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A. E. ELMORE ET AL
CLOSURE FOR A FLUID DISPENSING CONTAINER HAVING
A FLEXIBLE SLITTED DIAPHRAGM
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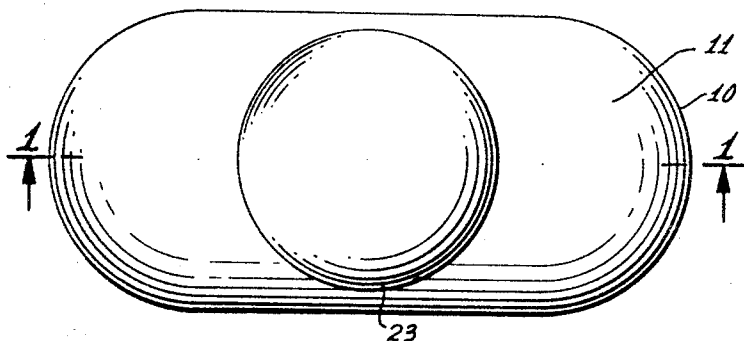


FIG. 2

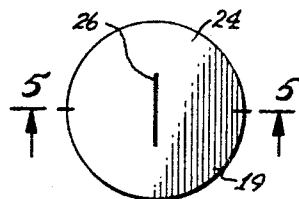
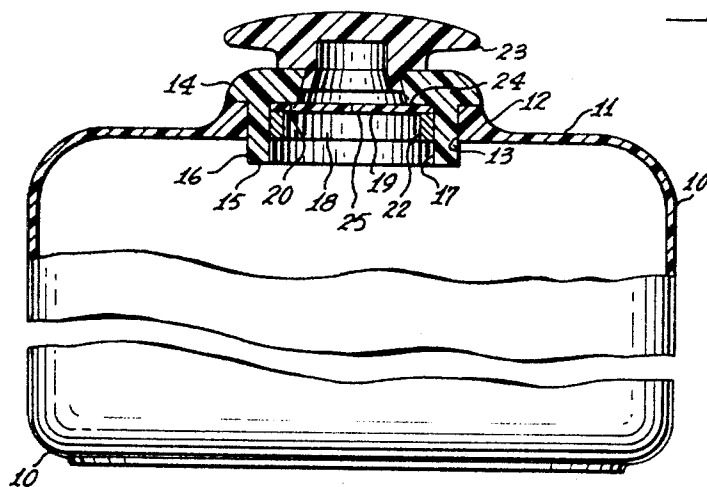


FIG. 4

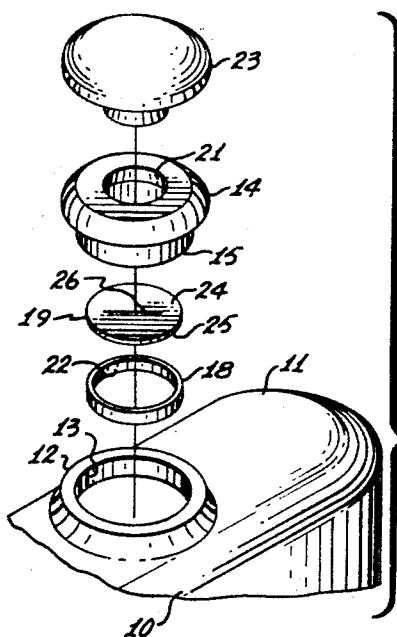


FIG. 1

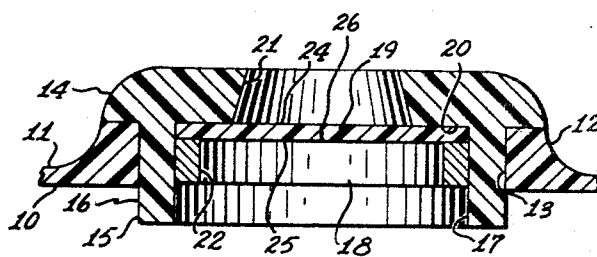


FIG. 5

FIG. 3

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CLOSURE FOR A FLUID DISPENSING CONTAINER HAVING A FLEXIBLE SLITTED DIAPHRAGM

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1 Claim

ABSTRACT OF THE DISCLOSURE

A closure for a resilient flexible container having a diaphragm of rubber or other flexible material across the outlet of the container in which is formed a diametrically disposed slot which is normally closed but which may be opened by pressure on the container to extrude material through the slot and when pressure is released from the container air may be drawn in through the slot as the container returns to its normal shape, ready for the next squeeze to extrude another supply of material.

Background of the invention

(1) The field of this invention lies in closures for receptacles and containers, and more particularly to an automatic closure for resilient flexible squeezable and return containers for liquid and semiliquid material.

(2) Heretofore, a great many attempts have been made to provide self-closing valves for resilient flexible containers and receptacles by which the necessity of receiving and replacing a cap for the container may be avoided while at the same time providing a leakproof and breathing discharge opening for the material in the container.

Summary of the invention

One of the objects of this invention is to provide a dispensing cap for a "squeeze" bottle and the like which has a normally closed slit capable of dispensing and extruding the material in the bottle when squeezed and to breathe or suck in air is the bottle returns to normal shape from squeezed position when released after a discharge of material.

Another object is to provide an automatic dispensing cap for a plastic squeeze bottle having a diametrically disposed slit in a flat disc-shaped piece of resilient flexible material which has a normally closed position of the slit, a dispensing outwardly deformed position of extrusion of the material when the bottle is squeezed, and a breathing or air intake of inwardly deformed position as the squeeze bottle returns to its normal shape.

And a further object is to provide a dispensing cap having a diaphragm with a diametrically disposed discharge control slit which is in normal flat closed position but which swings outwardly with greater pressure to dispense the material and which swings inwardly with lesser pressure to breathe or take in air for the next material discharge squeeze of the bottle by unique backup orifices or annular support each side of the slitted diaphragm.

Brief description of the drawings

FIG. 1 is an enlarged side elevation of a squeeze bottle with a dispensing cap and slit valve partly broken away and in section on the line 1-1 of FIG. 2.

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FIG. 2 is a plan view of the device shown in FIG. 1.

FIG. 3 is an enlarged exploded view of the dispensing cap control valve disc assembly.

FIG. 4 is an enlarged plan view of the control disc of the dispensing cap.

FIG. 5 is a sectional view on the line 5-5 of FIG. 4.

Description of the preferred embodiment

As an example of one embodiment of this invention, there is shown a squeeze bottle 10 of suitable plastic material that may be squeezed to discharge the contents thereof and released to recover its original normal form. The top 11 of the bottle 10 has a neck 12 having an opening bore 13 formed therein.

A valve sleeve member 14 has a depending portion 15, the outside diameter 16 of which snugly fits in and is sealed in the bore 13 of neck 12. The depending portion 15 has a counterbore 17 in which is tightly pressed and secured the annular ring 18 above which is supported the valve disc or diaphragm 19 held against the downwardly facing radial surface 20 of the counterbore 17. Above the diaphragm is formed a tapered bore 21, divergent downwardly, in the valve sleeve 14 while below the diaphragm is formed a larger bore 22 in the annular ring 18. A suitable closure cap 23, having a conical reduced end portion arranged to be demountably secured in the tapered bore 21 of the valve sleeve, may be utilized during shipping and rough handling and for cleanliness and dust when stored on a shelf.

It is important to note that the disc or diaphragm 19 is flat and has parallel top and bottom surfaces 24 and 25 as best seen in FIG. 5, with a diametrically disposed slit 26 formed therein. It will be further noted that the top surface is supported or backed up by the valve sleeve 14 by a smaller bore 21 than is the bottom surface 25 by the larger bore 22 of the annular ring 18. The purpose of this arrangement is so that greater force is required to discharge and extrude the material in the bottle 10 out through the slit 26 for proper and efficient control of the material for use while the larger bore 22 allows easier inward suction of air through the slit 26 when the bottle is released after squeezing to breathe or such air back into the bottle ready for the next squeezing discharge of the bottle.

We claim:

1. A combination of a receptacle and a closure valve therefor; comprising a resilient squeezable receptacle provided with an opening in one wall thereof, a sleeve member provided with a central bore extending lengthwise therethrough, said sleeve having an outer diameter snugly fitting in a sealed condition in said opening, said sleeve also provided with an annular flange at one end thereof adapted to encircle said opening and butt the wall of the receptacle, a counterbore in said sleeve extending from the inner end of the sleeve having a larger diameter than said through bore and forming a supporting shoulder for said closure valve within said sleeve, said closure valve comprising a diaphragm of resilient material provided with a diametrically disposed slot, said diaphragm being positioned within said counterbore with the outer edges of one face of said diaphragm abutting and being supported by said shoulder, a ring member having an outer diameter proximately the size of the counterbore and an opening having a diameter substantially smaller than

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said bore, said ring being positioned within said counter-bore abutting the outer edge of the diaphragm to maintain the diaphragm in abutting relationship with said shoulder, wherein the bore being of a smaller diameter than the diameter of the ring opening provides a restrained controllable material discharge from the receptacle through the slits upon the application of a squeezing pressure on the walls of the receptacle and a large volume of inflow of air into the receptacle to remove residual material from the bore the discharge face of the diaphragm and the slit surfaces so that the valve closes without leakage as the receptacle returns to its normal shape upon release of the squeezing pressure.

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WALTER SOBIN, *Primary Examiner.*

U.S. Cl. X.R.

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