

March 1, 1949.

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2,462,986

PARENTERAL FLUID CONTAINER AND DISPENSER

Filed Aug. 6, 1945

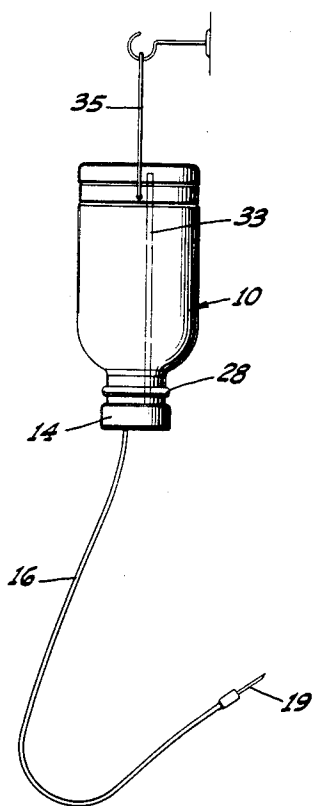


FIG. 3.

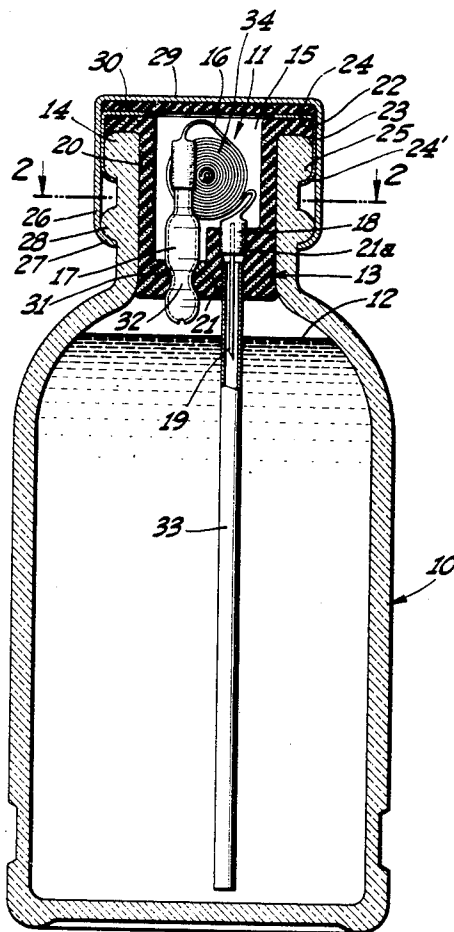


FIG. 1.

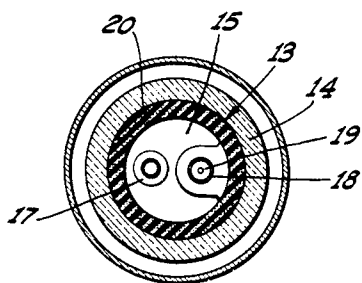


FIG. 2.

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Patented Mar. 1, 1949

2,462,986

UNITED STATES PATENT OFFICE

2,462,986

PARENTERAL FLUID CONTAINER AND DISPENSER

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Application August 6, 1945, Serial No. 609,286

18 Claims. (Cl. 128—214)

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This invention relates to the handling, and administering of parenteral solutions, a major object of the invention being to provide an apparatus with which such solutions may be handled, transported and administered without the danger of infection or undesirable reaction in the patient.

Parenteral solutions, for intravenous, intramuscular or other types of injections, are handled in containers of various types, and it is customary to separately procure the administration accessories, including tubing, hypodermic needle, and connections for applying the tubing to the container. It is also customary to use such administration accessories a number of times before they are discarded, and in many cases, the physician or hospital attendant assembles the administration apparatus from parts separately obtained from various sources. The process of disassembling, sterilizing and reassembling the parts of an administration set not only requires great care and consumes considerable time, but may easily result in a failure to obtain full closure or sterilization of all parts.

Furthermore it is difficult to attach an administration set to a container filled with parenteral solution and at the same time to preserve complete sterility of both the container and the administration set. This is particularly true in view of the various types and sizes of containers and the various types of administration sets that are used.

With the above problems and difficulties in mind, my invention has as its general object to eliminate these difficulties by the provision of a unitary package which includes both the solution container and the administration set. A further object is to provide such a package wherein the administration set and the container as a single unit are both hermetically sealed against contamination.

Another object of the invention is to provide a combined container and administration apparatus embodying a vent tube which serves the dual function of admitting air into the container to replace the solution being drawn therefrom, and also as a sheath for the hypodermic needle.

It is also an object of the invention to provide, in combination with a container, an administration set embodying a stopper for the container which functions additionally as a storage compartment for the administration set in the sealed package. A further and more detailed object of the invention, in this connection is the provision of a sealed package wherein the storage compartment for the administration set is contained within the container and thereby protected against damage in handling and transportation, as well as giving the sealed package a more trim appearance.

For the purpose of providing a clearer under-

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standing of the features and operation of my invention, I have described a preferred form thereof in the ensuing specification which makes reference to the appended drawings, in which:

Figure 1 is a sectional view taken axially through a combined container and administration set embodying my invention;

Figure 2 is a horizontal sectional view taken on the line 2—2 of Fig. 1; and

Figure 3 is a side elevation illustrating the apparatus in position for use.

As an example of one form in which the invention may be embodied, I have shown in the drawings a combined parenteral solution container and administration set which includes a container 10 and an administration set which is indicated generally by the reference numeral 11. In the sealed package, the container 10 is filled with liquid 12 such as, for example, a dextrose solution, and the administration set 11 includes a stopper 13 which is received in the neck 14 of the container. As shown, the container 10 comprises a glass bottle.

The stopper 13 is shaped so as to provide there-within a compartment 15 for the storage of an administering tube 16, a nipple 17, and the hub 18 of a hypodermic needle 19. The stopper 13 includes a cylindrical wall 20, which is fitted into the bottle neck 14, and an inner wall 21 which forms a closure for the space within the bottle in which the solution 12 is contained. The rim of the cylindrical wall 20 is provided with an outwardly extending flange 22. A sealing ring 23, having a flange 24 overlapping the flange 22, and an intumed flange 24 engaged beneath a shoulder 25 on the neck 14, seals the stopper 13 in the neck of the bottle.

As a sealed package, ready for shipping, the container 10 is provided with an outer cap 26 a marginal portion of which is turned inwardly as at 27 into engagement with a bead 28 formed on the neck 14. Between the end wall 29 of the cap 26 and the flange 24 of the sealing ring 23 is a sealing wafer 30 which seals the cap 26 against the flange 24, thus sealing the entire package. The bead 28 is spaced from the shoulder 25 to permit the separate application of the sealing ring 23 to the bottle neck.

The stopper 13 is preferably of a rubber or equivalent resilient material, and the inner wall 21 thereof is provided with an opening 31 in which is mounted a reduced portion 32 of the nipple 17. The tube 16 is attached to the outer end of the nipple 17.

The stopper wall 21 is provided with a boss 21a through which a vent tube 33 extends which serves to admit air into the container when solution is being drawn therefrom. The outer end of the tube 33 also serves as a sheath for the hypodermic needle 19 in the sealed package, the

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boss 21a being counterbored to provide a seat for the hub 18. The tube 16 is attached to the needle hub 18 and the intermediate region of the tube is packed in spiral folds 34, in the space between the nipple 17 and the cylindrical wall 20 above the tube 33. Thus the administration apparatus is stored within the compartment 15 until it is ready for use, and is thereby completely protected against contamination. The tube 16 is relatively thin-walled so that it may be readily collapsed and folded into the restricted space provided for it.

When the apparatus is to be used, the cap 26 is removed and the hypodermic needle is withdrawn from the storage compartment 15. The container 10 may then be hung in conventional fashion from a supporting device 35, and all that remains to be done is to insert the hypodermic needle 19 and commence the administering operation. It may be noted that in withdrawing the hypodermic needle from the storage compartment 15, the only portion of the needle which can be initially grasped is the hub 18, and that the needle itself and the interior passages of the nipple 17 and tube 16 remain fully isolated from contamination, and can be so maintained up to the act of inserting the needle into the patient's body. Thus maximum protection against infection of the patient is provided.

When the administration of the solution is completed, the administration set is removed from the container and discarded. The parts discarded may include the stopper 13 as well as the nipple 17, tube 16 and needle 19, or may include only the nipple, tube and needle. When the stopper is to be discarded, it is removed from the bottle by breaking the connection of the sealing ring 23 with the bottle neck.

The relatively thin-walled tube 16 is light and inexpensive, and an inexpensive type of hypodermic needle is provided. The nipple 17 which is preferably of glass, can also be provided at a fairly low cost. Thus the entire administration set can be supplied for a relatively small sum and this is conducive toward the discarding of this administration set when it has been used. The discarding of this apparatus is assured, however, by the fact that each filled container will come equipped with a new set of administration apparatus, and there will therefore be no reason to save the used set. The bottles of course will be sterilized and refilled by the packer.

While the particular apparatus herein shown and described in detail is fully capable of attaining the objects and providing the advantages hereinbefore stated, it is to be understood that it is merely illustrative of the presently preferred embodiment of my invention, and that I do not mean to limit myself to the details of construction or design herein shown, other than as defined in the appended claims.

I claim:

1. Apparatus for storing, transporting and administering parenteral solutions comprising: a container; a closure for said container, said closure having a storage recess therein substantially wholly within said container; administering apparatus mounted upon said closure and packed within said recess until ready for use; and a relatively flat cap attached to the container forming a closure for the container and for said recess whereby to form with said recess a sealed compartment for protecting said administering apparatus against contamination.

2. Apparatus for storing, transporting and ad-

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ministering parenteral solutions, comprising: a container having a mouth; a cup shaped stopper received in said mouth and having an inner wall for closing the space within the container; administering apparatus including a connection to said space within the container, mounted in said inner wall; and a cap attached to the container, forming a closure for sealing the container and cooperating with said cup shaped closure to define a storage compartment substantially wholly within said container that is sealed against contamination and within which said administering apparatus is packed until ready for use.

3. Apparatus for storing, transporting and administering parenteral solutions, comprising: a container having a mouth; a stopper of a cup shape including a lateral wall received within said mouth, an inner wall for closing the space within the container, and a flange at its lip in engagement with the lip of the bottle mouth, said stopper thereby having a compartment formed therein substantially wholly within said container; administering apparatus including a nipple extended through and mounted in said inner wall of the stopper, a flexible tube attached to and communicating with said nipple and adapted to be folded in a collapsed condition within said compartment of said stopper, and a hypodermic needle attached to the end of said tube, said inner wall having means for receiving said needle; and a cap on said container sealing the mouth thereof, said cap cooperating with said flange to seal said compartment within said stopper and thereby provide a sealed compartment for the storage of said administering apparatus.

4. Apparatus for storing, transporting and administering parenteral solutions comprising a container having a mouth; a cup shaped stopper received in said mouth and having an inner wall for closing the space within the container, whereby a chamber substantially wholly within said container is formed in said stopper; administering means including a collapsible tube, a hypodermic needle attached to one end thereof and a connection between the other end of said tube and the space within the container, said connection extending into the container, and a vent tube providing a sheath for receiving said hypodermic needle; and a cap on said container sealing the mouth thereof, said cap cooperating with said chamber in said stopper to provide a compartment in which said administering apparatus is stored until ready for use.

5. Apparatus for storing, transporting and administering parenteral solution, comprising: a container having a neck; a cup shaped stopper received within said neck and having an inner wall for closing the space within the container; a cap including an annular wall surrounding at least a portion of said container neck and attached hereto and an end wall covering the open end of said stopper and cooperating with the stopper to define a storage compartment that is substantially all contained within the neck of the container; and administering apparatus attached to the inner wall of the stopper and stored within said compartment until ready for use.

6. Apparatus for dispensing a parenteral solution from a container thereof, comprising: a cup shaped stopper for the container, having a compartment therein adapted to extend substantially wholly within said container and including an inner wall adapted to separate said compartment from the space within said container; a collapsible tube adapted to be folded within said com-

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partment; a nipple mounted in said inner wall for establishing communication between said tube and the space within the container, the majority of said nipple being contained within said compartment; a hypodermic needle attached to the other end of said tube; and a vent tube mounted in said inner wall and adapted to form a sheath for receiving said hypodermic needle for storage purposes.

7. Apparatus for dispensing a parenteral solution from a container thereof, comprising: a cup shaped stopper providing an internal recess adapted to cooperate with a closure for the container to define a storage compartment disposed substantially wholly within said container; a flexible tube adapted to be received within said storage compartment; a hypodermic needle attached to one end of said tube; and means for forming a connection between the other end of said tube, through said stopper to the space within the container.

8. Apparatus for storing, transporting, and administering parenteral solutions, which includes: a container having an open neck; a pair of spaced annular flanges on the outer surface of said neck; a cup-shaped closure member mounted within said neck to close said container, said member having a lateral wall fitting against the inner surface of said neck, a transverse wall extending across the innermost end of said member, and an outwardly extending flange bearing against the outer end of said neck; an annular sealing member fitting over said closure member and the outermost of said pair of spaced flanges, whereby said closure member is held in said container to seal the latter but the central compartment of said cup-shaped closure is not closed by said sealing member; an administering means mounted within said central compartment and comprising a collapsible tube, a nipple attached to one end of said tube and extending through said transverse wall into the space within said container, a vent tube extending from a recess in said transverse wall to a point in said container remote from said neck, and a hypodermic needle attached to the other end of said collapsible tube, said needle being inserted in said vent tube with the end of said collapsible tube being inserted in said recess to form a seal between said collapsible tube and said transverse wall; and a cap extending across said annular sealing member and engaging the remaining flange of said pair of spaced flanges to seal said central compartment of said cup-shaped closure, whereby said apparatus may be sterilized while all of said sealing members are in place, and said apparatus may thereafter be used without touching or otherwise destroying the sterility of said needle.

9. Apparatus for storing, transporting, and administering parenteral solutions, which includes: a container having an open neck; a cup-shaped closure member adapted to fit within said neck in sealing engagement therewith, said member having a lateral wall fitting against the inner surface of said neck, and a transverse wall extending across the innermost end of said member, said transverse wall having a pair of holes extending therethrough to establish fluid connection to the interior of said container; a vent tube mounted in one of said holes and extending from said transverse wall into said container, and extending less than completely through said transverse wall; a nipple mounted in the other of said holes to provide fluid connection from the interior of said container into the central com-

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partment of said cup-shaped closure member; a flexible tube adapted to be contained within said central compartment, connected to the outer end of said nipple; and a hypodermic needle mounted in the other end of said flexible tube and adapted to be sheathed in said vent tube, said last-mentioned end of said flexible tube fitting into said first-mentioned hole in said transverse wall with sealing engagement; and a cap extending across said central compartment and engaging said neck with a sealing fit, whereby said apparatus may be sterilized in its assembled form, and said needle thereafter need not be touched until the instant of insertion into a patient.

10. Apparatus for storing, transporting, and administering parenteral solutions, which includes: a container having an open neck; a cup-shaped closure member mounted within said neck to close said container, said member having an outwardly opening central compartment therein; an annular sealing member fitting over said closure member to hold said closure member in sealing engagement with said container while leaving said central compartment open; an administering means mounted within said central compartment and operatively connected to said container; and a cap extending across said annular sealing member to seal said central compartment, whereby said apparatus may be sterilized while all of said sealing members are in place.

11. Apparatus for storing, transporting, and administering parenteral solutions, which includes: a container having an open neck; a cup-shaped closure member held within said neck in sealing engagement therewith, said member having an outwardly opening central compartment therein; an administering means mounted within said central compartment and comprising a collapsible tube, a nipple attached to one end of said tube and extending through the bottom wall of said cup-shaped closure member into the space within said container; a vent tube extending from a recess in said bottom wall to a point in said container remote from said neck, and a hypodermic needle attached to the other end of said collapsible tube, said needle being inserted in said vent tube and the end of said collapsible tube being inserted in said recess to form a seal between said collapsible tube and said bottom wall; and a cap extending across said central compartment and engaging the outer surface of said neck to seal said central compartment to said cup-shaped closure, whereby said apparatus may be sterilized while all of said sealing members are in place, and said apparatus may thereafter be used without touching or otherwise destroying the sterility of said needle.

12. Apparatus for storing, transporting, and administering parenteral solution, which includes: a container having an open neck; a cup-shaped closure member adapted to fit within said neck in sealing engagement therewith, said member having a pair of holes extending through its end to establish fluid connection to the interior of said container; a vent tube within said container and extending part way into one of said holes; a nipple mounted in the other of said holes; a flexible tube adapted to be contained within the central compartment of said closure member, having one end attached to said nipple; a hypodermic needle attached to the other end of said flexible tube and adapted to be sheathed in said vent tube, with the adjacent end of said flexible tube fitting into said first-mentioned

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hole with a sealing fit, whereby a completely assembled administering means is contained within said central compartment, and releasably seals said fluid connection to the interior of said container; and a cap engaging the outer surface of said neck and closing said central compartment with a sealing fit, whereby said apparatus may be sterilized when in completely assembled form, and said sterility maintained until use.

13. Apparatus for storing, transporting, and administering parenteral solutions, which includes: a container having an open neck; a cup-shaped closure member adapted to fit within said neck in sealing engagement therewith to provide a central compartment substantially wholly within said container, said member having a pair of holes extending through its ends to establish fluid connection to the interior of said container; a vent tube mounted within one of said holes and extending into said container; a flexible tube adapted to be contained within said central compartment of said closure member, one end of said flexible tube being fluid connected to the other of said holes; a hypodermic needle mounted on the other end of said flexible tube and adapted to be sheathed by said vent tube, said last mentioned end of said flexible tube establishing a sealing connection with said first-mentioned hole, whereby a completely assembled administering means is contained within said central compartment, and releasably seals said fluid connections to the interior of said container; and a cap engaging the outer surface of said neck and closing said central compartment with a sealing fit, whereby said apparatus may be sterilized when in completely assembled form, and said sterility maintained until use.

14. Apparatus for dispensing a parenteral solution from a container therefor, which includes: a cup-shaped closure member adapted to fit within the neck of said container in sealing engagement therewith, said member having a lateral wall fitting against the inner surface of said neck, and a transverse wall extending across the innermost end of said member, said transverse wall having a pair of holes extending there-through to establish fluid connection to the interior of said container; a vent tube mounted in one of said holes and adapted to extend from said transverse wall into said container, and extending less than completely through said transverse wall; a nipple mounted in the other of said holes to provide fluid connection from the interior of said container into the central compartment, connected to the outer end of said nipple; and a hypodermic needle mounted in the other end of said flexible tube and adapted to be sheathed in said vent tube, said last-mentioned end of said flexible tube fitting into said first mentioned hole in said transverse wall with sealing engagement whereby said apparatus may be sterilized in its assembled form, and said needle thereafter need not be touched until the instant of insertion into a patient.

15. Apparatus for dispensing a parenteral solution from a container therefor, which includes: a cup-shaped closure member adapted to fit within the neck of said container in sealing engagement therewith to provide a compartment within said closure member substantially wholly

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within said container, said member having a pair of holes extending through its end to establish fluid connection to the interior of said container; a vent tube mounted within one of said holes and extending into said container; a flexible tube adapted to be contained within said central compartment of said closure member, one end of said flexible tube being fluid connected to the other of said holes; and a hypodermic needle mounted on the other end of said flexible tube and adapted to be sheathed by said vent tube, said last-mentioned end of said flexible tube establishing a sealing connection with said first-mentioned hole, whereby a completely assembled administering means is contained within said central compartment, and releasably seals said fluid connections to the interior of said container.

16. Apparatus for storing, transporting, and administering parenteral solution which includes: a container, a closure for said container having a compartment therein substantially wholly within said container; administering means within said compartment, connectable through said closure to the interior of said container; and sealing means closing the outer end of said compartment and removable to provide access to said compartment.

17. Apparatus for storing, transporting, and administering parenteral solutions which includes: a container having an opening therein; a closure fitted within said opening having an outwardly facing compartment substantially wholly within said container; administering means within said compartment, comprising a flexible tube, hypodermic needle means connected to one of said tube, and means for establishing a fluid connection through said closure, connected to the other end of said tube; and removable disc-like sealing means covering the open end of said compartment.

18. Apparatus for storing, transporting, and administering parenteral solutions which includes: a container having an opening therein; a closure fitted within said opening to make a sealing fit therewith, said closure having an outwardly facing compartment that is substantially wholly within said container; a vent tube extending from said closure to a point in said container remote from said closure; administering means located within said compartment and comprising a folded flexible tube, hypodermic needle means connected to one end of said tube, and nipple means connected to the other end of said tube to establish a fluid connection from the interior of said container, through said closure, to said tube; a removable, flat sealing member overlying said closure to seal said compartment; and means securing said sealing member against accidental removal from said closure.

JAMES E. MEAGHER.

REFERENCES CITED

The following references are of record in the file of this patent:

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Certificate of Correction

Patent No. 2,462,986.

March 1, 1949.

JAMES E. MEAGHER

It is hereby certified that errors appear in the printed specification of the above numbered patent requiring correction as follows:

Column 4, lines 54 and 55, claim 5, for "adminstering" read *administering*;
column 8, line 36, claim 17, for the words "one of" read *one end of*;
and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 6th day of September, A. D. 1949.

[SEAL]

THOMAS F. MURPHY,
Assistant Commissioner of Patents.