A. E. HOLMES.

LIQUID DISPENSER.

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1,165,673.

Patented Dec. 28, 1915.

Fig. 1.

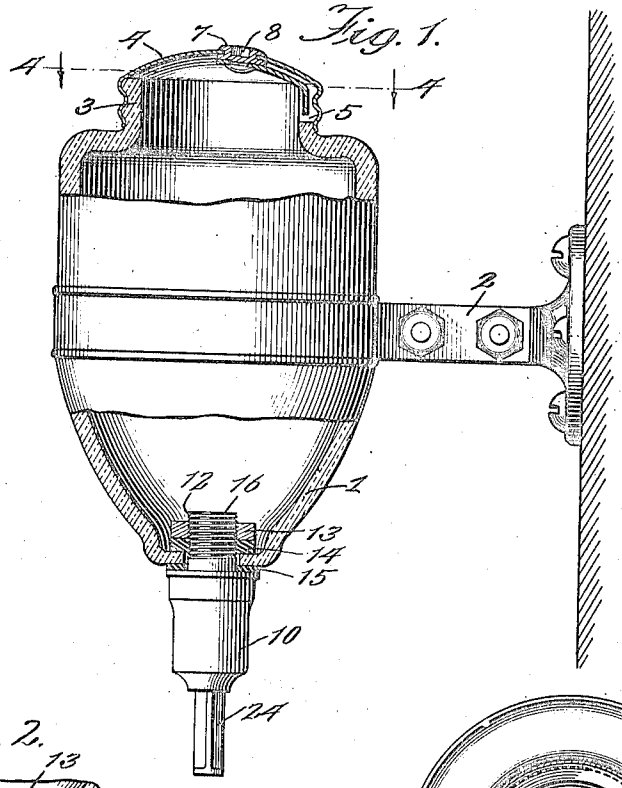


Fig. 2.

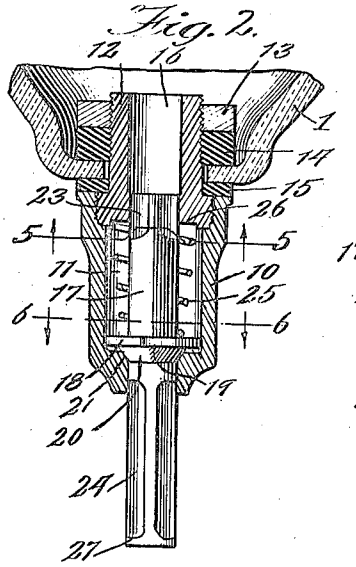


Fig. 5.

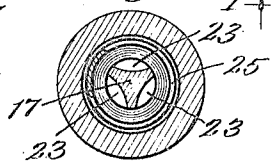


Fig. 6.

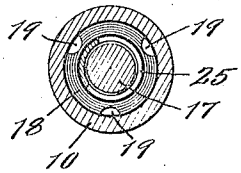


Fig. 4.

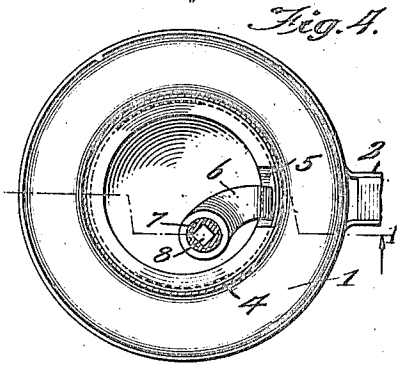
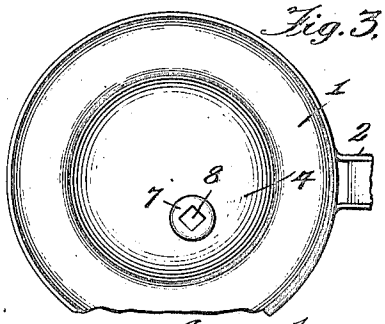


Fig. 3.



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UNITED STATES PATENT OFFICE.

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LIQUID-DISPENSER.

1,165,673. Specification of Letters Patent. Patented Dec. 28, 1915.

Application filed October 17, 1914. Serial No. 867,067.

To all whom it may concern:

Be it known that I, ALFRED E. HOLMES, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Liquid-Dispensers, of which the following is a specification.

My invention relates to liquid dispensers, and the general object of the invention is to provide a simple and efficient device of this class, especially for the dispensing of liquid soap in sleeping cars, toilet rooms and the like.

Among other more specific objects, it is my purpose to provide a positive acting valve mechanism for delivering the liquid, said valve mechanism to be capable also of measuring the quantity delivered at any full stroke of the valve.

Another object is to provide a construction such that the valve mechanism shall be self-cleaning.

I attain my objects by the mechanism illustrated in the accompanying drawings in which—

Figure 1 is a side elevation partly in central vertical section showing the assembled device. Fig. 2 is an elevation chiefly in central vertical section showing the valve mechanism. Fig. 3 is a top plan of the device. Fig. 4 is a plan section on the line 4—4 Fig. 1. Fig. 5 is a bottom plan section of the valve mechanism on the line 5—5 Fig. 2. Fig. 6 is a top plan section on the line 6—6 Fig. 2.

Similar numerals refer to similar parts throughout the several views.

Referring to the drawings, the container 1 may assume any desirable form and is made preferably of glass and mounted upon any suitable support 2. At the top of the container is an externally threaded portion 3, onto which screws the similarly threaded cap 4. This cap is preferably of sheet metal. A notch 5 is formed at one part of the top for receiving the end of a locking arm 6 which is secured to a socket member 7 the flanges whereof receive between them the metal of the cap as best shown in Fig. 1. This socket member has a central socket 8 which is polygonal, preferably square, for receiving the nose of a simple form of key. The construction is such that the flanges of the socket member permit said member and the locking arm 6 to be rotated but prevent the parts from becoming displaced. As the socket 8 is closed at the bottom it prevents foreign matter from entering the container. The socket member is located eccentrically upon the cover and the parts are so proportioned that the nose of the locking arm may be swung into and out of the notch 5. As a result of this construction, if the arm is swung into the notch it prevents the cap from being unscrewed. This construction is simple and prevents foreign substances getting into the liquid and at the same time is free from projections which might catch in surrounding objects.

Referring now to the valve mechanism; the valve casing 10 which contains the cylindrical valve chamber 11 is fastened in place by a nipple 12 which screws into the valve casing and is externally threaded to take the nut 13. By preference washers 14 and 15 are placed above and beneath the bottom of the container for rendering the connection watertight. The nipple 12 has a longitudinal passage 16 which receives the stem 17 of the valve. A plunger 18 is formed at the lower end of stem 17, said plunger making a sliding fit within the valve chamber. A plurality of ports 19 are formed in the perimeter of the plunger for permitting the liquid to pass. A valve seat 20 is formed at the bottom of the valve chamber and this receives the cone 21 formed on the valve stem beneath the plunger. Inlet ports 23 are formed in the sides of the valve stem at the upper end thereof for permitting the liquid to flow down into the valve chamber when the valve is in lowermost position as shown in Fig. 2. Outlet ports 24 are formed in the lower portion of the valve stem beneath the valve cone 21.

The parts just described are normally held seated, that is in closed position, by a spring 25 which is approximately helical and rests upon the disk 21. The upper end of said spring abuts a shoulder 26 formed at the lower end of the nipple 12. It is desirable that the outlet ports 24 terminate above the lower end of the valve stem, thus permitting the lower end of the valve stem to assume a circular outline at the point 27 in order that the valve mechanism may be operated with greater comfort to the hand of the user.

In operation, under normal conditions the

valve will remain seated as shown in Fig. 2. Under these conditions the valve chamber 11 will be closed at the bottom and the liquid from the container 1 will be permitted to flow down through the ports 23 into the said valve chamber. If now the operator presses upward upon the valve stem, the conical valve 21 will rise from its seat 20 and as soon as the upper end of the outlet ports 24 have reached the chamber, the liquid from said chamber will be permitted to flow down through the ports 19 in the plunger 18 and down through the outlet ports 24. The proportions are such, however, that the ports 24 will not be uncovered until the ports 23 have been covered by the lower end of the nipple 12. In this way it is impossible for the liquid to flow straight through in a continuous flow no matter what the position of the valve stem may be. When the operator releases the valve stem, the spring 25 forces it and the plunger 18 down, thus forcing out the liquid from the valve chamber until the outlet ports 24 close. Of course some of the liquid beneath the plunger when the latter is in highest position will, when the plunger is descending flow up through the ports or bypasses 19 so that only a portion of the contents of the chamber will be delivered at any one stroke.

From the foregoing, it will be seen that in my device the valve mechanism is very simple in form, easy to disassemble, and practically impossible of misoperation. The cover is simple and is practically smooth on top and yet may be securely locked by the application of a simple form of key. Furthermore, the valve mechanism is self-cleaning. As the plunger fits the sides of the chamber, it scrapes them every time it moves vertically. This is of great importance for it will be understood by those familiar with soap dispensers, for example, that the soap tends to harden and also to form verdigris on the sides of the chamber. If the plunger were simply a disk of smaller diameter than the inside wall of the chamber and depended for the resulting annular space for the passage of the liquid, the soap would soon build up on the walls and choke the passage. In my construction the passages are formed by actual notches or ports of open shape and the walls are continually being scraped. As there is nothing to prevent the plunger from rotating, it gradually does so under the action of the hand of the operator and hence the ports shift angularly from time to time and permit all parts of the wall to be cleaned.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is:

1. In a liquid dispenser, a container, a cylindrical valve stem having a plunger between its ends, and longitudinal grooves in its side above and below said plunger, said plunger having notches at the edge for the flow of liquid, a receptacle beneath said container, said receptacle having a cylindrical chamber in which the plunger fits slidingly, said chamber communicating with the container through a cylindrical passage and having a cylindrical passage at the lower end, said valve stem fitting slidingly in said passages, said valve stem having a valve seating upon said receptacle at the lower end thereof, and the plunger, when the valve is seated, being elevated above the lower end of said chamber.

2. In a liquid dispenser, the combination of a container, a valve stem having a plunger located between its ends, said plunger having an aperture for the passage of liquid, a separable nipple secured to the bottom of said container, said nipple having a passage in which the upper portion of the valve stem fits slidingly, a valve casing secured to said nipple, said valve casing having a chamber in which the said plunger fits slidingly, said valve casing having a passage at the lower end of the chamber in which the portion of the valve stem below the plunger fits slidingly, said stem having a longitudinally grooved port above and a similar port below said plunger for the passage of liquid into and out of the valve chamber.

3. In a liquid dispenser, the combination of a container, a cylindrical valve stem having a plunger located between its ends, and said plunger having a port for the flow of liquid, a separable nipple secured to the bottom of the container and having a passage in which the upper end of the valve stem fits slidingly, a valve casing screwing onto said nipple, and containing a valve chamber in which said plunger makes a close sliding fit, said valve casing having a passage at the bottom in which the lower end of the valve stem fits slidingly, said valve stem having ports above and below the plunger coöperating with the sides of the passages in the nipple and in the valve casing respectively, said ports being arranged longitudinally in the valve stem and so proportioned that the ports above and below the plunger are uncovered alternately, substantially as described.

4. In a liquid dispenser, the combination of a container having a cylindrical chamber beneath it, there being a cylindrical passage leading downward from the container to the chamber and another cylindrical passage leading down and out from the bottom of said chamber, said passages being in line with each other, a plunger fitting slidingly in said chamber and having notches formed in the edges thereof which constitute ports, a valve stem extending upward from the plunger into the first mentioned

passage and another stem extending downward from the plunger into the second mentioned passage, the upper stem having inlet ports formed in the side and the lower stem having outlet ports formed in the side, substantially as described.

5. In a liquid dispenser, a container, a cylindrical valve stem having a plunger between its ends, said plunger having notches in its periphery, and said stem having ports in its side above and below said plunger, a cylindrical chamber beneath said container, said plunger fitting slidingly within said chamber, a cylindrical duct at the top of the chamber leading thereinto from the container, a cylindrical duct at the bottom of said chamber, in line with the first mentioned duct, said ducts making a sliding fit with said valve stem, and a spring tending to force said plunger downward, said plunger and stem being free to rotate.

In witness whereof, I have hereunto subscribed my name in the presence of two witnesses.

ALFRED E. HOLMES.

Witnesses:
HOWARD M. COX,
W. H. PLUNKETT.