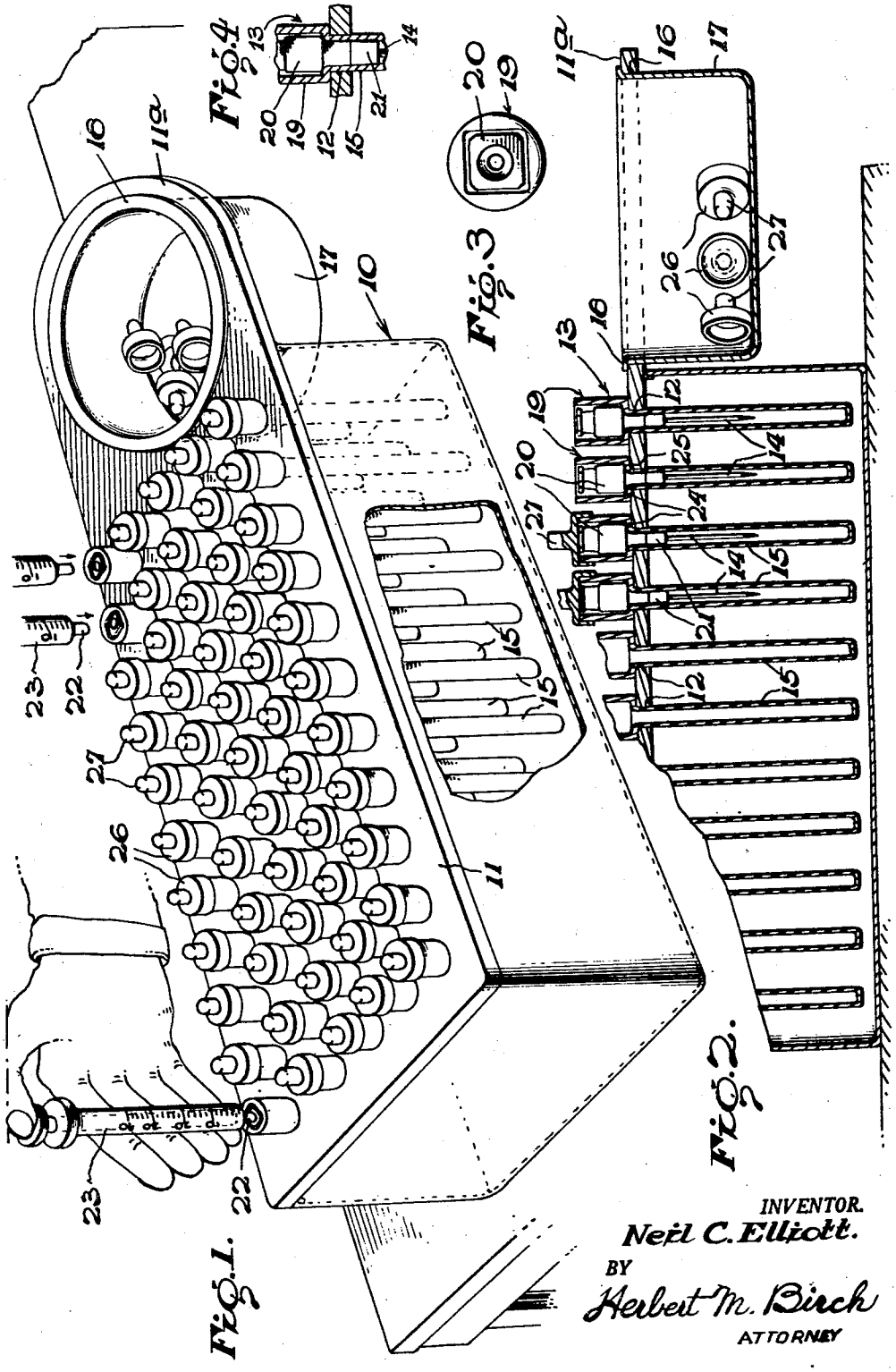
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HOLDER AND DISPENSER FOR STERILE HYPODERMIC NEEDLES

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HOLDER AND DISPENSER FOR STERILE HYPODERMIC NEEDLES

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The present invention relates to surgical instrument sterilization and more particularly to means and systems of sterilizing hypodermic needles without dulling the same and for greatly facilitating the dispensing of the needles after sterilization, so as to eliminate touching with the hands and substantially all possibility of exposure to infectious air prior to its actual injection into the patient.

The importance of complete sterilization is well illustrated in daily life, as many serious results have developed from the prick of an infested needle. Usually sharp surgical instruments, hypodermic needles and the like are treated by steam, boiling or chemical solutions. For example, by one of the conventional methods of sterilizing hypodermic needles, they are not kept properly sterilized prior to use due to the fact that a large quantity of needles are often kept in a cotton plugged test tube and each time a needle is needed, the tube must be opened exposing the rest of the needles to the outer infested air. Also, the needle to be used must be touched by hand to remove it from the tube and couple it to the syringe, and as the needles are generally loose within the container they are jostled together and against the sides of the tube and soon become dulled.

Systems of sterilization by heat are known to be effective for sterilizing surgical instruments, but to prevent dulling care in the selection of the form of heat is essential. For example, steam treatment or boiling in water for about thirty minutes will destroy about all known disease germs. But steam or boiling cause agitation of the needles and tend to dull them. Accordingly, an object of the present invention is to develop a novel method of hypodermic needle sterilization by dry heat application to individually housed needles held against agitation, sealed off from outside air and maintained in a position during and after sterilization, whereby the needle may be removed by the syringe itself as a part of the motion necessary for actual injection of the same into the patient.

It is another object to trap and seal air in and around a plurality of air sealed single needle holding container units, which container units support a needle by a friction connection with the usual coupling ferrule thereof while all the air surrounding the needle shank is sterilized by dry heat, for example, oven or like dry heat temperatures of approximately 160 degrees Fahrenheit as required.

Another object is to provide a novel holder

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for vertically supporting a plurality of needle holders specially formed so as to be air tight and individually seal off single needles in spaced apart relation for ready dispensing from each respective needle holder by the coupling action of the end tip of a syringe, whereby the needles are never touched by hand.

A further object is to provide in a dry heat sterilization system, a needle conforming container adapted to co-act with a part of the needle to effect a seal above the needle shank and an end sealing cap adapted to effect a second seal when applied to the ferrule housing and mounting part of the container.

Still a further object is to form the interior of the upper portion of an individual needle holder so that it conforms to the exterior square ferrule of the needle and thereby prevents any twisting or turning of the needle in the holder during the coupling of the syringe tip to the needle.

Yet another object is to provide a novel system for the combined dry sterilization and dispensing of hypodermic needles, comprising the steps of surrounding a plurality of spaced apart needle holders with an air jacket in at least a partially upright position, subjecting the holders to dry heat as by baking in an oven or the like while a needle is sealed therein with the ferrule end of the needle uppermost in a substantially friction tight fit in the holder, and then removing the needle, after a predetermined period of dry heat treatment calculated to sterilize the air around the needle in the sealed holder, by means of a syringe, whereby the needle is not touched by hand and is removed by the syringe for instant injection into the patient.

The above, other objects and novel features of the invention will more fully appear from the following detailed description when the same is read in connection with the accompanying drawings. It is to be expressly understood, however, that the drawings are for the purpose of illustration only and are not intended as a definition of the limits of the invention.

In the drawings, wherein like reference characters refer to like parts throughout the several views:

Figure 1 is a general perspective view partly in cross section of the invention supported on any suitable heater or the like, showing a plurality of hypodermic needle holders in position with the end sealing caps applied and a few of the caps removed for reception of the end tip of a hypodermic syringe.

Figure 2 is a side view in cross section of the arrangement in Fig. 1 partly broken away to conserve space in the drawing sheet.

Figure 3 is a top plan view of the top cap and square needle ferrule receiving portion of one of the needle holders to illustrate the nested position of the needle ferrule therein.

Fig. 4 is a fragmentary detail view showing the taper of the needle tubes and openings in the tube support plate.

Referring in detail to the several figures, there is shown a main supporting receptacle 10 formed with a bottom and side walls comprising a top cover plate 11 honeycombed with a plurality of openings 12. These openings are adapted to receive and mount the surgical instrument holders 13 which as herein illustrated are so shaped and so proportioned as to conform to a standard hypodermic needle 14. The cover plate 11 is formed with a rounded platform 11a, which extends beyond the side of the receptacle 10 and is formed with an opening 16 for holding a detachable storage vessel 17.

The rim of the vessel 17 is formed with a flange 18 adapted to support the same on the surface of the platform surrounding the opening 16.

In Figure 2 of the drawing the needles 14 are shown mounted in their respective container holders 13. The needle container holders comprise an elongated tube 15 corresponding to the shank of the needle and an enlarged cup-like top portion 19 corresponding internally in shape to the exteriorly rectangular ferrule of the needle. This top cup portion 19 opens into the mouth of the tube 15 at the bottom and the mouth of the tube is tapered downwardly toward the end of the tube to make a friction mounting for the tapered nipple 21 of needle 14 mounted therein. The exterior square or rectangular shape of each needle's coupling ferrule 20, and the corresponding rectangular interior of each cup portion 19 of the needle holder 13 serves a special purpose in the dispensing of the needles from the holders after sterilization. For example, to remove the needle the tapered end 22 of the syringe 23, see Fig. 1, is inserted within the correspondingly tapered bore, within the needle's coupling ferrule 20. A shoulder 24 defined by the bottom of the cup portion 19 around the mouth of the tube 15 and an annular land 25 around the tapered nipple 21 of the needle, as shown in Figure 2, are in or adapted to be in abutting relation. Thus any necessary downward pressure and coupling torque or twist between the syringe tip and the needle ferrule can be applied since the rectangular interior sides of the cup 19 and the exterior sides of the ferrule 20 serve to hold the needle 13 fixed, to thereby facilitate coupling to the syringe 23 without handling the needles.

End seal caps 26 formed with finger grip nibs 27 are provided to seal off the interior of each needle holder from outside air. When these end seal caps 26 are applied there is a double seal of the needle 14 in the holder. This is due to the fact, that, as previously stated, the tapered depending nipple 21 of each needle 14 forms a friction seal with the tapered mouth of the tube 15. This double seal effect for each individual needle is very important as it seals in the sterilized air trapped within each tube 15 and the entire needle shank and point are always kept surrounded by air which has been sterilized, until the needle is actually removed for use. On the other hand, with prior art devices, every time a needle is removed from a sterile chamber outside infected air leaks into the chamber, and the chamber is immediately reinfected and so are the other needles therein. Accordingly, the importance of these double sealed individual needle holders 13 is very important for thorough sterilization.

Finally it should be observed that the walls of the cover plate openings 12 are tapered toward the bottom of the receptacle 10 and are adapted to make a friction seal with the outer tapered wall of the tubes 15 just below flange 24 of the cup members 19. Thus when the holders are all in place in the openings 12 air trapped in the receptacle 10 becomes sealed therein and if the holders 13 are kept in place after sterilization the air in receptacle 10 stays sterile and is not opened to outside infested air.

Method of using the device

The general method of using the hereinbefore described structure comprises the steps of placing the cover plate 11 on the top of the receptacle with the platform and its storage vessel 17 in position with extra caps 26 therein. Then the novel needle holders 13 are inserted within the openings 12 of the cover plate in a friction-tight seal between the tapered walls of the openings and the tapered tubes 15. The needle tubes 15 are now ready to receive the needles 14 to be sterilized. Accordingly, a needle is pushed into the upper cup portion of each one of the holders firmly enough to develop a friction seal between the interior or tapered bore of the tube mouth and the tapered nipple 21 of the ferrule 20, so as to seal the needle shank in tube 15. Next the end caps 26 are pressed on and a double seal over the needle shank results.

At this stage, it is obvious that, first, there is air trapped and sealed in the receptacle 10 around the exterior of the tubes 15, second, there is air trapped and sealed inside the tubes 15 around the needle shank. This is a very important feature for thorough sterilization as no air can leak in or out of the device now that the parts are thus sealed.

The next step is to accomplish actual sterilization by placing the entire ensemble in an oven or the like and subjecting the same to dry heat up to a predetermined temperature of 160 degrees Fahrenheit or more for a predetermined time calculated to thoroughly sterilize the air trapped within the receptacle 10 and needle holder tubes 15.

After the sterilization period the ensemble is removed from the oven and the sealed-in air remains sterile in each separate needle tube 15, until the end cap 26 thereof is removed to the storage vessel 17, and also the needle per se by means of a syringe is removed and injected into a patient. Obviously, removal of an end cap 26 and a needle from one of the holders has no effect on the others and the air remains sterile in each separate holder.

Thus I have provided by my invention an individual needle sterilizing, holding and disposing system for dry heat treatment, which is free of possible reinfection from outside exposure before actual use is made of each of a plurality of individually mounted sterilized needles.

Without further description, it is thought that the features and advantages of the invention will be readily apparent to those skilled in the art, and it will of course be understood that changes in form, proportion, arrangement of parts, and method steps, and minor details of

construction may be resorted to, without departing from the spirit of the invention and scope of the appended claims.

I claim:

1. Apparatus for sterilizing hypodermic needles by dry heat comprising a receptacle having air-tight bottom and side walls, a top cover plate formed with a plurality of openings having tapered walls over the top of the receptacle, individual needle holders formed with cup-like portions and tapered elongated needle tube extending from around an opening in the bottom of said cup-like portion, said tapered part of the exterior of the tube being adapted to frictionally fit in one of said tapered walled openings to seal the same, the internal bore of the mouth of the needle tube around the opening in the bottom of said cup-like portion also being tapered and sealable by the nipple end of a hypodermic needle ferrule mounted in the needle holder, whereby air is sealed in said receptacle by mounting separate containers in each of said openings in the said cover plate and by the needle in each needle container for sterilization by application of dry heat to the said apparatus.

2. A hypodermic needle holder formed with a cup portion having interior side walls defined into a socket adapted to conform to the exterior of the ferrule of a hypodermic needle, said cup portion being formed with a centrally positioned opening in the bottom, and a tube for receiving the shank of a needle having an open mouth around the said opening in the cup bottom adapted to cooperate with the exterior walls of the ferrule of a hypodermic needle when the same is inserted in the holder to seal the cup

opening at the mouth of the tube above the shank of the needle and a sealing cap adapted to serve as a closure for said cup portion.

3. A hypodermic needle holder comprising a ferrule holding cup portion and a depending needle shank tube portion, said cup portion being formed with an internal square socket adapted to conform to the square ferrule of a hypodermic needle and said tube having a tapered internal bore opening from the bottom of said cup adapted to form a seal with the tapered nipple extending from the ferrule of the needle above the needle shank, and a cap adapted to form a second seal above the needle shank when applied to the cup portion of the holder.

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