Nov. 12, 1946. E. MULLER 2,410,991

HYPODERMIC INJECTION APPLYING DEVICE

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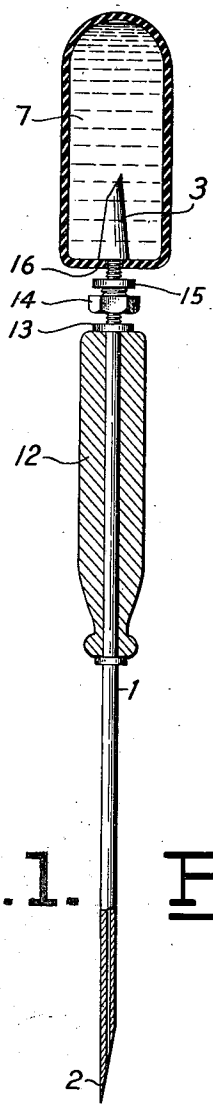


Fig. 1.

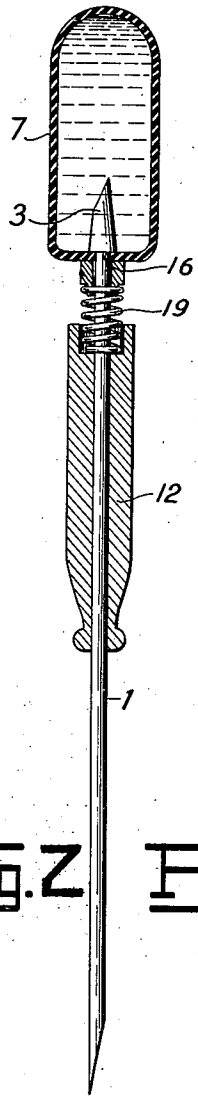


Fig. 2

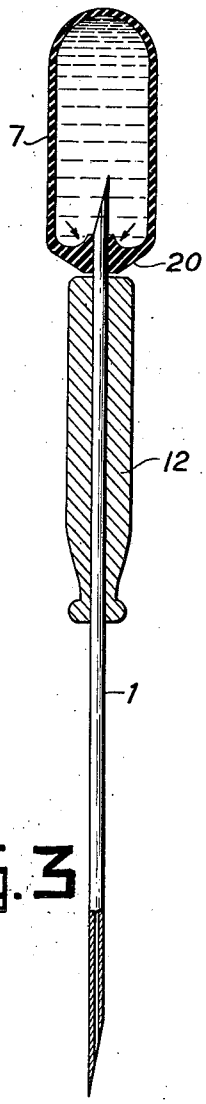


Fig. 3

Inventor
Enrique Muller
by J. Jurin
Atty.

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HYPODERMIC INJECTION APPLYING DEVICE

Enrique Müller, Chihuahua, Mexico

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4 Claims. (Cl. 128—215)

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The invention is directed to a hypodermic syringe designed to afford material and advantageous improvements in this type of device.

Broadly speaking, this invention refers to means for the application of medicinal substances, injecting them in the usual manner; and particularly for making their application more efficient and versatile, more expeditious and easy, more varied and more innocuous, affording, therefore, innumerable advantages over such types, equipment and systems so far used and known.

The device of my invention consists of two essential parts: first, a hollow hypodermic needle having both ends pointed, and secondly, of an ampoule containing the liquid to be injected, and which constitutes a capsule made of a more or less elastic material, such as rubber, gelatine or any other adequate plastic material which is puncturable.

In the drawing:

Figure 1 is an elevation partly in section of one form of the invention;

Figure 2 is a view similar to Figure 1 showing a slightly modified form of the invention;

Figure 3 is a view similar to Figure 1 showing a further form of the invention.

The improved syringe includes a needle 1, sharpened and formed at the delivery end 2 to provide the usual point. The opposite end of the needle is also formed with a sharpened end 3 to admit the fluid to the needle, the end 3 having a downwardly divergent portion terminating in a square end from which the needle 1 depends in normal diameter.

The capsule 7 is of compressible material and designed to receive the liquid to be introduced into the patient, and this capsule is formed with a square lower end to which the upper end 3 of the needle is inserted in connecting the needle and capsule. The square end of the needle terminal is brought into close association with the square end of the capsule to provide in effect a more or less sealing connection, and the needle 1 below the capsule is threaded to receive a nut 14 having a washer 15 which on threaded movement of the nut is brought into contact with the square end of the capsule following insertion of the needle to compel the washer 15 to compress the capsule between it and the square end of the needle point and insure a sealing connection regardless of the pressure on the capsule. A handle portion 12 encircles the needle 1 and is held rigidly connected thereto by terminal washers as shown.

In Figure 2 the variation in structure of Figure 1

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is shown in the sealing connection of the needle and capsule, and the other parts of this figure are the same and carry the same reference numerals as in part 1.

In the form shown in Figure 2, a gasket 16 slidably embraces the needle 1 above the handle 12 and is caused to exert sealing pressure on the outer surface of the capsule surrounding the needle 1 through the medium of a spring 19 bearing against the gasket and forming a recess in the handle 12.

According to the modfication shown in Figure 3, following the same principle of my invention, there is shown another scheme which further simplifies the device of my invention: The needle 1 is provided with both ends sharpened without any enlargement, and near its upper end it is provided with the same handle 12 to manipulate it, the said handle being perfectly fixed on the said needle 1 which goes through it.

Having eliminated the nut and the washer or bushing to produce a hermetic seal between the latter and capsule 7, the union is now effected by giving bottom 20 of the capsule made of a resilient and pierceable substance, a reinforcement 20 made of a thickness sufficiently greater than its remainder, thus obtaining a larger contact surface between needle 1 and the resilient material of which ampoule 7 is made, which gives us, by the friction and resiliency of the material, a good union between both, which union is improved by the shape of the said bottom 20 inside capsule 7, as clearly seen in Figure 3 of the drawing.

As seen in attached drawing, the said bottom 20 assumes a tapered shape surrounding the needle in such portion as has been introduced into the capsule when piercing it, following the axis of this tapered portion.

Operation.—On exerting pressure on the capsule by the puncture effected by the needle when applying the injection, the said pressure is transmitted by the liquid in a direction normal to the lateral surface of the tapered portion, as shown by arrows in Figure 3 of the drawing; and, as the material is resilient, this pressure is now exerted on the outside lateral wall of the needle, and by making the union stronger, it prevents the overflow of the liquid through the pierced opening. This bottom 20 of the thicker material has the further advantage of giving capsule 7 more stiffness at the said place, thus making it easier to handle in effecting the puncture.

Having thus described the invention what I

consider as new and desire to secure by Letters Patent are:

1. A hypodermic instrument comprising a tubular needle having an injecting point at one end and an enlargement at the other end, said enlargement tapering to a capsule-puncturing point at the end of the needle and terminating in a shoulder spaced axially inward from said point.

2. A hypodermic instrument according to claim 1, and including an annular member surrounding the needle and movable axially thereof to clamp the punctured wall of a capsule between itself and the shoulder, and means for securing said annular member in such clamping relation to said shoulder.

3. A hypodermic instrument according to claim 1, wherein a portion of the needle adjacent the shoulder is threaded, and a nut is mounted on said threaded portion for clamping the punctured wall of a capsule against the shoulder.

4. A hypodermic instrument according to claim 1, including a handle member surrounding the needle and presenting an end surface axially spaced from the shoulder, an annular member surrounding the needle between said end surface and the shoulder and movable axially of the needle, and a spring compressed between said member and end surface for clamping the punctured wall of a capsule against the shoulder.

ENRIQUE MÜLLER.