Aug. 17, 1965 W. A. SHIELDS 3,200,486

METHOD OF APPLYING A SHIELD TO A HYPODERMIC NEEDLE

Filed Sept. 16, 1963

FIG. 1

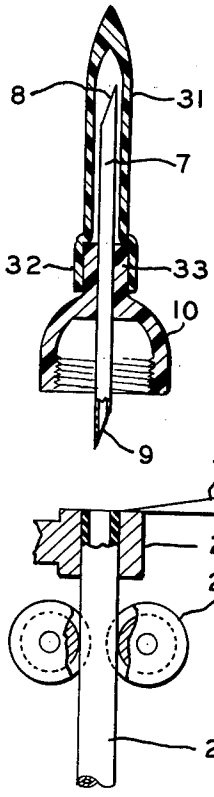


FIG. 2

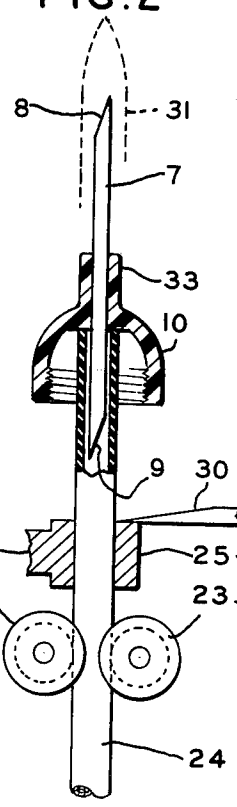


FIG. 3

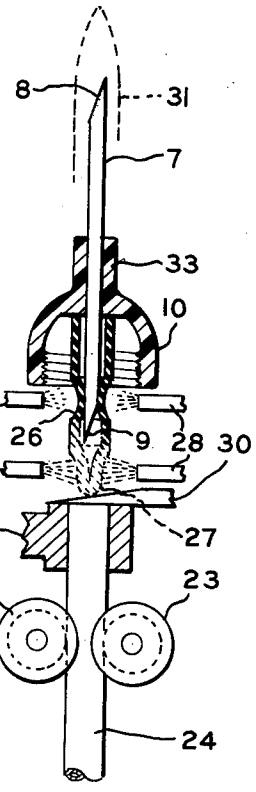


FIG. 4

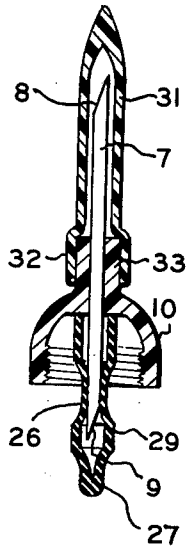


FIG. 5

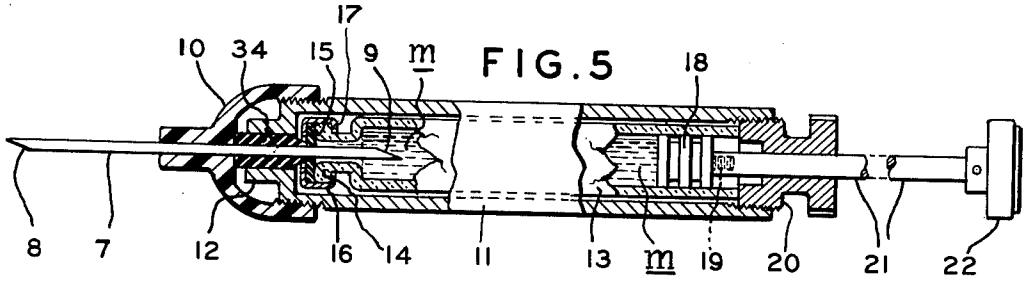
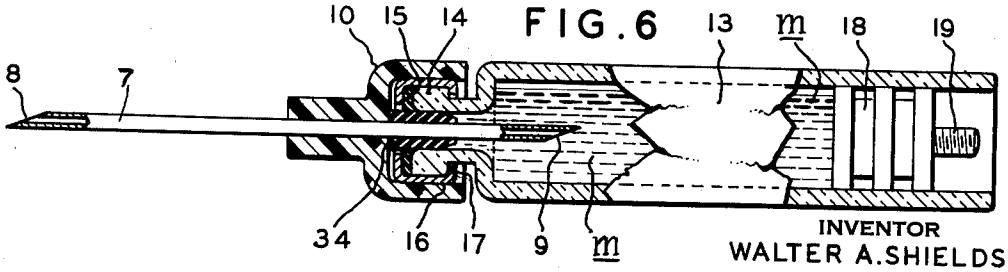


FIG. 6



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3,200,486

METHOD OF APPLYING A SHIELD TO A HYPODERMIC NEEDLE

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3 Claims. (Cl. 29—422)

This invention relates to the method of applying a protective shield on the end portion of a hypodermic needle which is inserted into the neck of a syringe barrel or into the pierceable sealing member of a vial containing a liquid medicament whereby the hypodermic needle does not contact said neck or the pierceable sealing member and become contaminated by bacteria on the neck or pierceable sealing member.

It is the object of the invention to provide a method of applying a protective shield on said end portion of the hypodermic needle whereby said protective shield is mechanically applied on a straight line production principle.

Other objects and advantages of the invention will be set forth in the detailed description of the invention.

In the drawing accompanying and forming a part of this application:

FIGURE 1 is a vertical view, partly in section, showing the initial step in the method of applying a protective shield to an end portion of a hypodermic needle;

FIGURE 2 is a view similar to FIGURE 1 showing the second step in the method;

FIGURE 3 is a view similar to FIGURES 1 and 2 showing the two final steps in the method;

FIGURE 4 is a vertical-sectional view of the product produced by the method;

FIGURE 5 is a view partly in section of the product produced by the method applied to a syringe carrying a cartridge or vial containing a liquid medicament and showing the function of the protective shield; and

FIGURE 6 is a view similar to FIGURE 5 showing the product applied directly to the vial containing the medicament.

A hypodermic needle 7 having penetrating ends 8 and 9 is mounted in a cap member 10 with the penetrating end 8 extended exteriorly of the closed end of the cap member and the penetrating end 9 extended from the open end of the cap member. In FIGURES 1 to 5, inclusive, the skirt of the cap member 10 is provided with internal screw-threads for the releaseable engagement of screw-threads on the exterior of an end portion of a syringe barrel 11 as shown in FIGURE 5. The barrel 11 is provided with a neck portion 12 through which the needle end portion provided with the penetrating end 9 is passed. A vial 13 containing a liquid medicament *m* is provided at one end with a beaded mouth 14 closed by a pierceable disk 15 secured to the mouth 14 by a perforated cap 16 having the skirt crimped around the beaded mouth, as shown at 17 in FIGURES 5 and 6. The opposite end of the vial 13 is closed by a plunger 18 having a screw-threaded stud 19 extended from the outer end thereof. The vial 13 is inserted in the syringe barrel 11 through the end opposite the end arranged with the neck portion 12 and said opposite end is closed by a plug closure 20 screw-threaded in said opposite end, as shown in FIGURE 5. A rod 21 is slidably mounted in the plug closure 20 with the inner end of said rod screw-threaded on the stud 19 and the outer end of the rod 21 provided with a manipulating knob 22.

In the use of the syringe shown in FIGURE 5, the vial 13 is inserted in the syringe barrel 11 and the plug closure 20 is screw-threaded in said barrel and the rod 21 is attached to the plunger 18, after which the penetrating end 9 of the hypodermic needle 7 is pushed through the perforation in the cap 16 and the pierceable disk 15 into the liquid medicament *m*. During the insertion of the needle 7 into the medicament *m*, the cap member 10 is screwed on the syringe barrel 11. After the cap member 10 is secured to the syringe barrel 11, the syringe is ready for use by puncturing the skin of a patent with the penetrating end 8 of the hypodermic needle 7 and pushing the rod 21 into the syringe barrel 11.

In FIGURE 6, the use of the syringe barrel 11 is omitted and the screw-threads on the skirt of the cap member 10 are also omitted. The skirt of the cap member 10 has a slip-on engagement with the skirt portion of the cap 16. The operation of the vial type of syringe shown in FIGURE 6 is the same as the barrel type of syringe whereby a rod, not shown, but similar to the rod 21, is attached to the stud 19.

It is the object of the invention to maintain the needle 7 as sterile as possible and there is always the possibility that the interior surface of the neck portion 12 in FIGURE 5 or the mouth 14 in FIGURES 5 and 6 may have become contaminated and the end portion of the needle 7 arranged with the penetrating end 9 may become contaminated by contacting said interior surface when it is inserted into said neck portion 12 or said mouth 14.

To avoid said contamination of the needle, the end of the needle entering the syringe barrel and medicament containing vial has been covered by a sleeve as shown in Patent No. 3,055,364, issued September 25, 1962, to Simon Myerson and Richard L. Myerson. This sleeve of the patent to Myerson et al. is placed on the needle by hand which is a slow and expensive method.

It is the object of the invention to reduce the cost and time in placing the sleeve or protective shield on the needle.

A plurality of needles 7 and their carrying cap members 10 are first sterilized and placed on a conveyor, not shown, and successively positioned above a pair of rolls 23 feeding a length of tubing 24 of fusible plastic material through a guide member 25. The rolls 23 feed a predetermined length of tubing 24 along the entire length of the needle 7 extending into and out of the cap member 10 with the forward end of the tubing abutting the interior of the bottom or closed end of the cap member, as shown in FIGURE 2.

Subsequent to the positioning of the tubing 24 over the needle, spaced portions of said feed tubing are collapsed around the needle above the penetrating end 9 and below said penetrating end 9, as at 26 and 27 in FIGURES 3 and 4. This is accomplished in the present illustration of the invention by fusing said portions of the tubing by burners 28 spaced around the portions of the tubing where it is desired to collapse. Other means for performing this step may be employed. The fusing of the portion of the tubing below the penetrating end 9 will form a sack 29 enclosing said penetrating end 9, as shown in FIGURE 4.

Simultaneously with or subsequently to the collapsing of the portions 26 and 27, the sack 29 is severed from the tubing by a blade 30 supported on the guide member 25 and reciprocated toward and away from the tubing 24, as shown in FIGURES 2 and 3.

After the sterilization of the needle 7 and their carrying cap members 10 and before the end portions of the needles 7 arranged with the penetrating ends 9 are encased with the sacks 29, each of the opposite end portions of the needles 7 arranged with the penetrating ends 8 is enclosed by a shield 31 having an enlarged open end portion 32 seated over a tubular portion 33 of the cap member 10.

After the sacks **29** have been applied, the entire needle units are removed from the conveyor and packaged.

In use, the sack **29** is forced either into the neck **12** of the syringe barrel, as shown in FIGURE 5, or through the perforation of the cap **16** and into the mouth **14** of the vial **13**, as shown in FIGURE 6, and the contact of the sack **29** with said neck portion **12** or the cap **16** and the mouth **14** will hold said sack and the continued movement of the cap member **10** onto the syringe barrel **11** or onto the cap **16** will move the penetrating end **9** from the sack **29** and into the vial **13**. Said continued movement of the needle will compress the sack **29** in the neck portion **12** or the cap **16** and the mouth **14**, as shown at **34** in FIGURES 5 and 6.

Having thus described my invention, I claim:

1. The method of applying a protective shield on one end portion of a hypodermic needle mounted in a cap member with the first end portion of the hypodermic needle extended from the exterior of said cap member and the second end portion of the hypodermic needle extended into the cap member, comprising feeding tubing of protective material and of greater length than the second end portion of the hypodermic needle onto said second end portion of the hypodermic needle with the forward end of the tubing abutting the interior of the cap member, collapsing spaced portions of the tubing to close the tubing around the second end portion of the hypodermic needle and at a point beyond the extremity of the second end portion of the hypodermic needle, and severing the tubing beyond the collapsed portion positioned beyond the extremity of the second end portion of the hypodermic needle.

2. The method of applying a protective shield on one end portion of a hypodermic needle, comprising feeding tubing of fusible material and of greater length than said end portion of the hypodermic needle onto said end portion of the hypodermic needle, heating spaced portions of said tubing to close the tubing around the hypodermic needle and at a point beyond the extremity of the end portion of hypodermic needle to be protected, and severing the tubing beyond the closed portion positioned beyond the extremity of the end portion of the hypodermic needle.

3. The method of applying a protective shield on one end of a hypodermic needle as claimed in claim **2**, wherein the heating of spaced portions of said tubing is produced by flame heating.

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