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METHOD OF PRODUCING STERILE PACKAGES

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Fig. 5.

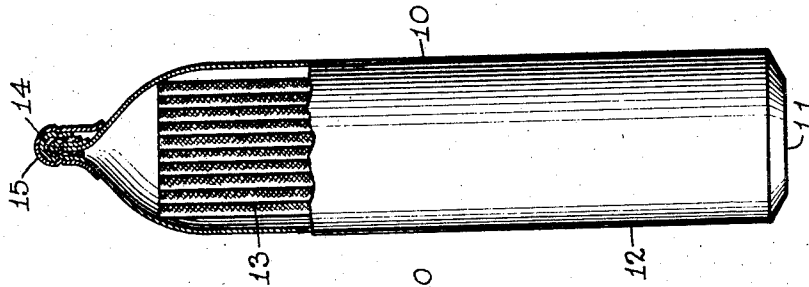


Fig. 4.

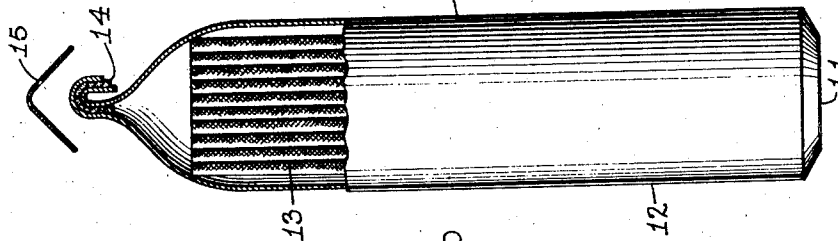


Fig. 3.

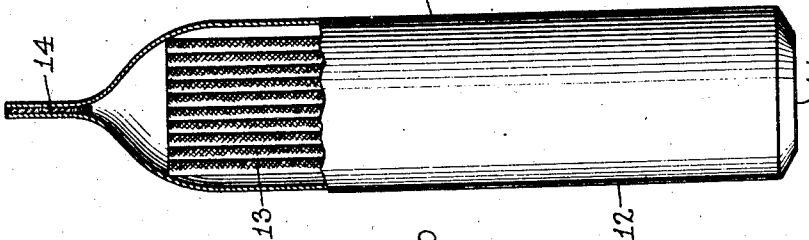


Fig. 2.

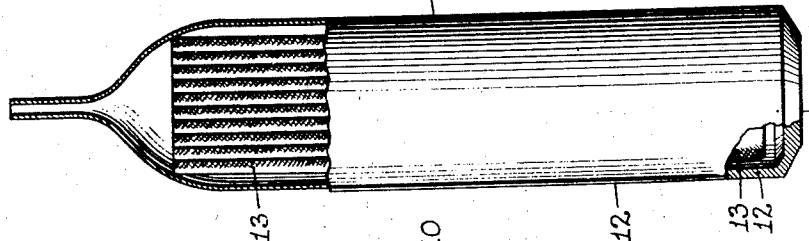
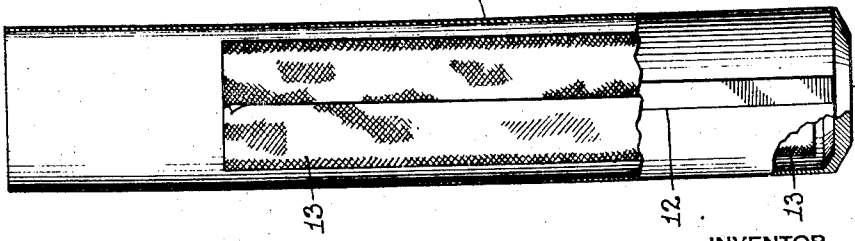


Fig. 1.



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METHOD OF PRODUCING STERILE PACKAGES

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2 Claims. (Cl. 21-2)

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This invention relates to methods of producing sterile packages. In one of its more specific aspects this invention is directed to novel methods for packaging sterile products.

In the art of gauze bandages and especially in that of bandages of this type which are impregnated with certain substances such as petrolatum or the like, it has been found essential in some cases to employ a sealed container therefor in order to maintain the same in proper physical and sterile condition. While a number of different means and different methods have been employed to obtain these results, none of them has been without certain disadvantages. After considerable experimentations with these problems, I have found that I may produce eminently satisfactory single use containers which may be hermetically sealed and sterilized in a simple and expeditious manner.

The objects and advantages of this invention will be readily apparent to those familiar with this art from the following description and drawings, wherein,

Figure 1 is a vertical cross-sectional view of a container having pleated gauze therein and shows the position of the gauze in the container or tube after the insertion of the gauze therein.

Figure 2 is a front elevation, with the upper part broken away, of the container with the gauze therein and after the step of flattening the open end of the container.

Figure 3 is a view similar to Figure 2 and shows the insert in the flattened end of the container.

Figure 4 is a view similar to Figure 3 and shows in cross-section the flattened upper end of the container after strip insertion and folding.

Figure 5 is a view similar to Figure 4 and shows in cross-section the upper end of the container after sterilization and hermetic sealing operations.

As shown in the drawings there is provided a normally cylindrical or hollow tubular body portion 10 having integral therewith a circular bottom or closure 11. A longitudinal narrow strip 12 of the body 10 is materially thicker than the remainder of said body and this portion 12 is also integral with the bottom 11. The portion or strip 12 is of material width and extends from closure 11 to the other end of the body portion 10. The closure or bottom 11, which may be of substantially uniform thickness throughout, is preferably materially thicker than either the strip 12 or the body portion 10.

In one of the preferred embodiments of this invention, I prefer that the body portion 10 with

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the exception of strip 12 be very thin and that the thickness thereof be no greater than about .006" and preferably between .003" and .006" so that the same may be readily sheared by the finger nail. The thickness of bottom 11 is at least 50% thicker than the thickness of body 10 and may be about 5 to 6 times the thickness of body 10 and is between about .030" and .065" to resist collapse under finger pressure. The strip 12 may be formed on the inside or outside of the tube and is at least 50% thicker than the thickness of the remainder of body 10 and for all practical purposes is between .004" and .016" thick. The width of strip 12 is at least .125" and may be between .125" and .375". These containers as aforescribed may be produced by any of the well known processes such as extruding and may be composed of any desirable material and preferably a shatterproof metallic material such as tin, aluminum, desirable alloys or the like capable of withstanding the high heat encountered in sterilization and being inert to gauze impregnants such as petrolatum or the like. These containers are primarily useful as packaging elements for pleated fabric such as cotton gauze or the like employed in the surgical dressing field.

One of the aforescribed containers is placed in an upright position as shown in Figure 1. The gauze to be placed therein is of a widthwise dimension somewhat less than the length of the body 10. A length of gauze 13 may be accordion pleated, with the width of all of the pleats, with the exception of the free ends, being substantially uniform. The accordion pleated gauze may then be inserted through the open end of the container and into said container so that it assumes the position shown in Figure 1. The free end of the gauze within the container is located in a near vicinity of tear strip 12. After the gauze 13 has been inserted into the container, a medicament or other substance such as petrolatum or the like may be poured into said container and over said gauze in order to saturate or impregnate the same therewith. The impregnated gauze in the container is shown in Figure 1. Then the upper or free end of the body portion 10 is flattened as shown in Figure 2, with the distance between the flattened sides being less than one-eighth of an inch and preferably between one-sixteenth and one-eighth of an inch. The depth of the flattened portion is between about one-quarter to one-half an inch. In the flattening operation, I prefer that the tear strip 12 be located at about the midpart of one of the flattened sides. After this first flattening operation to provide the construction

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shown in Figure 2, a thin cotton, paper, asbestos or other web or film 14 of fibrous material is inserted into opening between the flattened walls at the upper end of the tube or container. The length of the web 14 is approximately that of said opening, its depth is approximately that of said opening and its thickness is materially less than the distance between said flattened sides so as to permit ready insertion therebetween. After the insertion of said web or film 14 therebetween, pressure is applied between the outer surfaces of the flattened sides to maintain the film 14 in position. Then the package in this condition is placed in a pressure chamber capable of withstanding high pressures and equipped with devices for heating to the desired temperature, the gaseous medium, such as air or the like, therein.

In the course of heating the air in said chamber to the desired sterilizing temperature, the pressure within the container always approximates that of the gaseous ambient surrounding the same because there are some narrow "breathing" channels between the side walls of the container and the web or film 14. After the sterilizing step, the packages in the same physical condition are allowed to cool and in the course of cooling and consequent drop in pressure within the container, "breathing" again occurs through said channels. The "breathing" which occurs during sterilization and the cooling step thereafter is in the nature of exhaling and inhaling caused by differentials between the pressures inside and outside of the container. This "breathing" prevents container collapse or appreciable distortion during these steps and the disposition of the fibrous material 14 as aforescribed acts as a filter to prevent dust or other particles in the air being breathed therein from reaching the fabric located within the container.

Instead of carrying out the sterilizing and cooling steps in the package in the condition shown in Figure 2, one end of the package shown in Figure 2 may be loosely folded or lapped over but

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once as shown in Figure 3. Then this construction may be subjected to the sterilizing and cooling steps. This loosely closed end also permits "breathing" and in carrying out this invention, I prefer that the construction shown in Figure 3 rather than that shown in Figure 2 be subjected to the sterilizing and cooling steps in order to insure more effective filtering of the air in the course of inhalation during cooling.

After the cooling is complete, the loosely folded or lapped over end of the container is hermetically sealed by a strip or clip 15 being disposed lengthwise thereof and then subjected to high pressure.

I claim:

1. The method comprising placing a product to be sterilized in a collapsible tube having an open end, then flattening the open end of said container, inserting a fibrous filter material in said container and disposing said material between the flattened side walls of said end, then subjecting said assembly to heat and pressure to sterilize said product, cooling said assembly after said sterilization step, folding said flattened end of said container and said filter material and subsequently applying a clip to said folded over portion and subjecting the same to pressure to hermetically seal said end of said container.

2. The method comprising placing a product to be sterilized in a collapsible tube having an open end, then flattening the open end of said container to provide a pair of flat side walls spaced a small distance from each other, inserting a filtering medium in the space between said flat side walls, loosely folding said flat side walls with said filtering medium therebetween, then subjecting said assembly to heat and pressure to sterilize said product, cooling said assembly after said sterilization step, and subsequently applying a clip to said folded over portion of said tube and subjecting the same to pressure to hermetically seal said end of said tube.

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