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(54) NEEDLE GUARDING DEVICE FOR AN INJECTION NEEDLE

(71) I, SHIGEO OIWA of No. 10-6, 2-Chome, Nishimaiko, Tarumiku, Kobe, Japan, a Japanese Subject do hereby declare the invention, for which I pray that a patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The present invention is concerned with a needle guarding device for an injection needle for providing filtration of an injection solution during drawing of the solution into a syringe from a supply of the solution by way of the needle and needle guarding device.

When ampoules containing solutions are cut at the neck to give injections, fine fragments of glass formed pass into the solution and can thus be introduced into the body, together with the solution. Ever since this problem arose in the field of medication, various devices, including various adaptors, have been proposed in an attempt to free the injection solution from glass fragments but none of these devices are satisfactory because some are of complex construction and others are inconvenient to use.

I have made intensive investigations to provide a device for removing glass fragments which fulfils the requirements of being simple in structure, convenient to use and capable of removing any glass fragments and have found that fine glass fragments can be readily filtered off for removal by the use of a tube covering the injection needle and having one end intimately fitted to the base portion of the needle and the other end packed with a filter medium, because the interior of the tube is subjected to reduced pressure when the needle withdraws the injection solution from an ampoule with the latter end immersed in the solution, permitting the whole solution to be withdrawn from the ampoule through the filter medium.

Thus, according to the present invention, there is provided a needle guarding device

for an injection needle for providing filtration of an injection solution during drawing of an injection solution into a syringe from a supply of the solution by way of the needle and needle guarding device, the needle guarding device comprising a tube having at one end a portion intimately fittable to a syringe-end portion of the injection needle and packed with a filter medium at the other end of the tube, said filter medium being held in place by at least one internal projection in the tube.

The present invention will now be described in more detail, with reference to the accompanying drawings, in which:

Fig. 1 is a plan view, partly broken away, showing an injection withdrawing device according to the present invention; Fig. 2 is a side elevation, partly broken away, showing an injection withdrawing device according to the present invention; Figs. 3 and 4 are side elevations, partly broken away, showing the withdrawing devices of Figs. 1 and 2 in different modes of application; and Fig. 5 is a side elevation, partly broken away, showing another embodiment of the withdrawing device according to the present invention.

Tube 1, which is usually made of a soft or hard synthetic resin or of a light metal, such as aluminum, has a length such that, when the tube is intimately fitted at one end to the base portion 11 of an injection needle 10, a filter medium 2 packed in the other end, i.e. the front end, of the tube will be positioned slightly in front of the tip of the needle 10. The tube 1 has an internal diameter sufficient freely to accommodate a needle 10 therein and is usually 2 to 3 mm in inside diameter. Preferably, the tube 1 has an oblique front end extremity, which will eliminate the difficulty, otherwise encountered, in withdrawing the solution owing to the intimate contact of the tube front end with the inner surface of an ampoule. The tube 1, when made of a flexible soft synthetic resin, can be intimately fitted to the base portion 11 of

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the needle merely by being forced into fitting contact therewith, so that the tube need not be provided with a particular portion 1a intimately fittable to the needle base portion 11. However, when the tube 1 is made of a non-flexible material, such as a hard synthetic resin, the tube may be provided with a fitting portion 1a, as shown in Fig. 5, and conforming to the shape of the needle base portion 11.

Preferably, the base portion 11 of the needle is circular in cross-section and tapered to render the tube 1 easily and completely fittable to the base portion in intimate contact therewith.

Although not shown, the needle base portion 11 may be provided on its outer periphery with an appropriate engaging projection which will then ensure more effective and intimate contact between the tube 1 and the needle base portion 11.

Examples of the filter medium 2 to be packed in the front end of the tube 1 include polyurethane foam or a mass of fine fibres, such as of a polyester, polypropylene, polyamide or the like. The thickness of the layer of the filter medium 2 can be determined depending upon the nature of the material thereof, the density of the filter medium 2 packed in the tube 1 and the like. The density of the filter medium 2 can be adjusted according to the material and/or the amount of filter medium to be used. The density of the filter medium 2 can also be adjusted after the filter medium 2 has been packed in the tube 1, for example by shrinking a part of the peripheral wall of the filter medium 2 by hot pressing or by permanently deforming by cold pressing. It is preferable for the filter medium 2 to have a plurality of pores of 3 to 5 μ diameter.

The filter medium 2 is usually packed into the tube 1 by forcing it into the tube 1 from the front end thereof. To pack the filter medium 2 in a specified position, the tube may be provided with an internal projection 3 at the opposite ends of the portion where the filter medium 2 is to be positioned so as to render the inserted filter medium retainable, to a certain degree, by the projection 3. This is desirable since the filter medium 2 can be retained in the tube 1 against displacement during transport or use.

The solution-withdrawing device of the present invention has the construction described above and is used in the following manner. The fitting portion 1a of the tube 1 is appropriately intimately fitted to the base portion 11 of the injection needle 10, the front end of the tube is then immersed in the solution in an ampoule and the solution is withdrawn into the barrel of the syringe in the usual way. At this time, a vacuum is produced within the tube 1, causing the

solution to flow into the needle through the filter medium 2 so that any glass fragments contained in the ampoule will be filtered off and removed. Upon completion of the withdrawal of the solution, the tube 1 is removed from the needle base portion 11 to enable an injection to be given in the usual manner.

The solution-withdrawing device of the present invention has the advantages of being inexpensive to make because of its simple construction, permitting the ready withdrawal of the solution because filtration is effected over a relatively large area, and being capable of completely removing foreign matter, such as glass fragments, because the solution is withdrawn wholly through the filter medium 2.

WHAT WE CLAIM IS:—

1. A needle guarding device for an injection needle for providing filtration of an injection solution during drawing of the solution into a syringe from a supply of the solution by way of the needle and needle guarding device, the needle guarding device comprising a tube having at one end a portion intimately fittable to a syringe-end base portion of the injection needle and packed with a filter medium at the other end of the tube, said filter medium being held in place by at least one interval projection in the tube.

2. A device according to claim 1, which is intimately fitted to the base portion of an injection needle.

3. A device according to claim 1, which is intimately fitted to the base portion of an injection needle attached to a syringe.

4. A device according to any of the preceding claims, wherein the tube is made of a flexible soft synthetic resin.

5. A device according to any of claims 1 to 3, wherein the tube is made of a non-flexible material and is additionally provided with a fitting portion made of a flexible soft material.

6. A device according to any of the preceding claims, wherein the density of the filter medium is adjusted by shrinking part of the peripheral wall of the tube.

7. A device according to any of the preceding claims, wherein the filter medium is a polyurethane foam or a mass of fine fibres.

8. A device according to claim 7, wherein the filter medium is a mass of fine fibres of a polyester, polypropylene or polyamide.

9. A device according to any of the preceding claims, wherein the filter medium contains a plurality of pores of 3 to 5 microns diameter.

10. A needle guarding device according to claim 1, substantially as hereinbefore described with reference to the accompanying drawings.

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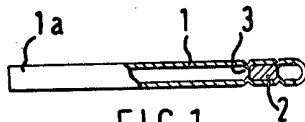


FIG. 1

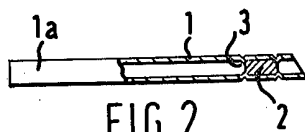


FIG. 2

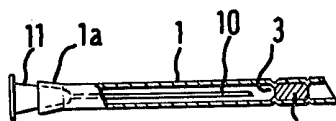


FIG. 3

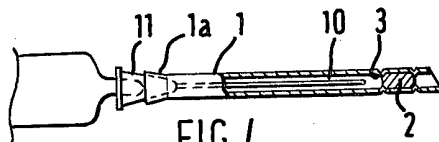


FIG. 4



FIG. 5