

March 8, 1932.

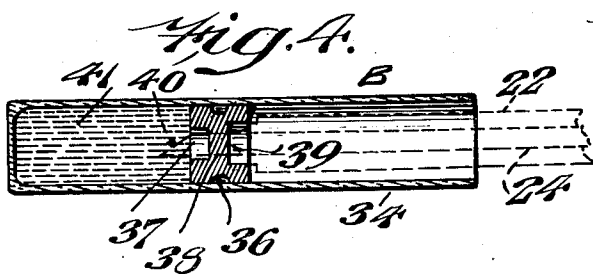
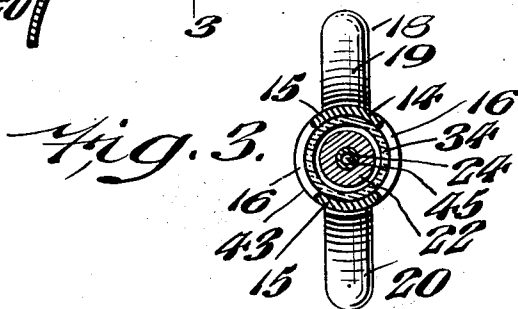
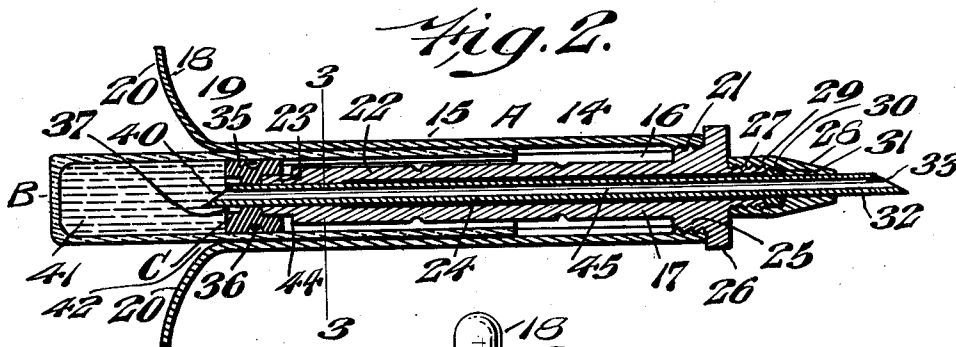
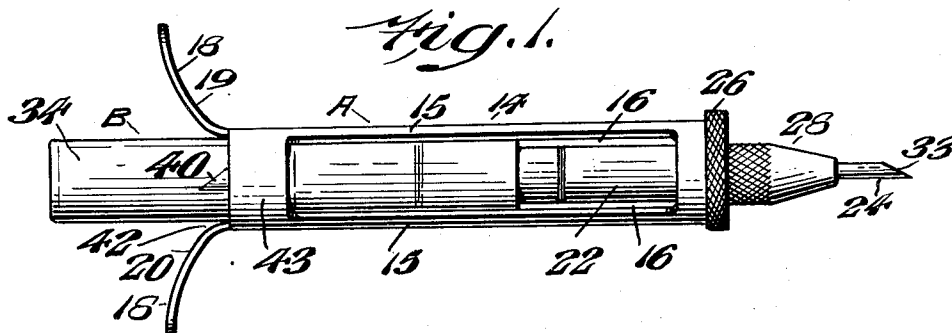
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1,848,711

HYPODERMIC SYRINGE

Filed April 24, 1930

2 Sheets-Sheet 1



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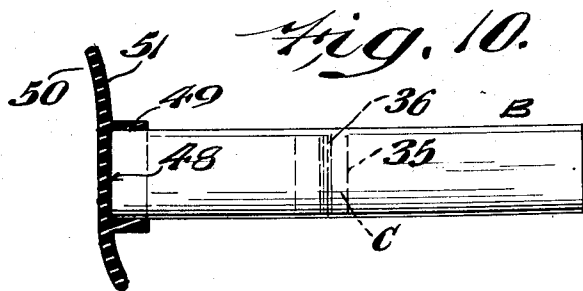
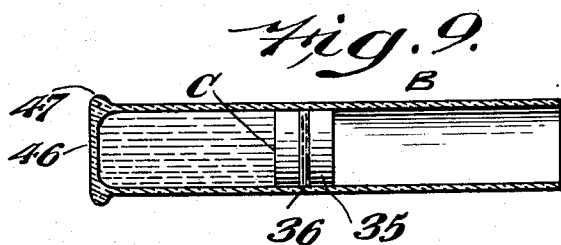
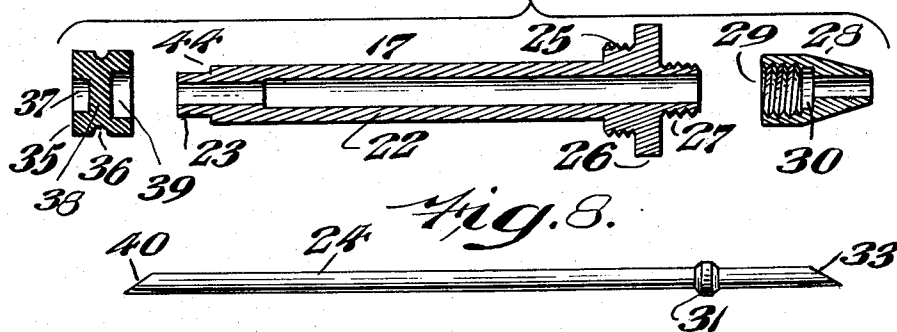
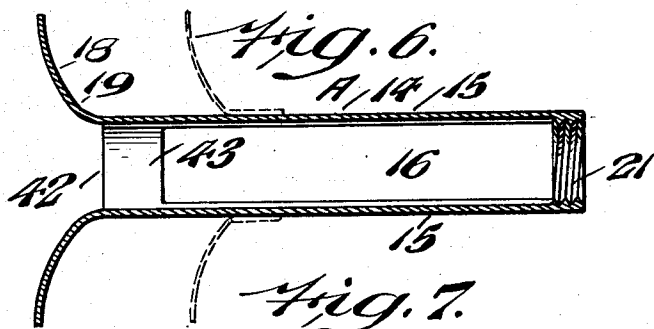
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HYPODERMIC SYRINGE

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2 Sheets-Sheet 2



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HYPODERMIC SYRINGE

Application filed April 24, 1930. Serial No. 446,832.

This invention relates to a hypodermic syringe having for its general object the provision of an improved simplified device of the kind indicated.

Another object is the provision of a hypodermic syringe of a design and construction effecting a substantial saving in cost both to the manufacture and purchaser, while affording a device more efficient in operation, and more compact in size.

Another object is to provide a hypodermic syringe in which the ampoule or vial serves as a liquid containing plunger.

A further object is to provide an improved ampoule.

A still further object of the invention is to provide an improved plug or stopper for an ampoule.

Additional features and advantages of the method and construction employed will appear hereinafter.

At the present time a number of hypodermic syringes of various types are available; nevertheless many of these devices have inherent defects or objections which render their use in practice not always to be recommended. This is particularly true of those hypodermic syringes of recent design which involve a comparatively complicated structure necessitating a preliminary adjustment preparatory to their immediate use which is alarming to high strung, imaginative and nervous patients with a consequent detrimental physiological reaction. In the present instance the design provided is particularly adapted, by reason of its compactness to be readily concealed within the palm of the hand of the physician or operator thereof without being perceived by the patient.

Referring to drawings:—

Figure 1 is a plan view of a hypodermic syringe embodying my invention as it appears ready for use;

Figure 2 is a longitudinal sectional view of the device shown in Figure 1;

Figure 3 is a transverse sectional view taken on line 3—3 of Figure 2;

Figure 4 is a longitudinal sectional view of an improved ampoule and stopper therefor;

Figure 5 is an elevational view of the stopper employed in my ampoule;

Figure 6 is a longitudinal sectional view of the ampoule container or plunger;

Figure 7 is a longitudinal sectional view of a piston and the cap or thimble therefor;

Figure 8 is a plan view of the needle used in the present invention;

Figure 9 is a longitudinal view partly in elevation of a modified form of ampoule which may be used with the container shown in Figure 6 and

Figure 10 is a sectional view of a finger rest which may be optionally employed with the ampoule used with my hypodermic syringe.

For the purpose of illustrating my invention I have shown in the accompanying drawings one form thereof which is at present preferred by me, since the same has been found in practice to give satisfactory and reliable results, although it is to be understood that the various instrumentalities of which my invention consists can be variously arranged and organized and that my invention is not limited to the precise arrangement and organization of the instrumentalities as herein shown and described.

In the drawings, wherein similar numerals of reference indicate corresponding parts in the drawings, A designates an ampoule-receiving container or housing which comprises a cylindrical body 14 formed with guide straps 15 provided by the cut-away portions 16 on opposed sides of the body 14, the cut-away portions 16 disclosing the piston or, more exactly, the piston rod 17 hereinafter described, and the ampoule B also referred to below.

The container A at one end is preferably formed with a finger rest 18 which includes the two arcuate diverging legs 19 and 20. The finger rest 18 may, if desired, be placed at the middle as shown in dotted lines in Figure 6, or any convenient point along the housing A, although I have shown it at the end by way of illustration. As best shown in Fig. 6, the forward end of the container A is provided with a threaded socket 21 the purpose of which will appear hereinafter.

The piston or piston rod 17, as shown in Figs. 2 and 7, comprise an elongated barrel or body portion 22 with a reduced stem 23 which latter serves as a guide for the elongated needle 24. As clearly shown in Fig. 7, at one end of the barrel or body portion 22 a threaded annular shoulder 25 is integrally formed therewith, the shoulder 25 being contiguous to and unitary with a manipulating disc or head 26 having a knurled edge, the head 26 serving as a means of securing and removing the piston 17 to and from the container A. At the forward end of the piston 17 a threaded projecting stem 27 is formed on which a thimble or cap 28 is secured, it being observed that the bore 29 of the latter has a threaded portion which is adapted to be engaged with the projecting stem 27 of the piston 17. By inspection of Fig. 7 it will be seen that at a point substantially mid-way of the interior of the cap 28 an annular recess 30 is provided which is adapted to receive a globular or oval-shaped bead 31 on the needle 24, the bead 31 serving to limit the longitudinal movement of the said needle in the direction of the cap 28, as viewed in Fig. 7. The cap 28 at its forward end is provided with a comparatively narrow bore 32 through which the injecting cannula end of the needle 24 projects.

The ampoule B constitutes an important feature of the present invention. As shown in Fig. 4, this ampoule comprises a cylindrical container 34 the open end of which is closed by a plug or stopper C, which also serves as a piston head, a plunger and as a perforable diaphragm, as will hereinafter appear. The stopper C as illustrated in Fig. 4 comprises a substantially cylindrical section 35 which may be of any suitable material, but preferably rubber, formed with an exterior groove 36 or a plurality of grooves, if desired, for a purpose which will hereinafter appear. By inspection of Fig. 4 it will be seen that at one end of the stopper C I have formed a circular recess 37 which is separated by a diaphragm 38, preferably formed integrally with the plug C, from a pocket 39 which may be circular and which is adapted to receive the reduced stem 23 of the piston rod or piston 17.

Reverting to Fig. 2, wherein the device is illustrated as ready for operation, it will be seen that the cannula 40 of the needle 24 is adapted to pierce through diaphragm 38 which has been designedly made of a thickness suitable for perforation when the removable plunger ampoule B is placed in the interior of the holder or container A. As shown in Figs. 1 and 2, the ampoule B has been partly emptied of its contents which may be any suitable liquid, serum or solution 41. The manner of operating the device described in Figs. 1 to 8 inclusive is briefly as follows:

Assuming the piston rod or piston 17, with its cap 28 mounted thereon, to be threadedly engaged with holder A, it will now merely be necessary to place an ampoule B previously filled with any desired liquid or solution at mouth 42 of container A, which as clearly shown in Figs. 1 and 2 is provided with an annular guide band 43, and then thrust the liquid laden or charged ampoule B longitudinally in the direction of cap 28, thus resulting in the perforation of the diaphragm 38 by the cannula 40 of the needle 17. It will now be obvious that further movement of the ampoule B, which serves also as the plunger of the present device, will result in protruding the stem 23 into the pocket 39 until the stopper C abuts against the shoulder 44, thus checking further movement of the plug C relatively to the fixed piston 17. Still further movement of the container 34 of the ampoule B relatively to the now fixed stopper C will cause the liquid, serum etc. 41 therein to be forced under pressure through the duct 45 of the needle 24 and thence into the patient for the usual subcutaneous, intravenous etc. injections.

It is desired here to point out the advantages resulting from the present mode of construction. The piston 17 and its cap 28 are normally secured to the holder or container A in which position, as pointed out above the insertion of the liquid filled ampoule B within the container A is but the work of a second. The natural apprehensions of a nervous or imaginative patient by this quick action are allayed as the injection may be accomplished practically instantaneously. After the ampoule B has accomplished its function or after each operation it is preferably thrown away as the price of ampoules of the present type is practically nominal. It is also desirable for antiseptic and prophylactic considerations to have a fresh ampoule for each treatment or injection.

In the modified form of the ampoule shown in Fig. 9 it will be observed that I have broadened or flared the base 46 of the ampoule B, it being observed that an annular flange 47 is formed at the exterior of the base 46. In this form the base 46 presenting more surface area against which the thumb may be comfortably seated. The same type of stopper or plug C may be employed here with the advantages accruing therefrom as mentioned above, it being noted that recess 37 plays a part in permitting the cannula end 33 to readily pierce the diaphragm 38 without jamming or bellying out the adjacent end of the stopper C.

In Figure 10 the base 48 of the ampoule B and the lower end thereof may be received in a cylindrical pocket 49 formed on a thumb or hand rest 50 which, as clearly shown in Fig. 10 is made preferably of rubber, with a curvilinear or arcuate portion 51 against which the hand or thumb of the manipulator

may comfortably seat. The present hand rest 50 is particularly adapted to cushion, reinforce and prevent breakage of the ampoule.

With further reference to the plug or stopper C it is desired to point out that the 5 groove 36 is not only used to accommodate a lubricating liquid such as glycerine for the free movement of the stopper C, but is also a means of preventing the jamming of the said 10 stopper in the container 34 since it allows for the necessary expansion of the entire plug or stopper C when the cannula 40 is inserted therein.

In manufacturing the present device, the 15 holder A may be cast as one piece, or if desired may be stamped or struck out of tubing which may be metal, fibrous material, vulcanized rubber etc. The piston 17 likewise may be cast, moulded or prepared by machin- 20 ing, while the cap 28 likewise may be cast or machined, etc. The entire device it will be observed is one of great simplicity and the mechanical advantages to be derived by the elimination of separate plungers which are 25 in addition to the holder and piston for the reception of an ampoule in which said plungers seat, are believed to be obvious. In the present instance the ampoule B is at once a container for the solution and a plunger 30 which coacts with the fixed piston 17 for the accomplishment of its function.

The needle 24 which, as mentioned above, is provided with a cannula at each end is also 35 by reason of its length particularly adapted to extend through the piston rod or piston 17 while operatively projecting from either end. The design and construction of this needle in addition eliminates the objections open to a 40 jointed passageway since the present construction affords an unbroken container passageway from the movable ampoule, which is a characteristic feature of the present invention. The ampoules B used with the contain- 45 er A are sold separately and are usually charged with the serum, liquid, or solution desired. In the art these separate ampoules are often referred to as "refills".

I am aware that the invention may be embodied in other specific forms without departing from the spirit or essential attributes 50 thereof, and I therefore desire the present embodiment to be considered in all respects as illustrative and not restrictive, reference being had to the appended claims rather than 55 to the foregoing description to indicate the scope of the invention.

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

60 1. A piston for a hypodermic syringe comprising in combination an elongated barrel having a reduced stem formed thereon, a threaded shoulder portion at a forward point 65 configured on said barrel, a manipulating head, and a threaded portion at the forward

end of said barrel, said threaded end receiving a cap having a circular recess accommodating a bead formed on a needle insertible in a duct provided in said barrel.

2. A syringe comprising an outer open- 70 ended casing, a hollow piston extending through and threadedly secured to one end of said casing, a hollow cap carried by said piston at the end thereof projecting through 75 said casing, the other end of said piston being provided with a reduced stem, a needle adapted to extend through said cap and said piston and having a bead thereon adapted to engage a seat in said cap, an ampoule adapted 80 for insertion through said casing, a stopper for said ampoule adapted to abut against said reduced stem and to be punctured by the juxtaposed end of said needle, said stop- 85 per being provided with a lubricant receiving annular groove and serving to force the liquid in said ampoule through said needle.

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