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SYRINGE-CONTAINER STRUCTURE

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2 Sheets-Sheet 1

Fig. 1

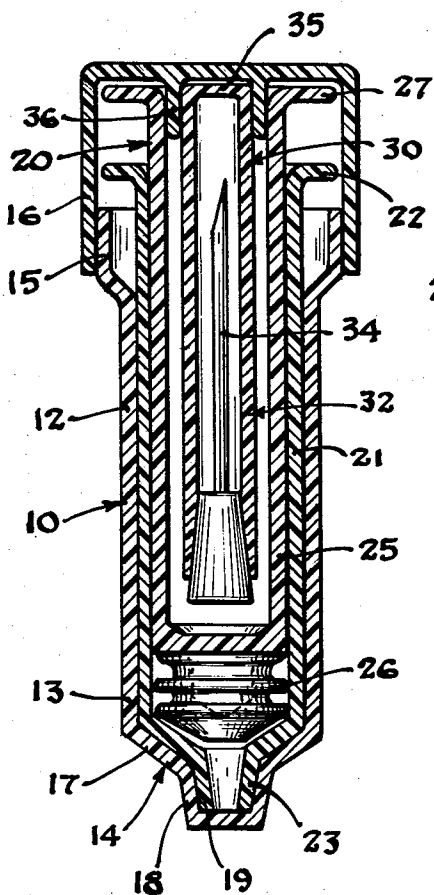
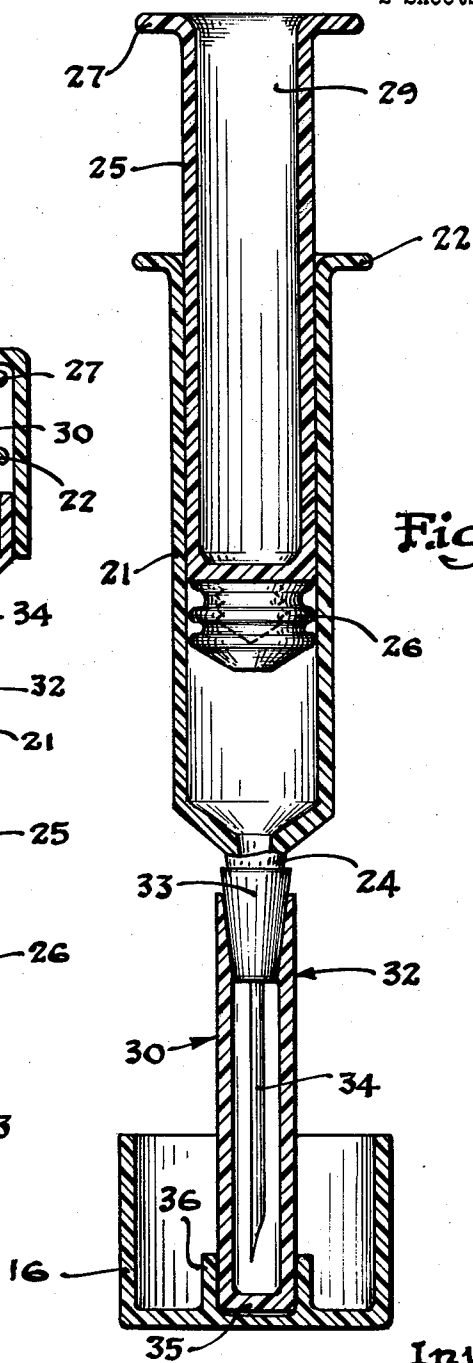


Fig. 2



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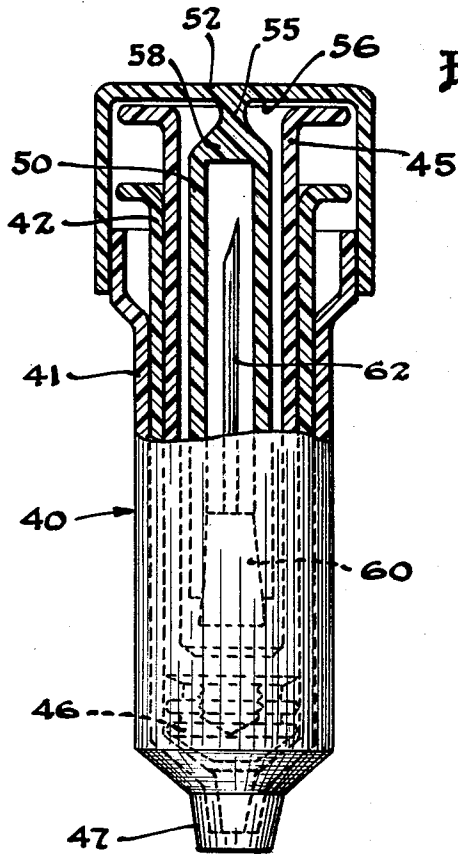


Fig. 3

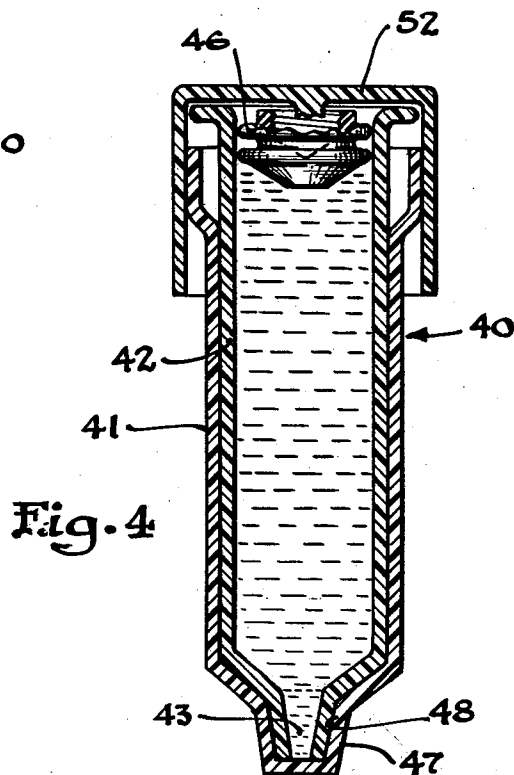


Fig. 4

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SYRINGE-CONTAINER STRUCTURE

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The present invention relates generally to a container structure which cooperatively engages with a medicinal apparatus which must be maintained in a sterile condition, and more particularly to a novel hypodermic syringe-container structure which maintains a hypodermic syringe or syringe assembly part retained therein in a sterile condition.

With the increased usage of disposable venoclysis equipment designed to be used only once and thereafter discarded in order to avoid the expense and dangers incidental to sterilization and reuse, the problem of supplying such equipment to the user in a convenient package and in a completely sterile condition has become of great practical importance. If the purchaser or ultimate user is not able to rely on the equipment being in a sterile condition as supplied by the manufacturer, much of the advantage over the reusable equipment is lost. Also, if the equipment is packaged in such a manner that during the assembly into operative arrangement, there is considerable danger of contaminating the equipment, the utility of the equipment is to a great degree lost.

The use of disposable venoclysis equipment, such as a hypodermic syringe, also presents a special problem concerning the safe handling and disposal of the equipment after it has been used because of the great danger of spreading pathogenic disease or the like by accidental contact with the fluid which remains on the equipment. It is therefore important to eliminate or reduce as much as possible exposing those using and handling the equipment to the fluid-contaminated parts thereof.

Heretofore, rigid plastic containers have been devised which are adapted to receive an individual hypodermic syringe for handling and storage. Certain of these rigid containers protect a syringe against bacterial contamination, corrosion, and other physical damage, while the syringe remains within the container. However, in those containers in which the syringe is disassembled, the syringe cannot be rapidly and conveniently removed and assembled into operating position without danger of contaminating the parts. When the syringe is removed from the container of the foregoing type, it must be handled with great care to avoid, for example, contaminating the needle cannula.

Accordingly, it is an important object of the present invention to provide an improved sterile container for a hypodermic syringe structure.

It is also an object of the present invention to provide an improved container for a hypodermic syringe unit which permits more rapid and convenient assembly of said syringe into operative arrangement with a minimum exposure of the hypodermic syringe parts to contamination.

It is another object of the present invention to provide an improved sterile container for a hypodermic syringe which occupies a minimum space and which nevertheless can be assembled with minimum danger of contamination of the parts thereof.

It is a further object of the present invention to provide an improved container for the convenient and safe disposal of a hypodermic syringe after a single use thereof.

It is a still further object of the present invention to provide an improved syringe-container for the safe and

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convenient storage and handling of a medicinal preparation or biological fluid.

Other objects of the present invention will be apparent to those skilled in the art from the detailed description and claims to follow when read in conjunction with the accompanying drawing wherein:

FIGURE 1 is a vertical longitudinal sectional view of a hypodermic syringe-container with a hypodermic syringe contained therein in accordance with the present invention.

FIGURE 2 is a vertical longitudinal sectional view of the syringe of FIGURE 1 with the parts in operative association and with the hypodermic needle cannula sheath in engagement with both the needle hub and container closure cap.

FIGURE 3 is a side elevational view partially in vertical section of a modified form of the hypodermic syringe and container assembly of the present invention.

FIGURE 4 is a vertical longitudinal sectional view of a hypodermic syringe barrel section of the present invention containing a fluid and sealably enclosed within the container of the present invention.

The foregoing objects of the present invention and others which will be apparent to those skilled in the art are achieved by providing a generally cylindrical container body section which is closed at one end by an integral end wall and open at its other end to permit insertion and withdrawal therethrough of a hypodermic syringe structure. The end wall of the body section is preferably provided with a small diameter tapered axial portion which is adapted to sealably engage a similarly tapered outlet portion of a hypodermic syringe. The upper or open end of the said body section is closed by a cap member which frictionally engages the upper end of the body section to form a bacterial seal therewith.

As an additional important feature of the present invention, the cap member has means associated therewith adapted to have detachably secured thereto a hypodermic needle sheath nested within an axial opening in the hypodermic syringe assembly and having a hypodermic needle held in the sheath. It will be apparent that when the closure cap member is removed from the container body section, the hypodermic cannula sheath and hypodermic needle therein are simultaneously removed without the necessity of the operator touching the sheath, the needle, or other part of the hypodermic syringe. Also, the hypodermic needle can be mounted on the outlet of the syringe without removal thereof from the sheath and without manually contacting the said hypodermic needle. If desired, the cap member can be readily separated from the sheath whenever desired and can be used thereafter to sealably enclose the syringe barrel or syringe assembly within the body section of the container. When the syringe barrel section is used for collecting a fluid or as a medicinal container, the barrel section containing a fluid material can be sealably and protectively stored in the container body section. The syringe barrel section at its lower end forms a sealing engagement with the lower end of the container body section and has the upper end thereof sealed by the piston tip.

In the specific embodiment of the present invention shown in FIGURES 1 and 2 of the drawing, the container 10 is formed of a generally hollow cylindrical body section 12 which is closed at its lower end by a stepwise inwardly tapering end wall 14 integral with the lateral wall 13 of the body section 12 and a closure cap member 16 closing the upper end of the body section 12. The upper end of the body section 12 is unobstructed to permit insertion and withdrawal therethrough of a hypodermic syringe assembly 20. The extreme upper end portion of the body section 12 is preferably provided with an enlarged diameter section 15 to accommodate an outwardly

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flared portion of the syringe assembly 20. In order to maintain the syringe assembly 20 in a sterile condition within the container body section 12, the closure cap 16 mounted on the enlarged section 15 is adapted to frictionally engage the section 15 to form a bacterial seal therewith.

The lower end wall 14 of the body section 12 has a first inwardly and downwardly tapered section 17 and a second downwardly and inwardly tapered section 18 which provides a frusto-conical axial recess portion. The inner lateral surface 19 of the tapered section 18 is adapted to form a sealing engagement with the lower end portion of a hypodermic syringe. The surface 19 preferably has a standard Luer taper.

The hypodermic syringe assembly 20 is comprised of a generally hollow cylindrical syringe barrel section 21 having an exterior diameter slightly smaller than the interior diameter of the container body section 12. The outer end of the barrel section 21 is flared outwardly, as at 22, to provide a finger grip section. The barrel section 21 has a length slightly greater than the body section 12 so that the barrel section 21 projects slightly beyond the end of the body section 12 to facilitate removal thereof from the container. The lower end of the syringe body section 21 has a small diameter axial discharge outlet 23 which is defined by a forwardly extending tubular portion 24 having the outer lateral wall tapered inwardly to provide a standard Luer taper thereon. The tubular portion 24 is dimensioned such that it forms a sealable engagement with surface 19 of the container body section 12.

A hollow cylindrical piston member 25 with a conventional sealing piston tip 26 mounted on the forward end thereof is reciprocally disposed within the syringe barrel section 21. The piston member 25 has the outer end flared outwardly, as at 27, to provide a bearing surface for an operator's thumb during manipulation thereof. The piston member 25 is also slightly longer than the barrel section 21 so that it projects beyond the end of the body section 12.

A hypodermic needle protective sheath member 30 having a hypodermic needle assembly 32 removably held therein is disposed within the hollow cylindrical interior of the piston member 25, as best shown in FIGURE 1 of the drawing. The sheath member 30 is held within the axial opening in the piston member 25 with the closed end 35 extending upwardly toward the cap member 16 and having the hypodermic hub assembly 32 mounted in the open lower end thereof. The hub 33 of the handle assembly 32 removably engages the open end of the sheath 30 so that the needle cannula 34 is protectively enclosed within the sheath 30.

The upper closed end portion 35 of the sheath 30, in accordance with the present invention, is integrally associated with the container closure cap 16 by providing on the interior surface of cap 16 an axially extending annular section 36 forming a cylindrical recess into which the end portion 35 of the sheath 30 is inserted to form a frictional engagement therewith. The end portion 35 of the sheath 30 preferably has a diameter slightly larger than the cylindrical recess portion of the annular section 36 so that the respective interengaging parts can be press fitted together but can be readily separated when desired.

In the embodiment of the present invention shown in FIGURE 3 of the drawing, the cylindrical body section 41 of the container 40, the syringe barrel section 42, and the piston member 45 have the same form and function as the corresponding parts of the structure shown in FIGURE 1. The modified form of FIGURE 3 differs from the previously described embodiment of FIGURE 1, however, in that the sheath 50 and the closure cap member 52 are connected integrally by means of a readily frangible neck section 55 extending between and integral with the inner transverse surface 56 of the cap 52 and

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the closed end wall 53 of the sheath 50. The frangible neck section 55 is preferably molded integrally with the sheath 50 and cap member 52 although other means of integrally forming the parts can be used, as by fusing one part to the other by the application of heat to one or both of the said parts. The hypodermic needle assembly 60 is removably mounted in the open end of the sheath 50 to protectively enclose therein the hypodermic needle cannula 62.

It will be apparent that the sheath 50 and the hypodermic needle assembly 60 held therein will be removed from the interior of the piston member 45 and the container body section 41 when the cap member 52 is removed from the end of the body section 41. The needle assembly 60 is thus adapted to be mounted on the discharge outlet of a hypodermic syringe in the same manner as in the previous embodiment with minimum danger of bacterial contamination.

The integrally connected sheath 50 and cap member 52 can be separated either before or after the needle assembly 60 is mounted on the discharge outlet 43 of the hypodermic syringe by causing the cap member 52 to rotate relative to the sheath 50. If desired, however, the cap 52 and sheath 50 can be allowed to remain connected integrally so that the cap member 52 serves as a support for the needle assembly 60 and hypodermic syringe, in the same manner as shown in FIGURE 2 of the drawing.

After the hypodermic syringe has been used to collect a fluid sample, such as blood, it is frequently necessary to transport the sample to a laboratory where the sample is analyzed, tested, centrifuged to separate into its components or the like. The container of the present invention is particularly suited to facilitate the safe and convenient transport and handling of such a fluid sample. Thus, for example, the syringe barrel section 42 disposed in an inverted position with a sealing piston tip 46 sealably mounted adjacent the open end thereof spaced from the discharge outlet 43 and having a fluid sample substantially completely filling the interior thereof is inserted into the body section 41 while it is held in a substantially vertical position with the tapered portion 47 of the closed end thereof uppermost until the outer surface of the tapered portion 48 of the syringe barrel section 42 forms a sealing engagement with the inner surface of the tapered portion 47. The container body section 41 can then be held in any position without danger of loss of the fluid sample therein, since the fluid is sealably held within the barrel section 42 between the sealing tip 46 and the interengaging surfaces 47 and 48. The closure cap member 52 is then mounted over the end of the body section 41 to provide an additional bacterial seal, as best shown in FIGURE 4 of the drawing.

The container-syringe assembly in the form shown in FIGURE 4 is adapted for convenient and safe usage in a standard centrifuge cup. Thus it will be apparent that the fluid sample sealably held within the syringe barrel 42 after centrifuging can be readily separated into distinct fractions simply by moving the piston tip 46 inwardly in the barrel section 42 to eject one or more of the separate components from the outlet under the syringe barrel after removal thereof from the container 40.

It will also be evident that the syringe-container assembly shown in FIGURE 4 of the drawing can be used as a convenient and safe package or container for a medication. Thus, by filling the hypodermic syringe barrel 42 with a medicament with the upper end thereof sealed by the plunger tip 46 and having the lower end thereof forming a sealing engagement with the tapered portion 47 of the container body section 41, the medicament is sealably held therein free of bacterial contamination. The cap member 52 mounted on the upper end of the container body section 41 provides an additional bacterial seal to prevent contamination of the plunger tip 46. The cap member 52 in the latter structure will be preferably sealably secured to the body section 41 by a frangible seal.

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After the hypodermic syringe has been used for its intended purpose and is ready for disposal, it will be readily apparent that the container of the present invention is adapted to be used for the safe and convenient disposal of the syringe. When the container is used for the latter purpose it will be clear to those skilled in the art that the hypodermic syringe and needle is simply inserted into the container body section with the several parts in the relative positions shown in FIGURE 1 or FIGURE 3 of the drawing.

The several parts of the container and the syringe with the exception of the needle cannula are preferably made of a plastic materials, such as polyethylene, polypropylene, styrene or other plastic materials having similar chemical and physical properties. If desired, however, other materials can be used for one or more of the several parts without departing from the present invention.

Others may practice the invention in any of the numerous ways which are suggested to one skilled in the art by this disclosure, and all such practices of invention are considered to be a part hereof which fall within the scope of the appended claims.

I claim:

1. A container and hypodermic syringe assembly which comprises a generally cylindrical container body section closed at one end by an integral end wall and having an opposite end open and having accommodated therein a cylindrical hypodermic syringe barrel, said barrel having a piston member slidably disposed therein and said piston member having a cylindrical axial recess extending substantially the entire length thereof, a sheath member with a hypodermic needle removably mounted therein disposed within said recess of the piston member with the uppermost end of said sheath closed by an integral end wall, a closure cap member mounted on said container body section and said end wall of the sheath member being in detachable engagement with said closure cap member mounted on the end of said container body section; whereby said sheath member and hypodermic needle are removable from said barrel and container body section when said cap member is removed from said body section.

2. A container as in claim 1 wherein the said end wall of the sheath member is connected with said cap member by an integral frangible section.

3. A container as in claim 1 wherein the said end wall of the sheath is removably connected with said cap member by means of a frictional telescopic engagement therewith.

4. A container as in claim 1 wherein said closure cap member has an annular section projecting from an inner surface of said cap member which is adapted to engage simultaneously an end portion of said sheath and said barrel, thereby preventing entry of contaminants into the cylindrical axial recess of said barrel.

5. A container and hypodermic syringe assembly which comprises; a generally cylindrical container body section closed at one end by an integral end wall and having the opposite end open and having a hypodermic syringe barrel extending into the interior thereof, said barrel having a piston member slidably disposed therein and said piston member having an axial recess therein, a tubular sheath member with a hypodermic needle removably mounted in one end of said sheath member and disposed within said recess, a closure cap member removably mounted on said container body section and said closure cap member adapted to engage the opposite end of said sheath member and said piston member and sealably supporting said sheath member within said piston member whereby said sheath member and hypodermic needle mounted therein are removed from said barrel and container body section as a unit when said cap member is removed from said body section.

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6. A container and hypodermic syringe assembly which comprises; a container body section closed at one end by an integral end wall and open at the opposite end and having supported therein a hypodermic syringe barrel with a reduced diameter discharge outlet at one end, said end wall having a portion thereof formed to provide a surface which sealably engages with said discharge outlet of said hypodermic syringe barrel, a closure cap member removably mounted on said opposite end of said body section retaining said barrel within said container body section free of bacterial contamination, said closure cap member having detachably associated therewith on the inner surface thereof a protective hypodermic needle sheath with a hypodermic needle removably mounted therein and extending into the interior of said barrel, and said sheath being integrally joined to the inner surface of said cap member by a frangible section.

7. A container and hypodermic syringe assembly which comprises; a container body section closed at one end by an integral end wall and open at the opposite end and having supported therein a hypodermic syringe barrel with a reduced diameter discharge outlet at one end, said end wall having a portion thereof formed to provide a surface which sealably engages with a lateral surface of said discharge outlet of said hypodermic syringe barrel, a closure cap member removably mounted on said opposite end of said body section retaining said barrel within said container body section free of bacterial contamination, said closure cap member having detachably associated therewith on the inner surface thereof a protective hypodermic needle sheath with a hypodermic needle removably mounted therein and extending into the interior of said barrel, said sheath being supported within said cap member by forming a frictional telescopic engagement with said cap member and being removable from said barrel as a unit with said cap member.

8. A container and hypodermic syringe assembly as in claim 7, wherein said frictional telescopic engagement in addition to supporting said sheath is adapted to prevent contamination of the interior of said sheath and said hypodermic needle removably mounted in said sheath.

9. A hypodermic syringe package comprising; a container body section closed at one end by an integral end wall and having a substantially unobstructed opening at the opposite end to permit insertion of a hypodermic syringe barrel, said end wall of said container body section having an axially projecting section with a portion thereof forming a surface which is adapted to form a sealable engagement with a discharge outlet of a hypodermic syringe barrel, a hypodermic syringe barrel disposed within said container body section with a reduced diameter discharge outlet in sealing engagement with said axially projecting section of said end wall, said syringe barrel having a piston tip sealably disposed therein spaced from said discharge outlet, a closure cap member removably mounted on said opposite end of said body section frictionally engaging said body section to retain said barrel in said container body section free of bacterial contamination, and a flowable material sealably contained in said syringe barrel between said piston tip and the sealing engagement formed between said discharge outlet and said end wall surface.

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