PATENT SPECIFICATION

DRAWINGS ATTACHED

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The inventors of this invention in the sense of being the actual devisers thereof within the meaning of Section 16 of the Patents Act, 1949 are VAGN HASSING HENNING JUNCHER and KNUD ERIK RASMUSSEN, Danish citizens, of 31, Kalovej, Vanlose, 18 Mathilde Fibigersvej, Frederiksberg and 70 Vejle Sovej, Holte, respectively.

COMPLETE SPECIFICATION

Ampoule for use in Surgical Injection

We, NOVO TERAPEUTISK LABORATORIUM A/S, a Danish Joint Stock Company, of 115, Fuglebakkevej, Copenhagen, Denmark, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to an ampoule for use in surgical injection.

Particularly during recent years there have been developed a long series of embodiments of the so-called injection ampoule which are intended for single use and on which ampoules an injection cannula or needle is mounted or can be mounted. After the cannula has been admitted to the interior of the ampoule the drug which has been stored under sterile conditions in the ampoule is discharged through the cannula either by compression of an ampoule made of compressible material, or by the ampoule itself serving as injection cylinder, the open bottom of the ampoule being provided with a cover serving as a piston which, when advanced, causes the ampoule to be discharged through the cannula.

It is a primary condition of the practical applicability of these injection ampoules that they can easily and simply be made ready for use without any risk of errors rendering their application difficult or impossible, and that their manufacturing costs are kept sufficiently low.

An injection ampoule is known, the open end of which is provided with a piercible cover or closure which has been given the form of a rubber disc on which a conical portion of metal or plastic has been placed for mounting of a cannula which is fixed in a socket and has a rearward extension with a cutting edge. This injection ampoule is made ready for use by first piercing the cannula extension through the tip of the conical portion of the cover and then through the cover itself until the socket of the cannula bears against the said conical portion. Besides the fact that a special form of cannula with an extended handle portion has to be used, the double piercing, both of the conical portion and of the cover, requires a certain care as it must be ascertained that the extended handle portion of the cannula strikes the cover more or less centrally in order that the cannula can be admitted without hindrance to the interior of the ampoule.

The present invention provides an ampoule for use in surgical injection, having an open discharge end provided with a piercible cover on which is mounted an outwardly extending portion shaped to fit in the socket of a cannula, said portion having a channel parallel to the ampoule axis and in the said channel a tube for penetrating into the interior of the ampoule by inward displacement on attachment of the cannula.

This construction ensures that no double piercing needs to be performed and that the tube for piercing or perforating the cover is centred in the channel in the neck of the cover, which ensures a central perforation of the cover. Moreover, it becomes possible to make use of the commonly employed types of cannulae (hypodermic record cannulae and luer-lock cannulae) which are extensively employed in connection with the ordinary hypodermic syringes, which presents a very essential advantage, not only due to the practical utility thereof, but also from an economic point of view.

According to a preferred embodiment of the injection ampoule of the invention the tube for piercing the cover is given such a length that the outer end thereof, after the

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socket is mounted on the neck, bears against either the cannula in the socket or, when using very thin cannulae, against the bottom of the socket in such a centred position that free passage from the interior of the ampoule to the cannula is ensured. By this embodiment a safe and correct piercing of the cover will automatically be obtained when the socket is mounted on the neck, so that the injection ampoule is made ready for use solely by mounting the socket. During this step the extending end of the tube destined for piercing the cover serves as a guide for the socket which, as a consequence thereof, will inevitably be placed thereon in a correct manner, whereas the piercing tube and the cannula will be brought into alignment and in touch with each other or close to each other.

In order to maintain sterile the tube and the interior of the neck according to a further feature of the invention a protective cap may be placed on the neck.

The invention is illustrated by way of example in the accompanying drawing, in which

Fig. 1 is a sectional elevation of the forward end of one embodiment of injection ampoule according to the invention, and

Fig. 2 is a sectional elevation of the injection ampoule of Fig. 1 made ready for use with a record cannula mounted thereon.

Referring to the drawings, 1 designates a glass ampoule having a neck 2 with a collar 3, on the top of which there is placed a rubber disc 4 and a frusto conical neck 5 provided with a flange 6, which frusto conical neck is produced from a plastic, such as nylon, or another material which can be sterilized. By means of a seamed-over rim thereof a metal ring 7 engages the flange 3 from below and the flange 6 from above, to provide a hermetic sealing of the ampoule. The neck 5 has a channel 9 therethrough, in which is mounted a tube 10 provided with a cutting edge 11 at its inner end, which tube has such a length that it extends beyond the neck 5. In order to maintain the tube 10 sterile, a cap 12 is placed on the said neck. This cap has a flange 8 bearing against the top of the metal ring 7.

The rear-end of the ampoule 1, not shown in the drawing, is designed in a manner known per se in that a plug serving as a piston is mounted in the open rear-end, and a piston rod may be fixed to the plug, said piston rod being guided in a finger grip bar mounted on the rear end of the ampoule.

When the injection ampoule is to be used, the cap 12 is removed, whereupon a hypodermic record cannula is placed on the neck 5, the tube 10 being simultaneously rearwardly displaced, which causes the tube to pierce the rubber disc 4 and the cannula to be admitted to the interior of the ampoule.

Fig. 2 shows the injection ampoule ready for use. 13 indicates the socket of the hypodermic record cannula whereas 14 indicates the cannula itself. It will be seen that the outer end of the tube 10 bears against the inner end of the cannula 14 and that the tube 10 by its rearward displacement has penetrated the rubber disc 4. When the piston not shown in the drawing is advanced, the ampoule can be discharged of its contents.

As will be seen, only two extremely simple operations are necessary in order to render the injection ampoule ready for use, i.e. removal of the cap 12 and mounting of the hypodermic record cannula 13, 14. This mounting is easily and simply performed in that the extending end of the tube 10 guides and centres the socket 13 which, as a consequence thereof, is inevitably advanced to its proper position on the neck 5. At the same time the tube 10 is automatically carried backwards while piercing the rubber disc 4.

It is also advantageous that it is possible to make use in the injection ampoule of ordinary hypodermic record cannulae which are extensively used in ordinary injection syringes, and with which the user of the injection ampoule is therefore fully familiar. As is known, hypodermic record cannulae exist of varying cannula size. Thus, the user of the injection ampoule is free to choose the cannula size most appropriate to each individual case, e.g. dependent on whether an intramuscular or subcutaneous injection is to be effected, and whether the injection is to be made on a child or an adult. The cannula employed need not be thrown away after use but can be used again after sterilization.

If by chance a practitioner obtains an injection ampoule as above described but without the tube 10 to pierce the rubber disc 4, he can in emergency break off the cannula of one of the hypodermic record cannulae he habitually carries and use it for piercing the disc 4.

In the embodiment shown in the drawing the injection ampoule according to the invention is used in conjunction with hypodermic record cannulae. It is, however, also possible to use it in conjunction with any other form of injection cannulae, such as the so-called luer-lock cannulae, in which case the frusto conical neck 5 is given a conicity corresponding to the internal conicity of the socket of the cannula employed, whereas the tube 10 is given the necessary length for ensuring piercing of the cover.

Moreover, the invention is not limited to use in connection with glass ampoules. It can also be used in connection with the various known embodiments of collapsible ampoules, in which the ampoule is discharged of its contents by compression of the sidewalls of the ampoule.

WHAT WE CLAIM IS:—

1. An ampoule for use in surgical injection, having an open discharge end provided with a piercible cover on which is mounted an outwardly extending portion shaped to fit in the socket of a cannula, said portion having a channel parallel to the ampoule axis and in the said channel a tube for ~~pentrating~~ penetrating into the interior of the ampoule by inward displacement on attachment of the cannula.

2. An ampoule as claimed in claim 1, in which the tube is of such a width that when the cannula is attached the tube abuts against the inner end of the cannula or against the interior of its socket.

3. An ampoule as claimed in claim 1 or 2, having a protective cap for fitting over the tube while the ampoule is in storage.

4. An ampoule for use in surgical injection, constructed and adapted to be operated substantially as described herein with reference to the accompanying drawing.

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