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V. HASSING ET AL

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INJECTION AMPOULE

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Fig. 5.

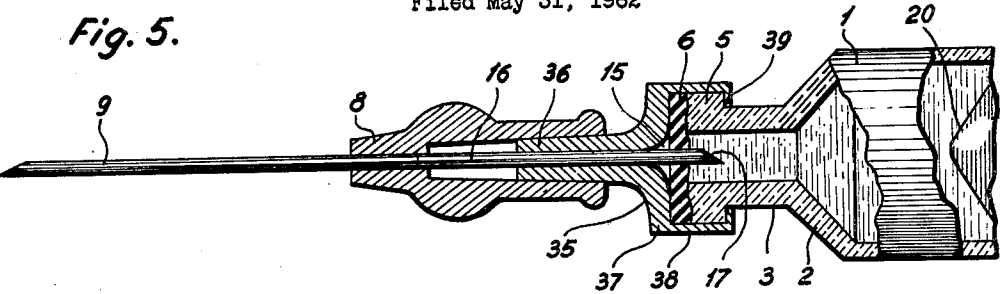


Fig. 4.

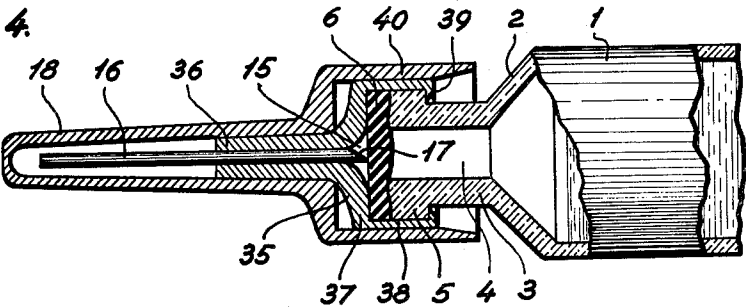


Fig. 2.

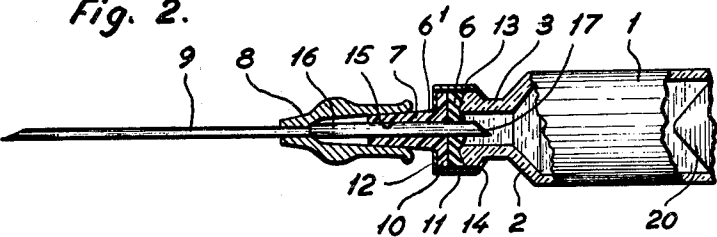


Fig. 3.

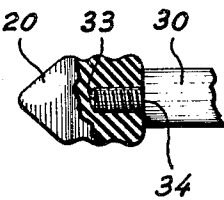
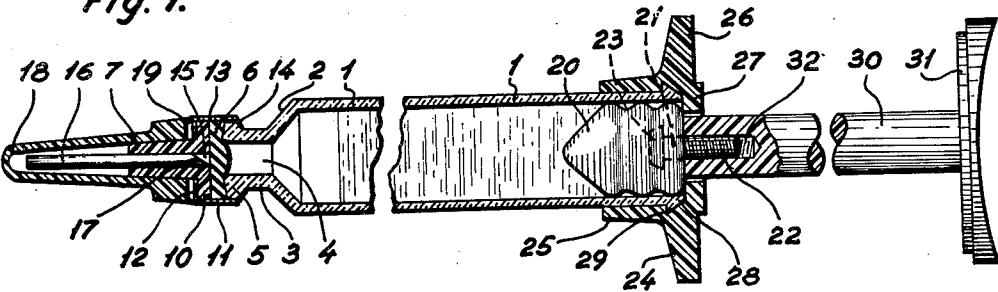


Fig. 1.



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INJECTION AMPOULE

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3 Claims. (Cl. 128-218)

This invention relates to an injection ampoule.

Particularly during recent years there have been developed various embodiments of so-called injection ampoules which are destined for one-time use. The principle of such injection ampoules is that the ampoule itself is designed to act as a syringe after the sealing member on the neck of the ampoule has been penetrated by a hypodermic needle or cannula. Opposite said sealing member the ampoule is closed by a slidable plug serving as a piston which, when advanced, will cause the ampoule to be emptied through the hypodermic needle.

It is an object of the present invention to provide an injection ampoule which can easily and simply be made ready for use without any risk of errors rendering its application difficult or impossible.

A further object of the invention is to provide an injection ampoule having a construction which makes it possible to use the commonly employed types of needles or cannulae, e.g. the so-called "record" needles and "luer-lock" needles or cannulae, consisting of a socket wherein the needle is mounted. "Record" needles have the same construction as "luer-lock" hypodermic needles, except that there is a slight difference in the internal conicity of the socket or hub of the needles.

A still further object of the invention is to provide an injection ampoule construction in which the mere mounting of the hypodermic needle or cannula on the injection ampoule makes the latter ready for injection.

A still further object of the invention is to provide an injection ampoule construction in which the sealing member on the neck of the ampoule is penetrated with certainty by the mere mounting of the hypodermic needle on the ampoule.

The invention will be explained in detail below with particular reference to the accompanying drawings which show preferred embodiments of the injection ampoule. It is to be understood, however, that the invention is not restricted to the embodiments shown in the drawings since many modifications may be made without departing from the spirit of the invention. In the drawings:

FIG. 1 shows a longitudinal sectional view of one embodiment of the injection ampoule of this invention,

FIG. 2 shows a partial longitudinal sectional view of the front part of the injection ampoule shown in FIG. 1 with the hypodermic needle mounted thereon,

FIG. 3 shows, partly in section, the piston of the ampoule with a modified mounting of the piston rod in the piston,

FIG. 4 shows on larger scale a partial longitudinal sectional view of the front part of a preferred embodiment of the injection ampoule, and

FIG. 5 shows a partial longitudinal sectional view of the front part of the embodiment shown in FIG. 4 with the hypodermic needle mounted thereon.

Referring first to the embodiment shown in FIGS. 1 and 2, 1 designates the cylindrical body of an ampoule or vial made of glass or plastic and containing the therapeutic fluid to be injected. At its upper end the body 1 is provided with an inwardly-extending conical wall 2 and a neck 3 having a central opening 4. At the top of the neck 3 there is provided a flange 5. On this flange

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rests a sealing member 6 in the form of a rubber disc. On the sealing member 6 there is arranged a plastic extension member 6' having an outwardly-projecting part 7 which has a conical outer surface adapted to receive the socket 8 of a hypodermic needle 9. At its inner end the extension member is provided with an outwardly-extending flange 10 resting on the sealing member 6. The extension member and the sealing member 6 are kept in place by means of a metallic ring 11 having an inwardly-extending flange 12, a cylindrical vertical part 13, and an inwardly-extending portion or flange 14 resting against the lower side of the flange 5 of the neck 3. By means of the flanges 12 and 14, respectively, the extension member and the sealing member 6 are pressed tightly against the upper outer surface of the neck 3 to provide sealing of the ampoule.

The outwardly-projecting part 7 of the extension member is provided with a through-going channel 15 wherein there is arranged a tube 16 provided with a cutting front edge 17. The tube 16, which is made of metal, such as steel, extends beyond the outwardly-projecting part 7 of the extension member and is covered by a cap 18 having a flange 19 bearing against the flange 12 of the metallic ring 11.

At the end opposite the neck 3, the cylindrical body 1 is closed by a slidable plug serving as a piston 20 fitting closely the inner wall of the body 1 to form a sealing member during storage of the injection ampoule. At its rear-end the piston 20 has a central hole 21 wherein there is mounted a threaded metal pin 22 having a head 23 insuring the attachment of the pin 22 in the piston 20.

On its lower end, the body 1 is provided with a handling member 24 having a cylindrical portion 25 surrounding the lower end of the body 1, and an outwardly-extending flange 26 for holding the injection ampoule during the injection operation. The handling member 24 also has an inwardly-extending projection 27 engaging the end of the body 1 and preventing the piston 20 from being drawn out of the body 1. The handling member 24 is kept in place on the end of the body 1 by means of a small projection 28 on the outer end of the body 1, said projection engaging a groove 29 in the handling member 24.

A piston rod 30 having a handling bar 31 at its lower end is provided with a threaded hole 32 at its front end to engage the threaded pin 22 on the piston 20.

A modified manner of attachment of the piston 20 to the piston rod 30 is shown in FIG. 3, where the piston 20 is provided with a threaded hole 33 adapted to receive a threaded projection 34 on the piston rod 30. This embodiment provides a cheaper construction than that shown in FIG. 1.

In the preferred embodiment of the injection ampoule shown in FIGS. 4 and 5 wherein parts identical with corresponding parts in FIGS. 1 and 2 are given the same reference numerals, there is arranged on the sealing member 6 a metallic extension member 35 having an outwardly-projecting part 36 which has a conical outer surface adapted to receive the socket 8 of the hypodermic needle 9. At its inner end the metallic extension member 35 is provided with an outwardly-extending flange 37 resting on the sealing member 6. The metallic extension member 35 keeps the sealing member 6 in place by means of a cylindrical vertical part 38 of the extension member itself, said part having an inwardly extending flange 39 which rests against the lower side of the flange 5 of the neck 3. By means of the flanges 37 and 39, respectively, the metallic extension member 35 keeps the sealing member 6 pressed tightly against the upper surface of the neck 3 to provide sealing of the ampoule.

The outwardly-projecting part 36 of the extension member 35 is provided with a through-going channel 15

wherein there is arranged a plastic tube 16 provided with a cutting front edge 17. The plastic tube, preferably a polyamide tube, extends beyond the outwardly-projecting part 36 of the extension member 35 and is covered by a protective cap 18 having a vertical substantially cylindrical part 40 which bears against the substantially cylindrical vertical part 33 of the metallic extension member 35. The embodiment shown in FIGS. 4 and 5 differs from that of FIGS. 1 and 2 only in the construction of its upper portion. Its lower portion is identical with that shown in the previously-described embodiment and may include a piston and piston-rod construction as shown in FIG. 1 or FIG. 3.

During storage of the injection ampoule, the piston rod 30 is usually detached from the piston 20. In such case, the first thing to do to bring the injection ampoule into operation is to attach the piston rod 30 to the piston 20. Then the protective cap 18 is removed, and the socket 8 of the hypodermic needle or cannula 9 is placed on the projecting portion of the tube 16, the inner end of the needle 9 in the socket 8 bearing against the uppermost end of the tube 16. Hereby the position of the socket is centered so that when the latter is pressed downwardly it engages the outer conical surface of the projecting part 7 or 36, respectively, of the extension member on the injection ampoule in correct position. By this movement, the tube 16 is moved downwardly through the channel 15 and the cutting front edge 17 of the tube 16 penetrates through the sealing member 6 so that the tube 16 is brought into the position shown in FIG. 2 and FIG. 5, respectively, where the outer end of the tube 16 bears against the inner portion of the socket 8 in close vicinity to the inner end of the needle 9. When the piston 20 is then pressed forwards by placing a finger on the handling bar 31, the therapeutic fluid within the ampoule flows out through the needle 9.

After the injection has been made, the hypodermic needle is removed from the projecting part 7 or 36, respectively, and can be used again after sterilization.

As will be seen from the foregoing, only two extremely simple operations will be necessary in order to make the injection ampoule ready for use, i.e. removal of the cap 18, and mounting of the hypodermic record cannula or needle. This mounting is easily and simply performed in that the projecting end of the tube 16 guides and centers the socket 8 which, as a consequence, is inevitably advanced to its proper position on the projecting part 7 or 36, respectively, of the extension member. At the same time the tube 16 is automatically carried downwardly within the channel 15 while piercing the sealing member 6 at its center, and only this piercing of the sealing member 6 is necessary to obtain access to the interior of the ampoule.

In the preferred embodiment of the injection ampoule shown in FIGS. 4 and 5 of the drawings, there is used a metallic extension member 35 and a plastic tube 16. In this embodiment, the use of a metallic ring pressing together the extension member and the sealing member is avoided. Furthermore, the use of a plastic tube which is adapted to slide in the through-going channel in a metallic extension member is of special advantage in that any unintentional skew mounting of the tube in the channel will merely cause the tube to bend a little and it will then slide in the proper position for penetrating through the sealing member after mounting of the hypodermic needle on the projecting upper part of the extension member. The novel combination of a plastic cutting tube (16) and a metallic guiding member (35), which also have the function of sealing the ampoule, is highly advantageous in manufacturing operations, since it simplifies the sealing and guarantees correct mounting of the cutting tube.

Preferably, the metallic extension member 35 is made of aluminum or other relatively soft metal. Hereby a very tight connection between the metallic socket of the cannula or hypodermic needle and the metallic extension

member can be ensured in that the relatively hard socket will grip tightly in the relatively soft aluminum extension member when turning the socket around the projecting upper part of the extension member during mounting.

It is an advantage of the injection ampoule according to the invention that it allows the use of ordinary hypodermic record cannulae which are extensively used in common injection syringes and with which the user of the injection ampoule is fully familiar. As is known, there exist hypodermic record cannulae with different cannula sizes. Thus, the user of the injection ampoule is free to choose the cannula size most appropriate in 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 in a child or in an adult.

In the embodiments shown in the drawings, the injection ampoule is constructed for use in connection with any other form of known injection cannulae, such as the so-called luer-lock cannulae, in which case the outer conical surface of the projecting part 7 or 36, respectively, is given a conicity corresponding to the internal conicity of the socket of the cannula employed, whereas the tube 16 is given the necessary length to insure piercing of the sealing member 6.

This application is a continuation-in-part of our application Serial No. 846,486, filed October 14, 1959, and now abandoned.

Having thus fully described our invention we claim as new and desire to secure by Letters Patent:

1. An injection ampoule comprising a container for a fluid to be injected, said container having an open rear end, a piston disposed interiorly of said container and reciprocable therein, means comprising a piston rod connected to said piston for selectively reciprocating said piston to inject said fluid, means cooperative with said rod for sealing said open end, a neck provided at an end of said container opposite to said end, said neck having an outlet opening, a puncturable sealing member covering said outlet opening and secured to said neck, an extension member having a tapered outer configuration shaped to receive a socket of a hypodermic needle, said extension member having a laterally-extending flange seated on said sealing member and having a longitudinally-extending passage coaxial with said neck opening, said passage terminating adjacent said sealing member, a slidable tube disposed in said passage and movably held frictionally therein for penetrating said sealing member when an axial force is applied to the tube in an axial direction toward the interior of said container, when a hypodermic needle is mounted on said extension, and said tube extending beyond the outer end of said extension member to receive said hypodermic needle.

2. An injection ampoule comprising a container for a fluid to be injected, said container having an open rear end, a piston disposed interiorly of said container and reciprocable therein, a piston rod selectively actuatable for selectively reciprocating said piston to inject said fluid, means cooperative with said rod for sealing said open end, a neck provided at an end of said container opposite to said end, said neck having an outlet opening, a puncturable sealing member covering said outlet opening and secured to said neck, an extension member having a tapered outer configuration shaped to receive a socket of a hypodermic needle, said extension member having a laterally-extending flange seated on said sealing member, and having a longitudinally-extending passage coaxial with said neck opening, said passage terminating adjacent said sealing member, a slidable centering tube disposed in said passage and movably held frictionally therein for penetrating said sealing member when force is applied to the tube in a direction toward the interior of said container, when a hypodermic needle is mounted on said extension, and said tube extending beyond the outer end of said extension member to receive said hypodermic needle and accurately center it in said extension member.

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3. An injection ampoule comprising a container for a fluid to be injected, said container having an open rear-end, a piston disposed interiorly of said container and reciprocable therein, a detachable piston rod selectively connectable to said piston for selectively reciprocating said piston to inject said fluid, means cooperative with said rod for sealing said open end, a neck provided at an end of said container opposite to said end, said neck having an outlet opening, a puncturable sealing member covering said outlet opening and secured to said neck, a metallic extension member having a tapered outer configuration shaped to receive a socket of a hypodermic needle said extension member having a laterally-extending flange seated on said sealing member, and having a longitudinally-extending passage coaxial with said neck opening, said passage terminating adjacent said sealing member, and a slidable plastic tube disposed in said passage and movably held frictionally therein for penetrating said

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sealing member when a sufficient force is applied to the tube in a direction toward the interior of said container, when a hypodermic needle is mounted on said extension, said tube extending beyond the outer end of said extension member to receive said hypodermic needle and accurately center it in said extension member.

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