July 18, 1950 C. J. GREENBERG 2,515,956

SYRINGE

Filed Jan. 21, 1949 2 Sheets-Sheet 1

Fig. 1.

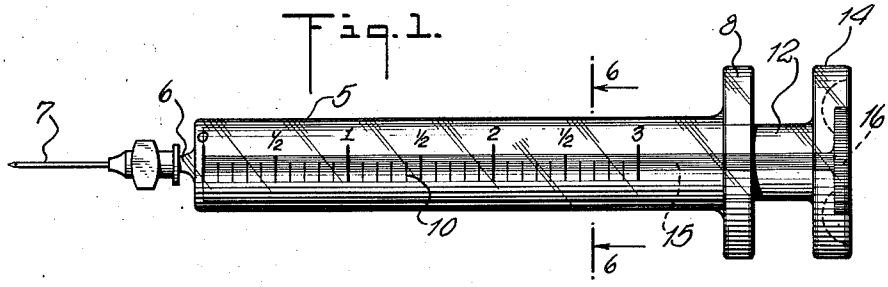
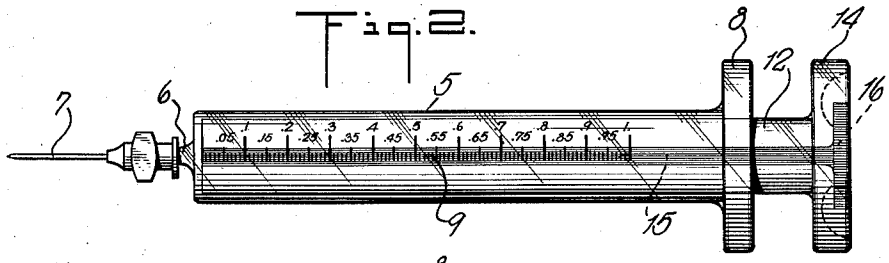


Fig. 2.



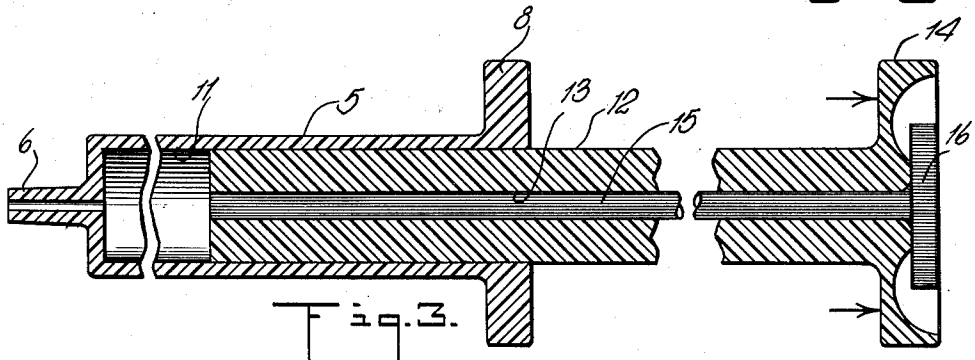


Fig. 3.

Fig. 4.

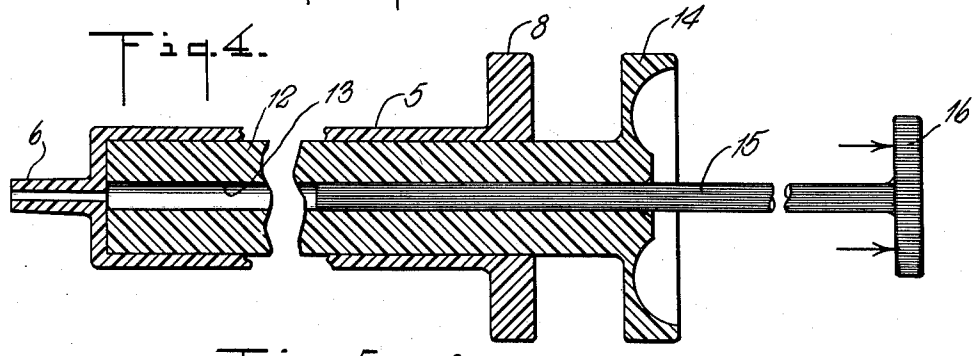
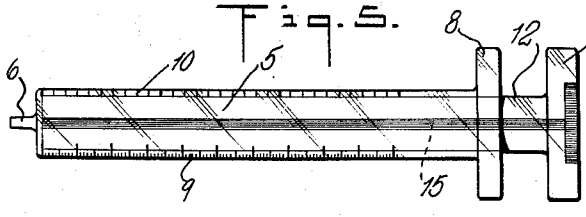


Fig. 5.



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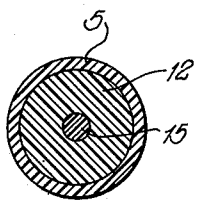


Fig. 6.

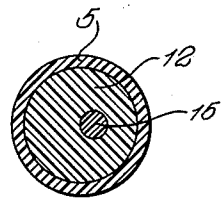


Fig. 7.

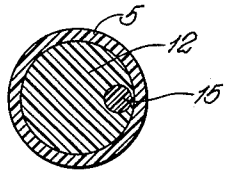


Fig. 8.

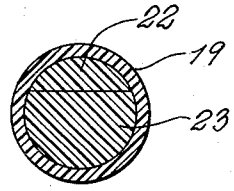


Fig. 10.

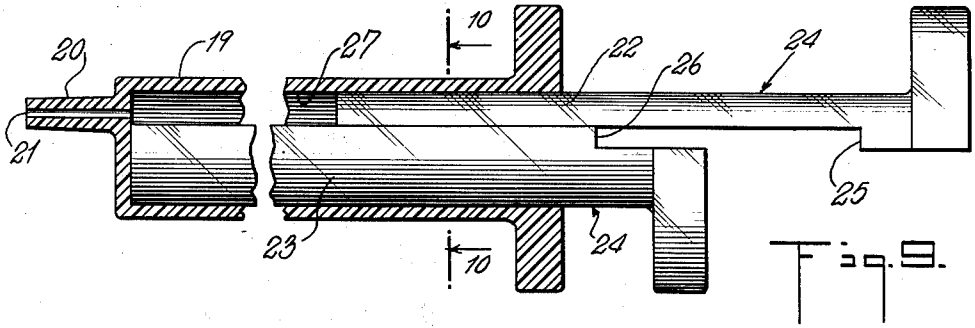


Fig. 9.

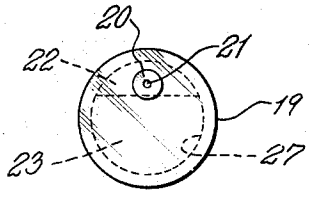


Fig. 11.

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SYRINGE

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Application January 21, 1949, Serial No. 71,949

3 Claims. (Cl. 128—218)

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This invention pertains to hypodermic syringes and particularly to a combination syringe adaptable for administering either minute, or comparatively large dosages.

Heretofore, it has been necessary to employ two species of syringes, one in which the dosages are measured by fine calibrations, for example, a syringe in which 1 c. c. is calibrated into .01 measurements, and another type of syringe in which 1 c. c. is divided into .1 calibrations.

My invention is capable of being employed for all kinds of injections, requiring either the fine, or larger dosages.

Briefly described, my syringe consists of a barrel having a conventional tip, the barrel provided with fine calibrations on one lateral side and larger calibrations on the other. Cooperating with and reciprocally movable within the barrel I provide an intermediate plunger and an inner plunger, the latter also cooperating with and reciprocally movable within the intermediate plunger.

The intermediate plunger with the inner plunger fixed therein, is used for larger injections, while the inner plunger, with the intermediate plunger in seated position, can be employed for finely measured injections, while a combination of both may be used to increase the capacity of the combined inner and intermediate plungers.

A principal object is to provide in one syringe measuring and dispensing means whereby any type of liquid injection may be measured and dispensed with facility; another object is the provision of an instrument which may be handled with despatch whether measuring injections requiring fine or larger calibrations.

A still further object is a syringe in which the possibility of breakage is minimized, and another object is an instrument wherein liquid materials may be measured and administered with the utmost accuracy, and one wherein the optimum in dosages may be achieved.

Other objects will be apparent from a perusal of the specification and drawings.

In the drawings:

Fig. 1 is a front elevation of one side of a preferred form of my invention.

Fig. 2 is a rear elevation taken of the side opposite to Fig. 1.

Fig. 3 is an enlarged longitudinal sectional view of the syringe with a large injection being measured.

Fig. 4 is an enlarged longitudinal sectional view of the syringe with a "fine" injection being measured.

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Fig. 5 is an elevational view indicating the positioning of the fine and large calibrations on opposite sides of the syringe.

Fig. 6 is a cross-section taken along lines 6—6 of Figure 1.

Fig. 7 is a similar cross-section of one modification of the invention.

Fig. 8 is a similar cross-section of a second modification.

Fig. 9 is an enlarged longitudinal sectional view partly in elevation of a further modification.

Fig. 10 is a cross sectional view taken on lines 10—10 of Figure 9.

Fig. 11 is an end elevational view of the device shown in Figure 9.

By way of introduction, I contemplate the manufacture of my syringe in any suitable plastic material, such as "Lucite," nylon or polystyrene or it may be manufactured of glass, or of any material having structural characteristics which lend themselves to use in a syringe of the character described.

Referring to the drawings, my syringe consists of barrel 5 preferably transparent, having its lower end provided with conventional discharge tip 6, adapted for holding the hypodermic needle 7 or other discharge means with the upper end of said barrel being formed with a peripheral flange 8.

On one lateral side of barrel 5 are fine calibrations denoted by the numeral 9. The example disclosed is the division of 1 c. c. into hundredths (.01) see Fig. 2. Other calibrations may be employed—those denoted in Fig. 1 being illustrative only.

On the opposite side of barrel 5 are what, for the purpose of explication, might be termed "large" calibrations 10, in contra-distinction to "fine," as illustrated in Fig. 2. Here 1 c. c. is divided into tenths (.1) and a maximum dosage equivalent to 3 c. c's may be measured.

Both calibrations 9 and 10 are graduated to correspond, in volume indication, to the content of chambers 13 and 11, respectively, hereinafter described.

Cooperating with barrel 5, which is centrally bored as at 11, is intermediate plunger 12, in the form of a cylindrical-like rod, also centrally bored as at 13, the plunger 12 formed for close fitting reciprocal engagement with barrel 5. The lower end of plunger 12, when seated, abuts the lower end of barrel 5, while peripherally, on its opposite end is formed an annular shaped recessed member 14, suitable for being gripped by

the fingers when the plunger is to be manipulated.

For reciprocal movement within central bore 13 I have designed inner rod-like plunger 15, the lower end thereof adapted to be seated contiguous the lower end of barrel 5, the upper end also formed with plunger head 16 adapted to be manipulated by the fingers; plunger 15 is preferably, though not necessarily opaque. And, as shown in Figs. 1, 2, 3 and 4, recessed member 14 accommodates plunger head 16 when plunger 15 is in telescoped position and permits of the said plunger head being gripped by fingers when it is desired to retract same.

If the physician, nurse, or other qualified person desires to measure and administer an injection of a comparatively "large" concentration, plungers 12 and 15 are grasped unitarily, the first and second fingers holding plunger 12 and the thumb impinging against member 16, the syringe needle immersed in the medicament, and the lower ends of plungers 12 and 15 withdrawn to the point opposite the calibration on barrel 5 corresponding to the dosage desired.

Fig. 3 admirably illustrates the position assumed by the plungers 12 and 15 in the measurement of a large dosage, with chamber 11 accommodating the desired dosage.

After the measurement of the fluid, it may be administered in the conventional manner by positioning the syringe needle where desired, and then exerting pressure on plunger head 16 to extrude or expel the medicament, plungers 12 and 15 being impelled in the direction opposite to that indicated by the arrows in Fig. 3.

If more than 3 c. c's of medicament must be administered, another capital advantage of my syringe can be exploited. For upon withdrawal of plungers 12 and 15 as a unit to the maximum 3 c. c. calibration, plunger 15 can be withdrawn still further to form an additional chamber 13 for accommodating an additional 1 c. c., or fraction thereof. This additional 1 c. c. or part thereof may be expelled by first impelling plunger head 16 to its closed position and continuing the pressure on said plunger head until the larger chamber 11 is cleared of fluid. And further a very minute amount of one medicament may be first measured within the smaller channel 13 to be mixed later with a quantitative amount of another medicament in the larger channel 11.

Fig. 4 depicts the position assumed by plunger 15 when a minute or "small" amount of medicament is to be measured and administered, wherein plunger head 16 is withdrawn in the direction indicated by the arrows—with chamber 13 formed for accommodating the desired fluid with intermediate plunger 12 being seated. In filling chamber 13, the fine calibrations as shown in Figure 2 would be employed, with the opaque, or colored member 15 enabling a quick, facile reading of the same calibrations. When the fluid is measured, plunger head 16 may be depressed, for the transfer or administering of the medicament.

In Figs. 7 and 8 I have illustrated cross-sections of modifications of my syringe wherein plunger 15 is positioned other than concentrically with respect to plunger 12, without departing from the concept of the invention.

Additionally, in Figs. 8, 9, and 10 I have illustrated another modification, wherein barrel 19 is provided with tip 20 appended eccentrically with respect to the center of the barrel, with orifice 21 formed to connect with optional chambers formed by the cooperating segmented parts 22, 23 of central plunger 24, said parts having shoulders 25, 26 acting as stops when the parts are closed.

In this modification, part 22 may be withdrawn and used as a plunger for the measurement of a fine dosage as to chamber 27 connecting with orifice 21 in the position shown in Fig. 9; while part 23 may be withdrawn simultaneously with part 22 as one unitary plunger for the measurement of larger dosages, and when the two segmented parts 22, 23 are so withdrawn orifice 21 connects with a chamber formed by the retracted part of central plunger 24. Again the fine calibrations are on one side of the barrel and the larger calibrations of measurements i. e. 1 c. c., 2 c. c., 3 c. c. are on the opposite side of the barrel as shown in Figs. 1 and 2.

The syringe is susceptible of further modification without departing from the scope of the invention. For example, member 14 is shown recessed for accommodating plunger head 16 and so that the latter may be gripped by the fingers. I propose that member 14 may be manufactured without the recess. Further the parts may be made either transparent or in varied colors. All or any parts of described syringes and modifications may be made of either heat resistant glass, plastic or metal. The plastic may be either nylon, Lucite, a methyl methacrylate resin or polystyrene, these having such physical properties as to resist heat or chemical action, so that little or no distortion takes place to interfere with the proper movements of the integral parts of the syringe described above.

I claim:

1. A syringe of the character described comprising, in combination, a barrel having fine calibrations on one side and larger calibrations on the opposite side, said barrel centrally bored to provide a chamber having the same dimension throughout its length, open at one end and closed at the other end except for a discharge tip leading from the chamber, a pair of cooperating, cylindrical and rod-like plungers of substantially different diameters, each of said plungers provided with heads, said plungers reciprocally movable within, and occupying the entire central bore of the barrel, the larger of said plungers in close fitting engagement with the chamber of the barrel, the smaller of the plungers reciprocally movable within the said larger plunger, said plungers adapted to be retracted and telescoped singly and as a unit with respect to said barrel to measure and expel liquids from the syringe, the larger calibrations employable to measure the contents of the chamber provided when the pair of plungers are retracted as a unit, the smaller calibrations employable to measure the contents of the chamber formed upon retraction of the head of the smaller of the pair of plungers away from the head of the larger of said pair of plungers.

2. A syringe as described in claim 1 wherein the barrel, intermediate and inner plungers are formed of plastic material, the barrel and intermediate plungers of transparent plastic material and the inner plunger of opaque plastic material.

3. A syringe of the character described comprising a barrel provided with fine graduated calibrations on one side thereof, and larger graduated calibrations on the other side, said barrel centrally bored to provide a relatively large chamber for liquids, open at one end and closed at the other except for a discharge tip leading therefrom, an intermediate cylindrical and rod-like

plunger of greater length and less diameter than the barrel, the lower end of the said plunger abutting the lower end of the central bore of the barrel when seated, the outer end provided with a plunger head, said plunger bored throughout its length to provide a chamber therein of substantially less diameter and capacity than the chamber of the barrel, said intermediate plunger adapted to be received in the central bore of the barrel and for close-fitting engagement therewith and an inner rod-like and solid plunger provided with a head, said inner plunger adapted for close-fitting reciprocal movement within the intermediate plunger, the lower end of said inner plunger abutting the lower end of the central bore of the barrel when seated, and said inner and intermediate plungers occupying the entire chamber of the barrel when seated, the large calibrations for measuring the contents of the

chamber provided upon retraction of the intermediate and inner plungers as a unit and the fine calibrations for measuring the contents of the chamber provided upon retraction only of the inner plunger.

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