C. W. COREY.

LIQUID SERVER.

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**1,085,404.** Patented Jan. 27, 1914.

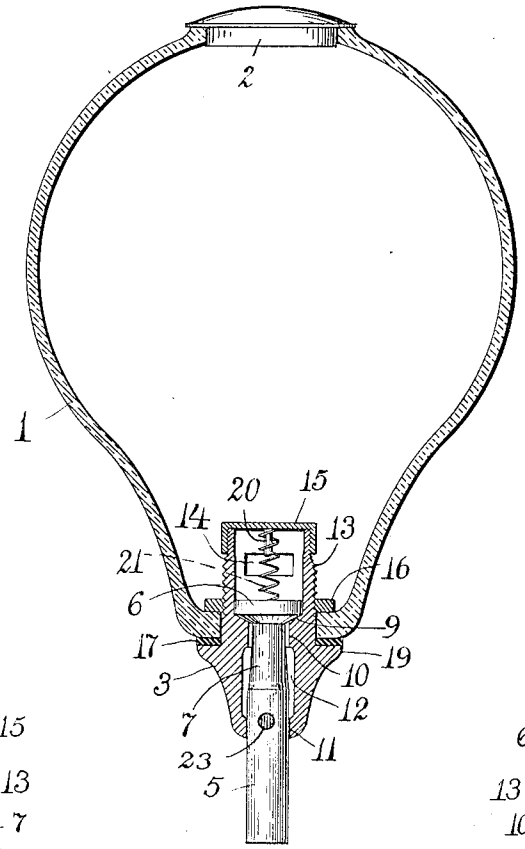



Fig. 1

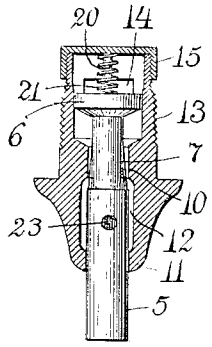



Fig. 2

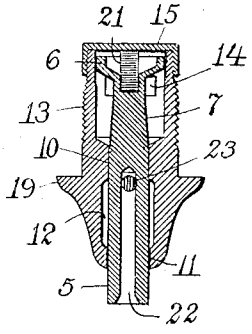



Fig. 3

Witnesses;

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# UNITED STATES PATENT OFFICE.

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## LIQUID-SERVER.

1,085,404. Specification of Letters Patent. Patented Jan. 27, 1914.

Application filed April 1, 1912. Serial No. 687,760.

*To all whom it may concern:*

Be it known that I, CHARLES W. COREY, a subject of the Dominion of Canada, and a resident of Malden, in the county of Middlesex and Commonwealth of Massachusetts, have invented certain new and useful Improvements in Liquid-Servers, of which the following is a full and exact description.

The object of this invention is the construction of an improved device for delivering fluids, such as liquid soap, into the palm of the receiver's hand, in a small and predetermined quantity.

In the drawings forming part of this specification, Figure 1 is a vertical central section of a liquid soap server made in accordance with my improvements. Fig. 2 is a similar section of the essential part of the invention, the delivering plunger not being in section and being illustrated in an intermediate position. Fig. 3 is a similar section but with the said plunger in section and in its topmost position.

The soap container 1 is preferably of glass, provided with a removable cover 2 for filling it. Through the bottom of the container is an opening within which is located a barrel or nozzle 3 formed with two chambers of about equal height but of unequal diameters. Vertically movable in said chambers is a piston comprising a tubular stem 5, a head 6 and a slightly reduced neck 7 joining said stem and head; the wall of the upper chamber being of equal diameter with said head, while between said chambers is a passage or bearing 10 of equal diameter with said stem, and through the bottom of the lower chamber is a passage or bearing 11 of the same diameter. Hence when the piston is depressed and its neck 7 within the bearing 10, it still has two bearings, the same consisting of the coaction of the stem and bearing 11, and the coaction of the head and the wall of the upper chamber.

The lower chamber 12 is made but slightly larger in diameter than the stem, so that while performing its function of a channel for the passage of the liquid soap to the stem, as hereinafter described, it limits the amount of liquid to be alternately discharged therein and withdrawn therefrom with each action of the piston, as explained hereafter. The upper chamber 13 is made sufficiently large to supply a prescribed amount of liquid soap at each thrust of the piston. The lower end or floor 9 of the upper chamber 13 is made somewhat conical to fit a correspondingly conical under surface of more or less of the head 6 and to insure the liquid-tightness thereof when in contact.

At a proper distance above the floor 9 is an intake opening 14 through the wall of the upper chamber, to permit the entrance of soap to such chamber after the head 6 has been elevated to bring it above such opening, the piston being kept from rising too far by the screw cap 15.

The barrel or nozzle 3 is secured within the bottom opening of the container by a nut 16 engaging the threaded exterior of the nozzle and clamping the lips of said opening between itself and the washer 17 on the shoulder 19.

The piston is returned to its lowermost position by the helical spring 21 abutting between the cap 15 and the bottom of a hole drilled to a considerable distance in the head 6 and neck 7, as shown in Fig. 3; the lower end of said spring being kept in place by said hole, while its upper end is kept from lateral displacement by the long pin or lug 20 depending from said cap within the spring.

As shown in Fig. 3, the channel 22 in the stem 5 extends nearly to the juncture of said stem and neck, and is there provided with one or more radial holes 23 for the passage of the liquid soap. The lower end or mouth of said channel is made conical, for the purpose set forth below.

The operation of the delivery device is as follows: The container having just been filled, the first upward movement of the piston,—preferably received by the pressure of the user's open palm up against the end of the stem,—causes the piston head to rise above the one or more openings 14, and the soap to fill the space beneath said head. While thus elevated, the upper part of the stem closes the bearing 10 and keeps the soap beneath the head from escaping; but as the hand is lowered and the piston permitted to descend, the head ejects the soap beneath it down through the restricted space between the neck and opening, into the lower chamber 12, and thence through the openings 23 to the channel 22 and from there into the palm of said hand as it moves down and away from the stem.

The descent of the soap from beneath the

piston head being mainly caused by the pressure of the spring 21, the tendency of the same is to be so suddenly ejected as to be spattered upon the sleeve or cuffs of the recipient, and so to cause dissatisfaction. To remedy this, the difference between the diameters of the neck 7 and bearing 10 is made very slight, so that the flow through said annular space is so much retarded as to render the escape of the soap from the stem too gentle for any danger of spattering.

When the piston head reaches the seat 9 and so terminates further escape of the soap, all the soap which was beneath the head when the latter was in its uppermost position, has descended to fill the annular space within the lower chamber 12 and the channel 22, and to deliver the excess to the waiting palm. Thus the first operation of the piston after a fresh replenishing of the container will deliver less than a specified charge, since a portion thereof remained behind in the lower chamber and the channel 22; but after such first operation, each subsequent movement of the piston delivers the full measured charge, since after each delivery, the space in the lower chamber and the channel always remains full by capillary attraction.

Upon each subsequent elevation of the piston, it tends to produce a vacuum beneath its head, which draws upward the soap about the neck and stem within the lower chamber, and also a small quantity of air up through the bearing 11 about the stem. When the piston reaches its highest position, the air aforesaid escapes into the container and a fresh supply of soap enters the upper chamber beneath the piston head.

Inasmuch as the elevation of the piston thus carries the contents of the lower chamber up into the upper chamber, the lower chamber should be made very little larger in diameter than the piston stem, so that but little soap will thus be moved, since the larger such quantity is, the smaller would be the amount delivered by the piston through the lower chamber. At the same time, the lower chamber must be large enough in diameter to permit easy delivery of the soap to the holes 23, and also for the purpose of lubricating the stem and lower bearing.

The channel 22 remains filled indefinitely, since it is closed by the contacting surface of the hand which is applied upward against the stem for raising the piston, and since by capillary attraction the latter part of a charge remains therein. Hence, if not in action for some little time, there is likely to be a hardening of the liquid exposed at the mouth of the stem; but by having said mouth conical as above stated, an area of exposed and hardened surface is provided which is considerably in excess of the cross section of the channel. Hence when the pressure of the discharge from the small channel strokes the larger surface of the conical mouth, the hardened layer thereat is easily broken through and the soap delivered, where otherwise the channel mouth would soon become clogged and stopped up entirely. Such conical or trumpet shaped mouth possesses another advantage. If, because of a long continued absence of the soap users, the channel should become closed by an accumulation of hardened soap therein, such mouth permits a wire or like small object to be readily thrust into the channel for the cleaning out thereof.

Although the stem 5 fits the bearing 11 snugly enough to prevent the escape of the liquid about the exterior of the stem, yet such fit is not close enough to prevent the air from rushing up through the space when the piston is elevated. The air thus drawn upward by the rise of the head 6 passes into the chamber 13 and escapes into the container when said head comes above the openings 14. This quantity of air is sufficient to take the place of the soap which is delivered by the descent of the piston, so that the container may be entirely air-tight and still permit the discharge of its contents.

By having the upper portion of the chamber 13 larger in diameter than the lower part, as shown in Figs. 1 and 2, whatever air or liquid there may be beneath the cap 15 can easily escape and will not interfere with the full elevation of the piston head.

Another important detail of construction is that of sinking the spring 21 down within the neck 7 to a considerable depth, since ample space is thereby given for a spring of ample length, and, in addition, a better action is given by the spring to the piston head for pressing the latter evenly upon the seat 9. The reason for this is found in the fact that the point of pressure given by the spring to the piston is below the head, so that it thereby gives what practically amounts to a pull upon the head instead of a push, and so draws it more uniformly and evenly upon the seat.

It may be well to note that the lower chamber 12 needs to be long enough to permit free delivery of the liquid during the entire downward stroke of the piston, and also after the latter comes to rest, for should the said chamber be shortened to bring the openings 23 entirely within the bearing 11 before the full charge has been delivered, such closure of said openings will cause the delivery-pressure of the piston head to force more or less of the soap down between the stem and bearing 11, so that it will ooze out and spread on the exposed surface of the stem. This causes an unsightly and unsanitary condition of the stem, as also an equally untidy drip therefrom.

What I claim as my invention and for

which I desire Letters Patent is as follows, to wit;—

A liquid server comprising a container, and a delivery nozzle connected with the lower part thereof, said nozzle having two chambers in vertical alinement, the upper chamber being cylindrical and having at its lower end a valve seat and a passage communicating with the lower chamber, the lower chamber having a passage at its lower end, said passages being in alinement and of equal diameters, and a piston consisting of a tubular stem equal in diameter to the diameter of said passages, a head equal in diameter to the upper chamber, and a neck uniting said stem and head, said stem having a radial opening into it near its upper end, and the piston having resilient means for pressing it against said seat, said neck being very slightly less in diameter than said stem, whereby the rapidity of delivery of the liquid from the upper chamber to the tubular stem is materially retarded.

In testimony that I claim the foregoing invention, I have hereunto set my hand this 28 day of March, 1912.

CHARLES W. COREY.

Witnesses:

A. B. UPHAM,

H. L. WHITTLESEY.