

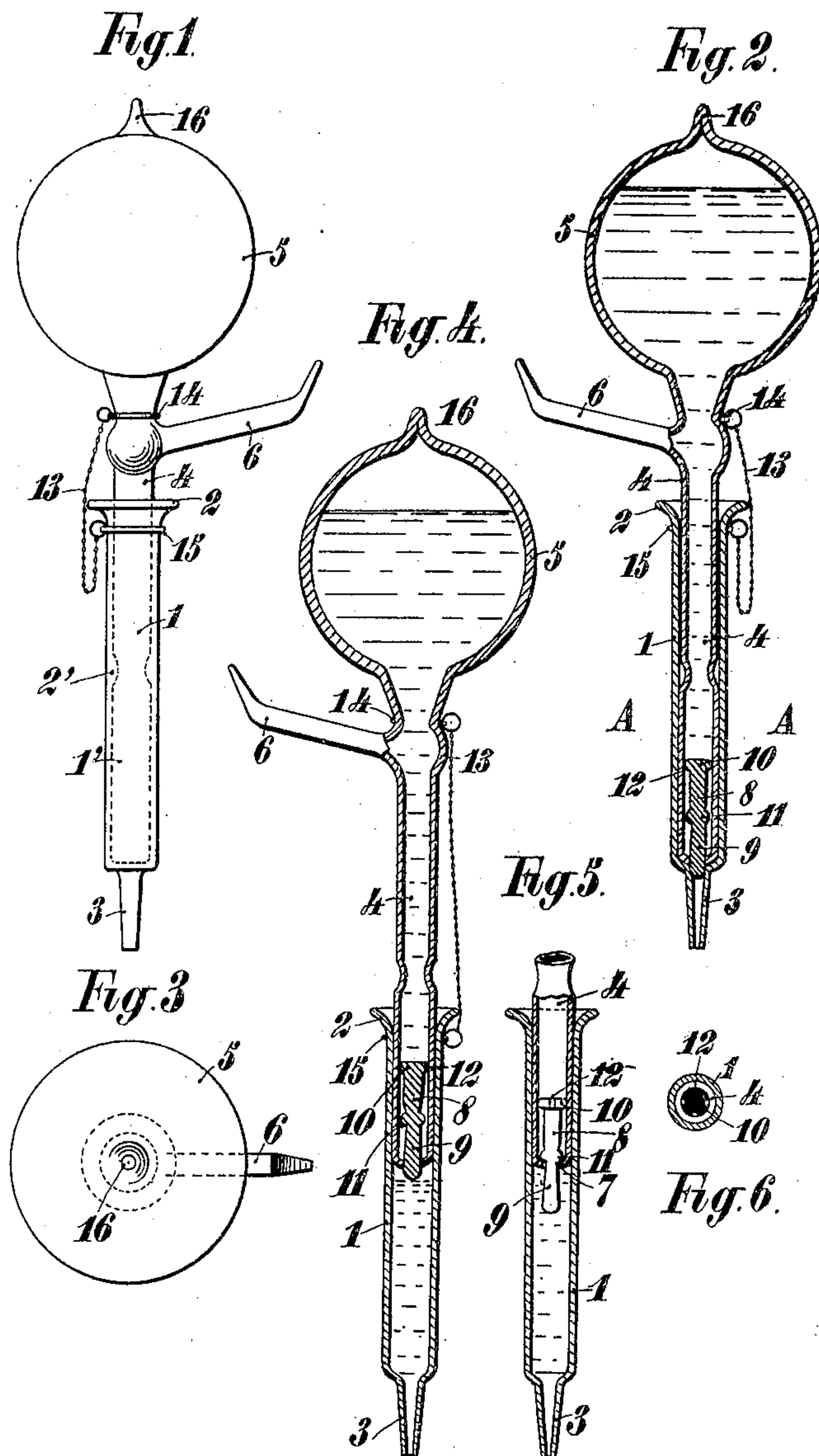
No. 822,110.

PATENTED MAY 29, 1906.

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SYRINGE FOR SUBCUTANEOUS OR OTHER INJECTIONS.

APPLICATION FILED OCT. 2, 1905.



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UNITED STATES PATENT OFFICE.

ANNE AUGUSTINE GAILLOT, OF PARIS, FRANCE.

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No. 822,110.

Specification of Letters Patent.

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Application filed October 2, 1905. Serial No. 281,016.

To all whom it may concern:

Be it known that I, ANNE AUGUSTINE GAILLOT, a citizen of the French Republic, residing at Paris, Department of the Seine, France, have invented certain new and useful Improvements in Syringes for Subcutaneous or other Injections, of which the following is a specification.

This invention has for its object a novel kind of syringe for subcutaneous or other injections, and is essentially characterized by its combination with the receptacle containing the substance to be injected—say a serum, for example. In accordance with this combination the said substance is protected from any contact with the outer air, and consequently from any alteration capable of modifying its effects. On the other hand, the syringe so constituted places the substance to be injected at the disposal of the practitioner without its being necessary for him to obtain it from a vessel or an independent bulb. This novel bulb-syringe is therefore at once a syringe and a bottle combined in such a manner that by the operation of the “syringe,” properly so called, the liquid contained in the bulb is sucked to a predetermined amount into the body of the syringe and is then injected in the customary manner. The syringe as a whole is constituted by three parts—first, the cylinder or body; second, the piston, in one piece with the bulb and a guide-piece, and, finally, third, a valve. These three constituent parts are preferably made of glass in such a manner as to provide the best guarantees of antisepticity; but any other material capable of procuring the same result is not of course excluded.

In order that the invention may be clearly understood, it is represented in the accompanying drawings, in which—

Figure 1 is an external elevation of the novel bulb-syringe. Fig. 2 is a corresponding view in longitudinal section. Fig. 3 is a projection plan of Fig. 1. Fig. 4 represents the same syringe in longitudinal section, but in operation—that is to say, ready to inject a certain quantity of liquid. Fig. 5 is a partial view, likewise in section, and illustrative of the operation. Finally, Fig. 6 is a horizontal section on the line A A of Fig. 2.

The body or cylinder 1 of the syringe is of ordinary form and of a capacity appropriate to its use. It comprises a flared inlet 2 at its upper part for facilitating the introduction of the piston and a nozzle 3 at its lower part for

fitting the sleeve of the needle in the ordinary manner.

The piston 4 is formed of a cylindrical tube the outer diameter of which corresponds to the internal diameter of the body 1. This piston 4 is of a predetermined length and is continued above by a bulb or vessel 5 of appropriate capacity and intended for the reception of the serum or other substance, as will be explained. Upon the tube 4 is provided an arm 6, serving as a guide-finger for the practitioner—that is to say, it permits of manipulating the appliance with one hand, as is requisite

The tube 4 at its lower part comprises an orifice 7, (see Fig. 5,) which acts as a valve-seat. This valve, which constitutes the third part of the novel syringe, is formed by a more or less cylindrical body 8 and a slightly conical part 9, the lower extremity of which—that is to say, the “valve,” properly so called—fits exactly into the orifice 7 of corresponding conicity, which has just been referred to. The valve terminates at its upper part in a flat head 10 of a diameter equal to the internal diameter of the tube 4, which serves to guide it. Finally, two bosses 11 serve to limit the displacement of the valve by striking against the inner wall of the bottom of the tube 4, as represented in Fig. 5. It should also be noted that the head 10 is formed with four passages 12, (more or less,) which serve to permit the liquid inclosed in the bulb and the upper part of the tube 4 or piston to pass into the body 1 of the syringe in order to be injected.

A small chain 13, retained by rings 14 and 15, serves to limit the movement of the bulb-tube and to prevent inopportune separation of this part of the instrument from the cylinder 1. Upon this cylinder 1 are marked by being engraved thereon or otherwise the divisions 1' and 2'. (See Fig. 1.) These divisions correspond to cubic centimeters—that is to say, with its largest aperture, which is that represented in Fig. 4, the syringe is able to inject two cubic centimeters of serum, while it will only inject one cubic centimeter if the displacement of the piston is confined to the division 1, which corresponds to this volume. It will of course be understood that these divisions may be varied at will and are only shown here in order to facilitate the description. In the same way the volume of the bulb 5 is in no way fixed. In the present case it has been assumed to be thirty cubic

centimeters, which is an appropriate volume having regard to the injection capacity.

Operation: The operation of this novel blub-syringe is as follows: Assuming, first of all, that the bulb or vessel 5 has been supplied with the quantity of serum or other substance that it is intended to contain, to this end when the bulb is blown an orifice is formed at the upper part for the introduction of the serum. This operation is effected by any appropriate means—for example, in a digester. When the bulb is judged to be sufficiently full, it is closed by means of the nipple 16, which is fused in place. When this has been done, the substance inside the bulb is protected from any contamination by the outer air. On the other hand, the conditions of filling by means of a digester having extracted either entirely or almost entirely the air contained in the bulb 5 and its tube 4 it follows that the atmospheric pressure will insure the closing of the valve, the base of which is applied to its seat 7 in as hermetic a manner as possible. The bulb having thus been charged, the piston is introduced into the cylinder 1 right to the bottom in such a manner as to expel the air which is contained in this cylinder. Then stopping the extremity of the nozzle 3, (with the index-finger of the left hand, for example,) the practitioner seizes the bulb with the right hand and exerts tractive effort upon the said bulb. This operation, owing to the vacuum which exists in the bottom of the cylinder 1, causes the valve to fall, as shown in Fig. 5, (the protuberances 11 striking against the bottom of the tube or piston 4,) and consequently produces the flow of the liquid contained in the bulb. This liquid enters the passages 12 and passes into the free part of the body 1 of the syringe. When it is considered that the quantity of liquid extracted from the bulb in this manner is sufficient and corresponds to one cubic centimeter or to two cubic centimeters, for example, the lower orifice of the nozzle 3 is freed and immediately, owing to the suction caused by the vacuum formed in the bulb by the flow of the liquid which has been extracted therefrom, the valve closes and communication between the bulb and the cylinder is interrupted. Obviously after the nozzle 3 has been freed the instrument must be held in such a manner that the liquid contained in the cylinder is not able to escape. It is now only necessary to fit the needle upon the nozzle and to effect the injection in the ordinary manner—that is to say, by pressing in the piston. It is in doing this that the doctor makes use of the guide-piece 6, pressing simultaneously upon it and upon the bulb, while at the same time he holds the cylinder. When the bulb is completely

emptied of liquid, it is recharged in the manner previously explained. In order to do this, it is necessary to break the nipple and to provide another after filling has been again effected.

It will be noted that by the construction of the instrument itself any introduction of air into the bulb as it empties is absolutely impossible. It will also be noticed that in proximity to the protuberances 11 the valve-rod is reduced, this reduction having for its object the reception by suction of the air-bubbles contained in the bulb and which must necessarily return there.

In conclusion it may be mentioned that the constituent parts of this syringe are formed by blowing or any other means used in glass-working and that the joints both of the piston with the cylinder and of the valve with its seat are made as perfect as possible. Obviously the syringe might be made of any material other than glass, provided that anti-septic safeguards are maintained.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is—

1. A syringe comprising a cylinder having a nozzle, a hollow piston inserted in said cylinder and having in its lower end an opening and being otherwise air-tight, and a gravity-valve associated with said opening and actuated by suction and pressure, respectively, to open and close the same, the combination operating as described.

2. A syringe comprising a cylinder having a nozzle, a hollow piston inserted in said cylinder and having at its lower end an opening and being otherwise air-tight, and a gravity-valve working in said opening and adapted to close upwardly, said valve being actuated by suction and pressure, respectively, to open and close said opening, the combination operating as described.

3. A syringe comprising a cylinder having a nozzle, a hollow piston inserted in said cylinder and having an opening in its lower end, a gravity-valve working in said opening and adapted to close upwardly, said valve being actuated by suction and pressure, respectively, to open and close said opening, and a bulb formed as a continuation of said piston and adapted, with said piston, to contain the fluid to be injected by the syringe.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

ANNE AUGUSTINE GAILLOT.

Witnesses:

PIERRE LEISSE,
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