Aug. 28, 1934. M. W. KRATZ 1,971,687

HYPODERMIC SYRINGE

Filed Jan. 10, 1933

Fig. 1.

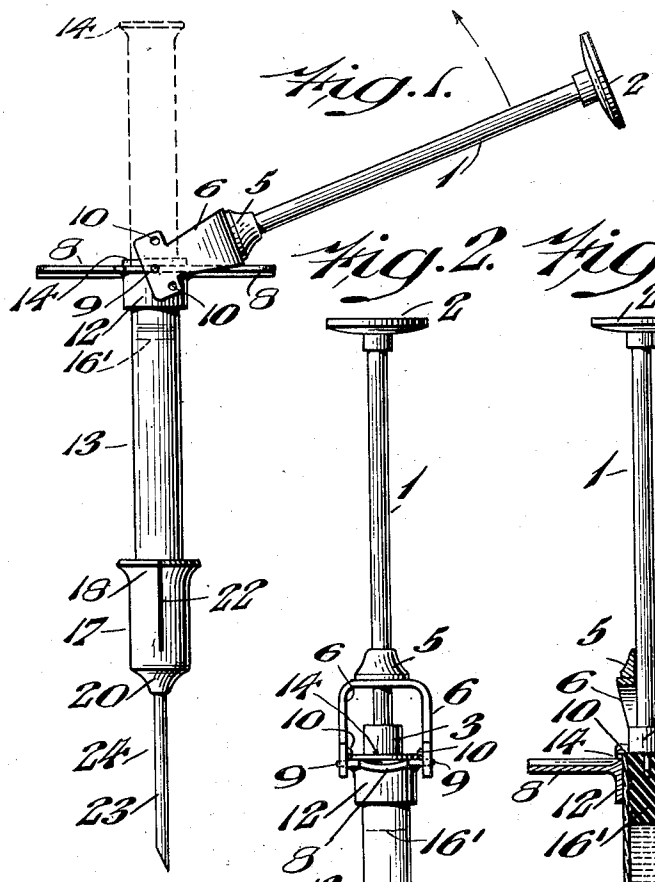


Fig. 2.

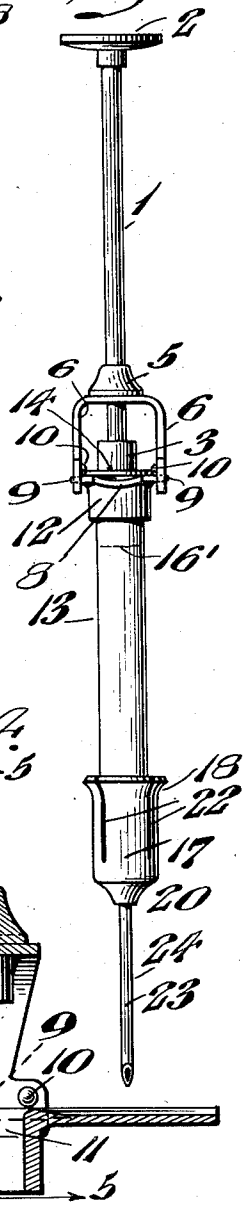


Fig. 3.

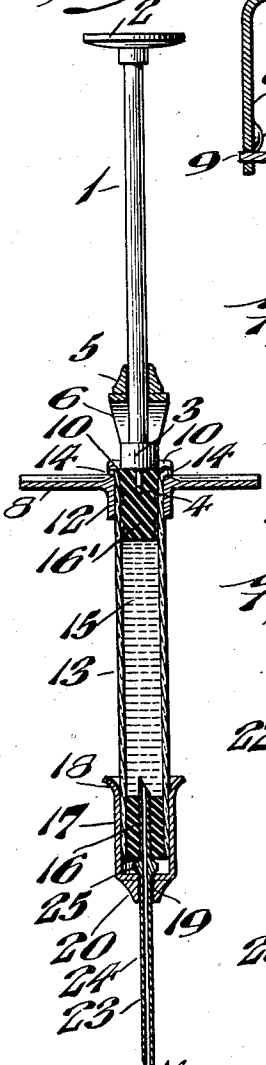


Fig. 4.

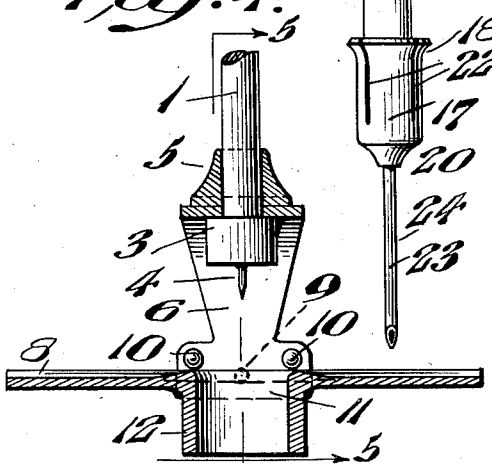


Fig. 5.

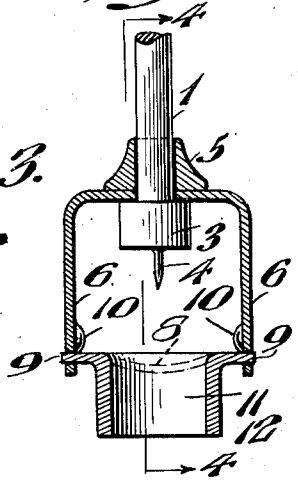


Fig. 6.

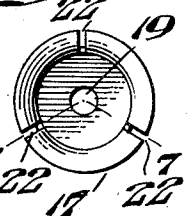
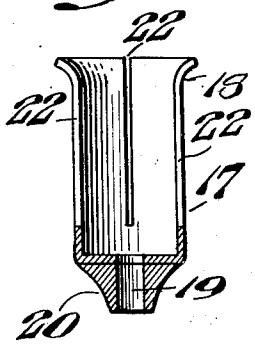


Fig. 7.



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HYPODERMIC SYRINGE

Michael W. Kratz, Philadelphia, Pa.

Application January 10, 1933, Serial No. 650,951

1 Claim. (Cl. 128—218)

This invention relates to a hypodermic syringe and more particularly to a construction of ampul and piston adapted for cooperation to provide a syringe structure.

An object of the invention is an improvement over the prior art type of syringe in that it allows greater ease and rapidity of operation, greater simplicity in manufacture, lessened cost of materials, a diminution in the weight of the instrument and compactness of its size.

Another object is a provision for an improved type of ampul in which a stopper acts as a piston for the expulsion of the contents of the ampul.

A further object is a provision for facilitation in the sterilization of such parts of the instrument as come into contact with the pathogenic bacteria and micro organisms of the patient and to this end conditions of asepsis and prophylaxis can be easily maintained.

Additional advantages in the construction and the technique of use of the instrument will be disclosed hereinafter.

Although there are now available many types of hypodermic syringes, nevertheless many of these devices have inherent defects and disadvantages which impair their usefulness in actual practice. The preparation of a hypodermic syringe requires considerable time for exact adjustment before its contents can be injected. This time can be largely reduced by the use of the present invention, the anticipatory fears of the patient can be greatly allayed and the technique of the manipulator can be expressed with despatch and assurance.

Referring to the drawing:—

Figure 1 is a view in side elevation of a hypodermic syringe embodying the invention and shown in a partly collapsed position.

Figure 2 is a view in side elevation at right angles to Figure 1 showing a device ready for use.

Figure 3 is a longitudinal sectional view of the assembled device and ampul.

Figure 4 is an enlarged fragmentary sectional view on line 4—4 of Figure 5 showing details of the piston and its housing.

Figure 5 is a sectional view on line 5—5 of Figure 4.

Figure 6 is an enlarged plan view of the cap shown at bottom of Figures 1, 2 and 3.

Figure 7 is a sectional view on line 7—7 of Figure 6.

For the purpose of illustrating my invention I have shown in the accompanying drawing 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 differently 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 drawing, wherein similar numerals of reference indicate corresponding parts in the drawing, 1 designates a piston rod terminating at the distal end in a concave thumb rest 2, which can either be threaded to engage with piston rod 1 or fabricated integrally with it, and at the proximate end in an enlarged piston 3 on which is positioned centrally the point 4 which imbeds itself in the upper stopper 16'—the details of which will be hereinafter more fully described. The piston rod 1 moves easily through the guide 5 which is rigidly attached to an approximately U-shaped yoke 6. The yoke 6 supports the finger rest 8 which admits of partial rotation about the pins 9 bearing in corresponding perforations in the yoke 6. The yoke 6 is preferably made of spring material and provided with semi-spheroidal stops 10 which not only hold the finger rest 8 in a rigid position transversely to the piston rod 1 when the instrument is ready for use but also retain the piston rod 1 and the yoke 6 in a collapsed position in order to facilitate "loading" and "unloading" of the ampul, as shown in Figure 1. The pressure necessary to rotate the yoke 6 and its stops 10 past the bearing surface 11 of the finger rest 8 is considerably in excess of the combined weight of the yoke 6 and the piston rod 1.

The finger rest 8 is integrally formed with the pendant sleeve 12 of an internal diameter sufficient to receive the upper end of the ampul 13 and serves as a seat for the upper annular flange 14 of the ampul 13 and as a guide to align the ampul 13 in its operative position as shown in Figure 3.

The ampul 15 is preferably made of glass and is provided with a square cut end which is closed by the stopper 16 for the purpose of hermetically sealing the contents such as a solution, serum or the like.

The lower squared end of the ampul 15 is inserted into a flexible cap 17 which comprises a cylindrical body outwardly flared at the larger open end 18 and terminating at the other end in a tapered hub 20 in which is cut the through opening 19.

The cap 17 is severally slotted at 22, imparting thereto a certain flexibility in respect to the in-

sertion and the yielding retention of the lower end of the ampul 14. The through opening 19 is of a bore sufficient to receive the cannula 23 of the needle 24 which toward its upper end is surrounded externally with the detent 25 for the purpose of preventing needle 24 from being forced outwardly through the opening 19. The extension of the cannula of the needle 24 above the detent 25 is adapted to puncture and project through the stopper 16 as shown in Figure 3.

Reverting to Figure 1, wherein the instrument is illustrated as ready for "loading", it will be seen that the piston rod 1 and yoke 6 are rotated to one side past the stops 10 in order to admit the ampul 13 into the bore of the sleeve 12. The distal end of the ampul is designedly flanged in order to "seat" itself upon the ventral surface of the sleeve 12. The manner of continued operation of the device described in Figures 1 to 7 inclusive is briefly as follows:

The piston rod is snapped into an upright position, as shown in Figure 2. After the needle 24 has been drawn through the opening 19 of the cap 17 until its motion is arrested by the detent 25, the cap 17 is forced over the lower end of the ampul until the upper cannula of the needle 24 has pierced the lower stopper 16 which rests securely on the detent 25. As previously described, the slots 22 in the cap 17 allow such a resiliency and tolerance in accommodating it to the glass ampul as to minimize the possibility of breaking because of the deviation of the external diameter of ampuls from a normal magnitude. Pressure applied to thumb rest 2 by the thumb imbeds the point 4 into the upper stopper 16' and inhibits any lateral motion of the piston 3 throughout its stroke. It is to be observed also that when point 4 is securely imbedded in stopper 16' the likelihood of the falling back of plunger rod 1 is practically eliminated. The continued application of pressure forces the upper stopper 16' through the lumen of the ampul, expelling before it the serum, solution or liquid through the orifice of the needle 24 for subcutaneous or intravenous administration. The curvilinear finger rest 8 provides for the application of a consistent and a directed pressure. It will be recognized that the technique of "loading" and discharging is extremely easy to perfect. Furthermore, dismantling the instrument is just as simple a procedure. The withdrawn piston 1 is snapped into a collapsed position. The cap 17 and the needle 24 are removed from the ampul and transferred to a sterilizer and the empty ampul 15 is easily withdrawn from the sleeve 12. The direct simplicity of design, the lack of multiplicity of parts, the comparative lightness of the instrument, its ease of efficient manipulation, its apparent economy of fabrication to the manufacturer and consumer are advantageous features obviously disclosed in the drawing and descriptions.

I am aware that the invention may be embodied in other specific forms without departing from the spirit or essential attributes 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 claim rather than 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:

A hypodermic syringe, comprising a ferrule having a laterally extending flange adapted to engage the upper end of a removable ampul passed therethrough, a yoke pivoted about a horizontal axis on said ferrule, stops on either side of the pivot of said yoke adapted to engage the flange on said ferrule to maintain said yoke in vertical alignment with said ferrule, a piston rod slidable through said yoke, a pin at the lower end of said piston rod adapted to engage the stopper in the upper end of said ampul, a finger rest formed on said ferrule, a slotted cap adapted to fit over the lower end of said ampul, and a hollow needle fixedly mounted in said cap with the cannula of said needle projecting above said cap to pierce the stopper in the lower end of said ampul.

MICHAEL W. KRATZ.