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LOCAL ANÆSTHETIC SYRINGE

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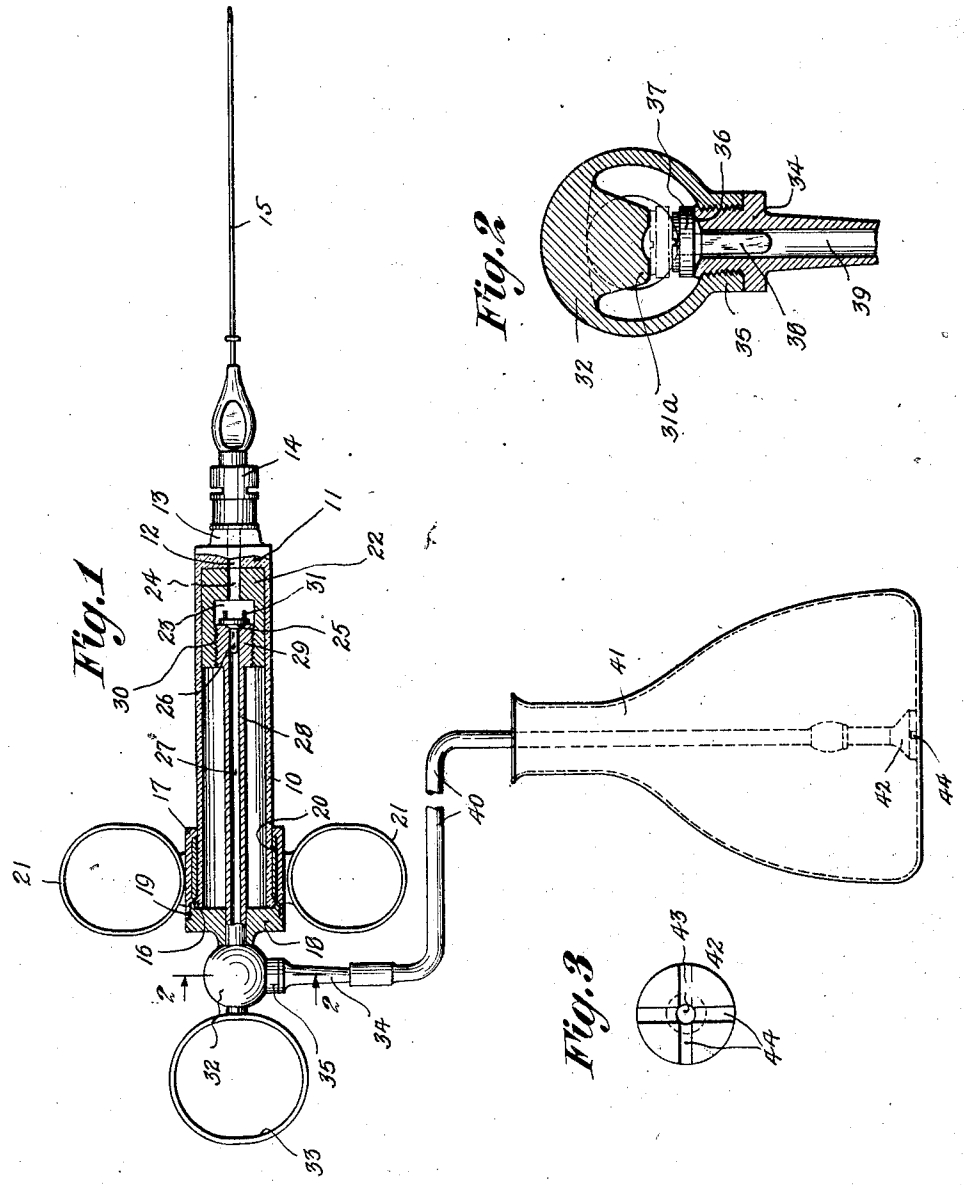

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LOCAL-ANÆSTHETIC SYRINGE.

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This invention relates to medical and surgical apparatus and has particular reference to devices for administering a local anæsthetic.

Among the objects of the invention is to provide improved means for obviating the necessity for frequent withdrawal and reinsertion of the hypodermic needle for the purpose of administering a larger quantity of fluid than the barrel of the syringe is calculated to hold.

A further object of the invention is to provide what is in the nature of a force pump, of which the syringe mechanism is a part, and which is peculiarly adapted for reliability and dependability while the important function of administering the anæsthetic is taking place.

A still further object of the invention is to include an attachment for the syringe that will enable practically the last drop of the fluid to be withdrawn from the receptacle and inject it into the tissues.

With the foregoing and other objects in view the invention consists in the arrangement and combination of parts hereinafter described and claimed, and while the invention is not restricted to the exact details of construction disclosed and suggested herein, still for the purpose of illustrating a practical embodiment thereof reference is had to the accompanying drawings in which like reference characters designate the same parts in the several views, and in which—

Figure 1 is a side elevation of a preferred embodiment of the invention, parts being in section.

Fig. 2 is a vertical transverse section on the line 2—2 of Fig. 1 and showing a preferred form of valve mechanism but on a larger scale than shown in the main figure.

Fig. 3 is a bottom plan view of the syringe foot above referred to.

Referring now more specifically to the drawings I show my improved syringe as comprising a barrel 10 preferably cylindrical in form and of any suitable material, preferably of glass or some other transparent material for the better observation of the treatment while it is being performed. The barrel 10 is formed with a head 11 at one end having a port 12 extending therethrough and having a nipple extension 13 for the attachment by any suitable means as at 14 of a needle 15, the needle having a port as usual communicating with the port 12. As the barrel 10 is constructed the end opposite the head 11 is open but provided with an external flange 16 against which a collar 17 abuts and is held by means of a head 18 having a thread communicating with an internal thread at the outer end of the collar as shown at 19. The head 18, bearing against the end of the barrel 10, reacts to hold the collar 17 firmly against the flange 16, either directly or through the intermediary of a gasket 20, making a firm fluid tight connection between the head 18 and the barrel, and affording also means for holding or manipulating the barrel as through the finger pieces 21 attached to the collar.

Fitted slidably within the smooth interior surface of the barrel is a piston 22 having formed therein an interior cavity or socket 23, the outer end of which is internally screw threaded while the inner end communicates through a port 24 with the port 12 at the barrel head. The socket 23 constitutes a valve chamber within which is fitted loosely a valve 25 having a stem 26 fitted slidably in the port 27 of a piston rod 28, the forward end of which at 29 is threaded into the threaded end of the socket. The valve is adapted to reciprocate toward and from the valve seat 30, the degree of reciprocation being limited by means of suitable projections between the valve and the body of the piston, shown herein as a plurality of pins 31 fixed to the valve and adapted to impinge against the piston on opposite sides of the port 24.

The remote portion of the piston rod is fitted for reciprocation in the head 18 of the barrel and carries outside of said head a valve body 32 and adjacent to which is a thumb piece 33 all rigidly connected together. 34 indicates a nipple threaded into a boss 35 projecting laterally from the body 32 and whose inner end at 36 constitutes a seat for a valve 37 within the body. This valve has a stem 38 fitted loosely in the port 39 of the nipple, and the valve is adapted to reciprocate between said seat 36 when closed and a plurality of projections 31^a formed on or carried by the body, when open. The nipple 34 is detachable from the body 32 for inspection, renewing, or the like, and when so disconnected, the valve 37 is removable therewith from the body. Either valve may be made of any suitable material, but preferably aluminum or some other light metal is used so as to facilitate the prompt seating of

the valve on reverse pressure, irrespective of the position in which the apparatus may be used or held at any time. Syringes as heretofore made and on the market so far as my experience justifies my opinion, are such that they must be held in a certain position to insure the reliable seating of the valve, whereas I have found that by making the valve of a light material and by providing pins or projections 31 or 31ª of the nature set forth herein, the space provided between the projections or pins insures that the reverse pressure of the fluids will be sure to act against the outside of the valve and cause the prompt seating thereof and without special reference to any particular position in which the apparatus may be held. And this too without demanding the use of any springs or other mechanical means for insuring the seating of the valve.

Connected to the nipple 34 is a flexible tube 40 of any suitable material or length and adapted to be projected into a receptacle 41 from which the anæsthetic is supplied. The lower or inner end of the tube 40 is fitted with a metal foot 42 having a central bore 43 communicating with the tube and having a flat bottom surface with one or more transverse scores 44 communicating at their inner ends with the bore 43. The form of the foot 42 insures that the flat bottom surface thereof will rest upon the bottom of the receptacle and because of the scores 44 the last drop or vestige of the fluid in the receptacle may be withdrawn therefrom.

From the foregoing specific description of the mechanism, its mode of operation may be briefly summarized as follows: With the receptacle 41 supplied with the proper anæsthetic to be injected into the tissues and with the foot 42 inserted into the receptacle, the operator grasping the instrument with his first two fingers in the loops or finger pieces 21 and his thumb in the thumb piece 33, will have complete control of the instrument for the insertion of the needle 15 as required and he will be enabled to reciprocate the piston 22 by action of his thumb. The outward or rearward movement of the piston, or away from the head 11, will set up a vacuum between the piston and the head 11, the tissues serving normally to obstruct the passage way through the needle unless the pointed needle should inadvertently be located in a blood vessel at which time the entrance of the blood into the transparent barrel will apprise the operator of this fact and he will reset the needle so as to avoid this objection. As a result of the vacuum above mentioned, the fluid from the receptacle will flow through the tube 40 and hollow piston rod past the valves 37 and 25 and fill the space between the piston and the head 11. On the forward reciprocation of the piston, the valves will close directly and cause the ejection of the fluid from the barrel through the needle into the tissues. I have found that for the sake of the highest degree of efficiency and least loss of effectiveness due to slipping of the fluid, two valves arranged in tandem or in alignment with each other are of peculiar advantage. There is always a possibility that for some reason or other one valve may fail to seat fully and completely, and if there is a leakage through the valve at the time when the injecting stroke is being made, the instrument fails seriously to perform its proper function.

I claim:

1. The herein described anæsthetic syringe comprising a barrel having a needle connection at one end, a piston slidable within the barrel, said piston having a socket within it, a tubular rod connected to the piston, the end of the rod adjacent to the piston constituting a valve seat, a valve seated loosely within the piston socket and adapted to seat against said seat, means to reciprocate the piston and rod to cause fluid to pass through the rod and piston past the valve, an abutment pin being provided to prevent the valve from seating closely against the piston remote from said seat, and means to convey fluid from a receptacle to said piston rod.

2. In an anæsthetic syringe, a barrel of transparent material having at one end an integral head with a port therethrough, needle connections communicating with said port, the other end of the barrel being open, a head for closing the open end of the barrel, a piston slidable in the barrel, a piston rod extending through the second mentioned head, means to convey fluid into the barrel for filling it on reciprocation of the piston, valve means to control the reverse movement of the fluid and cause the ejection thereof from the barrel through the needle mechanism, said valve mechanism comprising a valve of light metal and rigid abutment pin means co-operating therewith to insure a fluid space between the valve and the valve body remote from the seat.

In testimony whereof I affix my signature.

GEORGE P. PITKIN.