INJECTION DEVICE FOR LIQUIDS AND AMPOULE THEREOF

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The present invention relates to an injection device for liquids and an ampoule therefor.

Ampoules are known the container of which comprises a rigid wall and an elastic wall and which container receives an injection liquid. A membrane is provided normally at the dispensing end of the container for the ampoule as sealing means. A needle mechanism is also normally screwed over and projects from the dispensing opening. An injection needle in the form of a hollow needle is disposed inside of the needle mechanism, which hollow needle is equipped with a point at its forward end which point is adapted to be used for insertion of the needle into the organ of the patient. The rear end of the injection needle is likewise equipped with a point which is adapted to pierce the membrane provided at the dispensing end of the container for the ampoule upon axial movement of the injection needle in rearward direction. By this arrangement the contents of the ampoule may flow through the hollow needle.

The present invention relates to an ampoule structure in which the needle mechanism is rigidly mounted on the dispensing end of the container for the ampoule. In accordance with the present invention, the injection needle is loosely mounted in the needle mechanism. This embodiment is marketed in the form of a single unit. The needle can be moved in rearward direction so that the membrane is pierced and the needle is rigidly mounted on the dispensing end of the container simultaneously providing a sealing connection.

It is one object of the present invention to provide an injection device for liquids and an ampoule which is classified in the second mentioned group of ampoules and wherein the needle mechanism comprises a holding ring with a pressure ring connected with said holding ring, and a needle enclosure connected with said pressure ring. The holding ring may be screwed, for example, to the dispensing end of the ampoule. A screw ring is disposed over the holding ring and the pressure ring, which screw ring releases the pressure ring from the holding ring and the needle enclosure upon tightening said screw ring. The pressure ring presses the injection needle, which is equipped with a particular sealing member, sealingly to the dispensing end of the ampoule. Simultaneously the needle enclosure surrounding the injection needle jumps off, so that the forward end of the injection needle is now freed.

It is yet another object of the present invention to provide a notch between the holding ring and the pressure ring as well as between the pressure ring and the needle enclosure, in order to permit easy removal of the pressure ring from the holding ring and also to free the needle enclosure.

It is still a further object of the present invention to provide an injection device for liquids and an ampoule, in which the holding ring which secures the needle mechanism on the dispensing end of the container carries either on its outside and its inside, or on its outside only, a thread. The screw ring screwed to the outer thread may carry a sleeve which extends to the dispensing end of the ampoule and which sleeve cooperates with the pressure ring. This sleeve may be made integrally with the screw ring or may be made a separate member. The sleeve may carry two annular cutting edges at its lower end, which cutting edges are within the range of the notches of the pressure ring in order to arrive at a better sealing operation. The pressure ring adapted for the movement of the injection needle may be formed as a flat disc which is equipped preferably with radially arranged reinforcing ribs.

It is to be understood that the screw ring adapted for the removal of the pressure ring and of the needle enclosure may be replaced by any equivalent element as an auxiliary movable tube, a lever system, or a spring operated member.

It is a still further object of the present invention to provide an injection device for liquids and an ampoule in which the holding ring for the needle mechanism is formed as a sealing snap closure on the dispensing end of the container for the ampoule and also may be equipped with a nose-like extension in order to provide means to prevent relative rotation with the container.

It is yet a still further object of the present invention to provide an injection device for liquids and an ampoule in which the forward end of the needle enclosure has a chamber defined by a separating wall and a particularly provided notch, in which chamber is disposed a tampon soaked with disinfecting solution. The tampon may serve the purpose to clean the portion of the body where the injection is made.

It is still a further object of the present invention to provide an injection device for liquids and an ampoule, in which its container has a rigid and an elastic wall and in which both walls follow tangentially each other in order to bring about a complete dispensing of the injection liquid from the container of the ampoule.

With these and other objects in view which will become apparent in the following detailed description, the present invention will be clearly understood in connection with the accompanying drawings, in which:

Figures 1 and 2 are longitudinal axial sections through the needle mechanism in original and using condition, respectively;

Fig. 3 is a longitudinal axial section through a second embodiment of the device in original position;

Fig. 4 is a section along the lines 4—4 of Fig. 3, the screw ring being removed for better demonstration;

Fig. 5 is a longitudinal axial section through the container for the ampoule prior to its use; and

Fig. 6 is a longitudinal axial section through the container for the ampoule after its use.

Referring now to the drawings and in particular to Figs. 1 and 2, the container 1 for the ampoule shows at one of its ends a mouth formation 2. This mouth formation carries a membrane 3 to seal off the container 1. The membrane 3 may be inserted as a special member into the mouth formation 2, as clearly shown in Fig. 3 of the drawings.

The container for the ampoule comprises a rigid wall 1a and an elastic wall 1b (Figs. 5 and 6). The two walls are joined at their periphery 1c in tangential manner. The connecting or engaging line may be round or oval. If the elastic wall 1b is pressed toward the rigid wall 1a, the injection liquid is dispensed from the inside of the container 1 for the ampoule through a dispensing channel 2a in outward direction. Due to the tangential engagement of the two walls 1a and 1b at their outer periphery 1c, the elastic wall 1b engages the rigid wall 1a upon complete pressing down of the elastic wall 1a.
so that no injection liquid may remain inside of the container 1 for the ampoule. The outside face of the mouth formation 2 is equipped with an outer thread 2c and is adapted to carry a holding ring 4, which in turn is equipped with an inner thread 5. The holding ring 4 has also an outer thread 6 which is adapted to receive a screw ring 10. The holding ring 4 carries a pressure ring 7 with a cylindrical combination 8 and the needle enclosure 9. A notch 18 is provided between the pressure ring 7 and the needle enclosure 9 and a second notch 19 is disposed between the pressure ring 7 and the holding ring 4. The screw ring 10 is equipped with an inner thread 11. The injection needle 12 is equipped with a sealing member 13 and has at its forward end a point 12c adapted for insertion of the needle in the organ to be treated. The needle has furthermore at its rear end a point 12b which is adapted for piercing the membrane 5. The injection needle 12 is at first disposed loosely in the device by means of the enclosure 9, the pressure ring 7, the holding ring 4 and the membrane 3.

A sleeve 14 is provided inside of the screw ring 10, which sleeve 14 exerts pressure upon screwing the screw ring 10 onto the pressure ring 7. The sleeve 14 may be made integrally with the screw ring 10 and also of the same material or as separate members, in which case the sleeve 14 may be of a material different from that of the screw ring 10 (Fig. 3). The sleeve 14 may be equipped at its lower end with two annularly disposed cut edges 14a which are adapted to operate within the range of the notches 18 and 19 and, thereby, to provide an easier separation of the pressure ring 7 and also an easier removal of the needle enclosure 9.

A special chamber 15 may be provided at the forward end of the needle enclosure 9, which chamber 15 is adapted to receive a dissecting solution and a tampon 16 to be inserted therein. The chamber 15 is preferably also equipped with notches 17 disposed on the outside thereof in order to permit easy breaking off of said chamber 15. The latter is separated from the needle enclosure by means of a dividing wall 22. Upon breaking the needle enclosure 9 from the pressure ring 7, the chamber 15 may also easily be broken off and the tampon 16 may be removed.

The holding ring 4 may be equipped with a snap closure 5' instead of providing an inner thread 5 (Fig. 3). The holding ring 4 may be equipped sealingly to the mouth formation 2 by means of said snap closure 5'. The inwardly projecting portion 5'' enters a complementary annular groove of the mouth formation 2. In addition a nose formation 20 is also provided which enters a recess 21 of the mouth formation in order to prevent a rotation of the snap closure 5' relative to the mouth formation 2.

Referring now to the embodiment shown in Figs. 3 and 4, another pressure disc 23 is provided below the pressure ring 7. The pressure disc 23 is biased by a spring 24 which surrounds the sealing member 13' of the injection needle 12 properly spaced apart therefrom. The pressure disc 23 is furthermore loosely and adjustably mounted relative to the injection needle 12.

The operation of the needle mechanism takes place in the following manner: In the embodiment of the present device disclosed in Figs. 1 and 2 a pressure is exerted upon the pressure ring 7 upon tightening the screw ring 10 over the sleeve 14. The pressure ring 7 is then broken off from the holding ring 4. The pressure ring 7 is then moved axially and moves the injection needle 12 in the same direction, so that the membrane 3 is pierced and the pressure ring 7 finally presses the sealing member 13 onto the mouth formation 2 (Fig. 2). The needle enclosure 9 has been broken off simultaneously and falls out in forward direction. In this manner the forward end 12a of the injection needle is freed.

In the embodiment disclosed in Figs. 3 and 4, the sleeve 14 exerts pressure upon the pressure ring 7 by means of its cutting edges 14a. Upon breaking off the pressure ring 7, it moves backwardly. The needle enclosure is thrown outwardly in the present structure due to the force of the spring 24 by means of the pressure ring 7. Otherwise the operation of this embodiment is substantially equal to that disclosed in connection with the embodiment shown in Figs. 1 and 2.

In the embodiments disclosed in Figs. 3 and 4, the pressure ring 7 is shown of smaller dimension. In order to compensate for the thinner material it carries at its upper face 25 which are cut through by the cutting edges 14a upon lowering of the sleeve 14.

While I have disclosed two embodiments of the present invention, it is to be understood that these embodiments are given by example only and not in a limiting sense, the scope of the present invention being determined by the objects and the claims.

I claim:
1. An injection device and an ampoule therefor comprising an injection needle having points at both ends and a sealing member mounted in said ampoule, said sealing member being loosely disposed within said holding ring, said needle enclosure and said membrane, and means for connecting said holding ring with said mouth piece of said container, a screw ring at least partly surrounding and threadably connected with said holding ring and said pressure ring, said pressure ring being adapted to press the said injection needle sealingly on said mouth piece of said container and to break off said enclosure for said injection needle.
2. The device, as set forth in claim 1, in which a first notch is provided between said holding ring and said pressure ring and a second notch is providing between the said pressure ring and the said enclosure.
3. The device, as set forth in claim 1, in which the said holding ring has a thread at least at its outer face, and a screw ring having inner thread is screwed to the outer face of said holding ring, and a sleeve member project inwardly disposed in said screw ring to exert pressure upon said pressure ring upon screwing said screw ring over said holding ring.
4. The device, as set forth in claim 3, in which the inner end of said sleeve member has two annular cutting edges which are operative within the range of the said notches provided on said pressure ring.
5. The device, as set forth in claim 1, in which the said enclosure for the injection needle has a projection extending inwardly beyond said pressure ring, and a pressure disc is disposed inside of said holding ring and a spring member disposed in said holding ring to urge said pressure disc in outward direction for engagement with the end of said projection of the enclosure, in order to push said pressure disc and, thereby, said enclosure in outward direction by operation of said spring member upon breaking off of said enclosure.
6. The device, as set forth in claim 5, in which the inner end of said spring member engages said mouth piece of the container and surrounds said injection needle and said sealing member, respectively.
7. The device, as set forth in claim 1, in which the said pressure ring is formed as a flat disc having radially arranged reinforcing ribs.
8. The device, as set forth in claim 1, which includes an axially slidable tube movably mounted over said holding ring in order to exert pressure on said pressure ring.
9. The device, as set forth in claim 1, which includes a lever system disposed adjacent said pressure ring in order to exert pressure on the latter.
10. The device, as set forth in claim 1, which includes a releasable spring member disposed adjacent said pressure ring in order to exert pressure on the latter.

11. The device, as set forth in claim 1, in which the said holding ring includes a sealed snap closure for connection of the latter with the mouth piece of said container and in which the said holding ring has a downwardly extending nose projection and said container has a complementary recess to receive said nose projection, in order to prevent relative rotation between said holding ring and said container.

12. The device, as set forth in claim 1, which includes an additional chamber disposed at the forward end of said enclosure and separated from the latter by a dividing wall, said chamber having notches adjacent said dividing wall in order to permit easy breaking off of said chamber from said enclosure, and a tampon soaked with a disinfecting solution being disposed in said chamber.

13. The device, as set forth in claim 1, in which said container comprises a rigid wall and an oppositely disposed elastic wall, both said walls engaging each other at their joint periphery in tangential form.

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