

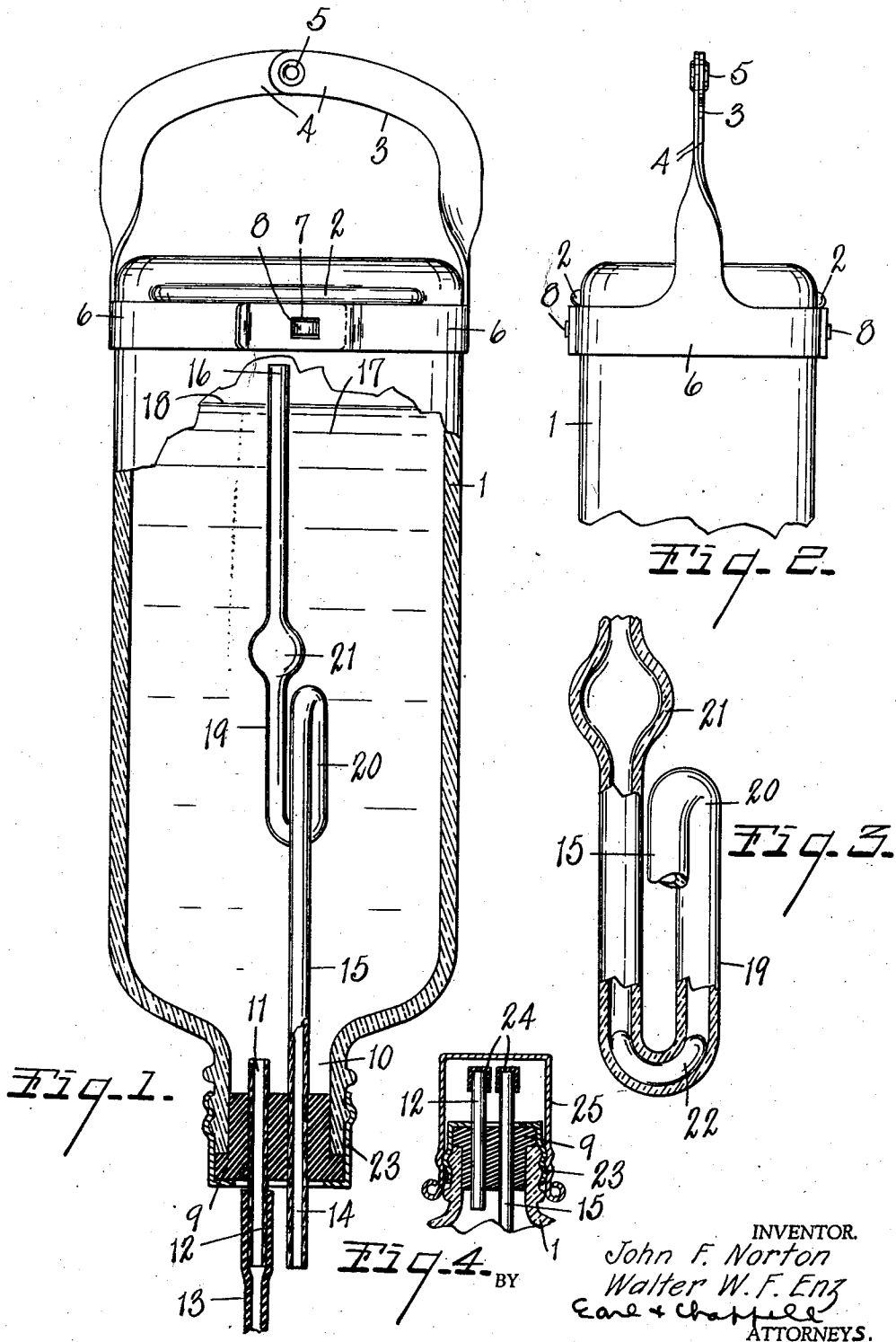
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STRIP SOLUTION DISPENSING BOTTLE

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STERILE SOLUTION DISPENSING BOTTLE

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1 Claim. (Cl. 128—214)

This invention relates to packages or containers for dispensing sterile solutions or the like. Heretofore sterile solutions or the like have been put up in bottles or other containers and have been sterilized. The sterilized container and its contents are then sent to hospitals or the like for use. In withdrawing the sterile solution from the bottle or container a tube carries the liquid from the bottle which is inverted to permit the withdrawal and another tube is ordinarily employed to permit air to pass into the bottle or container to facilitate the flow of the liquid. In carrying out this method of dispensing the sterile solution, bacteria or dirt particles from the air may be carried into the sterile solution. Heretofore attempts have been made to prevent the carrying of bacteria or dirt particles to the sterile solution. Various complicated stoppers or filtering devices have been provided. In certain of these a tube through which air is admitted is applied to an air inlet in the bottle and some cotton is placed in the tube to filter out the bacteria or dirt particles. In using such a device considerable care must be taken to hold the tube with the cotton filter above the level of the liquid in the bottle at all times because if the cotton becomes moistened it is a notoriously inefficient bacteriological filter. In using the cotton filter, there is a possibility that a small fiber of the cotton will be pulled into the sterile solution. This is extremely dangerous because the cotton may be thus introduced into the patient receiving the sterile solution. If this happens, an embolism is apt to result.

Certain complicated caps or stoppers have been devised for filtering the air as it is admitted to the bottle or container. These caps are not very satisfactory because they must be removed and sterilized after each use. In using them it is also necessary to uncap the container with the sterile solution and apply the sterilized cap or stopper. This exposes the sterile solution to the air for a short time and may result in contamination of the sterile solution.

The objects of this invention are:

First, to produce a new and improved dispensing package or container for sterile solutions or the like.

Second, to provide such a package or container which eliminates the disadvantages above set forth.

Third, to provide such a package or container in which the sterile solution is kept sterile until it is actually introduced into the patient.

Fourth, to provide such a package or container in which the air admitted to the container is thoroughly washed to remove contaminants.

Fifth, to provide such a package or container which can be made up easily and inexpensively and which may be destroyed after use.

Sixth, to provide such a package or container in which the chances for contamination of the sterile solution are reduced to a minimum.

Further objects and advantages pertaining to details and economies of construction and operation will appear from the description to follow. The invention is defined in the claim. A preferred embodiment of our invention is illustrated in the accompanying drawing, in which:

Fig. 1 is an elevational view partly in section of our improved package or container showing the same inverted for the withdrawal of the sterile solution or the like.

Fig. 2 is a view of the right side of the upper portion of Fig. 1.

Fig. 3 is a detail view partly in section of the anti-siphonic trap employed in our invention.

Fig. 4 is a partial elevational view partly in section of the top of the package or bottle showing the method of capping employed.

Referring to the drawing, 1 is a suitable bottle or container preferably made of glass. Lugs 2 are formed near the bottom to engage a holder 3 which consists of a pair of arms 4 pivoted together with the rivet 5. Each arm 4 carries at its end a fork 6 adapted to embrace the end of the bottle and engage the lug 2 when the bottle is held in inverted position for the dispensing of the liquid contained in the bottle. One fork 6 has at its ends apertures 7 and the other fork has at its ends lugs 8 adapted to fit within the apertures 7 when the holder is in position. The ends of the forks having the apertures 7 extend outside of the forks containing the lugs 8 and snap into place as shown in Figs. 1 and 2.

The bottle is provided with a stopper 9 of rubber or other suitable material which is fitted in the mouth 10 of the bottle. A liquid outlet 11 having a short section of tube 12 which may be of glass or any other suitable substance is provided. A rubber tube 13 may be fitted over the tube 12 to carry the sterile solution to its point of discharge. An air inlet 14 is provided in the stopper 9 and a tube 15 of glass extends from the air inlet 14 inside the bottle. The free end 16 of this tube extends to a point adjacent the bottom of the bottle and it will be apparent that when the bottle is in the upright position the free end 16 of the tube 15 will be immersed in the

liquid contained in the bottle if the bottle has its full content or if liquid is present in any appreciable amount.

In Fig. 1 the bottle is shown in inverted position for dispensing the liquid. The liquid shown at 17 rests against the stopper 9 of the bottle and the free end 16 of the tube extends above the liquid level which is indicated at 18. At a point spaced from the free end 16 of the tube 15, we provide an anti-siphonic trap 19. This trap consists of a loop 20 formed in the tube and an enlargement 21 formed in the tube adjacent the loop 20 and between the free end 16 of the tube and the loop 20. We prefer to use this arrangement of anti-siphonic trap because the tube 15 is preferably of glass and the enlargement 21 is formed by heating and blowing the glass, whereas the bends forming the loop 20 are formed by heating the glass. It is possible to form the trap more satisfactorily with this arrangement and it is also possible to make the enlargement 21 large enough to satisfactorily break up the air bubbles formed during use of the device and at the same time permit the easy insertion of the tube and its trap into the bottle or container during filling.

By locating the trap at a point spaced from the free end 16 of the tube, we eliminate breakage during handling and shipping because the weight of the loop 20 and the enlargement 21 is moved closer to the stopper or point of support of the tube 15.

The bottle is ordinarily kept in an upright position but when it is desired to withdraw the liquid from the bottle it is inverted to the position shown in Fig. 1. When the bottle is inverted, a portion of the liquid 17 which is contained in the bottle is trapped in the trap 19. When the liquid is withdrawn from the bottle, air passes in through the tube 15 and through the trap to the inside of the bottle. The liquid which is trapped in the trap 19 is shown in Fig. 3 at 22 and as the air passes through the tube 15 it reaches the trapped liquid 22 and carries the liquid up to the enlargement 21 of the tube. The bubble thus formed breaks on reaching the enlargement 21 and the liquid flows back to the bottom of the loop to the position indicated by the numeral 22 and as more air passes through the tube 15, this operation is repeated. The air entering the bottle is thus thoroughly washed, eliminating contaminants which might be otherwise carried to the sterile solution in the bottle. There is no danger

of cotton fibers passing into the solution and the washing of the air is assured by trapping of the liquid.

The tube 15 and the trap 19 are both sterilized when the sterile solution is sterilized and need no further sterilization. They are inexpensive and can be inserted in the bottle and can be thrown away when the solution has been used.

When the bottle is stored, the holder 3 is not in position on the bottle. The cork is held in position by a screw cap 23 and the ends of the tubes 12 and 15 are closed by rubber caps 24 and an outer screw cap 25 fits over the entire mouth of the bottle as shown in Fig. 4. In order to use the bottle it is necessary only to remove the outer cap 25 and the rubber caps 24. The tubes 12 and 15 are both in sterile condition and all that is necessary is to apply a sterile tube 13 to the tube 12 as shown in Fig. 1. Such sterile tube must of necessity be supplied so that no additional sterilization operations are required and it is not necessary to open the sterile solution bottle before use.

Having thus described our invention, what we claim as new and desire to secure by Letters Patent is:

In a dispensing package for sterile solutions or the like, the combination of a bottle, a stopper for said bottle having an outlet for liquid and an inlet for air, a tube extending inside the bottle and from the air inlet of the stopper with its free end adjacent the bottom of the bottle, whereby said free end will be immersed in liquid contained in the bottle when the bottle has its full liquid content and is upright but will extend above the liquid level in the bottle when the bottle has its full liquid content and is inverted for the withdrawal of liquid, and a trap formed in the tube at a point spaced from the free end of the tube in order to reduce the strain on the tube during handling of the package, said trap being located between said free end of the tube and said stopper and within the bottle, said trap comprising a loop formed in the tube, and an enlargement in the tube adjacent the loop and between the loop and the free end of the tube, whereby liquid from the bottle is trapped and retained in the loop when the bottle is inverted for the withdrawal of liquid whereby air passing into the bottle as the liquid is withdrawn will pass through the trapped liquid.

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