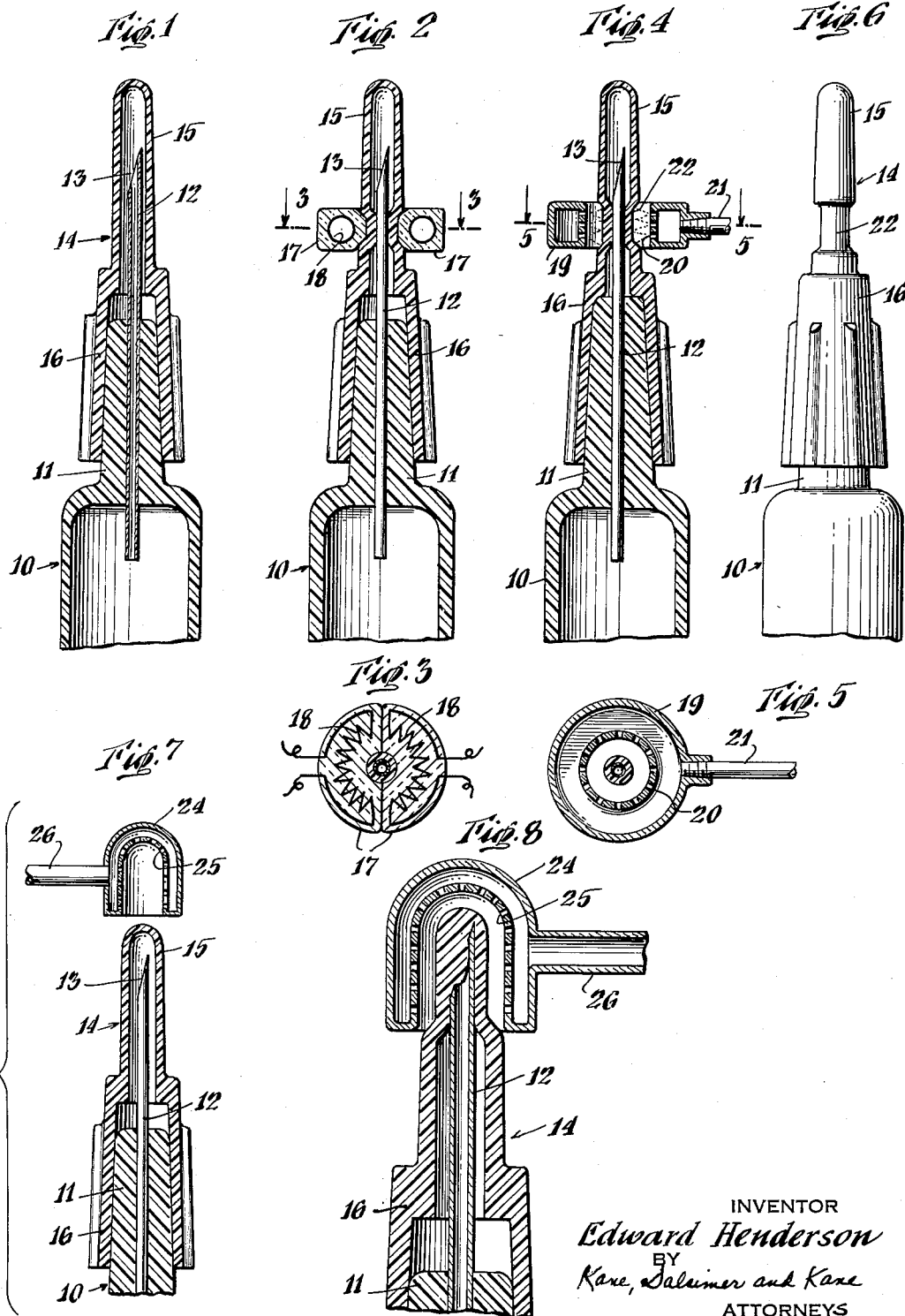


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SEALED HYPODERMIC RECEPTACLE AND
METHOD OF MAKING THE SAME
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SEALED HYPODERMIC RECEPTACLE AND METHOD OF MAKING THE SAME

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This invention relates to an improved sealed hypodermic receptacle and to a method of making the same.

It is desirable to package many pharmaceutical, biological and medicinal preparations in hypodermic receptacles so that they can be administered directly from the hypodermic receptacle without the necessity of transferring the product from a container in which it is sold to a separate hypodermic unit. If the hypodermic receptacle in which the product is packaged is properly sealed, then the product is preserved in sterile form, free from contamination and protected from deterioration by exposure to the air or loss by evaporation. In order to obtain the full benefit of this type of packaging, however, it is important that the hypodermic receptacle be sealed in a simple, inexpensive yet effective manner, which will not complicate or interfere with the subsequent use of the receptacle or with the hypodermic injection of the contents.

It is, accordingly, an object of the present invention to provide an improved hypodermic receptacle and an improved method of making hypodermic receptacles whereby the receptacle is sealed in a simple, inexpensive yet effective manner, and wherein the seal can be readily opened or removed when required to permit the contents of the receptacle to be hypodermically dispensed or injected.

In the accompanying drawing—

Fig. 1 is a sectional elevational view of one end of a hypodermic receptacle showing a closure cap or hood applied (but not sealed) over the needle;

Fig. 2 is a similar sectional elevational view showing one form of apparatus and method of heat sealing the closure cap or hood around the needle;

Fig. 3 is a cross sectional view in the direction of the arrows on the line 3—3 of Fig. 2;

Fig. 4 is a sectional elevational view similar to Fig. 2 but showing another form of apparatus and method for sealing the closure cap or hood around the needle;

Fig. 5 is a cross sectional view in the direction of the arrows on the line 5—5 of Fig. 4;

Fig. 6 is an elevational view of one end of the completed hypodermic receptacle embodying my invention showing the closure cap or hood heat sealed to the needle;

Fig. 7 is a sectional elevational view of the outer end of the hypodermic receptacle with the closure cap or hood applied thereto in unsealed condition and showing a modified type of heat sealing apparatus; and

Fig. 8 is a longitudinal sectional view of the device and apparatus shown in Fig. 7 showing the outer end of the closure cap or hood being heat sealed to the needle.

My invention is applicable to various types of hypodermic receptacles such as ampules or syringes in which pharmaceutical, biological or medicinal preparations may be packaged, shipped or stored for any period of time prior to use.

In the accompanying drawing, I have shown my invention as applied to a hypodermic receptacle 10 which, as previously indicated, may be an ampule or a syringe. The

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outer end of the hypodermic receptacle is provided with a needle hub 11 in which the hypodermic needle 12 is mounted. The inner end of the needle has communication with the interior of the receptacle so that the contents of the receptacle may be dispensed through the needle which is the usual tubular hypodermic needle having a central bore or lumen and a tapered outer end 13 for insertion through the skin or other tissue.

The receptacle 10 and needle hub 11 may be made of any desired materials such as glass, metal or plastic material. However, it should be of a character that will not be adversely affected by the pharmaceutical, biological or medicinal preparation contained therein. The opposite end of the receptacle (not shown) should be sealed in any well-known manner. Thus, if the hypodermic receptacle is an ampule, the opposite end may be closed by the usual piston type of stopper. If the receptacle constitutes a hypodermic syringe, then the opposite end may be provided with the usual piston and operating mechanism. If desired, of course, the receptacle may be of the collapsible type being made of a soft metal or plastic material, in which event the opposite end is merely sealed and the contents are dispensed by collapsing the tube.

As previously pointed out, the specific form of receptacle does not constitute the present invention. My invention simply contemplates that the receptacle itself, aside from the hypodermic needle, be sealed.

In carrying out my invention, I first apply over the needle and the outer end of the hub a closure cap or sheath-like hood 14 which is formed with an outer portion 15 of smaller diameter closed at its end and encasing but spaced from the needle. The hood also has a ribbed apron portion 16 of larger diameter and preferably tapering in width which engages and tightly embraces the needle hub 11.

The hood is made of a suitable thermoplastic material which is impermeable to, and unaffected by, air, water vapor, contaminants, and the fluid preparations contained in the receptacle. For this purpose, I may use polyethylene, cellulose esters such as cellulose acetate, or one of the polyvinyl resins.

After the hood is applied to the hypodermic receptacle in the manner shown in Fig. 1, I then apply heat and pressure to a portion thereof so as to cause it to form sealing engagement with the needle whereby the contents will be effectively sealed within the receptacle. The heat applied to the hood should be sufficient so that the plastic material becomes plastic and will flow under pressure. However, it should not be such as to liquify the plastic material or cause it to disintegrate.

The hood may be sealed to various portions of the needle and the heat and pressure may be applied in any suitable manner. Thus, as shown in Figs. 2 and 3, a split heated ring formed of two segments 17 having electric heating elements therein which may be thermostatically controlled (not shown) may be assembled around the hood a short distance beneath the open end of the needle. The ring is contracted by bringing the two segments together and the diameter of the ring is then of a size to force or squeeze the entire circumference of the closure, at a point slightly below the needle opening, into contact with the needle. The temperature of the ring is such as to cause the plastic material in the hood to flow inwardly under the heat and pressure into sealing engagement with the needle.

Instead of applying the pressure in this fashion, I may apply both the heat and pressure by means of heated air jets, as shown in Figs. 4 and 5. In these figures, I have shown a ring-shaped air nozzle 19 having inwardly directed jet openings 20. The nozzle is suitably connected by means of tube 21 to a source of heated air under pressure. The temperature of the air is sufficient

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to render the material in the hood plastic so that it can flow and the pressure of the air is maintained at a level so as to cause the plastic material to flow when thus heated. The ring is preferably assembled about the hood in the manner shown in Fig. 4 at a point slightly below the needle opening and the air supply is connected so as to cause the air jets to impinge upon the hood in a ring shaped band extending completely therearound. Under the action of the heat and pressure, the plastic material in the hood is compressed or molded into sealing engagement with the needle.

When the hood has thus been pressed or molded into sealing engagement with the needle as shown in Figs. 2 to 5, the heat and pressure are removed and the thermoplastic material is permitted to set in the fused, sealing position. The completed sealed hypodermic receptacle will then appear as shown in Fig. 6 with the compressed band 22 extending completely around the hood in sealing engagement with the needle.

Instead of sealing the hood into engagement with the periphery of the needle below the opening, I may seal the outer end of the hood into engagement with the point of the needle or with the surfaces of the needle, immediately surrounding the point. This may be accomplished by applying heat and pressure to the closed outer end of the closure as, for instance, by means of the hood-shaped nozzle 24 with jet openings 25 and having suitable connection as by means of a tube 26 to a source of supply of heated air under pressure. When the hood-shaped jet is brought over the closed outer end of the closure 14 in the manner shown in Fig. 8 and the heated air under pressure is caused to flow therethrough, the material forming the closure will be rendered plastic and will be caused to flow into sealing engagement with the outer end of the needle particularly with the surfaces immediately adjacent and surrounding the point. When the sealing has been accomplished, the hood-shaped nozzle is removed and the plastic material is permitted to cool and set.

In using my improved hypodermic receptacle a receptacle is first filled with a pharmaceutical, biological or medicinal preparation in the usual manner after first being suitably cleaned and sterilized. The opposite end of the receptacle is sealed either prior to or after filling. Then the closure 14 is applied thereto, as shown in Figs. 1 and 7 and it is compressed into sealing engagement with the needle under heat and pressure. When thus sealed the contents of the receptacle are preserved in sterile condition and are effectively protected from contamination and deterioration by exposure to the air and loss by evaporation or leakage. The receptacle may be

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used as a commercial package or it may be used merely for storage purposes in hospitals or institutions. When it is desired to use the device, the closure, even though it is sealed to the needle, can be readily withdrawn by forcibly withdrawing it from the end of the assembly. Thereafter, the fluid contents may be hypodermically administered in the usual manner.

It will thus be seen that I have provided an improved hypodermic receptacle and an improved method of making the same whereby the receptacle is sealed in a simple, inexpensive yet effective manner and wherein the seal can be broken or readily removed when required to permit the contents to be hypodermically dispensed.

Modifications may, of course, be made in the illustrated and described embodiments of my invention without departing from the invention as set forth in the accompanying claims.

I claim:

1. A sealed hypodermic receptacle comprising: means providing a chamber for holding a preparation to be hypodermically dispensed; a hypodermic needle having a lumen extending therethrough mounted at one end of said means and communicating with said chamber; and a sheath-like hood made of thermoplastic material closed at its outer end disposed over and encasing the outer end and the sides of the needle, said sheath-like hood having a portion in fused sealing engagement with the needle.

2. A hypodermic receptacle as set forth in claim 1 in which the portion of the sheath-like hood which has sealing engagement with the needle is disposed in a band extending completely around the needle beneath the open end thereof.

3. A hypodermic receptacle as set forth in claim 1 in which the portion of the sheath-like hood having sealing engagement with the needle is the closed outer end portion which engages the needle adjacent the point of the needle.

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