

Jan. 23, 1962

F. S. DICKINSON, JR

3,017,883

VENOCLYSIS ASSEMBLY

Filed Aug. 12, 1957

4 Sheets-Sheet 1

FIG. 1

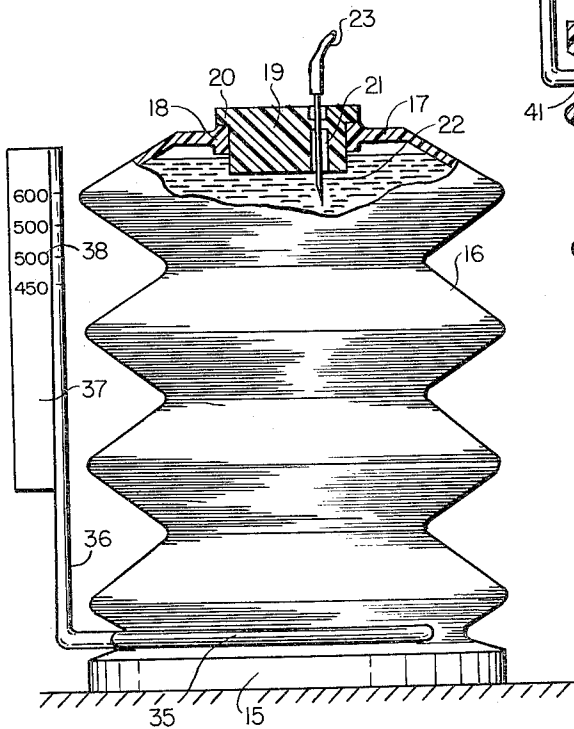
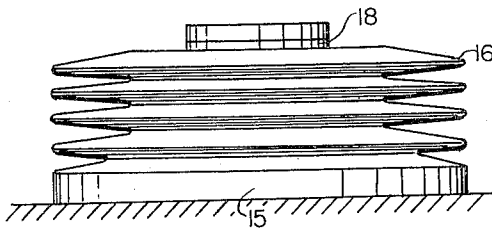


FIG. 2

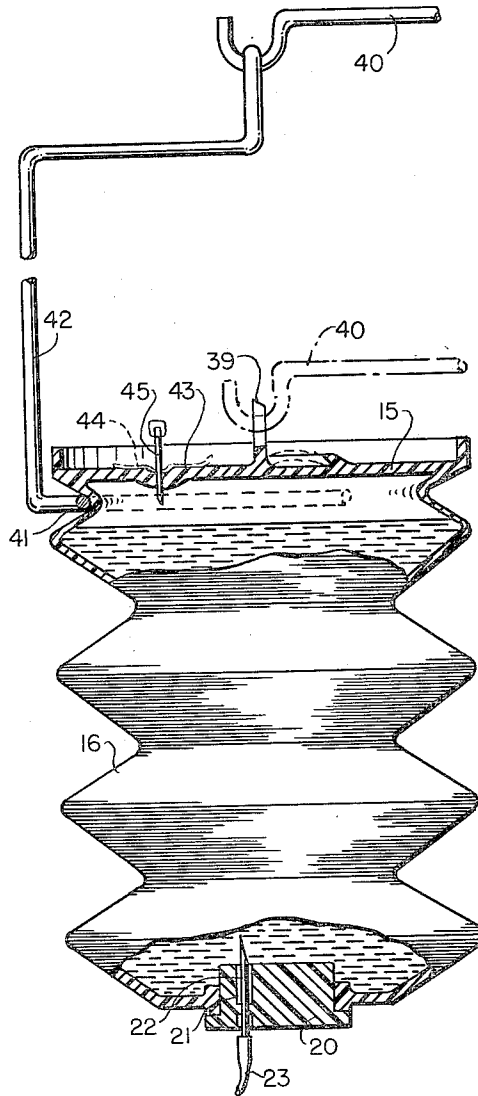


FIG. 3

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FIG. 4

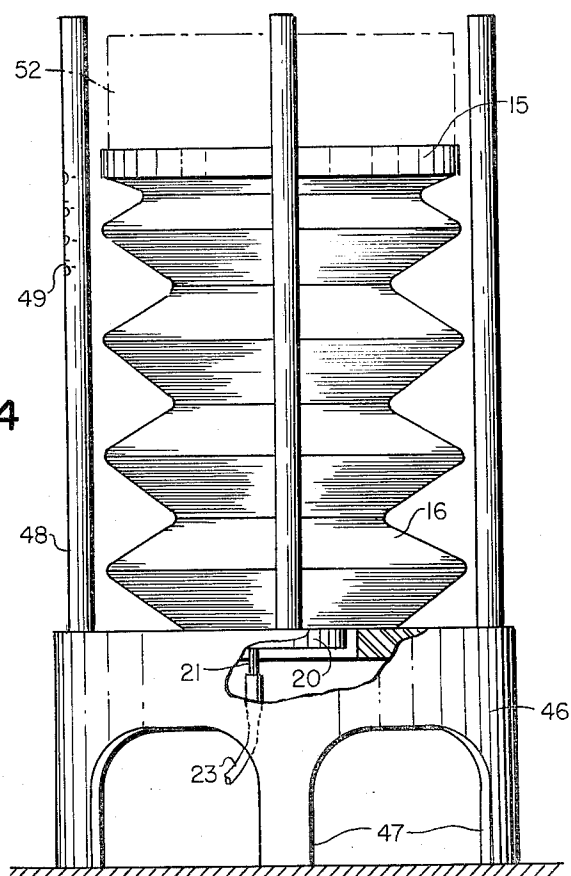
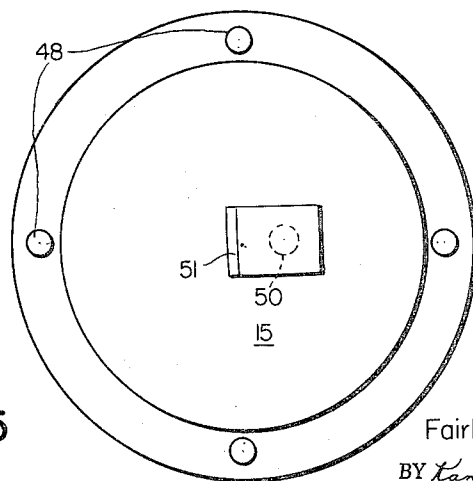


FIG. 5



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FIG. 6

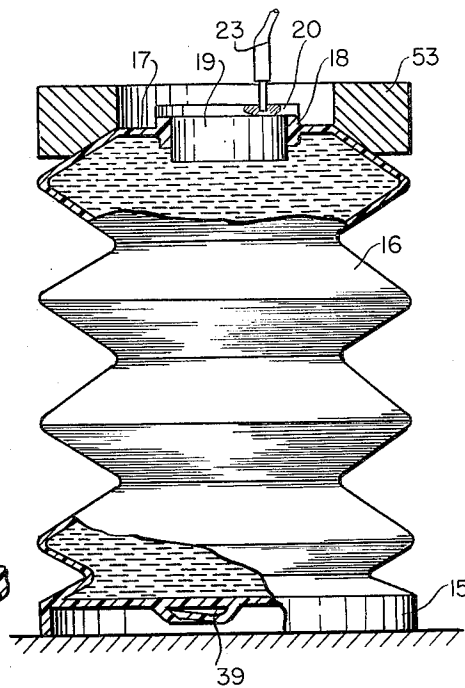


FIG. 7

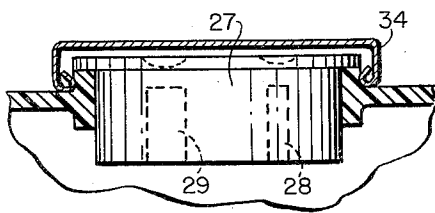


FIG. 8

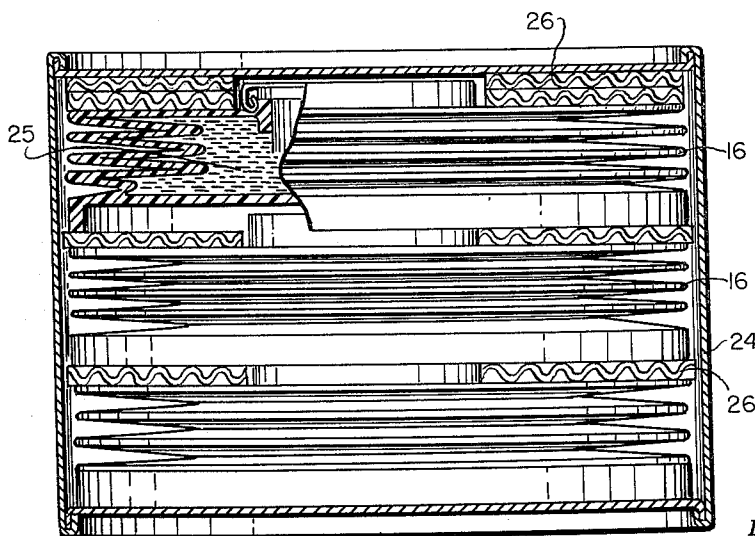
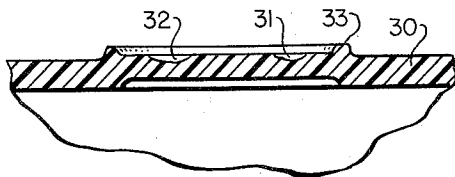


FIG. 9

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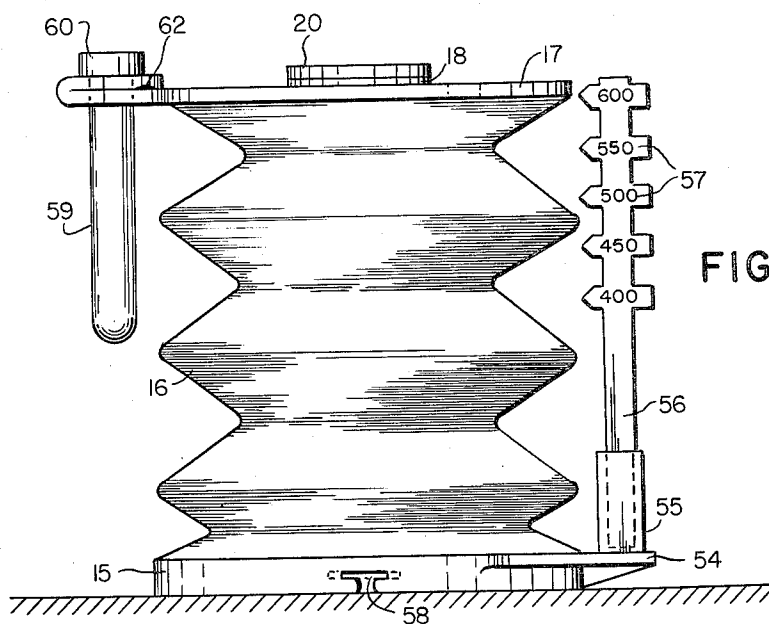


FIG. 10

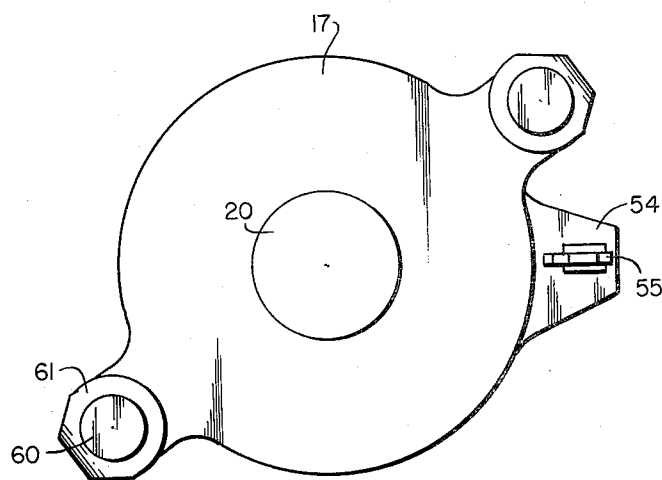


FIG. 11

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VENOCLYSIS ASSEMBLY

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Filed Aug. 12, 1957, Ser. No. 677,746

2 Claims. (Cl. 128—214)

This invention relates to structurally and functionally improved elements which may be combined to furnish a venoclysis assembly; certain of the elements being capable of being advantageously employed as individual units free from association with other elements.

It is a primary object to provide a receptacle which may be economically manufactured and sterilized and which will occupy only a minimum amount of space during shipping and storage.

A further object is that of designing an apparatus which may be conventionally used by physicians and technicians.

Still another object is that of providing an improved assembly particularly useful in the taking, administration and storage of parenteral solutions.

With these and other objects in mind, reference is had to the attached sheets of drawings illustrating practical embodiments of the invention and in which:

FIG. 1 is a side elevation of a receptacle in collapsed condition;

FIG. 2 is a partly sectional side elevation of the receptacle in filled condition;

FIG. 3 is a view similar to FIG. 2, but showing one manner of dispensing liquid from the receptacle;

FIG. 4 is a partly sectional side view of a receptacle associated with a preferred form of supporting structure or rack;

FIG. 5 is a plan view of the assembly as illustrated in FIG. 4;

FIG. 6 is a partly sectional side elevation of an assembly employed in the delivery or administration of liquids;

FIG. 7 is a fragmentary enlarged sectional view showing a closure element in association with the receptacle;

FIG. 8 is a similar view disclosing a pierceable area of a wall of the receptacle;

FIG. 9 is a sectional side view of a container within which a number of receptacles may be stored;

FIG. 10 is a side elevation of an alternative form of assembly; and

FIG. 11 is a plan view of the parts as illustrated in FIG. 10.

The main component of the present assembly is a receptacle which may receive, store and dispense parenteral liquids, such as blood. According to a preferred concept, it will involve a relatively thin side wall embracing superposed enlarged and reduced areas in the form of accordion pleating. This unit is ideally suited to being manufactured from plastic such as polyethylene vinyl, etc. It will include top and bottom walls through which cannula may be passed for receiving, donating and venting purposes.

Thus, referring primarily to FIGS. 1, 2 and 3, the numeral 15 indicates the base or lower wall of the receptacle. The latter will include side walls 16 arranged in the form of accordion pleats. In these figures, the wall of the receptacle opposite base 15 has been indicated by the numeral 17. It conveniently is formed with an opening which may be defined by an annular flange 18. Disposed within this opening is the plug 19 of a stopper, the head 20 of which may bear against the exposed surface of flange 18. As shown especially in FIGS. 2 and 3, this stopper may be formed with aligned recesses 21 in its upper and lower faces and through

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which a cannula 22 will be projected. That cannula has a pointed end which will pierce the diaphragm portion intervening the recesses 21. Conveniently, this diaphragm is of the self-sealing type. A tube 23 is connected with the outer end of the cannula to provide a passage for the flow of liquids.

As will be understood, the receptacle in the collapsed condition illustrated in FIG. 1 will occupy a minimum amount of space. Thus—attention being directed to FIG. 9—a number of these receptacles may in collapsed condition be stored within a container 24, preferably of metal. In that storage, their partially collapsed interiors may be partially or wholly filled with a saline or anticoagulant solution indicated at 25. The volume of any such solution will of course be related to the total capacity of the receptacle when the latter is distended. Any desired number of receptacles may be embraced within the container 24 and conveniently isolated from each other by separators 26 of suitable material. The interior of the container may also be filled with an inert gas so that the receptacles are maintained under proper conditions right up to the instant of use.

As illustrated in FIGS. 1—3, the stopper or closure 19—20 may have merely a pair of aligned bores separated by a pierceable partition. It is apparent that, as in FIG. 7, the closure might include one pair of such bores or recesses 28 suitable for the passage of a needle such as is to collect and/or dispense blood, plasma, etc. The closure might additionally include a further pair of aligned recesses 29. The latter might have a diameter greater than those of recesses 28 and serve for the passage of a venting needle or element. In fact, in lieu of a headed stopper type of closure, end wall 30 of the receptacle could be formed with pierceable zones 31 and 32, as shown in FIG. 8. This zone or zones might be defined by a flange portion 33. In either instance, however, a suitable cover 34 should be applied to overlie the zone or zones of piercing to maintain the sterility thereof.

In all instances it is preferred that the base portion of the receptacle be of sufficient area so that the receptacle will be stable when placed upon a supporting surface. While the receptacle could be employed as a separate unit, it is preferred that it be associated with a structure by means of which it will be properly supported during the taking or administering of blood. That structure may also include a provision serving to register the volume of liquid within the receptacle. Thus, referring to FIG. 2, a rack formed of wire or other suitable stock may be employed. The rack conveniently includes a bracket portion 35 resting within the valley of the corrugation next adjacent base 15 when the latter is supported upon a table or similar surface. Projecting at right angles to the bracket is a post portion 36. The latter will extend parallel to the axis of the receptacle and may carry a card 37 upon which will appear indicia 38 serving to register the liquid content of the receptacle. To that end, a suitable portion of the receptacle will, for observation purposes, be aligned with the imprinted area 38. Conveniently, that part of the receptacle may be the peak portion of the upper corrugation or pleat, which if desired, may be appropriately marked to indicate this fact.

When the receptacle is to be used, the stopper-piercing needle of a donor set may be introduced through the diaphragm portion intervening recesses 21. Of course, prior to this cap 34, or any other protective covering will have been removed. Under venous pressure, blood will flow through tube 23 and the lumen of the needle into the interior of the receptacle. Such flow will continue and the receptacle will expand to a point where its complete capacity is reached. Such capacity, by way of example, may be 600 cc. Under those circumstances and as in

FIG. 2, this fact will be registered by the indicia 38. Thereupon, needle 22 may be withdrawn and the diaphragm portion included within the stopper will seal the parts against in-flow of air or the escape of liquid. Anticoagulant or other solutions initially within the receptacle will of course have been evenly dispersed through the blood as it is introduced into the receptacle. Additionally, the physician or technician may agitate the receptacle to assure such a result.

When it is desired to administer blood, a procedure such as suggested in FIG. 3 may be resorted to. In that view, in addition to the parts previously described, it will be noted that base 15 may be provided with a tab portion 39 serving as a convenient suspending member for the receptacle if the latter is to be directly applied to a hook element such as 40. If a rack is to intervene the receptacle and the hook, as shown in full lines in this view, then the rack may include a bracket portion 41 resting within the valley of the last corrugation or pleat. From this bracket an arm 42 will extend upwardly for convenient suspension from a hook. The base portion 15 may be formed with a thickened part of area 43 which will be initially protected by a covering layer 44. The latter will be stripped from the face of the base and a venting needle or implement 45 will be caused to pierce this base area.

Therefore, with the needle 22 of an administering set extending through the pierceable diaphragm portion of the stopper and the receptacle supported as shown, the liquid within the same will flow downwardly under the action of gravity through tube 23. Air, of course, will be free to flow through the venting provision 45. Accordingly, an uninterrupted but controlled dispensing of the liquid will occur from within the receptacle.

A preferred form of rack structure has been shown in FIGS. 4 and 5. In those views it is to be understood that the receptacle has been partially or wholly filled in the manner heretofore described in connection with FIGS. 1 and 2. During such filling, the receptacle may have been freely supported upon a table or other surface. Also, it might have been supported within the rack shown in FIGS. 4 and 5. In any event, it is preferred that it be mounted by that rack during the administering or dispensing phase of the operations.

The rack will conveniently include a base portion 46 from which legs 47 extend downwardly into contact with a deck or table. Projecting upwardly from base 46 are guiding and supporting rods 48. The latter may be four in number and are spaced so that the body of a filled receptacle may be accommodated therebetween. Conveniently, one of the rods will bear indicia 49 for registration with a portion of the receptacle in order to indicate the extent to which the latter has been filled with liquid. As shown particularly in FIG. 5, an area of the base 15 may be provided for the passage of a venting needle. That area has been defined by a flange 50 and a protective strip 51 may overlie the same in a manner similar to that heretofore described in connection with the parts 43 and 44. A venting needle will not ordinarily be employed in the assembly shown in FIGS. 4 and 5. Rather, after the receptacle has been filled to the desired capacity with liquid, and after removal of the stopper piercing needle and the subjecting of the receptacle contents to any desired or necessary treatment, that receptacle is inverted. In such condition it will occupy the position shown in FIG. 4. The entire assembly may, of course, in the case of administering, be disposed at any desired level above the patient. In this manner, the force of gravity will overcome venous pressure.

Therefore, as the liquid empties from the receptacle it will pass through tube 23 and the pleats of its structure will gradually collapse on themselves, resulting in the over-all height of the receptacle decreasing. Ordinarily, however, in addition to gravity flow, it may be preferred to rest a weight 52 of proper value upon the base 15 of the inverted receptacle. This weight will of

course assist in the collapse of the receptacle, or in other words, in the dispensing of its contained liquid.

Similarly, in FIG. 6, a receptacle has been shown as supported upon a table or other suitable surface with its end wall 17 in an upward position. Under these circumstances, the receptacle may be filled to desired capacity with blood through tube 23 and the needle connected therewith which has been caused to pierce the stopper. It will not be necessary to provide the receptacle with a venting needle or similar accessory during the administering of the blood. Rather, by disposing upon the upper surface of the receptacle a weight 53, which may be ring-shaped, the receptacle is induced to collapse. Under these circumstances, the liquid will be dispensed upwardly and then downwardly with sufficient pressure to overcome the venous pressure of the patient. As shown, the adjacent surface of the receptacle and weight mate. Accordingly, these parts will tend to remain properly associated with each other. While the receptacle may be substantially unsupported as shown in FIG. 6, it is preferred to employ some rack or supporting structure of, for example, the type shown in FIGS. 4 and 5.

Again, in the case of the receptacle shown in FIGS. 10 and 11, a construction substantially duplicating that illustrated in FIGS. 1 and 2 exists. For this reason, the same reference numerals have been generally employed in these latter figures. However, contrary to the preceding structures, the base portion 15 may have extending therefrom a bracket part 54 which includes a socket 55. That socket may receive the base of a standard 56 provided with indicia 57. The latter, upon aligning with, for example, the upper surface 17 of the receptacle, will indicate the extent to which that receptacle has been filled with liquid. For the purpose of providing a compact assembly, the length of standard 56 may be substantially equal to the diameter of the receptacle. The base of that receptacle is conveniently formed with slots 58. These will receive the ends of the standard and thus retain it in position. Accordingly, when the receptacle is to be filled, all that an operator will have to do is withdraw the standard and mount it in socket 55 to extend parallel to the receptacle axis.

As also shown in these views, there may be associated with the receptacle two tubes for the purpose of serology and cross-matching. These tubes will, according to a preferred concept, embody the structure shown in the prior patent to J. J. Kleiner, #2,460,461, dated February 1, 1949, entitled "Blood Collecting Apparatus." As such, that will include bodies 59, the free ends of which are enclosed by perforable stoppers 60. To retain them in association with the main receptacle, the upper end 17 of the latter is extended in the form of tabs 61. Each of these tabs is formed with a pair of perforations slightly smaller than the diameter of one of the tubes 59. The tabs are folded upon themselves to align their perforations and these receive the tubes 59, as shown in FIG. 10. The free end of the tab is conveniently heat-sealed as at 62 to the upper surface of the top wall 17. This will insure against a loss of, or accidental detachment of tubes 59.

As will be understood, the present receptacle is not a shapeless unit which is difficult to store or to support. This has been one of the objections to receptacles of this type as heretofore marketed. The foregoing disclosure clearly evidences that a unit is furnished which, prior to its use, will be extremely compact and which together with other units may be readily packaged. In use the unit will be stable, not alone in its initial condition, but also in partially or wholly filled conditions. Additionally, the unit permits a casual observer to determine substantially the volume of liquid which it contains. Accordingly, it is unnecessary (as in earlier devices) to weigh the receptacle in order to reach a determination as to the volume of its contents.

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Thus, among others, the several objects of the invention as specifically aforementioned are achieved. Obvious numerous changes in construction and rearrangements of the parts may be resorted to without departing from the spirit of the invention as defined by the claims.

I claim:

1. For use in a venoclysis assembly, a substantially stable receptacle including a hollow body comprising base and top elements and side walls, at least said walls embracing flexible material, accordion pleats formed in said walls, said base elements including an uninterrupted outer supporting surface having an area such that the body of said receptacle will extend upwardly therefrom substantially free from lateral displacement with respect thereto, said top element extending beyond said side walls in the form of a tab portion provided with tube-receiving perforations and said tab being folded upon itself to align those perforations in the form of a single bore.

2. In a venoclysis assembly, in combination, a collapsible receptacle, a corrugated side wall therefor, a graduated volume-indicating member, means supporting said member adjacent said receptacle, a portion of the receptacle registering with the graduations of said member to disclose the fluid volume within said receptacle, a base forming a part of said receptacle and said supporting means

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comprising a bracket detachably engaging and bearing within the valley portion of a side wall corrugation adjacent said base.

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