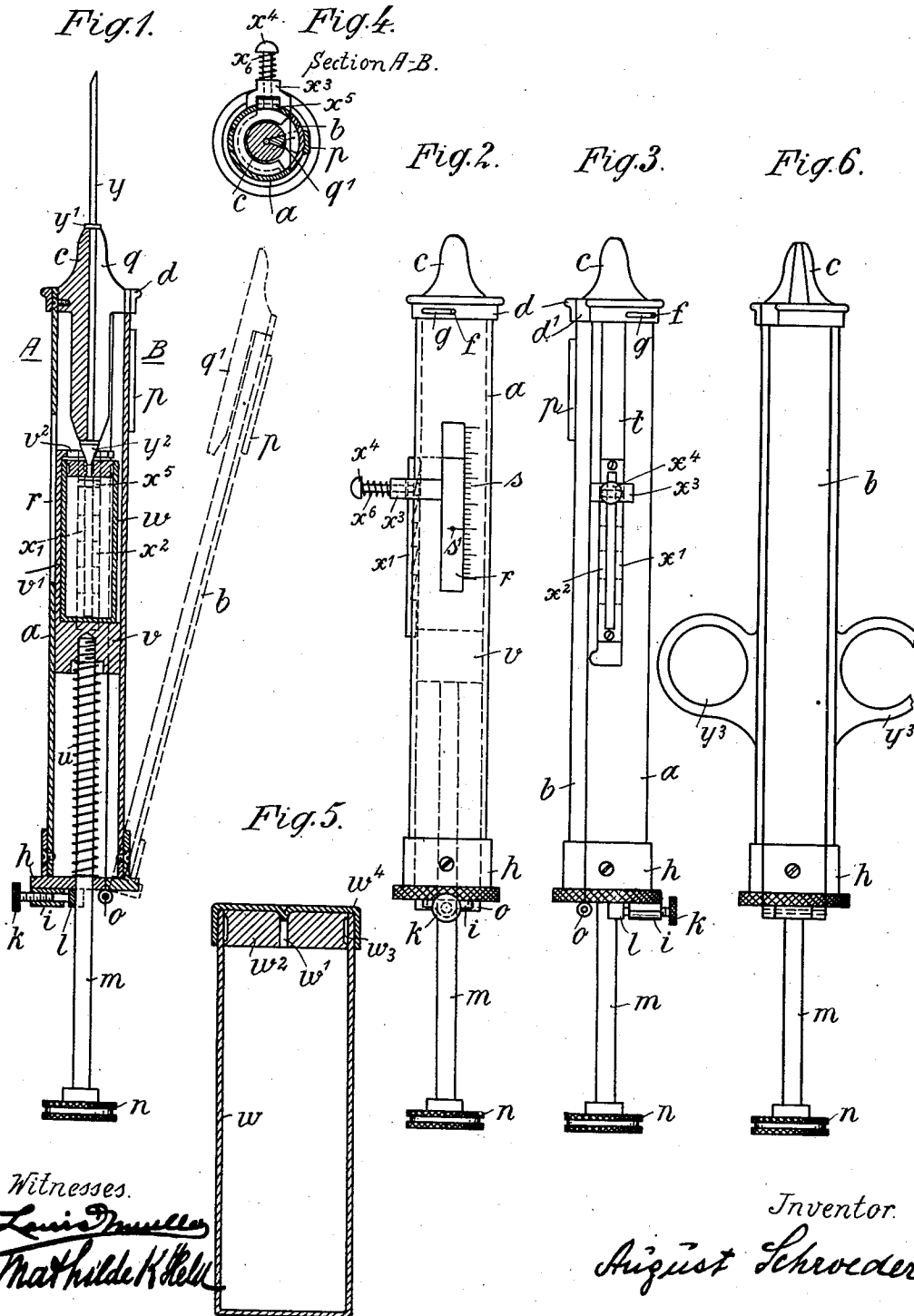


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 SUBCUTANEOUS SYRINGE.
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Patented Nov. 7, 1911.



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SUBCUTANEOUS SYRINGE.

1,008,078.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, AUGUST SCHROEDER, pharmaceutical chemist, a subject of the King of Prussia, German Emperor, and a resident of Schiltigheimerpl. 12, Strassburg, Elsass-Lothringen, German Empire, have invented certain new and useful Improvements in Subcutaneous Syringes, of which the following is a specification.

10 The invention relates to subcutaneous syringes used for the purpose of administering solutions of medicaments underneath the skin of the patient. With such instruments it is peremptory that both the solution and
15 those parts of the instrument which come into contact with the former are sterile. In order to avoid the necessity of sterilizing the syringe cylinder every time before it is going to be used, it has been suggested to
20 use as cylinder the same vessel in which the solution is packaged. The device carrying out this idea, however, shows several disadvantages which cause pollutions and destroy the sterility. This is mainly due to the fact,
25 that the needle must pierce the stopper before reaching the solution and being able to deliver it for hypodermic purposes. The needle thereby is bound to get clogged and ineffective and to introduce impurities into
30 the medicine which destroy its sterility.

It is the object of my invention to avoid these disadvantages and to secure a thoroughly sterile application of hypodermic medicaments.

35 Another object consists in providing means for rendering the manipulation of administering subcutaneous injections so easy that the physician practically does not need to employ any real strength or dexterity, as
40 was hitherto indispensable, but can concentrate his whole attention to more important observations.

With these objects in view my invention consists in employing for the vessel which
45 serves as cylinder a stopper which is provided with a boring against which the needle only needs to fit in order to secure the proper delivery of the fluid. Means are further provided by which the operator
50 need not expose the boring in the stopper until the instrument is being used, and also means that the stopper may smoothly slide toward the bottom of the vessel when pressed inwardly by the end of the needle.

55 Further my invention provides special means for manipulating an injection by the

construction of a particular instrument fit to hold needle and vessel in the proper way as formerly done by the hand of the physician and allowing the vessel to be moved
60 against the needle in such a way as to secure the proper operative effect *i. e.* expelling the medicine through the needle. This movement can be effected by hand but preferably by the action of a spring mounted inside the
65 instrument, means being provided to regulate the force produced by this spring against the vessel and also means for arresting at certain intervals the forward movement of that part which carries the
70 vessel.

I refer now to the accompanying drawings, in which similar reference numbers designate similar parts and of which—

Figure 1 represents a longitudinal section
75 of the syringe, containing the vessel and needle and showing in dotted lines one segment of the outer casing in the position which allows the setting of a new vessel; Fig. 2 gives an outside view of the syringe
80 without vessel and needle seen from a point of view at right angles to that of Fig. 1; Fig. 3 gives another outside view seen from the opposite side to that from which Fig. 1
85 is seen; Fig. 4 is a horizontal section on the line A—B in Fig. 1, Fig. 5 is a section on an enlarged scale of the vessel; Fig. 6 shows the syringe for hand-manipulation, seen from the opposite side to that from which
90 Fig. 2 is seen.

A solid casing, *a*, serves as main frame, which gives support to all other parts attached thereto or guided in it, and the cross-section is circular as appears in Fig. 4. At the bottom end of the same is fastened a solid foot-piece *h* through which the
95 shaft *m* enters the inside part of said casing in such a way that it can easily be moved in and out by means of a button *n*, placed at the outside end of said shaft. The other
100 end of the shaft *m* is threaded and has a member *v* secured to it, which is so shaped as to fit well into the inner circle of the casing *a*, giving the shaft *m* a good guidance in its movement to and fro. Member *v* is
105 at one side prolonged in form of a thin wall *v*¹, which ends in an inwardly extending rim *v*². This member *v*, *v*¹, *v*² serves to receive the vessel containing the medicine which fits loosely into the same, resting with
110 its bottom on the part *v* and being hindered by the rim *v*² from falling off toward the

top of the casing should the point of the syringe be held down. A segment b of the casing a is cut off and is hinged to the same at o , so that this segment can be removed, as indicated with dotted lines in Fig. 1, for putting a new vessel into the member v , v^1 , v^2 which is thereby laid open. To the top end of the casing a a member c is fastened by means of screws and projects both ways toward the inside of casing a and also in the opposite direction, serving to hold the needle in its hollowed center over a considerable length of the same in order to avoid any possibility of the same getting any way damaged. The member c is not closed all around, but a sector q is cut off corresponding to the segment which is hinged to the casing a , while the same segment possesses a projection q^1 , which minutely fits into the sector and is exactly of the same shape as the member c . The part q^1 presses slightly against the needle when the segment b is closed. A loose rim d is cut out at d^1 and possesses a slot g by which it is guided on a pin f of the casing a . This rim can be turned so that it locks the segment b within its end circle but allows the removal of the segment when the sector d^1 registers with part q^1 of the segment b . A projection p serves as handle when opening the segment b .

Between the member v and the foot-piece h is placed a helical spring u tending to move both parts away from each other. Such a movement is however checked by two devices, one of which is meant to regulate the speed of this movement while the other enables the operator to limit the length of it. A projection i of the foot-piece h holds a screw k and guides a brake-member l which can by means of the screw k be more or less pressed against the shaft m and so influence the speed of the movement of the latter. Another projection in form of a guide x^3 attached to the casing a serves as guidance to a pin x^4 which passes through the guide x^3 and possesses at its other end two lateral projections x^5 engaging under the influence of the spring x^6 two rack-bars x^1 and x^2 which are rigidly connected to the member v , v^1 , v^2 .

When the pin x^4 is pressed down, the two lateral projections x^5 free the two rack bars and thereby allow the member v , v^1 , v^2 to move. When the pin x^4 is not pressed down, the two projections x^5 are pressed against the two rackbars by the spring x^6 and so prevent member v , v^1 , v^2 from moving forward the top of the syringe. This device enables the operator to inject the exact quantity he may wish. In order that the operator can see if the dose is correct, the outer casing of the instrument is provided with a slit r underneath which a mark

s^1 is visible on the wall v^1 of member v , v^1 , v^2 . By means of a scale s on casing a any movement of the member v , v^1 , v^2 can be minutely observed. The needle y is provided in such a way with a collar y^1 and a conical end-piece y^2 that the member c exactly fits between both, and that the needle is held securely in position. The conical end-piece is so shaped as to fit in the boring w^1 of the stopper w^2 of the vessel w . In order that the stopper w^2 may easily slip toward the bottom of the vessel, when this is moved against the needle, the stopper is provided with an annular recess w^3 which prevents the stopper from sticking to the glass of the vessel at the same time securing its action as a piston when the needle is pressed toward the bottom of the vessel. The stopper w^2 is made of elastic material as caoutchouc. Before use the boring of the stopper is closed by a cover w^4 , preferably of elastic material as caoutchouc, which is brought sterile upon the vessel when the same is still warm after being filled. When cooling down the cover is firmly pressed on the vessel and stopper by the vacuum arising inside and is somewhat drawn into the boring by the same means. The physician can by this latter sign easily determine if a vessel is intact *i. e.* sterile.

For using the instrument he proceeds as follows: The cover is removed from the vessel and the latter placed into the member v , v^1 , v^2 , so that the conical end of the needle which must also be sterilized enters the boring of the stopper. After closing and locking the segment b the needle is inserted under the skin of the patient and pin x^4 pressed down until the mark s^1 reaches a certain place on the scale s corresponding to the quantity to be injected. The speed of the injection can be regulated by screw k .

In Fig. 6 is shown a syringe for hand-manipulation, which is constructed similarly to the one described before, but which possesses no spring u for driving the member v , v^1 , v^2 or means for regulating speed and length of movement. The operator lays two fingers through the two handles y^3 and presses with another finger on the button n . Even in this form the new syringe represents a considerable progress in comparison with known devices, because vessel and needle are held by the new instrument in the proper way and because the boring in the stopper secures a thoroughly sterile injection.

I claim:

1. In a subcutaneous syringe, in combination, a liquid-containing receptacle having a normally perforated stopper adapted to move relatively with respect to said receptacle, a needle adapted to engage said stopper and hold the same against movement relatively to said needle, and means

for moving said receptacle toward said needle, whereby the stopper will be forced to move into said receptacle.

2. In a subcutaneous syringe, in combination, a liquid-containing receptacle having a normally perforated stopper adapted to move relatively with respect to said receptacle, a needle having a portion engaging said stopper and extending within said perforation, and means for moving said re-

ceptacle toward said needle, whereby said stopper will be forced to move into said receptacle.

In witness whereof, I have hereunto signed my name in the presence of two subscribing witnesses.

AUGUST SCHROEDER.

Witnesses:

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