

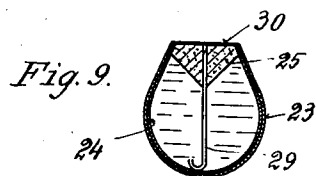
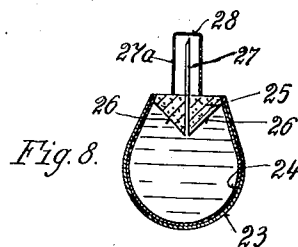
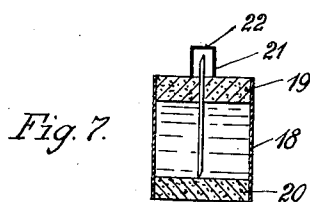
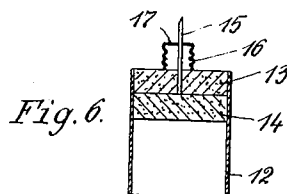
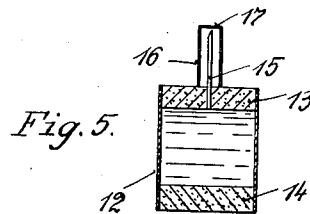
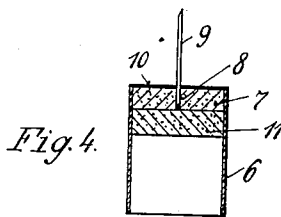
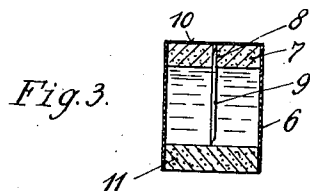
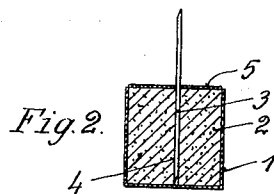
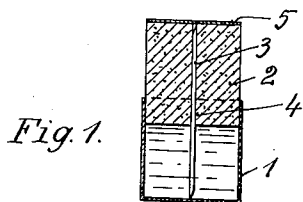
Nov. 29, 1927.

1,651,349

A. GAERTNER

THERAPEUTIC INSTRUMENT

Filed July 28, 1927



Inventor:
Arthur Gaertner
by K. K. K.
Att.

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UNITED STATES PATENT OFFICE.

ARTHUR GAERTNER, OF DANZIG-LANGFUHR, FREE STATE OF DANZIG.

THERAPEUTIC INSTRUMENT.

Application filed July 28, 1927, Serial No. 209,102, and in Germany April 7, 1926.

My invention refers to therapeutical instruments and more especially to means for injecting drug solutions and other liquids into the body. Up to the present day such solutions or other liquids are sold in closed glass containers (ampules) and in order to inject same, the point of the ampule is broken off, a canula mounted at the end of a syringe is introduced into the ampule and the liquid is drawn into the syringe through the canula. Obviously this mode of operation is rather inconvenient and requires the use of both hands. Apart therefrom the handling of the canula mounted on the liquid-filled syringe requires a certain skill and nervous patients are unfavorably impressed by the sight of this instrument.

It is an object of my invention to avoid all these drawbacks and to provide an instrument in which the ampule, syringe and canula are combined in such manner that the liquid-filled container will also serve as a syringe for injecting the liquid contained therein, the canula being hidden in the container and being protected against soiling until and during injection.

I am aware that it has already been suggested to combine an ampule with a canula partly hidden in the ampule, the projecting point of the canula being covered with a protective glass sleeve, which must be broken or otherwise removed before use.

In the instrument according to my invention the canula may or may not be hidden in the ampule, but in every case a protective body is arranged in the way of the canula point, such body being for instance formed by a layer of a material which can easily be removed or can be pierced by the point of the canula, without clogging same, and which at the same time serves to keep the canula sterile before and during injection. If the canula projects from the ampule before use, I prefer enclosing the projecting part in a protective sleeve or hood which is, however, closed at its free end by a protective body such as above described, the sleeve or hood being pliable so that on applying the free end of the protective sleeve against the skin of the patient and applying pressure to force the point of the canula through the skin, the protective body is pierced and the canula enters the tissue, while the protective sleeve is compressed.

In the drawings affixed to this specification and forming part thereof, several forms of

an instrument embodying my invention are illustrated diagrammatically by way of example.

In the drawings

Figs. 1 and 2 are axial sections of one modification before and after use.

Figs. 3 and 4 are similar modifications of a second form.

Figs. 5 and 6 illustrate a third modification in a similar manner.

Figs. 7, 8, and 9 are axial sections of three further modifications.

Referring first to Figs. 1 and 2, 1 is a cylindrical container, open at one end, which plays the role of the ampule and may consist of glass, celluloid, hard rubber, or some other suitable substantially rigid material. 2 is a body consisting of cork, rubber or some other suitable material which fits the interior of the container 1, so as to form one wall thereof and can be forced into the container after the manner of a piston so as to completely fill it. 3 is a canula or tubular pin which is here shown as being beveled at both ends, the end resting against the bottom of the container being blunt, while the other end has a sharp point. About one half of the canula is inserted in a central boring 4 of the piston-like body 2 and the boring is closed by a protective body in the form of a cover or coating 5 on the outer plane surface of the piston-like body 2. This covering or coating may for instance consist of a layer of tinfoil or the like, a rubber or lacquer film, of paper, impregnated fabric or some other suitable material, and firmly adheres to the body 2, being fixed thereto, if necessary, by means of an adhesive. 6 is the liquid filling the hollow of the container 1.

If this instrument is applied with the protective layer or coating against the skin of the patient and pressure is exerted on the bottom of the container 1, the point of the canula will pierce the protective body, film or coating 5 and will be forced into the body, the liquid being at the same time expelled through the canula. Obviously in this manner the patient is not given a chance of seeing the canula at all. The comparatively large surface of the protective coating 5 allows applying the instrument firmly onto the chosen place of the arm, leg, or the like, where the injection shall be made. The instrument can easily be handled also by single-armed persons. The canula and the so-

lution to be injected do not come in contact with the outer air and cannot be soiled before use, being protected until the last moment by the protective body 5. The canula will not enter the body farther than provided by the distance between the bottom of the container and the bottom end of the piston-like body 2.

The protective body may, if desired, be torn off or otherwise removed before use. The movable wall or piston-like body 2 may be impregnated with a mass, such as paraffine or the like, which renders it impervious to liquids, and a similar mass may also cover its cylindrical surface and act as a packing and a lubricant.

In the modification illustrated in Figs. 3 and 4, 6 is a cylindrical container open at both ends. 7 is a stopper or other closure having a central perforation 8 in which is inserted the point of the canula 9. 10 is the protective body or coating, 11 is a piston-like body serving as a temporary bottom for the container and as a piston, when the implement shall be used for an injection. In this case the piston 11 is forced farther into the container and in consequence thereof the canula resting with its blunt end against the inner surface of the piston 11 is forced through the protective covering 10 and into the body of the patient, the liquid in the container being at the same time expelled through the canula.

In the modification illustrated in Figs. 5 and 6 the container 12, stopper 13 and piston-like body 14 are arranged substantially as shown in Fig. 3. However, here the rear end of the canula 15 is fixed in a boring of the stopper 13 and its pointed projecting end is surrounded by a protective sleeve or cap 16, the free end of which is closed by a protective body 17 of the character afore-described. The sleeve 16 preferably consists of thin pliable material, such as rubber, impregnated fabric, or the like. If an injection shall be made with this instrument, the free end of the compressible sleeve is applied onto the skin of the patient and the movable piston-like body 14 is forced into the container by means of a finger, the point of the canula 15 being at the same time forced through the protective body 17 into the body of the patient and the liquid being expelled through the canula, while the sleeve 16, owing to its pliability, collapses.

In the modifications illustrated in Fig. 7, the container 18, stopper 19 and piston-like bottom 20 are arranged as before, and so is the protective cap 21 and body 22. However in this case the canula extends through the container and the stopper 19 in such manner that its blunt rear end rests on the inner surface of the piston-like bottom 20, while its sharp pointed end projects through the stopper 19 and into close vicinity of the pro-

jective body 22. The bunt end of the canula is beveled or otherwise recessed so as to prevent closing of the end of the canula by the piston 20, as would occur if this end were square. The operation of this device is the same as described with reference to Figs. 5 and 6, the canula being, however, forced through the stopper 19 and body 22 together with the liquid.

Figs. 8 and 9 show forms of the new instrument which differ from those hitherto described in that the rigid container is here replaced by a compressible container. Referring first to Fig. 8, the container consists of some suitable elastic material, and preferably of two concentric layers of two such materials, at least one of which is not only elastic but also durable and impervious to water and resistive against the action of acids and oils. I may for instance employ a container consisting of thin rubber film and an inner celluloid coating. In Fig. 8, 23 is the rubber skin and 24 is the celluloid coating, both together forming a composite bag, which is closed by a stopper 25 preferably formed with beveled rear faces so that, when the container is compressed between the fingers its walls will apply themselves against the bevelled faces 26 of the stopper, so that all the liquid can easily be expelled. The canula 27 is fixed in a boring of the stopper 25 and its projecting end is enclosed in a protective cap 27^a closed by a protective body 28, as described above.

In the operation of this device the point of the canula 27 is forced into the body of the patient, the pliable protective sleeve being collapsed as before, and the protective body 28 being pierced by the point of the canula. At the same time the pressure acting on the compressible container 23, 24 causes the liquid to be expelled through the canula 27.

In the modification illustrated in Fig. 9, the container 23, 24 and stopper 25 are arranged as described with reference to Fig. 8. However here the canula 29 is completely hidden in the container, its pointed end being inserted in a central boring of the stopper 25, while its blunt end is doubled up so that the curved portion of the canula contacts with the pliable container, whereby all danger of the container being pierced is avoided. The outer surface of the stopper 25 and the free edge of the container are covered by a protective body or coating 30 such as described with reference to Fig. 1. If this device shall be used for an injection, the protective coating is applied onto the skin of the patient and the canula 29 is forced into the body by applying pressure onto the part of the container contacting with the curved inner end of the canula, so that this latter is forced through the protective covering 30. At the same time liquid

is expelled through the canula by applying pressure onto the side walls of the compressible container.

I wish it to be understood that I do not desire to be limited to the exact details of construction shown and described for obvious modifications will occur to a person skilled in the art.

I claim:—

1. Instrument for injecting solutions of drugs and the like in a sterile manner comprising a liquid container arranged for the expulsion by manual pressure of liquid from the liquid space of said container, a canula associated with said container and communicating with the liquid space thereof, a closed protective body arranged on said container in front of the canula point, and means for uncovering said point and for forcing same beneath the skin of the patient.

2. Instrument for injecting solutions of drugs and the like in a sterile manner comprising a liquid container arranged for the expulsion by pressure of liquid from the liquid space of said container, a canula associated with said container and communicating with the liquid space thereof, and a protective body arranged on said container in front of the canula point and adapted to be pierced by said point upon the application of pressure without clogging said canula.

3. Instrument for injecting solutions of drugs and the like in a sterile manner comprising a liquid container arranged for the expulsion by pressure of liquid from the liquid space of said container, a canula enclosed in said container and communicating with the liquid space thereof and a protective body arranged on said container in front of the canula point and adapted to be pierced by said point upon the application of pressure, without clogging said canula.

4. Instrument for injecting solutions of drugs and the like in a sterile manner comprising a liquid container arranged for the expulsion by pressure of liquid from the liquid space of said container, a canula inserted in a wall of said container and communicating with the liquid space thereof and a protective body arranged on said container in front of the canula point and adapted to be pierced by said point upon the application of pressure, without clogging said canula.

5. Instrument for injecting solutions of drugs and the like in a sterile manner comprising a liquid container arranged for the expulsion by pressure of liquid from the liquid space of said container, a canula inserted and displaceable in a wall of said container and communicating with the liquid space thereof and a protective body arranged on said container in front of the

canula point and adapted to be pierced by said point upon the application of pressure, without clogging said canula.

6. Instrument for injecting solutions of drugs and the like in a sterile manner comprising a liquid container, a movable body forming a displaceable wall of said container, a canula associated with said container and communicating with the liquid space thereof, and a protective body arranged on said container in front of the canula point and adapted to be pierced by said point upon the application of pressure, without clogging said canula.

7. Instrument for injecting solutions of drugs and the like in a sterile manner comprising a substantially cylindrical liquid container open at one end, a cylindrical stopper axially movable in the open end of said container and provided with an axial boring, a canula inserted in said boring and extending towards and in the vicinity of the bottom of said container and a protective body covering the outer end surface of said stopper and said boring.

8. Instrument for injecting solutions of drugs and the like in a sterile manner comprising a liquid-filled ampule, a canula extending into said ampule and into an opening provided in a wall of said ampule, a protective body adapted to be pierced by the point of said canula without clogging same and sealing said opening and means for expelling liquid from said ampule through said canula.

9. Instrument for injecting solutions of drugs and the like in a sterile manner comprising a liquid-filled ampule, a canula extending into said ampule and into an opening provided in a wall of said ampule, a protective body adapted to be pierced by the point of said canula without clogging same and sealing said opening and means for forcing said canula out through said opening and said body and for expelling liquid from said ampule through said canula.

10. Instrument for injecting solutions of drugs and the like in a sterile manner comprising a liquid container arranged for the expulsion by pressure of liquid from the liquid space of said container, a canula beveled at both ends associated with said container and communicating with the liquid space thereof, the bevel at the rear end preventing closing of the canula, a protective body arranged on said container in front of the canula point, and means for uncovering said point and for forcing same beneath the skin of the patient.

In testimony whereof I affix my signature.

ARTHUR GAERTNER.