

Aug. 1, 1933.

N. R. KIRK

1,920,867

DISPENSING APPARATUS

Filed June 3, 1932

2 Sheets-Sheet 1

Fig. 1.

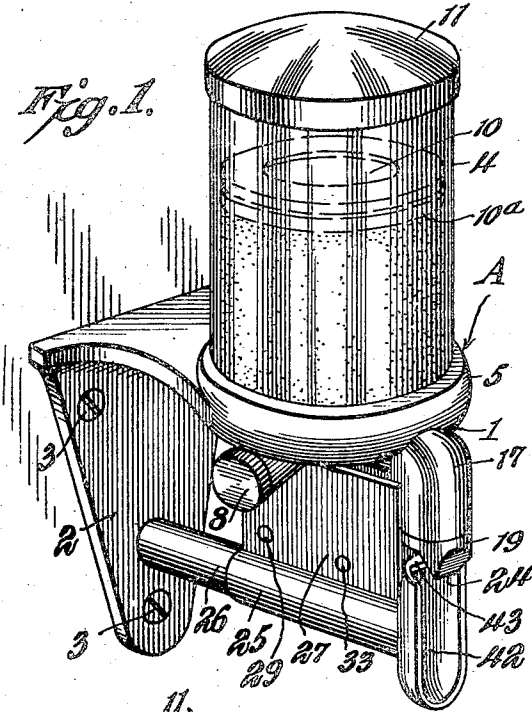


Fig. 3.

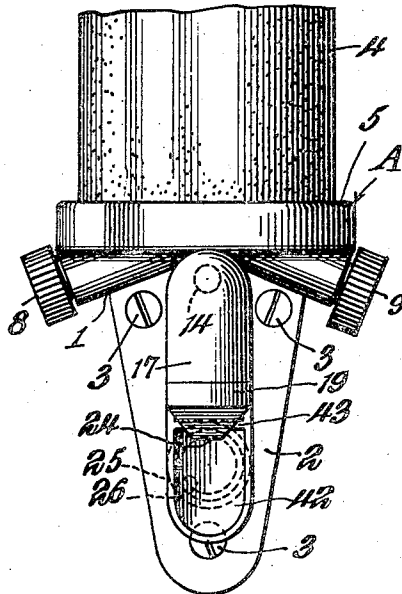


Fig. 2.

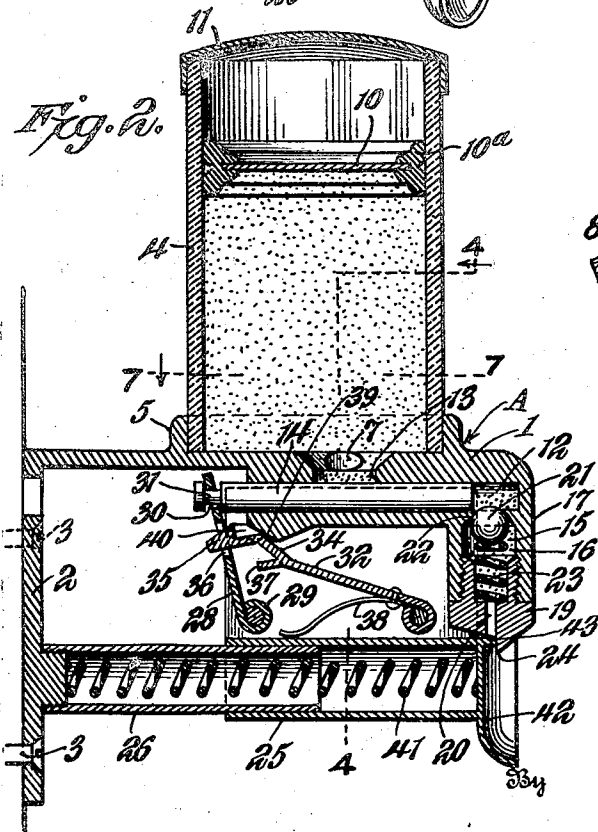
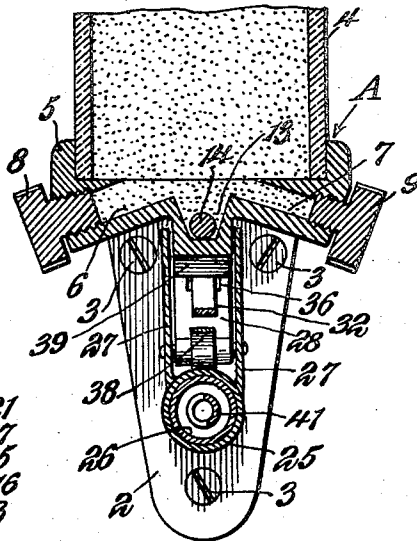


Fig. 4.



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2 Sheets-Sheet 2

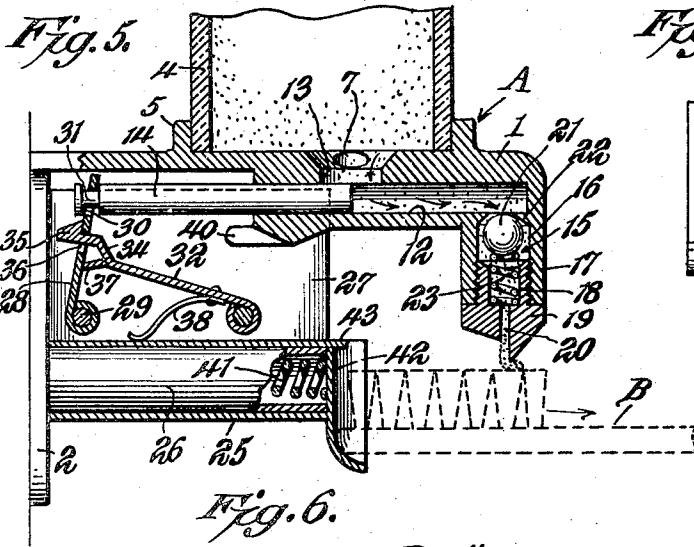


Fig. 5.

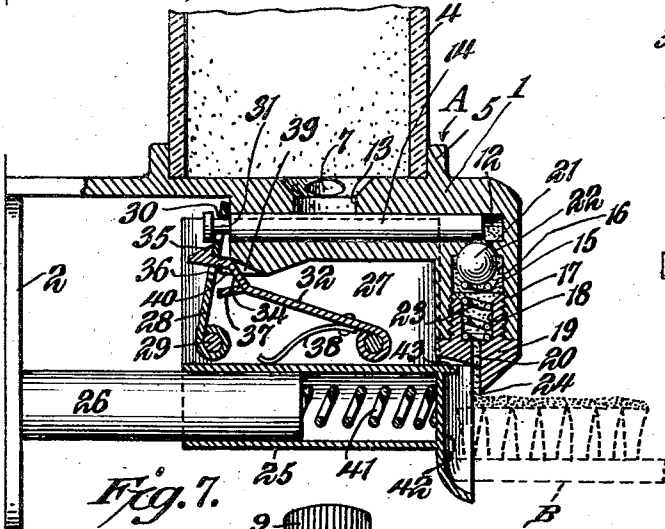


Fig. 6.

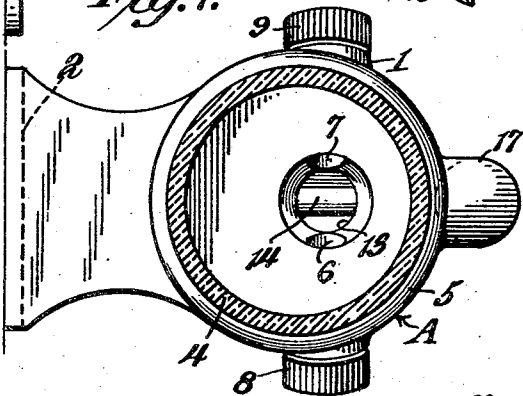


Fig. 7.

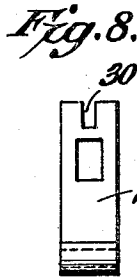


Fig. 8.

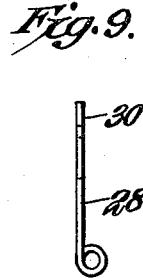


Fig. 9.

Fig. 10.

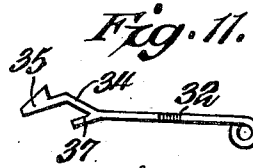


Fig. 11.

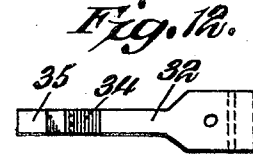


Fig. 12.

Fig. 13.

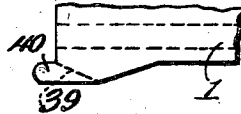
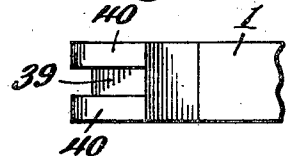


Fig. 14.



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UNITED STATES PATENT OFFICE

1,920,867

DISPENSING APPARATUS

Noel R. Kirk, Tientsin, China

Application June 3, 1932. Serial No. 615,190

12 Claims. (Cl. 221-102)

This invention relates to dispensing apparatus and particularly to apparatus for dispensing paste and depositing it upon a brush or similar implement. Apparatus embodying my invention is especially adapted for the dispensing of tooth paste and depositing it upon tooth brushes. Almost all tooth paste is sold in collapsible metal tubes provided with screw caps which are lost very easily. When the caps are lost and the tube nozzle left uncovered the paste has a decided tendency to harden in the nozzle, necessitating the application of greater pressure than usual in order to extrude paste from the tube, and frequently resulting in the waste of paste. Moreover, it is well known that such tubes, soon after being put into use, become unsightly due to being pressed at various points and being smeared with waste paste at their discharge ends.

One object of the present invention is to provide a dispensing apparatus including a preferably rigid reservoir adapted to be filled with the paste or like material to be dispensed, and means operated by a movement of the tooth brush or the like for forcibly expelling the material from the reservoir and depositing it upon a brush.

Another object is to provide apparatus of the character described adapted to perform a dispensing operation and then automatically to partially retrieve or suck back the material last extruded so as to prevent material from adhering to the outside of the apparatus and thereby avoiding the hardening of otherwise exposed material in the delivery opening.

Another object is to provide an apparatus of the kind set forth adapted to deliver material to a brush or the like when the latter is being withdrawn from under the delivery opening so as to cause material to be laid along the brush from the inner or handle end toward the outer or free end thereof. Other objects will become apparent from a reading of the following description, the appended claims, and the accompanying drawings.

In the drawings, Figure 1 is a perspective view of a dispensing apparatus embodying my invention;

Figure 2 is a central vertical sectional view of the apparatus shown in Figure 1, some parts being shown in elevation, and material expelling means being shown in its normal or inactive position;

Figure 3 is a view in front elevation of the apparatus shown in Figure 1, the top part thereof being broken away;

Figure 4 is a fragmentary vertical sectional view taken on the line 4-4 of Figure 2;

Figure 5 is a view similar to Figure 2, a part of the top of the apparatus being broken away and showing certain parts of the expelling means in different positions from those shown in Figure 2;

Figure 6 is a view similar to Figure 5, certain parts being shown in still different positions;

Figure 7 is a horizontal sectional view taken on the line 7-7 of Figure 2;

Figures 8 and 9 are side and front elevations of a lever;

Figure 10 is a fragmentary top plan view of a brush engageable piston operating member;

Figures 11 and 12 respectively are a side elevation and a top plan view of a combined push and drag link;

Figure 13 is a fragmentary side elevational view of a cylinder body and showing a fixed abutment formed thereon; and

Figure 14 is a fragmentary bottom plan view of the cylinder body showing a pair of spaced abutments and a cam surface.

In the drawings, which illustrate a preferred practical embodiment of the invention, there is shown a container generally designated A and including a body 1 formed preferably of metal and being provided with a bracket 2 which serves to mount the apparatus on a wall by means of screws 3, and a reservoir 4 which is preferably cylindrical and of glass, the lower end of which is seated on top of the body 1 and within an upwardly extending circular flange 5 formed on the body.

Two filler openings 6 and 7 extend inwardly from the sides of the body 1 toward the center and top face thereof so as to communicate with the interior of the reservoir 4. These openings preferably are of different diameters and are interiorly threaded at their outer ends for the reception of the exteriorly threaded nozzles of the conventional collapsible tooth paste tube. Threaded plugs 8 and 9 are provided for closing the filler openings 6 and 7 after the reservoir has been filled.

A follower 10 provided with a peripheral rubber washer 10a is mounted for sliding movements in the reservoir 4 in order to prevent the material therein from being in contact with the air, and a removable cap or cover 11 is fitted upon the upper end of the reservoir to prevent dust from collecting on the top of the follower 10.

By providing the follower 10 and by locating the filler openings 6 and 7 at the lower end of

the reservoir, contact of the paste with the air before delivery of the paste for use is entirely prevented. As paste is forced in through one or the other of the filler openings, it will cause the follower to rise within the reservoir so as to make room for the paste, but the paste will not come in contact with air from the time it leaves the collapsible tube or other source of supply until it is delivered for use.

In accordance with one feature of my invention, means are provided for pumping material from the container A and delivering it onto a brush or like implement for use. In the illustrative embodiment of the invention, there is provided a cylinder 12 formed in the body 1 and communicating adjacent one of its ends with the interior of the reservoir by means of an intake opening 13, and a piston 14 reciprocally mounted within the cylinder. Adjacent its other end the cylinder is adapted to communicate with the atmosphere by means of a discharge opening generally designated 15, the opening 15 comprising a valve chamber 16 formed in a downwardly extending part 17 of the body 1, a recess 18 in a plug 19 having threaded engagement with the lower end of the downwardly extending body part 17, and a relatively small diameter orifice 20 extending through the bottom of the plug 19. Discharge of material through the opening 15 is controlled by an outwardly opening ball valve 21 urged on a seat 22 by means of a spring 23 interposed between the ball and the bottom of the recess 18 in the plug 19.

In operation, when the piston 14 is moved from its Figure 2 position to its Figure 5 position, a vacuum will be created in the right hand end of the cylinder 12, causing material to descend from the reservoir through the intake opening 13 and into the cylinder. The piston 14 then will be moved from its Figure 5 position toward the right. After the end of the piston passes the right hand end of the opening 13, thereby closing the opening, further movement of the piston will force material from the cylinder past the valve 21 and through the discharge opening 15. As will be described later, this operation of the piston takes place when a brush B, indicated in dotted lines, is moved along under the lower end of the discharge opening. In order to facilitate the depositing of the material along the brush, the plug 19 is provided on one side only of the orifice 20 with a downwardly extending lip 24, one function of which is to guide the strip of material while it is being deposited on the brush and to assist in severing the strip when the desired amount of material has been discharged.

In accordance with a further feature of the invention, means are provided for operating the piston in such a way that material will be discharged upon the brush when the latter is moved along under the orifice 20 so as to lay the material upon the brush from the inner or handle end thereof to the outer end. For operating the piston to obtain this desired effect, I have provided a cylindrical piston operating member 25 mounted to slide upon a cylindrical guide 26 secured to the bracket 2 of the body 1, the cylindrical member 25 being provided with side plates 27-27 which serve to mount connections between the member 25 and the piston 14. These connections include a lever 28 journaled on a pin 29 carried by the side plates 27 and having an upper end slot 30 arranged to receive a reduced

portion 31 on the outer end of the piston; and a combined push and drag link 32 journaled upon a pin 33 carried by the side plates 27, the link 32 being adapted to engage or to be disengaged from the lever 28 in a manner to be described.

Near its outer or free end the link 32 is inclined upwardly as at 34 and then extends parallel to the main or inner end portion of the link, the extreme outer end of the link being provided with a latch nose 35 adapted to extend through an opening 36 in the lever 28. The link is also provided with a downwardly inclined thrust part 37 adapted to engage and exert a thrust upon the lever 28 when the tubular member 25 and the link 32 are moved to the left.

A leaf spring 38 secured to the link 32 and contacting the top of the tubular member 25 urges the link upwardly to effect engagement of the latch nose 35 with the lever 28. A cam surface 39 formed on the bottom of the body 1 and disposed in the path of travel of the link is adapted to engage the inclined part 34 thereof for moving it downwardly to disengage the latch nose 35 from the lever 28. On opposite sides of the cam surface 39 are fixed abutments 40-40 adapted to engage the lever 28 when the latter is moved to the right, after which further movement of the lever toward the right will cause it to rock about the abutments 40 as pivots.

The tubular member 25 is urged to the right by means of a spring 41 disposed between the bracket 2 of the body 1, and is provided with a brush engaging wall 42 normally disposed adjacent the lower end of the discharge opening 15. An extension 43 on the upper side of the tubular member 25 is adapted to abut against the lip 24 to limit movement of the tubular member toward the right, the extension 43 also being adapted, when in its extreme right hand position, to serve as a cut-off for closing the lower end of the discharge opening.

In operation, assuming that the parts are in the positions shown in Figure 2 with the exception that the reservoir 4 is empty and the follower 10 is at the bottom of the reservoir, in order to render the apparatus ready for use one or the other of the closure plugs 8 or 9 is removed, depending upon the size of thread on the tube from which the paste is to be supplied to the container. The tube is then screwed into the opening 6 or 7, as the case may be, and the material forced into the container by collapsing the tube. Material entering the container will contact with the under side of the follower 10 and move the latter upwardly, and thereafter air will not contact with the material.

When it is desired to deposit paste upon a brush, the latter is positioned with its outer end in engagement with the brush engaging wall 42 of the tubular member 25, and the latter is forced to the left against the edge of the spring 41. Movement of the tubular member 25 and the side plates 27 to the left will cause the outer or latch end of the link 32 to pass through the opening 36 in the lever 28, and the thrust portion 37 of the link to press against the lever. Further movement of the tubular member, the link 32, and the lever 28 to the left will move the lever to the position shown in Figure 5, thereby moving the piston to the left to permit material to descend from the reservoir and into the cylinder 12. The brush is then moved in the reverse direction underneath the discharge opening 15 with the tops of the bristles of the brush spaced slightly below the lip 24.

Movement of the brush in this direction will permit the spring 41 to move the tubular member 25 toward the right. During movement of the member 25 toward the right, the link 32, by reason of the engagement of its latch nose 35 with the lever 28, will move the latter and the piston 14 to the position shown in Figure 6. Upon further movement of the link 32 to the right, engagement of its inclined portion 34 with the cam surface 39 will cause the link to be swung downwardly and the latch nose 35 to be disengaged from the lever 28 so as to permit the nose 35 to pass through the opening 36 in the lever. At this time the lever will be in contact with the fixed abutments 40, and continued movement to the right will cause the lever to swing in a counter clockwise direction about the abutments 40 as pivots so as to move the piston toward the left. Movement of the tubular member 25 finally will be arrested by engagement of the cut-off 43 with the lip 24, and the parts will come to rest in the positions shown in Figure 2. During the last part of the movement of the member 25, which, as stated above, causes a partial retraction of the piston 14, material contained within the discharge opening 15 will be sucked back toward the cylinder 13 so as to prevent the accumulation of material around the lower end of the discharge opening, thus obviating the danger of material hardening within the small orifice 20.

Because of the fact that the material is deposited upon the brush as the latter is moved away from under the apparatus, that is, the material is laid upon the brush from its handle end toward its outer end, there is no danger of material already deposited upon the brush being smeared against the apparatus, which might take place if the material were deposited upon the brush while the latter is moving towards a position under the apparatus. The lip 24, being sharp at its lower edge, assists a clean break in the strip of material when the discharging operation has been completed.

Although the illustrative form of apparatus shown and described herein is considered to be a preferred embodiment of the invention, it will be understood that various changes may be made in the specific construction and arrangement of the parts without departing from the scope of the invention as defined in the claims.

I claim:

1. A dispensing apparatus comprising a cylinder provided with a discharge opening; a piston reciprocably mounted in said cylinder; piston operating means; a spring for urging said operating means in one direction; and connections between said piston and said operating means adapted to move said piston to perform automatically both a discharge stroke and part of a succeeding return stroke during movement of said operating means under the urge of said spring.

2. A dispensing apparatus comprising a cylinder provided with a discharge opening; a piston reciprocably mounted in said cylinder; a piston operating member; connections between said piston and said operating means adapted to move said piston to perform automatically both a discharge stroke and part of a succeeding return stroke, said connections including a lever pivotally connected to said piston and to said operating member and being loosely pivoted to one, a combined drag and push link connected to said operating member and being engageable with said lever; a cam on said cylinder engageable

with said link for disengaging the latter from said lever during the latter part of a stroke of said operating member; and a fixed abutment engageable with said lever intermediate its connections to said operating member and said piston.

3. A dispensing apparatus comprising a cylinder provided with a discharge opening; a piston reciprocably mounted in said cylinder for movements toward and away from said opening; an operating member mounted for sliding movements parallel to said piston's axis; a lever pivotally mounted on said member and having loose pivotal connection with said piston; a link pivoted to said operating member, and normally being connected to said lever at an intermediate point; a cam fixed with respect to said cylinder and disposed in the path of said link for disconnecting the latter from said lever; an abutment associated with said cam and located between said piston and said operating member and in the path of said lever whereby when said operating member is moved in one direction said link and lever first will move said piston to perform a discharge stroke, the link being then engageable with said cam and thereby being disconnected from said lever, and the lever being engageable with said abutment whereby further movement of the operating member in the same direction will rock the lever about said abutment and move the piston a limited distance in the opposite direction.

4. A dispensing apparatus comprising a cylinder provided with a discharge opening; a spring pressed outwardly opening valve for controlling said opening; a piston reciprocably mounted in said cylinder; piston operating means; a spring for urging said operating means in one direction; and connections between said piston and said operating means adapted to move said piston to perform automatically both a discharge stroke and part of a succeeding return stroke during movement of said operating means under the urge of said spring.

5. A dispensing apparatus comprising a cylinder provided with a discharge opening; a spring pressed outwardly opening valve for controlling said opening; a piston reciprocably mounted in said cylinder; a piston operating member; connections between said piston and said operating means adapted to move said piston to perform automatically both a discharge stroke and part of a succeeding return stroke, said connections including a lever pivotally connected to said piston and to said operating member and being loosely pivoted to one, a combined drag and push link connected to said operating member and being engageable with said lever; a cam on said cylinder engageable with said link for disengaging the latter from said lever during the latter part of a stroke of said operating member; and a fixed abutment engageable with said lever intermediate its connections to said operating member and said piston.

6. A dispensing apparatus comprising a container; a discharge opening adapted to communicate with said container and having a substantially downwardly facing lower end; a movably mounted member having a brush-engaging portion normally disposed adjacent the lower end of said opening, said member being movable away from said opening by pressure exerted by the end of a brush while the brush is moved in one direction along under said opening; spring means for returning said member to its normal position

when said brush is moved along underneath said opening in the reverse direction; and means connected to said movable member for forcing material from said container through said opening and on to the brush only during movement of said brush in said reverse direction.

7. A dispensing apparatus comprising a container; a discharge opening adapted to communicate with said container and having a substantially downwardly facing lower end; a movably mounted member having a brush-engaging portion normally disposed adjacent the lower end of said opening, said member being movable away from said opening by pressure exerted by the end of a brush while the brush is moved in one direction along under said opening; spring means for returning said member to its normal position when said brush is moved along underneath said opening in the reverse direction; means connected to said movable member for forcing material from said container through said opening and on to the brush only during movement of said brush in said reverse direction; and a cut off carried by said movable member and being adapted to close the extreme lower end of said opening when said member is in normal position.

8. A dispensing apparatus comprising a container; a discharge opening adapted to communicate with said container and having a substantially downwardly facing lower end; a movably mounted member having a brush-engaging portion normally disposed adjacent the lower end of said opening, said member being movable away from said opening by pressure exerted by the end of a brush while the brush is moved in one direction along under said opening; a spring for returning said member to its normal position when said brush is moved along underneath said opening in the reverse direction; means connected to said movable member for forcing material from said container through said opening and on to the brush only during movement of said brush in said reverse direction; and a stop for limiting movement of said member under the urge of said spring.

9. A dispensing apparatus comprising a cylinder provided with a discharge opening; a piston reciprocably mounted in said cylinder; a member mounted for sliding movements substantially parallel to the axis of said piston, said member having a brush engaging portion normally disposed adjacent to the lower end of said discharge opening, said member being movable away from said opening by pressure exerted by the end of a brush while the brush is moved in one direction along underneath said opening; a spring for urging said member to its normal position when said brush is moved along underneath said opening in the reverse direction; and connections between said piston and said member adapted to move said piston to perform a discharge stroke only during movement of said member under the urge of said spring.

10. A dispensing apparatus comprising a cyl-

inder provided with a discharge opening; a piston reciprocably mounted in said cylinder; a member mounted for sliding movements substantially parallel to the axis of said piston, said member having a brush engaging portion normally disposed adjacent to the lower end of said discharge opening, said member being movable away from said opening by pressure exerted by the end of a brush while the brush is moved in one direction along underneath said opening; a spring for urging said member to its normal position when said brush is moved along underneath said opening in the reverse direction; and connections between said piston and said member adapted to move said piston to perform automatically both a discharge stroke and part of a succeeding return stroke during movement of said member under the urge of said spring.

11. A dispensing apparatus comprising a cylinder provided with a discharge opening; a spring pressed outwardly opening valve for controlling said opening; a piston reciprocably mounted in said cylinder; a member mounted for sliding movements substantially parallel to the axis of said piston, said member having a brush engaging portion normally disposed adjacent to the lower end of said discharge opening, said member being movable away from said opening by pressure exerted by the end of a brush while the brush is moved in one direction along underneath said opening; a spring for urging said member to its normal position when said brush is moved along underneath said opening in the reverse direction; and connections between said piston and said member adapted to move said piston to perform a discharge stroke only during movement of said member under the urge of said spring.

12. A dispensing apparatus comprising a container; a discharge opening adapted to communicate with said container and having a substantially downwardly facing lower end; a movably mounted member having a brush-engaging portion normally disposed adjacent the lower end of said opening, said member being movable away from said opening by pressure exerted by the end of a brush while the brush is moved in one direction along under said opening; a spring for returning said member to its normal position when said brush is moved along underneath said opening in the reverse direction; means connected to said movable member for forcing material from said container through said opening and on to the brush only during movement of said brush in said reverse direction; a lip extending downwardly from said opening on the side thereof opposite that on which said movably mounted member is disposed; and a cut-off carried by said movable member adapted to engage said lip for limiting movement of said member under the urge of said spring and to close the lower end of said opening when in engagement with said lip.

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