United States Patent

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[54] **SEALED STERILE PACKAGE AND PROCESS FOR OPENING SAME**
7 Claims, 3 Drawing Figs.

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[51] **Int. Cl.** **C12b 3/00**
[50] **Field of Search** ..... 215/42, 45, 80; 53/39; 21/78; 206/45.12; 195/127, 139 LE, 102; 137/797

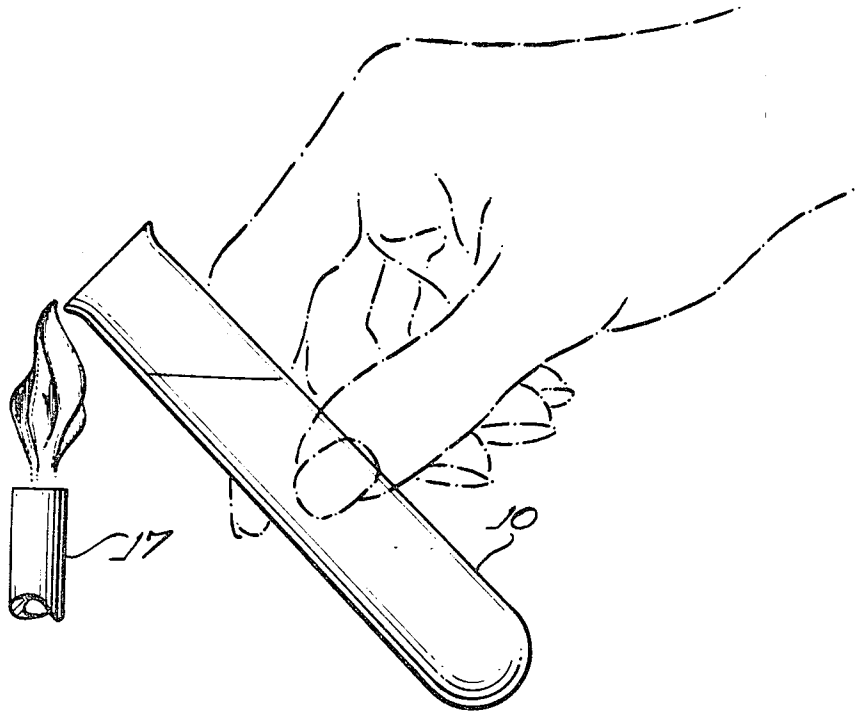
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ABSTRACT: The contents of a container are therein aseptically sealed by a heat-wastable closure secured in a small container opening. Access to the contents is achieved by passing the sealed portion of the container through a flame, simultaneously to waste said closure for unsealing said container and to sterilize the container about said opening.



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Fig. 1.

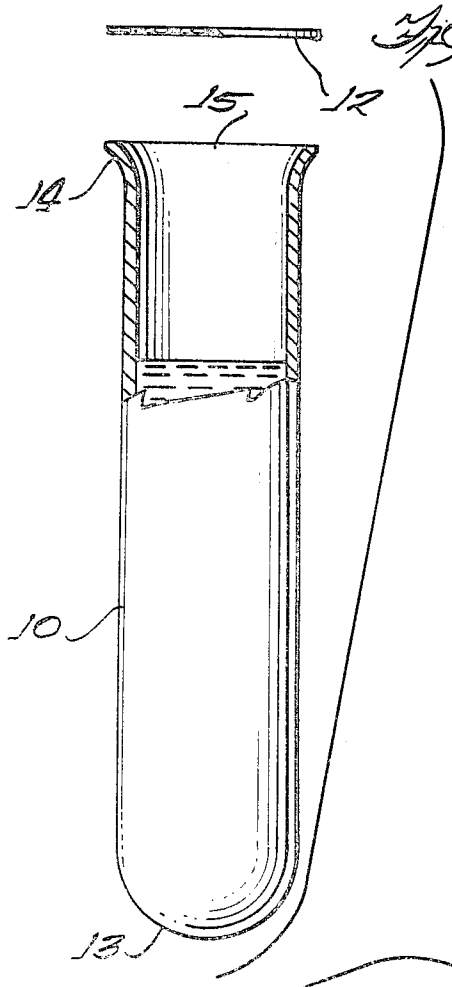


Fig. 2.

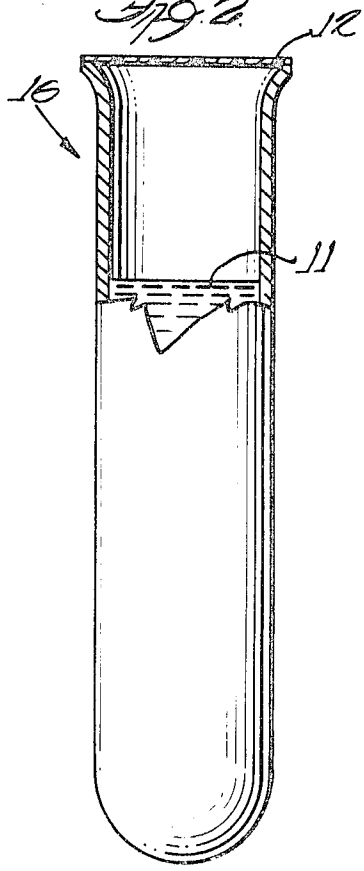
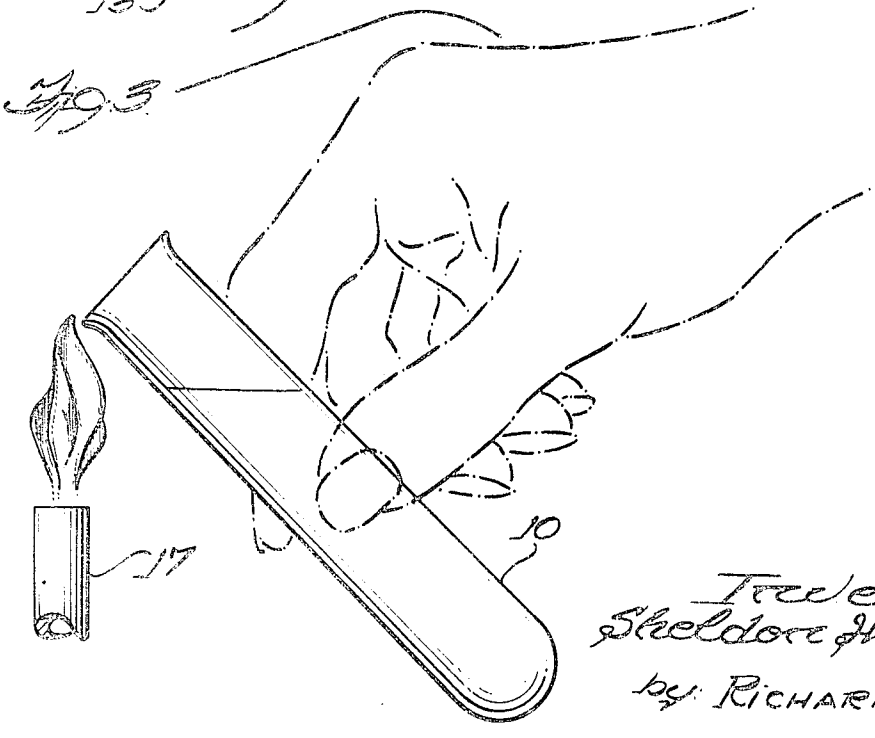


Fig. 3



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SEALED STERILE PACKAGE AND PROCESS FOR OPENING SAME

The present invention relates to a sterile package and a process for maintaining the package in an aseptic condition upon opening. Particularly the invention relates to a package and a process for culturing micro-organisms.

Micro-organisms may be cultured conventionally in a test tube or the like which is partially filled with a growth medium for supporting micro-organic proliferation. A removable closure such as a screwcap or stopper applied to the tube following partial filling seals the tube contents in consequence of which the medium will retain its aseptic condition during storage following sterilization.

At the time of use a technician who follows conventional practice first manually will remove the closure and thereafter pass the upper portion of the tube through a flame to sterilize and insure a sterile field about tube opening. Upon passing a bacteriologists loop, which has been contaminated from a known source, through the tube opening into the contents, the growth medium becomes inoculated with only selected matter. To prevent subsequent contamination, the open mouth of the tube is closed with a cotton plug. Thereafter, the tube and its contents are incubated for a predetermined period calculated to produce micro-organic growth from the inoculant.

The recent tremendous expansion in the demand for medical care has increased the work load in laboratories that concern themselves with microbiological examinations, particularly those in hospitals. Where the supply of technicians has been inadequate to accommodate the expansion, laboratory staffs have been overworked. Moreover, aside from overburdened staffs, the wages of laboratory technicians has risen with attendant rise in costs of services. In consequence there is a continuous quest for improving laboratory procedures to unburden staffs and minimize costs.

It is an object of this invention to minimize the time for performing a conventional laboratory procedure.

It is an additional object of the invention to provide an improved process for opening a container under sterile conditions.

It is a further object of the invention to eliminate one step in a conventional technique for microbiological examination.

It is another object of the invention to reduce the time required for preparation of a microbiological culture.

To achieve the foregoing objects a container having therein disposed contents which may be a growth medium for micro-organisms is sealed with a closure fabricated from a heat-wastable material. The sealed container is then stored temporarily. Thereafter, the closure is heated simultaneously to open and sterilize the container about the opening.

How to further achieve the foregoing and other objects, features and advantages of the invention will become more apparent upon consideration of the following description and appended claims, when considered in conjunction with the accompanying drawings wherein the same reference character or numeral refers to like or corresponding parts throughout the several views.

On the drawings:

FIG. 1 is a view of a package of a culture tube and closure in exploded relationship.

FIG. 2 is a view of the tube and its closure connected together in package form.

FIG. 3 is a view of the tube following wasting of its closure and illustrating the step of heat application.

Referring now more particularly to the drawings a container, herein shown as a culture tube **10** for microbes and the like, is partially filled with contents such as a growth-supporting culture medium **11**. Tube **10** may be of conventional fabrication such as glass or plastic. Preferred because its cost encourages disposability is a tube of transparent polystyrene fabrication having a diameter of about 15 mm. and being about 100 mm. long. However, because of its low-melting point polystyrene will preclude autoclaving for sterilization. If autoclaving is desirable then the tube can be polypropylene,

glass or other material which will retain its integrity under the heat of autoclaving. The culture medium **11** is not critical to the invention and may be of any conventional composition according to requirements, such as agar, blood agar or a broth of usual composition.

Tube **10** is closed at one end portion **13** and has an upper end portion **14** which defines an upper end opening **15** A cap or closure **12** is employed to seal opening **15** thereby to form a package **16** for culturing micro-organisms.

Closure **12** is a diaphragmlike construction, preferably a disc, which, if desired, may be transparent and rigid or semirigid. It may be made from a plastic material or a non-plastic, though plasticlike, material such as cellophane or a cellulose derivative such as cellulose acetate or cellulose butyrate. Essential is that the closure is easily heat wastable to the end that it can readily melt, combust or be incinerated. It is sealed to upper end portion **14** in any suitable fashion such as by gluing or welding, employing heat, pressure or ultrasonic energy so that a sterile barrier is formed across opening **15**. If fabricated from plastic, the closure may be polystyrene, but preferably is of biaxially oriented polypropylene or polyethylene fabrication approximately 0.004 inch thick. It may be conditioned for adherence or sticking to the container with a tackifying agent which may be incorporated in or coated on the closure, or with a thin coat of low-temperature melting or pressure-sensitive adhesive such as any well-known polyvinyl acetate or polyvinyl acetal.

Following sealing of tube **10** with contents therein the contents are sterilized such as by conventional autoclaving. If polystyrene is used for the tube, the tube contents will require sterilization before filling. After filling the sealed tube and sterile contents may be stored. A polystyrene tube of the aforestated preferred dimensions and filled with 6 ml. of blood agar when stored for 68 days at 5° C. loses only about 1 percent of its volume.

To use package **16** after storage, closure **12** requires removal. In accordance with the present invention this is effected by manually passing upper end portion **14** through a flame such as that provided in a laboratory by a conventional Bunsen burner **17**. Thereby the closure is wasted and the upper end portion of the tube is simultaneously opened and sterilized. Inoculation of the culture medium **11** with material from a known source preferably, is effected immediately following combustion of the closure by introducing a specimen into the medium **11** through opening **15** with a bacteriologists loop. Thereafter opening **15** may be sealed with a loose overcap or cotton plug to prevent contamination during ensuing incubation. Sterilization by flaming, as aforesaid, prevents contamination of the specimen resulting from engagement with the tube as the bacteriologists loop enters tube **10**.

From the foregoing it is apparent that heat wasting of the closure should be easily achieved. As used herein easily wasted means that the closure is quickly destroyed in a period insufficient to essentially affect the integrity of the tube. Preferably, the fabrication of the closure is such that upon wasting no interfering or substantially ostensible residue, such as ashes, result.

By reason of the foregoing, simultaneously a closure is removed from a sealed container to provide an opening to container contents and the container is sterilized about said opening. Moreover, in consequence of the foregoing, an operation in a conventional microbiological technique, namely the step of manually removing a closure, has been eliminated.

What is claimed is:

1. A process comprising the steps of:

sealing the opening of a container having therein disposed contents and with a closure fabricated from a heat-wastable material;

temporarily storing the sealed container; and then

applying heat about the sealed opening simultaneously to waste the closure for obtaining access to the contents through, and sterilize the container about, said opening.

2. A process according to claim 1 in which the step of heating comprises combusting.

3. A process according to claim 1 in which the closure is fabricated from a material which leaves no interfering residue when wasted.

4. A process according to claim 1 in which the step of sealing comprises sticking said closure by adhesive to said container while the closure is disposed across said opening.

5. A process according to claim 2 in which combusting comprises manually passing the sealed portion of the container through a flame.

6. A process according to claim 1 further characterized by the step of sterilizing the container and said contents prior to storage.

7. A process according to claim 6 in which the contents comprise a growth medium for a micro-organic culture.

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