United States Patent

Narusawa et al.

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[54] **METHOD OF AND DEVICE FOR PRESERVING DRUGS FOR INJECTION**

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Related U.S. Application Data

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[30] **Foreign Application Priority Data**

Jan. 9, 1969 Japan 44/1840

[52] **U.S. Cl.** .....**53/21 R**

[51] **Int. Cl.** **B65b 55/00**

[58] **Field of Search**.....53/21; 206/63.2 R; 128/272

[56] **References Cited**

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[57] **ABSTRACT**

A drug preservation container unit for use in connection with injection. It comprises a vertically elongated casing sealed with a cap and a needle assembly held in an upright position within said casing, said needle assembly containing a freeze-drying-processed drug for use in injection and arranged to be connected to a syringe. The unit contains such drug in such a small quantity as to be conveniently dispensed to a small number of persons. The invention also provides a method of preserving drugs for use in injection in such a small quantity as mentioned above, comprising applying freeze-drying to the drug.

1 Claim, 4 Drawing Figures

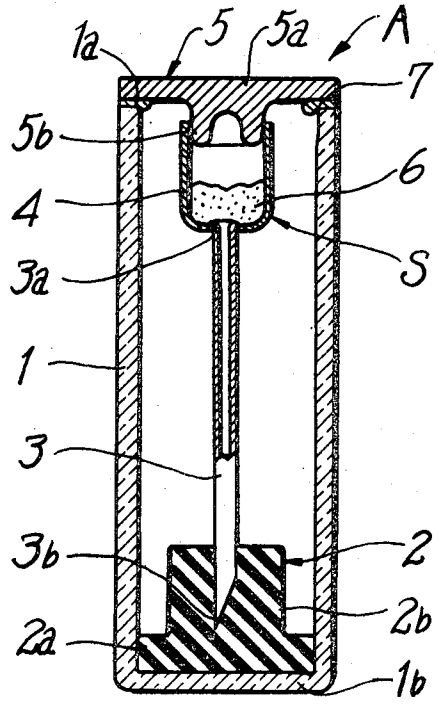


Fig-1

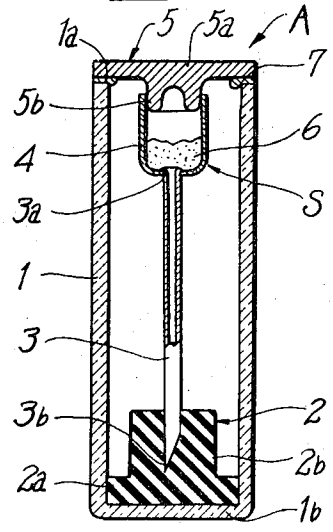


Fig-2

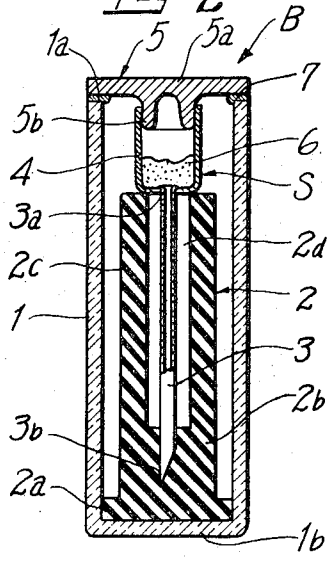


Fig-3

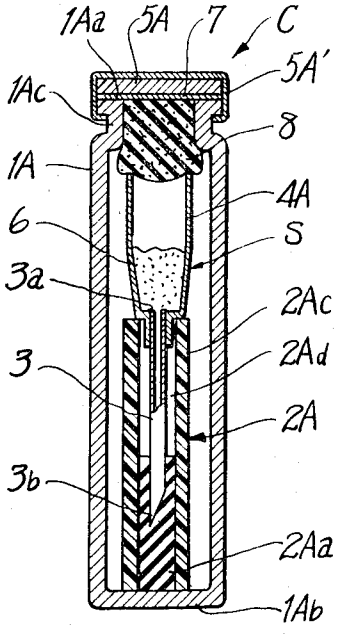
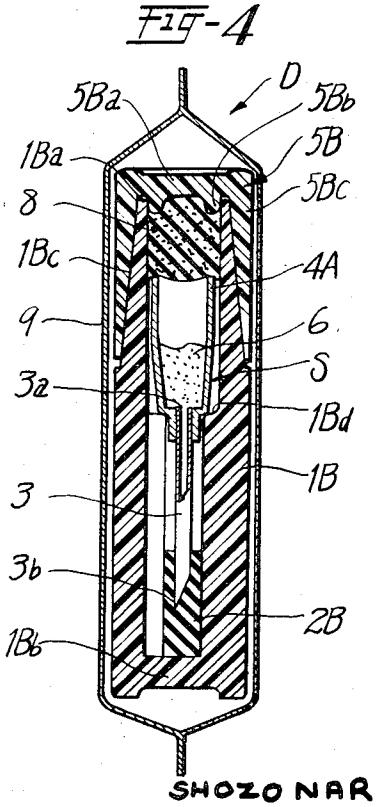


Fig-4



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METHOD OF AND DEVICE FOR PRESERVING DRUGS FOR INJECTION

This is a division of application Ser. No. 191, filed Jan. 2, 1970.

SUMMARY OF THE INVENTION

This invention relates to a method of and device for preserving drugs, and more particularly to a method of and device for preserving inoculums, such as BCG, PPD etc., or other drugs for injection, such as SLO, in such a small quantity as to be used for a small number of persons such, for example, as several persons.

In general, inoculums for use in preventive inoculation are preserved in large containers, such as a large bottle, capable of containing such inoculums for a large number of persons, such, for example, as 20 to 100 or more, for the purpose of making a collective inoculation.

However, when it is desired to inoculate only several persons or less, to open such container containing such a large amount of inoculum is disadvantageous from an economical point of view, since once the container is opened and part of the contents is used, the remainder is inevitably wasted.

On the other hand, in the case a small amount of inoculum is preserved in a small bottle or the like, the disadvantage is that lots of the inoculum contained in the container, for example, more than a half of it will adhere to the interior face of the container and will become useless.

The present invention is intended to eliminate such inconveniences and disadvantages indicated with conventional containers of this kind.

It is, therefore, one object of the present invention to provide a device for preserving inoculums, injections or other drugs for use in injection in such a small quantity as to be suitable for use for a small number of persons such, for example, as several persons or less, so that when it is desired to inoculate or inject such a small number of persons, the injector can economically use the drug preserved in the container.

It is another object of the present invention to provide a drug container unit for use in connection with inoculation or injection, comprising a needle assembly and a drug for injection preserved in said needle assembly, and adapted to be used conveniently.

It is a further object of the present invention to provide a drug container unit of the type stated, which is small in size and light in weight so as to be freely portable.

It is a still further object of the present invention to provide a method of preserving drugs for use in injection in such a small quantity as to be conveniently dispensed to a small number of persons, such, for example, as several persons or less.

It is yet another object of the invention to provide a method for the purpose stated, which is capable of preserving drugs for a considerably long period of time.

These and other objects and advantages of the invention will become apparent upon reading the following detailed description of the invention in conjunction with the accompanying drawings in which:

FIGS. 1 through 4 are longitudinal cross-sectional views, in an enlarged scale, of embodiments of the present invention, respectively.

In the drawing like portions or parts are designated with like characters or numerals.

Referring to FIG. 1, there is shown a drug preservation container unit A for use in inoculation or injection. The unit A comprises a relatively small vertically elongated cylindrical casing 1 with its upper end 1a opened which may be made of a glass, a metal or a synthetic resin, a support member 2 made of a flexible and soft rubber or synthetic resin, a needle assembly S composed of a needle 3 and a cup member 4 fixed to the base 3*a* of the needle and intercommucicating with the needle, and a cap 5 for closing the opening of the casing 1.

The support member 2 is provided with a base portion 2*a* adapted to be snugly inserted in the casing 1 and to be placed on the bottom wall 1*b*, and with a protrusion 2*b* protruding upwardly from the upper face of the base portion 2*a* and adapted to be pricked by the sharpened tip 3*b* of needle 3.

The cap 5 has a flat portion 5*a* having the diameter corresponding substantially to the outside diameter of the cylindrical casing 1 and is provided with an inverted cup-shaped portion 5*b* depending from the flat portion 5*a* and arranged to be snugly inserted in the cup member 4 of needle assembly S.

The depth or height of the casing 1 is designed so that when the cap 5 is placed on the upper end 1*a* of casing 1 after the needle 3 of the needle assembly S has been stuck into the support 2 at its tip portion, the cup-shaped portion 5*b* of the cap is brought into engagement with the upper portion of the inner peripheral face of cup member 4 of the needle assembly.

Before sealing the upper opening of casing 1, and after the needle assembly S has been vertically held within the casing 1 by pricking the tip 3*b* of needle 3 into the support member 2, a predetermined amount of inoculum 6 or drug for injection is put into the cup member 4. In this case, the inoculum or drug thus put into the cup member is prevented from flowing off through the needle 3, because the opening of the tip 3*b* is sealingly closed by the portion, surrounding the tip portion, of the elastic support 2 which is in pressure contact with said tip portion. Then, the inoculum or drug in the cup member 4 is subjected to application of the process of freeze-drying which is often applied to, for example, foods for preservation.

Upon application of the process of freeze-drying to the drug, the upper opening of casing 1 is sealed with the cap 5 airtight by interposing between the entire top face of casing 1 and the under-side of the cap 5 a packing material 7 and by applying a pressure to said cap to press the same against the top face of said casing. The packing material which is suitable for use in the sealing is, for example, an atactic polypropylene, an atactic polyethylene, their mixed compounds, etc. In the illustrated embodiment, the casing 1 is sealed under a reduced atmospheric pressure.

When it is desired to use the container unit A for inoculation or injection, first, the cap 5 is removed and the needle assembly S is drawn out and attached to the glass cylinder of a conventional syringe, not shown, and then a necessary liquid for dissolving the contents is fed into the cup member 4 through the needle 3 by manipulating the plunger of the syringe in conventional manner. With this operation, the preserved contents is

easily soluble and flows into the glass cylinder in a liquid state, thus enabling the injector to practice injection.

The drugs to be preserved in accordance with the present invention may either be of liquid or powder or of any other form as long as they are for use in injection and are suited for the application of the process of freeze-drying.

Referring now to FIG. 2, there is shown a variant B of the drug preservation container unit A shown in FIG. 1. As shown in FIG. 2, the unit B is provided with a cup-like portion 2*c* having bore 2*d* and extending vertically upwardly from the protruding portion 2*b* of the support 2. The depth of the bore 2*d* is made slightly shorter than the length of the needle 3 so that when the needle 3 is stuck at its tip into the protruding portion 2*b*, the cup member 4 of the needle assembly S is brought into contact at its bottom portion with the top surface of the cup-like portion 2*c*, thereby enabling the needle assembly S to be securely supported by the support member 2.

Thus, the embodiment illustrated in FIG. 2 is the same as the embodiment previously described in construction, with the exception of the provision of the cup-like portion 2*c*. The manner of assembling the unit and the method of preserving drugs in this instance are also the same as those in the first embodiment and further description as to these and other matters will be omitted.

Referring now to FIG. 3, there is shown another drug preservation container unit C according to the present invention. In the illustrated embodiment, the casing 1A is made of a metal, such as aluminum and is provided at its upper portion adjacent the upper end 1A*a* with a contracted portion 1A*c* defining the upper opening of the casing. The support 2A inserted in the casing 1A is composed of an open-ended cylinder 2A*c* of plastics, such as polyethylene, and a pad member 2A*a* of flexible and soft rubber or plastics into which the tip portion of the needle 3 is stuck. The support 2A is placed on the bottom 1A*b* of casing 1A in an upright position, as shown.

The cup member 4A of the needle assembly S vertically supported by the support 2A within casing 1A is covered with a packing 8 of plastics, such as an urethane foam, inserted in the upper opening of casing 1A. After the packing 8 has been inserted in the opening, the casing 1A is sealed with a flat cap 5A with the intermediary of the packing material 7 previously described. In the illustrated embodiment, the casing 1A is sealed under a reduced atmospheric pressure.

After the opening of casing 1A has been sealed with cap 5A, the head portion of casing 1A with cap 5A is covered with an aluminum foil 5A' for the purpose of protection of the cap 5A.

The manner of assembling the unit C and the method of preserving drugs in this instance are almost the same as those in the second embodiment B and further description as to these and other matters will not be made.

Referring now to FIG. 4, there is depicted another drug preservation container unit D according to the invention. In this embodiment, the casing 1B is made of a solid synthetic resin and is tapered inwardly upwardly at 1B*c* and terminates in the open end 1B*a*. The casing 1B is also formed inside thereof with shoulder portions 1B*d* for receiving the lower portion of cup member 4B of the needle assembly S. A support member 2B is inserted in the casing 1B and placed on the bottom 1B*b* of casing 1B.

The cap 5B is provided with a cylindrical skirt 5B*c* depending from the top portion 5B*a* and having the same diameter as the casing 1B, and also with an inverted cup-like portion 5B*b*, and is arranged to be snugly mounted on the tapered portion 1B*c* of the casing 1B. In this embodiment, the casing 1B is sealed with the cap 5B under a normal atmospheric pressure. The casing 1B covered with the cap 5B is packed with an aluminum foil 9, as shown in FIG. 4, to prevent moisture. In this instance, the casing 1B is preferably filled with nitrogen gas. The manner of assembling the unit and the method of preserving drugs in this instance are almost the same as those of the foregoing embodiments and, to avoid repetition further explanation as to these and other matters will be omitted.

As may be seen from the foregoing, in accordance with the present invention, the drug for use in inoculation or injection is preserved in the cup member of the needle assembly and, for example, when several persons are inoculated with the preserved substance, the inoculation for at least the first person can be made by the needle without using other needle. Further, in accordance with the invention, the tip of the needle is protected by the flexible support by being kept stuck into therein, so that the tip of the needle can be kept free from damage.

What we claim is:

1. A method of preserving a drug for use in injection, comprising the steps of: providing a support of flexible and soft rubber in a relatively small vertically elongated casing at the lower portion thereof; sticking the tip portion of a needle into said support, said needle having at its base a cup member arranged to be connected to the cylinder of a syringe; putting in said cup member the drug to be preserved, applying the process of freeze-drying to said drug; and sealing said casing and said cup member of said needle assembly.

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