Jan. 14, 1947. R. E. BRUCKNER 2,414,138

NEEDLE FOR FILLING RECEPTACLES

Filed March 6, 1942

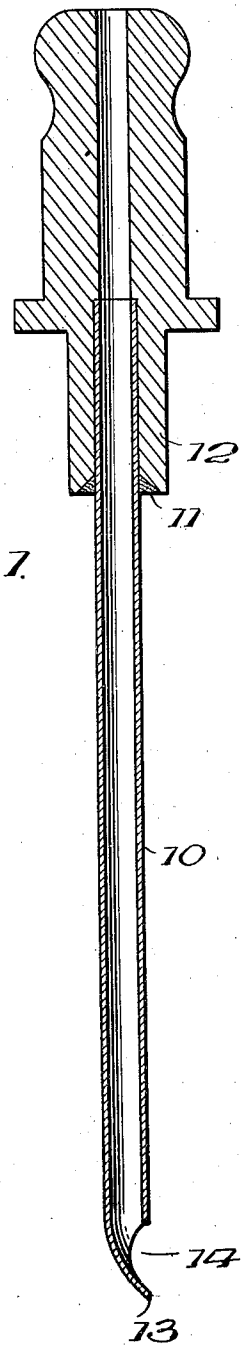


Fig. 1.

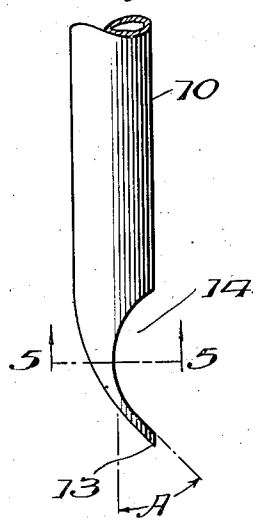


Fig. 2.

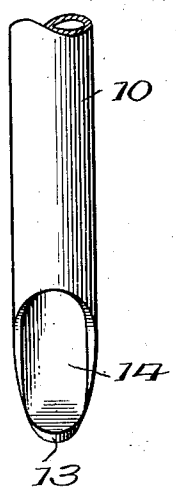


Fig. 3.

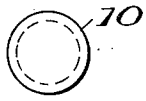


Fig. 4.



Fig. 5.

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Patented Jan. 14, 1947

2,414,138

UNITED STATES PATENT OFFICE

2,414,138

NEEDLE FOR FILLING RECEPTACLES

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Application March 6, 1942, Serial No. 433,683

2 Claims. (Cl. 226—93)

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The present invention relates to nozzles for filling receptacles with liquids. In filling some types of receptacles, such as glass ampoules, care must be taken to avoid splashing and foaming. The nozzles for filling these receptacles are usually hollow needles having relatively small discharge openings. If the needle has an end opening discharging liquid axially therefrom, the liquid is directed toward and against the bottom of the receptacle. This results in a back splash and foaming, the outer surface of the needle being thereby wet so that, upon withdrawal of the needle from the neck of the receptacle, it is quite likely that globules of the liquid clinging to the needles will be deposited on the inner surface of the receptacle neck. If and when the neck is subsequently flame sealed, these globules will be dried or burned, leaving an unsightly deposit on the glass receptacle neck. If the deposit is carbonized, the deposits will be black.

To obviate the difficulties referred to, some filling needles are closed at their discharge end, but provided with openings on both sides of the needle to discharge liquid laterally against the side wall of the receptacle. These openings are, of course, quite small and, while splashing is minimized, they cause excessive foaming. At the same time there is a tendency for liquid to cling to the outer surface of the needle and some of it will flow toward the lower end of the needle, thus forming a pendant drop at that end of the needle, which does not cover both openings.

It is customary when filling small mouth receptacles such as ampoules with needles of the type referred to herein to employ suction immediately after the desired quantity of liquid has been supplied to the receptacle through the needle. This is done to remove the last drop of liquid in the discharge opening to prevent wetting of the ampoule neck. As stated hereinbefore, pendant drops cling to the needle, leaving an open gap through one or both side wall openings so that suction in the needle does not remove the pendant drop. Instead, air is drawn through the discharge opening.

One of the objects of the present invention is the provision of a novel form of needle having an opening designed to discharge liquid angularly with respect to the axis of the needle without danger of excessive foaming.

Another object of the invention is so to proportion the size and shape of the discharge opening that the last drop of liquid clinging thereto is held within the area of the opening and a pendant drop is thus avoided.

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Other objects will be apparent from the following description of the invention, reference being had to the accompanying drawing, in which—

Fig. 1 is a longitudinal section through a preferred form of filling needle embodying the principles of the present invention;

Fig. 2 is an enlarged fragmentary side elevation of the discharge end of the needle;

Fig. 3 is an enlarged fragmentary front elevation of the discharge end of the needle;

Fig. 4 is an end view of the needle shown in Figs. 2 and 3; and

Fig. 5 is a section taken on line 5—5 of Fig. 2.

Referring to the drawing, the filling needle 10 is inserted and sealed as at 11 in a coupling 12 to which a connector hose (not shown) is attached, the hose in turn being connected to a filling pump or the like for supplying liquid to the needle. The diameter of the needle is relatively small, but may vary depending on the size of the ampoule. As examples it may be said that the outer diameters of three sizes of needles are approximately .049, .072, and .105 inch, respectively.

As will be seen in Figs. 1 and 2, the discharge end of the needle is curved or spoon-shaped. The preferred method of so forming the discharge end of the needle is to bevel the end of the tubular needle and then bend the resulting end portion until the tip 13 of the needle is in alignment with the side of the needle diametrically opposite the original plane in which this tip was disposed. The end view of the needle will then appear as in Fig. 4, that is, it will be solid but its projected area will correspond to a transverse cross-section of the tube. The discharge opening 14 thus provided is substantially elliptical or oval with curved edges and its projected length is approximately twice that of its width. The angle A at which the discharge tip or terminal deflector is downwardly inclined with respect to the axis of the needle may vary somewhat, but, as shown in Fig. 2, it is approximately 45°. The size and shape of the opening 14 is so related to the drop of liquid at the discharge end of the needle that the drop is held by surface tension and so fills the opening that there is no pendant excess but the drop completely covers the opening to prevent air from entering the tube upon the application of suction thereto. The dimensions of the opening may vary not only in respect to the diameter of the needle, but also to meet the different viscosities of various liquids. A relatively viscous liquid, for instance, requires a discharge opening somewhat larger than a free flowing

liquid. Nevertheless, the general characteristics of the size and shape of the opening remain the same for all types of liquids, that is, the opening is larger than the cross-sectional area of the tube passage. Also, the bent tip end of the needle should be displaced a distance approximately equal to the diameter of the needle and in no case extend beyond the projected wall of the needle so that there is no interference with insertion of the needle in a relatively small mouth by a lateral protrusion on the needle.

While the invention has been described in some detail, it is to be understood that it is to be limited only by the broad meaning of the appended claims.

What is claimed is:

1. A filling nozzle comprising a tube having an axial bore, said tube having an opening in a side wall thereof, said tube further having a portion at its terminal discharge end extending across the entire width of said bore to prevent axial discharge through said bore, said opening extending to said terminal discharge end of the tube, said terminal end having no appreciable thickness below said opening.

2. A filling nozzle comprising a tube having an axial bore, said tube having an opening in a side wall thereof, said tube further having a portion at its terminal discharge end extending across the entire width of said bore to prevent axial discharge through said bore, said portion being inclined downwardly toward the side having the opening, said opening extending to said terminal discharge end of the tube and being larger in area than the transverse area of said bore, said terminal end having no appreciable thickness below said opening.

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