Dec. 22, 1953 H. W. ROSE 2,663,298

APPARATUS AND METHOD FOR ADMINISTERING PARENTERAL SOLUTIONS

Filed June 16, 1950 3 Sheets-Sheet 1

FIG. 1

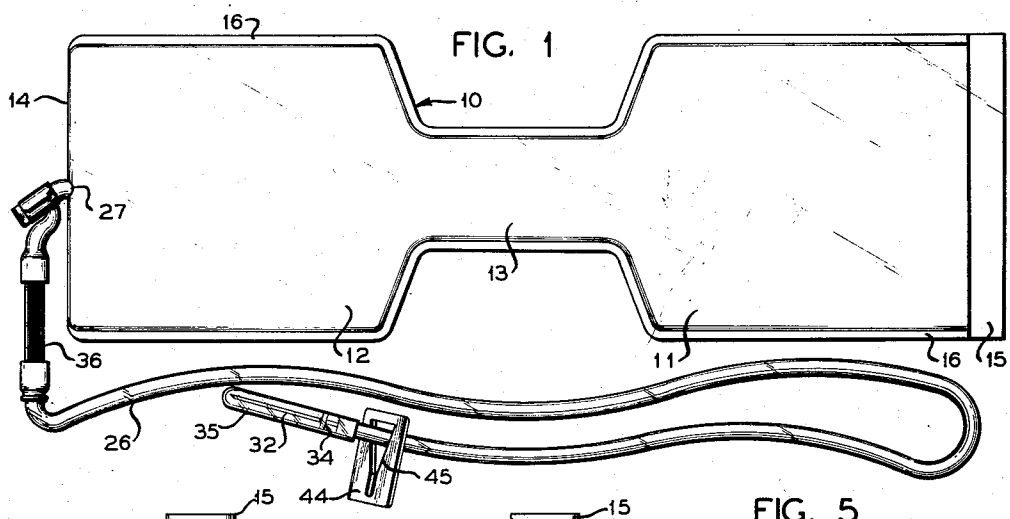


FIG. 2

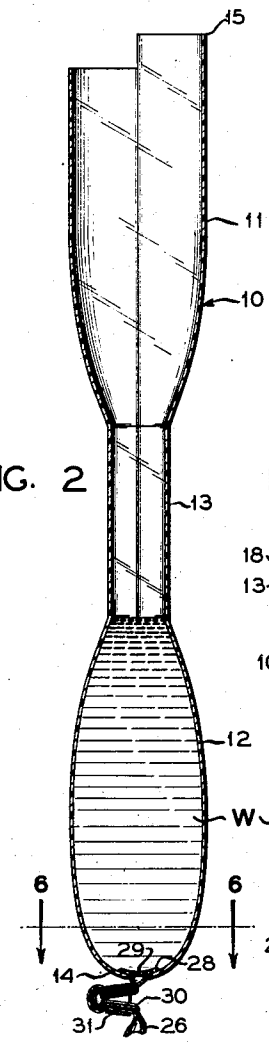


FIG. 3

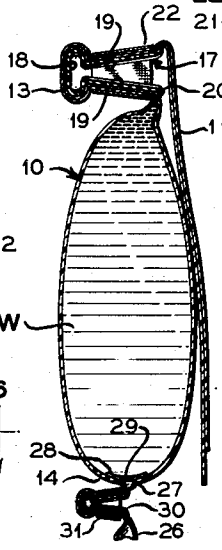


FIG. 4

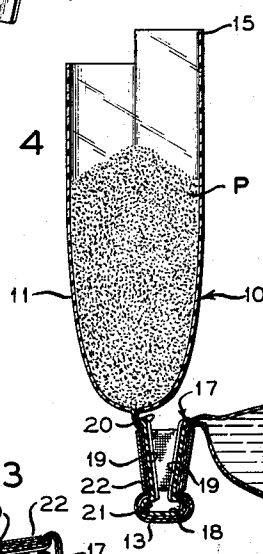


FIG. 5

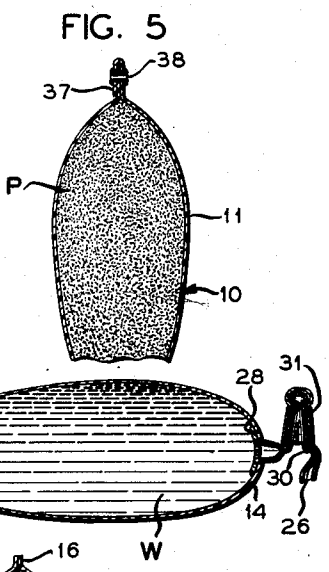
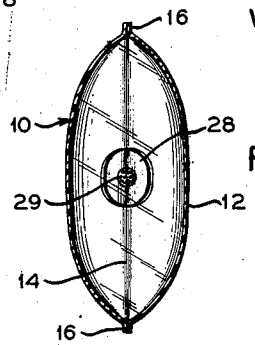


FIG. 6



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APPARATUS AND METHOD FOR ADMINISTERING PARENTERAL SOLUTIONS

Filed June 16, 1950 3 Sheets-Sheet 2

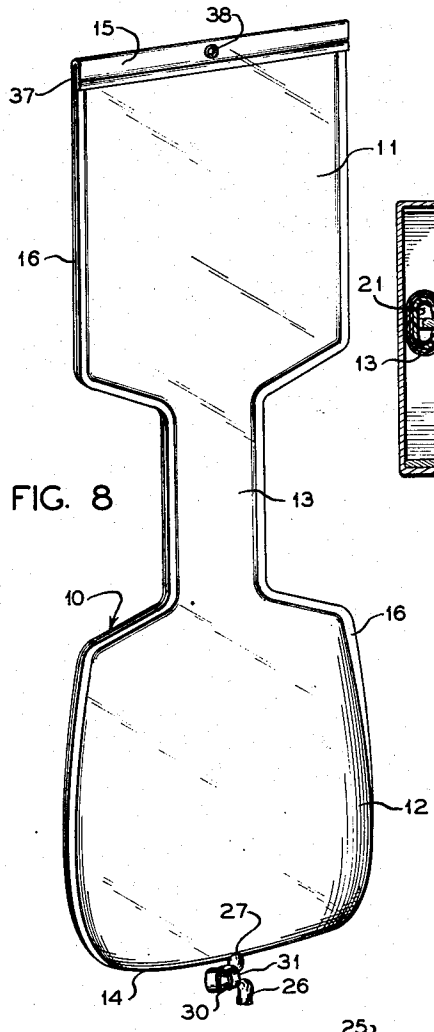

FIG. 8

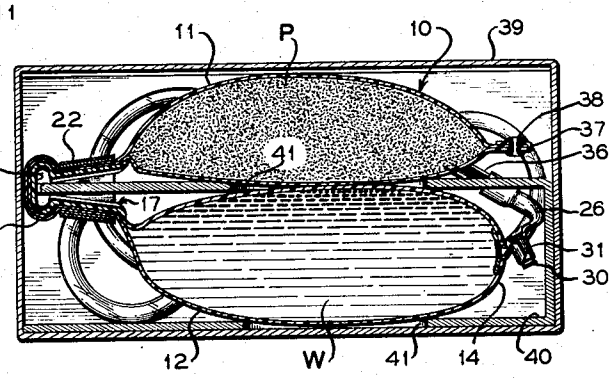

FIG. 7

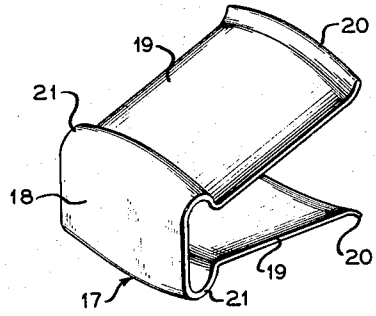

FIG. 9

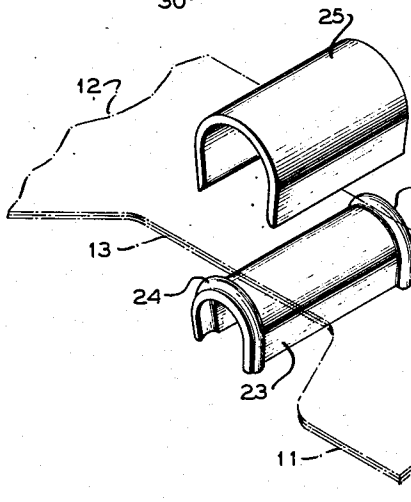

FIG. 15

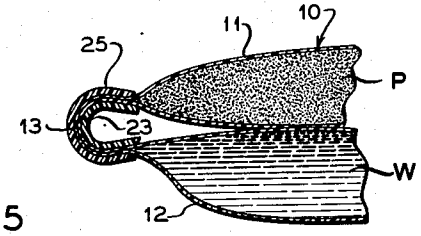

FIG. 16

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APPARATUS AND METHOD FOR ADMINISTERING PARENTERAL SOLUTIONS

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FIG. 10

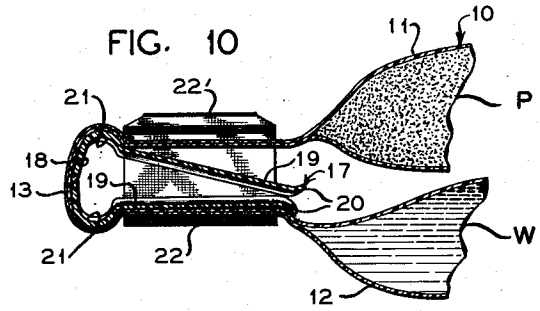


FIG. 11

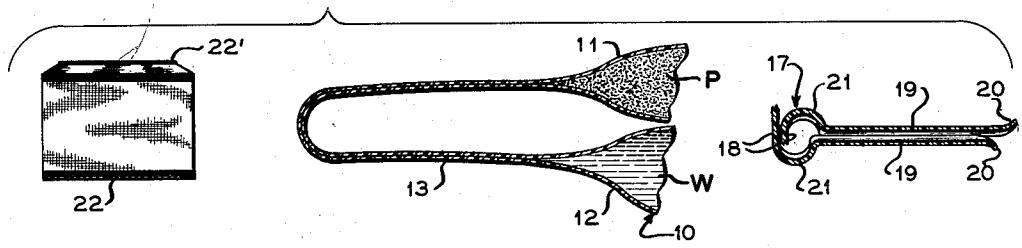


FIG. 14

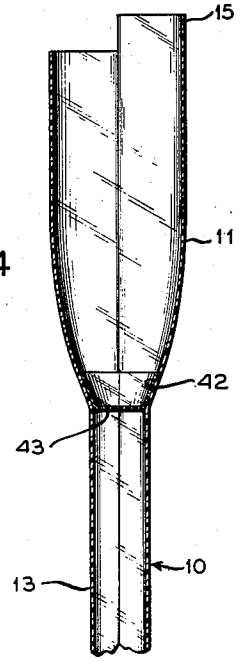


FIG. 12

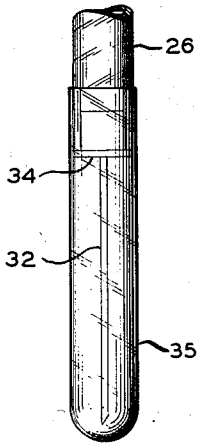
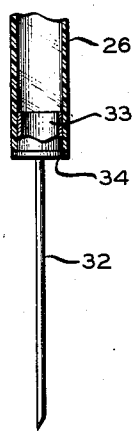


FIG. 13



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UNITED STATES PATENT OFFICE

2,663,298

APPARATUS AND METHOD FOR ADMINISTERING PARENTERAL SOLUTIONS

Hilton W. Rose, Arlington, Va.

Application June 16, 1950, Serial No. 168,431

7 Claims. (Cl. 128—214)

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This invention relates to an apparatus and a method for administering parenteral solutions and more particularly to a novel container for the storage of blood derivatives, such as dried plasma and the like, and blood substitutes, such as dextran and similar compounds, which may thus be packaged and thereafter dispensed from the container without possibility of contact with the air or contamination.

Present day methods of storage and shipment of the blood derivatives and substitutes with which we are here concerned are particularly cumbersome. This is especially true in connection with the furnishing of supplies of plasma for use under emergency conditions as, for example, by our armed forces, the approved method being costly, complicated and difficult to set up, including relatively heavy or weighty apparatus, and requiring an overall time interval for administration that is considered unduly prolonged.

The method currently employed contemplates the storage of dried human plasma and distilled water in separate glass bottles, each bottle being sealed by a penetrable, plastic closure member manufactured from sheet material such as rubber. The bottles must be separately and carefully packed, to minimize possibility of breakage, and a package or kit is provided including a pair of needles, tubing, filter, observation tube, and intravenous needle. Distilled water and dried plasma are bottled under vacuum and, after the bottle closures are carefully cleansed with alcohol or the like, a double ended needle is inserted into the opposed closures, a so-called airway assembly being also employed, to permit the distilled water to be drawn into the plasma bottle. During this step of the process it is necessary to hold the bottles in substantially upright position with the water bottle immediately above the plasma bottle. Even with the exercise of extreme care plasma and water are subject to contamination either during the step of puncturing the closures or by reason of vacuum having been partially or wholly lost.

The needles are then removed from the closure of the plasma bottle which is then gently agitated until the plasma is completely dissolved.

The needle of the airway assembly is then removed from the water bottle and inserted through the closure of the plasma bottle which must then be suspended in inverted, upright position for administration of the transfusion. A second needle is inserted into the closure of the plasma bottle and this second needle carries a discharge tube, including a plasma filter and

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observation tube, having an intravenous needle on the extremity thereof.

Not only are these preliminary steps time consuming but a support is required for maintaining the plasma bottle in upright position during the interval required for administration of the transfusion.

Moreover, the expense of packaging is relatively great, the glass bottles are heavy and readily frangible as well as costly, adding further to the cost and presenting problems of either disposition after use or storage and eventual shipment if salvage is contemplated.

It is accordingly a major purpose of the present invention to provide a novel and distinctly improved method of packaging and shipment of blood derivatives and blood substitutes wherein all of the objectionable features detailed hereabove have been eliminated.

It is a further object of the present invention to provide a novel and distinctly improved method of packaging and shipment of dried, human plasma wherein all of the foregoing difficulties of restoration of plasma and administration of transfusion are eliminated.

It is a further object of the present invention to provide a novel, sterile container for dried plasma and for the distilled water required for the restoration thereof which may be readily manufactured from inexpensive material of a character that may be conveniently disposed of or discarded after use.

It is a further object of the present invention to provide a novel container for dried plasma, and for the distilled water required for the restoration thereof, which will be flexible and not readily frangible, substantially eliminating breakage and handling problems during the shipment thereof.

It is a further object of the present invention to provide a novel container of the class set forth which is especially conformed so as to house separately dried plasma and the distilled water required for the restoration thereof, a novel clamping member being provided to prevent commingling of plasma and water.

It is a further object of the invention to provide a novel container of the class set forth having a discharge tube and intravenous needle permanently attached thereto, the needle being protected against damage and contamination, so that no contamination of restored plasma, or loss of time, may occur through any necessity for attaching a tube to the container to permit the

use thereof as a dispenser during administration of the contents.

It is a still further object of the present invention to provide a novel package of particularly economical construction, for a container of the class set forth, to permit the ready handling and shipment thereof with little possibility of damage to container and contents.

It is a still further object of the present invention to provide a novel method for commingling the contents of a container of the class set forth.

It is a still further object of the invention to provide a novel method for administering intravenously the restored contents of a container of the class set forth without any necessity for suspending the container during the transfusion interval.

It is a still further object of the present invention to provide a novel container of the class set forth which may be manufactured with particular economy, comprising a simple structure which may be used with especial convenience and requires no additional appliances to permit the use thereof as a dispenser or during the administration of the contents intravenously.

Further objects and advantages of the invention will be apparent from the following specification taken in conjunction with the accompanying drawings, wherein:

Fig. 1 is a plan view of a novel blood plasma container, constructed in accordance with the present invention;

Fig. 2, a vertical sectional view through the container of Fig. 1, a portion of the discharge tube being broken away, illustrating the first step in the filling thereof, a measured quantity of distilled water having been placed in the lower portion of the container;

Fig. 3, a vertical sectional view through the container, a portion of the discharge tube being broken away, illustrating the second step of the filling process, air having been evacuated from the lower portion of the container and a clamp having been applied to the neck portion of the container, immediately above the filled, lower portion;

Fig. 4, a vertical sectional view through the container, a portion of the discharge tube being broken away, illustrating the third step of the filling process, a measured quantity of dried blood plasma or other blood derivative or substitute having been placed in the upper portion of the container;

Fig. 5, a fragmentary, vertical sectional view through the container, illustrating the fourth step of the filling process, air having been evacuated from the upper portion of the container and the mouth thereof having been sealed;

Fig. 6, a horizontal sectional view through the lower portion of the container, taken on the line 6—6 of Fig. 2;

Fig. 7, a longitudinal sectional view through the filled container, illustrating a novel manner in which the container may be packaged for shipment;

Fig. 8, a perspective view illustrating the container in position ready for use, a portion of the discharge tube being broken away, the clamp on the neck portion having been removed and the dried blood plasma and distilled water having been combined;

Fig. 9, a perspective view of a preferred form of clamp used for effecting a seal between the upper and lower portions of the container;

Fig. 10, a longitudinal detail sectional view through the clamp and the adjacent portions of the container, illustrating the clamp broken, prior to effecting the removal thereof;

Fig. 11, a longitudinal sectional view through the broken clamp and associated parts disclosed in Fig. 10, illustrating the method for removal of clamp and tie member;

Fig. 12, an elevational view of the intravenous needle and novel protective cover applied to the extremity of the discharge tube;

Fig. 13, a vertical sectional view taken through the intravenous needle, the protective cover having been removed;

Fig. 14, a fragmentary vertical sectional view taken through the neck and upper portions of the container, illustrating a modified form of strainer element;

Fig. 15, a perspective view of a modified form of clamp, illustrating the component parts thereof in expanded position; and

Fig. 16, a longitudinal sectional view through the modified clamp of Fig. 15, illustrating the clamp applied to the neck portion of the container.

As illustrated more particularly in Fig. 1 of the drawings, the novel container 10 comprises upper and lower portions 11 and 12, respectively, and an intermediate connecting or neck portion 13 of substantially reduced width. The bottom 14 of the lower portion is closed and has a discharge tube 26 mounted centrally thereof, as will be hereinafter more fully described. The upper extremity of the top portion 11 is open to provide a mouth whereby the bag-like container may be filled with distilled water and dried blood plasma.

Preferably, the container 10 is formed from suitable plastic, sheet material, it having been found in practice that sheet material manufactured from polyethylene and/or polyvinyl derivatives is particularly desirable, combining the advantageous characteristics of tensile strength, flexibility, resiliency, and transparency. Further, no vulcanization takes place when layers of such material are maintained under pressure, an essential issue in connection with the instant device. In the preferred embodiment of the invention illustrated a single sheet of such material has been bent upon itself as indicated at 14 to provide superimposed layers of plastic material, the sides of which have been preformed to comprise upper and lower portions 11 and 12, respectively, connected by a restricted neck portion 13. One layer of such material extends beyond the open mouth of the container, as indicated at 15, to provide means for appropriately sealing such mouth. The side edges 16 of the container are permanently united as indicated, as will be more readily apparent from an examination of Figs. 1 and 6 of the drawings, by cementing or other related step as is well known in connection with plastic materials of the class with which we are here concerned. There has thus been provided a relatively tough, resilient and flexible container including spaced upper and lower bag-like portions designed for use as separate receptacles and connected by a tubular, restricted neck.

The lower portion 12 is intended to receive a measured quantity of distilled water while the upper portion 11 serves as the receptacle for the dried blood plasma and suitable sealing means is provided for maintaining the contents of these portions separate and preventing the inadvertent commingling thereof until it is desired to restore the plasma for transfusion or other pur-

poses. Thus the upper and lower portions of the container comprise, in effect, separate receptacles. A preferred embodiment of such sealing means is disclosed in Fig. 9 of the drawings and comprises a generally U-shaped supporting and spacing member 17 including a substantially vertically disposed end wall 18 and outwardly flaring legs 19. These legs are spaced farthest apart at their extremities 20 which may be sharply, outwardly inclined and provided with a rounded edge. Arcuate portions 21 join the end wall 18 and the legs 19, the over-all height of the end wall being preferably greater than the distance between the inner extremities of the legs. Preferably the legs 19 are formed with opposed arcuate transverse cross-sectional configurations, for a purpose which will hereafter become more fully apparent.

It will be obvious that the filling steps may be reversed, i. e., dried plasma may be placed in the lower portion 12 and distilled water in the upper portion 11, without in any manner affecting the functioning of the apparatus. By such an arrangement any necessity for a drying step, subsequent to the introduction of liquid and prior to the filling with plasma, is eliminated.

In practice, when the clamp 17 is applied to the container, the restricted neck portion 13 overlies the end wall and legs of the clamp, in parallel relation with respect thereto, and the upper and lower portions or receptacles 11 and 12, extend immediately beyond the extremities 20 of the legs of the clamp. It will be observed that the configuration of the clamp is such that no sharp surfaces are presented for contact with the material of the container, such as might result in vulcanization of the plastic material or in injury thereto. A suitable tie member is then positioned about the restricted neck portion of the container, in embracing relationship with respect to the clamping member. Various forms of tie members may be employed, a preferred embodiment comprising an adhesive member 22 intended to be wrapped around the legs 19 and overlying neck portion, the inner extremity of such a tie member being free from adhesive so as not to adhesively unite with the material of the container. Thus the first layer or two of the tie member 22 will not adhere to the restricted neck portion while the outer layers of such member will adhere to the lower layers thereof, obviating any possibility of passage of either distilled water or dried plasma from one portion of the container to the other during such time as the neck portion 13 is engaged with the clamping member 17. The arcuate portions 21 of the clamp and the angularly directed extremities 20 of the legs thereof effectively prevent any possibility of inadvertent displacement of the tie member 22.

As will be more readily apparent from an examination of Figs. 10 and 11 of the drawings, the outer extremity 22' of the tie member 22 is also free of adhesive and comprises a convenient tab which may be grasped and makes the task of manually removing or unwrapping the tie member from the clamp 17 a particularly simple one. It is contemplated, however, that this clamp will be readily frangible whereby fracture thereof, as will be more fully described hereinafter, results in practically instantaneous separation of tie member and clamp from the restricted portion 13 of the container.

Preferably the clamping member 17 is formed from a suitable plastic material which will be readily frangible so that, when it is desired to

remove the clamp, pressure upon the extremities 20 of the legs will result in fracture of the end wall 18, as is particularly illustrated in Figs. 10 and 11 of the drawings. The collapse of this end wall, occasioned by such fracture, will permit the lateral withdrawal of the tie member 22 as the pieces of the clamping member fall from place, freeing the neck portion of the container.

A modified form of clamping member has been illustrated in Figs. 15 and 16 of the drawings. In this embodiment the clamp comprises an inner U-shaped member 23 of arcuate cross sectional conformation provided with upstanding rounded ribs 24 on the ends thereof. Preferably the distance between such ribs is but slightly greater than the width of the restricted neck portion 13 of the container. An outer, complementarily arcuate and resilient clamping member 25 is provided, for engagement with the surface of inner member 23, between the ribs 24. In use, the restricted neck portion of the container is placed upon the inner member 23 in overlying relationship and the outer clamping member 25 is snapped thereupon. Firm pressure is thus obtained, effectively preventing passage of contents between the upper and lower portions of the container until the clamping members thus described are manually removed. Any suitable plastic or other material, having the required degree of flexibility, may be utilized for the manufacture of the clamping members 23 and 25, and, since no fracture thereof is intended in connection with disengagement from the container, such members are susceptible of reuse.

The lower portion or receptacle 12 preferably is provided with a discharge or injection tube 26. The bottom wall of the receptacle 12 may be provided with an aperture 27, positioned substantially centrally thereof, and the inner extremity of the tube is inserted through this aperture. A flange 28 is provided on the inner extremity of the tube 26 and this flange is cemented or otherwise united to the material of the container immediately surrounding the aperture 27. Preferably the flange 28 includes a suitable strainer element 29 provided with a plurality of extremely small apertures which will permit the passage of fluid therethrough but which will effectively prevent possibility of any particles or clumps of dried plasma entering into the discharge tube.

A clamping member 30 is applied to the discharge tube 26 immediately adjacent the receptacle 12 to prevent any distilled water from entering any substantial distance into the tube prior to the use of the device for administering transfusion. If desired, this clamping member may be similar to the clamping member 17, except on a materially smaller scale, and a tie member 31, similar to the tie member 22, may be used. It has been found in practice that when clamping members of this character are employed there is far less likelihood of deformation of the material clamped thereupon despite comparatively long storage intervals.

The discharge tube 26 is provided on the lower extremity thereof with an intravenous needle 32 as is well known in this art. Preferably the intravenous needle includes an enlarged engaging portion 33 receivable within the tube 26 and including a shoulder 34 limiting entry into the tube. To protect the needle against contamination a plastic or other suitable casing 35 is provided, the open inner extremity of such casing being designed for frictional engagement with the discharge tube 26 immediately adjacent the

lower extremity thereof. The tube 26 is further provided, intermediate the extremities thereof, with a plasma filter 36 of conventional constructions, also as is well known in the art.

The discharge tube 26 is further provided with a secondary clamping member 44 positioned adjacent the lower extremity of the tube, for a purpose to be more fully discussed hereinafter. Preferably this secondary clamp comprises a substantially rectangular plate-like body provided with a substantially V-shaped aperture 45 positioned centrally thereof. The width of the widened extremity of this aperture is such that the discharge tube is freely receivable therein; movement of the member 44 transversely of the discharge tube will constrict the tube between the converging walls of the aperture 45, thus effectively preventing flow of fluid through the discharge tube.

There has been illustrated in Figs. 2, 3, 4 and 5, the progressive steps of the filling of the novel container described hereabove. With particular reference to Fig. 2, the clamping member 30 is first applied to the discharge tube 26 and a measured quantity of distilled water W is placed in the lower receptacle 12, the clamp 30 effectively preventing water from entering into the tube 26 a sufficient distance to reach the plasma filter 36. Preferably the receptacle 12 if of a sufficient size to conveniently receive 600 cc. of distilled water, accepted practices dictating that such water be pyrogen-free, sterile, and contain 0.1% of citric acid. The level of distilled water approaches the lower extremity of the reduced neck portion 13 of the container and air is then exhausted from the receptacle 12, above the level of distilled water, and the clamping member 17 is then applied to said reduced or restricted neck portion. This step of the filling process is illustrated in Fig. 3 of the drawings.

After drying, the upper portion of the container or receptacle 11 is then filled with dried, human plasma indicated conventionally at P. Preferably the size of this receptacle is such as to conveniently receive 500 cc. of plasma, accepted practices indicating the requirement for a suitable and adequate preservative such, for example, as phenylmercuric borate in the proportion of 1:50,000. Air is then exhausted from above the level of plasma and the mouth of the container is then securely sealed. Such sealing is accomplished by bending the material 15 of one wall of the mouth of the container over upon the material of the opposed mouth wall and cementing or otherwise permanently uniting the layers of material as indicated at 37, particular reference being had to Fig. 5 of the drawings. The nature of the plastic material from which the container is fabricated is such as to readily lend itself to such a permanent seal. Preferably, a suitable eyelet or grommet 38 is placed through the united layers of material 37, substantially centrally of the width of the closed mouth of the device to permit the subsequent hanging thereof upon a hook, nail or the like, should disposition be desirable during administration of the restored fluid.

The novel receptacle having thus been filled, packaging for storage or shipment becomes a particularly simple matter, all issues of careful handling required for prior art devices by reason of frangibility having been eliminated.

A preferred method of packaging has been illustrated in Fig. 7 of the drawings where there is disclosed, somewhat diagrammatically, a box-like container 39 of any suitable material such as cardboard, fibreboard, or the like, provided with a substantially U-shaped supporting spacer 40, the opposed legs of which are provided with vertically aligned apertures 41 intended to receive the bellied surfaces of the filled receptacles 11 and 12. Preferably the spacer 40 is positioned within the container 39 and the water-filled receptacle 12 is positioned upon the lowermost leg of the spacer so as to be supported within the aperture 41. The upper leg of the spacer is then positioned upon the upper surface of the receptacle 12 and the plasma-filled receptacle 11 is positioned so as to be supported within the corresponding aperture 41 in said upper leg. Advantageously the upper leg is cut away or slightly shorter than the lower leg, to conveniently accommodate and support the clamping member 17 and the reduced neck portion of the device, and is also provided with suitable cut-away portions (not shown) to permit the free storage of the convolutions of the discharge tube 26. Obviously the receptacles 11 and 12 will tend to conform to the surfaces upon which they are supported, within the limits of flexibility of the plastic material from which the container is manufactured. The package thus described may be manufactured with particular economy, securely supports the container therein against lateral displacement and eliminates any requirement for excessive care in handling and shipment. Such a package may be dropped from the air, and parachuted into inaccessible areas, with substantial assurance that no damage to contents will occur.

In practice, when it is desired to restore the dried plasma for transfusion or other purposes, the clamp 17 is fractured and the tie member 22 removed from the neck portion 13. The receptacles 11 and 12 are then gently agitated or manipulated until the dried plasma is completely dissolved, free passage of fluid between the receptacles being had by reason of the tubular neck portion.

Upon completion of the restoration of the plasma, the clamp 30 is removed from the discharge tube 26, the cap or casing 35 is removed from the intravenous needle 32, and sufficient restored blood derivative or substitute, as the case may be, is permitted to pass through the discharge tube to vent all air therein. The tube 26 is then compressed, within the V-slot or aperture 45 of the secondary clamp 44, to shut off the flow of fluid, and the intravenous needle 32 is inserted into the patient. The tube is then released from constriction within the secondary clamp and the transfusion may be administered without loss of time. If desired, the device may be suspended utilizing the grommet 38; however, it has been found that such suspension is neither necessary nor particularly advantageous, another method comprising folding the empty upper receptacle or portion 11 about the filled lower receptacle 12 and inserting or positioning the device beneath the buttocks or other anatomical portion of the patient. Such practice is especially sound under conditions of extreme sanguination or where the patient is suffering from circulatory depression, or the like, where it is necessary to complete the transfusion with unusual rapidity.

It will be readily understood that, with the novel device described herein, there is no possibility of contamination of contents by air or outside influence and that the only time consuming portion of the procedure, other than that required for the transfusion per se, is that required

for restoration of the plasma, a task made particularly simple by reason of the flexibility of the material from which the container is manufactured which lends itself with especial ease to manual manipulation.

There has been illustrated in Fig. 14 of the drawings a modified form of strainer element 42, which may be substituted for the strainer 29 or used in addition thereto. The function of these strainers is to insure that no particles of dried plasma may enter into the discharge tube 26 to either clog the filter or affect the rate of delivery of fluid through the tube. In this modified form of strainer, a substantially cup-shaped member is cemented or otherwise secured in place at the lower extremity of the upper receptacle 11 and immediately adjacent the reduced neck portion of the device. This strainer is provided with a plurality of particularly small apertures 43 which will freely admit of the passage of distilled water from the receptacle 12 to the receptacle 11 but will effectively prevent particles or clumps of undissolved dried plasma from passing therethrough. Moreover, the nature of the plastic material from which the device is formed is such that pressure upon the receptacle 12, during the manipulation thereof, incidental to the restoring of the plasma, will force distilled water from one receptacle to the other, effectively assisting the rate of restoration.

It will be obvious to those skilled in this art that air is not admitted to the apparatus during the intravenous administration of the contents, the collapsible nature of the receptacle eliminating any necessity for the utilization of air to replace fluid during the dispensing thereof. Further, since plastics of the character with which we are here concerned may be either largely transparent or translucent, as desired, passage of fluid from the receptacle is susceptible of visual determination.

The novel apparatus of the present invention is particularly light in weight and occupies a minimum of space. It may be readily packaged without requiring special cushioning of any sort and thus eliminates transportation problems. During use, as well as during restoration of the plasma, no changes in the relationship of the parts are required since it is, essentially, an integral structure. It is fully susceptible of efficient operation without requiring additional equipment of any character, and reduces the time required for preparation, prior to transfusion, a major extent.

Further, the novel method of administration, utilizing the body of the patient as a weight or anchor, advantageously decreases the time required for transfusion, an element of particular importance often times in direct ratio to the critical condition of the patient.

It will be obvious to those skilled in this art that various changes may be made in the invention without departing from the spirit and scope thereof and therefore the invention is not limited by that which is illustrated in the drawing and described in the specification but only as is indicated in the appended claims.

What is claimed is:

1. An apparatus for administering blood plasma comprising an elongated flexible container formed from a single sheet of transparent plastic material doubled upon itself to provide a closed bottom and an open mouth, one wall of said mouth extending beyond the other to provide an overlapping extremity for sealing said mouth, suspension means connected with said overlapping sealed portion, the longitudinal edges of said container being united, said container having a reduced central portion providing communication between opposed bag-like receptacles, the receptacle adjacent the sealed mouth adapted to contain dried plasma and the receptacle adjacent the closed bottom adapted to receive distilled water, frangible clamping means on said reduced central portion whereby removal of said clamping means will provide fluid communication between said opposed receptacles to restore said dried plasma to liquid form, a discharge tube communicating with the interior of said container at the closed bottom thereof to permit the dispensing of restored plasma from said apparatus, clamping means on said discharge tube to prevent entry of fluid into said tube prior to the dispensing operation, and strainer means in said container to prevent any particles of dried plasma from entering into said discharge tube.

2. An apparatus for administering blood plasma comprising an elongated flexible container formed from a single sheet of transparent material doubled upon itself to provide a closed bottom and an open mouth, one wall of said mouth being provided with an extended extremity for sealing said mouth, the longitudinal edges of said container being united, said container having a reduced central portion providing communication between opposed bag-like receptacles, one receptacle adapted to contain dried plasma and the other receptacle adapted to contain distilled water, frangible clamping means on said reduced central portion whereby removal of said clamping means will provide fluid communication between said opposed receptacles to restore said plasma to liquid form, a discharge tube communicating with the interior of said container at the closed bottom thereof to permit the dispensing of restored plasma from said apparatus, and clamping means on said discharge tube to prevent the entry of fluid into said tube prior to the dispensing operation.

3. An apparatus for administering blood plasma comprising an elongated flexible container manufactured from a single sheet of transparent material bent upon itself to provide a closed bottom and an open mouth, one wall of said mouth being provided with an overlapping extremity for sealing said mouth, the longitudinal edges of said container being united, said container having a reduced central portion providing communication between opposed baglike receptacles, one receptacle adapted to contain dried plasma and the other receptacle adapted to contain distilled water, clamping means for said reduced central portion whereby removal of said clamping means will provide fluid communication between said opposed receptacles to restore said plasma to liquid form, and a discharge tube communicating with the interior of said container at the closed bottom thereof to permit the dispensing of restored plasma from said apparatus.

4. An apparatus for administering blood plasma comprising an elongated flexible container fabricated from a single sheet of flexible material bent upon itself to provide a closed bottom and an open mouth portion, one wall of said mouth portion being provided with an overlapping extremity for sealing said mouth, the longitudinal edges of said container being united, said container having a reduced central portion providing communication between opposed bag-like

receptacles, one receptacle adapted to contain dried plasma and the other receptacle adapted to contain distilled water, frangible clamping means for said reduced central portion whereby fracture of said clamping means will provide fluid communication between said opposed receptacles to restore said plasma to liquid form, and a discharge tube communicating with the interior of said container at the closed bottom thereof to permit the dispensing of restored plasma from said apparatus.

5. An apparatus for administering blood plasma comprising an elongated flexible container having a reduced central portion intermediate the extremities thereof providing communication between opposed bag-like receptacles, one receptacle adapted to contain dried plasma and the other receptacle adapted to contain distilled water, frangible clamping means for said reduced central portion whereby fracture of said clamping means will provide fluid connection between said opposed receptacles to commingle said dried plasma and distilled water restoring said plasma to liquid form, a discharge tube communicating with the interior of one of said receptacles to permit the dispensing of restored plasma from said apparatus, and clamping means on said discharge tube to prevent entry of fluid into said tube prior to dispensing therefrom.

6. An apparatus for administering blood plasma comprising a flexible container provided with a closed bottom and an open mouth portion, the side walls of said container being reduced intermediate the extremities thereof to provide two bag-like receptacles having a tubular connecting portion therebetween, one receptacle adapted to contain dried plasma and the other receptacle adapted to contain distilled water, fluid connection between the two receptacles being had through said tubular connecting portion, an overlapping portion on one wall of said mouth portion for sealing said mouth, frangible clamping means for said connecting portion to prevent the commingling of the contents of said receptacles, whereby rupture of said means will permit the combining of said dried plasma and said distilled water to restore said plasma to liquid form, and a discharge tube communicating with one of said receptacles to permit the dispensing of restored plasma from said apparatus.

7. An apparatus for administering blood plasma comprising an elongated flexible container, frangible clamping means engaging said container to provide opposed bag-like receptacles, one receptacle adapted to contain dried plasma and the other receptacle adapted to contain distilled water, fluid communication between said receptacles for restoring said dried plasma to liquid form being had by fracture of said clamping means, and a discharge tube communicating with the interior of said container to permit the dispensing of restored plasma from said apparatus.

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