

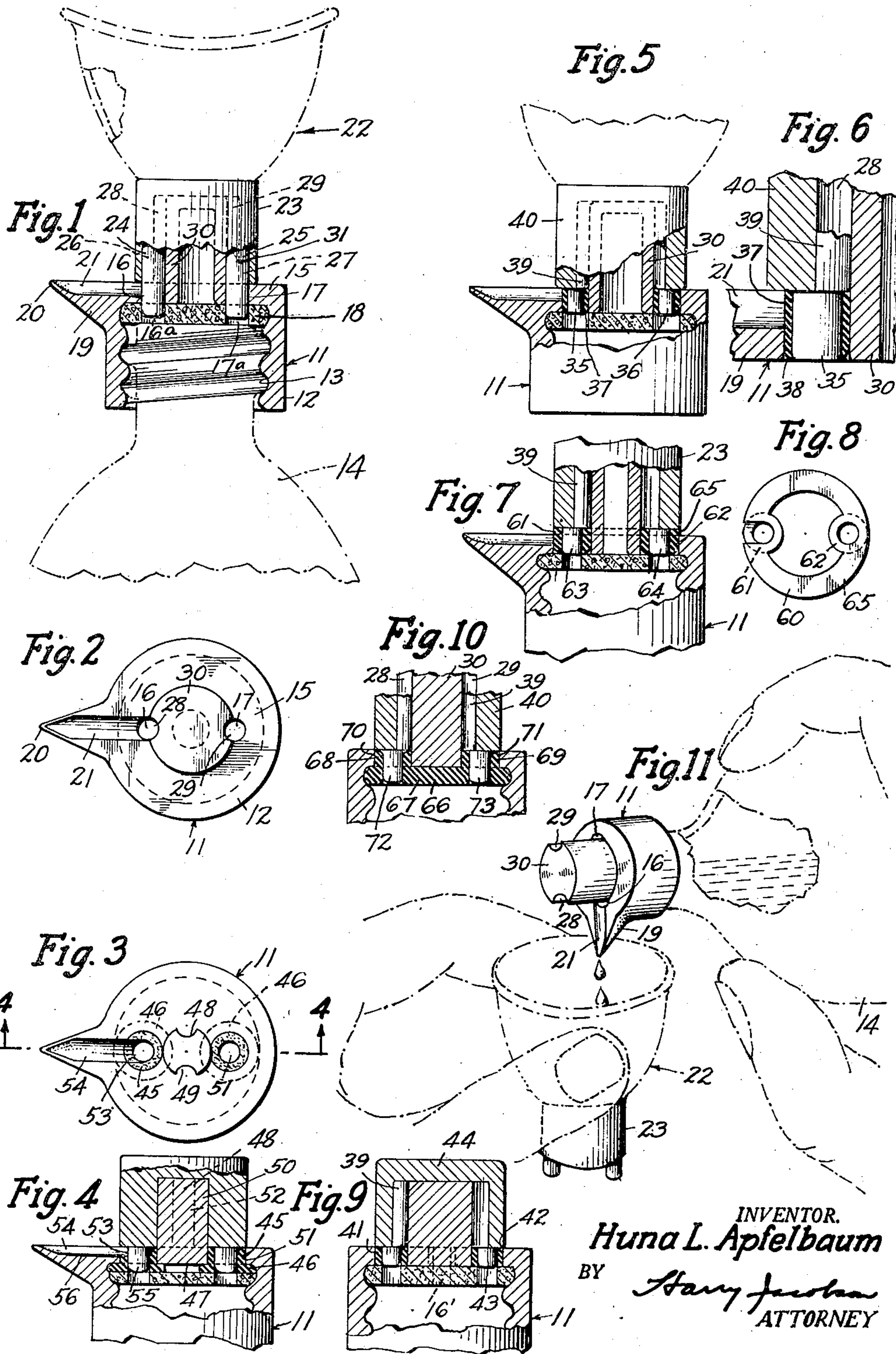
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DROPPER AND POURER CAP

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## DROPPER AND POURER CAP

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This invention relates to container closures and particularly to that type adapted for use as a sprinkler or dropper or as a pourer device.

The invention contemplates the provision of a perforated container cap adapted to support an eye cup or any other type of auxiliary member which serves also as an adequate sealing element for the perforations of the cap, and is removable to permit the discharge of limited quantities of the contents of the container without removal of the cap.

The invention further contemplates the provision of a simple, economical and easily attachable and detachable closure element for a perforated cap, which element is held in place solely by friction and which may constitute an auxiliary device for use with or without the contents of the container closed by the cap.

The invention further contemplates the provision of cooperating means on the perforated container cap and the closure element for enabling the quick and correct assembly thereof to seal the cap and the quick and easy separation thereof to unseal the cap for the dispensing of the container contents in the form of countable drops or sprinkled droplets or spray, or, when the contents are powdery or granular, to permit the sprinkling thereof on a selected area by shaking.

The invention further contemplates the provision of a combined dropper, sprinkler, shaker and pourer cap readily attachable to and detachable from its container and provided with means free of screw threads and cooperating with an auxiliary closure element to seal and unseal the cap and to guide the element into and out of its sealing position.

The invention further contemplates the provision of an auxiliary closure element provided with pins adapted to enter and to be held in the perforations of a perforated cap to seal the same and to hold the element to the cap.

The various objects of the invention will be clear from the description which follows and from the drawing, in which,

Fig. 1 is a partial vertical section and partial front elevation of one form of my improved closure wherein the auxiliary element shown is an eye cup and the cap is provided with a pouring spout, the container being shown in dash dot lines.

Fig. 2 is a top plan view of the cap of Fig. 1 after the auxiliary element has been removed.

Fig. 3 is a similar view of a modified form of

the cap wherein the guides are separated from and spaced from the sealing and holding pins.

Fig. 4 is a vertical section taken on the line 4-4 of Fig. 3, the auxiliary element cooperating with the cap being shown in its normal sealing position.

Fig. 5 is a view similar to Fig. 1 of another modified form of the closure.

Fig. 6 is a similar enlarged fragmentary view of the means for holding the auxiliary element to the cap and for removably sealing the cap.

Fig. 7 is a view similar to Figs. 1 and 5 of another modified form of the closure wherein an annular sealing and holding washer is employed.

Fig. 8 is a top plan view of the washer of Fig. 7 cut away at one of its tubes.

Fig. 9 is a view similar to Fig. 4 of another modified form of the sealing and holding means.

Fig. 10 is a similar fragmentary view of another modified form of the sealing and holding means constituting also a liner or gasket for sealing the container.

Fig. 11 is a perspective view of the closure wherein the auxiliary element is an eye cup or measuring cup and the cap is provided with a spout, showing the parts separated and in use for pouring drops into the cup.

In the practical embodiment of the invention shown by way of example, the closure comprises generally an internally threaded cap provided with perforations in its top and with an upstanding integral grooved member, together with an auxiliary element provided with pins entering and sealing the perforations of the cap, which pins also constitute a means for holding the element removably to the cap, the element having suitably shaped longitudinal guides adapted to enter the grooves of the upstanding member of the cap and to slide therein. Flexible and resilient means may additionally be provided for forming a friction seal between the pins and the walls of the cap or liner perforations thereby to insure against accidental separation of the cap and auxiliary element.

Referring now to the form of the invention shown in Figs. 1 and 2, the cap 11 is preferably made of suitable moldable plastic in one piece, the skirt 12 thereof having the internal screw threads 13 adapted to removably engage the screw threads on the neck of a bottle 14 or other container. The top wall 15 of the cap is pierced with a pair of preferably oppositely disposed perforations or comparatively small holes 16, 17 communicating with the interior of the container through registering holes 16a, 17a in the



gasket or liner 18. A spout 19 may optionally be formed integrally with the top and skirt of the cap, said spout terminating preferably in a slightly rounded point 20 and being provided with a shallow depression or channel 21 in the top surface thereof terminating at one end just behind the point 20 and at the other end communicating with the discharge perforation 16. The top surfaces of the cap and spout are preferably in the same plane and flat. The auxiliary element 22 is shown in this form of the invention as an eye cup having the hollow base portion 23, though it will be understood that said element may take any convenient form such as a measuring cup, applicator, marker or the like usable with or without the contents of the container, or said element if desired, may have no other function than to serve as a closure or sealing device for the perforations of the cap. (See Figs. 4 and 9.)

Said element is preferably, though not necessarily made of suitable moldable plastic in one piece and the base 23 thereof is provided with the perforation-sealing pins 24, 25 adapted to fit sufficiently tightly into the cap perforations 16, 17 to hold the element to the cap adequately against accidental separation thereof and to permit removal of the element without the necessity for using excessive force. If desired and as shown, the pins 24, 25 are made long enough to enter the holes 16a, 17a of the liner 18, which being of resilient material such as cork, rubber, rubber-like material, or other suitable flexible resilient material, grips the pins firmly when said holes are made of the proper size, preferably slightly smaller than the pins. It will therefore be seen that the pins 24, 25 not only hold the element removably on the cap but serve also to seal the perforations of the cap against loss, leakage or evaporation of the contents of the container.

In the form shown in Fig. 1, the pins 24, 25 not only project below the bottom surface of the base 23, but extend upwardly for substantially the entire interior height of the hollow base, being fitted and secured respectively into the substantially semi-cylindrical longitudinal grooves 26, 27 made in the inner wall 31 of the base. The inner portions of the upper parts of the pins project inwardly of the wall 31, and, when the element 22 is raised or lowered, slide longitudinally in the corresponding upright semi-cylindrical grooves 28, 29 respectively of the cap part 30 upstanding from the central portion of the top wall 15 of the cap. The pins and the cap part 30 therefore cooperate to arrange the element 22 in the proper position to cause the pins 24, 25 to enter and seal the cap perforations when said pins are first arranged in the grooves 28, 29 and then the element is moved downwardly relatively to the cap; the pins cooperating with the grooves to prevent relative rotation and disarrangement of the element and the cap. In the normal or assembled positions of the closure parts, the flat lower surface of the base rests on the flat upper surface of the cap wall 15, the pin 24 seals the perforation 16 and the inner end of the spout channel 21, and the pin 17 seals the perforation 25.

When material is to be dispensed from the container, the element 22 is removed from the cap by a simple longitudinal movement. The lower ends of the pins are thereby removed from the cap and liner perforations, while the upper parts of the pins slide in the grooves of the cap

part 30. When the perforations have been exposed by the removal of said element, the container may be tilted into the position of Fig. 11 to dispense the required number of drops into the element or other receptacle, or the container may be turned upside down or nearly so and its contents whether liquid, powdered or granulated, sprinkled over the selected area.

When used as a dropper, the perforation 17 serves to admit a limited amount of air into the interior of the container thereby to permit the contents to flow out through the channel 21 of the spout to the pointed tip thereof, there to fall off drop by drop. The perforations are properly proportioned for this purpose. Should larger quantities of the contents be needed at any one time, the cap 11 may be completely removed from the container together with the element 22 as a unit, and the contents dispensed in the customary manner. To replace the auxiliary element after it has been removed, the pins and the projecting guide extensions thereof are first inserted into the opposed grooves of the upstanding cap part 30, whereafter the element is moved toward the cap, at which time the pins are guided by the grooves until the lower ends thereof are inserted into the perforations of the cap, thereby to seal said perforations against evaporation or leakage of material therethrough. The frictional contact of the pins with the walls surrounding the perforations may be made if desired with the required accuracy to prevent accidental separation thereof.

If a more certain holding action is required, the projecting parts 35, 36 of the pins may be coated or covered on their cylindrical surfaces with suitable flexible and compressible resilient material 37 such as rubber, rubber-like substances, cork, felt or the like which tends to return to its original shape after being compressed or distorted. (Figs. 5 and 6). The lower part of the coating or covering tube may be bevelled off or tapered as at 38 to permit the pins together with the coating or tube to enter the perforations 16, 17 easily, the coating or covering tube being slightly compressed when forced into the perforations with the pins. The tendency of the coating or covering to expand puts sufficient pressure on the walls of the perforations to hold the pins firmly therein against accidental displacement, but does not prevent intentional removal of the pins and of the auxiliary element from the cap. In order that the perforations may not be made too large for dispensing drops, the pins 35, 36 are reduced in diameter as compared to the diameters of the guide projections 39 of the hollow base 40 and of the grooves 28, 29 in the cap part 30 which receive said projections. As shown, the projections 39 are formed integrally or in one piece with the base 40, being semi-circular in cross section and extending inwardly from the inner cylindrical wall of said base, and functioning similarly to the upper guide portions of the pins 24, 25 of Fig. 1.

It will be understood that instead of coating the pins or covering the same with the layer of resilient flexible material, the walls of the perforations 16, 17 may be so coated or covered, as shown for example in Fig. 9 at 41. In this case, the upper ends 42 of the coating or lining 41 are bevelled or tapered to permit the pins 43 to enter easily therinto. In case the lining 41 is made in the form of a cylindrical tube, it is cemented or otherwise adhesively secured to the walls of the perforations. As is also shown



in Fig. 9 the auxiliary element 44 may simply be made in the form of an auxiliary cap not having any eye cup or other device attached thereto or formed therewith and functioning only to seal the perforations.

In Fig. 9 there is also shown more than two perforations 16, 17, there being shown a third perforation 16' removed a quarter turn from the other perforations. It will be understood that as many additional perforations and pins may be provided as may be found desirable, as when for example, the cap is to be used as a sprinkler top for a container.

As shown in Figs. 3 and 4, the liners 45 for the perforations may take the form of flanged tubular members, each having a flange 46 secured to the under surface 47 of the cap top and having a tubular part also cemented to the wall of the perforation. The flange prevents the pins from pulling the liners out of the perforations with them when the auxiliary element is removed from the cap. As is also shown in Figs. 3 and 4, the sealing and holding pins need not necessarily be aligned with or form part of or a continuation of the guide pins or projections. Instead the opposed guide grooves or recesses 48, 49 in the upstanding cap part 50 are removed a quarter turn from the perforations 51 and the guide projections 52 of the auxiliary elements are similarly positioned to register with and enter the grooves. It will be noted that the tubular part of the liner 45 nearest the spout is cut away as at 53 to permit communication of the hole therein with the spout channel 54 when the auxiliary element and its pins 55 are removed from the cap. The channel 54 is also shown with an upwardly and outwardly tapering bottom 56 to assist in the formation of drops.

Referring now to Figs. 7 and 8, an annular washer 60 is there shown formed integrally with the opposed tubes 61, 62. When the under face of the washer is secured to the top of the cap in the position of Fig. 7, the tubes 61, 62 are arranged in the respective corresponding perforations of the cap and may be secured therein if desired. The pins 63, 64 in that case enter and compress the tubes and are frictionally held therein and thereby hold the auxiliary element firmly to the cap with the washer flange 65 between the under face of the base and the upper face of the top wall of the cap.

The washer may however, be secured with the upper face of its flange against the under face of the base 23, and the tubes 61, 62 secured to the respective pins 63, 64. In this form of the invention, the lowermost parts of the tubes are preferably bevelled or tapered to permit the tubes to enter the perforations easily and to be compressed by the walls thereof.

In the form of the invention shown in Fig. 10, the liner or gasket 18 is dispensed with and a combined liner for the cap and for the perforations is provided. Said liner 66 may be made throughout of rubber, cork or the like resilient compressible material. The flange 67 thereof is secured to the under face of the top wall of the cap, while the integral tubes 68, 69 (similar to the tubes 61, 62) are fixed to the walls of the cap perforations 70, 71. When the cap is in place on the container, the liner 66 is compressed and serves to seal the container as well as to cooperate with the pins 72, 73 to seal the cap perforations and to hold the element 40 to the cap.

In any case, it will be seen that I have pro-

vided an auxiliary element having pins removably entering the perforations of a cap to be held normally to the cap and to be readily removed therefrom for using the cap as a dropper or sprinkler, that the cap and element have cooperating means thereon for guiding the pins accurately into and out of the perforations without undue stress thereon, that the auxiliary element may be shaped and designed for uses additional to the sealing function thereof if desired, that the parts may readily and economically be molded of plastic material, and that the parts of the closure are retained against accidental separation, by simple means constituting combined sealing and holding means without the use of screw threads or other fastening devices.

It will be understood that various changes may be made from the forms of the invention herein shown without departing from the spirit of the invention and within the scope of the appended claims.

I claim:

1. In a container closure, a cap having a plurality of perforations therein, a sealing element for the perforations normally carried by the cap and removable therefrom when the contents of the container are to be dispensed, said element having pins projecting beyond the bottom surface thereof, and cooperating means on the cap and the element for guiding the pins into and out of the perforations, said means comprising a grooved upstanding central part on the cap and projections on the element above the pins arranged to slide in the grooves of said central cap part.

2. In a container closure, a cap having a top wall provided with perforations and having a central grooved part upstanding from said wall, and a sealing element for the perforations carried by the cap and adapted to receive said grooved part, said element having inwardly extending longitudinal projections thereon adapted to slide in the grooves of said grooved part and having pins projecting downwardly therefrom and arranged to enter the perforations, and a yieldable resilient member interposed between the cap and the pins and having openings therein arranged coaxially with the pins, the material of the resilient member surrounding said openings being compressed by the pins when the element and the cap are assembled in the sealing positions thereof and exerting gripping pressure upon the pins normally to hold the element to the cap against accidental separation thereof.

3. In a container closure, a perforated cap having an upstanding grooved part, a hollow sealing element adapted to receive said part and having guide means thereon slidable in the grooves of said part and pins projecting from the element in position to enter the perforations of the cap.

4. The structure claimed in claim 3 and a resilient member compressed between the pins and the cap when the element is in its sealing position on the cap and the pins are in the perforations.

5. In a container closure, a cap having a top wall provided with spaced perforations and with an internally threaded skirt portion depending from the periphery of the top wall, a centrally arranged part upstanding from the top wall and having oppositely disposed grooves therein, and an auxiliary element having a hollow part adapted to receive the upstanding part of the cap and provided with inwardly extending longitudinal



guide projections adapted to slide in the grooves, said element surrounding the upstanding part and having a plurality of spaced pins projecting downwardly therefrom and entering the perforations when the projections are arranged in the grooves and the element is moved toward the cap.

6. In a container closure, an internally threaded cap having a plurality of spaced perforations in the top thereof, an integral spout projecting from the cap and having a channel therein communicating with one of the perforations, an upstanding longitudinally grooved part on the cap between the perforations, an auxiliary sealing element normally carried by the cap in position to seal the perforations and to enclose the upstanding part, inwardly extending projections on the element slidable in the grooves of the upstanding part, and a plurality of spaced pins projecting beyond the base of the element and entering the perforations of the cap to seal the same and to hold the element removably to the cap.

7. In a container closure, a cap having a plurality of perforations in the top thereof, a removable sealing element normally carried by the cap, and means for sealing the perforations comprising a plurality of pins projecting from the ele-

ment and normally arranged in the perforations and tubes of resilient compressible material interposed between the pins and the walls of the perforations when the element is on the cap.

8. In a container closure, an internally threaded cap having a substantially flat top wall provided with a plurality of perforations therein spaced outwardly from the center thereof, an integral spout on the cap having a flat top surface continuous with the top surface of said top wall, said top surface of the spout having a shallow channel therein communicating with one of the perforations, a sealing element having a flat bottom surface normally arranged on the top surface of the cap and a plurality of pins projecting from the bottom surface of the element in position to enter and seal the perforations, whereby the contents of a container capped by said closure may be dispensed by first removing the sealing element to unseal the perforations, and then shaking or sprinkling the contents out through the perforations or pouring the contents drop by drop through said one perforation leading to the spout and along the channel of the spout.

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