This invention relates to a medical injecting apparatus and more particularly to a medical device for simultaneously injecting into and extracting fluids from the body.

In the medical art, various types of syringes and medical apparatus are used for extracting fluids from and injecting others into the body. These types of apparatus usually contain a syringe with a hollow body, a valve and a syringe needle so that by operating the valve, once the needle has been inserted into any desired part of the body, the fluid is withdrawn by means of one of the syringes from the body, and after this operation has been completed, one of the other syringes containing fluids of any suitable kind, depending upon the kind of operation being performed by the physician, is forced into the body through said syringe needle. It is apparent that this process is tedious with this type of apparatus since there is no provision in such type of apparatus for a simultaneous extraction of fluid from the body and injection of necessary fluid into the body.

With the above disadvantages in view, it is a primary object of my invention to provide an easily operable medical device which permits simultaneous extraction of fluid of one kind from the body and simultaneously injecting a fluid of another kind into the body.

Another object of the present invention is to provide an easily assembled, simply and economically made medical device having a dual channel adapted for injecting gaseous or liquid fluids through one channel into the body while simultaneously withdrawing through the other channel fluid of another type from the body.

A specific object of the present invention is to provide a medical device comprising a body member with a multiple-way valve and multiple channeled needle and an operable fluid regulator in connection with said valve.

A more specific object of my invention is to provide a medical device containing a body member to which may be attached a plurality of syringes, a fluid regulator, and a needle integral with the body member having a pair of independent channels one of which is in direct communication with the fluid regulator and the other in selective communication with the syringes.

Other objects, advantages and features will become apparent from the hereinafter described invention taken in connection with the accompanying drawings in which:

Fig. 1 is a sectional view of a preferred embodiment of my invention;

Fig. 2 is a sectional view of my invention containing intake fluid regulating means for controlling the amount of fluid intake into the body;

Fig. 3 is an enlarged detail sectional view of a portion of the embodiment, shown in Figs. 1 and 2; and

Fig. 4 is a sectional view taken on line 4—4 of Fig. 3.

Referring now to the drawings in which like reference numerals refer to like parts throughout, it will be noted that I provide a medical device 10 containing a body member 11, provided with a plurality of inlets 12, 13 and 14, respectively, and passages 15, 16, and 17, respectively, for said inlets 12, 13 and 14, respectively. Said body member 10 is provided with an opening 18 in which is disposed a manually operable valve or plug 20 containing a passage 21 extending through the diameter of the plug and a passage 22 at right angles to passage 21. It will be noted that said plug can be rotated to control the passage of fluids through either passage 21 or 22 from passages 16 or 17 in any desired manner into a passage 23 leading into a syringe needle 24.

Said needle 24, as shown, is provided with a channel 25 leading into passage 23, and a channel 26 which, as shown, is in communication with passage 15 and inlet 12 of body member 11. The puncture end 27 of said needle 24 is provided with an inclined opening 28 disposed in the periphery of said needle and forming part of channel 25. The other channel 26 is closed at its end but is provided as shown with a side opening 29.

It will be noted that said side opening 29 and opening 28 in the inclined tip 27 of the needle, as shown in Figs. 1 and 3, are so disposed that they do not extend too far from the puncturing tip thereby avoiding too deep a penetration of said needle end into the body during the use of the device.

The inlets 13 and 14, respectively, are provided with syringes 30 and 31, respectively, of the usual type of construction, while inlet 12 is adapted to accommodate a closure member 32 containing a flexible stem 33 which is adapted to enter into inlet 12 and passage 15 into channel 26 of the needle, while the rear or head portion 34 of said member 32 is adapted to form a seal with inlet 12 of body member 11. Said member 32 is provided in order to close the channel 26 and permit penetration of the needle 24 to a certain depth into the body, whereupon the said member 32
is removed and a fluid-flow regulator 35 is connected with inlet 12.

Said fluid-flow regulator 35 is provided with an adapter 36 to form a suitable seal or connection with the inlet 12 of body member 10. Attached to said adapter 36 is an outer shell 37 and an inner rubber tubing 38 which are attached at one end to said adapter 36. It will be noted that said shell 37 is provided with a manually operable screw member 39 at the end which is a protrusion plate member 40 which is adapted to press against said rubber tubing 38. Said shell 37 is provided with an opening 41 through which a fluid, such as air, which has been initially cleaned can be passed but whose amount is controlled by means of said screw member 39 pressing against the rubber tube so as to restrict the size of said tube.

Plug 20 in body member 11, it will be noted, can be rotated into any desired position such as that shown in Figs. 1 and 2. It will be noted furthermore, that said plug 20 can be rotated so that it forms a communication between syringe member 20 and channel 25 thus permitting the injection of fluid through said channel while simultaneously withdrawing fluid from the body through the other channel 26 and out through passage 15. This operation, however, may be reversed so that fluid can be withdrawn through said channel 25 by withdrawing the piston 42 or 43 of syringe 20 or 31, respectively, and simultaneously permitting the flow of another fluid through the regulator 35 into channel 26 and thus into the body. It may be desired to inject two different types of fluid into the body at different times while drawing out a fluid from the body by using the arrangement as shown in Fig. 1 in which case the plug 20 may be turned as shown in Fig. 1 to permit injection of fluid into the body by means of syringe 30, then turning the plug 20 as shown in Fig. 2 so that the communication between the syringe 31 is effected with channel 25, and then injecting another fluid into the body through said latter syringe 31 while at the same time forcing another fluid into the body through regulator 35 into channel 26. By proper manipulation of the plug 20 and syringes 30 and 31 connected with member 11 and the operation of regulator 35 and the use of the needle 24, several desired techniques may be developed, whereby different types of fluids may be alternately added to the body, or whereby various body fluids may be removed therefrom.

It will be noted from the foregoing description taken in connection with the accompanying drawings that there is provided a medical device containing one or more syringes and a needle construction in which one of the channels of the needle is adapted for extracting or ejecting a fluid from the body. By the use of a dual channel needle such as that described and forming part of my invention, a single puncture into any cavity of the body permits injecting a substance either liquid or gaseous in character directly into the body. Furthermore, the needle as described and shown and forming part of this invention, because of its dual channel permits a constant inflow and outflow of different fluids through the channels. Because the location of the respective terminal openings at the puncturing end of the needle are in different positions, there is little likelihood of the fluids entering or leaving the body being immediately mixed. The injected liquid should preferably be of a different specific gravity from the fluid being extracted from the body cavities. In some instances, where it is desired to remove pus from a cavity of the body, it is quite difficult by ordinary needle and syringe to remove said pus because of its thickness. By utilizing the device invented by me and described herein, the pus can be diluted by injecting a medicile or saline solution through one of the channels of the needle to permit intermixing of the pus and the medicile or saline solution and then flowing the resultant mixture through the other channel of the needle, thus cleaning and washing the cavity containing said pus. It will be further noted that by utilizing the fluid control regulator, the pressure in the cavity into which the needle has been inserted can be kept constant during the operative procedure. This is an extremely important factor in rendering the patient comfortable and also in eliminating the possibility of shock and other dangerous complications formed through sudden change in pressure in a closed space in the body, especially as in the case of pleural and lumbar punctures.

For example, my invention can be used for an ordinary diagnostic lumbar puncture, in which case the gradual injection of air through the syringe 31 into the spinal canal permits the spinal fluid to pass out through the regulator from channel 26 of needle 24. The flow of air bubbles entering through one of said channels is under controlled pressure by the proper manipulation of the fluid control regulator 35 through channel 26, thereby balancing the pressure of spinal fluid coming from the body through channel 25 of the needle. This spinal fluid may be collected in syringe 32 or 31 where the spinal fluid can be measured in order to insure that there is not any great difference in displacement of the spinal fluid by air.

It will be noted that the device herein described can be used for puncturing various parts of the body such as the joint cavities, sinuses, abscesses, arteries and veins and that in the hands of the physician can be of great importance and assistance to him in alleviating a condition in the body or in assisting him to obtain fluids for analysis and proper diagnosis.

While a preferred embodiment of my invention has been described in connection with the accompanying drawings, it is understood that various changes or modifications as to form, arrangement of parts, and use of materials, may be made without departing from the spirit and scope of the invention as claimed.

I claim:

1. Medical apparatus for injecting into and withdrawing fluids from the body, comprising a body member having a three-way passage and a needle with a multiple channel in communication with said passage, operable means for selectively passing fluid through the passage, selectively rotatable plug means for directing the flow of the secretions, exudate pus, blood or gas automatically from the body. Furthermore, the needle as described and shown and forming part of this invention, because of its dual channel permits a constant inflow and outflow of different fluids through the channels. Because the location of the respective terminal openings at the puncturing end of the needle are in different positions, there is little likelihood of the fluids entering or leaving the body being immediately mixed. The injected liquid should preferably be of a different specific gravity from the fluid being extracted from the body cavities. In some instances, where it is desired to remove pus from a cavity of the body, it is quite difficult by ordinary needle and syringe to remove said pus because of its thickness. By utilizing the device invented by me and described herein, the pus can be diluted by injecting a medicile or saline solution through one of the channels of the needle to permit intermixing of the pus and the medicile or saline solution and then flowing the resultant mixture through the other channel of the needle, thus cleaning and washing the cavity containing said pus. It will be further noted that by utilizing the fluid control regulator, the pressure in the cavity into which the needle has been inserted can be kept constant during the operative procedure. This is an extremely important factor in rendering the patient comfortable and also in eliminating the possibility of shock and other dangerous complications formed through sudden change in pressure in a closed space in the body, especially as in the case of pleural and lumbar punctures.

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1. Medical apparatus for injecting into and withdrawing fluids from the body, comprising a body member having a three-way passage and a needle with a multiple channel in communication with said passage, operable means for selectively passing fluid through the passage, selectively rotatable plug means for directing the flow of the secretions, exudate pus, blood or gas automatically from the body.
body member having a plurality of passages, a multiple channeled needle integral with the body member, means in the body member for controlling the direction of passage of fluids through the body member, fluid control regulating means in connection with the body member, to permit the flow of a fluid therethrough into one of the channels of the needle, as fluid is withdrawn from the body through the other channel and directed through the body member by said means in the body member.

3. Medical device for injecting fluids into the body while simultaneously extracting a fluid of a different type from the body, comprising a body member having a plurality of passages therein and a multi-channeled needle integral therewith, means inscribable into the body member for controlling the direction of flow of fluids through the passages of the body member, a plurality of syringes each in connection with the body member passages respectively, and sealing means for the body member and one of the channels of the needle said needle having a channel with an external side opening disposed short of the puncturing end thereof and being concentric with respect to the axis of the needle.

4. Medical device for injecting fluids into the body while simultaneously extracting a fluid of a different type from the body, comprising a body member having a plurality of passages therein and a multi-channeled needle integral therewith, means inscribable into the body member for controlling the direction of flow of fluids through the passages of the body member, a plurality of syringes each in connection with the body member passages respectively, and a fluid passage regulator in connection with the body member for permitting the direct flow of fluid through the body member into one of the channels of the needle.

5. Medical device for simultaneously injecting into and extracting fluids from the body, comprising a body member having a plurality of delivery passages and a dual channeled needle integral with the body member, one of the delivery passages directly communicating with one of the channels of the needle, operable means in the body member for selectively directing the flow of fluids through the body member and the needle, and fluid passage regulator in connection with the delivery passage directly communicating with the channel of the needle.

6. Medical device according to claim 5, in which one of the channels of the needle directly communicating with the delivery passage of the body member is provided with a side opening at the puncturing end thereof, while the other channel has an opening in alignment with the puncturing end and communicates with the other delivery passages in the body member via the operable means in the body member.

7. A device according to claim 6, in which the operable means is adapted to selectively direct the fluid from one of the channels of the needle through a plurality of the delivery passages and vice versa, and the openings of the channels in the puncturing end of the needle are in substantially the same plane perpendicular to the axis of the needle.

8. Medical device for puncturing the surface of the body at any desired area to permit simultaneous injection and extraction of fluids from the body, comprising a body member having a plurality of delivery passages and a needle integral therewith, said needle having two independent channels, one of which directly communicates with one of the delivery passages, manually rotatable plug means inscribable into said body member adapted to intercommunicate the other channel of the needle with the remaining delivery passages, and manually operable fluid passage regulating means in connection with the first named channel for controlling the flow of fluid into the channel into the body, said channel being provided with a side opening at the puncturing end thereof.

9. A device according to claim 8, in which there is provided a closing member adapted to be inserted into the delivery passage and channel directly communicating therewith, said member having a flexible member extending the length of the channel and a head adapted to fit into and seal the delivery passage.

10. Medical apparatus for injecting into and abstracting fluids from the body, comprising a three-way body member, a multiple-way plug in said body member for selectively directing fluid into or out of any one of the ways of said body member, a needle extending from said body member, fluid regulating and control means in connection with said body member, and a plurality of syringe members adapted for attachment to said body member, said needle having a pair of independent channels one of which is in communication with the multiple-way plug and the other is in direct communication with the control means, said last named channel being closed at the puncturing end of the needle but opened to the side thereof.

QUANG HSI HU.

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