

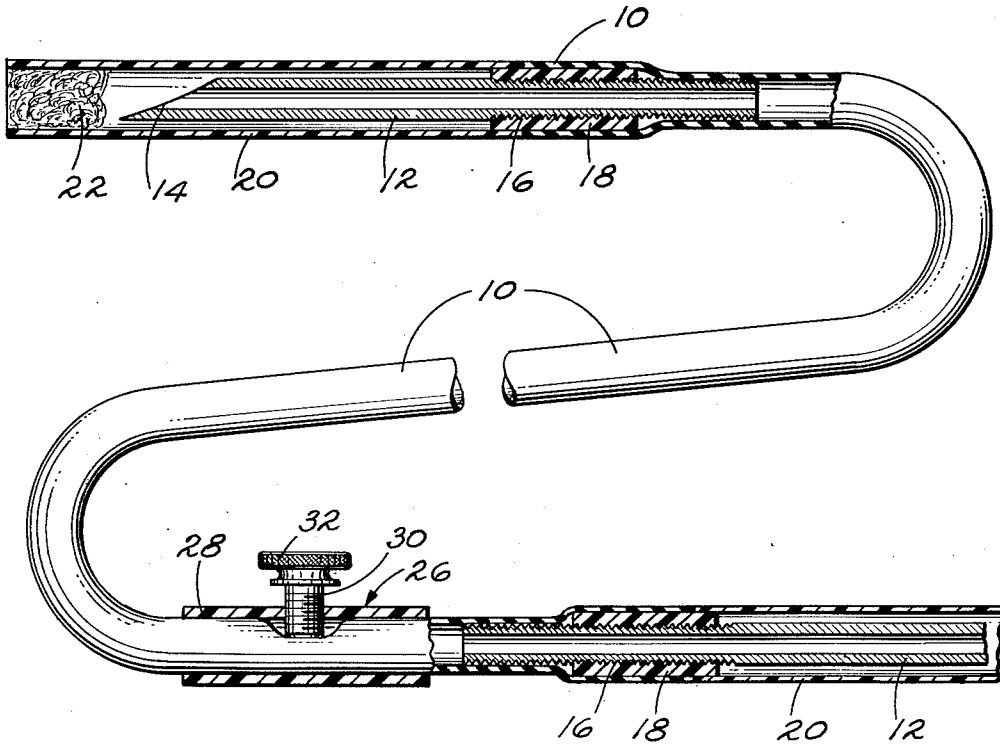
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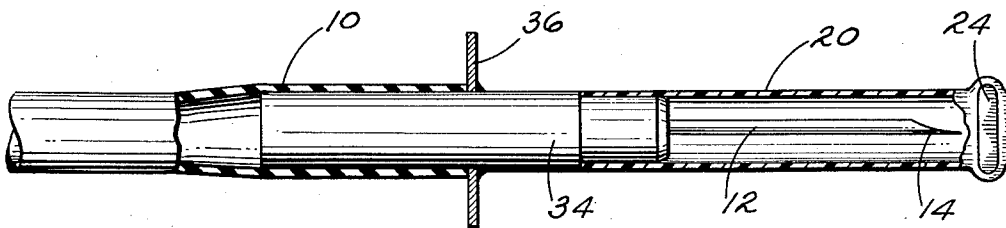
2,816,545

FLUID TRANSFER APPARATUS

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*Fig. 1*



*Fig. 2*

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**FLUID TRANSFER APPARATUS**

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3 Claims. (Cl. 128—214)

This invention relates to blood donor sets and more particularly to blood donor sets having needles permanently affixed to each end of a flexible tube respectively.

The use of blood donor transfer sets requires that they be absolutely sterile and clean before each use. To recondition a used set is an expensive operation requiring cleaning, sterilization, and sharpening of the needles. The use of conventional needle assemblies is expensive, since the needles are unnecessarily complicated and manufacturing costs therefore are excessive. Accordingly, one of the objects of this invention is to provide a blood donor set which may be manufactured at a cost less than the cost of cleaning an ordinary assembly.

Another object of this invention is to provide a blood donor set wherein the parts may be sterilized and maintained in a sterile condition until it is used.

A still further object of this invention is to provide a blood donor set wherein an absolute seal is made between the needle and the tubing, thus eliminating air leaks and faulty operation.

Another object of this invention is to provide a blood donor set with needles at each end of a flexible tube respectively, and throttling apparatus associated with the tubing for controlling the rate of flow therethrough.

Other objects and advantages more or less ancillary to the foregoing, and the manner in which all the various objects are realized, will appear in the following description, which considered in connection with the accompanying drawings, sets forth the preferred embodiment of the invention.

In the drawings:

Fig. 1 is an assembly view of the blood donor set with parts in section showing details of the assembly of the tubing to the needles; and,

Fig. 2 is a view of a modified form of the needle assembly.

Referring first to Fig. 1 in which the preferred embodiment of my invention is shown, a flexible tube 10 of rubber, plastic, or other suitable material is provided, having the customary length for extending from the patient to a blood collecting bottle. A hollow needle or cannula 12 having a sharpened end 14 commonly used on hypodermic needles is affixed to the tube 10. The needle 12 has a series of serrations 16 which may take the form of a fine thread run onto the end of the needle opposite the needle point 14. A bushing 18 of a hard thermosetting or thermoplastic material is placed on the needle 12 with the serrations 16 engaging the innerwall thereof and with the bushing 18 spaced from the end of the needle opposite the point 14. The tubing 10 is stretched over the outer wall of bushing 18, the end of the tubing 10 being spaced from the end of the bushing 18. Thus a portion of the needle 12 extends into the tube 10 beyond the end of the bushing 18.

The hood 20 of plastic tubing 10 is placed over the free end of the needle 12 and engages the end of the bushing 18 adjacent the tube 10. The hood 20 is closed

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by a cotton wadding 22 which prevents bacteria or dirt from entering the sterile parts of the donor set. The hood 20 may have a sealed end 24 as indicated in Fig. 2. However, it is necessary that at least one hood 20 having the wadding 22 be used to allow equalization of the pressure inside the tubing during the sterilization of the set and to facilitate the accomplishment of the sterilization.

When the bushing 18 has been assembled on the needle 12 and the tube 10 has been placed thereon, the tube 10 by virtue of its elasticity, provides a tension which tends to compress the bushing 18. During the sterilization operation the temperature of the parts is brought to approximately 250° F., at which time the bushing 18 becomes softened. The tension of the tube 10 thereupon compresses the bushing 18 into tight engagement with the serrations 16. The bushing 18 retains this fit and cannot be removed from the tubing inadvertently. Further, the bushing will not allow air to pass between the needle and the tube because of the intimate contact between the bushing and the needle. Bushing 18 also provides a grip which is used during the insertion of the needle into the vein of the patient and for withdrawing same.

When the donor set is used, one needle is placed in the vein of the patient, the other needle is inserted into a stoppered bottle in which a vacuum has been formed. The vacuum provides the pumping pressure for transferring the blood from the patient to the bottle. If leakage were to occur at the junction of the tube 10 and the needle 12, the vacuum would be lost and the blood would cease to flow into the bottle. The provision of the thermoplastic bushing 18 eliminates the possibility of such leakage thereby forming a reliable piece of apparatus.

Intermediate the ends of the tube 10 is a regulating valve 26. The valve 26 is formed from a tubular plastic sleeve 28 slidable on the outer surface of the tube 10. The sleeve 28 is drilled to receive a screw 30 having a knurled head 32. The threads of the screw 30 form the threads in the sleeve 28. As the screw 30 is turned inwardly, the tube 10 is compressed and the flow passage is reduced or may be closed entirely. The resistance of the rubber tube 10 is constant and allows a very accurate flow control. Further, the sleeve 28 with the screw 30 backed out, may be moved to any part of the tube 10 for the convenience of the user. The sleeve 28, by reason of its length, provides a grip which facilitates a one-hand operation of the screw 30 during the adjustment operation.

In the modified form of my invention as shown in Fig. 2 the needle 12 is soldered, brazed, or rolled into a metallic shank 34. The shank 34 has a diameter which will receive the tube 10 and stretch the same, thereby providing an air-tight seal therebetween. A flange 36 intermediate the ends of the shank 34 is affixed thereto for an additional gripping surface which may be used in the insertion of the needle 12 into the rubber stopper of the bottle. The shank 34 also receives a hood 20 for covering the end of the needle and preventing contamination of the needle and the inside of the tube assembly.

Although the foregoing description is necessarily of a detailed character, in order that the invention may be completely set forth, it is to be understood that the specific terminology is not intended to be restrictive or confining, and that various rearrangements of parts and modifications of detail may be resorted to without departing from the scope or spirit of the invention as herein claimed.

What is claimed is:

1. A blood donor set comprising a flexible tube having a needle assembly at each end thereof, respectively, said assembly including a hollow needle having a sharpened end, serrations on the outer wall of the needle adjacent

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the end opposite the sharpened end, a bushing having the inner wall thereof in engagement with the serrations on the needle and having its outer wall engaged by the inner wall of the tube, said needle having a portion of the serrated wall extending into and engaging the inner wall of said flexible tube.

2. A blood donor set comprising a flexible tube having a needle assembly at each end thereof, respectively, said assembly including a hollow needle having a sharpened end, a portion of the outer wall of the needle being serrated, said portion being adjacent the end opposite the sharpened end; a bushing having the inner wall thereof in engagement with a part of the serrated portion of the needle and having its outer wall engaged by the inner wall of the tube, the remainder of said serrated portion extending into and engaging the inner wall of the flexible tube, and a hood mounted on the bushing and enclosing the needle.

3. A blood donor set comprising a flexible tube having

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a needle assembly at each end thereof, respectively, said assembly including a hollow needle having a sharpened end, the other end of said needle being threaded on the outer surface, a bushing having the inner wall thereof in engagement with a portion of the threads and having its outer wall engaged by the inner wall of the tube, said threaded end extending beyond said bushing and engaging the inner wall of said flexible tube, and a hood mounted on the bushing and enclosing the needle.

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