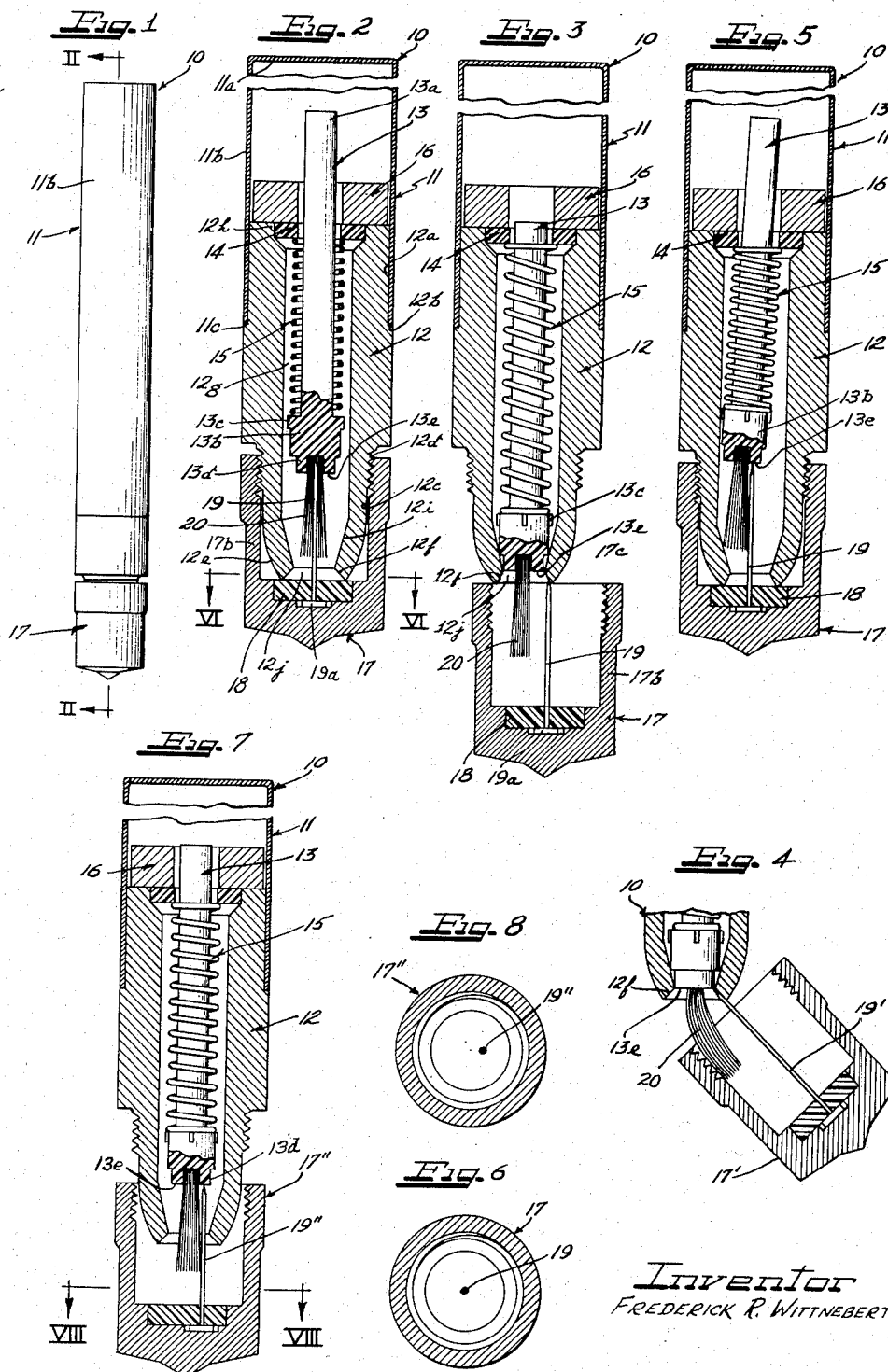


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FOUNTAIN BRUSH WITH ORIFICE GUIDED BRUSH  
RETRACTOR AND CLOSURE CAP  
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## FOUNTAIN BRUSH WITH ORIFICE GUIDED BRUSH RETRACTOR AND CLOSURE CAP

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This invention relates to a fountain applicator having a propelled applicator unit capable of being repeatedly sheathed or retracted without damage by a closure cap-carried pin which is automatically guided into position by the dispensing orifice wall of the applicator. More specifically, this invention deals with a fountain brush having a spring-propelled brush and valve unit and a dispensing nozzle closure cap carrying a pin to retract the brush and open the valve wherein the pin is guided into position by the orifice wall of the nozzle.

This application is a continuation-in-part of my application Serial No. 366,798, filed July 8, 1953, entitled: "Fountain Brush With Closure Cap Controlled Valve," now Patent No. 2,806,239.

In my parent application there is disclosed a fountain brush with a spring-propelled fountain brush and valve unit mounted in a nozzle which provides an elongated side guide wall for an elongated side wall or skirt of a closure cap. The closure cap has an end wall for sealing the nozzle orifice and this end wall carries a pin which projects along the longitudinal axis of the cap interior to penetrate the brush and retract it into the nozzle in advance of the end wall of the cap. The side wall or skirt of the cap extends materially beyond the pin to provide a guide coacting with the elongated wall of the nozzle for aligning the pin with the longitudinal axis of the brush before the pin engages the brush. In this manner, the pin penetrates the brush along its longitudinal axis and engages the base of the brush or valve to sheath or retract the brush into the nozzle and to open the valve. Then, when the cap is rotated into threaded engagement with the nozzle, the pin will not twist or mat the brush bristles and the brush will be sealed in the nozzle in full communication with the contents of the applicator reservoir.

The present invention now provides a closure cap pin-controlled brush unit which does not require the elongated nozzle guide wall or the elongated cap skirt.

In accordance with this invention, the nozzle orifice is provided with a wide beveled entrance mouth capable of directing the cap pin into the nozzle for engaging a portion of the brush unit regardless of the relative alignment or misalignment of the nozzle and the cap. The brush and valve unit has a relatively large platform or shoulder surrounding the base of the brush to accommodate the pin in the event that the pin is misaligned so that it does not penetrate the brush. The brush unit can tilt or cock in the nozzle under the influence of misaligned pin and threading of the cap on the nozzle will not damage the brush bristles or pin even though the pin is not centrally aligned with the brush unit. In the event that the brush unit is cocked or tilted by the pin as it is retracted into the nozzle, the cocked retracted unit, if driven by an eccentric pin during rotation of the cap, will merely wobble as the cap is rotated into threaded engagement with the nozzle and this wobbling action will not in any way damage the brush bristles or pin.

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A feature of this invention therefor is the manner in which manufacturing tolerances can be increased without loss of efficiency since the cap pin can be eccentrically mounted in the cap and the brush and valve unit can have a loose fit in the nozzle.

It is then an object of this invention to shorten the nozzle length and the cap side wall length of the fountain brush and cap assembly of the aforesaid parent application Serial No. 366,798, filed July 8, 1953 now Patent No. 2,806,239.

Another object of this invention is to provide a pin-controlled spring-loaded applicator brush with a nozzle orifice that will guide the pin into operative position to protect the brush against damage by the closure cap.

Another object of this invention is to provide an orifice wall guided pin and short cap assembly for fountain brushes to retract the brush into the orifice and seal the orifice without damaging the brush.

A further object of the invention is to provide a spring-propelled brush and nozzle assembly for fountain applicators wherein a brush and valve unit is adapted to be tilted or cocked in the nozzle to accommodate a misaligned closure cap carried brush unit retracting pin.

Other and further objects of this invention will be apparent to those skilled in this art from the following detailed description of the annexed sheet of drawings which, by way of preferred examples only, illustrate several embodiments of the invention.

On the drawings:

Figure 1 is a side elevational view of the applicator and closure cap assembly of this invention in closed position.

Figure 2 is a longitudinal cross-sectional view, with parts in elevation and with parts broken away, taken along the line II—II of Figure 1 and illustrating the assembly on a slightly enlarged scale.

Figure 3 is a view similar to Figure 2 but illustrating the opened condition of the brush and showing the manner in which the cap pin is guided by the orifice wall into position for retracting the brush and valve unit even when the cap is misaligned relative to the nozzle.

Figure 4 is a view similar to Figure 3 but illustrating the manner in which a pin projecting beyond the cap is guided by the orifice wall into position by the orifice wall even when the cap is carelessly applied at an angle to the nozzle.

Figure 5 is a view similar to Figure 2 but illustrating the manner in which the brush unit can tilt or cock when retracted by a cap pin that is initially misaligned as illustrated in Figures 3 and 4.

Figure 6 is a transverse cross-sectional view of the cap taken along the line VI—VI of Figure 2.

Figure 7 is a view similar to Figure 3 but illustrating a closure cap having a pin eccentrically mounted in the cap.

Figure 8 is a transverse cross-sectional view taken along the line VIII—VIII of Figure 7.

As shown on the drawings:

The applicator or fountain brush 10 of Figures 1 to 5 and 7, comprises an elongated tubular barrel 11, a nozzle 12 projecting from the barrel, a brush and valve unit 13 mounted in the nozzle, a plastic guide washer 14 pressed in the inner end of the nozzle to hold the unit 13 in the nozzle, a spring 15 for propelling the unit 13, and an agitator ring 16 in the barrel 11 to stir the contents of the barrel. In Figures 1 to 3 and 5, the nozzle 12 is closed by a cap 17 with a seal plug 18 pressed in the end wall thereof and carrying a brush unit retracting pin 19 along the longitudinal axis of the cap to terminate flush with the end of the cap. In Figure 4, the cap 17' is equipped with a longer pin 19' that projects beyond the mouth of the cap. In Figure 7, the cap 17'' carries

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a pin 19'' eccentrically displaced from the longitudinal axis of the cap. As will be more fully hereinafter explained, each form of cap serves to seal the orifice of the nozzle 12 and to retract the brush unit 13 into the nozzle without damaging the brush.

The barrel 11 has a closed end 11a, an elongated side wall 11b and an open end 11c. The barrel is preferably composed of metal such as aluminum or zinc, synthetic plastic material, glass, rubber, or the like. The barrel is cylindrical in shape and has a considerable length to simulate a fountain pen. However, the shape of the barrel can vary as desired and can include a bottle type of reservoir unit.

The nozzle 12 is preferably composed of molded relatively hard plastic material such as Bakelite, hard rubber, or the like. It has a cylindrical configuration with a reduced diameter inner end portion 12a press fitted into the mouth 11c of the barrel. The end of the barrel is bottomed on a shoulder 12b provided on the nozzle. The outer end of the nozzle also has a reduced diameter dispensing end 12c embraced by the closure cap. This portion 12c is relatively short and has threads at its inner end and a converging rounded nose 12e at its outer end with a wide beveled orifice defining wall 12f at the convergent end thereof.

A cylindrical bore 12g is formed through the nozzle 12 and has a countersunk inner end portion 12h, receiving the guide washer 14 in press fit relation therewith, together with a converging valve seat forming portion 12i at the opposite end thereof. The wall 12i converges to the orifice opening 12j defined by the beveled mouth or wall 12f providing a restricted throat and an outlet of venturi configuration.

The brush unit 13 has a cylindrical rod-like stem 13a composed of plastic, hard rubber, or the like rigid material freely guided in the aperture of the washer 14. An enlarged head portion 13b on the end of the stem has spaced radially projecting lugs or guide ears 13c around the upper ends thereof to guide the head 13b in the central portion of the bore 12g while, at the same time, providing sufficient clearance to accommodate cocking of the unit as shown in Figure 5. The spring 15 encircles the stem 13a and is bottomed at one end on the head 13b and the other end on the washer 14. The stem projects beyond the washer 14 into the aperture of the agitator 16 when the agitator rests on the nozzle 12.

The head 13b of the brush unit 13 has a reduced diameter end portion 13d fitting freely through the orifice 12j and providing a platform or end face 13e in the mouth of the orifice when the brush is fully projected as shown in Figure 3. Brush bristles 20 are anchored in the central portion of the head part 13b and, as shown, an appreciable marginal area of the platform 13e is exposed laterally beyond the anchored brush bristles. The bristles are adapted to fit freely through the orifice opening 12j.

When the brush is fully projected by the spring 15, the head 13b seats on the valve seat 12i of the nozzle to close the bore 12g and stop the flow of the contents of the reservoir or barrel to the brush. However, end pressure on the projected brush bristles will depress the unit 13 to open the valve and accommodate flow of material from the bore 12g to the brush bristles. A modulated valve feed to the brush is thereby obtained.

The cap 17 has an end wall 17a with a recessed inner face receiving the sealing plug 18. A cylindrical side wall 17b extends from the end wall 17a and has an internally threaded end 17c for mating with the thread 17d of the nozzle. The cavity defined by the cap is appreciably larger than the rounded nose 12e of the nozzle so that the cap may be misaligned when being applied to the nozzle as illustrated in Figures 3 and 4. The pin 19 extends through the sealing plug 18 and has a head 19a between the plug and end wall 17a of the cap so as to be

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retained by the plug approximately in the longitudinal central portion of the cap chamber.

The pin 19 terminates flush with the end face of the skirt or side wall 17b of the cap. The pin will, therefore, engage either the base of the brush bristles or the platform 13e of the brush unit before the cap is in any way guided by the nozzle. In the event that the cap is initially longitudinally aligned with the nozzle as it is applied to the nozzle, the pin will penetrate the brush bristles and engage the base of the bristles to retract the brush unit 13 back into the nozzle with the brush bristles held in spaced relation ahead of the end wall or seal plug 18. In this manner, as the cap is applied to the nozzle, the brush unit 13 is automatically sheathed or retracted into the nozzle before the end wall of the cap can engage the brush bristles.

As illustrated in Figure 3, in the event that the cap 17 is longitudinally misaligned relative to the nozzle, the pin 19 will engage the platform 13e and be guided into this engagement by the beveled or tapered orifice wall 12f before the cap even engages any part of the nozzle. Then, as the cap is pressed down onto the nozzle and is shifted into alignment by the nozzle walls to mate the cap and nozzle threads, the pin 19 will be shifted accordingly to laterally displace the brush unit 13. This lateral displacement is accommodated as illustrated in Figure 5 since the guide ears 13c are spaced inwardly from the orifice wall 12f a considerable distance when the brush stem is coaxially aligned with the bore 12g. Therefore, cocking or tilting of the brush unit as shown in Figure 5, will not in any way damage the assembly. When the cap 17 is threaded home on the nozzle, rotation of the pin with the cap may rotate the pin on the platform.

In the event that the pin is longer than the cap or in the event that the cap is applied to the nozzle at an angle as shown in Figure 4, the tapered mouth or guide wall 12f of the nozzle, will guide the pin 19' onto the platform 13e and when the cap is then guided by the nozzle into an upright position, the brush unit will be retracted and cocked as shown in Figure 5.

In the cap 17 and 17', the pins 19 and 19' lie on the longitudinal axis of the cap. In the caps 17'', however, the pin 19'' is illustrated as being eccentrically mounted in the cap so that even when the cap is longitudinally aligned with the nozzle as illustrated in Figure 7, the pin will engage the platform 13e. When the cap is threaded onto the nozzle, the eccentric pin may tend to wobble the brush unit 13 but this wobbling action is accommodated as illustrated in Figure 5. The washer 14, the brush stem 13a and head 13b, and the plug 18, are preferably composed of plastic such as nylon, polyethylene, or the like. The pin 19 is preferably composed of steel.

From the above descriptions it should, therefore, be understood that this invention provides a short cap and pin assembly for controlling a spring-loaded brush unit of a fountain brush without the necessity of guiding the cap on the applicator nozzle. The orifice defining wall of the nozzle flares outwardly to provide a guide surface for the pin which will direct the pin against the brush unit. The orifice mouth is of appreciably larger diameter than the diameter of the brush base so as to expose a platform or end wall outside of the brush bristles which can be engaged by the pin in the event that the cap is not pre-aligned with the orifice before it is applied to the nozzle. It will be appreciated that this invention eliminates the heretofore required long nozzle and cooperating guide wall or skirt on the cap for longitudinally aligning the pin before the pin engages the brush.

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

I claim as my invention:

1. A fountain brush which comprises a container having at one end an external converging rounded nose with

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a dispensing orifice in the end thereof, a brush unit within said container having a head with a valve portion thereon for closing said orifice, a stem secured to and extending longitudinally and rearwardly from the rear end of said head, the forward end of said head having a cylindrical end portion of reduced diameter, a brush projecting from the forward end wall of said head and anchored in the central portion thereof leaving a marginal platform therearound, means selectively projecting said brush through said orifice, said orifice having a tapered interior wall forming a valve seat, said orifice having a tapered exterior wall and mouth portion forming a circular V-shaped sealing edge portion with the exterior surface of the rounded nose portion adjacent said orifice, the junction of said internal wall and said external wall of said orifice forming a restricted throat, a skirted closure cap for the container having an end wall for contacting said V-shaped surface and sealing the orifice, the skirt of said cap being adapted for fitting on the rear external wall portion of said rounded nose, a pin projecting into the interior of the cap from said end wall thereof and extending to the mouth of said cap and adapted to engage the forward end of the cylindrical portion of said head, the cylindrical end of said head extending to the throat of said orifice, said tapered exterior wall of said orifice providing a guide wall adjacent said orifice for directing said pin into such engagement with the marginal platform on the end of said cylindrical portion of said head and around said brush before the end wall of the cap can contact said brush unit, and said pin being effective to retract the applicator unit into the container ahead of the end wall of the cap.

2. A fountain brush type applicator comprising a fluid reservoir, a nozzle, a fountain brush unit and a removable skirted cap, said reservoir having an elongated side wall with one end closed and its opposite end open, said dispensing nozzle having an inner end portion of reduced diameter secured with the open end portion of said reservoir, said nozzle having an external converging rounded nose with an outlet at the other end thereof, said outlet being of venturi configuration with inner and exterior walls and a restricted throat portion therebetween, the inner wall of said nozzle outlet providing a tapered internal valve seat, the exterior wall of said outlet providing an outwardly beveled mouth terminating in a V-shaped circular exterior sealing edge in conjunction with said rounded nose, said nozzle having a passage extending therethrough from end to end thereof, said fountain brush unit slidably mounted in said passageway in the nozzle and adapted to receive fluid from the reservoir therearound, a valve on said brush unit adapted to engage the internal valve seat of the nozzle, a spring in the nozzle passageway urging the valve toward the valve seat to close the outlet end of the nozzle, said valve having a forward reduced cylindrical end portion substantially equal to the diameter of said throat of the venturi outlet and extending to and terminating at the throat thereof, the end of said reduced cylindrical end portion providing a marginal platform thereon and around said brush supported thereby, said end portion of the valve to project the brush beyond the end of the nozzle, said fountain brush unit fitting freely in said passageway in said nozzle and adapted to be tilted in the nozzle passageway without damaging the brush, the removable skirted cap for said nozzle having a centrally depending thin internal pin extending substantially to the mouth of the cap, said outwardly beveled mouth of the nozzle being effective to guide said pin into engagement with said marginal platform of the valve for opening the valve and for retracting the brush into the nozzle prior to application of said cap upon said nozzle and in advance of the end wall of the cap, said brush unit being tiltable in the nozzle passageway to accommodate misalignment by the pin, and said cap having a sealing plug arranged in its interior end wall for overlying and seating

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on the substantially V-shaped circular exterior edge portion surrounding the nozzle to seal the nozzle outlet.

3. A fountain brush and orifice guided brush retractor and closure cap which comprises a container having a nozzle projecting from one end thereof defining an internal passageway with a converging valve seat portion and a discharge orifice having an outwardly flared discharge mouth portion at the convergent end of said seat portion, the junction of said valve seat portion and said discharge mouth portion providing a restricted throat for said orifice, a stemmed brush unit loosely mounted in said passageway, a head on the stem providing a valve coacting with said valve seat, said head having a forward cylindrical end portion of slightly smaller diameter than the diameter of the throat of said orifice, said end portion extending to and terminating flush with said throat, brush bristles projecting from the central portion of the end surface of said reduced cylindrical end portion of said head leaving a marginal platform upon the end thereof, a washer in said nozzle slidably guiding the brush unit, guide lugs on said head adapted to engage the passageway of the nozzle when said head is forced into contact with one side of the passageway as said brush unit is tilted in said passageway, a spring compressed between said washer and said head for urging the brush through the nozzle to seat the valve against the valve seat, a closure cap having a threaded skirt portion engageable with the exterior side wall of said nozzle and an end wall portion for closing the orifice, a thin elongated pin extending in said cap from said end wall to at least flush relation with the mouth of the cap, said platform of said reduced cylindrical end portion of said head providing an end wall portion surrounding the brush to be engaged by said pin, said flared mouth of the orifice guiding said pin against said platform portion to cause the pin to retract the brush unit into the nozzle in advance of the end wall of the cap, longitudinal misalignment of the pin and brush unit being accommodated by tilting of the unit in the passageway, and said flared mouth portion forming a circular peripheral sealing edge with the exterior surface of said nozzle for contacting the inner wall of said cap.

4. A fountain brush and brush retractor closure cap assembly which comprises an elongated cylindrical container having a closed end and an open mouth, a nozzle member having one end press fitted into said open mouth of the container, the opposite end of said nozzle having a cylindrical portion with converging rounded nose, said nozzle having longitudinal passageway therethrough with a converging end portion providing an internal valve seat and an outwardly beveled discharge outlet mouth at the convergent end of the valve seat providing a V-shape peripheral cap sealing edge portion with the exterior surface of said nose, said nozzle adjacent said nose having reduced diameter short cylindrical portion with screw threads thereon, a brush and valve unit slidably mounted in the passageway of said nozzle, a washer press fitted in the nozzle providing a guiding orifice at the inner end of the nozzle, said unit having a stem freely slidable in said washer, a head on said stem for contacting with said valve seat, lugs on said head for guiding the stem longitudinally in the passageway of the nozzle and for spacing said head from the sidewall of said nozzle, said head having a forward cylindrical end portion of reduced diameter, the area about said brush bristles secured in the end of said head to provide a platform surrounding the brush bristles, the diameter of said head reduced end portion being slightly smaller than the diameter of said outlet mouth at the convergent end of said valve seat allowing said reduced portion to extend to and terminate at the restricted area of said outlet mouth, a skirted closure cap having an end wall and sealing plug embodied therewith for sealing the outlet mouth, the depending skirt of said cap having an internal thread for mating with the thread on the nozzle,

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a pin carried by said end wall and projecting in said cap into at least flush relationship with the end of the skirt, said pin adapted to engage said platform on the end of said head to retract the brush unit into the nozzle passageway for opening the valve and sheathing the brush, and said outlet mouth guiding said pin into engagement with said platform in the event of misalignment of the cap and nozzle and said peripheral edge seal of said nozzle forming a circular line sealing engagement element with said sealing plug in said cap.

5. A fountain brush and brush retracting closure cap assembly which comprises a container having a rounded nose dispensing nozzle with a venturi type orifice therein, a spring-propelled brush and valve unit slidably mounted in a passageway within said nozzle, the brush portion of said unit adapted to project freely through the orifice of said nozzle, the venturi type orifice having a tapered inner wall, an outwardly beveled outer wall and a restricted throat therebetween, said outwardly beveled outer wall forming a peripheral edge sealing surface with the outer surface of said rounded nose of said nozzle, the valve portion of said unit adapted to coact with the inner wall of said nozzle orifice for closing the nozzle orifice, the forward end of said valve having a cylindrical portion of reduced diameter, said brush portion of the unit assembled in the central portion of the end surface of said cylindrical end portion, the marginal area about said brush on said end of said cylindrical end portion forming a marginal platform, a closure cap having a skirt em-

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bracing said nozzle and an end wall with a sealing plug embodied therewith for overlying said peripheral sealing edge portion of said nose of said nozzle to seal the container, a pin extending longitudinally in the cap in displaced relationship from the longitudinal axis of the cap, said pin adapted to engage said platform on the end of said valve member adjacent said brush portion to retract the brush bristles into the nozzle passageway in advance of the end wall of the cap, said cylindrical end of said valve member being slightly smaller than the diameter of the passageway in said nozzle and extending to and terminating at said restricted throat of the orifice, and said brush and valve unit being tiltable in said nozzle passageway to accommodate wobbling of the unit upon rotation of the displaced pin.

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