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BLOOD TRANSFUSION APPARATUS

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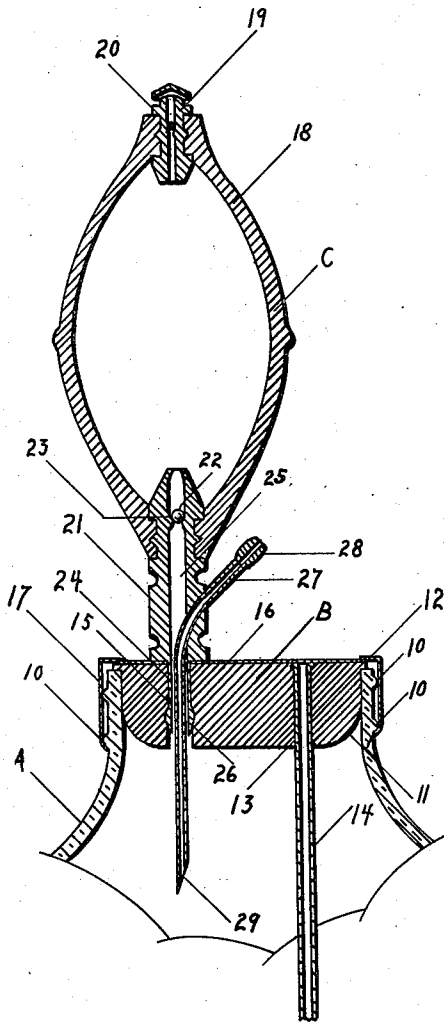


Fig. 1

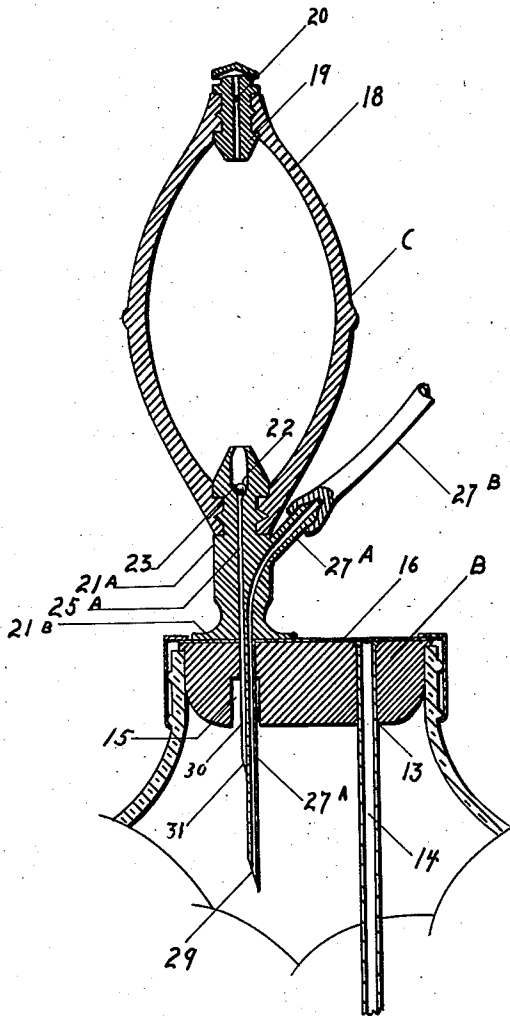


Fig. 2

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BLOOD TRANSFUSION APPARATUS

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3 Claims. (Cl. 128—214)

This invention relates to blood transfusion apparatus. It will be found that the apparatus may be applied to other uses.

Blood transfusion apparatus now commonly employed usually comprises a container equipped with a handle and a head provided with means for sealing the end of the container. Apparatus of this type is shown in my application Serial No. 155,133, for Blood transfusion apparatus.

An object of the present invention is to provide an extremely simple mechanism which may be employed without a special head or handle fitting and which may be used in conjunction with a sealed and sterile container. A further object is to provide transfusion means which may be readily applied to a sealed container having flow passages through a sealing plug closed by a thin resilient disk, or an air-tight plug may be used to be changed when the blood is dispensed. Other specific objects and advantages will appear as the specification proceeds.

The invention is illustrated, in preferred embodiments, by the accompanying drawing, in which—

Figure 1 is a vertical sectional view of apparatus embodying my invention applied to a sealed container, the container being broken away; and Fig. 2, a view similar to Fig. 1, but showing a modified form of structure.

In the illustration given, A designates a container; B a closure for the neck thereof; and C the evacuating apparatus.

The container A may be of any suitable structure or type. It is usually provided with a band and bail (not shown) at the lower end thereof, so that the container can be inverted for the dispensing of blood or other fluid after it has been filled. The container is provided with threads or beads 10.

The plug B is preferably formed of a resilient material, such as rubber, having a lower rounded corner portion 11 and an upper flared lip portion 12, the lip portion 12 resting upon the top of the container neck.

The plug B is provided with a passage 13 adapted to receive a glass tube 14, the purpose of the tube being to permit air to pass toward the side of the bottle opposite the plug when the bottle is inverted. Plug B is also provided with an outlet flow passage 15.

Both of the passages 13 and 15 are closed normally by a thin resilient sealing disk 16, which may be of rubber or other suitable material. Normally the seal 16 is held in position by the vacuum within the container. The edges of the

seal 16 are further secured in place by a clamping ring 17, which extends below the head 10 and has a top horizontal flange extending over and engaging the seal 16.

The evacuating apparatus C includes a bulb 18 of rubber or other suitable elastic material. The upper portion of the bulb is equipped with a fitting 19 provided with a ball 20 adapted to seat in a valve seat, the valve seat and ball permitting air to escape from the bulb 18, but preventing the entrance of air therein. The lower end of bulb 18 is closed by a fitting 21.

The fitting 21 is provided at its upper end with a ball 22 received within a valve seat 23, the valve seat and ball cooperating in a well known manner to permit air to enter bulb 18, but to prevent air from escaping downwardly through the fitting 21 to escape into the container.

The fitting 21 is provided with an integral extension 24 which extends into the passage 15 of plug B. A passage 25 extends all the way through the fitting 21 and the extension 24 so as to establish communication between the interior of the bottle and the interior of bulb 18. It will be noted that the lower end of the fitting extension 24 is tapered inwardly at 26, thus facilitating the insertion of the extension into passage 15.

In order to introduce blood or other fluid into the container in response to the vacuum therein created, I provide a rigid tube 27 provided with an end enlargement 28 adapted to receive the end of a rubber tube leading to a hollow needle (not shown) as in the usual practice. The tube 27 extends through an opening in the side wall of the fitting 21 and then is turned downwardly into the passage 25. The reduced lower end of the tube 27 extends below the end of the extension 24 and is provided with an inclined or pointed end 29.

The structure shown in Fig. 2 is identical with that shown in Fig. 1, except that the tube 27^a, to which the rubber tube 27^b is attached, does not extend through a central extension provided by the fitting 21^a. Instead, it extends through an opening and then downwardly below the fitting 21^a.

The fitting 21^a is provided with a separate tube 30 which extends below the fitting and is soldered to the lower extension of the tube 27^a. To facilitate the insertion of the tube 30, the lower end thereof is cut away or inclined at 31. With this structure, there are thus two separate passages which run side by side, one being the passage through the tube 27^a and the other being the pas-

sage 25^a through the fitting 21^a and extended tube 30.

Thus the only difference between the structure shown in Fig. 1 and that shown in Fig. 2 is that the passage for the liquid in Fig. 1 extends centrally within an enlarged hollow passage for the air, while in Fig. 2 the liquid passage extends side by side with the air passage, the two tubes being united by welding, soldering, etc.

In the operation of the apparatus, a sterile container, which may be slightly under vacuum if desired, is provided. The two passages 13 and 15 are closed by the resilient seal 16, the seal 16 being also held in place by the clamping collar 17. Normally an outer cap is provided which extends about the member 17 and over the seal 16, the cap being removed when the container is to be used. Or as tubes 27^a and 30 may be inserted through solid rubber, no openings such as 13 and 15 need be provided, and a separate dispensing cork utilized later.

The apparatus C is now placed in position for drawing a partial vacuum within the container A. In this operation, the fitting 21 is grasped and pressed downwardly so as to force the pointed tube 29 and extension 28 through the resilient sealing member 16 and into the passage 15 as illustrated in Fig. 1. In the same operation, with the structure shown in Fig. 2, the double needle is forced through the solid rubber cork B at any appropriate spot, preferably at a thin area in B, leaving openings 13 and 15 to be sealed by the rubber diaphragm. By this means, when the blood has been drawn into container A, the apparatus C may be withdrawn and container A will be automatically sealed.

The top of the plug B may be provided with an X or other mark directly above the passage 15. Thus when the needle is passed through this solid portion, it enters the recess or passage 15.

As the bulb is pressed and released, air is expelled from the interior of the container through the passage 25 or 25^a, thus reducing the pressure within the container. The reduced pressure causes the blood to flow from the needle and through the tube into the fitting 27 or 27^a and thence downwardly into the container. Normally an anti-coagulant is maintained within the container, having been placed therein and sealed in a prior operation. The anti-coagulant is mixed with the blood by moving the container in a circular path as the blood flows. It will be noted that the walls of the bulb after compression expand slowly, thus drawing a slow vacuum and making it unnecessary for the operator to continuously operate the bulb.

With apparatus of this character, it is found that a desired low vacuum can be obtained which does not injure the blood corpuscles or structure and which permits the operator to maintain a nice control of the blood flow. After the blood has been withdrawn, the apparatus C may be removed.

The seal 16, which is of very elastic material, such as pure rubber, permits the members 24 and 27 to be withdrawn without disturbing the seal, the opening caused by the piercing of the seal 16 being instantly closed by the elasticity of the material. Since there is practically no vacuum within the container at this point, there is no tendency for air to enter through the seal 16, and a sterile closure is maintained. In the case of the modification shown in Fig. 2, the needles 27^a and 30 are forced through both dia-

phragm 16 and the solid rubber B so that a vacuum-tight seal is obtained in container A when the apparatus C is withdrawn. The container A may then, if desired, be placed in a refrigerator and stored for some time until it is desired for use.

In dispensing the blood from the container A, the container is inverted as in the usual practice, the outlet tube being inserted within the passage 15 and the tube extending to the usual transfusion needle (not shown). In view of the well known use of the apparatus for the dispensing of blood, a further detailed description is unnecessary.

It will be noted that the apparatus is extremely simple, that it may be employed with a sterilized and sealed container having therein an anti-coagulant, that it permits the ready withdrawal of blood under a controlled low vacuum which does not injure the delicate blood structure, and that upon removal of the apparatus a container is provided for storage or for ready transfusion of the blood.

While in the foregoing description I have set forth a detailed structure for the purpose of illustrating the invention, it will be understood that such details may be widely modified without departing from the spirit of my invention. I wish it to be understood that I do not desire to be limited to the exact details of construction shown and described, for obvious modifications will occur to a person skilled in the art.

I claim:

1. Suction apparatus adapted to be used with a container having an open neck, a resilient sealing plug in said neck, said suction apparatus consisting of a body having a flange adapted to rest upon said resilient plug, a double needle provided with a sharp point carried by said body, said needle being adapted to be thrust through said plug, said body providing a pair of passages communicating through said double needle with the interior of said container, evacuating means communicating with one of said passages in said body, and a flow line communicating with the other of said passages in said body, said resilient plug hermetically closing the opening occupied by said needle after the same is withdrawn.

2. Suction apparatus adapted for use with a container provided with an open neck and with a resilient sealing plug in said neck, said suction apparatus comprising a fitting body having two passages extending therethrough, a double needle carried by said body, each of the passages therein communicating with the passages of said body, said needle being adapted to be thrust through said resilient plug to provide communication between said passages with the interior of the container, said fitting body providing a connection member through which a tube may be attached for communication with one of said passages, and evacuating means carried by said body and communicating with the other of said passages, said resilient plug hermetically closing the opening occupied by said needle after the same is withdrawn.

3. Suction apparatus for use with a container equipped with a neck closed by a resilient sealing plug, said plug having at least one opening therethrough and a resilient seal over said plug, said suction apparatus comprising a fitting body having two passages therethrough and a double needle, the two passages of which communicate with said body passages, said needle having sharpened points permitting it to be thrust through the resilient body of said plug and said 75

fitting body having a flange adapted to rest upon
said seal over said plug, said fitting body having
a connection member communicating with one of
said passages and adapted to receive a tube, and
5 evacuating means carried by said fitting body and
communicating with the other of said passages,

said resilient plug and resilient seal closing the
opening formed by said double needle immedi-
ately upon its withdrawal to provide a hermeti-
cally sealed container.

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