May 24, 1960 J. M. LAPEYRE 2,937,790

TOOTHPASTE DISPENSERS

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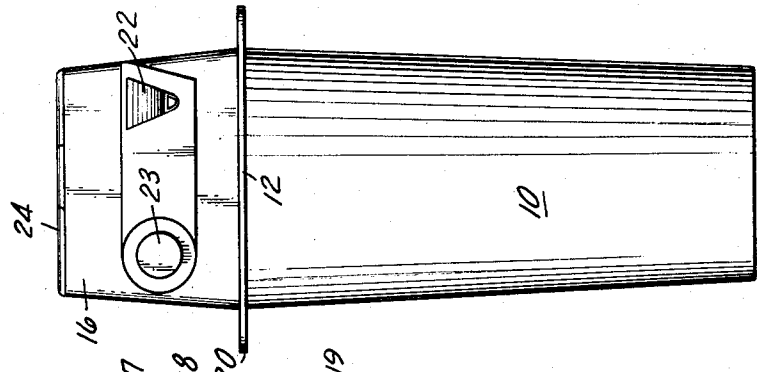


Fig. 1

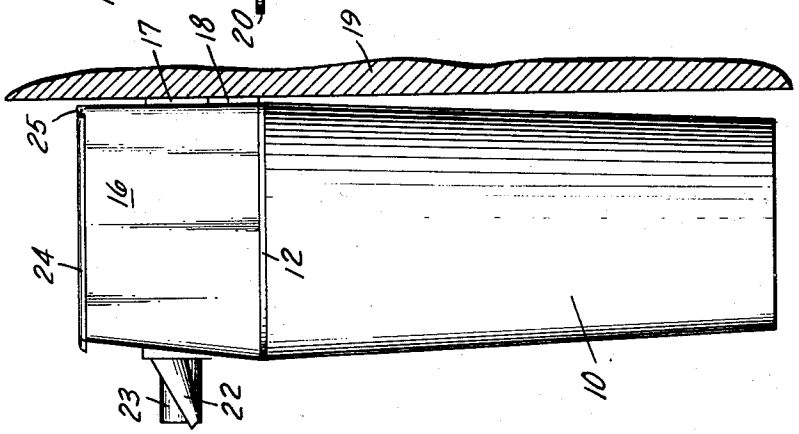


Fig. 2

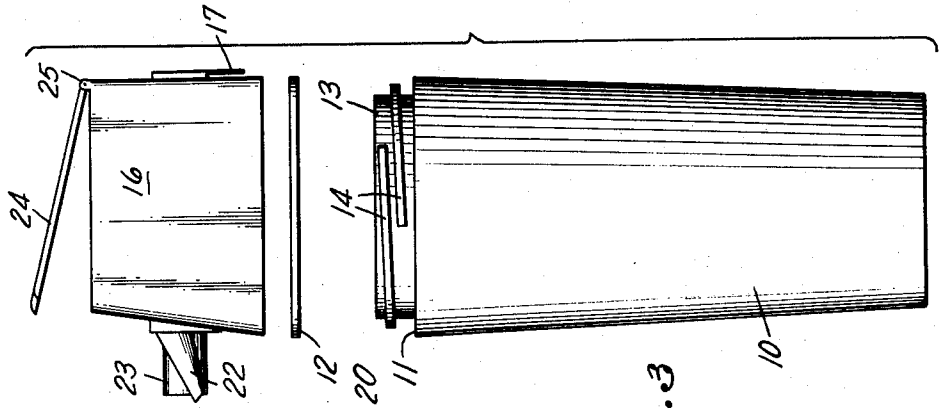


Fig. 3

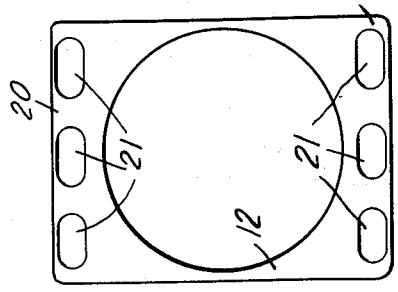


Fig. 4

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TOOTHPASTE DISPENSERS

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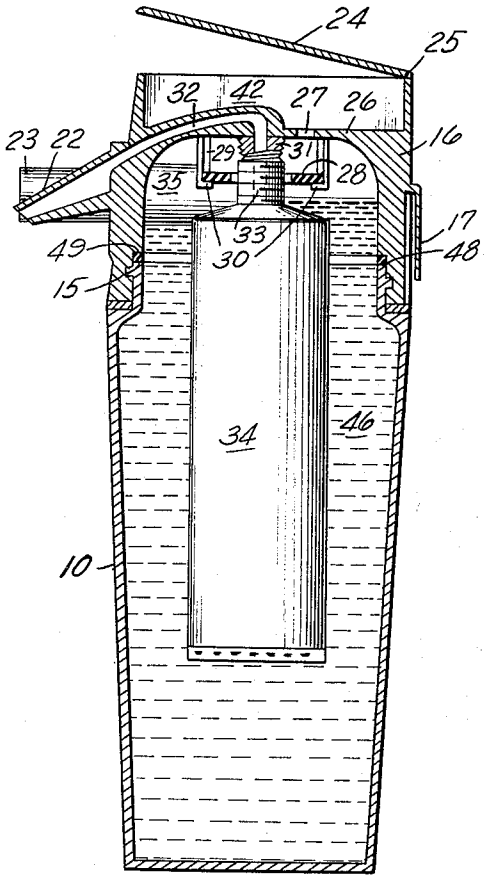


Fig. 7

Fig. 8

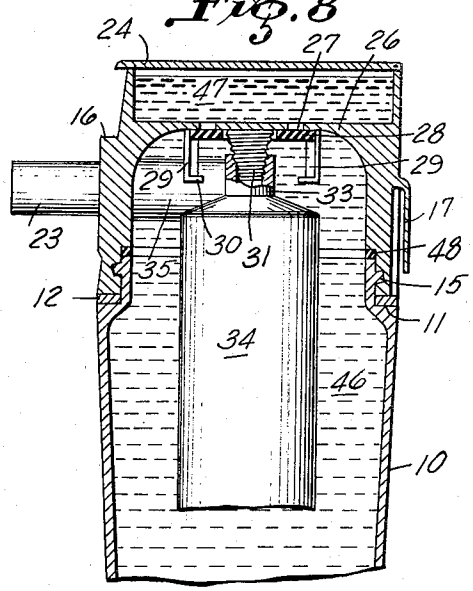


Fig. 9

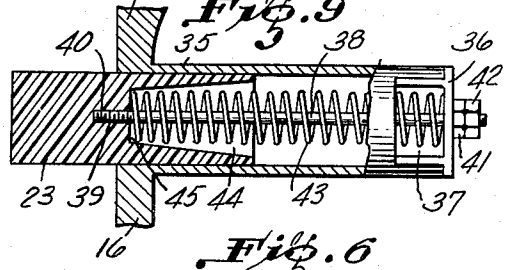


Fig. 5

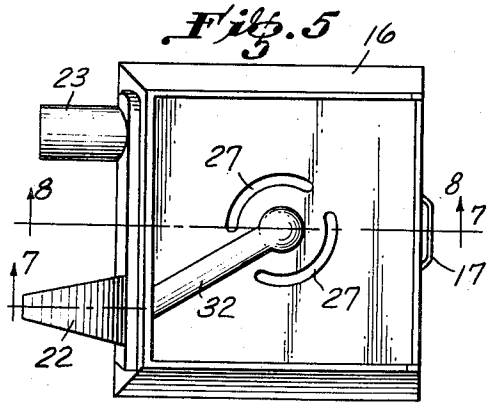
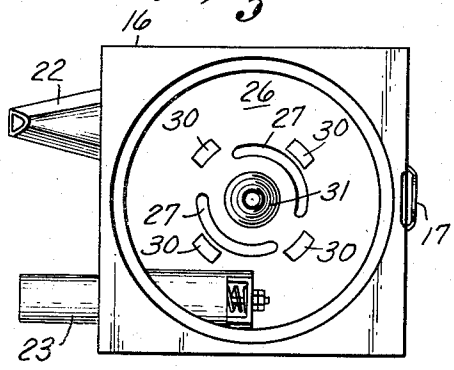


Fig. 6



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United States Patent Office 2,937,790 Patented May 24, 1960

2,937,790

TOOTHPASTE DISPENSERS

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Filed Jan. 18, 1957, Ser. No. 634,992

9 Claims. (Cl. 222—94)

The present invention relates to toothpaste dispensers and constitutes certain improvements over my similarly entitled copending application, Serial No. 355,383, filed May 15, 1953, now Patent No. 2,786,605.

In common with the objects of said prior application, it is the general purpose of the present invention to provide a device for hydraulically acting upon the deformable walls of a toothpaste or like tube to squeeze the contents therefrom in a series of successive measured discharges adequate for the needs of each application of toothpaste or other material.

Another object of the invention is to provide an improved toothpaste dispenser in the form of a simple hydraulic pump for progressively squeezing the deformable walls of a collapsible tube to achieve the delivery of the contents of the tube and wherein provisions is made for automatic air evacuation from the hydraulic chamber.

A still further object of the invention is to provide an improved hydraulic toothpaste dispenser in which any leakage of the hydraulic fluid from the device is substantially eliminated and in which there is little or no chance of any leakage of material from the tube incident to the discharge operation.

It is a still further object of the invention to provide a hydraulic toothpaste dispenser in which the paste discharge is arranged relatively higher, is more easily visible and more convenient to use.

With the foregoing and other objects in view, the invention will be more fully described hereinafter, and will be more particularly pointed out in the claims appended hereto.

In the drawings, wherein like symbols refer to like or corresponding parts throughout the several views:

Figure 1 is a front elevational view of a toothpaste dispenser constructed in accordance with the present invention.

Figure 2 is a side elevational view of the same shown suspended upon a wall indicated in fragmentary section.

Figure 3 is an exploded side elevational view showing the can or receptacle, the toothbrush supporting plate and the head fitting in side elevation with the lid of the head fitting partially raised.

Figure 4 is a plan view of the toothbrush supporting plate.

Figure 5 is a top plan view of the dispenser.

Figure 6 is a bottom plan view of the head fitting removed from the receptacle or can.

Figure 7 is a vertical sectional view taken through the dispenser with a toothpaste or other collapsible tube in place therein and with the lid of the reservoir raised.

Figure 8 is a fragmentary vertical sectional view taken on the line 8—8 in Figure 5 and showing the valve floated up to closed position, the reservoir and hydraulic pressure chamber filled with liquid and the lid of the reservoir in closed but not air tight position.

Figure 9 is a longitudinal sectional view taken through the hydraulic pump or plunger.

Referring more particularly to the drawings which illustrate only one embodiment of which the invention is susceptible, 10 designates a can or receptacle for hydraulic fluid, such for instance as water which, as more particularly appears from Figure 3 is provided at its upper open portion with a shoulder 11 which extends about a reduced neck 13 having external screw threads 14 thereon. An apertured plate 12 is adapted to rest upon the shoulder 11 and to be held thereto by a head or head fitting 16 which has at its lower end an internally threaded socket 15 into which the external threads 14 of the reduced neck 13 of the can 10 may be screwed for supporting the can 10 from the head 16. A rubber gasket 48 fits between the can top edge and a shoulder 49 in the head 16 inwardly of the socket 15.

As shown more particularly in Figure 2 a bracket or hook 17 is affixed to the rear wall of the head 16 for the purpose of supporting the dispenser upon a wall of a bathroom, cabinet or the like, by means of a complemental bracket or hook 18 affixed to said wall 19.

As shown more particularly in Figure 4, the apertured plate 12 is provided with lateral ledges 20 having slots 21 therein receive toothbrushes for supporting the same in convenient location to the toothpaste dispenser.

The toothpaste is adapted to be dispensed or extruded through a nozzle or spout 22 which protrudes through the front wall of the head fitting 16. Also projecting from said front wall of the head fitting 16 is a reciprocable plunger 23 which may be manually depressed inwardly by a finger of the operator for the purpose of driving out the contents of the toothpaste or other tube through the nozzle 22 in a manner hereinafter explained.

A lid or cover 24 is provided for the head fitting 16, the same being connected therewith as by a hinge 25 which appears from Figures 3 and 7.

The interior of the head fitting 16 is substantially hollow, the internal space being divided by a partition 26 having one or more valve ports 27 therethrough which are controlled by a ring float valve 28 slidable up and down in the valve guides 29 and confined against escape by inturned flanges 30 at the lower ends of the guides 29. These flanges restrict the downward movement of the ring valve 28, as shown in Figure 7, where the valve ports 27 are shown to be open. In Figure 8 however the float valve 28 is shown as having been floated upwardly against the lower side of the partition to close the valve ports 27.

A hollow tapered externally threaded spud 31 depends from an intermediate portion of the partition 26 and has its lower end open so as to communicate with the internal paste space of a collapsible container or tube 34 for toothpaste or other material.

As the spud 31 will be of substantially hard metal and the paste tube 34 essentially of a soft metal, the neck 33 of the paste tube, from which the conventional screw cap has been removed, may be received internally upon the spud 31 and by a rotational movement of the tube or container 34 a thread may be cut on the inside of the neck 33 by the threads of the spud 31. Thus the paste container 34 may be suspended from the spud with the interior paste space of the paste tube 34 in open communication with the hollow spud 31 which connects by a duct or passage 32 to the external nozzle or spout 22.

Referring more particularly to Figure 9, the plunger 23 is mounted to reciprocate in a cylinder 35 which is mounted in and supported by the front wall of the head fitting 6. The outer end of this cylinder is open to permit the plunger 23 to extend to the exterior of the device where it may be accessible for operation by depressing the same inwardly with a finger or otherwise.

The inner end of this cylinder 35 is closed as indicated

at 36 and adjacent this closed end 36, the side wall of the cylinder 35 is provided with one or more slots 37. A plunger retainer rod 38 is mounted through the cylinder 35 and has a threaded outer end 39 which is screwed into a threaded socket 40 of the plunger 23. The inner end of this plunger retaining rod is slidably fitted through the closed inner end 36 of the cylinder and such inner threaded end receives an adjusting nut 41 and a lock nut 42. A coil spring 43 is wound in a suitable number of convolutions about the rod 38 within the cylinder 35 and at its inner end engages against the closed inner end wall 36 of the cylinder. The outer end of this coil spring 35 is received in a recess 44 in the inner end of the plunger 23, there being a shoulder 45 within this recess for convenience in seating the outer end of the spring helix 43.

From Figures 7 and 8 it will appear that a hydraulic pressure chamber 46 lies below the partition 26 to and including the lower end of the can or receptacle 10, and a liquid reservoir 47 lies directly above the pressure chamber 46 and communicates therewith through the valve port 27 under the control of the float ring valve 28. It will also be noted particularly from Figures 7 and 8 that the inner end of the plunger 23 communicates directly with the pressure chamber 46. As shown in Figure 6 the cylinder 35 of the plunger 23 at its inner end extends to one side of the valve 28.

In operation, in the detached position of the can or receptacle 10 from the head 16, as shown in Figure 3, this receptacle 10 is partially filled with water or some other incompressible hydraulic liquid, but care should be taken not to fill the same full to avoid spillage when the collapsible paste tube 34 is introduced thereinto, as when the receptacle 10 is elevated to the head 16 or the head 16 brought down to the receptacle 10 for the purpose of screwing the receptacle 10 into the internally threaded socket 15.

However before the head 16 and receptacle 10 are united, the head may be inverted in the manner shown in Figure 6 and the screw cap removed from the externally threaded neck 33 of a paste collapsible container 34 so that the interior wall of this neck 33 may be fitted over the tapered externally threaded spud 31 and rotated thereon while pressure is applied to the paste tube 34 and neck 33 so that a thread may be cut on the interior of the neck 33 by the external threads of the spud 31. This is for the purpose of tightly uniting the paste container 34 to the spud 31 so that in the uprighted position of the head 16 the spud 31 will support the paste tube 34 and provide a water tight seal between spud and paste tube. The pressure chamber 46 will of course be of greater diameter than the paste tube 34, as shown in Figures 7 and 8.

Of course it will be understood that the apertured plate 12 will be placed between the receptacle 10 and the head 16 at the time the union is made between the receptacle and head.

The device in the assembled condition may then be hooked on to a wall or other support in the manner shown in Figure 2 and the lid or cover 24 raised so that water may be poured into the reservoir 47 above the partition 26.

It being remembered that the receptacle or can 10 was originally only partially filled with hydraulic fluid, the valve 28 will have dropped by gravity to the supporting flanges 30 as shown in Figure 7. As water is poured from a tumbler, suitable pitcher or by hose connection into the open upper end of the reservoir 47, such water may therefore descend by gravity through the valve port or ports 27. As the liquid level thus rises in the pressure chamber 46, the air may freely pass out upwardly through the valve port or ports 27 so that there is little likelihood of the pressure chamber 46 becoming air bound. Thus the valve port 27 subserves a double function, namely of permitting the descent by gravity of the substantially heavy liquid down into the pressure chamber 46 which is disposed below the reservoir 47 and at the same time permitting the upward escape of air from the pressure chamber 46 which is pushed up by the rising column of liquid in the hydraulic pressure chamber 46.

When the liquid level reaches the level of the float valve 28 it will lift the valve off the flanges 30 or other limit stops and when the hydraulic pressure chamber 46 is completely filled with the hydraulic liquid the valve will be floated up to the position of Figure 8 where it closes against the lower sides of the ports 27. Thus the valve in this position prevents any escape of the hydraulic liquid from the hydraulic pressure chamber 46 upwardly into the liquid reservoir 47. Of course all other avenues of escape are completely closed. Therefore when the plunger 23 is pushed inwardly, by the amount of its linear movement and its diametric dimension it will displace a proportional volume of the hydraulic liquid in the chamber 46. The amount of this linear movement of the plunger 23 may be adjusted by means of the adjusting nut 41, the adjustment being later locked by means of the lock nut 42.

The hydraulic fluid being substantially incompressible, this displacement of the hydraulic fluid in the plunger cylinder 35 is attended by an effective hydraulic pressure against the deformable walls of the paste tube or container 34.

In proportion to the hydraulic thrust against the deformable wall of the paste container 34, a measured quantity of the paste from the interior space of the tube 34 will be extruded upwardly through the hollow spud 31 and through the duct or passage 32 to and through the nozzle or spout 22 at which the head of the toothbrush may be held in order to receive this ribbon of toothpaste or other desired material.

When pressure is relieved from the plunger 23, the coil spring 43 will restore the same backwardly to the out or projected position of Figures 8 and 9. In executing this motion of the plunger, the original volume of the pressure chamber 46 will be restored and in addition will be added to the volume of the same the amount by which the paste container 34 has been collapsed. This will leave the pressure chamber 46 deficient in an amount of hydraulic fluid of the value of the squeezing action upon the collapsible tube 34. However this deficiency is automatically cured by the head of free liquid contained in the liquid reservoir 47 which by its weight will gravitate down through the ports 27 and against the exposed face of the ring valve 28 so that this valve will descend away from the ports and permit the entry of the requisite increment of hydraulic fluid. Upon this accretion in the pressure chamber 46, the valve 28 will be automatically floated up a closed position again and the device will be automatically restored to an origin position in which the hydraulic pressure chamber 46 is completely filled with the hydraulic pressure medium.

Therefore alternately by depressing the plunger 23 and subsequently removing the thrust, the same cycle of operations may be repeated at rapid intervals so that measured charges of the paste may be caused to be emitted from the nozzle 22 as the demand requires.

The device automatically, at each operation, provides volumetrically equivalent increments of the hydraulic fluid from the superposed liquid reservoir 47 down into the pressure chamber 46 at each actuation of the plunger so that the pressure chamber 46 is maintained full of the hydraulic fluid as is necessary for effective action upon each depression of the plunger 23.

It will be understood that the capacities of the chamber 46 and reservoir 47 may be proportioned so that there will be ample hydraulic fluid in the reservoir to accommodate the pressure chamber 46 in evacuating completely at least one tube of the paste, after which it will be necessary to dismember the device so as to remove the exhausted toothpaste tube 34 from the spud 31 and to substitute a full paste tube therefor.

It will be understood that the valve 28 traps the hydraulic fluid in the pressure chamber 46 and that when

the plunger 23 is pushed inwardly it compresses the valve more tightly against its seat about the valve ports 27. Then on the return outer movement of the plunger 23 under the return influence of the coil spring 43, hydraulic fluid will be drawn into the cylinder 45 and away from the bottom of the valve 28 so that, by a species of suction, the plunger 23, in moving to its restored origin outer position, will tend or assist to open the valve 28, thus assisting the gravity head of the liquid in the reservoir 47 which exists at all times upon the upper face of the valve through the valve ports, this being possible by reason of fact that the reservoir 47 is located directly above the hydraulic pressure chamber 46.

The plunger and its cylinder constitute a pump with resilient return so that in effect the paste is pumped out of the tube by the pump acting hydraulically upon the deformable walls of the paste tube 34.

It will be appreciated that when the resilient plunger pump 23 is pushed inwardly the volume of the hydraulic pressure chamber 46 is proportionately reduced and the valve 28 acts as a check valve to automatically close against the partition 26 about the valve ports 27, thereby closing these ports 27 and stopping any flow of the water from the pressure chamber 46 to the reservoir 47.

Since the pressure per square inch which is applied to the plunger 23 is transmitted undiminished to the entire surface of the collapsible tube 34, complete evacuation of the tube 34 is easily effected.

The ring float valve 28 may be of floating rubber or other appropriate material so that the valve is deformable so as to be readily inserted within the flanges 30 and the guides 29 and is easily removed therefrom. These guides 29 and flanges 30 form in effect a valve cage which does not interfere with the opening and closing movements of the valve 28 but restricts the same from any undue movement which would permit the valve to shift from an operating position. Any other form of check valve and cage may be used as even a non-float valve will be closed automatically on actuation of the plunger 23 because of the pressure created thereby in the hydraulic chamber 46. However the particular valve 28 herein illustrated and described is preferred.

It will also be understood that any other form of hydraulic pump may be used instead of that specifically illustrated in Figure 9, although this form of pump is to be preferred.

Now it will be appreciated that automatic air evacuation is obtained from the hydraulic chamber 46 through the valve ports 27 which are at substantially the top of the system. The automatic valve 28 floats shut as the water level reaches the top of the system, forcing air through the valve port 27.

The device may be filled with water while it is in place on the wall as shown in Figure 2.

The air liberated from the water automatically floats to the top of the system where it is bled off through the valve port 27.

Chance of leakage of hydraulic fluid is substantially eliminated as there are no openings, seams or joints below the can top edge. The head of water is small above the highest joint or seam which occurs between the threaded spud 13 of the can 10 and the head 16.

Also there is substantially no chance of material leakage. In other words there is substantially no head acting to force paste through the discharge duct 32 and through the nozzle 22. In other words it is only when the pump is actuated that a hydraulic force is created in the chamber 46 acting to collapse the tube 34 and expell the contents thereof in an amount dependent upon hydraulic displacement by the pump.

In my application aforesaid the paste discharge was at the bottom of the system. However according to the present invention the paste discharge 22 is at a higher elevation, is more easily visible and more convenient in point of use. The mouth of the nozzle 22 is in an easy-to-

see position. It is also positioned for easy cleaning and it points down at its open mouth and therefore avoids dust settlement.

The hollow tapered externally threaded spud 31 will accommodate collapsible tubes of any size. Due to the taper of this spud the inner wall of the neck 33 of any size toothpaste tube 34 may be accommodated. However this feature, standing alone, will be found disclosed in the prior Patent 1,751,129 granted March 18, 1930 to Harry J. Cocks.

The rubber or other compressible gasket 48 forms a seal between the can edge and the head fitting 16. It is important that a good seal be made at this point. This seal is made against the gasket 48 and not against the apertured plate 12.

In production, it is contemplated that the dispenser can and head 16 would probably be made of plastic material and only the spud 31 will be of substantially hard metal. The can and head may be made of a variety of materials with a hard metal spud inserted in the proper place during the time of manufacture or subsequently.

The cylinder 35 may be moulded as a part of the head member 16 and actually formed in the chamber. Of course it is contemplated that this cylinder may be manufactured separately and affixed in the head fitting in any suitable manner so that the plunger 23 may project to the exterior.

Although I have disclosed herein the best form of the invention known to me at this time, I reserve the right to all such modifications and changes as may come within the scope of the following claims.

What is claimed is:

1. For use with a filled collapsible container, a material dispenser comprising a hydraulic chamber having a material discharge passage therefrom through which the contents of the container may be expelled, said chamber being adapted to receive said container and retain same with the discharge opening of the container in communication with the chamber discharge passage, a hydraulic fluid reservoir above and in communication with said hydraulic chamber, a float check valve between said reservoir and chamber adapted to float upwardly and close said communication when the chamber becomes filled with hydraulic liquid, means associated with said chamber for creating a hydraulic pressure therein to collapse the container and expell the contents therefrom while causing said check valve to seat prohibiting hydraulic fluid from the chamber bleeding off into the reservoir whereby upon removal of the application of pressure the check valve will unseat admitting a quantity of hydraulic fluid from the reservoir to the chamber equal in amount substantially to the volumetric quantity of material dispensed from the container.

2. For use with a filled collapsible container, a material dispenser comprising a hydraulic chamber having a material discharge passage therefrom through which the contents of the container may be expelled, said chamber being adapted to receive said container and retain the same with the discharge opening of the container in communication with the chamber discharge passage, a hydraulic fluid reservoir at a higher elevation than said chamber and in communication with said chamber, said reservoir being in open communication with the outside atmosphere, a check valve between said reservoir and chamber, means associated with said chamber for creating a hydraulic pressure therein to collapse the container and expell the contents therefrom while causing said check valve to seat prohibiting hydraulic fluid from the chamber bleeding off into the reservoir whereby upon removal of the application of pressure the check valve will unseat admitting a quantity of hydraulic fluid from the reservoir to the chamber equal in amount substantially to the volumetric quantity of material dispensed from the container, air from the chamber adapted to pass

upwardly into the reservoir in the open position of the valve and to be thus evacuated to atmosphere.

3. For use with a filled collapsible container, a material dispenser comprising a hydraulic chamber having a material discharge passage therefrom through which the contents of the container may be expelled, said chamber being adapted to receive said container to retain same with the discharge opening of the container in communication with the chamber discharge passage, a hydraulic fluid reservoir above said hydraulic chamber, a partition between said reservoir and said chamber having a valve port therein establishing communication between the reservoir and chamber, a float check valve in said chamber positioned to close upwardly against said port when the valve is floated upwardly incident to the filling of the chamber with hydraulic liquid, means associated with said chamber for creating a hydraulic pressure therein to collapse the container and expell the contents therefrom while causing said check valve to seat prohibiting hydraulic fluid from the chamber bleeding off into the reservoir whereby upon removal of the application of pressure the check valve will unseat admitting a quantity of hydraulic fluid from the reservoir to the chamber equal in amount substantially to the volumetric quantity of material dispensed from the container.

4. For use with a filled collapsible container, a material dispenser comprising a hydraulic chamber having a material discharge passage therefrom through which the contents of the container may be expeller, said chamber being adapted to receive said container and retain same with the discharge opening of the container in communication with the chamber discharge passage, a hydraulic fluid reservoir above said hydraulic chamber, a partition between said reservoir and chamber having a valve port therein, a valve cage depending from said partition in said chamber, a check valve movably mounted in said cage to open and close said port and being of buoyant material to float upwardly to close said port incident to the completion of filling of the chamber with hydraulic fluid, means associated with said chamber for creating a hydraulic pressure therein to collapse the container and expell the contents therefrom while causing said check valve to seat prohibiting hydraulic fluid from the chamber bleeding off into the reservoir whereby upon removal of the application of pressure the check valve will unseat admitting a quantity of hydraulic fluid from the reservoir to the chamber equal in amount substantially to the volumetric quantity of material dispensed from the container.

5. For use with a filled collapsible container, a material dispenser comprising a hydraulic chamber having a material discharge passage therefrom through which the contents of the container may be expelled, said chamber being adapted to receive said container and retain same with the discharge opening of the container in communication with the chamber discharge passage, a hydraulic liquid reservoir above said chamber, a partition between said reservoir and chamber having a valve port therein, a valve cage depending from said partition, a deformable valve removably mounted in said cage and confined therein in its movements toward and from said valve port, means associated with said chamber for creating a hydraulic pressure therein to collapse the container and expell the contents therefrom while causing said check valve to seat prohibiting hydraulic fluid from the chamber bleeding off into the reservoir whereby upon removal of the application of pressure the valve will unseat admitting a quantity of hydraulic fluid from the reservoir to the chamber equal in amount substantially to the volumetric quantity of material dispensed from the container.

6. For use with a filled collapsible container, a material dispenser comprising a hydraulic chamber having a material discharge passage therefrom through which the contents of the container may be expelled, a hydraulic fluid reservoir above said chamber, a partition between said reservoir and chamber having a valve port therein, means depending from said partition for receiving and supporting the container with its discharge opening in communication with the discharge passage, a check valve in the chamber disposed to open and close said port, means associated with said chamber for creating a hydraulic pressure therein to collapse the container and expell the contents therefrom while causing said valve to seat prohibiting hydraulic fluid from the chamber bleeding off into the reservoir whereby upon removal of the application of pressure the valve will unseat admitting a quantity of hydraulic fluid from the reservoir to the chamber equal in amount substantially to the volumetric quantity of material dispensed from the container.

7. For use with a filled collapsible container, a material dispenser comprising a hydraulic chamber having a material discharge passage therefrom through which the contents of the container may be expelled, a hydraulic fluid reservoir above said chamber, a partition separating said reservoir and chamber and having a valve port therein, a hollow tapered externally threaded spud depending from the central portion of the partition and in communication with the material discharge passage, said spud adapted to screw into the internal wall of the neck of the container to be threaded thereon for supporting the container in the hydraulic pressure chamber, a ring valve extending about said spud and positioned to move to open and close said port, and means associated with said chamber for creating a hydraulic pressure therein to collapse the container and expell the contents therefrom while causing said valve to seat prohibiting hydraulic fluid from the chamber bleeding off into the reservoir whereby upon removal of the application of pressure the check valve will unseat admitting a quantity of hydraulic fluid from the reservoir to the chamber equal in amount substantially to the volumetric quantity of the material dispensed from the container.

8. For use with a filled collapsible container, a material dispenser comprising a head fitting, a partition therein dividing the fitting into upper and lower spaces, said upper space constituting a hydraulic fluid reservoir in open communication with the atmospheric pressure, a receptacle having a detachable connection with the lower portion of said fitting and together with the lower space of the fitting constituting a hydraulic pressure chamber, said partition having a valve port therein for the upward escape of air from the chamber into the atmosphere and for the downward entrance of hydraulic liquid to said chamber from the reservoir, means for supporting the container in the chamber, said fitting having a material discharge passage in communication with the interior of the supported container, a check valve movable toward and from the valve port, and means carried by the fitting and projecting into said hydraulic pressure chamber for creating pressure therein to collapse the container to discharge the contents therefrom while closing said valve against its port followed by the opening of the valve to permit hydraulic fluid from the reservoir to automatically descend into the chamber to augment the volume of hydraulic fluid in proportion to the volumetric quantity of material dispensed from the container.

9. For use with a filled collapsible container, a material dispenser comprising a hydraulic chamber having a material discharge passage therefrom through which the contents of the container may be expelled, said chamber being adapted to receive said container and retain same with the discharge opening of the container in communication with the chamber discharge passage, a hydraulic fluid reservoir above and in communication with said hydraulic chamber, a check valve between said reservoir and chamber, a hydraulic pump extending into said chamber for creating a hydraulic pressure therein against the container to expell the contents therefrom, said pump comprising a cylinder formed in the chamber, a plunger

mounted to reciprocate in said cylinder, said cylinder having open communication with the interior space of said chamber, means for returning the plunger to outer origin position after each depressing movement thereof, and means associated with said plunger and cylinder to limit or adjust the linear movement thereof.

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