STERILE FLUID DISPENSER

Erik Lennart Wikander and David Georg Dahlinder, Sodertalje, Sweden, assignors to Akeleholget Astra, Apotekarnes Kemiska Fabriker, Sodertalje, Sweden, a company of Sweden


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The present invention deals with a device for the sterile extraction of a liquid from a container by means of a hypodermic syringe. Liquids to be injected are as a rule contained in bottles or similar containers which are equipped with a rubber stopper which, after the removal of an outer seal is pierced by the hollow needle of the hypodermic syringe each time the injection liquid is withdrawn. The manufacturer is responsible for sealing the injection fluids in a sterile condition and for ensuring that they are so packed that the sterility is maintained during storage, provided that the seal on the container is unbroken. Once the seal is broken and the first quantity is extracted the sterility is, of course, completely dependent on the user's method of handling the container. In this connection there is not only a risk that the sterility of the fluid will be endangered by the repeated penetration of the rubber stopper but it is also very usual for such penetration to cause specks of rubber from the stopper to fall down into the fluid and contaminate it. These specks of rubber can even bring about a blockage in the needle, particularly where suspensions are involved during both the drawing-off and the subsequent injection. Moreover, the needle can very easily be damaged or bent in piercing the rubber stopper.

It is an object of this invention to provide a device which permits injection liquid to be extracted from the container while maintaining the sterility. It is another object of the invention that it shall be possible to extract injection liquid from the container without piercing the rubber stopper by the needle of the hypodermic syringe. It is a further object of the invention to provide a device which can be secured to a bottle or a similar container for an injection liquid so as to be ready for use, so that the rubber stopper need not be pierced until the first quantity of liquid is to be extracted from the bottle.

The device according to the invention comprises a guiding member arranged to be secured to the container above the rubber stopper, a needle holder with a hollow needle arranged to be movable in said guiding member, means for holding said needle-holder in said guiding member in a first position in which the needle is above the rubber stopper, means for holding said needle-holder in said guiding member in a second position in which the hollow needle penetrates the rubber stopper, a conical socket arranged in said needle-holder to receive the conical end of a hypodermic syringe, and a cover arranged to enclose the needle-holder and the guiding member and being provided inside with a sealing plug for said conical socket.

The invention will now be more precisely described by reference to the accompanying drawings, in which FIG. 1 shows a preferred embodiment of the invention in an "exploded view," FIG. 2 shows the device of FIG. 1 arranged on a bottle, and FIG. 3 shows another embodiment of the invention.

The device according to FIGS. 1 and 2 consists of a hollow, cylindrical guiding member 1, the lower end of which has a conical opening 2 and the upper end of which has an inward facing rim 3. The lower end of the guiding member is shaped as a capsule 5 of the kind usually used for closing a bottle. This capsule-shaped portion has been omitted in FIG. 1. In the guiding member 1 there is situated a needle-holder 6 which can be pushed along it and which is furnished with a hollow needle 7 and a conical socket 8. The outside surface of the needle-holder 6 is furnished with grooves 9 and 10 which are intended to work in conjunction with the inward facing rim 3 of the guiding member. In the socket 8 a conical plug 11 is fitted. Said plug is arranged in a cover 12 which protects the guiding member 1 and the needle-holder 6. The protective cover 12 has, preferably, a protruding rim 12a surrounding its open end. If the cover is placed, for instance, on its side upon a table, said protruding rim 12a will keep the open end of the cover spaced apart some distance from the table, thus reducing the risk that the sterile inside of the cover will be contaminated by the table.

During storage the needle 7 is completely enclosed in the guiding member 1 and is held fast there by means of the rim 3 of the guiding member which engages with the groove 9 on the outside of the needle-holder 6.

FIG. 2 shows the device according to FIG. 1 mounted on a container 13 which is equipped with a rubber stopper 14, of which the cylindrical mantle-shaped lower end 15 projects downwards into the neck of the container. The rubber stopper 14 is secured to the container 13 by means of a metal ring 16, which is bent for fitting against the top of the stopper and against a protruding rim 17 round the neck of the container. The guiding member 1 is placed upon the rubber stopper 14 so that the capsule 5 grips the metal ring 16 and the rim 17. In this position the needle 7 is completely enclosed in the guiding member 1, and the point of the needle 7 is above the rubber stopper 14, as indicated by the full lines in FIG. 2.

When the first portion of injection liquid is to be withdrawn from the bottle, the cover 12 is pressed down as indicated by the arrow A in FIG. 2, to the position indicated by dotted lines. The cover pushes the needle-holder 6 downwards in the guiding member 1 and the needle 7 pierces the rubber stopper. The inward facing rim 3 of the guiding member thus engages in the groove 10 so that the needle-holder 6 is held fast as is indicated by the dotted lines in FIG. 2. Then the protective cover 12 can be removed, thus freeing the conical socket 8 so that the conical end of the hypodermic syringe can be inserted into it.

The device of FIG. 2 is intended to be secured to the bottle after the bottle has been filled and sealed. FIG. 3 shows an embodiment which is intended to be secured to the bottle as it is being sealed. The lower portion of the guiding member is here shaped as a circular plate 4, which is placed upon the rubber stopper 14, and is secured to the bottle by a ring 18 which is bent to grip said plate 4 and the rim of the bottle.

The device of this invention may be sterilized, for instance in an autoclave, before it is mounted on the container. If desired, the device of the invention may be sterilized together with the container, after it has been arranged on the container.

Immediately after each withdrawal of fluid the arrangement is again closed by the replacement of the protective cover 12 by which it is well protected since the close fitting plug 11 in the conical cavity of the needle-holder 6 ensures an airtight fit.

The arrangement according to the invention, including the needle itself, can with advantage be made of inert, heat-resisting plastic. If the needle-holder 6 consists of fire-proof material, the upper part of it can, if so desired, be flame-treated after each withdrawal and when the protective cover has been removed.

What we claim is:

1. In a device for the sterile extraction of liquid from
a container having a puncturable resealable seal and a hollow needle having a first end adapted to puncture said seal when moved from a first position disengaged from said seal to a second position wherein it punctures said seal, and a second end adapted to communicate with means for dispensing liquid extracted from said container, the combination with said needle and said container of means for guiding said needle along a fixed path between said first and said second positions and means for springedly locking said needle in each of said first and said second positions.

2. In a device for the sterile extraction of liquid from a container having a puncturable resealable seal and a hollow needle having a first end adapted to puncture said seal when moved from a first position disengaged from said seal to a second position wherein it punctures said seal, and a second end adapted to communicate with means for dispensing liquid extracted from said container, the combination with said container and said needle of a hollow cylindrical guide member slidably engaging said needle and mounted in fixed relation to said sealing member and means springedly engaging said needle in each of said first and said second positions.

3. In a device for the sterile extraction of a liquid from a container having a puncturable resealable seal and a hollow needle having a first end adapted to extract the contents of said container when moved from a first position disengaged from said seal to a second position wherein it penetrates said seal, and a second end adapted to communicate with means for dispensing liquid extracted from said container, the combination with said needle and container of a hollow cylindrical guide member having a fixed relation to said sealing member and slidably receiving said needle, collar means on one of said needle and said guide member, and a collar receiving groove on the other of said needle and guide member, said collar means and collar receiving groove adapted to coact whereby said needle may be springedly engaged in each of said first and said second positions.

4. In a device for the sterile extraction of liquid from a container having a puncturable resealable seal and a hollow needle having a first end adapted to extract the contents of said container when moved from a first position disengaged from said seal to a second position wherein it punctures said seal, and a second end having syringe receiving means adapted to communicate a hypodermic syringe with the passage through said hollow needle, the combination with said container and said needle of means on said container and needle for guiding said needle along a fixed path between said first and said second positions and a slidably detachable cap having an open mouth fitting over and engaging said syringe receiving means and said guide means on said container and a collar on and around the open mouth of said cap extending outwardly therefrom and adapted to hold the mouth in spaced relation to a surface on which the cap is laid when said cap is removed from said container.

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