

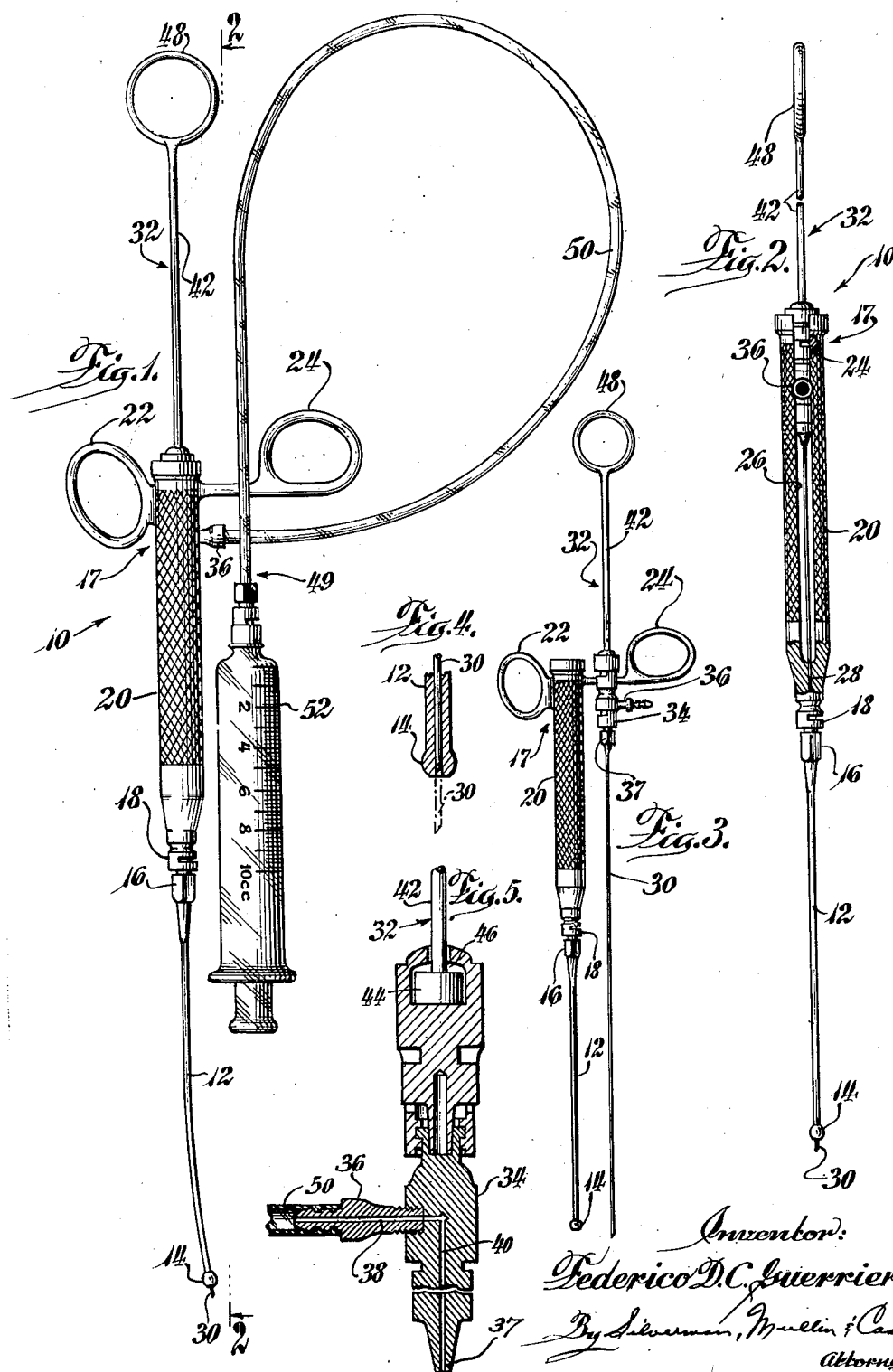
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CANNULA-DIRECTED HYPODERMIC NEEDLE

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1

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CANNULA-DIRECTED HYPODERMIC NEEDLE

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8 Claims. (Cl. 128—215)

This invention relates generally to medical hypodermic needles and more particularly to medical hypodermic needles which may be safely utilized for para-cavitary injection and for injection to, or drainage from, heretofore inaccessible body areas.

The use of hypodermic needles and syringes in connection therewith is old and well-known in the science of medicine. It is also well-known that such needles can be safely used only at external body surfaces or at internal portions of the body which are directly accessible, such as the gums of the mouth.

Obviously it is often desirable or even necessary to inject medicine into or drain poisonous fluids from portions of the body which are not readily accessible, such as for example, the larynx, the nose and sinus cavities, the vaginal cavity and the anal canal. In such cases, the usual hypodermic needle heretofore employed cannot be used because of the limitations of shape and because it would be obviously dangerous to internally probe "blindly" with a long sharp needle. As a matter of fact, para-cavitary injections are sometimes attempted with long sharp needles. However, precision injection in a pre-selected area is at best haphazard since accuracy is well-nigh impossible, especially with a long flexible needle aimed at a cavity wall some distance away. To my knowledge, no medical instrument has yet been provided which can serve this purpose.

It is therefore a principal object of this invention to provide a medical hypodermic needle which will overcome all of the difficulties mentioned hereinabove. A related object is to afford an elongated hypodermic needle capable of achieving precision para-cavitary injections.

The use of cannulae is likewise well-known to the medical art. Heretofore, they have been used primarily to transmit medication into, or drain fluids out of, an internal body cavity. Depending on the material of construction used, they could be shaped and then inserted to virtually any place in the body. For example, a rubber or plastic cannula is often inserted through the nostrils and down into the stomach for drainage purposes. While properly shaped and constructed cannulae could be safely inserted into virtually any normally accessible part of the body, they obviously were neither intended or capable of performing the functions of a hypodermic needle.

It is therefore another important object of the invention to afford an elongated hypodermic needle and cannula so combined that the needle may be directed to heretofore inaccessible body areas, such as the remote walls of any of the body cavities.

Another object is to provide a hypodermic needle of the character described in which the needle-directing cannula may be pre-shaped into virtually any form depending upon the position of the target of the body wherein the injection is to be made. An object relating thereto is to make the cannula of a readily deformable material through which a flexible needle may be freely reciprocated.

A further object is to afford a hypodermic needle of the

2

character described in which the plunger action of the needle is independent of the syringe action whereby the doctor may concentrate all of his efforts and attention on making an accurate injection.

5 Still another object is to provide a hypodermic needle of the character described in which the cannula acts as a reinforcing or support member thereby enabling the use of elongated flexible needles.

10 Yet another object is to afford a hypodermic needle of the character described in which the needle is controlled by a plunger rod which may be rotatably mounted in the device to better accommodate the same to the hand of the user thereby facilitating the use thereof.

15 Still a further object is to provide a hypodermic needle of the character described which is simply constructed and easy to operate, yet is safe and effective.

With the foregoing and other objects in view which will appear as the description proceeds, the invention consists of certain novel features of construction, arrangement 20 and a combination of parts hereinafter fully described, illustrated in the accompanying drawings, and particularly pointed out in the appended claims, it being understood that various changes in the form, proportion, size and minor details of the structure may be made without departing from the spirit or sacrificing any of the advantages of the invention.

For the purpose of facilitating an understanding of my invention, I have illustrated in the accompanying drawings a preferred embodiment thereof, from an inspection 30 of which, when considered in connection with the following description, my invention, its mode of construction, assembly and operation, and many of its advantages should be readily understood and appreciated.

Referring to the drawings in which the same characters 35 of reference are employed to indicate corresponding or similar parts throughout the several figures of the drawings:

Fig. 1 is a plan view of a hypodermic needle embodying the principles of my invention and showing the same 40 operationally connected to a syringe;

Fig. 2 is a sectional view taken on the plane of line 2—2 in Fig. 1, viewed in the direction indicated, and partially broken away to show certain details of construction;

45 Fig. 3 is a plan view showing the needle and cannula-barrel without the connecting tube;

Fig. 4 is an enlarged sectional view of the fragmentary end of the cannula showing the needle therein; and

50 Fig. 5 is an enlarged sectional view of the coupling element and nipple of Fig. 3 showing certain details of construction.

Referring first to Fig. 1 of the drawings, reference character 10 indicates generally a hypodermic needle apparatus embodying the principles of my invention. The apparatus 10 comprises generally an elongated hollow 55 cannula tube 12, a handle portion 17, a needle 30, a plunger 32, and a syringe and tubing 49.

Cannula tube 12 may terminate at one of its ends in a spherical-shaped tip 14. The opposite end of the cannula comprises the male portion 16 of the usual medical instrument coupling means such as are well known in the medical instrument art.

Detachably connected to cannula tube 12 is the handle 60 portion 17. Handle 17 comprises a hollow cylindrical barrel 20, which may taper at the bottom thereof and terminate in a female portion 18 of the above-described coupling means. Secured near the top of the barrel 20 may be oppositely projecting finger grips such as 22 and 24. In the wall of barrel 20 there may be formed a longitudinal slot 26 whose function will become apparent as the description proceeds. The barrel portion adjacent the

3

female coupling portion 18 may have a central needle-receiving aperture 28 (see Fig. 2).

The cannula tube 12 may be made of any suitable material and in the embodiment shown is made of a readily deformable metal such as brass or copper for reasons which will become apparent as the description proceeds. The brass or copper tube is preferably coated or plated with a non-toxic covering, such as chromium. The tube may also be of any desired length as will be subsequently described.

Removably and reciprocally positioned through the cannula 12 and aperture 28 is an elongated hollow flexible needle 30. The needle 30 may be removably coupled by means similar to the above-described coupling means to the plunger indicated generally by the numeral 32. Plunger 32 comprises a female coupling element 34 which may have an integrally formed nipple 36 extending transversely therefrom. The female coupling element 34 is adapted to cooperate with a male coupling element 37 mounted on the needle 30 to effect the coupling between the needle and the plunger. Nipple 36 has a central passage 38 which connects with a passage 40 inside the coupling element 34. Rotatably secured to coupling element 34 is a plunger rod 42 which may have an integrally formed disc 44 at an end thereof. Coupling element 34 may be formed with a cavity 46 in which the disc 44 is rotatably positioned. The plunger rod 42 may have a finger grip such as 48 integrally formed at its free end. It should be noted that the rotatable connection indicated permits the plunger rod 42 to readily accommodate itself to the finger motion of the operator during injection. In addition, it protects against any inadvertent and injurious turning of the injected needle.

Removably connected to nipple 36 is the syringe assembly indicated generally by the numeral 49. The syringe assembly 49 may comprise a length of flexible plastic or rubber tubing 50 and a syringe 52 of the type commonly used in the medical profession. It is important to note here that the entire needle-plunger-assembly is removably positioned within the barrel 20 with the nipple 36 protruding out through the slot 26, thus permitting this assembly to be operationally reciprocated (see Fig. 2).

In operation, my hypodermic needle functions in the following manner. Depending upon the area of the body affected, the deformable cannula 12 is pre-shaped to conform with that anatomical area. Thus, for example, if an injection is desired to be made deep in the larynx, the cannula may be sharply bent at almost right angles to conform to the shape of the mouth and throat passage. The device is then operationally assembled as shown in Fig. 1 of the drawings with the point of the needle 30 retracted and sheathed within the cannula. The cannula is then inserted to the desired location. It should be noted that this may be safely done because of the spherical tip 14 on the end of the cannula and because the needle point is sheathed therein. When the desired point is reached, the operator then injects the needle into the flesh by pushing the plunger 32. The operator, or a second operator if desired, then manipulates the syringe 52 to inject or extract, as desired, by way of the passages 38 and 40.

An alternative method of operation may be employed where the toughness or thickness of a muscular wall so requires. In this method, the cannula is inserted as before. When the target has been neared by the cannula tip, the needle is then ejected to that length with which the doctor desires to penetrate the cavity wall. The entire apparatus is then jabbed into the cavity wall until the spherical tip abuts the wall. The injection or extraction is then made. Thus, the toughest muscular wall may be penetrated and to the exact depth desired.

From the drawings and description as set forth hereinabove, it will be apparent that I have provided a unique, simple but most safe and effective hypodermic needle

4

which can be utilized for para-cavitary injections and on anatomical areas heretofore almost inaccessible. The need for, and benefits of, such a device are obvious. The cannula may be of any desired length depending on the area of the body to be reached, with the needle being of a corresponding length. The reinforcing effect of the cannula permits the use of elongated flexible needles. In addition, my unique needle may be operated by two people. Thus, a perfectly accurate injection is thereby assured. Moreover, where the exact amount to be injected or removed is critical, the second operator may devote his entire attention to this activity.

As used in this application, it should be understood that the term "hypodermic needle" includes all needles used for injection into, or drainage from, an animal body.

It is believed that my invention, its mode of construction and assembly, and many of its advantages should be readily understood from the foregoing without further description, and it should also be manifest that while a preferred embodiment of the invention has been shown and described for illustrative purposes, the structural details are nevertheless capable of wide variation within the purview of my invention as defined in the appended claims.

What I claim and desire to secure by Letters Patent of the United States is:

1. In a medical hypodermic apparatus including a syringe; a barrel, an elongated hollow needle, means for reciprocating said needle, said needle positioned in said barrel, means for operationally connecting said needle to the syringe, and an elongated deformable cannula tube connected to the bottom end of said barrel, said tube adapted to sheath said needle so that at least the point thereof may be moved to protrude beyond the bottom end of the tube.

2. In a medical hypodermic apparatus including a syringe; a barrel, an elongated hollow needle, means for reciprocating said needle, said needle positioned in said barrel, means for operationally connecting said needle to the syringe, and an elongated hollow tube connected to the bottom end of said barrel, said hollow tube adapted to sheath said needle so that at least the point thereof may be moved to protrude beyond the bottom end of the tube, said hollow tube comprising a deformable cannula tube having an integrally formed spherical tip.

3. The medical hypodermic apparatus of claim 2 in which said first-mentioned means comprises a plunger connected to the needle, said latter-mentioned means comprises a coupling element having a fluid passage communicating with the bore of said needle, a centrally-bored nipple extending transversely of said coupling element and communicating with said fluid passage, and a length of tubing, said nipple and tubing adapted to cooperate for connecting said coupling element to said syringe.

4. The medical hypodermic apparatus of claim 3 in which said barrel comprises an elongated hollow cylinder open at the top and having a longitudinal slot in its wall, said slot adapted to reciprocally accommodate said nipple, the bottom of said cylinder having a central needle-receiving aperture communicating with said cannula tube, and a pair of oppositely extending finger grips secured to the cylinder wall adjacent its top.

5. The medical hypodermic apparatus of claim 4 in which said plunger comprises a rod having a finger grip at its top and an integrally formed disc at its bottom, said disc being rotatably mounted in a cavity formed in said coupling element.

6. In a medical hypodermic apparatus including a syringe, a barrel and a plunger; an elongated flexible centrally-bored needle connected to said plunger and reciprocally positioned in said barrel, means for operationally connecting said needle to the syringe, and an elongated deformable cannula tube having a spherical tip connected

5

to the bottom of said barrel, said cannula tube adapted to be pre-bent into any desired shape for insertion into a body cavity, said cannula tube affording a reinforcing sheath for said needle, the relative length of the needle and tube being such that a portion of the needle may be moved to protrude from the tube whereby the needle may be injected into a wall of said cavity.

7. In a medical hypodermic apparatus including a syringe, a cannula-sheathed elongated needle and a plunger connected to the needle; a transversely-projecting centrally-bored nipple connected to said needle, said nipple affording means for operationally connecting said needle to said syringe, and a barrel connected to said cannula, said barrel comprising an elongated hollow cylinder open at its top and having a longitudinal slot in its wall, and a pair of oppositely extending finger grips secured adjacent the top of said cylinder wall, said needle, plunger and nipple reciprocally positioned in said cylinder.

8. A medical hypodermic apparatus comprising an elongated hollow cylinder open at its top and having a longitudinal slot in its wall, a pair of oppositely extending finger grips secured adjacent the top of said cylinder wall, a deformable metal cannula tube having a spherical tip connected to the bottom of said cylinder, an

6

elongated flexible centrally-bored needle, a coupling element connected at its bottom end to said needle, said coupling element having a fluid passage communicating with the bore of said needle, said coupling element having an annular cavity in its top end, a plunger rod having an integrally formed disc at its bottom end rotatably mounted in said coupling element cavity, a centrally-bored nipple extending transversely of said coupling element and communicating with said fluid passage, a syringe, and a flexible tube connecting said syringe to said nipple, said cylinder adapted to reciprocally accommodate said needle, coupling element, plunger rod and nipple, said cannula tube adapted to be pre-bent into any desired shape for insertion into a body cavity, said cannula tube affording a reinforcing sheath for said needle, the length of said needle exceeding the length of said tube so that the same may be moved to protrude therefrom for injection into a wall of said cavity after the cannula tip has reached said wall.

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