

Oct. 6, 1959

M. J. COHEN
HYPODERMIC SYRINGE

2,907,328

Filed March 20, 1953

2 Sheets-Sheet 1

Fig. 1.

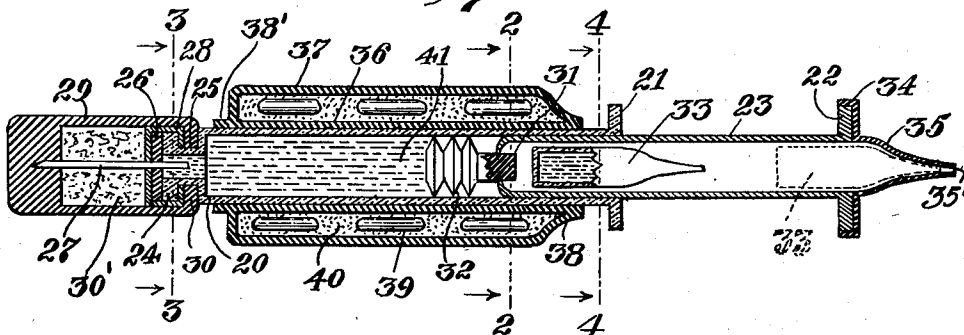


Fig. 2.

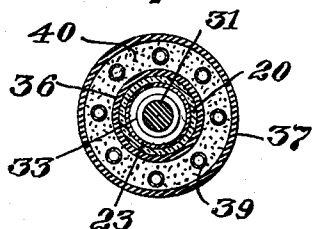


Fig. 3.

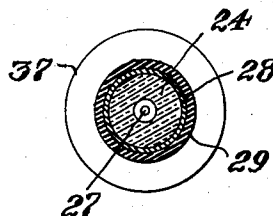


Fig. 4.

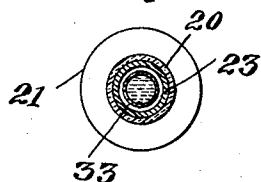


Fig. 5.

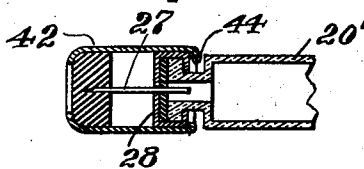


Fig. 6.

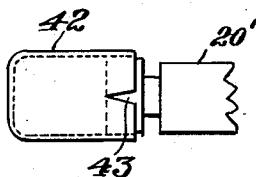
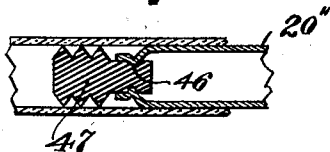


Fig. 7.

INVENTOR
Milton J. Cohen

BY

Frank W. Dehn

ATTORNEY

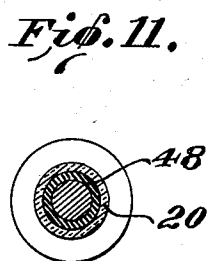
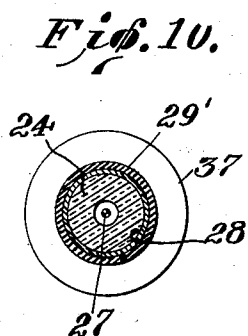
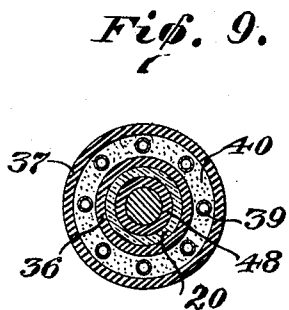
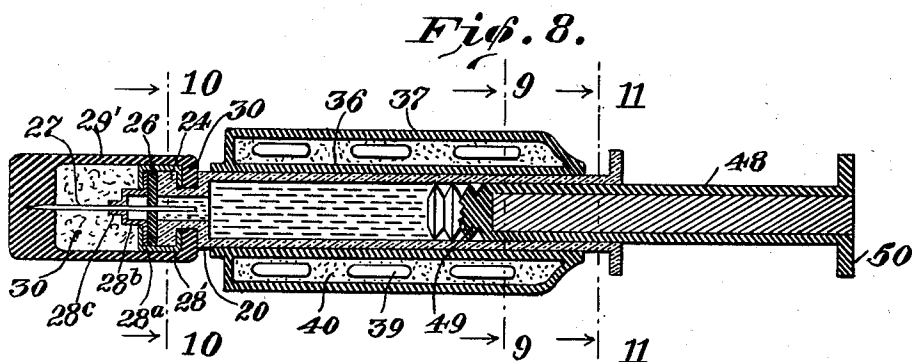
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INVENTOR
Milton J. Cohen

BY

Frank W. Dahn

ATTORNEY

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HYPODERMIC SYRINGE

Milton J. Cohen, Washington, D.C., assignor to Miljam Instrument Corporation, Washington, D.C., a corporation of Delaware

Application March 20, 1953, Serial No. 343,680

8 Claims. (Cl. 128—218)

My invention relates to a hypodermic syringe and it is an object of the same to provide a disposable syringe that shall be inexpensive as to materials and assembly; that can be put to use with a minimum of preliminaries, therefore being available for use by unskilled persons or under unfavorable conditions such as strong cold or extreme heat or other physically unfavorable conditions; that shall be adapted to sterilize areas of skin adjacent the point of application with the least possible delay; that can also serve to deaden the nerves at such points to lessen shock to a patient and that can quickly warm to body temperature a syringe and the liquid that is to be injected, for the purpose of reducing shock such as may result from the use of a cold syringe and the injection of a cold liquid, the heating means being also available to thaw a frozen liquid in case of need.

Another object is to provide improved plungers for hypodermic syringes.

Still another object is to provide improved means for supporting the needle in such a syringe.

Since it is of major importance to prevent any leakage of contents of such syringes, as well as to prevent entry of any foreign matter of whatever nature, and to avoid contact of such contents with any material that might possibly react with such contents, I have provided a glass barrel with means to seal its contents and with coating parts of rubber, neither the rubber nor the glass being subject to corrosion by any probable contents of the syringe, nor chemically combinable with such contents.

Referring now to the annexed drawings, which are made a part of this application and in which similar reference characters indicate similar parts;

Figure 1 is a longitudinal section of the device of my invention.

Figures 2, 3 and 4 sections respectively on lines 2—2, 3—3, and 4—4 of Figure 1.

Figures 5 and 7 respectively a longitudinal section and an elevation of part of the needle end portion of a modified form of the invention.

Fig. 6, a longitudinal section of a portion of a modification of the plunger of Fig. 1.

Fig. 8, a longitudinal section of another form of the invention, and

Figs. 9, 10 and 11, respectively transverse sections of Fig. 8 on lines 9—9, 10—10, and 11—11.

In the drawings, reference character 20 indicates the glass barrel of a syringe in Figs. 1 to 4, said barrel having an integral radial flange 21 at one end beneath which the fingers can engage in using the syringe, while the thumb bears on the head 22 of a plunger 23 for ejecting the contents of the chamber in the barrel in well known manner. At the end of the barrel farthest from the flange 22 there is a similar flange 24 that is connected to the body of the barrel by a neck 25. A washer 26 is positioned against the outer end face of the flange 24 and a needle 27 is clamped in place by means of a metallic connector 28 to which the needle is fixed by

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placing it in a central opening and swaging the metal about the needle or otherwise affixing it thereto. It will be seen that the rubber washer seals the contents of the chamber against any leakage or contact with the parts at the front end of the syringe except that the interior of the barrel connects with a hollow needle while all parts at that end are locked in place by the metallic connector 28.

In another form, as shown in Fig. 8, the needle 27 may be affixed to a disc 28a, 28b, 28c, clamped in place over a washer 26 by a metal connector 28', with the needle projecting through a central opening in the connector.

A cap 29 which may consist wholly or only in part of stretchable material such as rubber is engaged over the end of the syringe in position to cover the needle and the cap has a rim 30 engaging between the opposed faces of the connector 28 and the barrel 20, as shown in Fig. 1. The rim need not fit precisely between such faces but should maintain the position indicated while being easily removable to expose the needle and permit its use in the usual manner. A cavity about the needle contains a pad of fibrous material 30', which is impregnated with a medicament such as antiseptic ointment. The inner end wall of the cap is preferably made of soft rubber or like material into which the end of the needle may penetrate far enough to seal the passage thru the needle and thus prevent leakage of the contents of the chamber in barrel 20, while also locking the plunger against movement, as explained in my copending application Ser. No. 255,983, filed November 13, 1952. The antiseptic material preserves the needle and the pad 30' may be taken out and rubbed over the area at which injection is to take place so as to prevent infection.

The plunger 23 is hollow and may consist essentially of a thin-walled length of aluminum tubing having a jagged end crimped about the stem 31 of a plug 32 that has circumferential ridges to scrape the interior of the barrel clean and thus insure use of all the contents of the chamber in barrel 20, which are to be injected into the body of the patient, said plunger also sealing the rear end of the chamber and retaining the liquid contents until the syringe is to be used. The hollow space in the plunger furnishes a convenient storage place for a frangible or crushable ampule 33 containing anesthetic material, the ampule being here shown as being pointed at its rear end. A cap or cover 34 of rubber or other flexible material is positioned at the rear end of the plunger, said cover being shaped to fit over the flange 22 so as to hold the cover in place, and having a pointed portion 35 into which the capsule 33 can slide when the syringe is tilted, said capsule fitting more or less closely in the cover. The cover has a port 35' in its pointed end, so that the contents of the capsule may pass out of the syringe when the capsule is crushed by the fingers, the port being directed on the area of injection surface, which prevents pain of needle upon entry into the skin. The empty cover can collapse or fall over against the plunger, but the flexible material of the cover will prevent cutting of the user's fingers, as by fragments of the glass of an ampule and at the same time allow thumb pressure on the plunger without discomfort. Spare needles or other small articles can be stored safely in the interior of the plunger if desired. The dotted lines in Fig. 1 illustrate the position the capsule may assume in the cover when the syringe is tilted preliminary to the crushing of the capsule. Because disposable syringes and their contents may become uncomfortably cold in winter or in cold climates it is desirable to provide means whereby they can easily and quickly be raised to body temperature, and for those reasons I have added to the device a heating means which

is a modification of my Patent No. 2,615,447, comprising a hollow sleeve having inner and outer walls 36 and 37 with a space between them, said sleeve being tapered at one end at 38 so as not to interfere with the entering of the user's fingers between the sleeve and the flange 21. At its other end the sleeve preferably has an elastic collar 38' that grips the barrel 20 tightly enough to resist free sliding of the sleeve along the barrel, though permitting the removal of the entire sleeve from the barrel and at least the outer wall 37 is flexible.

In the space between the walls 36, 37 I place frangible capsules 39 holding liquid such as water and the capsules are embedded in granular exothermic material 40 such as will emit heat when wet, as may be caused by kneading the flexible wall of the outer sleeve to break the capsules and release their contents. The function of the water is to combine with the material 40 and emit heat, as by the combination of water with chemicals, e.g., such as set forth in Patent No. 1,901,313 to Mann.

In the use of this syringe the device can be tilted to cause the capsule 33 to enter the pointed portion 35 after which the capsule is crushed and its contents ejected through port 35' and applied to the area to be treated, to anesthetize the skin at that area. The cap 29 may be removed either before or after application and the pad 30 applied to skin area if desired to sterilize the same, after which the injection may follow at once if the temperature is mild. Otherwise, the receptacles for capsules 39 before or after the preliminary treatment, may be kneaded to rupture them and injection may be postponed until the liquid in the barrel is warmed. After injection the syringe is discarded.

In the modified form of Figs. 5 and 7 all parts may be as above described but the cap 42 is made of metal or relatively inelastic material with a notch in its skirt to permit limited expansion of the skirt. The lower margin of the skirt is folded in to form a flange or hem-like part 44 that gives limited rigidity to the said margin which can snap past the adjacent margin of connector 28 to hold the cap in place as shown in Fig. 5.

In Fig. 6 I have shown a modified plunger, in which the tube 20' is connected to the piston head 47 by one or more inwardly extending corrugations 46 that are pressed into the stem of said head to hold the head in place.

In the form shown in Figs. 8 to 11 the parts shown are generally the same as those above described, but the plunger consists of a rubber tube 48 with an integral circumferentially corrugated head 49 and an integral rear flange 50. Since such a sleeve would serve as a plunger for ejecting the contents of the syringe I have inserted a rod of steel or other rigid material to strengthen the plunger.

At the needle end of the device the parts in this form of the invention are as above described, but instead of swaging the needle into place in an aperture of the metallic connector I provide a special hub for holding the same. This hub consists of a washer-like flange 28a that lies between the rubber washer 26 and an inwardly extending flange of connector 28. Integral with the flange 28a there is a forwardly extending annular flange or mantle 28b supporting a boss 28c which is swaged about the shank of the needle 27 or otherwise rigidly fixed thereto. No leakage into or out of the medicament chamber is possible and no contact of the medicament with material that can affect the medicament is possible as all parts of the syringe are glass, rubber or aluminum, the plunger cannot move out or in for reasons

previously elaborated so that the medicament is preserved in full quantity and purity until used.

It will be obvious to those skilled in the art that many changes can be made in the devices above described, all without departing from the spirit of the invention; and, therefore, I do not limit myself to what is shown in the drawings and described in the specifications, but only as indicated in the appended claims.

Having thus fully described my invention, what I claim is:

1. In a hypodermic syringe having a barrel, a needle fixed to one end of the barrel and a plunger in the barrel, the combination of a sleeve surrounding the barrel, and heating means in the sleeve, the heating means comprising granular exothermic material with frangible liquid-containing capsules interspersed among the granules and the sleeve being flexible.

2. In a hypodermic syringe having a barrel, a needle fixed at one end of the barrel and a plunger in the barrel, a sleeve comprising inner and outer cylindrical walls with a circumferentially extending space between them, at least the outer wall being flexible, frangible water-filled capsules in said space, and granular exothermic material filling the interstices between them.

3. In a hypodermic syringe, a barrel, a needle projecting from the barrel, a tubular plunger in the barrel, a solid head closing one end of the plunger, a crushable capsule in the plunger, a flexible cover at the other end of the plunger, said cover shaped to contain the capsule, and a port in the cover.

4. A device as in claim 3, wherein the capsule is a glass ampule.

5. A device as in claim 4, wherein the ampule contains anaesthetic material.

6. A device as in claim 3, wherein the capsule is pointed at one end and the cover has a point shaped to fit about the point of the capsule.

7. A hypodermic syringe comprising a barrel having an annular flange at one end, a reduced neck portion between said flange and the body of the barrel, an elastic washer fitting against the outer face of said flange, means for securing the washer against the flange including a disk bearing against the washer and having a portion bearing against the rear face of the flange, and a hypodermic needle permanently secured to the disk.

8. In a hypodermic syringe, a barrel, a needle permanently secured to the barrel, a rubber plunger head in the barrel, and a tubular plunger in the barrel, said tubular plunger having an open end portion crimped about a portion of said rubber plunger head and permanently securing said plunger to said plunger head.

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