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R. B. WAITE

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FILLING HEAD

Filed Sept. 24, 1927

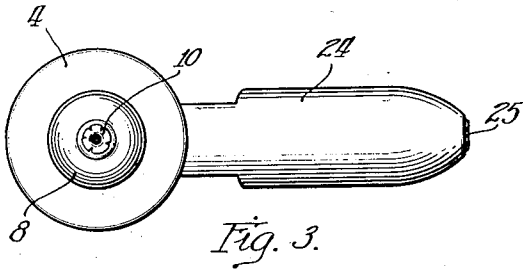


Fig. 3.

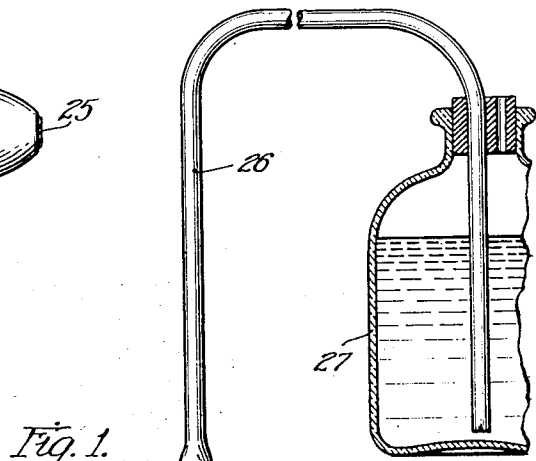


Fig. 1.

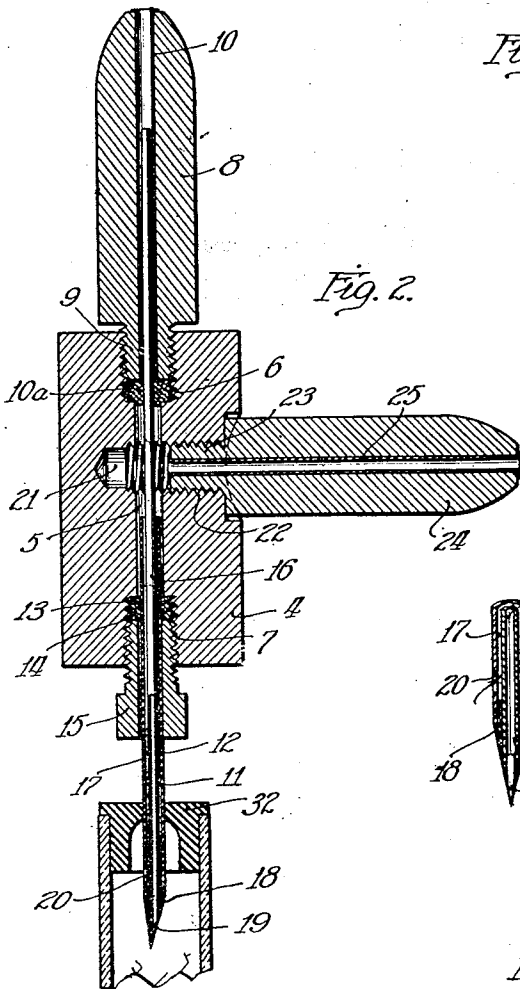


Fig. 2.

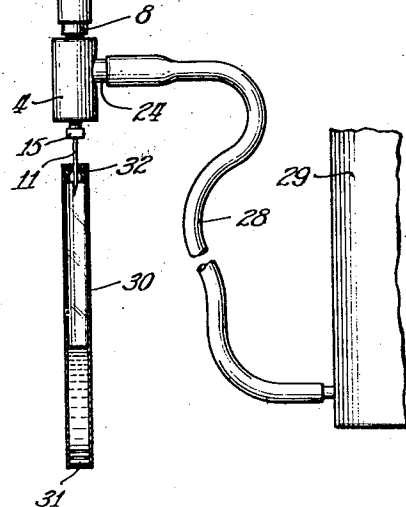


Fig. 4.

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UNITED STATES PATENT OFFICE

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FILLING HEAD

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My invention relates to a device which may, appropriately, be termed a "filling head" and which is for the purpose of effecting the filling of so-called "cartridges" with a liquid medicament.

The device comprises essentially a needle adapted to pierce a rubber or composition stopper at one end of the cartridge, this needle being provided with two passageways, one for the entry of the liquid medicament and the other for the withdrawal of air. Devices of this general character are not new in the art. However, the prior devices have given rise to difficulties because their needles were prone to chip pieces of rubber or composition from the stopper, in the piercing action, such chips then clogging one or the other or both of said passageways to the extent of preventing further operation and requiring tedious cleaning before operation can be resumed.

My invention overcomes these difficulties and provides a filling head needle which pierces the cartridge stopper without cutting or chipping any material therefrom, providing also a head in which the needle is adjustable.

My invention is illustrated in the accompanying drawings in which

Fig. 1 is a general view showing my filling head in elevation and illustrating the system of cartridge filling;

Fig. 2 is an enlarged axial sectional view of the filling head of my invention, and

Fig. 3 is a plan view thereof.

Fig. 4 is an enlarged axial sectional view of a modified form of needle.

The main body of the head is conveniently of cylindrical form and is indicated at 4. It has an axial bore 5, the upper end of which is enlarged and screw-threaded as indicated at 6 and the lower end of which is enlarged and screw-threaded as indicated at 7. A nipple 8 has a reduced end 9 which is screw-threaded in enlargement 6, against a suitable packing ring 10a. This nipple has an axial bore in which the lining 10 is provided.

The needle 11 comprises an outer tube 12 which extends downwardly from about the middle of the bore 5, this tube having a collar

13 fastened thereon for engagement with the end of the enlargement 7, as clearly indicated in Figure 2. A packing ring 14 surrounds the tube 12 and is forced into engagement with the collar 13 by means of a gland nut 15, this assembly serving the double purpose of holding the tube 12 firmly in place and of making the bore 5 air-tight at its lower end. The collar 13 need not be secured to tube 12, but may be a friction fit thereon permitting the needle to be adjusted lengthwise through body 4 by slightly loosening nipple 8 and nut 15, after which the needle is secured in position as before.

A longer but smaller tube 16 is disposed within the tube 12, their relative diameters being such as to leave a space 17 between them. The tube 16, extended upwardly, fits into the bore of the nipple 8, and the packing ring 10a serves the purpose of making the upper end of the bore 5 air-tight and separating it effectively from any possible connection with the bore in nipple 8. The lower ends of the tubes 12 and 16 are soldered together by a filling of solder 18 at the bottom of the annular passage 17 and the needle, as a whole, is pointed as indicated at 19, the lower end of the tube 16 thus opening in the point without presenting cutting edges of any kind. The lower end of the passageway 17 is provided with an inlet port 20 in the outer tube 12 just above the solder filling 18.

The main body 4 is provided with a transverse well bore 21, intersecting the axial bore 5 and screw-threaded as indicated at 22 for the reception of the reduced end 23 of the nipple 24, this nipple having a central bore provided with a lining 25.

As indicated in Figure 1 the nipple 8 is connected by means of flexible tubing 26 with a source of medicament supply, such as a bottle 27 into which the end of the tubing 26 extends.

The nipple 24 is connected by means of flexible tubing 28 with a vacuum tank 29.

It thus appears that the bore in the nipple 8 and the tube 16 constitute means for conveying the liquid medicament to the point of the needle and the bore in nipple 24, the bores 21 and 5, the annular passageway 17

and the port 20 constitute means whereby air may be drawn through from a point near the pointed end of the needle.

5 The cartridge, which is shown in section in Figure 1, and the end of which is shown in larger section in Figure 2, comprises, in this instance, a glass tube 30 the lower end of which is closed by a stopper 31 and the upper end of which is closed by a stopper 32. 10 The stopper 32, of soft rubber or composition, is called the diaphragm stopper because it is formed, as illustrated, with a central portion of reduced thickness through which the needle 11 is adapted to be passed. 15 The operator, whose duty it is to fill the cartridge 30 with the liquid medicament, holds the filling head by grasping, conveniently, the hose-covered nipple 24 with the right hand, holding the cartridge to be filled, 20 with the diaphragm stopper up, in her left hand. She pushes the needle 12 through the central portion of the stopper 32, as indicated in Figures 1 and 2, this being a simple piercing action in which the material of the stopper is spread and not cut. She drives the 25 needle through the stopper sufficiently, as shown particularly in Figure 2, to expose the side port 20 to the interior of the cartridge, the lower end of the tube 16, under the circumstances, being of course exposed to the interior of the cartridge. The connection with the vacuum tank exhausts the air from the cartridge, the soft rubber or composition 30 diaphragm stopper keeping the upper end of the cartridge air-tight, and the exhausted air is displaced by the liquid medicament entering through the tube 26, the bore of the nipple 8, and the tube 16. As the level of the 40 liquid reaches the top the operator withdraws the needle, the material of the stopper, by reasons of its inherent nature, closing the piercing and leaving the cartridge properly sealed. A surplus vacuum bottle may be disposed in the line 28 to catch and save such of the liquid medicament as may be drawn through after the cartridge is filled and before the needle is withdrawn. 45

In Figure 4 I have illustrated a modified 50 form of needle in which the end of the inner tube 16 is closed by a solid point 33, soldered in place, the side opening 19a being provided for the feeding in of the liquid medication.

55 By reason of the nature of the construction of the lower end of the needle, the diaphragm stopper is simply pierced, and not cut in any way, so that the clogging which characterizes filling heads of the prior art is effectively 60 eliminated. Since the needle elements are held in the head by the arrangement described, they are adjustable lengthwise thereof, whereby needles of any desired length may be used and may be extended out of the head 65 any desired length.

I claim:

1. In a filling head, an outer tube, an inner tube within and substantially concentric with said outer tube, a filling of solder at one end of said tubes functioning dually to secure the tubes together and to space them apart so as to provide an axial and annular passageway, the outer tube having a port therethrough adjacent said filling and communicating with said passageway, the inner tube having a port therethrough adjacent said filling, closure means for the end of the inner tube adjacent said filling, said closure means, tubes and filling being substantially tapered. 70 75

2. In a filling head, an outer tube, an inner tube therein and substantially concentric therewith, a filling of solder adjacent one end of said tubes functioning dually to secure the ends of the tubes together and to space them apart so as to provide an axial and annular passageway, the outer tube having a port therethrough adjacent said filling communicating with said passageway, the inner tube having an exposed port therethrough intermediate the ends of said filling, a point closing the end of the inner tube adjacent said filling, said point, tubes and filling being substantially tapered. 80 85 90

3. In a filling head, a body having a bore, an outer tube having one end terminating in said bore, an inner tube within and substantially concentric with said outer tube, a filling of solder at the outer ends of said tubes functioning dually to secure the tubes together and to space them so as to provide an axial and annular passageway, said inner tube extending beyond the inner end of the outer tube, a nipple removably secured to said body and into which said inner tube extends, a compressible ring about the inner tube secured in place by said nipple and serving as a retaining means for the tube, a nut removably secured to the body about the outer tube, a compressible ring secured in place about the outer tube by the nut so that the latter ring will serve as a securing means for the outer tube, each of the tubes at the latter end having a port therethrough, and the tubes at the latter end being substantially tapered. 95 100 105 110

In witness whereof, I hereunto subscribe my name this 22nd day of September, 1927. 115

RALPH B. WAITE.

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