Feb. 18, 1941. A. JUCHLI 2,232,029

DROP DISPENSING VESSEL

Filed Dec. 23, 1938

Fig. 1

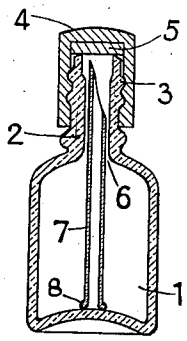


Fig. 2

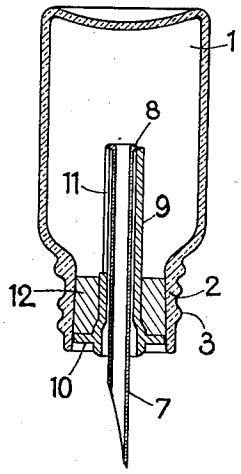


Fig. 3

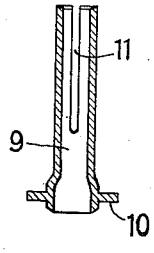


Fig. 4

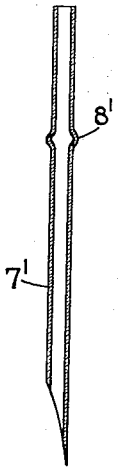
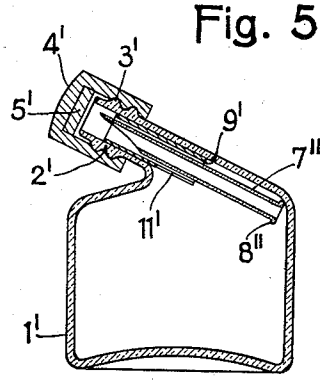


Fig. 5



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DROP DISPENSING VESSEL

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In Switzerland May 25, 1938

11 Claims. (Cl. 221—148)

This invention relates to vessels for delivering liquids, such as medicaments, flavorings, cosmetics and the like, in drops.

The prior art has produced numerous dropping bottles which, however, are defective in many respects.

It is an object of the present invention to provide a drop dispensing bottle that can be handled without the need of any particular skill, and which is especially adapted for use by invalids.

A further object of this invention is a bottle from which liquids may be discharged in drops, and in which the last drop will not adhere to the mouth of said bottle.

Another object of the invention is a bottle which cannot be clogged in the drop discharging portion by the crystallisation or solidification of liquid material remaining in the mouth of the bottle after the desired amount of liquid has been dispensed therefrom.

Still another object of the invention is a pocket bottle for the discharge of liquids in drops, the discharging part of which does not comprise projecting parts, such as a beak or a dropping point, which would make it impossible to close the vessel securely.

Still further objects of the invention will become readily apparent from the accompanying drawing and description.

The new dropping stopper is applicable to vessels of all kinds and comprises a small tube adapted to slide with slight play in a guide in the mouth of the vessel, which guide may advantageously be somewhat widened at its upper end, and which is adapted to be easily closed. When the vessel is closed, this tube is in such a position in the guide that it is completely within the vessel, and when the latter is inverted for delivering the liquid, the tube slides in its guide to protrude from the vessel as far as it is permitted by a stop. In this position liquid can flow between the guide and the tube, and down the outer surface of the protruding portion of the tube, finally dropping from the suitably chamfered end to fall in easily counted drops. The quantity of air corresponding to the liquid delivered flows easily through the bore of the tube into the vessel. Afterwards, when the container is returned to the normal position, the portion of liquid adhering to the exterior of the tube returns to the vessel, and the tube slides back into its original position without any loss of liquid.

The invention is illustrated by the accompanying drawing, which shows several embodiments of the invention.

Fig. 1 is a cross-section through a drop dispensing bottle closed by its cap.

Fig. 2 is a cross-section through a drop dispensing bottle while being used for discharging liquid.

Fig. 3 is a separate cross-sectional view of the guide of the bottle illustrated in Fig. 2.

Fig. 4 is an axial section through the guiding tube, and

Fig. 5 shows in cross-section a drop dispensing bottle having an inclined neck.

More particularly, Fig. 1 shows bottle 1 having an external screw thread 3 on its neck 2 to receive a correspondingly internally screw-threaded closing cap 4 containing a disc-shaped washer 5. The mouth of the bottle is a comparatively narrow tube, preferably enlarged at its upper end and serving as a guide 6 for a sliding tube 7. The tube 7 is longer than the guide 6, but slightly shorter than the height of the bottle, so that, when the bottle is closed or stands in an upright position, the tube is entirely contained therein. The end of the tube, which is in the upper end of the bottle standing in upright position, is chamfered, and the end of the tube, that is placed in the lower end of the bottle, is enlarged to form a stop 8, which prevents the tube from slipping out of the guide when the bottle is inverted. This stop 8 can be conveniently provided by heating the lower end of the tube to redness and letting it fall into the bottle whereby the end is enlarged.

Fig. 2 shows a different embodiment of the invention, namely a bottle in which the guide for the sliding tube comprises a separate part which is held in place by a suitable packing, for instance by a perforated cork or rubber stopper 12, or by cementing the guide in the neck 2 of the bottle. Fig. 3 shows a modification of the guide separate from the bottle. In Fig. 2 that end of the guide 9 which is at the upper end of the bottle when in upright position is at the same or at the higher level as compared with the mouth of the bottle, and is held in position by a flange 10 which rests on the packing 12, thereby reenforcing the mouth portion of the bottle. The upper end of the guide preferably is somewhat enlarged. Close to the lower surface of this packing 12 the guide has a lateral opening which may be a simple perforation or a slot 11, extending along the tube to the packing, as shown in Figs. 2 and 3, so that there is no dead space in the bottle, and that consequently the last residue of liquid may be delivered.

The stop 8 on the sliding tube 7 need not be at the end thereof. Fig. 4 shows a tube 7' in which the stop 8' is at some distance from the end of the

tube. This modification is suitable especially in a large vessel in order that the tube may not project too far from the vessel when liquid is being delivered and thereby be exposed to danger of breakage. The modification shown in Fig. 4 also serves the purpose of preventing the layer of liquid above the tube from becoming so high that the air cannot pass into the vessel through the tube.

Fig. 5 shows a modification of the bottle in which the neck is inclined. Parts 1' to 5', 7'', 8'' and 11' corresponding to parts 1 to 5, 7, 8 and 11 of Figs. 1 and 2. The guide 9' illustrated in Fig. 5 is a simple tube cemented into the correspondingly narrow neck of the bottle.

The guide tube may be made of any suitable material, for instance metal, glass, porcelain, synthetic resins and artificial material of any kind. It is advantageous to manufacture the device or some of its parts by molding or injection casting of plastic synthetic resinous material.

The constructions shown in Figs. 1, 2 and 5 are particularly suitable for drop dispensing vessels to be carried in the pocket. When liquid is to be withdrawn, the cap 4 or 4' is removed and the vessel is inclined downwardly, so that the tube 7 or 7'' slides down its guide 6 or 9 or 9' until checked by the stop 8 or 8''. The liquid now flows between the guide and the tube and along the latter until at the chamfered point it forms drops which can be conveniently counted, and does not drop in jerks as is the case with ordinary drop dispensers. At the same time the quantity of air corresponding to the liquid to be withdrawn enters the bottle through the tube 7 or 7'' so that uniform delivery from the bottle is assured. The last residue of the liquid in the bottle can flow through the space between the guide and the tube, and the bottle can be completely emptied. When the desired dose has been measured from the bottle, the latter is brought again into upright position whereupon the tube 7 or 7'' slides back into the bottle and completely disappears in the guide 9 or 9' so that no breakable portion remains projecting. The liquid still adhering to the dropping device returns to the tube as the latter slides back from the bottle, thereby avoiding stickiness or crusts. This feature is aided by the slight enlargement of the guide at its upper end.

The modification illustrated in Fig. 5 shows a suitable application of the operation out-lined above to a bottle the neck of which is at an angle to the longitudinal axis of the bottle. The sliding tube 7'' is inclined and held by the guide 9' against the inside of the bottle. This form of dropping vessel is more convenient to handle, since it is not necessary to tilt it at as great an angle as is the case with an ordinary bottle from which liquid is withdrawn.

The speed of delivery of the drops is easily adjustable by the amount of play permitted between the guide and the sliding tube. The greater this amount of play the greater the speed of delivery, and vice versa. A suitable choice of the amount of play also adapts the drop dispensing device for liquids of various viscosities.

What I claim is:

1. A drop dispensing vessel comprising a tube and a container with a tubular neck providing a single tube-like delivery opening, which serves as a guide for the tube adapted to slide within said guide, said tube having an oblique outer end and being provided with a stop interiorly of said outer end and being of sufficient length to remain in engagement with said guide when the vessel is in upright position.

2. A drop dispensing vessel comprising a tube and a container with a tubular neck providing a single tube-like delivery opening, which is enlarged at the outer end of the neck and which serves as a guide for the tube adapted to slide within said guide, said tube having an oblique outer end and being provided with a stop interiorly of said outer end and being of sufficient length to remain in engagement with said guide when the vessel is in upright position.

3. A drop dispensing vessel comprising a tube and a container with a guide fixed by a packing in the neck of the vessel, having a flange covering said packing and providing a single tube-like delivery opening which is enlarged at the outer end and serving as a guide for the tube adapted to slide within said guide, said tube having an oblique outer end and being provided with a stop interiorly of said outer end and being of sufficient length to remain in engagement with said guide when the vessel is in upright position.

4. A drop dispensing vessel comprising a tube and a container with a guide fixed by a packing in the neck of the vessel having a flange covering said packing and providing a single tube-like delivery opening which is enlarged at the outer end and having a lateral opening close to the lower surface of said packing and serving as a guide for the tube adapted to slide within said guide, said tube having an oblique outer end and being provided with a stop interiorly of said outer end and being of sufficient length to remain in engagement with said guide when the vessel is in upright position.

5. A drop dispensing vessel comprising a tube and a container with a tubular neck providing a single tube-like delivery opening, which is enlarged at the outer end of the neck and which serves as a guide for the tube adapted to slide within said guide, said tube having a stop at its lower end and having an oblique outer end and being of sufficient length to remain in engagement with said guide when the vessel is in upright position.

6. A drop dispensing vessel comprising a tube and a container with a guide fixed by a packing in the neck of the vessel, having a flange covering said packing, and providing a single tube-like delivery opening which is enlarged at the outer end and serving as a guide for the tube adapted to slide within said guide, said tube having a stop at its lower end and having an oblique outer end and being of sufficient length to remain in engagement with said guide when the vessel is in upright position.

7. A drop dispensing vessel comprising a tube and a container with a guide fixed by a packing in the neck of the vessel, having a flange covering said packing and providing a single tube-like delivery opening which is enlarged at the outer end and having a lateral opening close to the lower surface of said packing and serving as a guide for the tube adapted to slide within said guide, said tube having a stop at its lower end and having an oblique outer end and being of sufficient length to remain in engagement with said guide when the vessel is in upright position.

8. A drop dispensing vessel comprising a tube and a container with a tubular neck providing a single tube-like delivery opening, which is enlarged at the outer end of the neck and which

serves as a guide for the tube adapted to slide within said guide, said tube having a stop between its upper and lower end and having an oblique outer end and being of sufficient length to remain in engagement with said guide when the vessel is in upright position.

9. A drop dispensing vessel comprising a tube and a container with a guide, fixed by a packing in the neck of the vessel, having a flange covering said packing and providing a single tube-like delivery opening which is enlarged at the outer end and serving as a guide for the tube adapted to slide within said guide, said tube having a stop between its upper and lower end and having an oblique outer end and being of sufficient length to remain in engagement with said guide when the vessel is in upright position.

10. A drop dispensing vessel comprising a tube and a container with a guide fixed by a packing in the neck of the vessel, having a flange covering said packing and providing a single tube-like delivery opening which is enlarged at the outer end and having a lateral opening close to the lower surface of said packing and serving as a guide for the tube adapted to slide within said guide, said tube having a stop between its upper and lower end and having an oblique outer end and being of sufficient length to remain in engagement with said guide when the vessel is in upright position.

11. A drop dispensing vessel comprising a tube and a container with an inclined tubular neck being at an oblique angle to the longitudinal axis of said container and providing a single tube-like delivery opening, which is enlarged at the outer end which serves as a guide for the tube adapted to slide within said guide, said tube having a stop in the interior and having an oblique outer end and being of sufficient length to remain in engagement with said guide when the vessel is in upright position.

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