Nov. 5, 1957 A. M. BUTKUS ET AL 2,812,117

VENOCLYSIS APPARATUS

Filed March 29, 1955

Fig. 1

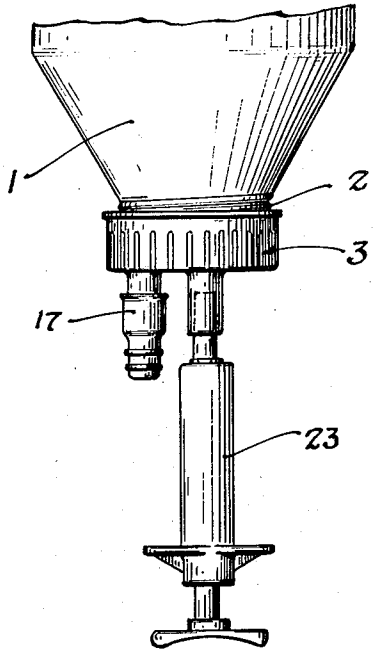


Fig. 2

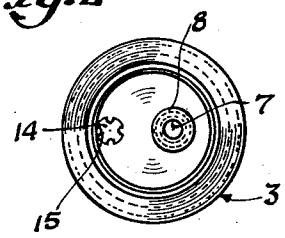
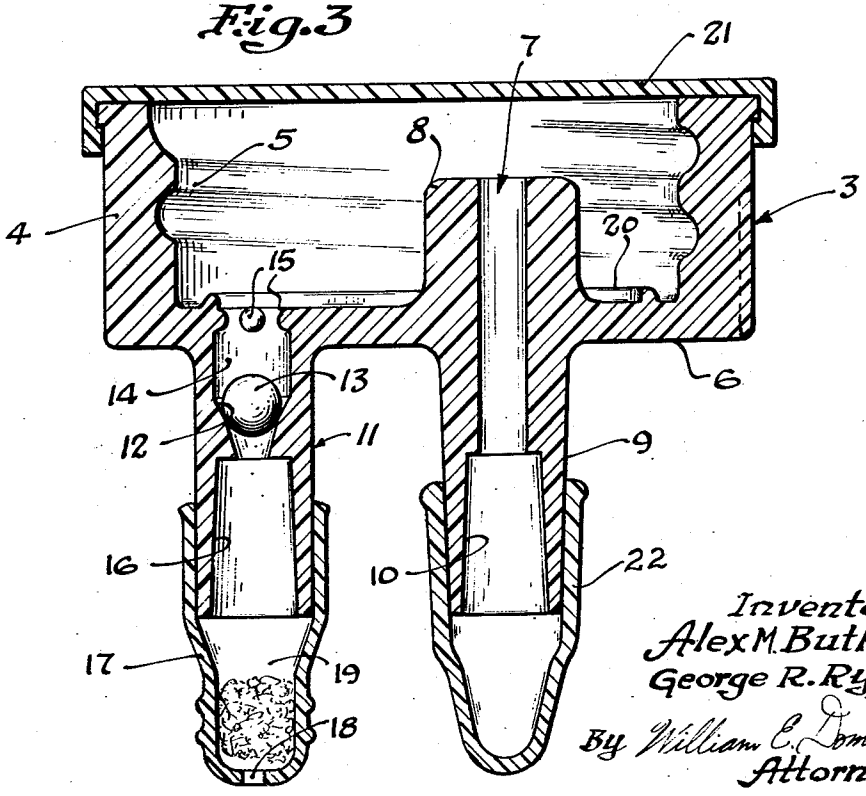


Fig. 3



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VENOCLYSIS APPARATUS

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2 Claims. (Cl. 222—189)

The present invention relates to an improved apparatus for the administration of parenteral liquids and more particularly to an improved closure means for a container of liquids which are administered by means of a hypodermic syringe.

In accordance with modern hospital procedure it has become common practice to prepare stock solutions of medicinals which can be used for a large number of patients. The containers of stock solution of the above type are normally provided with a penetrable resealable closure or rubber stopper through which a hypodermic needle is inserted when it is desired to withdraw an aliquot of the solution into a hypodermic syringe. However, because of the dangers of contamination of the solution and the introduction of particles which might cause embolyson as a result of the coring of the stopper by repeated insertion of a hypodermic needle through the stopper, in addition to the possibility of inadequate resealing of the stopper after withdrawing the hypodermic needle, the use of a penetrable closure on a container for a stock solution of a medicinial has many objectionable features which should be corrected.

It is therefore an object of the present invention to provide an improved closure means for a medicinal container which substantially reduces contamination of the medicinal contents of the container.

Another object of the invention is to provide a simple, safe, and economical means of access to the interior of the said container.

Other objects of the present invention will be apparent from the detailed description and claims to follow.

In the drawing

Figure 1 is a side elevation view of the closure cap means operatively mounted on a medicinal container showing the manner in which a hypodermic syringe coacts therewith.

Figure 2 is a planned view of the closure means shown in Figure 1.

Figure 3 is a vertical sectional view of the closure cap shown in Figure 1 with sealing caps mounted thereon.

The improved apparatus of the present invention as illustrated in the drawing is shown operatively associated with a container for intravenous liquids as represented by a container or glass bottle **1** in an inverted position with the neck **2** thereof projecting downwardly. The neck **2** of the said container is provided with suitable external screw threads. The closure cap means **3** which is preferably formed of a stable plastic material, such as polyethylene plastic, is provided with a preferably cylindrical body section **4** having internal screw threads **5**, said threads **5** being operatively engageable with the external threads on the neck **2** of the bottle **1**.

The end wall **6** of the cap **3** is provided with a discharge passage **7** extending therethrough. The wall section **8** of the upper end of the said passage **7** extending inwardly above the inner surface of wall **6** so that the upper end of passage **7** is elevated above the end wall **6**, thereby providing an area in which sedimentation may collect and

thereby reduce the danger of clogging the said passage **7**. The enlarged wall section **8** of passage **7** also provides a seat for a filter element (not shown) which extends upwardly into the interior of the container **1** and which can be used when considered necessary.

The inner wall surface of the outwardly extending wall section **9** defining the passage **7** provides thereof an inwardly tapering surface **10** which is suitable for receiving a male Luer taper element, as provided on the hub of a standard hypodermic syringe.

Spaced laterally from passage **7** on the wall **6** of the cap member **3** is a tubular vent section **11** extending outwardly from the lower surface of the end wall **6**. Intermediate the ends thereof the tubular section **11** is provided with an inwardly tapering restricted wall section **12** which forms the seat of a ball check valve member **13**. Spaced upwardly from said tapered section **12** is a chamber **14** of slightly greater diameter than said taper section **12** into which is inserted the ball check valve member **13** which completes the ball check valve assembly. The ball valve member **13** is retained in the chamber **14** by means of the inwardly extending lugs **15** at the upper end of the chamber **14**. The lower end of tubular section **11** is provided on the inner surface thereof with inwardly tapering wall portions **16** which are suitable for receiving a male Luer taper element. Mounted on the outer surface of the lower end of the tubular section **11** is a cap **17** which has a passage **18** extending therethrough at the outer end thereof through which air passes and which also has a chamber **19** spaced inwardly from the outer end which receives a small wad of cotton or other filtering material so that air passing therethrough is rendered sterile and free of dust. The inner surface of end wall **6** is also preferably provided with a raised sealing ring **20**.

In packaging and handling of the said closure cap **3** prior to mounting on a container, it is preferred to provide the body section **4** with a sealing cover **21** which completely encloses the upper end of the body section and prevents dust and bacteria entering the cap member. Also, as an essential element of the present invention, the lower end of the passage **7** is provided with a sealing means **22** secured in sealing engagement with the wall section **9**, except when a hypodermic syringe is being used to withdraw medicament from the container **1**, which effectively prevents the entry of bacteria or dust and maintains the closure cap **3** in a sterile condition.

In operation, a hypodermic syringe **23** (without needle) having a hub with a Luer taper at the outer end thereof is inserted into the tapered surface **10** of the discharge passage **7** of the closure cap **3** mounted on a medicinal container **1** while the said container is in its normal vertical position.

After the hypodermic syringe hub forms a sealing engagement with the tapered surface **10**, the assembly is thereupon inverted to the position shown in Figure 1 of the drawing. The hypodermic syringe plunger is then moved outwardly, drawing liquid medicinal from the container **1** into the hypodermic syringe. When the desired volume of medicinal has been withdrawn, the medicinal container **1** is then moved into its normal vertical position and the hypodermic syringe removed from the closure cap **3**. Thereafter, the sealing cover **21** and sealing means **22** are replaced on the cap **3** so that the medicinal content of the container is maintained in a sterile condition. The medicinal can then be injected in the usual manner by providing the hypodermic syringe with a suitable hypodermic needle for injection.

While the closure member is preferably made of a plastic material such as polyethylene, it should be understood that other plastics and other materials can be used, among those which are suitable for the present invention

are nylon, polystyrene and polyvinyl plastics, stainless steel, aluminum, rubber and glass. Also, while the specific form of the cap shown in the drawing has the end wall **6**, the discharge passage **7**, and the tubular vent section **11** integral with the body section **4** of the cap, it should be understood that, if desired, these elements can be formed as a separate insert member which can be detachably mounted in a circular opening in the cap in the manner commonly employed in the art. It should also be understood that the Luer taper surface, such as wall portion **16**, can be provided on the exterior of the section so as to fit into a female Luer taper element without departing from the present invention.

Others may readily adapt the invention for use under various conditions of service, by employing one or more of the modifications described, or the equivalent thereof. As at present advised with respect to the scope of our invention, we desire to claim the following subject matter.

1. A fluid dispensing container closure comprising a body section with end wall and upstanding lateral surface provided with means adapted to form a fluid-tight detachable connection with the outlet of a fluid container, a cover member detachably secured to said upstanding lateral surface until such time as the closure is attached to a container outlet and which protects the interior of said body section against contamination, said end wall having a tubular section extending outwardly therefrom with an air filter and valve means associated therewith, a tubular liquid discharge member spaced laterally from the said tubular section which extends outwardly from said end wall, said tubular member having at the outer end thereof an enlarged inner chamber with tapered lateral surfaces adapted to receive in sealing engagement a hypodermic syringe hub, and a sealing cap member mounted on the said tubular member in the absence of a hypodermic syringe hub being in engagement therewith..

2. A fluid dispensing container closure comprising a plastic body section with integral end wall and upstanding lateral surface provided with means of forming a fluid-tight detachable connection with the outlet of a fluid container, said lateral surface adapted to removably support a cover member which is detachably secured thereto until such time as the closure is attached to a container outlet and which protects the interior of said body section against contamination, said end wall having a tubular section extending outwardly therefrom which has associated therewith an air valve means, a tubular liquid discharge member integral with said wall extending outwardly therefrom and spaced laterally from said tubular section, said tubular member having the inner end thereof extending inwardly above the plane of said end wall and having at the outer end thereof an enlarged inner chamber with a tapered lateral surface adapted to receive in sealing engagement therewith a hypodermic syringe hub, and a sealing cap member mounted on the said tubular member in the absence of a hypodermic syringe hub being in engagement therewith.

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