Aug. 24, 1948. N. EVANS 2,447,691

DEVICE FOR PACKAGING AND DISPENSING INTRAVENOUS SOLUTIONS

Filed Feb. 17, 1947

Fig. 1

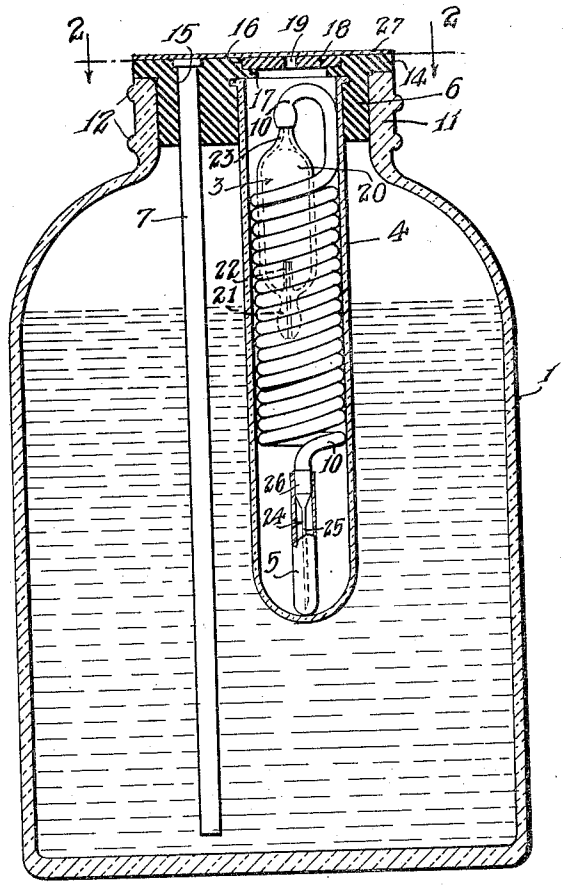
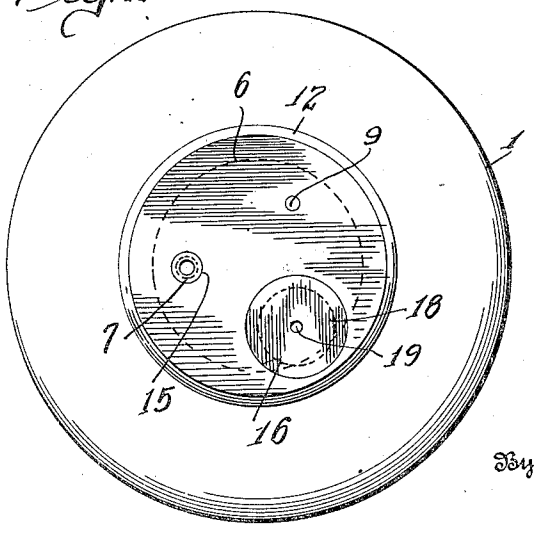


Fig. 2



Inventor

Newton Evans

By Lyon & Lyon Attorneys

Patented Aug. 24, 1948 2,447,691

UNITED STATES PATENT OFFICE

2,447,691

DEVICE FOR PACKAGING AND DISPENSING INTRAVENOUS SOLUTIONS

Newton Evans, Montrose, Calif., assignor to Don Baxter, Inc., Glendale, Calif., a corporation of Nevada

Application February 17, 1947, Serial No. 729,135

7 Claims. (Cl. 128—214)

1

This invention relates to a device for packaging sterile solutions and the administration sets for such solutions. The invention is particularly directed to a device for holding solutions of the type which are to be injected intravenously and to administration sets, which permit such solutions to be injected directly from the container into the veins of a recipient. The invention is also directed to a device adapted for maintaining both the solutions and the administration sets in sterile condition.

In order that the administration of such solutions can be most economically handled with the greatest asurance of safety, such solutions and the apparatus by which they are to be administered should be packaged by the manufacturer of the solutions in a package in which the solutions and apparatus may be placed in a sterile condition and retained in that condition until administered. It is also advisable that the packages containing both the solutions and the administration apparatus contain some visible means for indicating whether or not the desired sterile condition of the ingredients has been maintained.

It is the general object of the present invention to provide a device for packaging and dispensing a sterile solution, which device is capable not only of maintaining the solution in a sterile state, but also holding and maintaining all the essential apparatus for administering such solution likewise in a sterile state, and which device is provided with suitable means, preferably separate, for the solution and for the administering apparatus, of indicating whether the desired sterile condition has been, in fact, maintained in the package.

Another object of the present invention is to provide a device for maintaining in a sterile condition not only the intravenous solution, but the apparatus for administering the same, in which device these elements are adequately sealed, one from the other, until it is desired to administer such sterile solution. It is highly important to maintain the administration apparatus and the solution separate in the package. If the dispensing apparatus is allowed to come into contact with the solution, there is danger not only that the dispensing apparatus, particularly any metal parts, such as the hypodermic needle thereof, may become corroded on standing and also the danger that loss of sterility to that portion of the solution which is adhering to the dispensing apparatus will not be subject to proper detection. By means of the present invention, I have, therefore, provided for the packaging in one unit of not only the

2

solution and the dispensing means, but have provided a package by which these may be simultaneously sterilized and maintained independent and separate from each other and provided with separate sterile-indication means.

The device for packaging and dispensing sterile solutions of the present invention, together with various additional advantages of the invention, will be fully understood from the following description of a preferred example of the invention, which description is given in connection with the accompanying drawing, in which:

Figure 1 is a vertical view, mainly in section.

Figure 2 is a horizontal sectional view along the line 2—2 of Figure 1.

Referring to the drawings, 1 indicates a container, such as a glass bottle, for holding the sterile solution. The container 1 has the usual neck 11, which is preferably beaded, as indicated at 12. At the neck 11, there is provided a rubber stopper 6, preferably having a flange 14 resting on the lip of the neck to assist in preventing the stopper 6 from being forced into the bottle 1. The stopper 6 is provided with an opening 15 adapted to receive the upper end of an air tube 7. There is also provided an opening 9, intended to serve as a solution outlet.

Through the stopper 6 is provided a relatively larger opening 16 which, near the upper end, is provided with an internal annular flange 17. A container 4, preferably of glass, such as a glass test tube, is provided with its open end inserted in the opening 16, up to and against the flange 17. Preferably a somewhat tight fit is provided between the upper end of the glass container 4 and the walls of the opening of the stopper 6, into which it is forced in order to provide a tight seal. The container 4 has its lower end closed and may be of sufficient size, as hereafter described, to house the equipment to be used in dispensing a solution from within the container 1. Above the flange 17, there is provided the easily removable chamber cap 18 having a small opening 19 therein. The opening 19, as hereafter particularly pointed out, serves in combination with the other parts of the apparatus as a vacuum indicator.

The dispensing equipment disposed within the chamber 4 includes a drip member 3, which may be of any usual or preferred construction. In the particular case illustrated, the drip indicator is shown as comprising a glass member 20, reduced at one end and connected to a nipple 21, which may be tapered as indicated and below which there is provided a short inner tube 22. The opposite end is reduced, as indicated at 23,

for adjustment to the flexible tubing 10. The flexible tubing 10, after leaving the reduced end 23, is preferably coiled in a helical manner to conform to the inner wall of the glass chamber 4 and, at the lower end, the flexible tube is preferably attached to the needle 24. The needle 24 includes the cannula 25, having a large hollow sleeve 26 at one end, to which the end of the tubing 10 is attached. Preferably, there is provided a guard 5, enclosing the needle as an additional protection therefor.

Above the stopper 6, there is provided a thin flexible rubber disc 27. In the use of the invention of the present application, there may be added various other caps, seals, and the like, to the top of the elements herein illustrated and described so that these members are used only during the sterilization and shipping of the apparatus and are generally removed before use and, therefore, are omitted from the present disclosure.

In the use of the apparatus of the present invention, after the solution has been placed inside of the glass bottle and the dispensing apparatus has been placed in the glass container 4 and the flexible rubber seal 27 and the remainder of the closure has been applied, it is then possible to subject the solution and also the dispensing apparatus, in one operation, to a mechanical evacuation process and a sterilizing treatment, generally conducted at elevated temperature. During these processes, a vacuum may be generated in the container 1 above the solution and in the glass container 4. At the end of such sterilizing operation, the flexible rubber seal 27 is still mounted in position and at the openings 15 and 19, the flexible diaphragm 27 will be drawn inwardly by the vacuum forming the two depressions in the surface thereof. In the further transit of the product to the market and the storage of the product, these depressions serve, respectively, to indicate the preservation of the vacuum above the solution in the container 1, and the preservation of the vacuum within the glass container 4. If, for any reason of defective equipment or defective handling, the vacuum in the container on the inner chamber is lost, the absence of the characteristic depressions above described will indicate to the operator the loss of such vacuum and a probable loss of the sterile condition of the contents.

When it is desired to utilize the apparatus of the present invention, after the removal of such other caps as may be provided, the flexible seal 27 is removed, the cap member 18 may be removed, whereupon the device is withdrawn by grasping the bend in the tubing where it makes connection with the reduced end 23. Thereby, the drip indicator 3 may be first removed from the glass housing 4 and the end 21 thereof then forced into the solution outlet 9 of the container. The remainder of the tubing and the hypodermic needle may then be withdrawn from the apparatus and the guard 5 removed from the needle, and the apparatus is then in condition for operation by attaching a clamp to the tubing, inverting the bottle and inserting the hypodermic needle into the vein of the intended recipient.

In operation, the solution which passes through the tubing 22 will be seen visibly to drip through the body of the glass member 20 and affords the operator the opportunity of checking the flow of the sterile solution.

By means of the apparatus herein described, it is possible to maintain, in one package, not only the solution and all the necessary sterile dispensing equipment, but I provide two separate indicating means for indicating the loss of sterility of each part separately and also to maintain all of the solution out of the dispensing equipment, until time for utilization of the device.

While the particular form of the invention herein described is well adapted for carrying out the objects of the present invention, various modifications and changes may be made, and this invention includes all such modifications and changes as come within the scope of the appended claims.

I claim:

1. A device for packaging and dispensing a sterile solution, which comprises a container for the solution having a neck, a stopper for the container closing said neck, an opening in said stopper, a supplemental container member having its upper end fitting the opening of said stopper and depending from said stopper within said container, and means for dispensing the solution from said container to a recipient, mounted within said supplemental container.

2. An apparatus for packaging and dispensing sterile solutions, which apparatus comprises a container having a neck, a stopper closing said neck, said stopper having an opening therethrough, a supplemental relatively small container member having an open end fitting in the opening in said stopper and suspended thereby, and means for dispensing a solution from said container to a recipient, mounted within said supplemental container, said means including a tubing and an injection needle connected with said tubing.

3. An apparatus for packaging and dispensing sterile solutions, which apparatus comprises a container having a neck, a stopper closing said neck, said stopper having an opening therethrough, a supplemental relatively small container member having an open end fitting in the opening in said stopper and suspended thereby, and means for dispensing a solution from said container to a recipient, mounted within said supplemental container, said means including a drip indicator, a tubing connected therewith, and an injection needle connected to said tubing.

4. An apparatus for packaging and dispensing sterile solutions, which apparatus comprises a container having a neck, a stopper closing said neck, said stopper having an opening therethrough, a supplemental relatively small container member having an open end fitting in the opening in said stopper and suspended thereby, means for dispensing a solution from said container to a recipient, mounted within said supplemental container, said means including a drip indicator, a tubing connected to said indicator, and an injecting needle connected to said tubing, and a guard covering said needle.

5. An apparatus for packaging and dispensing a sterile solution, which apparatus includes a bottle having a reduced neck, a stopper closing said neck, said stopper having an opening, an air tube attached to said opening and extending into said bottle, a second relatively larger opening, a tube closed at its lower end having its open end inserted in said relatively larger opening and likewise extending into said bottle, means within said tube for administering a solution from said bottle to a recipient, and a flexible sealing member positioned over said stopper and having a portion thereof adapted to be main-

tained in a depressed condition over the opening of said stopper, connecting the air tube and having a portion thereof adapted to be maintained in a depressed condition over the opening of said stopper connected to said tube.

6. An apparatus for packaging and dispensing a sterile solution, which apparatus comprises a bottle having a neck, a stopper closing said neck, an air tube depending from an opening in said stopper, a solution outlet for said stopper, a relatively large opening in said stopper, a tubular member having one end fitting said relatively large opening and suspended by said stopper, said tubular member enclosing a drip indicator, tubing and a needle adapted for connecting it to said sterile outlet for administering the contents of said bottle to a recipient.

7. An apparatus for packaging and dispensing a sterile solution, which apparatus comprises a bottle having a neck, a stopper closing said neck, an air tube depending from said opening in said stopper, a solution outlet for said stopper, a relatively large opening in said stopper, a tubular member having one end fitting said relatively large opening and suspended by said stopper, said tubular member enclosing a drip indicator, tubing and needle adapted for connecting it to said sterile outlet for administering the contents of said bottle to a recipient, and a flexible sealing member over said stopper having separate depressions for indicating the presence of vacuum within said bottle and within said tubular member.

NEWTON EVANS.