, thus uncovering ports 106 in piston 78. Also, valve disc 92 still holds the position shown in Fig. 1.

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As slider 100 moves to the position shown in Fig. 3, the leverages will continue to move valve rod 10 and valve flange 12 upward accompanied by piston 78 in the same spaced relation to valve flange 12, shown in Fig. 2. Valve disc 92 will be drawn by suction to the bottom of perforated partition 74 and cover the ports 108.

As slider 100 now moves to the limit of its forward stroke shown in Fig. 4, valve rod 10 and valve flange 12 will continue their upward movement accompanied by piston 78 in the same spaced relation to valve flange 12. During this movement, ports 108 will be covered by valve disc 92 and the suction created in piston chamber 72 by the upward movement of piston 78 will cause tooth paste to be drawn into piston chamber 72 through ports 106.

As the tooth brush is started on its return stroke, the tension of springs 44 and 46 will cause the leverages to force slider 100 to the position shown in Fig. 5. Valve rod 10 has now moved downward, sliding along spindle 80 until pin 84 is at its uppermost position in slots 86 of valve rod 10. Valve flange 12 has now closed ports 106 of piston 78 which has not begun its return stroke, and ports 108 are still closed by valve disc 92.

As the tooth brush continues on its return stroke, and slider 100 reaches the position shown in Fig. 6, ports 106 will be closed by valve flange 12, and the tooth paste in piston chamber 72 will begin to be forced downward, thus forcing valve disc 92 away from ports 108 and discharging tooth paste from vestibule 76 through orifice 94 upon the tooth brush in channel 102 of the slider 100.

As the tooth brush continues further on its return stroke, tooth paste will issue upon it from orifice 94 until slider 100 returns to the starting position shown in Fig. 1.

The longitudinal measurement of slot 86 in the valve rod 10 determines how far valve flange 12 moves away from its valve seat at the top of piston 78 when the ports 106 are uncovered. The stroke of piston 78 may be varied and regulated by shifting the adjustable fulcrum 68 on the stem 66, thereby determining how much tooth paste will be delivered to the brush for each reciprocation of piston 78.

The present invention is not limited to the specific details set forth in the foregoing examples which should be construed as illustrative and not by way of limitation and, in view of the numerous modifications which may be effected therein without departing from the spirit and scope of this invention, it is desired that only such limitations be imposed as are indicated in the appended claims.

I claim as my invention:

1. A paste dispenser comprising in series a reservoir compartment for tooth paste, an intermediate chamber, a vestibule and an outlet orifice, a longitudinally perforated piston separating the compartment from the chamber and disposed to reciprocate in said chamber and closely fit therein, a perforated partition between said chamber and said vestibule, said piston having an external spindle, a valve rod having a valve flange at its lower end, a bore in said valve rod extending upwardly from the bottom face of said valve flange, a pin-receiving slot in said valve rod and spaced from said valve flange, said spindle on the piston projecting into said bore in the valve rod and being adapted to reciprocate within said bore, a pin connected to said spindle and projecting into said pin-receiving slot in said valve rod for limiting reciprocation of said spindle in said bore, a loose valve disc in said vestibule, a shaft fastened to said perforated partition and projecting downward into said vestibule and through said loose valve disc in said vestibule and having a valve stop spaced from the bottom of the perforated partition, said valve disc being disposed to slide along said shaft and between the perforated partition and said

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valve stop and to close the perforated portion of said partition against passage of paste therethrough when resting against said partition, said valve flange being disposed to close the perforated portion of said piston against passage of paste therethrough when resting on said piston, a slider disposed below said outlet orifice and adapted to be pushed by a tooth brush, a lever system connected to said valve rod and adapted to be actuated by said slider and to reciprocate said valve rod.

2. A paste dispenser comprising in series a reservoir for tooth paste, a piston chamber, a perforated partition, a vestibule and an outlet orifice, a piston having longitudinal ports therethrough disposed to reciprocate in said chamber and partially emerge therefrom into said reservoir, said piston having an external spindle, a valve rod in said reservoir and above said spindle and having a valve flange at its lower end, a bore in said valve rod extending upwardly from the bottom face of said valve flange, a pin-receiving slot in said valve rod and spaced above said valve flange, said spindle on the piston extending into said bore in the valve rod and slidably connected to the valve rod by a pin projecting from said spindle into said pin-receiving slot in said valve rod, said valve flange being disposed to close the ports of said piston against passage of paste therethrough when resting on said piston, a loose valve disc in said vestibule, a shaft fastened to said perforated partition and projecting downward into said vestibule and through said loose valve disc in said vestibule and having a valve stop spaced from the bottom of the perforated partition, said valve disc being disposed to slide along said shaft and between the perforated partition and said valve stop and to close the perforated portion of said partition against passage of paste therethrough when resting against said partition, a slider disposed below said outlet orifice and adapted to be pushed by a tooth brush, a lever system connected to said valve rod and adapted to be actuated by said slider and to reciprocate said valve rod.

3. In a mechanism for dispensing paste in measured quantities from a container, a loose valve disc in said container, a perforated partition in the container and having a projecting shaft below the perforations, said shaft passing through said loose valve disc slidably mounted on said shaft and movable along said shaft between the perforated partition and a stop on said shaft, said valve disc serving to close the perforated portion against passage of paste therethrough when resting against said partition, a longitudinally-perforated, elongated piston disposed to reciprocate in a piston chamber above said perforated partition and partially emerge from the piston into a paste reservoir forming part of the container, a spindle on said piston and having a projecting pin, a valve rod having a bore for holding said spindle in slidable relation thereto, a slot in said valve rod for receiving said pin, said pin and said slot serving to limit reciprocation of said spindle in said bore, and a valve flange on said valve rod at its lower end adapted to close the perforated portion of said piston against passage of paste therethrough when resting on said piston.

4. In a mechanism for dispensing paste in measured quantities from a container, a loose valve disc in said container, a partition in the container, said partition having a shaft projecting from below and a plurality of ports, said shaft passing through said loose valve disc slidably mounted on said shaft and movable along said shaft between the partition and a stop on said shaft, said valve disc serving to close the ports against passage of paste therethrough when said valve disc rests against said partition, an elongated piston having a plurality of ports, said piston being disposed to reciprocate in a piston chamber above said partition and partially emerge from the piston chamber into a paste reservoir forming part of the container, a spindle on said piston and having a projecting pin, a valve rod having a bore for holding

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said spindle in slidable relation thereto, a slot in said valve rod for receiving said pin, said pin and said slot serving to limit reciprocation of said spindle in said bore, and a valve flange on said valve rod at its lower end adapted to close the ports of said piston against passage of paste therethrough when resting on said piston. 5

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