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R. CHIBRET ET AL

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HYPODERMIC SYRINGE MADE OF PLASTIC MATERIAL

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FIG. 1.

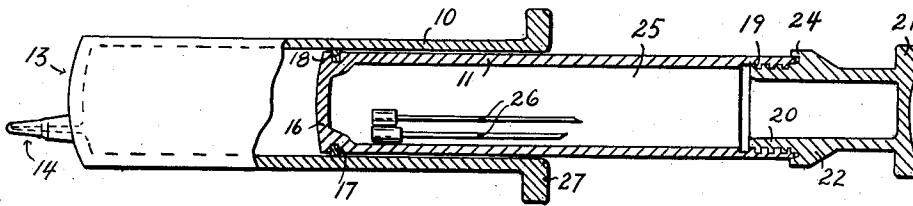


FIG. 2.

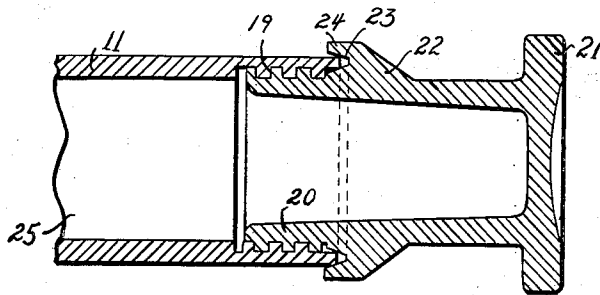
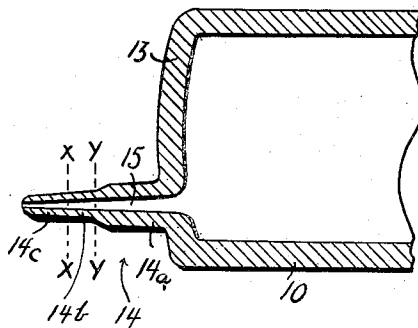


FIG. 3.



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HYPODERMIC SYRINGE MADE OF PLASTIC MATERIAL

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1 Claim. (Cl. 128—218)

Our invention relates to hypodermic syringes made of plastic material and has for its chief object to supply the practitioner with an instrument adapted to be used at any moment, whatever may be the type of needles available, said needles having been previously sterilized so that the said practitioner may be certain at the moment of their use that they are perfectly sterile.

According to a primary feature of our invention, the piston made of plastic material cast through injection, as is the case also of the syringe cylinder or body, is provided with a fluid-tight annular packing fitted inside an outer annular groove of said piston which is hollow, while its inner end is permanently closed, at the moment of casting, by a cover that is made rigid with the cylindrical wall of the piston; the outer end of the piston is, in contradistinction, removably closed by a plug forming the operative knob of the piston, the closed chamber thus provided inside the piston being used for placing therein one or more needles before use, which needles are sterilized together with the syringe.

According to a further object of the invention, the knob controlling the operation of the piston and that serves also for closing the chamber containing the provision of needles, is provided at its front end with a tapped skirt screwing inside the hollow body of the piston and, to the rear of said skirt, with an annular groove, the outer peripheral edge of which extends as a short projection parallel with the outer surface of the skirt and covering outwardly the edge of the piston body to form a sort of hoop for the terminal part of said piston which is thus prevented from deforming or swelling; fluidtightness is ensured thus, without it being essential to resort to a packing, through a clamping of the rear edge of the piston inside said groove, as allowed by the plasticity of the material forming the piston.

According to a further object of the invention, the breadth of the above mentioned groove in the knob decreases gradually from its opening to its bottom, i. e. said groove has a V-shaped cross-section.

According to a still further object of the invention, the needle-carrying nozzle carried by the front end of the body of the syringe and obtained in the casting, is adapted, without resorting to any intermediary member, to receive any needles of which the sizes of the internal contour of their fitting sleeves are different.

For this purpose, the syringe nozzle has a greater length than the similar nozzles provided in other syringes and includes a plurality of stepped frustocones of outwardly decreasing sizes, which allows fitting on our improved syringe needles of any standard type, the outer cone or cones, which have a smaller diameter, being removed, if necessary, by cutting the nozzle with a knife or with scissors, which is possible in the case of plastic material; this is done whenever the cone or cones of larger diameter which are those nearest the syringe body, are required for use, so that the extension formed by the smaller cones may no longer prevent the engagement of the larger needle fittings on the larger cones.

We have illustrated, by way of example, in accompanying drawings, a preferred embodiment of our improved hypodermic syringe. In said drawings:

Fig. 1 is a general cross-sectional view passing through the axis of the syringe;

Figs. 2 and 3 are detail views showing, on a larger scale, the knob controlling the piston and the nozzle of the body or cylinder respectively.

The syringe includes a body or cylinder 10 and a

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piston 11 which are both made of an injectable plastic material such as a superpolyamide.

The body 10 is closed by a cover 13 carrying a nozzle 14 enclosing a channel 15 opening into said body. The other end of the body 10 is open and is provided with a flange 27 directed outwardly in a diametrical plane.

The piston 11 is hollow and is provided at one end with a cover 16 and in proximity with said cover with an outer annular groove 17 inside which is fitted a ring 18 of yielding elastic material. The other end of the piston is provided on its inner wall with a tapping 19 having a square thread and inside which is screwed the threaded skirt 20 rigid with a knob 21. This knob is provided with a thicker part 22 in its medial portion adjacent the skirt, in which thicker part is provided a groove 23 defining an outer peripheral lip 24 covering with the minimum clearance consistent with mass production, the rear terminal edge of the piston 11.

This knob 21 forms a stopper for the syringe and it defines with the cover 16 and with the side wall of the piston 11, a closed chamber 25 inside which may be laid a provision of needles 26.

The above mentioned groove 23 assumes a conical outline so that, upon screwing down of the knob 21, the fluidtightness of the chamber 25 may be ensured through a peripheral clamping of both sides of said rear terminal edge of the piston between the inner and outer walls of said groove, so as to provide thus a balanced or compensated fastening. The lip 24 acts, furthermore, as a hoop opposing, chiefly at the moment of the sterilization of the syringe through boiling, any objectionable tendency of the terminal section of the piston to swell.

As to the nozzle 14 provided with a channel 15 opening into the body or cylinder 10, it is constituted by an inner larger part 14a of conical outline opening into a narrower further medial part 14b terminating in its turn as a part 14c of still smaller diameter. The conicity and the diameter of the inner part 14a of the nozzle correspond to the requirements of needles of the American type. The conicity and diameter of the part 14b correspond to the requirements of the needles of the so-called German or record type and those of the part 14c to the requirements of needles of the French type.

When it is desired to fit French type needles on the syringe, the terminal fitting of said needle should be secured over the terminal part of the nozzle 14c without any modification being brought to the syringe.

If it is desired to use needles of the German type, the syringe may also be used as it is, the fitting of the needle being slid over the nozzle until it engages the medial part 14b. The fitting of the needle is sufficiently long for the terminal part 14c of the nozzle to remain housed therein without hindering operation in any manner. Should this not actually be the case, it is always possible to cut off the terminal portion of the nozzle with a knife or with scissors through the line x—x.

In the case of American type needles, the end of the nozzle is cut off at y—y so that the fitting of the needle may be secured directly over the inner part of the nozzle 14a.

In accompanying drawings, the nozzle having a plurality of stepped parts or sections has been illustrated as extending laterally with reference to the axis of the body or cylinder of the spring but obviously it could as well be located axially of the syringe.

The ring 18 that is positioned inside the groove of the piston 11 provides for fluidtightness between the piston and the inner wall of the cylinder 10, when the piston is being shifted in either direction inside said cylinder. The knob 21 serves for pushing the piston in or drawing it out while the outer flange 27 serves for holding the cylinder in position.

What we claim is:

A hypodermic syringe made of injectable plastic material comprising a body including a nozzle adapted to carry needles, which nozzle includes a plurality of stepped frustocones of outwardly decreasing sizes, a forwardly closed hollow piston slidably engaging the body defining an inner chamber adapted to carry a provision of needles and a control knob threadably engaging the inner surface of the rear end of the piston, and

closing fluidtightly the needle-containing chamber in said piston, said knob including a peripheral projection adapted to clampingly engage the outside of the rear end of the piston when the knob is screwed in said rear end of the piston.

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