March 15, 1955 O. UXA 2,704,174

DROP CATCHING DEVICE FOR POURING LIQUIDS

Filed Jan. 8, 1953

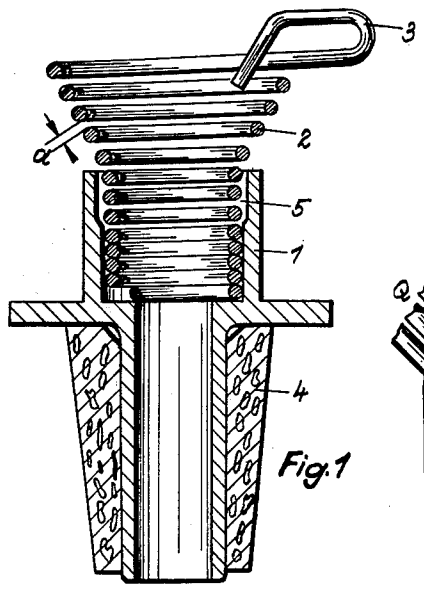


Fig.1

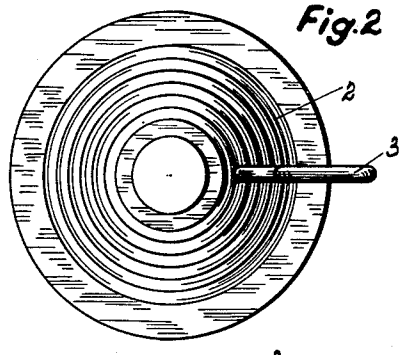


Fig.2

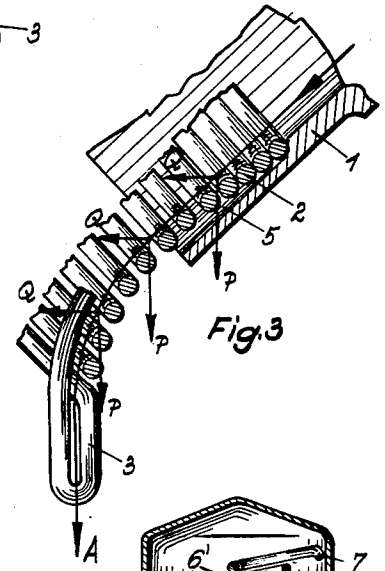


Fig.3

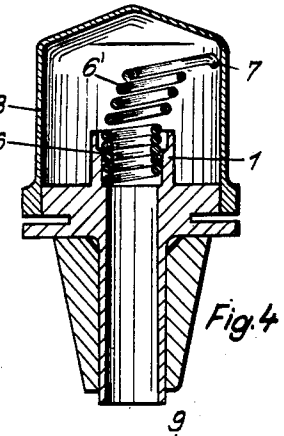


Fig.4

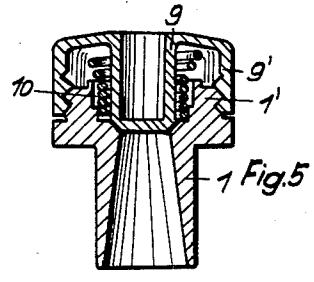


Fig.5

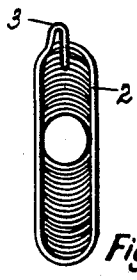


Fig.6

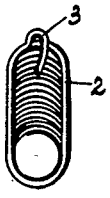


Fig.7

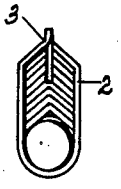


Fig.8

Oskar Uxa, INVENTOR.

BY Maxwell E. Parker

ATTORNEY

United States Patent Office 2,704,174 Patented Mar. 15, 1955

2,704,174

DROP CATCHING DEVICE FOR POURING LIQUIDS

Oskar Uxa, Vienna, Austria, assignor to Eduard Haas, Muhlbach, Attersee, Austria

Application January 8, 1953, Serial No. 330,311

Claims priority, application Austria January 23, 1952

7 Claims. (Cl. 222—571)

The invention relates to a drop catching device for pouring liquids, comprising a coil guiding the liquid, and is intended more particularly for use with thin liquids, especially liquids which are volatile or contain volatile substances. Liquids of this type include alcoholic liquids of low viscosity, such as brandy, as well as alcohol, benzine, and the like.

Hence, it is a main object of the invention to provide a drop catching device to be mounted on bottles and similar containers, which gives good service particularly when used for liquids of low viscosity.

It is another object of the invention to provide a drop catching device of this type which may be used particularly for volatile substances.

It is another object of the invention to provide a drop catching device which provides for an automatic return of residues of liquid into the vessel on which it is mounted, after the pouring has been finished.

Finally it is an object of the invention to provide a device for pouring liquids which is provided with a liquid guide to enable pouring of the liquid without spilling even into small vessels.

For guiding the liquid the device embodying the invention uses a coil, generally described as a wire laid in flat turns.

It has been found that a drop catching device comprising a coil, which functions, i. e., catches drops, most safely and properly independently of the viscosity and other properties of the liquid, is obtained when the liquid guide coil is of such shape that the inner peripheral surface of the several turns leads away from the axis of the coil at least in that portion where it guides the liquid, said part of the peripheral surface having the general form of a downwardly curved trough while the liquid is being poured.

Several embodiments of the present drop catcher are shown in the schematic drawings and some additional features of the invention will be discussed with reference thereto.

In the schematic drawings

Fig. 1 is a vertical sectional view of a device embodying the invention,

Fig. 2 is a plan view thereof,

Fig. 3 a diagram to illustrate the function of the device embodying the invention,

Fig. 4 a vertical sectional view showing a modified embodiment,

Fig. 5 a vertical sectional view of another modified embodiment, and

Figs. 6 to 8 show several forms of coils suitable for the purposes of the invention.

In Figs. 1 and 2, **1** is a hollow body, suitably formed of metal or plastics, in which the coil **2** is inserted, e. g. as a friction fit. The several turns of the coil increase toward the top in diameter and as regards their small spacing *a*. The end of the coil is formed into a pouring lip **3**, which has a guiding effect on the liquid. This lip is not essential. It has been found, however, that when the bottle is erected this lip will return the drop remaining on the pouring device into the interior thereof in a particularly reliable manner. A packing member **4**, suitably of cork, is pushed on the downwardly extended part **1**. The entire device should be assumed inserted in the neck of a bottle, which is not shown.

A gutter **5** may be formed in the upper part of the body **1** holding the coil. This gutter should be of a

width so small that when the bottle provided with the pouring device is tilted the liquid entering the gutter will not flow out of the latter to reach the rim of the coil along the outside thereof, but will remain in the gutter under the influence of capillary forces, to return into the interior of the bottle later. For this purpose the several turns of the coil are also slightly spaced in the region of the gutter.

As the bottle is discharged several times, the gutter **5** will fill with liquid to an increasing extent. As a result the lower part of the annular body of liquid thus formed will come under a hydrostatic pressure excess whereby the liquid is caused to pass between the turns into the interior of the bottle. Hence, the gutter **5** can never be overfilled. The proper width of the gutter depends on the nature of the liquid. For alcoholic liquids of low viscosity, such as gin, a gutter less than 0.5 mm. wide is recommended.

Whereas the physical causes of the satisfactory function of a device thus constructed cannot be described with assurance, a tentative explanation will be given with reference to Fig. 3, in which a part of the embodiment shown in Figs. 1 and 2 is represented in pouring position, all details not necessary for this explanation being omitted.

It is apparent that the spacing between the several turns of the coil, and the diameter thereof, increase toward the extreme turn to form a kind of funnel, in which the liquid is guided to its widest part. The liquid-wetted part of this funnel forms a trough much more highly adapted to the natural trajectory of any liquid jet, i. e., the parabola, than would be possible in the case of strictly cylindric coils.

Hence, the liquid will flow past the several turns of the coil **2** approximately in the direction of the arrow A and it is apparent that two major forces will act on every liquid particle: Gravity (P) and a lateral component (Q), the magnitude of which increases with the velocity and the directional change of the downflowing liquid. This lateral component can be considered a centrifugal force due to the curvature of the path of the liquid. In any case the component Q will be negligibly small. It is recognized that the passage of liquid drops through the coil, as is observed in cylindric-coil drop catchers when used with low-viscosity liquid, is caused by the force P. In this case such passage of drops is eliminated because the spacing of the turns increases only gradually and reaches a magnitude sufficient for a passage of drops only when the direction of P is substantially coincident with the direction of flow of the liquid. This makes it also clear that the performance of a cylindric coil may be improved by a mere tapering of the coil.

When the device is returned into the position shown in Fig. 1, the rest of liquid remaining on the device when the liquid thread has been broken will enter the interior of the bottle in the opposite direction and will again pass over the spacing between the several turns owing to the surface tension of every liquid. The last drop, the catching of which is a particular object of the present device, is safely drawn over the extreme rim of the coil. The presence of the lip **3** obviously improves that effect whereas the same is ensured to a sufficient extent also without such lip. That effect is so pronounced that the gutter **5** is not essential; it is recommended only for highly wetting liquids of very low viscosity. As stated above, the gutter **5** is of very small width. A drop entering it will be retained therein when the bottle is inclined once more, as has been described hereinbefore.

Whereas a roughly funnel-shaped coil is suggested according to the embodiments of Figs. 1 and 2, though the reference to the funnel is not to be understood as restricting the invention to a conical coil, Fig. 4 shows an embodiment obtained by the deformation of a generally cylindric coil **6**. The lower portion of that coil is fitted in the tube portion **1**, whereas the upper portion **6'** has been obtained by a deformation effected at an oblique angle to the axis of the device and combined with a moderate elongation. In this case too the pouring lip **7** is not essential. This illustration also

shows a possibility of mounting a closing cap **8** over the entire device for sealing it when out of use.

Fig. 5 shows an embodiment in which the closing cap **9** forms in the carrier **1** a tapered closure, which by means of the screw thread **9'**, **1'** can be forced against a correspondingly shaped seat formed in the carrier **1**. In this case the spring guiding the liquid has the shape apparent from Fig. 1, though without pouring lip. It should be considered received in the space **10**, but has not been shown, for the sake of clearness.

Figs. 6 to 8 show modifications of the coil according to Figs. 1, 2. They reside in that the coils **2** (the rest of the device is not shown) have been pressed flat laterally to give them the shape of a beak. Fig. 6 shows a double beak, Fig. 7 a single beak, in both cases with round, liquid guiding inner peripheral surfaces. According to Fig. 8 the single beak has a wedge-shaped guide surface for the liquid. The pouring lip **3**, different forms of which are shown in Figs. 6 to 8, can be eliminated.

I claim:

1. A drop catching device for pouring liquids from bottle-type containers, comprising a coil having a liquid guiding portion which forms in liquid pouring position a downwardly curved trough with an inner peripheral surface leading away from the coil axis in the liquid pouring direction, and a part defining with the outer peripheral surface of the coil a gutter spaced from the outer end of the coil, the width of said gutter between said part and said coil being sufficiently small to hold any liquid entering the gutter by capillary force when the device is inclined.

2. A drop catching device for pouring liquids from bottle-type containers, comprising a coil having a liquid guiding portion which forms in liquid pouring position a downwardly curved trough with an inner peripheral surface leading away from the coil axis in the liquid pouring direction, said coil being formed at its outer end with a bail portion having an inwardly directed end and adapted to return a drop to be caught.

3. A drop catcher for the pouring of liquids from a container having a spout comprising a coil having a cylindrical base portion receivable in said spout and a pouring portion extending outwardly beyond said spout upon insertion of said base portion in said spout, said pouring portion being provided with an inner peripheral liquid-guiding surface curving away from the axis of said base portion.

4. A drop catcher according to claim 3, wherein said pouring portion comprises a succession of turns of substantially the same diameter as said base portion but progressively offset from the latter.

5. A drop catcher according to claim 3, wherein said pouring portion comprises a succession of turns of progressively increasing diameter.

6. A drop catcher according to claim 3, wherein said pouring portion comprises a succession of flattened turns of substantially constant width but progressively increasing elongation.

7. A drop catcher for the pouring of liquids from a container having a spout, comprising a coil having a cylindrical base portion receivable in said spout and a pouring portion extending outwardly beyond said spout upon insertion of said base portion in said spout, said base portion comprising a succession of contiguous turns, said pouring portion comprising a succession of spaced turns defining an inner peripheral liquid-guiding surface curving away from the axis of said base-portion.

References Cited in the file of this patent

UNITED STATES PATENTS

53,655	Myers	Apr. 3, 1866
1,628,106	Booty	May 10, 1927
1,816,141	Booty	July 28, 1931