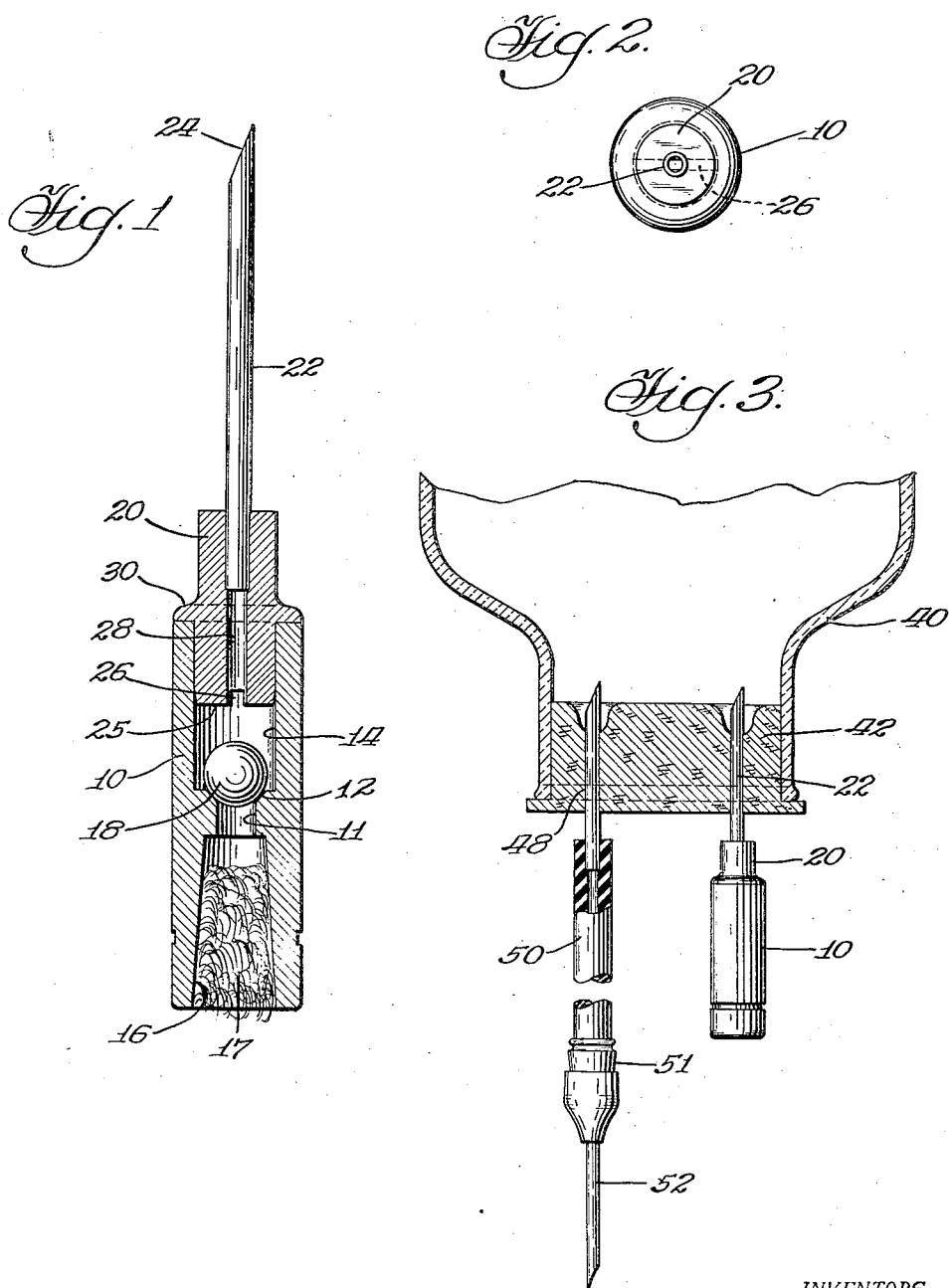


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VENOCLYSIS EQUIPMENT

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VENOCLYSIS EQUIPMENT

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This invention relates to an air-bleed for venoclysis equipment, and more particularly to a combined air-bleed and bottle-connector for use with equipment transferring fluids from a bulk container to a patient's body.

Generally, venoclysis equipment consists of a fluid container holding a substantially greater amount than an ordinary hypodermic syringe, an outlet for the container attached to a length of tubing having a hypodermic cannula on the end thereof, and an air inlet to the container. It not infrequently happens that fluid from another bottle is desired to be injected into the receiving patient; and the simplest procedure is to connect the additional bottle directly into the equipment set up, so that no break in the injection procedure is necessary.

The devices of the prior art have various and sundry methods of introducing air and other fluids into the main fluid container of the venoclysis set up. Included in the prior art devices are internal air bleeds such as a stand-pipe in the fluid container, which is open to the atmosphere and to the inside top of the bottle, bulky external liquid air filters, and the like. The known air bleeds for venoclysis equipment have many disadvantages, and each being specifically designed for a certain type of bottle, they have limited use. Furthermore, with most of the air bleeds it is impossible to connect another bottle of fluid therethrough.

According to the present invention, our air bleed is adaptable for use as an air bleed, an air filter and a connector.

Referring to the drawings:

Figure 1 is a longitudinal section of the device according to the invention;

Figure 2 is an end elevation of the device of Figure 1; and

Figure 3 is a partial section of the air bleed in operation.

The device of Figure 1 comprises a main tube 10, having a constricted portion 11 in the approximate center of the bore. The constricted portion 11 has a ball valve seat 12 on one side thereof. On the opposite side of the constriction 11 the bore flares outwardly with a diverging wall 13, having a standard tapered wall, commonly called a Luer fitting. A ball 18 is disposed on the seat side of the constriction 11 and the ball is retained in the tube 10 by means of a cap 20. The cap 20 has a bore 28 therethrough and the transverse notch 26 to allow fluid to pass around the ball when the ball is adjacent the end 25 of the cap. The cap 20 has a tight frictional fit in

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the tube 10, and is prevented from further entry into the tube by a shoulder 30, which rests on the end of tube 10. A hypodermic cannula 22 having a sharpened end 24, is retained by a forced fit in the bore 28. The ball 18 is a very loose fit in the bore 14 and is free to move between the seat 12 and the end 25 of the cap.

In the operation of the device of Figure 1 is an air bleed, a wad of cotton 17 is inserted into the Luer fitting 16 to filter air entering through the bleed. The air bleed is inserted through a stopper in the fluid container, such as stopper 42 shown in Figure 3 which is inserted into the bottle or fluid container 40. The dispensing tube 50 is also connected through the stopper by means of a cannula 48. The bottle 40 is then inverted, and after completely filling the dispensing tube 50 with the fluid, the hypodermic cannula 52 is inserted into the vein of the patient. As fluid leaves the bottle, air must be admitted to replace the dispensed fluid, or the flow of fluid will cease. When the air bleed is in operative position, the ball 18 rests on the seat 12 which prevents any exodus of fluid from the air bleed, but as the pressure in the bottle decreases, as by dispensing fluid therefrom, atmospheric pressure will force the ball to rise, allowing air to enter. When the pressure in the bottle is equalized with the atmospheric pressure, the fluid head will force the ball back on the seat, thereby preventing the escape of fluid. If the ball 18 is forced against the end 25, the transverse notch 26 leaves an opening into the passage 28, so that air may still enter the bottle.

During periods of inward air flow the ball need only rise from the seat 12 far enough to let air enter, and on cessation of flow the ball falls back on its seat immediately. Thus there will be a volume of air above the ball 18 equal to the entire interior volume of the bore 14 and the cannula 22. Even with considerable back pressure, the ball will ordinarily retain this air so that liquid will not even get down to the ball, much less to the cotton 17. If the ball does not happen to have an absolutely air-tight seat, the eventual filling of the bore 14 with liquid will wet the ball and seat, and thereafter the ball will be much more effective in preventing the liquid from accidentally wetting the cotton.

When it is desired to inject another bottle of fluid when the equipment is already set up and the hypodermic cannula 52 is in the patient's vein, it is only necessary to suspend another similar bottle adjacent the main fluid bottle 40 and connect the dispensing tube 50 by means of the

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male Luer fitting 51 into the female Luer fitting 16, after the removal of the cotton wad 17. The liquid from the second bottle flows into the first or primary bottle through the air-bleed, and subsequently into the patient through tubing 50. Thus additional fluids may be administered by the simple expediency of connecting another bottle directly into venoclysis set up.

The cotton plug 17 may be replaced with an external air filter, such as an externally fitting elongated sleeve with a cotton plug in the sleeve. With such an external air filter which is easily removed and replaced, the various manipulations are facilitated.

Others may readily adapt the invention for use under various conditions of service, by employing one or more of the novel features disclosed or equivalents thereof. As at present advised with respect to the apparent scope of our invention, we desire to claim the following subject matter.

We claim:

1. A device of the character described comprising, in combination, a main tube having a constriction intermediate the ends thereof, a ball valve seat on one side of said constriction, a plug closing the end of said tube adjacent said seat, said plug having a bore therethrough, said plug having a transverse notch communicating with the internal end of said bore, shoulder portions on said plug limiting inward movement thereof, a hypodermic cannula secured in the outer end of said plug, a ball disposed between said seat and said plug and adapted to close the bore of said tube when said ball is against said seat, and a tapered bore section in said tube on the opposite side of said constriction.

2. A device of the character described comprising, in combination, a tube having a bore therethrough, a portion of said bore of restricted diameter intermediate the ends of said tube, a plug having a small bore closing one end of said tube, a hypodermic cannula secured in said bore and communicating with said tube bore, a loose fit-

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ting ball disposed between said restricted bore portion and said plug adapted to close said bore when seated on said restricted portion, the bore on the opposite side of said restricted bore being tapered outwardly, and a transverse notch on said plug communicating with said plug bore adapted as a fluid passage when said ball is seated on said plug.

3. A unitary fitting for venoclysis equipment adapted for use as an air bleed or an air filter or an air connector and adapted for assembly with any container equipped to receive a penetrating cannula comprising: a tubular metal body having an annular interior shoulder midway of its length; a ball on one side of said shoulder; said tube having a tapered interior surface on the other side of said shoulder; said taper being sufficiently acute to receive and contain a cotton plug by frictional grip; said shoulder having a ball seat on the ball side thereof; said tube having interior walls of constant circular diameter on the ball side of said shoulder; a metal plug remote from said ball integrally fitted in the end of said tube and having an abutment shoulder to limit its inward movement; a penetrating cannula integrally seated in said plug and projecting coaxially away from said tube; the end of said plug facing toward said ball being incapable of forming a seat for said ball in communication with said cannula, whereby said ball cannot prevent the flow of fluid into said cannula.

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