Aug. 19, 1958 S. E. EDELSTONE ET AL 2,847,691

FOUNTAIN APPLICATOR

Filed Aug. 4, 1955

Fig. 1

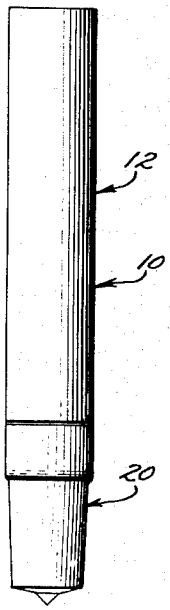


Fig. 2

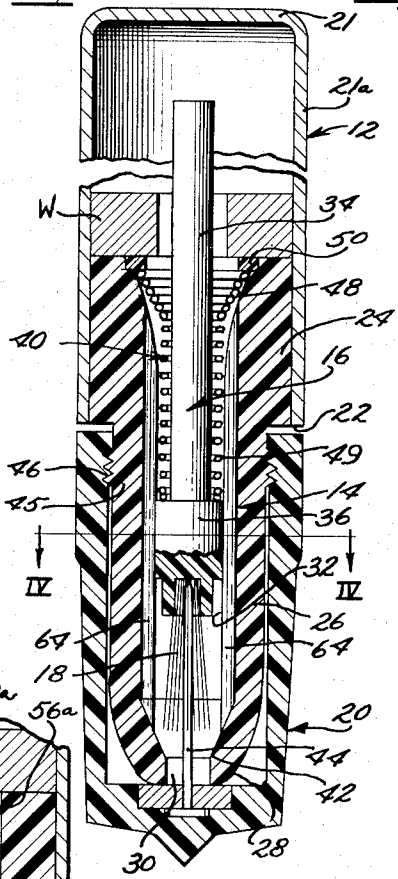


Fig. 3

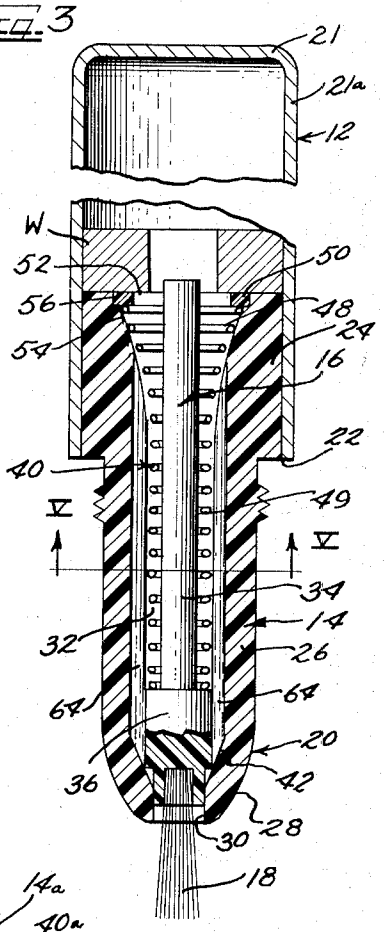


Fig. 6

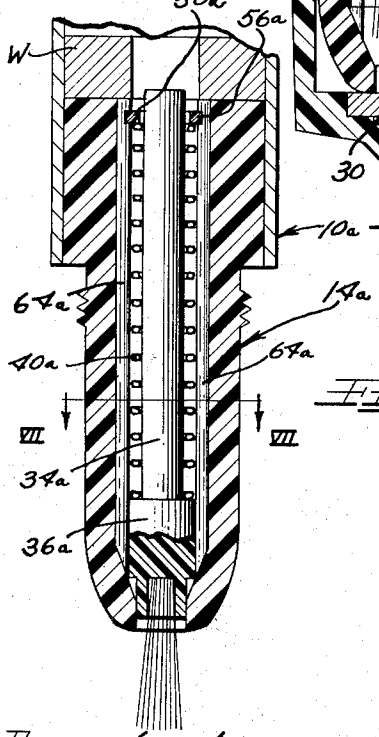


Fig. 7

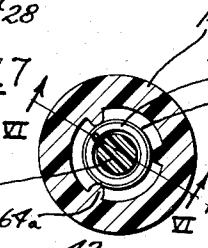


Fig. 4

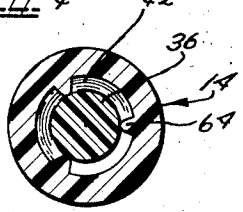
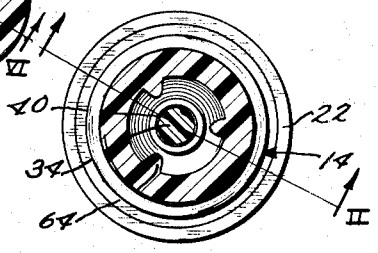


Fig. 5



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FOUNTAIN APPLICATOR

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6 Claims. (Cl. 15—139)

This invention relates to fountain applicators or fountain brushes, and has particular reference to such a device of a type having a retractable dispenser brush assembly or applicator unit slidably carried by and within an elongated fluid container.

Such devices normally provide a liquid-supply barrel having projecting from an end thereof an elongated hollow nozzle which slidably carries the applicator unit. The nozzle of such a device is provided at its tip with an orifice through which extends the applicator brush and through which flows the liquid to be dispensed. The applicator unit normally carries an enlarged head adapted to abut the interior of the nozzle tip to seal the orifice and to limit movement of the applicator unit outwardly of the nozzle, and there is provided in the nozzle a spring for bearing against the applicator head to urge the applicator unit outwardly into an extended position in which the applicator brush projects from the nozzle.

It is an object of the present invention to provide for such a device new and improved means for effecting a filter of the contents of the applicator.

In many applications of a device of the type indicated, it is particularly desirable to provide for thorough mixing of the complete contents of the applicator, as for example in a device for dispensing automobile "touch-up" paint or lacquer, wherein all of the liquid dispensed should match exactly with a certain color of the automobile body. Accordingly, a further object of the present invention is to provide a new and improved construction permitting improved inter-flow of material between the barrel and the nozzle chambers of such an applicator and improve the characteristics of the device with respect to mixing of the contents thereof.

A still further object of the present invention is the provision of new and improved means for guiding the applicator unit for its sliding movement in the nozzle.

A further object is to provide an improved means for effecting a better and more uniform distribution of the dispensed liquid circumferentially about the applicator brush.

A particular object of the present invention is the provision of new and improved spring means for such a device, the spring being adapted to provide not only a biasing means for urging the applicator unit outwardly with respect to the nozzle, but additionally to provide means for effecting a filter of the liquid contained in the applicator, and to guide the applicator unit for sliding movement within the nozzle along a path desirably central thereof.

These and other objects, features, and advantages of the present invention will be readily apparent from the following description of preferred embodiments thereof, taken in conjunction with the accompanying drawing, in which:

Figure 1 is a side elevation of the applicator and closure cap, the parts being shown in closed position;

Figure 2 is a longitudinal cross sectional view of such a device according to our invention, with parts in elevation and with parts broken away, the section being taken along the line II—II of Figure 5.

Figure 3 is a longitudinal cross sectional view similar to Figure 2, with the cap removed and with the dispenser-brush assembly being shown in a position extending operatively outwardly of the nozzle;

Figure 4 is a transverse cross section taken along the line IV—IV of Figure 2, the cap being omitted for clarity;

Figure 5 is a transverse cross section taken along the line V—V of Figure 3;

Figure 6 is a longitudinal cross sectional view of applicator according to a modified embodiment, and taken generally along the line VI—VI of Figure 7; and

Figure 7 is a transverse cross sectional view of the embodiment shown in Figure 6, the section being taken along the line VII—VII of Figure 6.

As shown on the drawings:

The applicator or fountain brush **10** includes a container, desirably in the form of an elongated barrel or body **12** having a hollow nozzle **14** projecting therefrom, a dispenser-brush assembly **16** carried for sliding movement in the nozzle and including a dispenser or applicator such as a brush **18** adapted to project from the nozzle, and a closure cap **20** adapted to be applied to the body **12** to cover the nozzle **14** and dispenser brush assembly **16**. The closure cap **20** illustrated is of a type which provides for automatic brush-retraction by means yet to be described, but the cap could be of a non-brush-retracting type.

The barrel or body **12** is shown as having an elongated tubular shape, and has a closed end wall **21** and a cylindrical side wall **21***a* terminating in an open end **22**. The body may be formed of any desired material, such as metal, plastic, glass, rubber, or the like.

The nozzle **14** illustrated is preferably composed of molded, relatively hard plastic material such as Bakelite, hard rubber, or the like. It is of a generally cylindrical shape, having an enlarged diameter inner end portion **24** press fitted into the mouth **22** of the body **12**. The nozzle has a stem **26** projecting outwardly from the body **12**, and ending in a smoothly rounded tip **28** in which there is provided an orifice **30** through which the liquid is adapted to be dispensed.

The dispenser brush assembly **16** is carried within the hollow bore **32** of the nozzle **14**. As shown, it includes an elongated plunger or stem **34**, the head **36** of which is adapted to carry the bristles of the applicator brush **18**. A spring **40** is disposed about the stem **34** to operatively engage the stem as by bearing against the head **36** as shown, to bias the dispensing brush assembly **16** toward the forward, extended position illustrated in Figure 3. In that extended position the dispensing brush **18** projects outwardly of the nozzle tip **28** through the orifice **30**, and the plunger head **36** seals against the tapered inside wall **42** of the nozzle tip **28** adjacent orifice **30** to seal the orifice. The means provided for bottoming the rear end of the spring **40** is yet to be described; but it should be here noted that the spring **40** provides a yieldable means which biases the brush assembly **16** toward the forwardly extended position shown in Figure 3, but permits a retraction of the brush assembly **16** to a rearward, retracted position as shown in Figure 2. Such a retracted position of the dispenser brush assembly **16** may be effected as shown in Figure 2 by the closure cap **20** which carries a brush-retracting pin means **44** which engages the head **36** to effect a brush-retraction automatically with the closure of the cap onto the nozzle, as by interengaging thread means **45—46** carried by the cap and nozzle; or, brush assembly retraction may be effected by the user merely pressing down on the container or body **12** as when he desires to obtain a further charge of liquid to flow through the orifice

30 onto the brush 18. Prior art devices have employed coiled springs to provide the desired resilient bias.

According to our invention, however, the spring 40 is not cylindrical throughout its full length, as is known in the prior art, but rather is provided with larger diameter turns near its rearward end, as is illustrated by the outwardly tapering conical spring configuration indicated by reference numeral 48. The enlarged turns 48 of the spring 40 provide several advantages over springs heretofore used in devices of this type. First, since they extend outwardly to the diameter of the nozzle bore, all liquid to be dispensed must pass between the turns of the spring, thereby obtaining a filter of the fluid to strain out any solids from being dispensed. It should be here noted that the forward turns 49 are fairly snug on plunger 34 to prevent any material solids from escaping into the nozzle chamber past the spring. A further advantage is obtained because of the fact that the turns are of larger diameter than the turns 49 of the spring forwardly thereof, in that the rearward turns 48 become fully compressed as indicated in Figure 2 prior to full compression of the smaller diameter turns at the forward portion of the spring. This provides an effective liquid seal effected by the closely adjacent or touching larger diameter turns when compressed, stopping the flow through the spring turns, with the unused compressibility of those forward turns 49 providing substantial manufacturing tolerances for the spring. Another advantage provided by the enlarged spring portion 48 is that the largest end coil or several of those coils of its broad base are seated snugly in the nozzle bore 54. This centers the spring in the bore and urges the plunger 34 generally in the desired central path of the nozzle bore. Thereby, the forward spring turns 49 which are fairly snug on the plunger 34 guide the plunger as those forward turns 49 are guided by the broad rear turns 48. An additional advantage provided by the enlarged turns 48 at the rear of the spring 40 is that it permits the spring to be bottomed against an abutment or spring-retaining means spaced a substantial distance radially of the plunger 34 and providing substantial clearance thereabout, thereby to accommodate fairly unrestricted liquid flow past the retaining means upon which the spring is bottomed. The retaining means shown comprises a retainer ring 50 whose inner diameter 52 it should be noted is substantially larger than the diameter of the plunger 34. The good fluid inter-flow characteristic thereby effected between the chamber defined by the body 12 and the chamber within the nozzle bore 32 permits and accommodates a thorough mixture of the entire contents of the applicator device, permitting agitation and mixing of the complete contents of the applicator rather than merely the contents contained within the nozzle bore 32. This advantage is particularly desirable where the liquid to be dispensed is a paint or the like which must match exactly with the color of the surface to which the dispensed liquid is to be applied, as in automobile finish "touch-up" work and the like. An agitator or mixer in the form of an annular weight W is slidably disposed of in the body 12 to reciprocate in the contents of the container to uniformly mix the contents when the container is shaken. The plunger or stem 34 can project freely into the hole of the annular weight W and the weight can bottom on the nozzle while fluid can flow freely through the weight.

To accommodate the larger diameter rear portion 48 of the spring 40, the rear portion 54 of the nozzle bore 14 is shown as likewise enlarged. The retainer ring 50 is held at the rear end of the nozzle bore portion 54 as by being press fitted into an annular recess 56 provided in the nozzle.

Means such as the three annularly spaced flanges or ribs 64 extend longitudinally within the bore 32 of the nozzle 14, desirably from the bore rib 42 adjacent the tip 28 of the nozzle and continuing rearwardly a significant distance. Desirably those ribs 64 are provided integrally with the nozzle. The ribs 64 offer distinct advantages not provided in prior constructions. First, by slidably receiving the head 36 of the plunger 34, they effect a guiding of the forward end of the plunger within the nozzle bore 32. A further important advantage afforded by the ribs 64 is that of providing for a more uniform distribution of the dispensed fluid circumferentially around the brush 18. This is accomplished by their effecting a circumferential guide or baffle of material at spaced points within the nozzle bore 42 adjacent the orifice 30. This provides that even though the device is held by the operator in a usual non-vertical disposition when in use, liquid will be directed by the guide ribs 64 at portions circumferentially about the orifice 30 rather than merely along that portion which is lowest as held by the operator. Another advantage of the guide ribs 64 is that it is possible to effect the guiding of the plunger head 36 without the necessity of guide lugs or the like extending outwardly from the plunger head. Thus the guide ribs 64 provide the desired plunger-guiding characteristic without the disadvantage sometimes resulting from radially extending abutment lugs carried on the plunger head in prior constructions.

Figure 6 illustrates a modified embodiment wherein the applicator 10*a* has an elongated hollow nozzle 14*a* provided with longitudinally extending guide ribs 64*a*, and a plunger 34*a* is adapted for reciprocation within the nozzle 14*a*, much like the embodiment first described, with corresponding parts correspondingly numbered.

In Figure 6, however, the guide ribs 64*a* effectuate a guide of the plunger 34*a* longitudinally therealong through the spring 40*a*. To this end, the diameter of the plunger 34*a*, and the diameter and wire size of the spring 40*a*, and the clearance diameter within the guide ribs 64*a* are all coordinated to provide the desired guide of plunger 34*a* through the spring 40*a*. Thus the spring 40*a* is shown as fairly snugly receiving the plunger stem 34*a*, and the ribs 64*a* fairly snugly receiving the spring 40*a*, the fit of each providing the desired relative sliding engagement with at least operating clearance therebetween.

In this Figure 6 embodiment, the spring may be, and desirably is, of constant diameter, and it is bottomed between the plunger head 36*a* and a snap retainer ring 50*a* fitted into notches 56*a* provided in the guide ribs 64*a*.

Thus it will be seen from the foregoing description of our invention according to a preferred embodiment, considered in conjunction with the accompanying drawing, that a fountain applicator or fountain brush constructed according to our invention provides many desired advantages and characteristics, and accomplishes its intended objects including those hereinbefore pointed out and others which are inherent in the invention as described.

It will be understood that modifications and variations may be effected without departing from the scope of the novel concepts of the present invention.

We claim as our invention:

1. In a fountain brush, a liquid dispensing container having a body for containing a supply of liquid and having a hollow nozzle projecting from said body, said hollow nozzle having a central bore with a dispensing orifice at the forward end, a dispensing brush assembly slidable in said nozzle and including an elongated plunger embodying a rearwardly extending stem and an applicator brush means carried by the forward end thereof, the forward end of said plunger forming a valve for said orifice, said brush means adapted to fit freely through the orifice and project beyond the end of the nozzle, said brush assembly adapted to be depressed upon application of end load thereon to open the valve and receive fluid from the container, a plurality of ribs arranged longitudinally upon the internal annular surface of the nozzle and extending to the area adjacent said orifice, said ribs forming a plurality of passageways for guiding liquid to said orifice, a spring retainer having a central bore carried by the rear

end of said nozzle, a coil spring disposed about the stem of said plunger with its side portions adjacent said ribs, said spring having one end thereof in contact with said plunger and the other end thereof in contact with said spring retainer, said spring adapted to bias said plunger as a valve in a forwardly extended position with respect to said orifice, the bore of said spring retainer and the bore of said nozzle being substantially larger than the diameter of said plunger stem to accommodate a generally free interflow of liquid within said nozzle about said brush assembly, and said ribs forming guide rib means for guiding the forward end of said spring and said plunger in the bore of said nozzle, the forward end of said spring having forward turns of a diameter small enough to be received snugly by said guide rib means and having enlarged rearward turns of a diameter adapted to seat on said spring retainer, whereby all liquid to be dispensed must pass through the turns of said spring to said passageways between said ribs for passage to said orifice.

2. In a fountain brush, a liquid dispensing container having a body for containing a supply of liquid and having a nozzle projecting from the forward end of the body, said nozzle having a central bore with a dispensing orifice at the forward end thereof, a dispensing brush assembly slidable in the bore of said nozzle, said brush assembly including an elongated plunger embodying a rearwardly extending stem and an applicator brush means carried in a bore in the forward end thereof, the forward end of said plunger forming a valve for said orifice, a spring retainer ring having a central bore carried by said nozzle at the rear end thereof, the stem of said plunger extending through the central bore of said spring retainer ring, a conical coil spring disposed about the stem of said plunger with its smaller end in contact with said plunger and its larger end in contact with said spring retainer ring, said brush means adapted to fit freely through the orifice and project beyond the forward end of said nozzle, said brush assembly adapted to be depressed upon application of end load thereon to open the valve and receive fluid from the container, a plurality of ribs arranged longitudinally upon the internal annular surface of the nozzle and extending to the area adjacent said orifice, said ribs forming a plurality of passageways for guiding liquid to said orifice, said ribs forming guide rib means for guiding the forward end of said spring and said plunger in the bore of said nozzle, said spring adapted to bias said plunger as a valve in a forward extended position with respect to said orifice, and the bore of said spring retainer and the bore of said nozzle being substantially greater than the diameter of said plunger stem to accommodate a general free flow of liquid within said nozzle about said brush assembly.

3. In a fountain brush, a liquid dispensing container having a body for containing a supply of liquid and having a nozzle projecting from the forward end of the body, said nozzle having a central bore with a dispensing orifice at the forward end thereof, a dispensing brush assembly slidable in the bore of said nozzle, said brush assembly including an elongated plunger embodying a rearwardly extending stem and an applicator brush means carried in a bore in the forward end thereof, the forward end of said plunger forming a valve for said orifice, a spring retainer ring having a central bore carried by said nozzle at the rear end thereof, the stem of said plunger extending through the central bore of said spring retainer ring, a conical coil spring disposed about the stem of said plunger with its smaller end in contact with said plunger and its larger end in contact with said spring retainer ring, said brush means adapted to fit freely through the orifice and project beyond the forward end of said nozzle, said brush assembly adapted to be depressed upon application of end load thereon to open the valve and receive fluid from the container, a plurality of ribs arranged longitudinally upon the internal annular surface of the nozzle and extending to the area adjacent said orifice, said ribs forming a plurality of passageways for guiding liquid to said orifice, said ribs forming guide rib means for guiding the forward end of said spring and said plunger in the bore of said nozzle, said spring adapted to bias said plunger as a valve in a forward extended position with respect to said orifice, and the bore of said spring retainer and the bore of said nozzle being substantially greater than the diameter of said plunger stem to accommodate a general free flow of liquid within said nozzle about said brush assembly.

4. In a fountain brush, a liquid dispensing container having a body for containing a supply of liquid and having a nozzle projecting from the forward end of the body, said nozzle having a central bore with a dispensing orifice at the forward end thereof, a dispensing brush assembly slidable in the bore of said nozzle, said brush assembly including an elongated plunger embodying a rearwardly extending stem and an applicator brush means carried in a bore in the forward end thereof, the forward end of said plunger forming a valve for said orifice, a spring retainer ring having a central bore carried by said nozzle at the rear end thereof, the stem of said plunger extending through the central bore of said spring retainer ring, a coil spring disposed about the stem of said plunger with one end in contact with said plunger and the opposite end in contact with said spring retainer ring, said brush means adapted to fit freely through the orifice and project beyond the forward end of said nozzle, said brush assembly adapted to be depressed upon application of end load thereon to open the valve and receive fluid from the container, a plurality of ribs arranged longitudinally upon the internal annular surface of the nozzle and extending to the area adjacent said orifice, said ribs forming a plurality of arcuate passageways for guiding liquid to said orifice, said ribs forming guide rib means for guiding the forward end of said spring and said plunger in the bore of said nozzle, said spring adapted to bias said plunger as a valve in a forward extended position with respect to said orifice, and the bore of said spring retainer ring and the bore of said nozzle being substantially greater than the diameter of said plunger stem to accommodate a general free flow of liquid within said nozzle about said brush assembly.

5. In a fountain brush, a container having a body for containing a supply of liquid and having a hollow nozzle projecting from said body, said nozzle having a substantially cylindrical bore tapered outwardly at the rear end thereof and having a dispensing orifice at the forward end thereof, a dispensing brush assembly slidable within said nozzle and including an elongated plunger, said plunger including a rearwardly extending stem and an applicator brush means carried by the forward end thereof, the forward end of said plunger forming a valve for said orifice, a spring retainer ring having a central bore carried at the rear of said nozzle, the stem of said plunger extending through the bore of said spring retainer ring, a substantially conical coil spring disposed about the stem of said plunger and having one end thereof engaging said plunger and the other end contacting said retainer ring to bias said dispensing brush assembly in a forwardly extended position with respect to said orifice, said spring having adjacent said retainer ring turns of a larger diameter than turns of said spring more forwardly thereof to provide a broad spring base, and to snugly contact the nozzle bore at the rear end thereof, the said more forwardly turns of said spring adapted to fairly snugly receive said plunger stem to effect a centering action upon said plunger during its sliding movement toward extended position of said dispenser brush assembly, said brush means adapted to fit freely through the orifice and project beyond the end of said nozzle, said brush assembly adapted to be depressed upon application of end load thereon to open the plunger valve for receiving

fluid from the container, a plurality of guide rib means formed on the annular wall of said nozzle forming longitudinal guide means for the forward portion of said spring and the plunger therein, and said ribs further forming a plurality of passageways extending longitudinally therealong in the wall of said nozzle for guiding the flow of liquid which has passed from said container and between the turns of said spring to said orifice.

6. In a fountain brush, a liquid dispensing container having a body for containing a supply of liquid and having a nozzle with an elongated side wall projecting from the forward end of the body, a closure cap having a deep skirt slidably embracing the elongated side wall of said nozzle, said nozzle having a central bore with a dispensing orifice at the forward end thereof, a dispensing brush assembly slidable in the bore of said nozzle, said brush assembly including an elongated plunger embodying a rearwardly extending stem and an applicator brush means carried in a bore in the forward end thereof, the forward end of said plunger forming a valve for said orifice, a spring retainer ring having a central bore carried by said nozzle at the rear end thereof, the stem of said plunger extending through the central bore of said spring retainer ring, a conical coil spring disposed about the stem of said plunger with its smaller end in contact with said plunger and its larger end in contact with said spring retainer ring, said brush means adapted to fit freely through the orifice and project beyond the forward end of said nozzle, said brush assembly adapted to be depressed upon application of end load thereon to open the valve and receive fluid from the container, a plurality of ribs arranged longitudinally upon the internal annular surface of the nozzle and extending to the area adjacent said orifice, said ribs forming a plurality of passageways for guiding liquid to said orifice, said ribs forming guide rib means for guiding the forward end of said spring and said plunger in the bore of said nozzle, said spring adapted to bias said plunger as a valve in a forward extended position with respect to said orifice, the bore of said spring retainer ring and the bore of said nozzle being substantially greater than the diameter of said plunger stem to accommodate a general free flow of liquid within said nozzle about said brush assembly, and said spring providing a yielding means to permit a retraction of the brush assembly to a rearward retracted position effected by a pin arranged in the closed end of said closure cap when applied to the nozzle, said cap having its deep skirt slidably embracing the side wall of the nozzle; and its end wall overlying the orifice and in sealed relation therewith, said pin being an elongated thin pin in the cap and extending from the end wall of the cap along the central axis and terminating inside the cap, said deep skirt of the cap being longer than the projected length of the brush means sufficiently for engaging the side walls of the nozzle to longitudinally align the pin with the plunger valve, and said pin being sufficiently long to open the plunger valve and to hold the brush in advance of the deep skirt of the cap and retracted into the contents of the nozzle.

References Cited in the file of this patent

UNITED STATES PATENTS

596,951	Wiehl	Jan. 4, 1898
1,253,032	Hardin	Jan. 8, 1918
1,317,562	Dunbar	Sept. 30, 1919
1,992,607	De Mille	Feb. 26, 1935
2,029,152	Bonkowski	Jan. 28, 1936
2,250,444	Brigham	July 29, 1941
2,299,627	Hunter et al.	Oct. 20, 1942
2,643,409	Hempel	June 30, 1953
2,686,925	Hempel	Aug. 24, 1954

FOREIGN PATENTS

280,036	Switzerland	Apr. 1, 1952