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2,687,838

AMPOULE FILLING DEVICE

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2 Sheets-Sheet 2

FIG. 3.

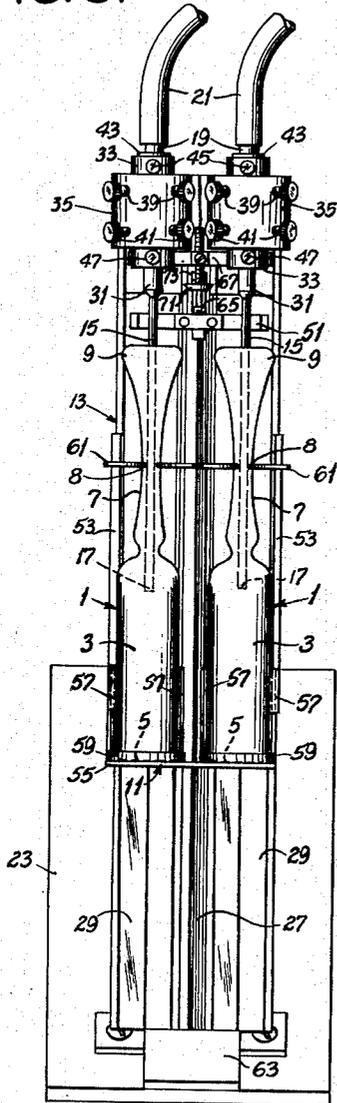


FIG. 6.

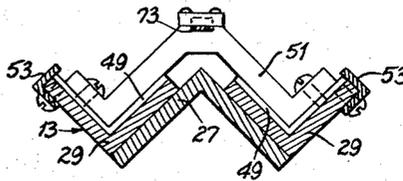


FIG. 7.

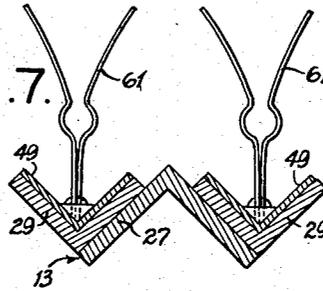


FIG. 8.

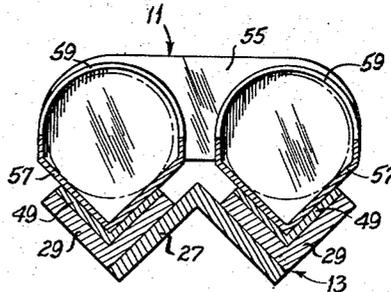
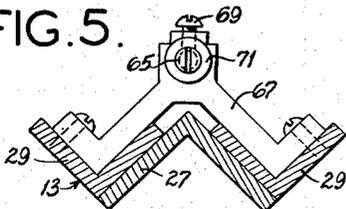


FIG. 5.



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UNITED STATES PATENT OFFICE

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AMPOULE FILLING DEVICE

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9 Claims. (Cl. 226—93)

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This invention relates to ampule filling devices, and more particularly to devices for use in filling glass ampules of the type having a neck, the neck having an intermediate narrow section, the ampule being hermetically sealed after it has been filled by flame-sealing the neck.

The object of the invention is the provision of a device for facilitating the filling of necked ampules by enabling an ampule easily and quickly to be accurately positioned in aligned relation with respect to an ampule filling needle, and then quickly moved into a filling position wherein the needle extends completely through the neck of the ampule with its discharge end entered within the body of the ampule. This enables necked ampules to be filled quickly without wetting the inside of the necks. This avoids the possibility of there being any charred spots in the necks of the ampules which would occur upon flame-sealing if their necks were wet on the inside in the region of sealing.

In general, an ampule filling device of this invention comprises an inclined track and an ampule filling needle carried by the track extending downward in cantilever fashion from the upper end of the track above and generally parallel to the track. The needle is supported for universal adjustment of the position of its axis. The needle has a discharge opening at its lower end, and its upper end is adapted for connection of the supply tube leading from the outlet of a pump for dispensing a liquid with which the ampules are to be filled. A carriage adapted to hold a necked ampule with the neck extending upward in accurate alignment with the needle is slidable on the track between a lower retracted position, wherein an ampule may be placed on the carriage, and a raised filling position, determined by engagement of the carriage with a stop on the track, wherein the needle extends completely through the neck of the ampule with the lower discharge end of the needle entered in the body of the ampule. Other features will be in part apparent and in part pointed out hereinafter.

The invention accordingly comprises the elements and combinations of elements, features of construction, and arrangements of parts which will be exemplified in the structures hereinafter described, and the scope of the application of which will be indicated in the following claims.

In the accompanying drawings, in which one of various possible embodiments of the invention is illustrated,

Fig. 1 is a view in side elevation of an ampule

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filling device embodying the invention, a carriage thereof being shown in retracted position;

Fig. 2 is a view of Fig. 1 as viewed from the line 2—2 of Fig. 1, parts being shown in section;

Fig. 3 is a view similar to Fig. 2, illustrating the carriage in filling position;

Fig. 4 is an enlarged section taken on line 4—4 of Fig. 1;

Fig. 5 is an enlarged section taken on line 5—5 of Fig. 1;

Fig. 6 is an enlarged section taken on line 6—6 of Fig. 1;

Fig. 7 is an enlarged section taken on line 7—7 of Fig. 1;

Fig. 8 is an enlarged section taken on line 8—8 of Fig. 1; and,

Fig. 9 is a fragmentary view illustrating how an ampule filling needle extends through the neck of an ampule in filling position.

Similar reference characters indicate corresponding parts throughout the several views of the drawings.

The drawings illustrate a preferred embodiment of the invention for simultaneously filling two long-necked ampules 1 of the type shown in solid lines in Figs. 3 and 9 and in dotted lines in Fig. 1. As illustrated, each ampule, made of glass, consists of a cylindrical body 3 having a flat bottom 5 and a long neck 7. Adjacent the body 3, the neck is narrow, then develops sharply into a wider section, then tapers toward a narrow intermediate section 8 where it is to be flame-sealed. From the narrow section 8, the neck flares out to its upper open end 9. Ampules of this type, as supplied by the manufacturer, are not always uniform. In some instances the diameter of the neck or the body may vary, or the axis of the neck may not coincide with the axis of the body. For example, the neck may be inclined with respect to the axis of the body, or parallel to but offset from the axis of the body. This invention provides a device for filling these ampules which makes it possible accurately to align the neck of an ampule with a filling needle and to move the ampule into filling position wherein the needle extends completely through the neck in such manner as to avoid any possibility of wetting the narrow section 8 of the neck of the ampule, taking into account the possibility of non-uniformity of ampules.

In general, the embodiment of the invention shown in the drawings comprises a carriage or slide 11 for holding two ampules side-by-side. The carriage is slidable up and down on an inclined track generally designated 13. A pair of

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ampule filling needles 15, of smaller diameter than the minimum inside diameter of the neck in its narrow section 8, are carried by the track at its upper end, and extend downward in cantilever fashion from the upper end of the track above and generally parallel thereto. Each needle has a discharge opening 17 at its lower end. The upper ends 19 of the needles are adapted for the connection thereto of supply tubes 21 connected to a pump (not shown) for dispensing the liquid with which the ampules are to be filled.

More particularly, the device illustrated in the drawings comprises a stand consisting of a horizontal base plate 23 and a vertical post 25 extending upward from the base plate adjacent its rearward end. The track 13 comprises an angle bar 27 mounted in inclined position extending from adjacent the forward end of the base plate over the upper end of the post. A pair of V-shaped angle bar rails 29 are mounted side-by-side on the bar 27. The inclination of the rails is preferably about 45°. As shown, the bar 27 is inverted so that its legs are downwardly divergent, and the rails 29 are mounted on the outer sides of the legs of the bar 27 with their legs upwardly divergent.

Each needle 15 has an enlarged portion 31 adjacent its upper end which is slidably fitted in a sleeve 33 (see Figs. 2 and 4). At the upper ends of the rails 29 are open-ended cylinders 35 mounted side-by-side with their axes parallel to and above the rails. The cylinders are cradled in and secured to V-shaped spacers 37 fixed in the rails at their upper ends. The sleeves 33, carrying the needles 15, are adjustably held in position in the cylinders by upper and lower series of set screws 39 and 41, respectively, threaded radially in the cylinders at approximate 120° intervals, thereby providing two adjustable three-point mountings for each needle spaced axially along the length of the needle. This enables each needle to be universally adjusted to extend parallel, or at least substantially parallel, to its respective rail, and at different distances from the rail. Each needle has a collar 43 abutting the upper end of the respective sleeve, and is fixed in the sleeve by set screws 45 and 47 threaded in the sleeve above and below the respective cylinder 35.

The carriage 11 comprises a pair of V-shaped slides 49 slidably in the V-shaped rails 29. The V-shaped slides 49 are held together adjacent their upper end by a bridge member 51, and are retained in the rails by angle clips 53 (see Figs. 1, 2 and 6). At their lower ends, the slides are held together by a bottom plate 55 in a plane at right angles to the rails. Fixed in the slides 49 adjacent their lower ends are V-shaped cradles 57 each having a narrow arcuate rim 59 abutting and secured to the plate 55. The cradles are V-shaped to hold the cylindrical bodies 3 of the ampules with the necks of the ampules extending generally parallel to the track, and with the bottoms of the ampules retained within the rims 59 in engagement with the bottom plate 55. Each slide 49 is provided with a centering member 61 for supporting the narrow section 8 of the neck of any ampule in a laterally and vertically centered position as regards the carriage and the track. Preferably, member 61 is a spring clip, as illustrated, for receiving the narrow section 8 of the neck of any ampule and releasably gripping the neck. This arrangement insures that the narrow section 8 of the neck of any ampule is

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located in the same laterally and vertically centered position as the narrow section of the neck of any other ampule, despite variations in the ampules as above mentioned. This is important to assure substantial concentricity of the narrow sections of the necks of all ampules with the filling needles 15, so that the needles may pass centrally through the narrow sections without touching the glass. The needles are adjusted by means of set screws 39 and 41 to secure axial alignment thereof with the narrow sections of the necks of the ampules mounted in the carriage.

The carriage 11 is manually slidable on the track 13 between the lower retracted position illustrated in Figs. 1 and 2, and the raised filling position illustrated in Figs. 3 and 9. The lower retracted position of the carriage is determined by the engagement of its bottom plate with a lower stop 63 on the base plate. The raised filling position of the carriage is determined by engagement of the bridge member 51 of the carriage with an upper stop 65 adjustably mounted on the track. The stop 63 is spaced from the lower discharge ends of the needles 15 a distance measured along the inclined track somewhat greater than the length of the ampules to be filled, so that when the carriage is retracted, it is clear of the needles so that ampules may be placed therein. When the carriage is in retracted position, the stop 63 is spaced from the bridge member 51 a distance measured along the track greater than the length of the neck of the ampule to the extent that when the carriage is moved to filling position, the needles will extend completely through the necks of the ampules with their lower discharge ends entered in the cylindrical bodies 3 of the ampules. Stop 65 comprises a screw adjustably threaded in a bridge member 67 secured to the rails adjacent the lower ends of the cylinders 35 (see Figs. 1, 2, 3 and 5). The stop or screw 65 extends parallel to and above the track. It is retained in adjusted position by a set screw 69, and provided with a collar 71 acting as a detent in conjunction with a spring latch 73 carried by the bridge member 51 of the carriage, the latch engaging the detent releasably to hold the carriage in its raised filling position. The stop 65 may be threaded into or out of the bridge member 67 to vary the distance which the needles extend into the ampules.

In use, the carriage 11 is placed in its retracted position of Figs. 1 and 2, and two ampules are placed neck upward in the cradles 57, their necks being clipped in clips 61. This properly centers the narrow sections 8 of the necks of the ampules with the filling needles 15, simply by the act of placing the ampules in the carriage, due to the centering effect of the V-shaped cradles 57 and clips 61. The clips grip the narrow sections of the necks to hold them substantially concentric with the needles, while permitting the ampules easily to be removed from the carriage subsequently. While the narrow sections 8 of the necks of all ampules are centered in the clips, the positions of the bodies of the ampules in cradles 57 may vary in accordance with variations in the ampules.

Then the carriage is manually moved upward on the track 13 to its raised filling position illustrated in Fig. 3 determined by engagement of bridge member 51 with the stop 65. The carriage becomes releasably latched in this position by engagement of spring latch 73 with the detent 71. This prevents the carriage from sliding downward if it should be released. As the carriage

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moves upward to its raised filling position, the ampules telescope over the needles without interference since the narrow sections of the necks are substantially concentric with the needles. With the carriage and ampules carried thereby in filling position, the needles extend completely through the necks of the ampules so that the discharge ends of the needles are entered just within the cylindrical bodies of the ampules, with the discharge openings 17 above the level of the quantity of liquid that is to be supplied to the ampules. Then the dispensing pump (not shown) is operated to supply a measured quantity of liquid to each of the ampules. The liquid is delivered into the bodies of the ampules through the discharge openings at the lower ends of the needles below the lower ends of the necks, so that no liquid runs down through the necks.

When the filling of the ampules has been completed, the carriage is moved downward to its lower retracted position. Should any liquid be present at the discharge opening of the ampule filling needles, it is not wiped onto the necks, inasmuch as the ends of the needles do not come into engagement with the insides of the necks. This is because of the assurance of substantial concentricity of the narrow sections of the necks and the needles. Once the carriage has been moved downward to its lower retracted position, the filled ampules are removed from the carriage. They may then be placed in a machine for flame-sealing the necks, and two more ampules filled, and so on.

In view of the above, it will be seen that the several objects of the invention are achieved and other advantageous results attained.

As many changes could be made in the above constructions without departing from the scope of the invention, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

We claim:

1. A device for use in filling ampules of the type comprising a cylindrical body and a neck having an intermediate narrow section, comprising an inclined track, an open-ended cylinder mounted at the upper end of the track with its axis substantially parallel to and above the track, a sleeve held in the cylinder by two axially spaced sets of adjustable three-point mountings with the axis of the sleeve substantially parallel to the track, an ampule filling needle held in the sleeve and extending downward in cantilever fashion above and generally parallel to the track, a carriage slidable on the track having a cradle for cradling the cylindrical body of an ampule and a member for supporting the neck of an ampule by its intermediate narrow section with the neck extending upward and with the narrow section of the neck substantially concentric with the needle, said carriage being slidable between a lower retracted position wherein an ampule may be placed therein, and a raised filling position, determined by engagement of the carriage with a stop on the track, wherein the needle extends completely through the neck of an ampule with the lower end of the needle entered in the body of the ampule.

2. The device set forth in claim 1, wherein the neck-supporting member comprises a spring clip.

3. The device set forth in claim 1, further including latch means for releasably latching the carriage in filling position.

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4. A device for use in filling ampules of the type comprising a cylindrical body and a neck having an intermediate narrow section, comprising an inclined track of V-shape in cross section with the V opening upward, an ampule filling needle mounted at the upper end of the track extending downward in cantilever fashion above and generally parallel to the track and generally in the vertical plane of the apex of the V, the needle having a discharge opening at its lower end, a carriage comprising a V-shaped cradle for cradling the cylindrical body of an ampule, the cradle being slidable in the V-shaped track, said carriage carrying a member for supporting the neck of an ampule by its intermediate narrow section with the neck extending upward and with the narrow section of the neck substantially concentric with the needle, said carriage being slidable between a lower retracted position wherein an ampule may be placed therein, and a raised filling position, determined by engagement of the carriage with a stop on the track, wherein the needle extends completely through the neck of the ampule with the lower end of the needle entered in the body of the ampule.

5. The device set forth in claim 4, wherein the neck-supporting member comprises a spring clip.

6. The device set forth in claim 4, further including latch means for releasably latching the carriage in filling position.

7. A device for use in filling ampules of the type comprising a cylindrical body and a neck having an intermediate narrow section, comprising an inclined track, a support at the upper end of the track, an ampule filling needle mounted in said support extending downward in cantilever fashion above and generally parallel to the track, means carried by the support holding the needle by its upper end in the support and adjustable with respect to the support for universal adjustment of the position of the axis of the needle, the needle having a discharge opening at its lower end, a carriage slidable on the track having a cradle for cradling the cylindrical body of an ampule and a member for gripping the neck of an ampule by its intermediate narrow section with the neck extending upward and with the narrow section of the neck substantially concentric with the needle, said carriage being slidable between a lower retracted position wherein an ampule may be placed therein, and a raised filling position, determined by engagement of the carriage with a stop on the track, wherein the needle extends completely through the neck of the ampule with the lower end of the needle entered in the body of the ampule.

8. The device set forth in claim 7, wherein the neck-gripping member comprises a spring clip.

9. The device set forth in claim 8, further including latch means for releasably latching the carriage in filling position.

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