

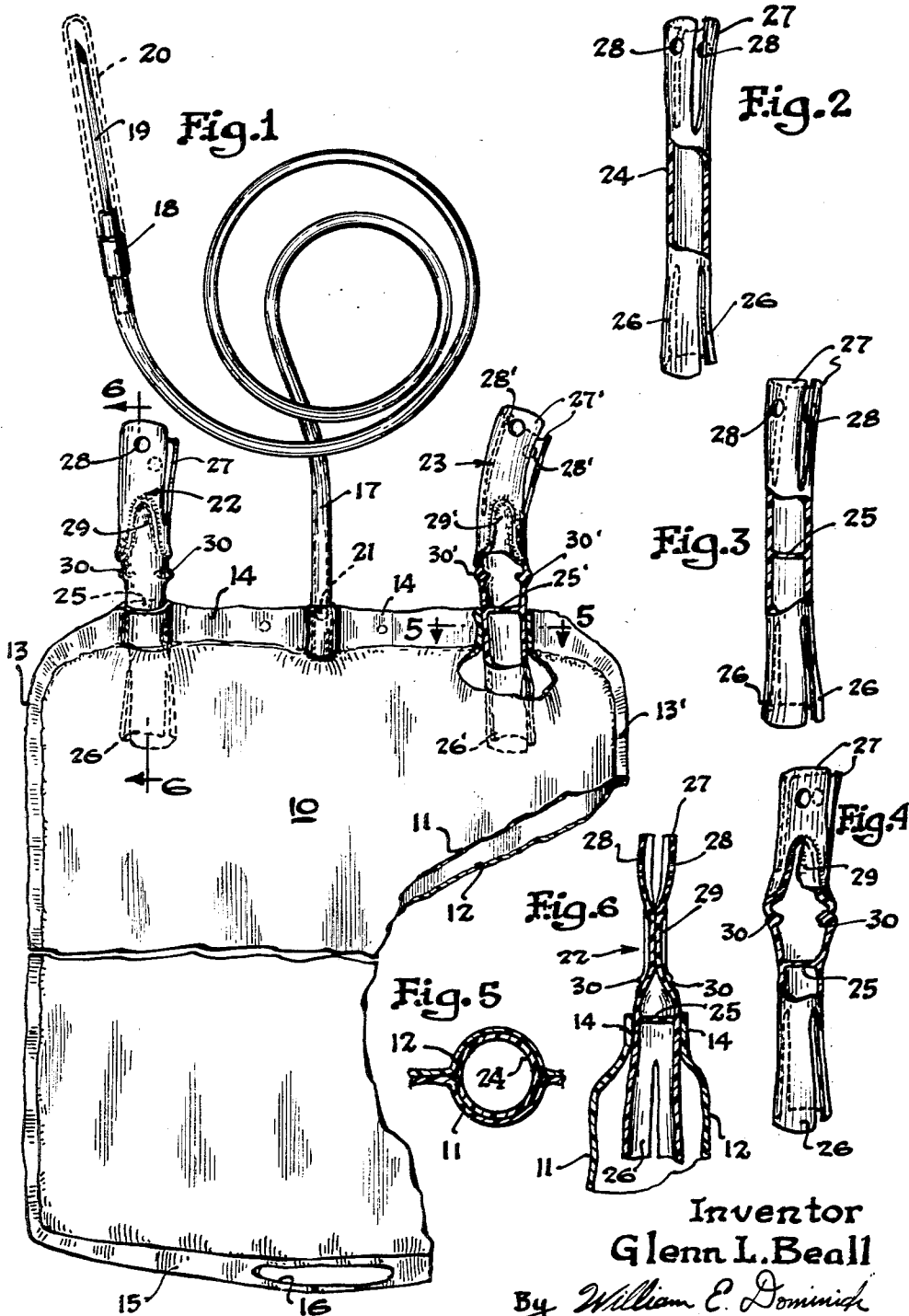
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CONTAINER

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CONTAINER

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The invention relates generally to an improved container and more particularly to an improved flexible fluid container having sealed tubular passageways communicating with the interior thereof and integrally formed therewith.

The present invention relates particularly to equipment for receiving, storing, and dispensing fluids of the general type, including whole blood, blood plasma, glucose solution and like fluids which are commonly administered parenterally. In equipment of the foregoing type in which whole blood is stored, for example, it is important that the stored blood be as readily accessible from the container as possible. In many instances wherein flexible containers are used to store blood, difficulties are encountered in withdrawing the blood from the container. It is standard procedure in withdrawing blood from a flexible container to provide some means for entry of a cannula or the like into the storage container and conveying the blood through a length of tubing to the patient. It is also standard procedure to provide the storage container with more than one passage means so that any desired fluid such as glucose solution and the like can be mixed with the whole blood simultaneously at the time of administration or to allow for the administration of a portion of the contents thereof through one of said passage means while preserving the remainder of said contents for subsequent administration through one of the other said passage means.

It is of prime importance that the entry means or passage be kept sterile at the site of puncture by the inserted cannula. It is also important that at the time the cannula is inserted into the container that it not puncture the walls of the container. Still another requirement is that the entry passage be provided with walls or the like which firmly engage the piercing cannula in order to provide a tight seal and prevent leakage. Of even greater importance is the problem of providing a flexible container with the means of entry or passage means having the prescribed characteristics and to do so at low cost.

It is therefore an object of the present invention to provide a fluid container at low cost with a one-piece passage means communicating with the interior of the container which will facilitate safely administering the contents of the container.

It is a further object of the present invention to provide a fluid container with one-piece passage means communicating with the interior of the container which will provide a sterile site of puncture for an inserted cannula.

It is still a further object of the present invention to provide a fluid container with inlet and outlet passageways of simple construction which will prevent leakage of the contents thereof.

The foregoing objects and other advantages of the present invention will be readily appreciated by reference to the following detailed description when considered in conjunction with the accompanying drawing shown in the embodiment of the invention wherein:

Figure 1 is a side elevation fragmentary view of the flexible container of the present invention partially in vertically sectional view.

Figure 2 is a perspective view of the passage means of Figure 1 partially in vertical section in its first stage of manufacture.

Figure 3 is a perspective view of the passage means

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of Figure 1 partially in vertical section in its second stage of manufacture.

Figure 4 is a perspective view of the passage means of Figure 1 partially in vertical section in its third stage of manufacture ready for integrally joining with the flexible container walls.

Figure 5 is a horizontal sectional view along line 5—5 of Figure 1.

Figure 6 is a vertical sectional view along the line 6—6 of Figure 1.

In the embodiment of the invention illustrated in the foregoing figures, the container body section 10 is comprised of two sheets 11, 12 of flexible, chemically inert and physically non-porous plastic material such as plasticized polyvinyl chloride, which are sealed together by applying heat and gentle pressure to form cross-weld sections at the lateral edges 13, 13' as well as at the upper or top edge 14 and at the bottom edge 15 in which is cut supporting means 16. Disposed along the upper edge of body section 10 and sealed therein is an intake tube 17 which has its innermost end integral with the wall of the said body section 10 and has attached to the outer end thereof by means of needle hub 18, a collection needle 19, which after being sterilized is enclosed in a protective casing 20. Located within the end of intake tube 17, at a point where tube 17 is sealed to the body section 10 is a valve ball 21. Disposed also along the upper edge 14 of section 10 and on opposite sides of tube 17 are passage means 22 and 23 communicating with the interior of the container body which are sealed therein and extend outwardly and inwardly from the top edge 14 of the body section 10.

The passage means 22 and 23 are comprised preferably of a length of tubing 24 (as best shown in Figure 2) which is of similar material as the body section 10 having pierceable diaphragms 25 and 25' respectively, positioned intermediate the ends thereof. The lower ends of passage means 22 and 23 are split diametrically to provide a pair of oppositely disposed protective flaps 26 and 26' respectively. The upper ends of the passageways 22 and 23 are also split in a similar manner to provide a pair of oppositely disposed pull tabs 27 and 27' respectively. Positioned near the upper edges of the pull tabs 27 and 27' are pairs of hanging slots 28 and 28' respectively. Spaced inwardly from the upper end of each of the passage means 22, 23 and above the diaphragms 25, 25' respectively is an inverted U-shaped air and water impervious seal 29, 29' respectively extending completely across and sealing the passage means 22, 23 respectively, and extending above the lower ends of the said pull tabs 27, 27'. Located immediately inwardly from U-shaped seals 29, 29' and along the opposite lateral edges of passage means 22 and 23 are crimps 30 and 31' which are formed by sealing together in a transverse manner, the edges of the tubing of the respective passage means.

The passage means of this invention are essentially of a one-piece construction and are conveniently made in three stages of operation as illustrated in Figures 2, 3 and 4 of the drawing. As shown in Figure 2, a length of tubing 24 of the same material as body section 10 is diametrically split inwardly a short distance from both the upper and lower ends to provide a pair of oppositely disposed pull tabs 27 at the upper end and a pair of oppositely disposed protective flaps 26 at the lower end thereof. During this first stage of operation, two oppositely disposed holes are placed in the tabs 27 to provide a pair of hanging slots 28. In the next stage of manufacture as shown in Figure 3, a diaphragm 25 of penetrable thickness is formed intermediate the ends of tubing 24 by the melting under slight pressure, a pellet composed of the same material as body section 10 at a point within the tubing 24 intermediate the ends thereof so that it is flattened and integrally joined

with the walls of tubing 24. In the final stage as shown in Figure 4 the tubing is heated and semiflattened under pressure to provide an inverted U-shaped seal 29 spaced inwardly from the upper edge of tubing 24. Immediately inwardly from the lower end of seal 29 are crimps 30 which are formed by sealing the lateral edges of the tubing in a transverse manner.

When the two passage means 22 and 23 are in the form described in Figure 4, they are placed between the upper edges of the flexible plastic sheets 11, 12 in such a position that diaphragm 25 is opposite the uppermost edges of sheets 11, 12. With the said passage means in the described position and the intake tube 17 also being placed between the upper edges of sheets 11, 12 in such a position that its innermost end is in communication with the inside of body section 10, sheets 11, 12 are placed in juxtaposition and the edges are sealed together by applying heat and gentle pressure to form cross-weld sections defining the top or upper edge 14, the lateral edges 13, 13' and the lower edge 15 of the container. Because of the one-piece construction of the passage means only a double thickness of material need be sealed as is shown in Figure 5 wherein 11 and 12 are the front and back walls of body section 10 and 24 is the tubing from which the passage means are constructed.

To collect blood from a donor, container body section 10 is hung in an upright position by means of hanging slots 28 and 28'. The collection needle 19 is removed from its protective casing 20 and inserted into the vein of the donor. The blood then enters container body section 10 by means of intake tube 17 when valve means 21 is displaced from the end of tube 17. When container 10 is filled, intake tube 17 can be cut off a short distance above the container and sealed by means of heat and gentle pressure or otherwise closed. The blood is then stored in container 10 until needed for administration. At time of administration, container 10 is hung in an inverted position by means of a supporting slot 16. The tabs 27 of passage means 22 are then pulled laterally, rupturing the inverted U-shaped seal 29 and thereby exposing the sterile diaphragm 25. A cannula, which has a length of tubing and a needle attached thereto for the conveyance of blood to a recipient, is pushed through diaphragm 25 and consequently into the inside of body section 10. As the cannula is inserted through passage means 22 the walls of body section 10 are protected against puncture by means of protective flaps 26. At the same time the cannula is piercing diaphragm 25, it is frictionally engaging crimps 30 which thereby form a tight seal and prevent any leakage of blood or accidental dislodgement of the cannula. Passage means 23 is operated in a similar manner as that described for passageway 22 when, for example, supplemental medication must be added simultaneously at the time of administration of the blood, or in the alternative, when only a portion of the contents of the container is administered and the remainder of the contents are desired to be preserved and to be administered at a subsequent time.

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

I claim:

1. A container for fluids comprising in combination; a flexible walled body section of chemically inert and physically non-porous plastic, said body section having integrally affixed thereof at least one passage means communicating with the interior of the body section, said passage means comprising a short length of plastic tubing having a penetrable sealing diaphragm disposed intermediate the ends of said tubing, the outer end of said tubing being slit diametrically a short distance inwardly toward said diaphragm to provide oppositely disposed

pull tabs with the inner end of each said tab being spaced outwardly from said diaphragm, and said tubing also having a protective seal disposed across said tubing intermediate said diaphragm and the outer end of said tubing, with the said protective seal extending above the lower end of said tab.

2. The container of claim 1 wherein the body section and passage means are formed non-toxic of a plasticized polyvinyl chloride composition.

3. A container for receiving, storing and dispensing fluids comprising in combination; a flexible walled body section of chemically inert and physically non-porous plastic, said body section having integrally affixed therein and communicating with the interior thereof a plastic inlet tube and at least one additional passage means extending inwardly and outwardly of the said body section comprising a length of plastic tubing having a penetrable plastic diaphragm disposed intermediate the ends of said tubing, a diaphragm protecting seal disposed across said tubing intermediate said diaphragm and the outer end of said tubing, said tubing also having its outer and inner ends split in an oppositely disposed manner to provide a pair of oppositely disposed pull tabs at the outer end thereof and protective flaps at the inner end, within said body section.

4. A container for receiving, storing and dispensing fluids comprising in combination; a flexible walled body section of chemically inert and physically non-porous plastic, said body section having integrally affixed therein a plastic inlet tube and at least one additional passage means extending inwardly and outwardly of the said body section comprising a length of plastic tubing having a penetrable plastic diaphragm disposed intermediate the ends of said tubing with an inverted U-shaped diaphragm protecting seal disposed across said tubing between the said diaphragm and the outer end of the said tubing, said tubing having disposed intermediate said diaphragm and said seal a plurality of oppositely disposed crimps, which are positioned along the lateral edges of said tubing, said length of tubing also having its outer and inner ends split diametrically to provide pull tabs at the outer end and protective flaps at the inner end thereof, said tubing being positioned in said body section in such a manner that said diaphragm is adjacent with the outer edges of said body section.

5. A container for receiving, storing and dispensing fluids comprising in combination; a flexible walled body section of chemically inert and physically non-porous plastic, said body section having integrally affixed therein a plastic inlet tube and two additional passage means comprised of a length of plastic tubing disposed on opposite sides of said inlet tubing, said tubing having a penetrable plastic diaphragm disposed intermediate the ends of said tubing with an inverted U-shaped diaphragm protecting seal disposed across said tubing between the said diaphragm and the outer end of said tubing, said tubing also having disposed intermediate the said diaphragm and the said seal two oppositely disposed crimps which are positioned along the lateral edges of said tubing, said tubing also having its outer and inner ends split diametrically to provide for a pair of oppositely disposed pull tabs at the outer end and protective flaps at the inner ends thereof, said pull tabs having oppositely disposed holes in the ends thereof and said tubing being positioned in said body section with the said diaphragm being adjacent to the outer upper edge of the said body section.

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