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3,255,873

COMBINATION SEALING AND DISPENSING DEVICE

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FIG. 1.

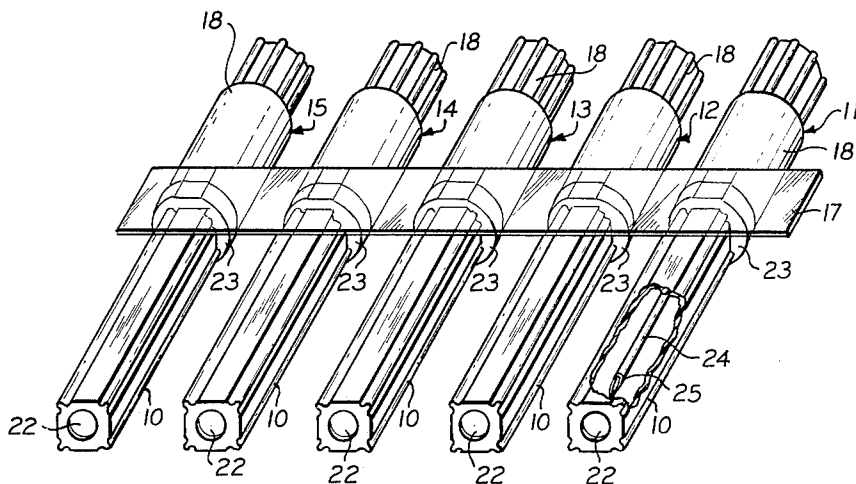


FIG. 2.

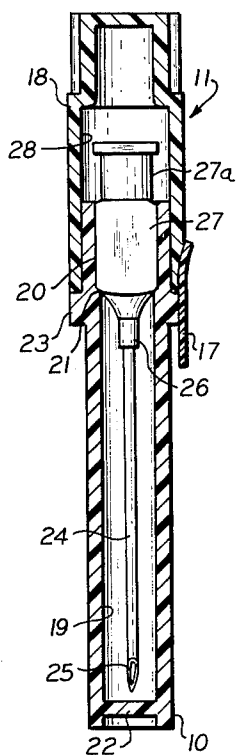


FIG. 3.

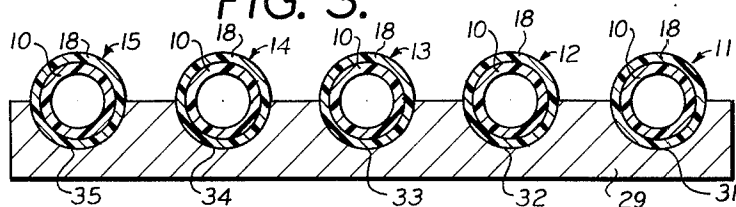


FIG. 4.

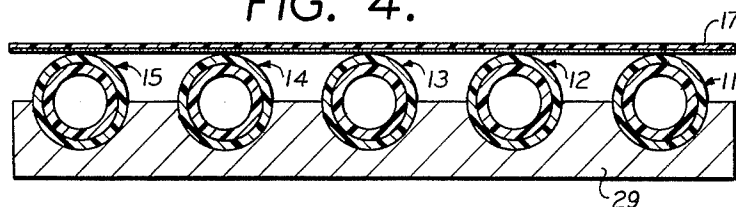
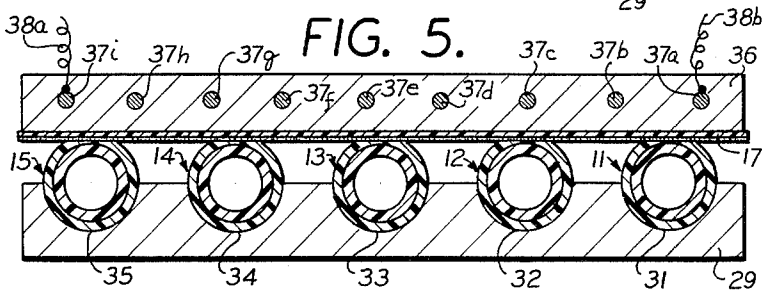


FIG. 5.



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COMBINATION SEALING AND DISPENSING DEVICE

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7 Claims. (Cl. 206—56)

The present invention relates generally to disposable hypodermic needle units and more particularly to a device for connecting and sealing a number of said units to form an assembly.

At present, hypodermic needles which are used in the medical field and which are sold to hospitals or similar institutions are usually sold in bags of about 500. Each needle is encased within a respective container and the needle and container together form a disposable hypodermic needle unit. The container comprises a cap which is usually sealed to a lower portion. When the hypodermic needles are to be used, the units are counted out on a per ward or per floor basis and are then dispensed to the person in charge of the respective ward or floor. It is therefore apparent that such a procedure is extremely time consuming (i.e., a person is required to count out the individual number of units destined for the particular ward or floor). Moreover, it has been found in practice that the cap portion of a particular unit can very easily be separated from the respective lower portion before the needle and the container reach their destination. Once the cap portion and the lower portion of the container separate the sterility of the needle within the container is destroyed since the needle becomes exposed to the hospital pathogens. Thus, the hypodermic needle is rendered useless unless it can be resterilized at a later time.

It is a primary object of the present invention to facilitate the handling of disposable hypodermic needle units.

It is a further object of the present invention to insure the sterility of the hypodermic needles in disposable hypodermic needle containers until such time as they are to be used.

In accordance with the above objects, a preferred embodiment of the present invention comprises a tape having a heat sensitive adhesive applied to a number of disposable hypodermic needle units to form a disposable hypodermic needle assembly. It is to be understood that the individual units are of the type having a lower portion which receives the hypodermic needle. The units may further include a shoulder located below the open end of the lower portion and projecting outwardly perpendicularly from the lower portion. A cap is slidably received on the lower portion and covers the open end with the lip of the cap abutting the upper surface of the shoulder; the diameter of the outer surface of the lip being approximately equal to the diameter of the outer surface of the shoulder. A predetermined number of such units are spaced from each other and the tape connects said predetermined number; the tape contacts and seals each unit at the junction of the cap and the shoulder.

A number of such assemblies may be combined in a single package. Thus, when the units are dispensed, all one need do is to count off the requisite number of assemblies, each comprising the same amount of units, thereby greatly facilitating the dispensing of the individual units. Moreover, since the tape is connected to the junction of the cap and shoulder, the cap will be maintained in place until the seal is broken. Thus, the sterility of the needle will be insured at all times since the cap cannot fall off. Additionally, since a heat sensitive adhesive is used, an individual unit cannot accidentally be separated from an assembly (thereby making it susceptible to the

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disadvantages noted hereinabove) because a predetermined amount of force is needed to separate a unit from the assembly proper.

It is a feature of the present invention to provide disposable hypodermic needle assemblies comprising a number of disposable hypodermic needle units connected in spaced relation to one another.

It is a further feature of the present invention to provide disposable hypodermic needle assemblies comprising a number of disposable hypodermic needle units wherein the device which connects the units, as noted in the preceding paragraph, also seals the cap of a particular unit to the lower portion of the particular unit.

The above and other features of the present invention will become more apparent from a consideration of the following detailed description in which:

FIG. 1 is a perspective view illustrating a plurality of disposable hypodermic needle units connected and sealed together by the device of the present invention to form an assembly with a portion of one of the units cut away;

FIG. 2 is a horizontal sectional view of a disposable hypodermic needle unit;

FIGS. 3, 4 and 5 are vertical sectional views diagrammatically illustrating the method of applying the connecting and sealing device of the present invention to the units.

The present invention is adapted for use with disposable hypodermic needle units such as the unit 11, illustrated in FIG. 2. The unit 11 comprises a lower tubular portion 10 and an upper cap portion 18. Portion 10 has an inner axial bore 19 and an axial bore 20, the diameter of which is slightly larger than the diameter of bore 19, extending downwardly perpendicularly from the open upper end of portion 10 for a predetermined distance. Bore 20 and bore 19 define an annular shelf 21 in lower portion 10. A transverse bottom wall 22 seals the bottom end of portion 10. An annular shoulder 23, spaced from the top of portion 10, projects outwardly perpendicularly from the outer surface of portion 10.

A hypodermic needle is received within the hollow interior of portion 10. The needle comprises a canula 24 which is cut to form a penetrating point 25 in a manner well known in the art. The canula 24 extends into a hub 26 at the upper end thereof. Hub 26 is integral with a head portion 27. The lower surface of head 27 abuts annular shelf 21 to limit the extent of the insertion of canula 24 into portion 10. Thus, point 25 will be spaced from wall 22. An extension 27a of head 27 extends past the top of portion 17 and is adapted to receive a hypodermic syringe within a cavity (not shown) in extension 27a in a conventional Luer lock fitting.

The cap 18 contains an inner bore 28, having a diameter which is approximately equal to the diameter of the outer surface of portion 10 above shoulder 23, so cap 18 may slidably be received thereon in a friction fitting. Axial bore 28 extends a sufficient distance so top portion 27a of the hypodermic needle may be received therein. The diameter of the outer surface of cap 18 is approximately equal to the diameter of the outer surface of shoulder 23. Thus, the cap is slidably received on portion 10 with the lower lip of cap 18 abutting the upper surface of shoulder 23 and the outer surface of cap 18 and the outer surface of shoulder 23 being coplanar. It is to be emphasized that the unit above described is by way of example only as the present invention can be utilized with any type of unit having a removable cap.

A number of these units 11 through 15 (FIG. 1), are longitudinally spaced from one another with their axes lying in parallel planes. It is to be noted that in the preferred embodiment five of such units will be connected together. However, this quantity is by way of illustration only and not to be interpreted as a limitation of the pres-

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ent invention. In accordance with present invention a tape 17 (which may be composed of cellophane), having a heat sensitive adhesive on the back thereof (although any type of adhesive may be utilized), is placed across the units 11 through 15 so the tape will be in contact with each unit at the junction formed by the lower lip of cap 18 and the upper surface of shoulder 23 (FIGS. 1 and 2). Heat is then applied to the tape and the units, as noted below, thereby causing the tape to adhere to the units. Thus, a disposable hypodermic needle assembly comprising five of such units connected together and individually sealed by the same device, in accordance with the present invention is thereby formed (FIG. 1).

The taping operation of the present invention may be performed in the manner diagrammatically illustrated in FIGS. 3, 4 and 5. Thus, the upper surface of a die 29 contains a plurality of semi-circular longitudinally spaced indentations, 31 through 35, which are shaped to respectively receive units 11 through 15 with the axes of the units lying in parallel vertical planes and in the same horizontal plane. The tape 17 having a heat sensitive adhesive on the back thereof as illustrated in FIG. 4, is placed on these units by means (not shown) so the back of the tape is in contact with the junction formed by the lower lip of cap 18 and the upper surface of shoulder 23. A heating plate 36 has a plurality of serially connected heating coils 37a-37i therein which are connected to a source of power (not shown) by the leads 38a and 38b. The heating plate is placed over and contacts the surface of tape 17 and exerts a predetermined amount of pressure against the units. Plate 36 heats both tape 17 and the individual unit until the adhesive becomes tacky and adheres to the unit. Heating plate 36 is then removed and the units, which are now joined together by tape 17 to comprise a disposable hypodermic needle assembly wherein each unit is individually sealed, may be allowed to cool and are then removed from the die.

A number of these assemblies may be combined to form a package. Thus, when the needles are to be dispensed, the assemblies of five units are taken out of the package and routed to the various destinations by the attendant in charge. By joining a number of the units to form an assembly, the dispensing process is greatly facilitated. Moreover, it is to be noted that since the tape is specifically applied to the junction of the cap and the shoulder, the tape serves the purpose of also maintaining the cap on lower portion 10, thereby insuring the sterility of the hypodermic needle within the unit until such time as the tape is broken and the cap is removed by the person utilizing the hypodermic needle. Additionally, since a heat sensitive tape is used, a predetermined amount of force is required to separate the unit from the tape, thereby eliminating the possibility of accidentally breaking the seal.

In accordance with the objects of the present invention, I have provided a means to both facilitate dispensing of disposable hypodermic needle units and for maintaining the cap of the individual unit on the lower portion of the unit until such time as the hypodermic needle is to be used.

Although a preferred embodiment of the present invention has been described, it will become apparent to those in the art that modifications may be made therein without departing from the scope of the invention.

What is claimed is:

1. The method of joining a plurality of disposable hypodermic needle units of the type having a lower portion and a removable cap and sealing said cap to said lower portion, comprising the steps of longitudinally spacing and aligning a predetermined plurality of hypodermic needle units, placing a strip of tape having a heat sensitive adhesive across said plurality of units so said adhesive is in contact with the junction of the cap and the lower portion of each of said plurality of units, heating said tape and said unit above room temperature until the adhesive on said tape becomes tacky and adheres to said units, and

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allowing said tape and units to cool, whereby said plurality of units are joined in spaced relation to each other by said tape and the respective cap and lower portion of each of said plurality of units are sealed to each other by said tape.

2. The method of joining a plurality of disposable hypodermic needle units of the type having a lower portion and a removable cap and sealing said cap to said lower portion, comprising the steps of longitudinally spacing and aligning a predetermined plurality of hypodermic needle units, placing a strip of tape having a heat sensitive adhesive across said plurality of units so said adhesive is in contact with the junction of the cap and the lower portion of each of said units, applying pressure to and heating said tape and said units until the adhesive on said tape becomes tacky and adheres to said units, and allowing said tape and said units to cool, whereby said plurality of units are joined in spaced relation to each other by said tape and the respective cap and lower portion of each of said plurality of units are sealed together by said tape.

3. The method of joining a plurality of disposable hypodermic needle units, comprising the steps set forth in claim 2, wherein said units are aligned with their axes lying in parallel vertical planes and in the same horizontal plane.

4. A plurality of disposable hypodermic needle units, each of said units comprising a lower portion containing a hypodermic needle therein and a cap in slidable engagement with said lower portion, and a tape containing an adhesive thereon connecting said predetermined plurality of units in spaced relation from each other and contacting and sealing each unit at the junction of said cap and said lower portion, whereby said units may be dispensed as an assembly comprising said plurality of units wherein the respective cap and lower portion of each of said plurality of units are sealed to each other.

5. A plurality of disposable hypodermic needle units, each of said units comprising a lower portion having an open upper end and containing a hypodermic needle therein, each of said units further comprising a removable cap in slidable engagement with said lower portion for covering said open upper end, a tape having a heat sensitive adhesive on the back thereof connecting said plurality of units in spaced relation from each other with said adhesive contacting and sealing the junction of said cap and said lower portion of each of said plurality of units, whereby said plurality of units may be dispensed as an assembly comprising said plurality of units wherein the respective cap and lower portion of each of said plurality of units are sealed to each other.

6. A predetermined plurality of disposable hypodermic needle units, each of said units comprising a lower portion having an open upper end and containing a hypodermic needle therein, each of said lower portions having an outwardly perpendicularly projecting shoulder spaced from said upper end, and a cap sized and adapted to be slidably mounted on said lower portion to cover the open upper end with the lower lip of said cap abutting the upper surface of said shoulder, and a tape having a heat sensitive adhesive thereon joining said plurality of units in spaced relation from each other, said adhesive contacting and sealing each of said plurality of units at the junction formed by the lower lip of the cap and the upper surface of the shoulder, whereby said units may be dispensed as an assembly comprising said predetermined plurality of units wherein the respective cap and lower portion of each of said units are sealed to one another.

7. A predetermined plurality of disposable hypodermic needle units, each of said units comprising a lower tubular portion having an open upper end and containing a hypodermic needle therein, each of said lower portions having an outwardly perpendicularly projecting shoulder spaced from said upper end, and a cap sized and adapted to be slidably mounted on said lower portion to close said

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upper end with the lower lip of said cap abutting the upper surface of said shoulder, and a cellophane tape having a heat sensitive adhesive on the back thereof joining said units in longitudinally spaced relation to each other with the axes of said tubular portions lying in parallel vertical planes, said adhesive contacting and sealing said units at the junction of said cap and said shoulder, whereby said units may be dispensed as an assembly comprising said predetermined plurality of units with the respective cap and lower portion of each of said units being sealed to each other.

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