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HYPODERMIC SYRINGE

Filed April 4, 1923

Fig. 1.

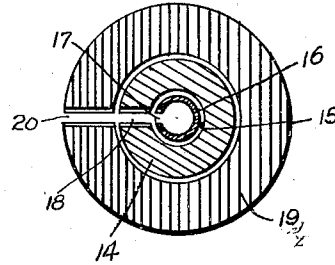
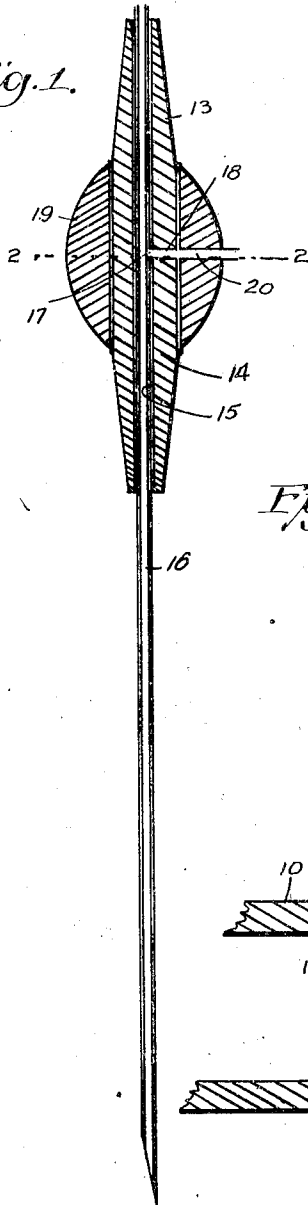


Fig. 2.

Fig. 4.

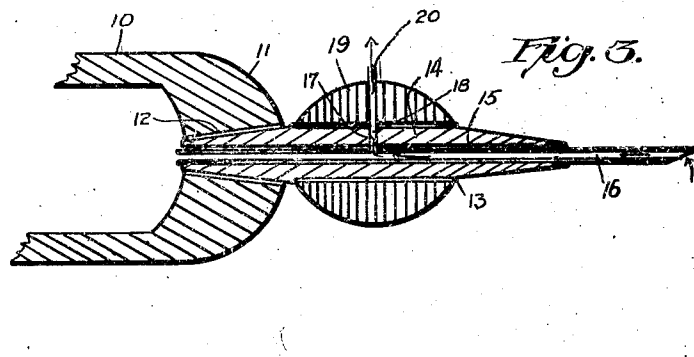
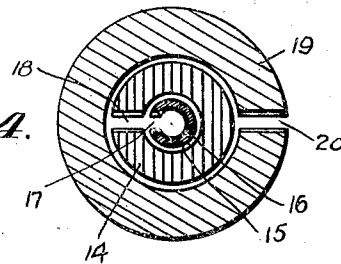


Fig. 3.

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HYPODERMIC SYRINGE.

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My invention relates to improvements in hypodermic syringes for the introduction of medicated solutions into an artery.

It is customary to perform an inoculation into the blood by means of an ordinary syringe comprising a small glass tube provided with a needle-shaped nozzle at one end, and a reciprocating piston controlled from the opposite end. In the application of this type of instrument considerable difficulty has been encountered by the inability of the one administering the injection to properly determine just how deeply the point of the needle must be inserted beneath the skin to encounter and remain within the passage of the blood vessel. The indication commonly depended on by physicians in determining when the passage in the needle is in communication with the interior of the artery, is by the inflow of blood into the needle towards the head of the fluid in the syringe. This demonstration apparently seems conclusive, but there is still no definite indication that the point of the needle has remained within the artery and did not puncture the opposite side of the latter, in which case the point is embedded in a muscle or other adjacent part of the body, and the injection of fluid would not inoculate the blood. Further difficulty occurs where the solutions to be injected are of a dark color and may not be clearly distinguished from the blood as it enters the needle.

With the foregoing in mind it is the purpose of the present invention to provide a syringe of a general type having means whereby it may readily be determined at any time subsequent to the insertion of the needle beneath the skin whether the passage therein is in communication with the interior of an artery or not. In carrying out this purpose the invention contemplates the use of a valve and outlet passage in direct communication with the main passage through the needle whereby blood entering the needle will merely flow outwardly through the valve and outlet passage, as hereinafter more fully described.

The invention is illustratively exemplified in the accompanying drawings, in which Figure 1 is a longitudinal sectional view through my improved syringe needle, showing the parts more or less diagrammatically, and indicating the valve in open position;

Figures 2 and 4 are transverse sectional views taken on the line 2—2 of Figure 1 and showing the valve in open and closed positions respectively; and Figure 3 is a longitudinal sectional view of the needle applied to the customary type of syringe.

Referring to the drawing, 10 denotes the tubular body portion of a syringe having a closed discharge end 11 provided with a tapered axial opening 12 communicating with the interior of the body portion 10. In its simplest form the syringe is provided with a reciprocating piston which is drawn up while the opening 12 is immersed in any fluid, whereupon the latter is forced into the body 10 by atmospheric pressure and by pushing back the piston to the bottom of the cylinder the contained fluid is expelled outwardly in the direction of the opening 12.

In the embodiment of the invention shown in the drawing the nozzle, indicated at 13, is a separate member capable of being inserted into the opening 12 and embraced by the tapered walls to hold its position. The nozzle proper comprises a cylindrical member 14 tapered off at opposite ends and having an axial bore 15 through which a tubular needle 16 projects. The needle is closely embraced by the wall of the bore 15 and at a midpoint thereof is a radially disposed orifice 17 communicating with the interior of the tubular needle 16 and with a radially disposed outlet passage 18 in the wall of the cylindrical member 14. The passage 18 projects to the periphery of the member 14 and is acted upon by a valve member 19, which comprises a rotatably mounted device carried by the portion of the cylindrical member between the tapered end portions, and which is provided with a radially disposed passage 20 adapted to be moved into and out of register with the passage 18.

The purpose of the tapered end portions of the member 14 is to provide means for holding the nozzle 13 in either of its possible axial positions, i. e. when the needle is to be placed in use and when it is reversed and is disposed within the body 10 of the syringe for protection.

The application of the invention is as follows:—Subsequently to a charge of fluid having been drawn into the body 10 of the syringe and the nozzle 13 being in operative condition, as indicated in Figure 3,

the valve 19 is opened and the point of the needle 16 may be thrust beneath the skin in search of a blood vessel. Having encountered an artery the point will puncture the wall of the latter and the blood will rush
5 outwardly through the passage in the needle 16, and following the line of least resistance, will discharge through the orifice 17, passages 18 and 20. The flow thus started will
10 continue so long as the needle-point remains within the artery and the valve 19 remains open, but if the point punctures the opposite side of the wall of the artery the flow will immediately stop, a condition which
15 should indicate that the insertion has been too deep. When the proper depth is determined the valve is simply closed and the piston projected toward the bottom of the syringe whereupon the contained fluid is

expelled through the passage in the needle 20 and into the blood vessel.

Having described my invention what I claim and desire to secure by Letters Patent is:—

In a syringe, the combination of a nozzle 25 having an axial discharge passage and a radial outlet passage communicating therewith, said nozzle including a holder having an axial and a radial bore, a needle disposed in said axial bore and provided with
30 an orifice adapted to register with the radial bore, and a valve carried by the holder and provided with a radial passage adapted to be moved into and out of register with the said radial bore, substantially as described. 35

In testimony whereof I have affixed my signature.

MIGUEL BECERRO DE BENGUA.