This invention relates to dip-proof and tamper-proof pouring and/or sealing devices.

There are sealing devices known, which provide for tamper-proof sealing of containers, such as a sealing cap made of resilient plastics and provided at its outside surface with a tearable section for removing the cap. Such devices, however, provide for sealing of the container only, but do not offer means for drip-proof dispensing of liquids.

One purpose of the present invention is to incorporate into one and the same device not only means for tamper-proof sealing of the container, but also pouring means capable of spill- and drip-proof dispensing of liquids of all surface tensions and/or viscosity and provide also additional sealing means for transit and re-sealing the container.

Another purpose of the invention is to enable the application of a pouring and sealing device, providing for the above advantages, in a single operation to the container.

The above purposes are achieved by a device made of resilient materials and unremovably secured to the neck or top plate of a container by snap action, wherein the pouring aperture of said device is sealed by a disc arranged at a suitable level at the interior of the same, said disc being tearable along a thin section arranged at or near to the perimeter of said disc, the top portion of said device being provided with an annular recess inwardly and downwardly adjoining a pouring surface, said surface consisting of two parts, the first part being extended in an outwardly and downwardly projecting direction, while the second part is upwardly projecting in the upright position of the container and/or device, the merging or meeting area of said two parts being arranged within the area of influence of the capillary or backflow suction of said recess, and wherein said device and container is additionally sealed by a sealing cap, secured by threads or other suitable means to the neck of the container, or by a resilient stopper, penetrating into and making sealing contact with the interior of the pouring aperture of said device, said stopper being preferably attached to said device by a resilient hinge, and wherein a cylindrical portion penetrating into the interior of the neck or top plate of a container, or a second cylindrical portion, embracing the neck is provided with suitable means for securing said device to the container.

For better understanding of the invention and to show how it may be carried into effect, the same will now be described by way of examples with reference to the accompanying drawings, in which:

FIGURE 1 is a cross-sectional view of a screw-cap sealed neck of a tin or drum, provided with a tamper-proof pouring device.

FIGURE 2 is a cross-sectional view of a tamper-proof pouring and sealing device, provided with a hinged stopper, the device being applied to the plain neck of a can, the stopper being in the unsealed position.

FIGURE 3 is a cross-sectional view of modified execution of a tamper-proof pouring and sealing device provided with a hinged stopper as applied to the top plate of a can, shown in the sealed position.

FIGURE 4 is a cross-sectional view of a tamper-proof pouring and sealing device provided with a hinged stopper, as applied to the neck of a glass or plastic bottle, shown in the sealing position, and

FIGURE 5 is a cross-sectional view of a tamper-proof pouring device of modified execution, as applied to the neck of a container having thin wall sections, the device being shown in the sealing position.

In the drawings identical or similar parts are provided with the same references and some of them are exaggerated for a better understanding.

The neck a (FIGURE 1) of a can or drum or the like is provided with threads, with which the threads of a screw-cap 13 are engaging. The pouring device 1, made of resilient materials, is applied to said neck by snap action, the outwardly protruding annular ledge 8 of said device engaging with the bottom edge of the downwardly projecting portion 6 of the neck and holding the device firm in said neck in a liquidtight and unremovable manner. Said ledge 8 is suitably made in a dovetail tapering manner in order to facilitate application of the device to the neck. The upper portion of the device is provided with an outwardly end upwardly protruding annular ledge 7, said ledge limiting the penetration of the device into the neck and providing at the same time for a suitable distance between the pouring surface p and the top surface of said neck. Inwardly adjoining to said pouring surface, to be described in detail further below, an annular recess 2 is arranged. The bottom of said device is sealed by a disc 10, said disc being provided at near to its perimeter with a thin section 9, along which said disc can be torn and removed by pulling the tab 11, attached to the boundary of the thick section 10 and provided with a grip 12. Said tab may, however, be attached to the thin, tearable section 9, the latter being than arranged to have a suitably larger width. In the drawing the device is shown sealed by a screw-cap, the latter making liquidtight contact with the top surface of the device. The container may be sealed without a wad in the screw-cap, and the upwardly protruding portion of the ledge 7 is suitably arranged to have such a length that said pouring surface is located high enough relative to the top plate of the container to eliminate the disadvantage of weting the top plate, when a small stream of liquid is poured from the full can.

The device 1a (FIGURE 2) is applied to the neck b of a can or the like in a similar manner, as described above, but said neck may be made without threads, as said device is provided with its own sealing means for transit and re-sealing, after the tamper-proof disc 9, 10 has been removed. A disc 14 is attached to the pouring device 1a by a flexible hinge 17, said disc being the base of a resilient stopper 18, suitably made with a tapered outside surface near to its open end for easier location in the interior of said pouring device. Said disc is suitably provided at or near to its perimeter with an annular wall 16, which is interrupted by a gap or cut away portion 16a in the vicinity of said hinge. Said wall is arranged in order to protect the pouring surface in the sealing position of the device from dust and damage. Said disc is also provided with a protruding tub 15 for levering up said stopper, said tab being suitably located facing the hinge 17. The stopper 18 may be provided with an outwardly protruding annular rib 19 snapping in the sealing position into a groove 19a, arranged at the interior of the pouring device. The vertical portion of the ledge 7 of said device may be made to protrude over the top surface of the neck to any suitable distance, as its dimensions are not restricted by a screw-cap.

The spill-and-drip-proof pouring means consist of an annular recess 2, arranged at the interior of said device near to its top portion and an annular pouring surface, consisting of two parts: the first part 3 of said surface is arranged outwardly adjoining said recess in an outwardly
and subsequently downwardly projecting direction, while the second part 4 of said surface is upwardly projecting in a substantially vertical direction in the upright position of the device and/or container, the merging area 5 of said first and second parts being arranged within the area of influence of the capillary or back-flow suction of said recess. Said first part may be provided with one or more step-like shoulders 3a, in order to increase the adhesion of liquids of low surface tensions to said first part. In this manner, the adhesion of the liquid to the first part of said surface, in co-operation with the capillary or back-flow suction of said recess, prevents the poured liquid from spreading to said second part of the pouring surface and under the influence of gravity it will part at the merging area 5 from said pouring surface. After righting up the container, the last—not yet fully developed—drop is withdrawn by the force of the capillary or back-flow suction of said recess into same. As a result, wetting of the neck by spilling or escaping drops is eliminated, however small quantity of liquid is dispensed from time to time. It should however be understood that very viscous liquids of low surface tension, such as heavy motor oils or the like, have considerable inertia and, therefore, a not yet fully developed drop cannot be always withdrawn at the required speed, when the container is righted up. Nevertheless, the last—fully developed drop—always falls down from the merging area 5, if the container is righted up slowly enough to allow time for it.

FIGURE 2 shows said device as it comes out from the mould and the tab 11 for destroying the tamper-proof disc 9, 10 is attached in this example to the thin section 9 of said disc and is provided in addition to the knob 12, with serrations 20 in order to secure a better grip for the fingers. The otherwise annular pouring surface 1, 2, 3, 4 and 5 may be made with a section of the same missing in the vicinity of the hinge 17 for facility of manufacture. The missing portion of said surface is not shown in the drawing, and it will be understood that this arrangement relates to all the other examples, provided with a hinged stopper.

The pouring device 16 (FIGURE 3) is applied to the top plate c of a can or drum or the like in a similar manner to the previous examples, an annular ledge 8, arranged at the bottom portion of the device engaging with the downwardly projecting portion 6 of the aperture of said top plate. The bottom surface of ledge 7 of the substantially cylindrical portion of said device abuts against said top plate, and said portion is suitably arranged to have such an extension that the pouring surface p of said device is located at such a suitable distance above said top plate that a small stream of liquid poured from a full container cannot touch said top plate. The tamper-proof disc 9, 10 may be arranged at any level below the bottom end of the stopper 18, when the same is in the sealing position.

The pouring device 1c (FIGURE 4) of the modified exemplification is applied to the neck d of a bottle made of glass, plastics or the like, said device being provided with two cylindrical portions for application to said neck. The first, 23, of said portions embraces said neck and is provided with an inwardly protruding annular ledge 8, engaging in application with an annular recess 24 arranged at the outside surface of said neck. The second cylindrical portion 24 of smaller diameter and suitable length penetration into the aperture of said neck, making liquid tight contact with the interior surface of the same and the ledge 7 located between the two said portions, abuts against the top surface of said neck. The bottom end of said second cylindrical portion 24 is sealed by a tamper-proof disc 9, 10, and the bottom part of said portion is suitably made downwardly tapering at its outside surface for easier location and application with the device to the neck. This device is also provided with a stopper 18 based at the disc 14, the latter being connected with said device by a resilient hinge 17.

The pouring device 1d (FIGURE 5) is applied to the neck a of a container having thin wall sections made of plastics or metals or the like. Said neck is formed with a substantially horizontal top surface 25 and an annular recess 21a, with which the inwardly protruding annular ledge 8 of the first cylindrical portion 23 is engaging by snap action. The second cylindrical portion 24, penetrating into the aperture of said neck, makes liquid tight contact with the interior surface of the same. Access 21a and recess portion may be provided with a tamper-proof disc 9, 10, as already previously described. The base 14 of the stopper 18 is provided in this example with annular grooves or thinner sections of any shape 22 in order to save material and preserve, at the same time, the required strength of said base.

The above described pouring and sealing devices, provided with a hinged stopper can be folded into the sealing position while they are in the loose condition, and can be applied to the containers in a single operation, either automatically or by hand.

The devices may be made of all suitable resilient materials, such as resilient plastics, rubber or the like. The containers and/or their necks may be made of metals, plastics, glass, ceramics or the like.

What I claim is:

1. A spout-type container closure device for closing the neck portion of a container, said device comprising, in combination, a generally resiliently flexible material fittable into the container neck to be closed, said spout having at its pouring end an outwardly expanding recess constituting a first pouring surface and a second pouring surface contiguous to said recess, said second pouring surface having a generally cylindrical first part extending radially outwardly in reference to the center axis of the spout, a generally cylindrical second part depending from the outer rim of said first part, a generally cylindrical third part extending upwardly in reference to said first part and being disposed radially intermediate said second part and the outer wall of said spout, and a generally annular fourth part joining said second and third parts, the area of said fourth part constituting an area at which the capillary action of said recess upon a liquid poured out through said spout is effective to impede dripping due to a formation of residual drops, a sealing disk having a buckled peripheral portion sealed to said spout adjacent the inner end thereof to close said spout for preventing tampering with the contents of a container to the neck of which the device is fitted, and a pull tab secured to said disk to forcibly remove the same from the spout.

2. A device according to claim 1, wherein the first part of said second pouring surface includes a peripheral step along the outer peripheral outline of said third part.

3. A device according to claim 1 and comprising elastic one-way retaining means adapted to underlie a wall portion of the container neck when the spout is fitted into the same, whereby said retaining means holds the device permanently captive in the neck.

4. A device according to claim 1, wherein said retaining means comprise a cylindrical wall portion of the spout having an outwardly protruding circumferential ledge engageable in underlying relationship with a wall portion of the container neck.

5. A device according to claim 1, wherein said retaining means comprise a cylindrical wall portion of the spout, said wall portion having in the face wall at its inner end a peripheral recess defining two mutually parallel branches, said branches being adapted to straddle a neck wall portion therebetween when the device is fitted into the container neck, the radially outer one of said branches having an inwardly protruding circumferential ledge engageable with the straddled neck wall portion at the outside thereof in underlying rela-
6. A device according to claim 1 and comprising a screw cap fittable upon the spout to close the same after removal of said sealing disk.

7. A device according to claim 1 and comprising a stopper removably fittable into the interior of said tubular spout to close the same after removal of the disk, and a resilient hinge means joining said stopper to said spout.

8. A device according to claim 7, wherein said stopper has a cylindrical wall portion insertable into the interior of said tubular spout for engagement with the inner wall thereof, said cylindrical wall portion of the stopper having an outer circumferential resilient rib and said inner spout wall having a circumferential groove engageable with said rib in the inserted position of the stopper.

9. A device according to claim 7, wherein said stopper comprises a top wall having a diameter such that the outer peripheral rim of the top wall protrudes beyond the outer peripheral outline of said second part of the second pouring surface, and a peripheral flange depending from said outer peripheral rim of the top wall to encompass said second part for protecting said second pouring surface.

10. A device according to claim 1, and comprising limit means on the outside of the spout to limit the depth of insertion thereof into the container neck to a predetermined maximum depth, said fourth part of the pouring surface being positioned to be spaced apart from the outer end of said neck portion when the spout is fully inserted into the container neck.

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