APPARATUS FOR THE INDUCED INFUSION OF LIQUID FROM A FLEXIBLE LIQUID CONTAINER

Glenn L. Reall, Woodford, and James E. Alder, Grayslake, Ill., assignors to Abbott Laboratories, North Chicago, Ill., a corporation of Illinois

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Claims. (Cl. 128—214)

This invention relates to an apparatus for the induced infusion of a liquid, and in particular, it relates to an apparatus which is particularly useful in the induced infusion of a liquid, for example, a solution or blood, from a flexible liquid container.

It is one of the purposes of the invention to provide an apparatus for the induced infusion of a liquid which is simple and inexpensive to manufacture, which is safe and easy to use, and which is dependable in its operation.

It is one of the features of the invention to provide an apparatus for the induced infusion of a liquid from a flexible liquid container having an inflatable bladder and a sleeve encircling the bladder, wherein the bladder can only be inflated to a pressure which is less than the pressure at which the liquid container which is preferably employed therewith will rupture.

It is another feature of the invention to provide an apparatus of the character herein-described which will assure that substantially all of the liquid contained in the liquid container will be forced therefrom by the apparatus of the invention, thereby obviating unnecessary wastage of the liquid.

It is another feature of the invention to provide an open-ended sleeve portion which encircles the bladder and which in operation prevents the bladder the apparatus of the invention from substantially bulging or bellying outwardly at its central portion. Moreover, and importantly, the bladder does not substantially bulge or belly inwardly at its central portion toward the flexible liquid container.

It is another feature of the invention to provide a handle which is extendable through a handle in the liquid container for supporting the liquid container and the bladder and its associated sleeve.

It is another feature of the invention to join the bladder and an open-ended sleeve portion by a longitudinally extending seal which longitudinally stiffens the bladder and its associated sleeve.

In the diagrammatic drawings:

FIGURE 1 is a perspective view, partly cutaway, showing the manner in which the apparatus of the invention is employed;

FIGURE 2 is a perspective view, partly cutaway, of the apparatus of the invention;

FIGURE 3 is a cross-sectional view taken along line 3—3 of FIGURE 2;

FIGURE 4 is a cross-sectional view taken along line 4—4 of FIGURE 1 showing the bladder inflated to a certain degree; the broken lines represent the position of the outer wall of the bladder and a sleeve when the bladder is inflated to a greater degree;

FIGURE 5 is a perspective view showing the relationship of the inner and outer walls of the bladder and the sleeve with respect to each other before they are completely assembled;

FIGURE 6 is a perspective view showing the same elements as in FIGURE 5 in which the components of FIGURE 5 are manipulated in order to form the completed apparatus of the invention; and

FIGURE 7 is an enlarged fragmentary cross-sectional view of the upper portion of the apparatus of the invention.

Referring now to FIGURE 1 of the illustrative drawings, there is shown an apparatus 10 for the induced infusion of a liquid from a flexible liquid container 11. Conventional administration equipment 12 leading from the flexible liquid container 11 is shown to include a drip chamber 12a, a length of tubing 12b and an intravenous needle 12c. The liquid container 11 is shown to be provided with an elongated slot 15 which forms a handle 16. A handle 17 secured to the apparatus 10 is extendable through the elongated slot 15 and is shown to be supported by a supporting arm 18 which is adjustably mounted by a wing screw 19 on a standard 20. Although throughout the specification the bladder is described as being inflatable, the fluid medium employed to inflate the bladder is not limited to a gas such as air but is also intended to include a liquid such as water.

The material of which each of the components of the apparatus 10 of the invention is constructed is preferably a flexible transparent material such as polyvinyl chloride, although the invention is not to be considered to be limited to any particular flexible material of construction.

Referring now to FIGURES 2 through 6 of the illustrative drawings, the apparatus 10 is shown to comprise a bladder 22 having an inner wall 23 and an outer wall 24 which are shown to be sealably secured at ends 25, 25a and 26, 26a and at their marginal sides 27, 27a and 28, 28a, respectively. The inner wall 23 of the bladder 22 defines a longitudinally extending opening 29 which is adapted to receive the liquid container 11. A fitment 30 is shown to be secured preferably by dielectric, thermal, or chemical sealing to the outer wall 24. The fitment 30 provides fluid communication with the bladder 22. When shown to be a conventional hand inflation bulb 31 is employable to inflate the bladder 22 when it is desired to induce the liquid out of the liquid container 11; however, any suitable device for inflating the bladder 22 is employable.

A flexible sleeve generally indicated at 32 comprises a first sleeve portion 33 and a second sleeve portion 34. A marginal side 35 of the first sleeve portion 33 is shown in FIGURE 4 to overlap the marginal side 27a of the inner wall 23. The second sleeve portion 34 encircles the bladder 22 and the first sleeve portion 33 and overlaps at its marginal side 38 a generally medial portion 39 of the flexible sleeve 32. As best illustrated in FIGURE 4 of the illustrative drawings, the marginal sides 27, 28, 35, 27a, 28a, 38 and the medial portion 39 are sealed together by a longitudinally extending dielectric or thermal sealing apparatus (not shown). Seals 40a and 40b at the marginal ends 25 and 26 and 25a and 26a, respectively, are of a character that they reduce the thickness of the marginal ends 25 and 26 as indicated at 25b, consequently weakening the bladder 22 at the place of the seals 40a and 40b. This weakening limits the fluid pressure which can be sustained by the bladder 22. The weakening is intentionally such that the bladder 22 will rupture at a fluid pressure which is less than the fluid pressure at which the liquid container 11 employed therewith will rupture. By way of specific example but in no limiting sense, taking a liquid container will rupture at a fluid pressure of about ten pounds per square inch, the weakening which occurs will be of a magnitude that the bladder will rupture at a fluid pressure of about eight pounds per square inch. It is therefore apparent that the bladder 22 will rupture before the liquid container ruptures, thereby obviating unnecessary wastage of the liquid in the liquid container 11 due to overinflation of the bladder 22. It
is readily apparent that other modes of weakening the bladder 22 are within the purview of the invention.

In accordance with one of the features of the invention, the second sleeve portion 34 is open at its ends 42 and 43, giving the sleeve portion 34 a tubular character. The open ends 42 and 43 do not follow the joined ends 25 and 26 and 25a and 26a of the inner and outer wall and joined ends 33a and 33b of the first sleeve portion 33, respectively, when the bladder 22 is inflated. It is therefore apparent that the open-ended sleeve portion 34 serves to prevent the central portion C of the bladder 22 from substantially bulging or bellying outwardly or inwardly to any appreciable extent.

The first sleeve portion 33 and the second sleeve portion 34 are shown to be provided with aligned apertures 44 and 45, respectively, which permit the fitment 30 to extend therethrough.

In use, the liquid container 11 is inserted into the opening 29 defined by the inner wall 23 of the bladder 22. The handle 17 of the apparatus 10 is passed through the elongated slot 15 in the flexible liquid container 11 and is then hooked over the supporting arm 18. The intravenous needle 12c is inserted into the patient when the infusion of the liquid is required. When it is desired to induce the infusion of the liquid contained in the liquid container 11, the hand operated bulb 31 or its equivalent is actuated to inflate the bladder 22. As the pressure in the bladder 22 increases the liquid contained in the liquid container 11 will be forced through the tubing 12 and the intravenous needle 14 into the patient.

In the event that excessive pressure is built up within the bladder 22, the bladder 22 will rupture, and in fact, the bladder will rupture before the liquid container 11 ruptures.

The handle 17 is shown to be attached to the inner wall 23 of the bladder 22 for example by dielectric, thermal, or chemical sealing, although it is attachable to either the first sleeve portion 33 or the second sleeve portion 34, if desired.

The above-described embodiment being exemplary only it will be understood that modifications in form or detail can be made without departing from the spirit and scope of the invention. Accordingly, the invention is not to be considered as limited save as is consonant with the scope of the following claims.

What is claimed is:
1. In an apparatus for the induced infusion of a liquid from a flexible liquid container: a tubular-shaped member having open ends and comprising a flexible inner wall and a flexible adjacent outer wall sealingly united at the ends thereof and having overlapping opposite marginal sides, said open-ended portion of said tubular member being adapted to receive a completely liquid container which is encircled by said inner wall, a flexible sleeve having a first sleeve portion joined to the ends of said outer wall of said tubular member and a second open sleeve portion encircling said first sleeve portion and overlapping on at least one of its marginal sides said marginal sides of said inner and outer walls, a seal extending from the opposite marginal sides of said inner and outer walls to said one marginal side of said sleeve portion, aligned apertures in said first and second sleeve portions and a fitment in fluid communication with the space defined by said inner and outer walls sealably united to said outer wall and extending through said aligned apertures, one of the junctures of the ends of said inner and outer walls comprising a rupturable seal portion adapted to fail upon the attainment of a predetermined pressure in the space defined by said inner and outer walls.

2. Apparatus as set forth in claim 1 including a supporting loop handle portion fastened to said tubular member and adapted to support the flexible liquid container.

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