

[54] **INTRAVENOUS FEEDING CONTAINER
AND METHOD OF PREPARING THE
SAME**

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128/214 C, 218 M, 214 D; 137/192; 215/11 D

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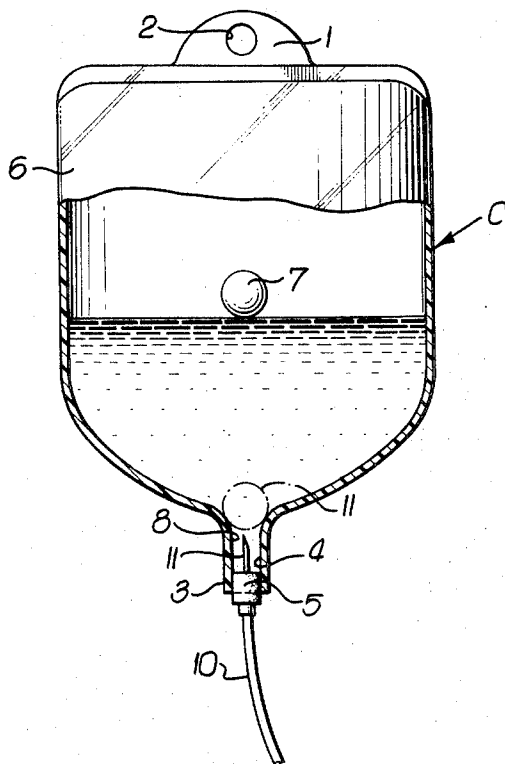
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[57] **ABSTRACT**

An intravenous feeding container composed of flexible material and containing a quantity of water soluble material for the preparation of an intravenous solution to be fed to a patient, the container being normally storable in a folded, flat condition. The container has a buoyant check valve at its outlet. The method of preparing intravenous feeding containers, wherein sterile water is displaced from a water supply into a normally folded, flat container having water soluble material therein, forming with said water an intravenous feeding solution.

1 Claim, 3 Drawing Figures



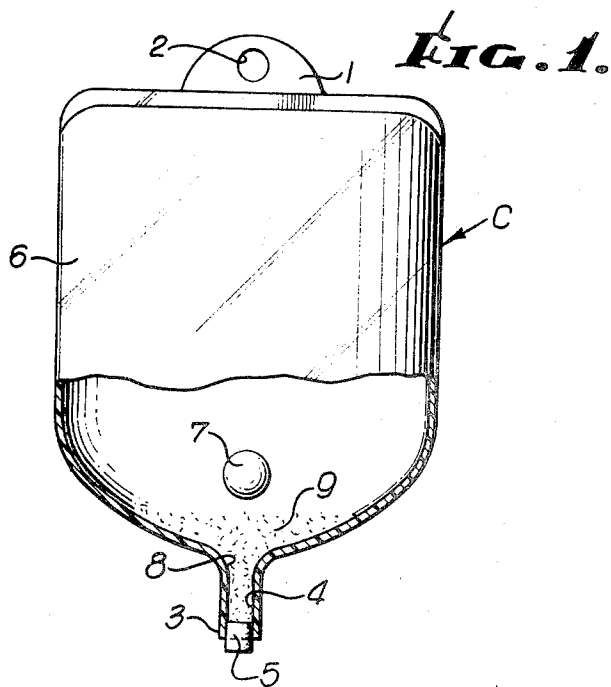
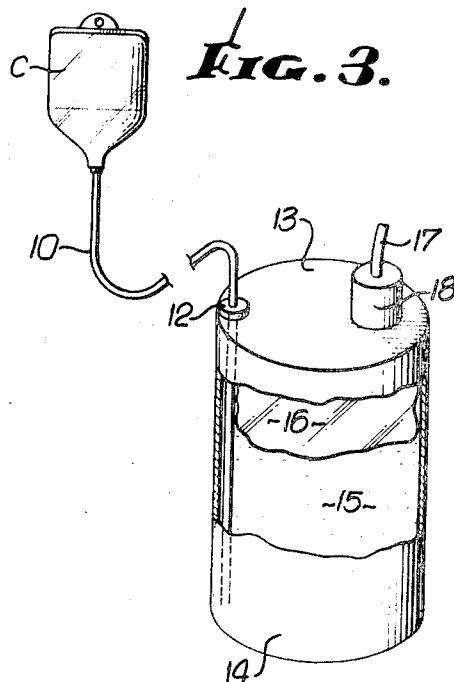
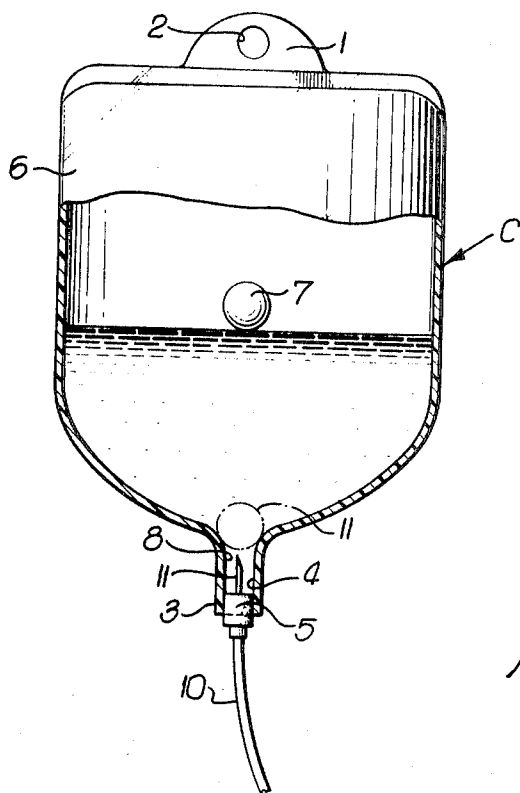


FIG. 2.



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INTRAVENOUS FEEDING CONTAINER AND METHOD OF PREPARING THE SAME

In the treatment of patients for various ailments and injuries, it is the practice to intravenously feed the patient an aqueous solution containing salt, glucose, or protein, or a combination thereof. Such practice involves the problem of storage of the solution in bottles, generally of one liter capacity.

In use, the bottle is hung in an elevated position close to the patient, and the solution is fed to the patient through a flexible tube leading to a needle inserted into a vein of the patient.

The storage of bottles of intravenous feeding solutions in hospitals, and particularly military field hospitals, or other remote locations, requires substantial storage space. In addition, there is the ever present danger of breakage of the bottles and loss of the feeding solution.

In order to avoid these problems, the present invention provides a receptacle or container composed of flexible plastic material capable of storage in a flat condition, thereby effecting a substantial saving in the required storage space, as well as simplifying delivery of the containers or receptacles to remote locations.

The container or receptacle has the necessary quantity of water soluble material therein which, when mixed with sterile water, will provide the desired volume of intravenous feeding solution. Since the container or receptacle is composed of flexible or plastic material, it is susceptible of storage in a small space, and, also, the receptacle or container cannot be readily damaged. The receptacle or container is free from the danger of breakage even if it should be inadvertently dropped or knocked down when in use. Thus, there is the reduced danger of the loss of intravenous solution as well as the elimination of the danger of broken bottle fragments.

More particularly, the invention provides a plastic or other resilient container or receptacle containing a quantity of water soluble materials adapted, when mixed with sterile water, to provide a quantity of intravenous feeding solution, wherein the receptacle contains a check valve cooperable with the container outlet to form a seal when the container or receptacle is emptied during use. Such a construction avoids the necessity of an attendant's vigil to prevent emptying of the usual intravenous feeding bottle and the potential passage of air from the receptacle into a patient's vein.

In the use of the flexible container or receptacle, it is adapted to be charged with sterile water from a convenient source of sterile water, such as the discharge from a water sterilizing plant, or more particularly, from a storage drum of sterile water. In the use of a storage drum to supply sterile water to the flexible intravenous feeding container, the container is adapted, by the utilization of a rubber or rubber-like stopper, to have a needle injected into the discharge end of the container, the needle being in fluid communication with a tube leading into the sterile water drum. Sterile water is displaced from the drum through the tube and into the intravenous feeding container by the application of air under pressure into a flexible sack or bag contained in the drum.

This invention possesses many other advantages, and has other purposes which may be made more clearly apparent from a consideration of a form in which it may be embodied. This form is shown in the drawings accompanying and forming part of the present specification. It and its method of use will now be described in detail, for the purpose of illustrating the general principles of the invention; but it is to be understood that such detailed description is not to be taken in a limiting sense.

Referring to the drawings:

FIG. 1 is a view in elevation, with a portion broken away, illustrating an intravenous feeding container made in accordance with the invention;

FIG. 2 is a view in elevation, with parts broken away, illustrating the intravenous solution in the container and further illustrating the function of the buoyant check valve; and

FIG. 3 is an isometric view of the intravenous feeding container and a sterile water supply drum, a portion of which is broken away, for filling the container.

As seen in the drawings, an intravenous feeding receptacle or container C is in the form of a generally rectangular resilient, or flexible plastic, hollow body having a tab 1 at one end provided with an opening 2 for hanging the container C from the usual intravenous feeding bottle support (not shown), which is normally composed of a stand provided with a hook for suspending the intravenous bottle in inverted position adjacent to a patient. At its other end, the container C has a neck 3 providing a discharge opening 4. A stopper 5 closes the discharge opening 4, this stopper being composed of resilient or rubber-like material adapted to be pierced by a hollow needle. The body portion 6 of the container C may be of any desired configuration, but, within the purview of the present invention, it is composed of a suitable, flexible plastic material, enabling it to be stored in a flat condition, much in the manner of a rubber or rubber-like hot water bottle.

Within the container C is a ball check valve 7 adapted to form a seal in the throat 8 of the neck 3 of the container C the throat having a valve seat portion. Also within the container is a quantity of water soluble material 9, which may comprise such dry nutrients, in powder or granular form, as glucose, protein or salt, or a combination thereof, adapted when contacted by sterile water of the desired volume to provide the desired quantity and concentration of intravenous feeding solution.

As seen in FIG. 2, a tube 10 is provided with a hollow needle 11 adapted to be inserted through the stopper 5 of the container C so as to conduct sterile water into the container and form the desired solution. The ball check valve 7 is buoyant in the solution and will float thereon until, in use, the ball check valve seats in the throat 8 in the neck 3 of the container C as shown in broken lines, with a small quantity of liquid still present in the throat 8.

The neck 3 of the container is elongated so that the opening 4 is of sufficient length to accommodate a needle, such as the needle 11, without contact between the ball check valve 7 and the inner end of the needle 11 when the valve is seated. In this connection it will be understood that in the intravenous feeding of a patient, a tube, such as the tube 10 having a needle, such as the needle 11, is employed to conduct the intravenous solution from the container C to the patient's vein. Thus, with the container C suspended by the tab 1, the ball check valve 7 will seat in the throat 8 of the discharge neck 3 of the container when the container is substantially emptied, but before the inner end of the needle extends into an unfilled portion of the container C, to stop further discharge of the solution from the container, thereby preventing air from passing through the needle 11 and tube 10 to the patient.

Referring to FIG. 3, the tube 10 is shown as extending downwardly through a seal 12 in the top 13 of a storage drum 14. The drum 14 contains a body of sterile water 15 adapted to be displaced through the tube 10 and the needle 11 into the container C so as to mix with the dry intravenous feeding material 9 in the latter and form the desired intravenous feeding solution. In order to displace the sterile water 15 from the drum 14 through the tube 10, the drum 14 has a flexible bag or sack 16 in its upper portion adapted to be supplied with air under pressure through a tube 17 which leads through an appropriate fitting 18 in the top 13 of the drum. As the bag 16 is inflated by the air, it will displace the sterile water 15 through the tube 10 and into the container C. The lower end of the tube 10 is preferably located closely adjacent to the bottom of the drum, so that substantially all of the water in the drum can be forced therefrom.

As an example, the drum 14 may contain sufficient sterile water to fill 50 containers C. If the facility at which the containers C are to be filled has a sterile water plant, then, of course, there is no need for the drum 14, since the container can be filled directly from the plant, the water flowing through the tube 10. However, containers or receptacles C, together

with a full drum 14, may be supplied to remote locations, such as a field hospital in a war zone, to facilitate the intravenous feeding of patients in such an environment. It is also apparent that the delivery of a supply of conventional intravenous feeding bottles may be difficult to accomplish in such locations.

From the foregoing, it will be apparent that the invention comprises not only a flexible intravenous feeding container C having therein a quantity of water soluble intravenous feeding material, initially occupying a small volume in the container, enabling it to be stored in a flat condition, but also includes the method of preparing intravenous feeding containers comprising the steps of connecting a flexible intravenous feeding container having a quantity of intravenous feed material therein to a source of sterile water, and supplying from said source to the container a quantity of the sterile water to provide in the container the desired quantity of intravenous feeding solution when the dry soluble material is contacted by the sterile water, the container then being disconnected from the

source.

I claim:

1. In a intravenous feeding container: a collapsible container body of flexible material adapted to occupy a substantially flat condition and to hold a quantity of intravenous feeding solution, said container body having an outlet means comprising an elongate throat member having a valve seat in its upper portion, a stopper in said outlet means adapted to be punctured by a needle, a quantity of dry water soluble intravenous feeding material in said container, a check valve within said container and adapted to be buoyant in a feeding solution and engageable with said seat to prevent the passage of air from said container when said solution is substantially fully drained from said container, said valve seat being substantially spaced from said stopper to prevent said check valve from engaging a needle as said check valve descends to engaged position with said seat.

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