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HYPODERMIC SYRINGE

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Fig. 1.

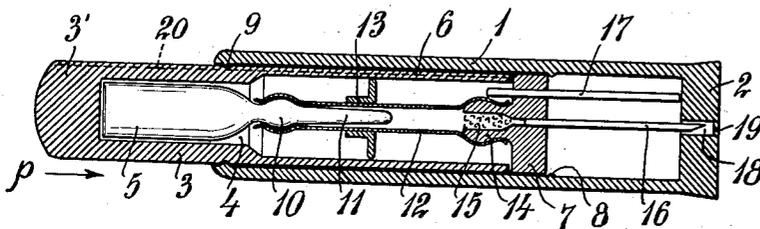
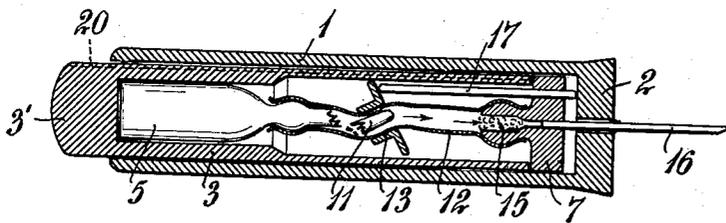


Fig. 2.



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HYPODERMIC SYRINGE

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5 Claims. (Cl. 128—216)

The invention refers to a hypodermic syringe of the kind in which the liquid to be injected is contained in an ampoule under pressure. The syringe according to this invention is primarily intended to be used by laymen when injecting an antidote to noxious gases, for instance poison gases used in chemical warfare. It is a special object of the invention to provide a simple and reliable hypodermic syringe which can be used by military people against so-called nerve gases, enabling any person to inject an antidote in his own body.

Several kinds of hypodermic syringe for said purpose are previously known. The known embodiments, however, have not been sufficiently reliable and have been comparatively difficult to operate. This is a great drawback when a poisoning must be practically immediately counteracted, which is the case with nerve gases.

Therefore, it is an object of the invention to provide a hypodermic syringe of the kind described, which is simple and reliable in operation. Thus, in the syringe according to the invention the needle is enclosed by the syringe and is brought to its operative position only immediately before the injection takes place. Further, the injection takes place automatically through a mere pressure or blow against the rear end of the syringe. If necessary, the syringe may be operated by one hand, and it is not necessary to break the point of the ampoule in a separate step of the operation, but the point is automatically broken during the operation of the syringe.

For the sake of better illustrating the invention, it will be described below with reference to the accompanying drawing which as an example shows an embodiment of the syringe. The invention, however, is not limited to the shown embodiment but may be varied in different ways within the scope of the invention.

FIG. 1 shows a sectional view along the axis of a preferred embodiment of the syringe according to the invention in the inoperative position, and FIG. 2 shows the same syringe in its operative position.

The illustrated syringe comprises two casings 1 and 3 having the shape of hollow cylinders, casing 3 being arranged to be axially movable within casing 1. The casings are preferably manufactured by a plastic. Casing 1 is closed in one end 2, and casing 3 is closed in the end 3' being remote from the closed end 2 of casing 1. In casing 3 a chamber 4 is arranged to contain an ampoule 5. The portion 6 of the wall of the casing 3 which is in the casing 1 is thinner than the other portion of said wall. The point 11 of the ampoule 5 extends into the thin-walled portion of casing 3 and is provided with a widened portion 10. A flexible tube 12 of a material such as an elastic plastic material, rubber or the like is provided over point 11 so as to closely surround the widened portion 10. The other end of the tube 12 engages a projecting portion 14 of a member 7 which is slidably arranged in casing 1 and serves as holder for an injection needle 16. Portion 14 and member 7 contain a canal for the injection liquid. A filter 15 is provided in said canal, preferably in a widened portion thereof. The filter, which may consist of a fibrous material, e.g. cotton, prevents glass fragments and other solid impurities to pass from the ampoule to the injection needle.

A collar 13 which is provided with a flange is arranged on the tube 12 on the portion thereof which surrounds point 11 of the ampoule. A rod 17 is arranged to be

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slidable in an opening in the needle holder 7 and to abut against or be secured to the bottom 2 of casing 1.

The two casings 1 and 3 and the needle holder 7 are secured in the position shown in FIG. 1 by means of grooves and ridges 8 and 9. The engagement between those parts shall, however, be so weak that upon a pressure upon the end 3' in the direction of the arrow *p*, casing 3 is pushed into casing 1 and presses the needle holder 7 towards bottom 2.

In the non-operative position illustrated in FIG. 1 the point of the injection needle 16 is situated in a central recess 18 provided in the end wall 2, leaving only a thin wall 19, which may easily be perforated by the needle 16.

FIG. 2 shows the syringe of FIG. 1 in its operative position. The syringe has been placed with its end 2 against the portion of the body into which the injection is to take place, for instance the thigh, and the casing 3 has been pushed into casing 1 by means of a blow against the end 3' in the direction of the arrow *p*. Thereby, the needle 16 has perforated the wall 19 and penetrated into the place of the injection. When the needle has reached a predetermined position, the end of the rod 17 will come into contact with collar 13 and tilt the collar so as to break the point 11 of the ampoule. The liquid in the ampoule, which is under pressure, flows through tube 12, filter 15 and needle 16.

It is clear from the above that the hypodermic syringe according to the invention is simple and reliable, because the introduction of the needle and the injection of the liquid take place automatically and in the correct succession without the necessity of making more than one manipulation, that is to press or blow casing 3 into casing 1, provided that the end wall 2 has previously been placed against the portion of the body into which the injection is to take place.

In order that the air contained in the space inside the casings 1 and 3 shall not prevent casing 3 from being rapidly pushed into casing 1, canals should preferably be provided for this air to escape. Such canals may, for instance, be arranged along the external surface of the inner casing 3, as indicated by means of dotted lines 20. In the inoperative position of the syringe, the projection 9 will close said canals, and consequently the interior of the syringe will be airtightly closed from the surrounding atmosphere. If desired, the whole syringe may be covered with an airtight coating, for instance a lac or varnish. The interior of the syringe will be effectively protected against contaminations and mechanical influences, and no additional package is necessary.

I claim:

1. A hypodermic syringe comprising an outer member having a longitudinal channel therein and having an end wall with an opening, an inner member slidable within the channel in the outer member, an ampoule wholly enclosed within said inner member and supported for movement therewith, said ampoule containing a liquid under pressure and having a breakable end, an injection needle, means fixedly mounting said injection needle on said inner member, a passageway extending from the breakable end of the ampoule through the injection needle, said injection needle adapted to be extended outwardly through the opening in the end wall of said outer member as the inner member moves inwardly with respect to the outer member, and means for breaking the end of said ampoule when said inner and outer members are moved with respect to each other to extend the injection needle.

2. A hypodermic syringe according to claim 1 wherein said means for breaking the ampoule comprises a collar disposed around an end portion of said ampoule and a

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projection fixedly mounted on said outer member, said projection engaging said collar when said members are moved relative to each other, whereby said collar is tilted to break the end of the ampoule.

3. A hypodermic syringe comprising an outer casing having a longitudinal channel therein, an inner casing slidably disposed within the longitudinal channel in said outer casing, an injection needle mounted in a fixed position on said inner casing and slidable therewith, an ampoule wholly enclosed within said inner casing, means defining a communicating passageway between said ampoule and said injection needle, and means for breaking an end of said ampoule as the inner casing is moved inwardly with respect to the outer casing, the injection needle simultaneously being extended through the outer casing.

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4. A hypodermic syringe according to claim 3 wherein said means for breaking the ampoule comprises a rod secured to the outer casing and a member in said inner casing engageable with said rod to break the ampoule.

5. A hypodermic syringe according to claim 3 the injection needle being disposed in a recess within the outer casing in the inoperative position.

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