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VENOCLYSIS APPARATUS

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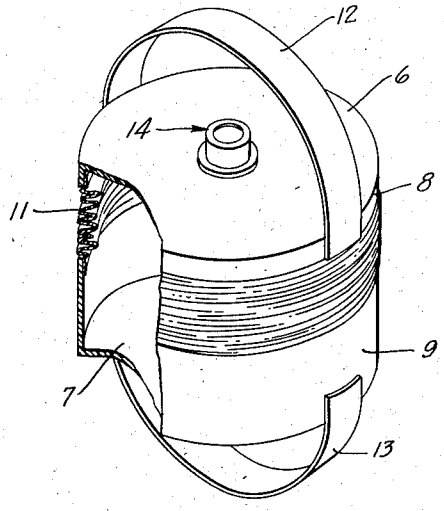

FIG. 1

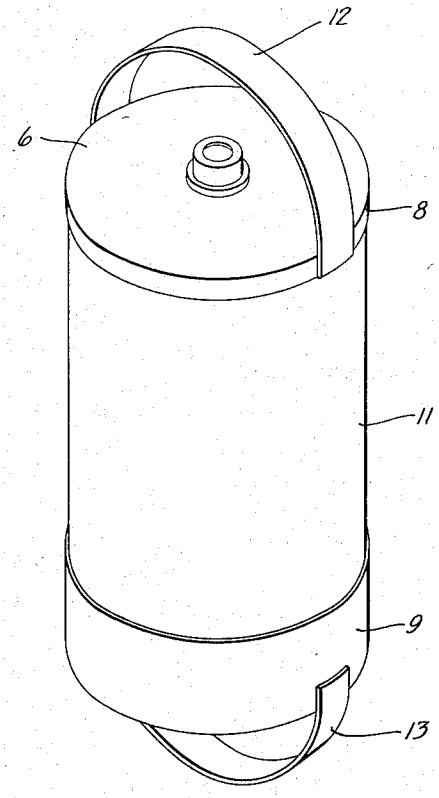

FIG. 2

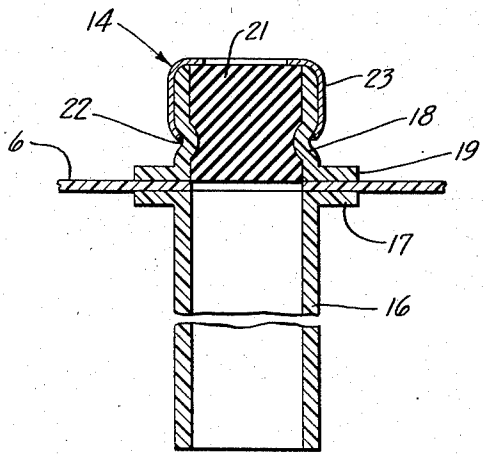

FIG. 3

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VENOCLYSIS APPARATUS

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1 Claim. (Cl. 128—272)

This invention relates to venoclysis apparatus.

In the collection, storage and transfusion of blood or of solutions to be given intravaneously, it has been usual heretofore to employ a container or flask made of glass. Because of the fragile nature of glass, the handling, transportation, storage and use of such containers provide certain problems and make necessary special care and attention in the handling of the containers.

In accordance with the present invention, I have devised a blood or solution container which can be readily made of a flexible plastic and, therefore, obviates those problems inherent in the use of glass. Further, since the apparatus of the present invention is made of a plastic material, it is possible to make at least a portion of the apparatus of a very flexible construction, thus enabling the apparatus to be utilized readily to vary the pressure in the flask at will and to have it sub-atmospheric, atmospheric or super-atmospheric. For example, the flask of the present invention can be partially filled with an anti-coagulant solution and packed in a partially collapsed condition so that the container is at atmospheric pressure at all times prior to use. When it is desired to use the container for the collection of blood, for example, expansion of the container to its normal size will result in creation of a sub-atmospheric pressure within the container. Thus, the possibility of drawing unsterilized air into the container by reason of the creation and existence of a sub-atmospheric pressure within the container is reduced to only that period when the blood is being collected within the container. If it is subsequently necessary to utilize pressure in excess of atmospheric, this can be done readily by applying the required hand pressure to the container.

It is in general the broad object of the present invention to provide a novel flexible container for the collection, storage and transfusion of blood or intravenous solutions.

The invention includes other objects and features of advantage, some of which, together with the foregoing, will appear hereinafter wherein the present preferred form of flask or container is disclosed. In the drawing accompanying and forming a part hereof,

Figure 1 is a perspective view partially broken away, showing a flask embodying the present invention.

Figure 2 is another perspective view of the flask in extended position.

Figure 3 is an enlarged cross-section through the inlet and the outlet means.

Referring to the present preferred embodiment shown in the drawing, this includes opposite circular closures **6** and **7** having, respectively, flanged ends **8** and **9**, each disposed at a right angle to the respective end. Closures **6** and **7** are of the same diameter and the flanges **8** and **9** are joined by a flexible cylindrical wall **11**, which is disposed in the form of a bellows, to facilitate collapsing of the container, as in Figure 1. The complete container is of cylindrical form when fully extended as in Figure 2. The flask is made of a flexible synthetic plastic, preferably one that is transparent.

It is preferred to have the flange **9** on the lower closure member **7** of somewhat greater extent than the flange **8** on the upper closure member **6**, to provide a container for the anti-coagulant solution placed in the container when it is to be used for the collection, storage and transfusion of blood.

To facilitate handling of the container, loops **12** and **13** are provided, respectively, upon the top and bottom closures **6** and **7**.

The upper closure **6** is provided with a single inlet-outlet closure, generally indicated at **14**, and comprising a length of cylindrical tubing **16** having a flange **17** at one end thereof, this being joined to the inner face of the upper end closure **6**. Another cylindrical tube **18** is secured by a flange **19** in axial alignment to tube **16** but on the outer face of the end closure **6**. A rubber plug **21** is inserted within the tube **18** and is retained therein under compression by the crimped or indented portion **22** in the tube **18**. A metal sealing cap **23** is provided about the end of the tube to protect and retain the rubber plug **21**. Because of the necessity of manufacturing containers of this type at low cost, only one inlet-outlet closure is provided. If expense is not a factor, then a generally similar closure can be provided on end **7** and loop **13** omitted.

In operation, when the container is to be used for the collection, storage and transfusion of blood, the anti-coagulant solution is placed in the container, which is collapsed until the required amount of air is expelled, and is then sealed; the container then appears in the form in which it is shown in Figure 1.

To fill the container with blood or solution, the container is suspended by the loop **12** with the inlet-outlet **14** pointing upwardly. The inlet plug **21** is then pierced with a hollow needle connected to a length of flexible tubing having another hollow needle at the other end thereof and which is inserted into the vein of the donor following the usual procedure. This procedure includes manipulation of a valve on the line between the donor and the container to control flow through the line (see valve 15, Figure 1, in Butler Patent 2,362,537). The weight of solution in the container will expand the container and thus create a certain suction force which can be utilized to draw blood through the line into the container under the control of the valve. The suction force can be augmented by exerting a downward pull upon loop **13**. When the desired amount of blood has been obtained from the donor, the valve on the line is closed and the needle is removed from the donor's vein. Removal of the needle from the rubber plug **21** closes the container inasmuch as this is self-sealing.

When it is desired to give a transfusion, the container is suspended by loop **13** with the inlet-outlet closure **14** on the underside of the container. The spiked end of a filter drip meter structure, such as is shown in Cutter Patent No. 2,644,586, is inserted through the inlet-outlet **14** and the usual flexible tube attached to the outlet of the filter is then filled with liquid until all air is ejected from the flexible tube. The usual hollow needle attached at the end of the tube is then inserted at the desired location in the patient and the transfusion then proceeds in the usual manner.

A positive pressure transfusion can be effected by pressing upwardly gently upon the bottom of the container, the liquid flow being at all times under the control of the operator inasmuch as the flow of liquid can be discontinued immediately upon releasing pressure upon the container. If desired, the flow can be by the drip or gravity method, end closure **7** having first been punctured with a "Luer" needle, the needle having been first filled with cotton, to act as an air filter. The flow of liquid, in this instance, is under the control of the operator by

reason of the usual valve attached to the flexible line leading from the inlet-outlet closure **14** to the patient.

From the foregoing, I believe it will be apparent that I have provided a relatively simple and novel form of container for the collection, storage and transfusion of blood or solution, particularly one enabling any desired mode of operation to be achieved with a relatively simple, inexpensive container which is free of any hazard of breakage due to inherent fragility of the material of construction.

I claim:

A unitary flask for the collection, storage and transfusion of a parenteral fluid, said flask consisting of a pair of substantially flat, rigid discs disposed in a parallel spaced relation, a flexible tubular sidewall collapsibly joining said discs to provide a unitary flask, an inlet-outlet closure provided centrally on one of said discs to permit of the admission and withdrawal of a parenteral fluid, said closure including a tube mounted on a disc with its

longitudinal axis normal to the disc and having a first portion and a second portion, a needle pierceable plug mounted in the first portion, the second portion being in communication with the interior of the flask and acting as a guide for a needle piercing the plug, and suspension support means attached to each disc for supporting the flask from either end.

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