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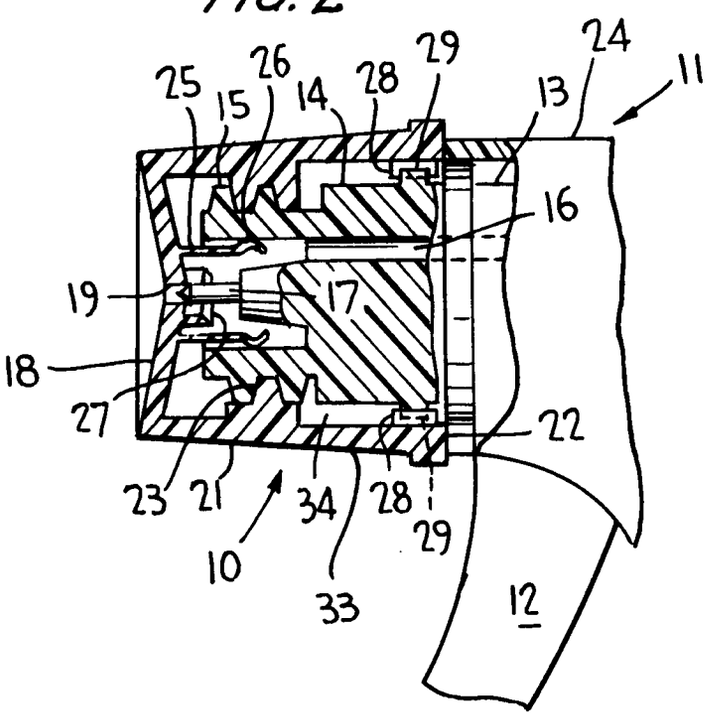
(54) **A pump dispenser.**

(57) A child-resistant threaded nozzle assembly (10) for a manually actuated pump dispenser (11) is locked in its discharge closed position when internal lugs (28) on the nozzle (10) engage external detents (29) on a forward end (14) of the dispenser body (11) for locking the nozzle (10) in a discharge closed position. Upon squeezing the nozzle skirt (21), the lugs (28) are shifted radially outwardly to disengage from the detents (29) to facilitate unthreading the nozzle (10) to its discharge open position.

FIG. 2



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This invention relates generally to a manually actuated pump dispenser, and more particularly to a rotatable nozzle assembly for such dispenser capable of being easily and effectively locked in its off position against rotation from such position, thereby rendering the nozzle child-resistant.

There are known safety closures for containers of cleaners and household fluids which may be toxic, such closures being rendered child-proof by requiring some type of manipulation in additon to closure rotation.

One of such safety closures is of the "squeeze and turn" cap variety, having a closed end and a flexible skirt. The skirt has one or more internal locking lugs which engage one or more external locking detents on the container neck, the cap being threaded to the neck and being locked when being fully threaded upon such lug/detent engagement. The cap skirt must be inwardly flexed to force its locking lugs radially outward from engagement with the neck detents.

U.S. Patent Nos. 3,941,268 and 4,117,945 disclose such safety closures. However, the closures are not structured for effective use as a nozzle assembly for a pump dispenser.

U.S. Patent 4,358,031 discloses a squeeze and turn child-resistant safety closure with a dispensing spout. The closure includes an inner snap cap press-fitted within the closure and snapped onto the outer rim of the container neck. The cap is provided with a dispensing spout which is closed by the outer closure.

The inner snap cap required for such an assembly, and the seals required between the cap and closure, render the assembly ineffective for use as a child-resistant nozzle for a pump dispenser.

It is an object of the present invention to provide a child-resistant nozzle assembly for a manually actuated liquid pump dispenser. The nozzle has a discharge orifice in its end wall, and threadedly engages a forward end of the dispenser body for rotation between discharge open and closed positions. A discharge valve element at the forward end of the body seats against the orifice in the discharge closed position.

The forward end of the body has one or more external locking detents located adjacent the terminal edge of the nozzle. The nozzle has a flexible skirt portion and a pair of internal locking lugs in engagement with the detents for locking the nozzle against rotation from its discharge closed position. The lugs are disengageable from the detents upon manual application of inward pressure to the skirt portion at locations other than that of the lugs to thereby deform and unlock the nozzle and permit nozzle rotation toward its discharge open position.

Other objects, advantages and novel features of the invention will become more apparent from the following detailed description of the invention when taken in conjunction with the accompanying drawings.

Figure 1 is a side elevational view of the nozzle assembly according to the invention, shown mounted on a manually operated pump dispenser;

Figure 2 is a view similar to Figure 1, showing the nozzle assembly and forward end of the dispenser in vertical section;

Figure 3 is a cross-sectional view taken substantially along the line 3-3 of Figure 1; and

Figure 4 is a view similar to Figure 3 showing disengagement of the lugs from the detents upon manual application of inward pressure to the nozzle skirt.

Turning now to the drawings wherein like reference characters refer to like and corresponding parts throughout the several views, a nozzle cap is generally designated 10 in Figures 1 and 2, shown mounted on a pump dispenser 11 which may be of the trigger-operated variety having a trigger actuator 12, as disclosed in U.S. Patent 4,204,614, commonly owned herewith. The entirety of the disclosure of this patent is specifically incorporated herein by reference. Of course, pump dispenser 11 may comprise any of the other known trigger actuated dispensers without departing from the scope of the invention.

As shown in detail in Figure 2, the dispenser has a body 13 terminating in a forward end 14, having external threads as at 15.

The dispenser body includes the discharge passage 16 located adjacent a discharge valve 17 which may be in the form of a needle valve or which may take the form of another type valve element known in the art.

Nozzle 10 has an end wall 18 containing a coaxial discharge orifice 19 through which product is dispensed upon pump actuation. The discharge orifice is in communication with discharge passage 16.

The nozzle has a slightly tapered annular skirt 21 extending from end wall 18 and terminating in a free edge 22. The skirt is internally threaded as at 23 for thread engagement with external threads 15 for thread mounting the nozzle in place on forward end 14 of the dispenser body. In the Figure 2 position, the nozzle is threaded into its discharge closed position at which edge 22 abuts against the forward end of a shroud cover 24 of the dispenser, or against some other portion of the dispenser body. In the Figure 2 position, valve 17 is seated against orifice 19 for closing the discharge.

A sleeve 25 extends inwardly of end wall 18 and is slightly bulged at its free end as at 26. Bulged end 26 bears against the inner wall of

forward end 14 to provide a seal thereat and to form a forward extension of the discharge passage.

A pair of arcuate walls are mounted on the inner surface of end wall 18 (only one such wall 27 being shown in Figure 2), and extend a short distance toward valve element 17. These arcuate walls define a swirl chamber surrounding the discharge orifice, and present tangential slots therebetween so that, when fluid is forced into the swirl chamber through these slots, it is caused to rapidly swirl adjacent the discharge orifice before it is discharged outwardly therethrough, all as specifically described in U.S. 4,204,614.

Skirt 21 of the nozzle has one or more internal locking lugs 28, such as a pair of such locking lugs spaced 180° apart. The locking lugs may be located adjacent free edge 22 of the nozzle.

Forward end 14 of the dispenser body has a corresponding number of external locking detents 29, each having a ledge 31 and being tapered as at 32.

Thus, as the nozzle is threaded to its discharge closed position of Figure 2, upon clockwise turning movement when viewed in the drawings, ramps 32 permit the detents to slide beyond lugs 28 until their ledges 28 engage the lugs, as shown in Figure 3, for locking the nozzle in its off position.

Skirt portion 33 of the nozzle skirt, between threads 23 and free edge 22, is sufficiently flexible and deformable in response to the application of manual external pressure. Thus, to open the discharge, skirt portion 33 is squeezed by applying external pressure, as by the thumb and forefinger, inwardly against the skirt portion, at locations other than that of lugs 28, as illustrated by the arrows in Figure 4. The skirt portion 33 is therefore caused to deform, whereupon lugs 28 shift radially outwardly from engagement with detents 29 for unlocking the nozzle and permitting nozzle rotation in a counter-clockwise direction toward the discharge open position.

Upon unlocking, a counter-clockwise turn through less than 90° will open the discharge as orifice 19 is unseated from valve element 17. Upon rethreading the nozzle back to its Figure 2 position, it is locked in the discharge closed position at which element 17 is reseated against orifice 19.

To facilitate squeezing, skirt portion 33 may be spaced a predetermined distance from forward end 14 so as to present an annular gap 34. This will assure that the skirt portion is easily deformed to effect a radial outward shift of lugs 28 for unlocking. This gap, however, may be relatively shallow, since the lug/detent engagement presents but a small overlap, which is all that is required to maintain the nozzle locked in place.

Obviously, many other modifications and variations of the present invention are made possible in the light of the above teachings. It is therefore to be understood that within the scope of the appended claims the invention may be practiced otherwise than as specifically described.

Claims

1. A manually actuated liquid dispensing pump assembly comprising, a pump body for mounting with a closure cap to the upper end of a container for fluent product, a shroud cover on said body, said pump body extending transversely above the closure cap, said body having means defining a pump chamber having an inlet port in communication with a valve controlled inlet passage, said chamber having an outlet port in communication with a discharge passage extending in a transverse direction through said body, a discharge valve element lying adjacent said discharge passage, a forward end of said body surrounding said valve and having external threads, a discharge nozzle mounted on said forward end and having a discharge orifice in communication with said discharge passage, said nozzle having internal threads in engagement with said external threads for rotation between discharge open and closed positions, said valve element being seated against said orifice in said discharge closed position, at least one external locking detent on said forward end adjacent a terminal edge of said nozzle, said nozzle having a flexible skirt portion located between said internal threads and said terminal edge, at least one internal locking lug on said skirt portion in engagement with said detent for locking said nozzle against rotation from said discharge closed position, said detent providing the sole means for engagement with said lug for the locking of said nozzle, said skirt portion forming an essentially smooth extension of said shroud cover adjacent said nozzle and without said cover having a projection extending from a forward end thereof, said lug being disengageable from said detent upon manual application of inward pressure to said skirt portion at locations other than that of said lug to thereby deform and unlock said nozzle and permit nozzle rotation toward said discharge open position.

FIG. 1

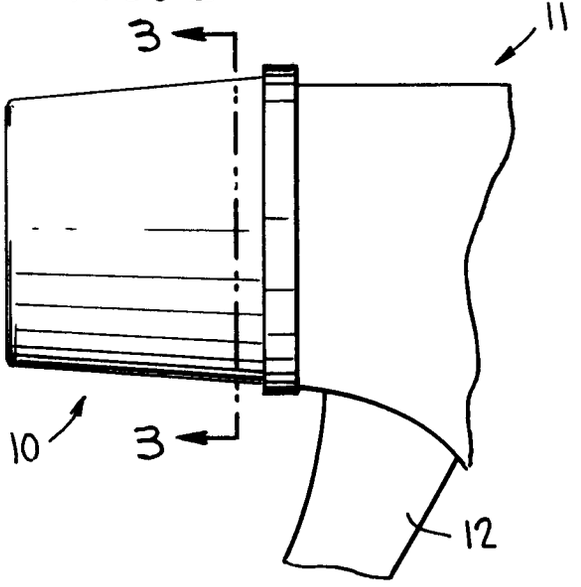


FIG. 2

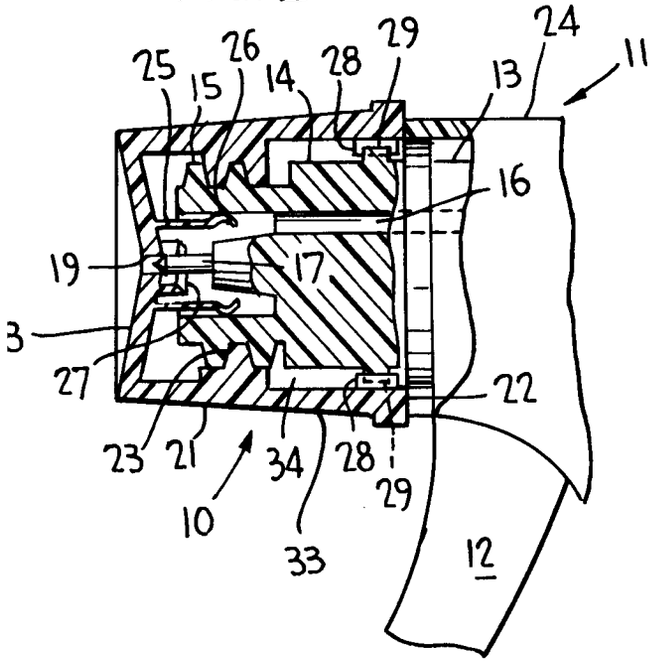


FIG. 3

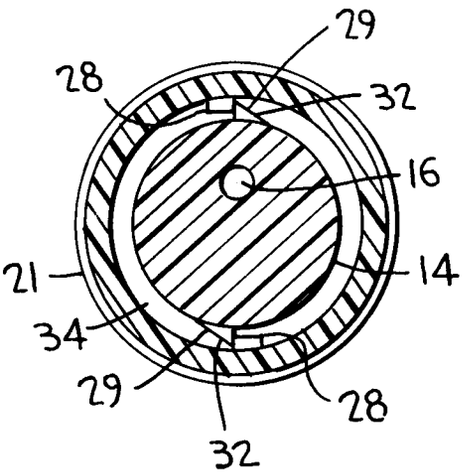
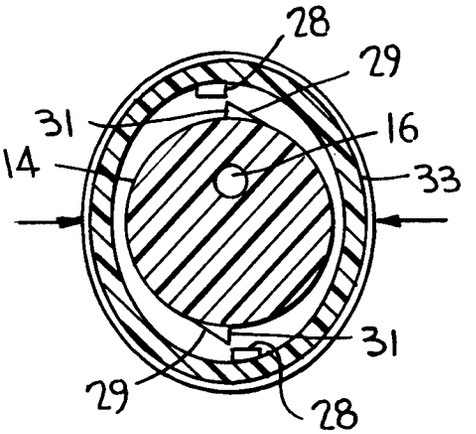


FIG. 4



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EUROPEAN SEARCH REPORT

Application Number

EP 91 30 6011

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
Y	US-A-4 204 614 (REEVE) * claim 1; figures 6,8,10 *	1	B 05 B 11/00 B 65 D 55/02
Y	US-A-4 358 031 (LOHRMAN) * column 3, line 38 - line 51; figures *	1	
A	GB-A-2 051 612 (ETHYL PRODUCTS COMPANY) * claims 1-6; figures 2,3 *	1	

TECHNICAL FIELDS SEARCHED (Int. Cl.5)

B 05 B

The present search report has been drawn up for all claims

Place of search	Date of completion of search	Examiner
The Hague	14 October 91	BREVIER F.J.L.

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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