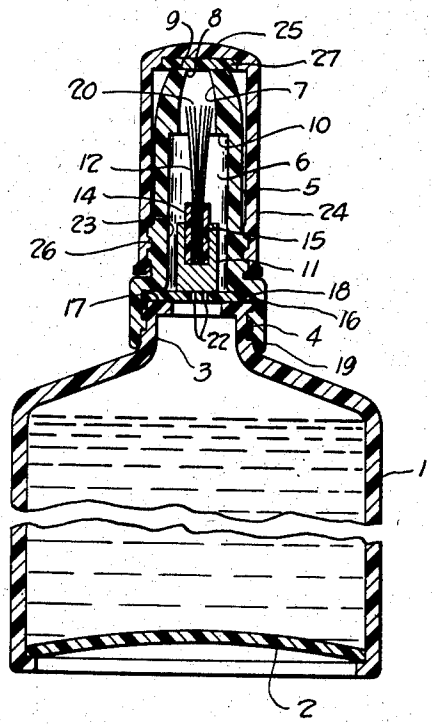
Oct. 20, 1959 H. W. JOCKERS 2,908,926

LIQUID APPLICATOR HAVING NOZZLE CONTAINED BRUSH ASSEMBLY

Filed March 5, 1956

Fig. 1



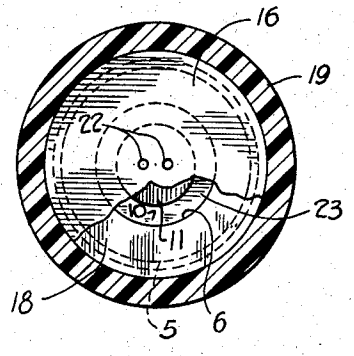


Fig. 3

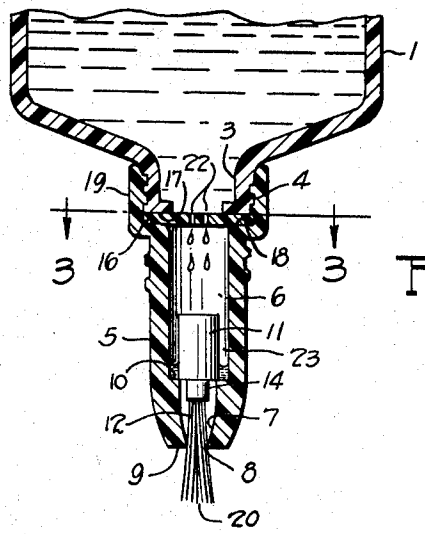


Fig. 2

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2,908,926

LIQUID APPLICATOR HAVING NOZZLE CONTAINED BRUSH ASSEMBLY

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Application March 5, 1956, Serial No. 569,384

1 Claim. (Cl. 15—139)

This invention relates to a liquid applying device of the type in which a brush is moved outwardly through a discharge opening in one end of the casing to a use position in which the brush projects from such end opening and in which the brush is retracted to a storage position within the casing when not in use.

More specifically, although not restricted to gravity operation, the invention is related to the type of liquid applicator described and claimed in U.S. Patent 2,485,494.

In accordance with a preferred embodiment representing the best-known mode of practicing the invention, the device is provided with a tubular nozzle member which is suitably secured to a receptacle that contains the liquid to be applied. The nozzle member, preferably elongated, is formed with a through passage. One end of the passage is continuous with a discharge opening at the tip end of the nozzle and the other end of the passage is continuous with the interior of the receptacle so as to receive a charge of liquid from the receptacle when the device is tilted or inverted to use position. A partition element is disposed across the opening through which the nozzle chamber connects with the interior of the receptacle so as to control the flow of the liquid into the nozzle chamber when the device is inverted for use.

Contained within the nozzle chamber and either spring pressed or, as will appear, free for gravitational axial movement therein is a brush assembly comprising a stubby stem body and a brush disposed in end to end relation. This brush assembly is guided by the walls of the nozzle chamber for movement in one direction to project the brush through the discharge opening of the nozzle for use when, in the case of a gravity controlled applicator, the device is inverted and such opening is directed downwardly. The limit of movement to such projected or use position is determined by engagement of the periphery of the stem body at one end of the latter against an internal valve seat in the nozzle member, thus sealing the nozzle passage to prevent the flow of liquid out of the discharge opening. Endwise pressure on the brush displaces the stem or valve body from sealing position against the valve seat so as to permit, when needed, the flow of an additional quantity of liquid through the discharge opening and onto the brush for use. The brush assembly is retracted in a reverse direction to a storage position wholly within the nozzle chamber when, again in the case of a gravity controlled applicator, the device is turned to a position in which the discharge opening is directed upwardly. In such retracted position the stem body engages the partition element over the liquid metering apertures or slots in the latter, constituting a closure for said slots and thereby trapping within the nozzle chamber whatever quantity of liquid remains therein at the conclusion of the preceding use of the device.

The partition element is desirably removable or replaceable so that the opening or openings with which it is formed can be selected as by changing partition elements

to provide metering characteristics suited to the particular liquid contained in the receptacle. It may take the form of a washer or disc slotted or apertured to provide orifices through which the liquid is metered into the chamber of the nozzle member. In one arrangement the partition element is snap fitted within a counterbore or increased diameter end portion of the nozzle, or, alternatively, and as will appear in connection with the detailed description, the partition disc is peripherally clamped between a circular shoulder provided by a counterbore or enlarged chamber in the receiving end of the nozzle member and the circular end of the bottle or other receptacle to which the nozzle member is secured. As a further refinement, the base end of the nozzle member is internally threaded to receive the externally threaded neck of the receptacle and the threaded parts arranged to clamp the partition between them. Thus the nozzle is readily removed from and replaced on the threaded neck of the receptacle as a unit which includes the brush assembly and an external sealing cap, the brush assembly being wholly contained within the nozzle and confined entirely between the partition element and the sealing cap.

Other objects and advantages are apparent in the following detailed description of the preferred embodiment of the device, this description being made in connection with the accompanying drawings forming a part of the specification.

In the drawings:

Fig. 1 is a foreshortened vertical sectional view of the device in an upright storage position;

Fig. 2 is a fragmentary longtudinal sectional view similar to Fig. 1 showing the nozzle end of the device in an inverted use position; and

Fig. 3 is a sectional detail through the base end of the nozzle, with parts broken away and removed, this view being taken substantially in the plane represented by the line 3—3 of Fig. 2 and enlarged with respect to that figure.

The device comprises a tubular casing or receptable 1 which constitutes a reservoir and may take the form of a glass, metal or plastic bottle having a closure 2 at one or its bottom end. At its other or open top end, attached as to neck 3 by threads 4, is a tubular nozzle member 5 through which the liquid contents of the receptacle 1 are delivered for use. The nozzle member may be formed as by molding or turning metal although it is preferably made as an elongated molded plastic body of circular section. Extending axially through the nozzle is a fluid passage comprising a cylindrical central or main chamber 6, an enlarged base end chamber, and a converging discharge passage 7 which extends between the central chamber 6 and discharge orifice 8 in tip end 9. The juncture between the central chamber portion 6 and the tapered discharge passage 7 occurs in a plane transverse to the axis of the nozzle member, the diameter differences providing a circular radial shoulder 10 which constitutes a valve seat.

Within the nozzle chamber is accommodated a brush assembly by means of which the liquid contained in the receptacle 1 is applied. This brush assembly comprises a weighted body or base 11 in the form of a cylindrical flat ended metal member and a brush or bristle tuft 12. The ends of the hairs or bristles comprising the brush 12 are imbedded or held in a plug or tube element 14 of deformable plastic material press fitted into a cylindrical socket 15 drilled axially into one end of the weighted base 11.

In the retracted or storage position of the brush assembly, shown in Fig. 1, such assembly is wholly accommodated within the nozzle chamber or passage, the flat circular bottom end face of the base resting on partition element or circular disc washer 16. This partition disc

is marginally clamped between upper end **17** of the receptacle neck **3** and a circular radial shoulder **18** formed within the nozzle member at the juncture of the central chamber portion **6** of the nozzle passage and the larger diameter chamber or counterbore within base end **19** threaded onto the neck of the receptacle. The brush assembly is of such over-all length that, at the limit of retractive movement when the assembly rests in storage position on the partition **16**, free ends **20** of the bristles extend axially beyond the valve seat shoulder **10** and are disposed within the tapered discharge passage portion **7**. By such relationship of parts, there is avoided the possibility of the bristle ends **20** engaging the circular valve seat shoulder when projecting the brush to use position.

In the use position of the device (Fig. 2) the circular end of the stubby stem base member or weight **11**, being the end which surrounds the press fitted brush holding plastic element **14**, engages in passage sealing relation, either the walls of the tapered portion **7** of the passage, or, as shown, the internal annular valve seat **10** of the nozzle body. In the movement to the projected use position the brush assembly is centered in the nozzle passage by the brush **12** and the plastic sleeve **14**, and the brush carries with it a quantity of the liquid. A limited quantity of the liquid flows into the discharge passage portion **7** and out of the discharge orifice **8** prior to sealing of the nozzle passage by the engagement of the stubby stem weight **11** against the valve seat **10**. The brush **12** is of sufficient length to project through the discharge orifice **8** in the nozzle tip **9** and to be effective for applying the liquid when the weight body **11** is seated against the valve seat shoulder **10**.

In the inverted use position of the device, the liquid content of the receptacle or reservoir **1** is metered through apertures or bleed holes **22** in the partition washer **16** to provide a small quantity of the liquid within the central nozzle chamber **6** and close to the valve for immediate discharge and use as needed. The size of the metering apertures **22** or their number or both size and number may be increased or decreased depending on the viscosity of the particular liquid with which the device is used. The purpose of thus limiting the free flow of the liquid contents into the nozzle chamber **6** is to maintain within such nozzle chamber during all periods of normal use, a free air chamber. Buoyant effects on the weighted base **11** of the brush assembly are thus eliminated and, upon displacement of the base **11** from sealing engagement with the annular valve seat **10**, excessive flowing or flooding of the liquid through the discharge passage portion **7** and out the nozzle orifice **8** is avoided.

When the device, after a period of normal use, is upended or returned to its brush retracting position, represented in Fig. 1, the brush assembly returns gravitationally to the interior of the nozzle chamber, drawing the brush **12** through the orifice **8** and seating the flat bottom end face of the base weight **11** against the flat upper surface of the partition washer **16** over the metering apertures **22**, sealing the latter. The diameter or cross-sectional shape of the brush assembly base weight **11** is such that clearance **23** is provided between the internal walls of the nozzle **5** and the base weight in all laterally shifted positions of the latter. In the arrangement illustrated, this clearance for the free flow of liquid around the brush assembly from one end to the other of the nozzle passage is of annular form and uniform in section from end to end of the weight **11**. It is apparent, however, that other cross-sectional configurations of both the nozzle passage **6** and the base weight **11** can be used to provide free endwise gravitational movement of the weight while maintaining an open passage between the weight and the walls of the nozzle chamber for the flow of liquid.

The cross section of the base weight is also related to that of the nozzle passage **6** so that in the retracted position of the brush assembly (Fig. 1), the liquid metering aperatures **22** are covered and sealed by the flat end face of the weight even though the latter may be displaced laterally from the centered position shown in the drawings as in agitating trapped liquid by gravitational or inertial lateral shifting. By thus sealing the metering aperatures **22** are covered and sealed by the traction of the brush assembly to storage position, return to the receptacle or reservoir **1** of any liquid that may be contained in the nozzle **5** is prevented, trapped liquid constituting a small ready supply for immediate release through the discharge passage **7** when the device is next inverted to use position.

In an arrangement in which the reservoir **1** is formed of resilient flexible material such as polyethylene or other suitable plastic, squeezing of the deformable receptacle augments the flow of liquid through the metering openings **22** in the partition **16**. An advantage of the feature by which the openings **22** are sealed automatically by the brush assembly **11** when the latter returns by gravity to the storage position of Fig. 1 is that flow through the apertures **22** is inhibited even though inadvertent squeezing of the plastic or deformable receptacle **1** occurs.

To seal the discharge orifice **8** during relatively long periods of non-use, there is provided a tubular closure cap **24** of molded plastic material which is received over the main body of the nozzle **5**. This cap has a closed end **25**, the inside of which is drawn strongly against the tip end **9** of the nozzle by the interengagement of external threads on the nozzle body and internal mating threads on the skirt portion of the cap, the thread joint being indicated at **26**. A circular flat washer or gasket **27** of rubber or polyethylene is press fitted in an internal recess in the cap end **25** for direct engagement with nozzle tip **9** to insure a tight seal.

In accordance with the provisions of the patent statutes, I have described the principle of operation of my invention together with the apparatus which I now believe to represent the best embodiment thereof, but desire to have it understood that the apparatus shown and described is only illustrative and that my invention may be carried out by other arrangements.

What I claim and desire to secure by Letters Patent of the United States is:

A combined liquid storage container and applicator device comprising a receptacle for holding a quantity of liquid, said receptacle having an outlet opening; a tubular nozzle on the receptacle and having tip and base ends, the nozzle being formed with a through passage continuous with said outlet opening, the through passage of the nozzle having a cylindrically walled main chamber portion of relatively large cross sectional area and a discharge chamber portion of relatively small cross sectional area, said discharge chamber portion terminating in a discharge opening at the tip end of the nozzle member, the nozzle member being formed with an internal valve seat surrounding the passage at the juncture between the main and discharge chamber portions; flat surfaced partition means extending across the through passage perpendicular to the longitudinal axis thereof and adjacent the base end of the nozzle, said partition means being formed centrally with liquid metering orifice means providing the sole path for liquid into the main portion of the through passage from the receptacle; a cylindrical weight disposed wholly within the main chamber portion of the passage and having on one end a flat circular face directed toward the flat surface of the partition means, said weight being of less diameter than, of less length than and wholly confined between the axial limits of the main chamber portion of the passage to permit gravity induced axial movements of the weight in such main chamber portion; a brush secured to the other end of the weight for movement therewith as a unit, the brush projecting axially from the weight in the direction of the discharge opening and terminating in a working tip axially spaced from the weight; said brush weight unit, in storage

position of the device in which the nozzle tip is directed upwardly, being normally retracted wholly within and confined between the axial limits of the nozzle passage with the flat end face of the weight resting by gravity against the flat surface of the partition means; said brush weight unit, upon inverting the device from said storage position to a working position in which the nozzle tip is directed downwardly, moving by gravity to project the brush through the discharge opening for use; the axial length of the through passage between said surface of the partition means and the valve seat being less than, and between said surface of the partition means and the discharge opening in the nozzle tip being greater than the overall length of the brush weight unit so that in the retracted position of the brush weight unit the working tip end of the brush is located intermediate the ends of the discharge portion of the through pasage outwardly of the valve seat and is confined by the walls of such discharge passage portion; the weight and the wall of the main chamber portion defining between them a clearance space through which liquid flows by gravity in passing the weight, the weight being free within the main chamber portion of the passage for lateral shifting as an agitator under gravitational and inertial forces into and out of engagement with the wall of such main chamber portion, said weight being formed sealingly to engage the internal valve seat of the through passage in the projected use position of the brush weight unit to prevent continuous flow of the liquid out the discharge opening when the device is inverted, and upon return of the device to said storage position following use in the working position the weight being adapted to retract gravitationally and to seat flatwise against the partition means with he flat end face of the weight directly contacting the flat surface of the partition means, the end face of the seated weight encompassing the orifice means in sealing relation to prevent return flow of liquid from the main chamber portion to the receptacle in all laterally shifted positions of the weight to thereby trap a quantity of liquid in such main chamber portion, and the seated weight being further adapted for said lateral shifting over and in direct surface contact with substantially the entire area of the partition means surface exposed toward the main chamber portion while maintaining said sealing relation to effect direct agitation of all portions of the trapped liquid.

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UNITED STATES PATENT OFFICE

CERTIFICATION OF CORRECTION

Patent No. 2,908,926 October 20, 1959

Henry William Jockers

It is hereby certified that error appears in the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 4, lines 6 and 7, strike out "aperatures 22 are covered and sealed by the traction" ind insert instead -- holes 22 immediately upon gravitational retraction --; line 33, before "nozzle" insert -- the --; column 5, line 17, for "pasage" read -- passage --; column 6, line 5, for "he" read -- the --.

Signed and sealed this 17th day of April 1962.

(SEAL)

Attest:

ESTON G. JOHNSON
Attesting Officer

DAVID L. LADD
Commissioner of Patents