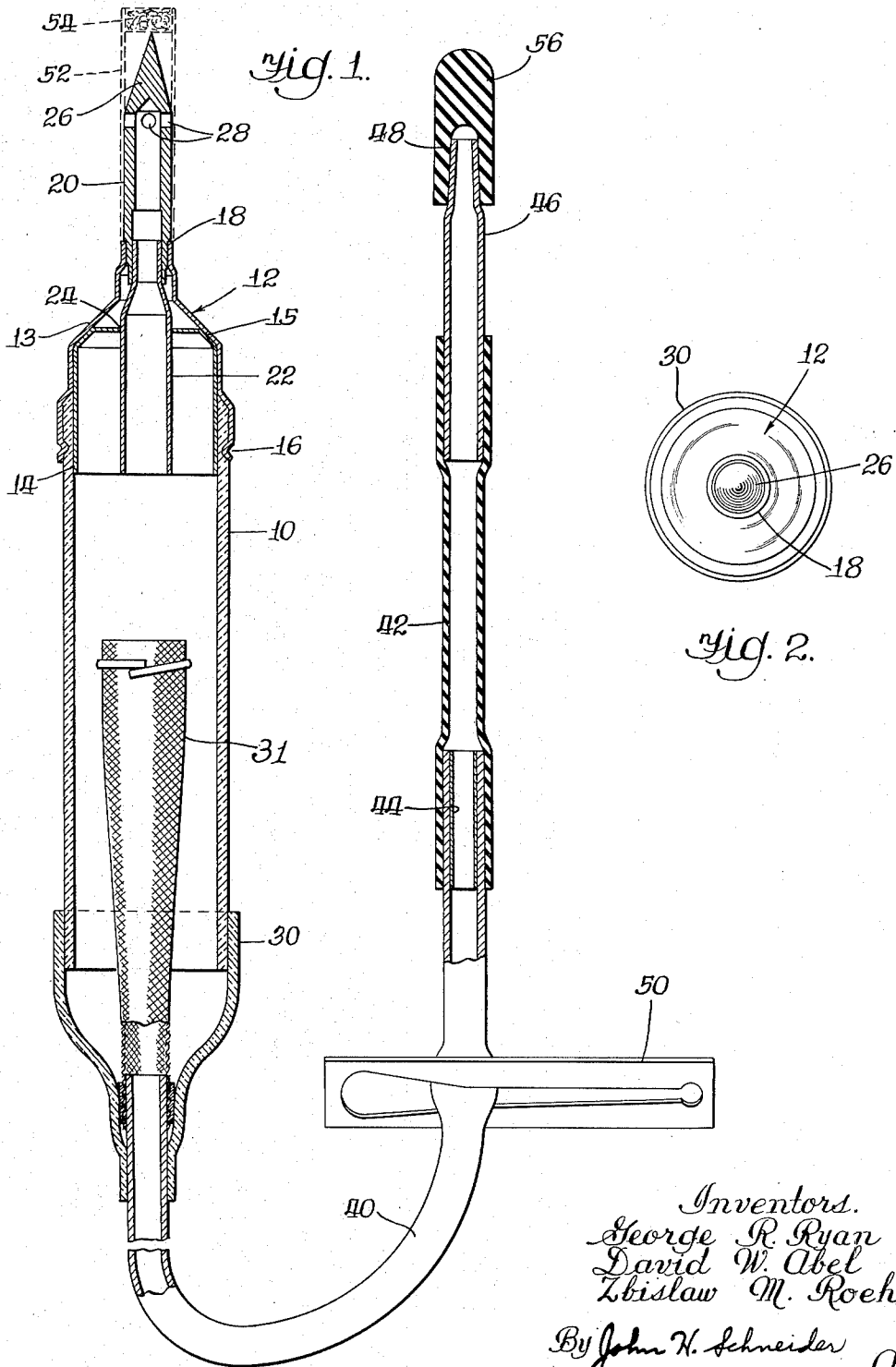


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VENOCLYSIS EQUIPMENT

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VENOCLYSIS EQUIPMENT

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Our invention relates to an improvement in devices for intravenous administration of fluids.

Included among the objects and advantages of the present invention is an improved drip chamber useful in the administration of blood and blood fractions.

In the accompanying drawings:

Fig. 1 is a partial longitudinal section of a device according to the invention;

Fig. 2 is a top elevation of the drip chamber of Fig. 1.

In the embodiment of the invention selected for illustration in Fig. 1, the drip chamber comprises a tubular barrel 10 of transparent, flexible, resilient plastic. The barrel is sufficiently rigid to retain its cylindrical shape under its own weight, but only relatively slight forces are necessary to collapse it. It is sufficiently flexible and resilient to be collapsed and folded repeatedly without material injury or permanent distortion.

The upper end of the barrel is provided with a stepped metal cap 12. The open end of a metal cup-shaped cap 14, having a partially tapered bottom 15, is telescoped inside the barrel. The cup 14 is telescoped in the cap 12, and the tapered bottom 15 abuts the tapered step 13 of the cap. The plastic barrel lies between the cup 14 and the cap 12, and the three parts are retained in position by crimping the cap at the end 16 thereof. The cap has a reduced opening 18 at the apex thereof. A hollow needle 20 is placed, with a force fit, into the opening of the cap. Small drip tube 22 extends from the needle to the bottom of the cup 14, through a hole 24 in the bottom of the cup. The drip tube has a force fit in both the needle and the cup, and is retained in position thereby.

The needle 20 is a hollow metal tube having a closed, sharply pointed conical end 26. A series of small holes 28 in the shank of the needle adjacent the conical point thereof, form the inlet to the needle.

The lower end of the barrel is closed by a plastic reducing cap 30. The reducing cap is secured to the barrel by cementing or by heat sealing thereto. A length of flexible, resilient plastic tubing 40 telescopes into the cap 30 and provides an outlet for the assembly. The tubing is cemented or heat sealed to the cap. A relatively fine filter element 31 is disposed across the end of the tubing 40 so that all fluid passing through the tubing must pass through the said filter. Attached to the opposite end of the tubing is a short length of rubber tubing 42, telescoped and sealed on the end thereof. A short length of

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rigid plastic tubing 44 is inserted into the end of the flexible tubing 40 to prevent the rubber from closing the opening therethrough. A length of rigid nylon tubing 46 is telescoped in the opposite end of the rubber tubing, the tubing 46 has a tapered end 48 to provide a fitting, or adapter, for a hypodermic needle.

The drip chamber is assembled by placing the needle 20 in the opening 18 of the cap 12, and then attaching the drip tube 22 to the needle. The cup 14 is pushed inside the cap so that the shoulder 15 is against the cap shoulder 13 and the drip tube extends through the hole 24 in the bottom of the cup. The barrel is inserted in the slot between the cap and the cup, and the end 16 is crimped to securely hold the barrel.

The tubing 40 is sealed into the reducing cap 30 with a short section thereof extending inwardly. The filter element 31 is placed over the end of tubing 40, and the unit is sealed to the cap. The sealing of the plastic parts may be accomplished by a plastic solvent, a plastic cement, or by heat-sealing the parts together. The reducing cap is placed and sealed over the end of the barrel. A pinch clamp 50 is placed on the tubing, and the rigid tube 44 is inserted into the free end of the tubing. The short length of rubber tubing 42 is slipped over the tubing end, and the needle adapter 46 is telescoped into the rubber tubing.

A cap 56, of rubber or similar material is placed over the end of the needle adapter, and a short length of thin plastic tubing 52 having a wad of cotton 54 in the end thereof is placed over the needle 20. The cotton wad in the protective sleeve 52 is to allow gas and moisture to escape from the unit during sterilization. The unit is sterilized in a steam autoclave, and is then suitably packaged.

For use the pinch clamp is moved to closed position, and the protective tube 52 is removed. The needle is pushed through the stopper of a supply bottle, and the bottle is inverted and hung above the patient. Before inverting, the bottle is supplied with an air vent. The drip chamber barrel is squeezed gently to pump liquid from the bottle into the chamber. The liquid level should be above the top of the filter to prevent air from entering the tubing. When the liquid level is at the desired position the pinch clamp is moved to open position to permit the tubing to fill with the liquid. The veni-puncture is made with a hypodermic needle. The protective cap 56 is removed and the needle adapter attached to the hypodermic needle. The pinch clamp is adjusted

to the desired flow of fluid, as indicated by the number of drops from the drip tube. In the event that additional medication is desired during the infusion, a hypodermic needle may be inserted into the rubber tubing, and the medicament discharged into the stream of fluid going into the patient.

The needle 20 with its relatively small inlet holes 28 acts as a preliminary filter for any large clots or the like which may have formed in the fluid during storage. In the event that the openings of the needle are blocked by large clots, it is only necessary to close the tubing 40 and pump the chamber, by squeezing, to dislodge the clot from the openings.

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

We claim:

1. A disposable venoclysis apparatus for intravenous administration of fluids comprising, in combination: a flexible, resilient barrel; a closure member having a small diameter outlet attached to one end of said barrel; a length of flexible resilient tubing attached to said reduced diameter opening and communicating with the interior of said barrel; filter means covering the small diameter opening; cap means covering the opposite end of said barrel; said cap means comprising a cap member the lower lip thereof having a diameter greater than the said barrel and a telescoping metal cup member of smaller diameter than a portion of the lip of said cap member, whereby said barrel is insertable therebetween and engaged thereby; said cap member having a small diameter opening at the apex thereof; a needle attached in said opening; and a metal drip tube attached to said needle and extending through the bottom of said cup member.

2. A disposable venoclysis apparatus for intravenous administration of fluids comprising, in combination: a flexible, resilient barrel; a flexible, resilient plastic closure having a small diameter opening, attached to one end of said barrel; a length of flexible, resilient tubing attached to said reduced diameter opening and communicating with the interior of said barrel; filter means enclosing the small diameter opening and extending inwardly in said barrel; conical cap means covering the opposite end of said barrel; said cap means comprising a conical metal cap and a telescoping metal cup; said cap having an enlarged lip portion, whereby said barrel is insertable between said cap and said cup and upon crimping said cap against said cup securely holds said barrel therebetween; said cap having a small diameter opening at the apex thereof; a needle attached in said opening; said needle being a hollow metal tube having a sharply pointed conical end, and inlet holes disposed inwardly of said end; and a metal drip tube attached to said needle and extending at least through the bottom of said cup; said cup having a center aperture therein to accommodate said drip tube.

3. A disposable venoclysis set for intravenous administration of fluids comprising, in combination: a flexible, resilient barrel; a flexible, resilient plastic reducing cap having a small diameter outlet attached to one end of said barrel; a length of flexible, resilient tubing attached to said reduced diameter opening and communicat-

ing with the interior of said barrel; filter means covering the small diameter opening and extending inwardly in said barrel; conical cap means covering the opposite end of said barrel; said cap means comprising a conical metal cap and a telescoping metal cup of smaller diameter than a portion of the lip of said cap, whereby said barrel is insertable therebetween; said cap having a small diameter opening at the apex thereof; a needle attached in said opening; said needle being a hollow metal tube having a sharply pointed conical end, and inlet holes disposed inwardly of said end; a drip tube attached to said needle and extending at least through the bottom of said cup; said cup having a center aperture therein to accommodate said drip tube; and means in the nature of a hypodermic needle adapter attached to the opposite end of said plastic tubing.

4. A packaged, sterile, ready to use, disposable venoclysis set comprising, in combination: a flexible, resilient barrel; a flexible, resilient plastic reducing cap having a small diameter outlet attached to one end of said barrel; a length of flexible, resilient tubing attached to said reduced diameter opening and communicating with the interior of said barrel; filter means covering the small diameter opening and extending inwardly in said barrel; conical cap means covering the opposite end of said barrel; said cap means comprising a conical metal cap and a telescoping metal cup of smaller diameter than a portion of the lip of said cap, whereby said barrel is insertable therebetween; said cap having a small diameter opening at the apex thereof; a needle attached in said opening; said needle being a hollow metal tube having a sharply pointed conical end, and inlet holes below said end; a drip tube attached to said needle and extending to the inner edge of said cup; said cup having a center aperture therein to tightly accommodate said drip tube; means in the nature of a hypodermic needle adapter attached to the opposite end of said plastic tubing; a removable sealing cap covering said adapter; and a protective sleeve, containing a wad of cotton enclosing the open end thereof, covering said needle, whereby the parts thereof are protected from contamination.

5. In venoclysis equipment, a closure cap for a tubular liquid chamber comprising a cap member having a depending outer skirt portion and a smaller diameter axial opening at the opposite end thereof from said skirt portion, an inner cup member telescoping within the said outer skirt portion, said cup member having an axial opening in the closed end thereof, said chamber end being insertable between the said skirt and cup member and engageable therebetween, a penetrating cannula disposed in said smaller diameter axial opening and a drip tube communicating with the said cannula and extending through the axial opening in the said cup member.

6. In venoclysis equipment, a closure cap for a tubular liquid chamber comprising a conical cap member having a depending outer skirt portion with an enlarged lip portion of a greater diameter than the outer diameter of the said chamber, said cap member having a smaller diameter axial opening at the opposite end thereof, an inner cup member telescoping within the said outer skirt portion having a diameter less than the diameter of the said cap member, whereby said chamber is insertable between said cap and said cup and securable therebetween, said cup member having an axial aperture in the closed end thereof, a penetrating cannula dis-

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posed in said smaller diameter axial opening in the said cap member extending outwardly therefrom, and a drip tube communicating with the said cannula and extending inwardly, said axial aperture in said cup member accommodating the said drip tube.

7. In a venoclysis device, a closure member for a flexible tubular barrel comprising a conical cap member having a depending outer skirt with an enlarged lip thereon of greater diameter than the end of said flexible barrel, a cup member telescoping within said skirt portion of a smaller diameter than a portion of the said lip, whereby the said barrel is insertable and securable therebetween, said cap having a small diameter open-

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ing at the apex thereof, a needle attached in said opening, said needle being a hollow tube having a sharply pointed conical end, and inlet holes disposed inwardly of said end, said cup member having a center aperture therein to accommodate a drip tube, and a drip tube attached to said needle and extending inwardly through the said center aperture in the bottom of said cup member.

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