

Oct. 20, 1936.

2,057,745

S. SCHEYER, BORN VON PEZACHOWICZ ET AL

LIQUID CONTAINER

Filed April 24, 1935

3 Sheets-Sheet 1

Fig. 1

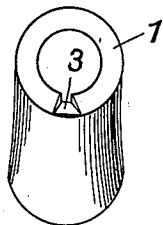


Fig. 2

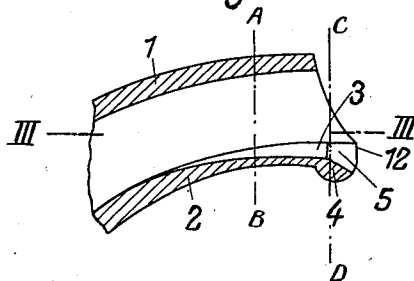


Fig. 4

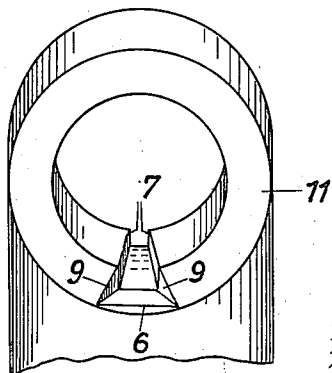


Fig. 3

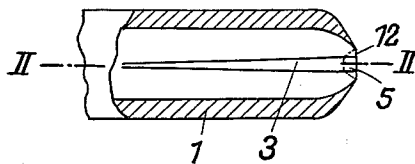


Fig. 5

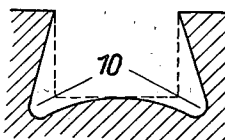


Fig. 6

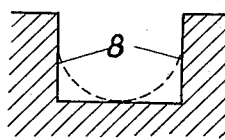


Fig. 7

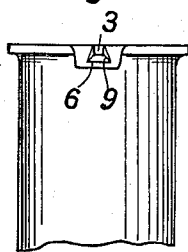


Fig. 8

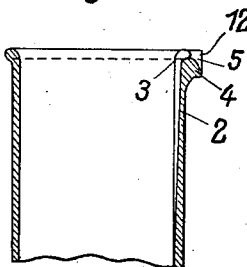
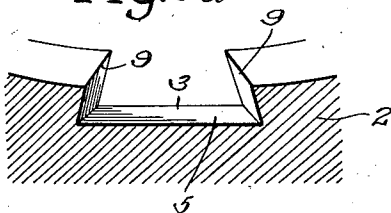


Fig. 6a



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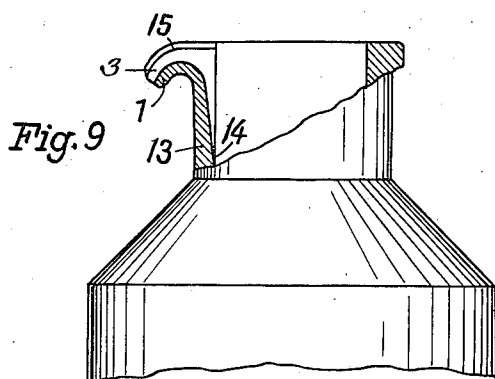


Fig. 10

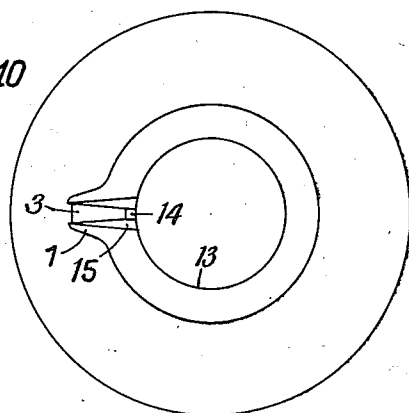
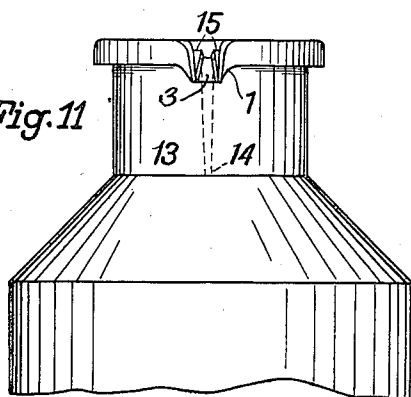


Fig. 11



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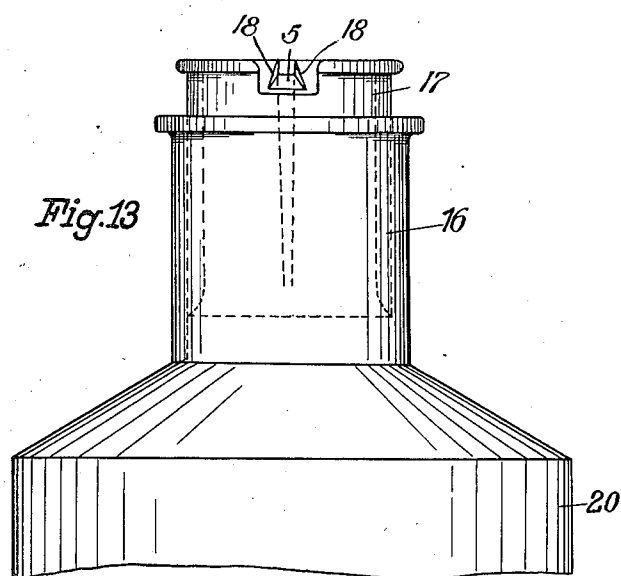
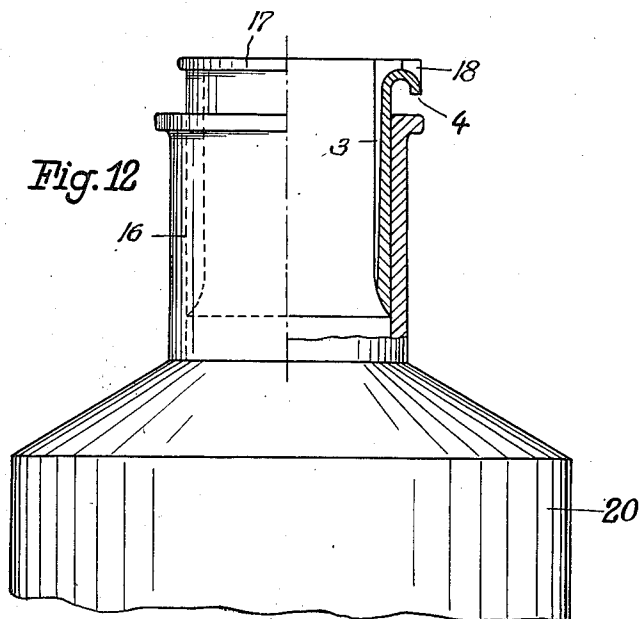
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S. SCHEYER, BORN VON PEZACHOWICZ ET AL

LIQUID CONTAINER

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3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE

2,057,745

LIQUID CONTAINER

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Application April 24, 1935, Serial No. 18,012
In Germany April 24, 1934

7 Claims. (Cl. 215—31)

This invention relates to liquid containers having pouring means for regulating the outflow of liquid, for example, for preventing the escape of drops after a liquid has been poured out or for dispensing the liquid from the container.

Liquid containers in which a spout has pouring means provided with a capillary groove widening or enlarging in the direction in which pouring occurs are already known.

The object of the invention is to provide a liquid container with improved pouring means of this type by making the uppermost part of the groove substantially semi-circular from inside to outside of the pouring means. The inner end of the capillary groove adjacent the semi-circular part is made deeper according to the invention than the outer end of the enlarged capillary groove.

The enlarging capillary groove in the pouring means according to the invention terminates at the outer end in an enlargement with the formation of corners, for example, a hemispherical or similar hollow space disposed in the pouring means.

Further, according to the invention the groove is funnel-shaped and is substantially enlarged in dove-tail fashion at the front end disposed in the lip of the spout.

A further important feature of the present invention is that another groove is provided above the groove which enlarges in the pouring direction, said further groove becoming narrower in a direction opposite to that of the first-mentioned groove in the pouring means.

According to another feature of the invention an insert is provided for liquid containers not provided with pouring means, for example, for bottles for containing chemicals or the like, such insert having pouring means according to any one of the embodiments of the invention.

Further features of the invention will be hereinafter referred to with reference to the accompanying drawings in which several forms of the invention are illustrated by way of example.

Fig. 1 is a front elevation of the spout of a can.

Fig. 2 is a longitudinal section taken on the line II—II of Fig. 3.

Fig. 3 is cross-sectional view taken on the line III—III of Fig. 2.

Fig. 4 shows the edge of the spout on an enlarged scale.

Fig. 5 illustrates the method of forming the interior channel prior to becoming set, the figure being a section on the line A—B of Fig. 2.

Fig. 6 shows the shape after setting has occurred, the figure being a section on the line A—B of Fig. 2. Figure 6a is a cross-sectional view taken on the line C—D of Figure 2 on a larger scale.

Fig. 7 shows a modification of the invention applied to a measuring cylinder.

Fig. 8 shows the embodiment according to Fig. 7 in section, it being clearly indicated that the shape of the capillary groove at the highest part in the pouring means is substantially semi-circular in an outwardly extending direction.

Fig. 9 shows a side elevation of a bottle partly in section and embodying a further feature of the invention.

Fig. 10 is a plan view of the bottle according to Fig. 9 and clearly showing how two superposed grooves enlarge in opposite directions.

Fig. 11 is a front view of the bottle according to Fig. 9.

Fig. 12 shows a bottle serving, for example, for containing chemicals, an insert having a groove according to the invention being fitted in the neck of the bottle.

Fig. 13 shows a front elevation of the bottle and pouring means according to Fig. 12.

A groove 3 of funnel shape is provided in the under part of a spout 1 and widens outwardly, i. e. in the direction in which pouring of the liquid occurs. In the preferably thickened forward end 4 of the under part of the spout 2 the groove 3 is enlarged as indicated at 5. The groove 3 as illustrated in cross section in Fig. 6 throughout the rear part has sharp corners and is of U-shape. Its front part is enlarged in dove-tail fashion so that the base 6 is larger than the distance of the crown 7, and the funnel-like configuration of the groove suddenly terminates at the forward part of the lip in an enlargement, the walls 8 of the groove no longer being vertical but in consequence of the dove-tail formation being inclined laterally or undercut as shown at 9 in Figures 4, 6a and 7. The base line 6 is so formed that it follows as close as possible the outer edge 11 of the lip of the spout. In order to obtain a particularly sharp cornered groove it is preferable to make it oversized when the article is in the soft state so that the side parts 10 are deeper but when the container sets or becomes hard the side parts become adjusted and receive the desired shape shown in Fig. 6.

In Fig. 9 a further modification of the invention is illustrated and is particularly adapted for the discharge of very fine doses from the bottle. In such containers for regulating the out-

flow so as to permit the delivery of very small and uniform drops, as distinct from preventing the subsequent escape of drops, it has proved necessary for the surface tension of the liquid in relation to the cohesion of the drop to be greater one time and smaller another time. When the force of adhesion of the drop is high the latter remains in the container and discharge is prevented. The reverse is the case when the cohesion of the drop is greater than the adhesion. In order to attain this the liquid must be supplied for delivery as drops in the smallest quantities. In consequence a special supply groove must be provided which is smaller than the complete outflow orifice proper but which is larger than the groove in order to overcome the adhesion thereof. Preferably the two grooves are provided above one another so as to be of stepped formation in cross section. The groove for the backflow of the drops is deeper than the other upper groove which is wider in cross section than the former. That is, the upper groove which does not extend to the end of the bottle neck is funnel-shaped and only permits the supply of liquids in very small or minute quantities.

In known manner the pouring lip 1, Fig. 9, is provided on the neck of the bottle and the groove 3 for the back-flow of the drops is cut or pressed in the lip. The groove shown in Fig. 9, 10 or 11 terminates at the bottom of the bottle neck 13 in a flat mouth 14. The groove 14/3 enlarges outwardly like a funnel. This funnel-shaped groove can be made more effective at the lip 1 in a particularly favourable manner by providing above it a second groove 15. This groove 15 is also of funnel-shape but it narrows in the direction in which pouring occurs. This is clearly shown in Fig. 10. The groove 15 is located above the groove 3 so that both grooves have the stepped formation illustrated in front view in Fig. 11.

A particularly advantageous arrangement is illustrated in Figs. 12 and 13 in which an insert is provided for containers or bottles which are not themselves provided with pouring means. Ordinary bottles without pouring means are used for containing liquids, for example in chemists' shops, laboratories and the like. With such containers it is possible to prevent the escape of drops after a pouring operation by providing an insert in the form of a stopper in the neck thereof, said stopper having a capillary groove constructed as hereinbefore described. Such a stopper, apart from preventing the escape of drops, affords the further advantage that by properly tilting the container a predetermined number of drops can be discharged slowly and uniformly.

Figs. 12 and 13 illustrate how the tubular stopper 17 is inserted in the neck 16 of a bottle 20. In the case of ground bottles the stopper can be ground on its outer surface and may be made conical. It may even be cemented in the neck of the bottle should this be necessary. The tubular stopper 17 has a mouth 4 which is ground flat at the front as indicated at 18. This part terminates the sharp cornered groove 3 which is rectangular in cross section and which enlarges

outwardly in funnel-shape. This groove can be formed in any desired manner. The mouth of the groove is enlarged at its outer end 5 in funnel-shape. The tubular insert can be closed by a stopper. It may also be made completely closed except for a spout shaped mouth 4 in which case a closure stopper is not required.

Fig. 12 clearly shows that the highest part of the groove is substantially semi-circular in shape in the direction in which pouring occurs.

The liquid pouring means having a capillary groove shaped according to the invention can be provided in all liquid containers made of any material such as glass, porcelain, whiteware, Fayence, metal and the like. It has been shown that the device according to the invention is particularly suitable for delivering drops of uniform size or doses of lighter or heavier liquid as well as for preventing the escape of lighter or heavier liquid from a container after a pouring operation.

What we claim is:—

1. A liquid container including pouring means having a funnel-shaped capillary groove which widens towards the outflow orifice and terminates in a portion which is of undercut shape in transversal cross section.

2. A liquid container including pouring means having a capillary groove which widens towards the outflow orifice and terminates in a part of semi-circular shape in longitudinal cross section and of under-cut shape in transversal cross section.

3. A liquid container including a delivery spout having a capillary groove which widens towards the outflow orifice and terminates in a dovetail portion the base line of the outermost or lowermost cross section of which substantially coincides with the outermost or lowermost edge of the spout.

4. A liquid container including pouring means having a first capillary groove which widens towards the outflow orifice and an additional substantially capillary groove which is situated above said first capillary groove and narrows towards the outflow orifice.

5. Pouring means adapted for use with a liquid container, said means having a funnel-shaped capillary groove which widens towards the outflow orifice and terminates in a portion which is of dove-tail shape in transversal cross section.

6. A delivery spout adapted to be inserted in a liquid container, said spout having a capillary groove which widens towards the outflow orifice and terminates in a dove-tail portion the base line of the outermost or lowermost cross section of which substantially coincides with the outermost edge of the spout.

7. Pouring means adapted to be inserted in a liquid container, said means having a first capillary groove which widens towards the outflow orifice and an additional capillary groove which is situated above said first capillary groove and narrows towards the outflow orifice.

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