

Sept. 4, 1945.

C. B. RAVEN

2,384,398

STERILIZING CONTAINER

Filed June 22, 1943

2 Sheets-Sheet 1

FIG. 1.

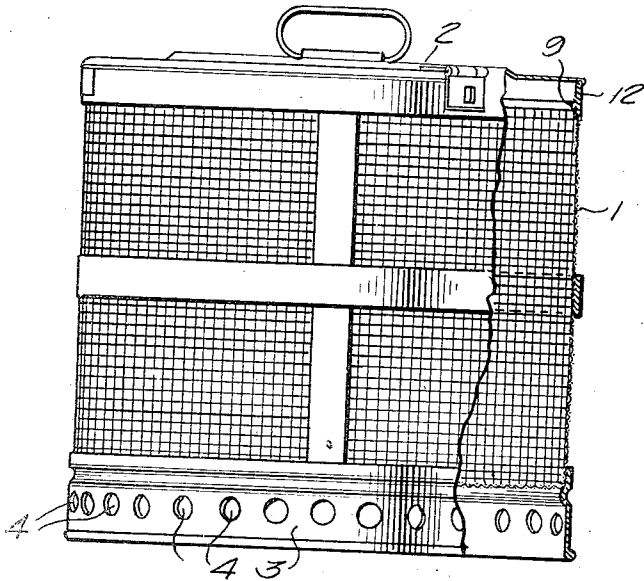


FIG. 5.

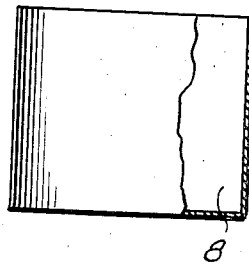


FIG. 2.

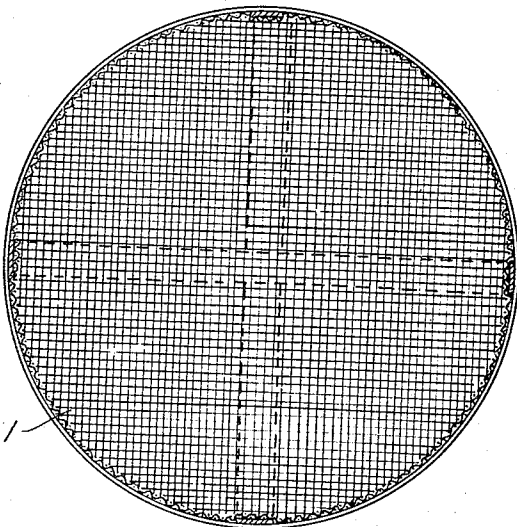
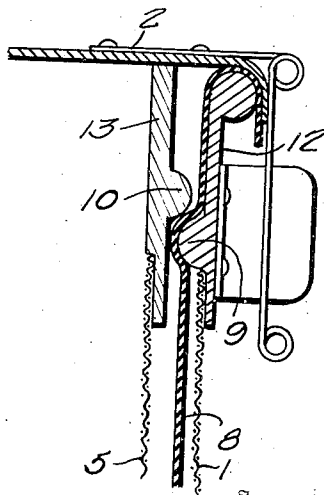


FIG. 6.



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FIG. 3.

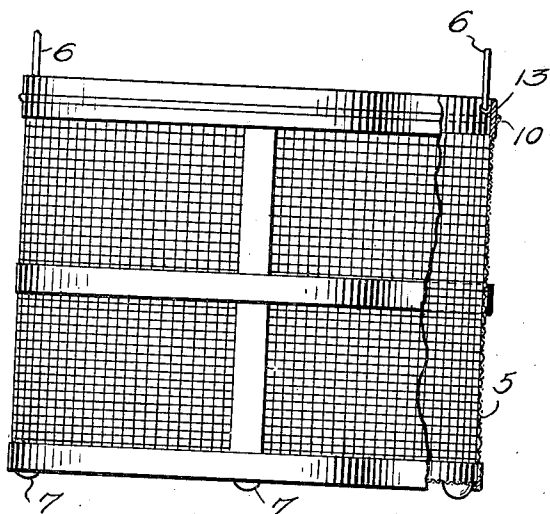


FIG. 7.

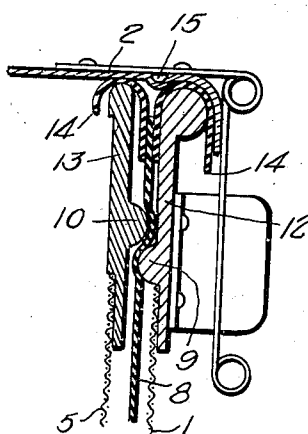


FIG. 4.

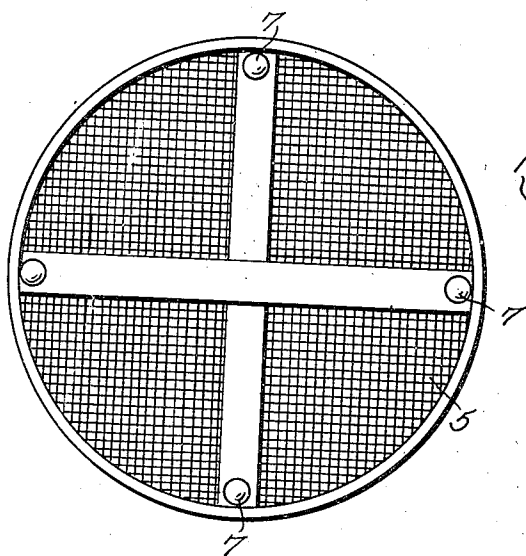
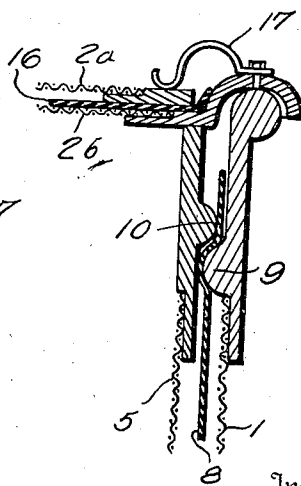


FIG. 8.



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UNITED STATES PATENT OFFICE

2,384,398

STERILIZING CONTAINER

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Application June 22, 1943, Serial No. 491,821
In Sweden June 20, 1942

17 Claims. (Cl. 21—91)

When sterilizing surgical instruments, first-aid requisites and the like by means of steam of elevated pressure in sterilizing containers it is of great importance that practically all the air is expelled from the autoclaves and containers, as the presence of even such a small amount of air as 10–20% may affect the sterilizing property of the steam. It is therefore important that the steam shall be able to enter easily into every part of the container so that no air pockets arise in the container. Besides this, it must be possible to close the container so tight that it is impossible for foreign matter to enter after termination of the sterilization process. Sterilizing containers now used do not fulfil this requirement.

One object of the present invention is to provide a sterilizing container that fulfils the above mentioned extremely important requirement.

Another object of the invention is to provide a sterilizing container that is not impaired by a number of disadvantages from which the hitherto known sterilizing containers suffer, e. g., that one or more flaps or lids of the container must be opened, when the container is inserted into the autoclave, so that steam of elevated pressure may have access to the interior of the container, it being necessary to close the said flaps or lids, when the container is taken out of the autoclave after the steam treatment, so that no impure air or other foreign matter may enter the container. Overcoming this disadvantage of the known containers is extremely important, as it may easily happen that the attendant absolutely automatically performs the hand-movements necessary for the closing of the flaps or lids on termination of the sterilizing process and consequently is liable to be in doubt as to whether the flaps or the lids of a certain container have been closed during the whole of the sterilizing process, especially as often 10 or 20 containers are treated at the same time. Should the attendant be in such doubt, the container in question must for safety's sake be sterilized anew.

A further object of the invention is to provide a sterilizing container, whereby a bag of textile material or filter paper is used as germ filter.

Another object of the invention is to provide a sterilizing container, whereby the bag serving as a germ filter made of textile material or preferably filter paper need not be folded for assuring germ-tightness.

Another object of the invention is to produce a sterilizing container, whereby it is possible to ascertain with certainty at a single glance

whether the container is germ-tight closed or not.

Other objects and advantages of the invention will be understood from the following description of a suitable embodiment of the invention, as shown in the drawings.

In the drawings

Fig. 1 shows an outer casing for the sterilizing container seen from the side and partly in section.

Fig. 2 is a horizontal section through the casing according to Fig. 1.

Fig. 3 shows a basket seen from the side and partly in section.

Fig. 4 shows the basket seen from underneath.

Fig. 5 shows on a smaller scale a bag seen from the side and partly in section.

Fig. 6 shows on a large scale a fragmentary section through the upper corner portion of the assembled and closed sterilizing container according to the invention.

Fig. 7 shows a similar fragmentary section as Fig. 6 through a modified embodiment of the sterilizing container according to the invention.

Fig. 8 shows a similar fragmentary section as Figs. 6 and 7 of a further modified embodiment, of the sterilizing container according to the invention.

The sterilizing container shown in the drawings consists of an outer casing 1 (see Figs. 1 and 2) which can be closed by means of a lid 2. The casing herein shown is cylindrical, but it can be given any suitable form, although that of a cylinder is to be preferred. The lateral wall and bottom herein shown are made of netting stretched on a frame of metal laths, but they may also, although in certain respects not so advantageously, be made of perforated sheet metal. So that steam may have free access to the bottom of the outer casing 1, even when it is placed on the bottom of the sterilizing autoclave, for example, the casing is provided with a circumferential edge lath 3 projecting from the bottom, said lath being provided with perforations 4. This lath can, of course, also be made of netting. Instead of being provided with such an edge lath 3, the casing may for the same purpose be provided with one or more radially arranged laths or legs or the like projecting from the bottom, it not being necessary for such laths, etc., to be perforated.

The sterilizing container consists furthermore of a basket 5 (see Figs. 3 and 4) that is insertable into the casing, said basket being shown consisting of netting stretched on a lath frame, but

may also be made of any other perforated material. So that the basket may easily be taken out of the outer casing 1 it is provided with a pair of annular grips 6 and, so that it may stand steady on the table or the like, it is provided with small feet 7.

Finally the sterilizing container consists also of a bag 8 (see Fig. 5), into which the basket 5 may be inserted and which, together with the bag inserted therein, can be introduced into the outer casing 1. The bag 8 may be made of textile material or, what is especially advantageous, of filter paper. The use of the last mentioned material for the bag is made possible by the fact that the outer casing 1 and the basket are made of comparatively fine-meshed netting or possibly of sheet metal densely perforated to assure ample entrance for the steam, said material protecting the relatively fragile germ filter from injury from without.

Inside the outer casing 1 there should preferably be one or more holding means, from which the basket 5 together with bag 8 may be suspended. As shown (see especially Fig. 6) such a holder may preferably consist of an inward projecting circumferential rib 9 arranged on the upper part of the outer casing 1, on which rim the basket 5 together with the bag 8 is suspensible by means of a circumferential outwardly projecting rib 10 of the basket. Rib 9 preferably is formed integral with the unperforated upper edge band or rim 12 of the cylindrical wall of the outer casing 1. Rib 10 is preferably formed integral with the unperforated upper edge band or rim 13 of the basket 5. Either rib, however, may be formed as a separate element and then secured to the edge band or rim to which it is to be applied.

To prevent the germs from penetrating to the sterilized things inside the basket 5, the unperforated lid 2 of the outer casing 1 may, when closed, be in sealing engagement with either the top edge of the basket or with the upper edge of the outer casing. By the adaptation of ribs 9 and 10, the germ-tight bag 8 is caused to lie zigzag between the rims 12 and 13, thus assuring a very good germ-tight sealing, so that when the lid 2 is in sealing engagement with the upper edge of the casing, the germs cannot come in through the lateral wall of the casing 1 and up through the space between the casing and the bag 8 and over the upper edge of the latter and of basket 5 into said basket or, when the lid 2 is in sealing engagement with the upper edge of the basket 5 the germs cannot come in through the space between the lid and the upper edges of the casing 1 and of the bag 8 and down through the space between the bag 8 and the basket 5 and in through the wall of the latter to the things in the basket.

To further assure a tight sealing, the bag 8 may be made of such height, that, when it is positioned around the basket 5 and the latter inserted in the outer casing 1, its upper edge extends beyond the upper edges of the basket and of the outer casing and can be folded over either the upper edge of the basket, when the lid 2 is placed in sealing engagement with the upper edge of the basket, or as shown in Fig. 6, the upper edge of the outer casing 1, when the lid is placed in sealing engagement with the upper edge of the casing. That part of the bag folded over the edge of the basket 5 or of the casing 1 hereby serves as packing between the said edge and the lid 2. When the bag is made of filter

paper or other material of inferior stretching property the edge portion of the bag may preferably consist of a strip of material, that is more tensile.

As shown in Fig. 7 the height of the bag 8 is most preferably of approximately the same height as that of the basket 5 said bag having two circumferential sealing strips 14 which are stuck to the inside or the outside of the bag around its upper edge portion. One of these sealing strips 14 is folded over the upper edge of the casing 1, and the other strip is folded over the upper edge of the basket 5. The lid 2 may be placed in sealing engagement with either the upper edge of the basket or the upper edge of the casing, or with both, and it is preferably provided with a downward projecting rib 15 which is arranged in such a manner that, when the lid is closed, it projects downwards between the upper edge of the basket and that of the casing and presses the sealing strips against the respective rims 12 and 13 of the casing and basket respectively. If the bag 8 is made of filter paper the sealing strips 14 may advantageously be made of another more tensile material. In case the bag 8 is made of filter paper, one of the sealing strips 14, preferably the inner one, may, if desired, consist of the upper edge part of the bag whose height is greater than that of the basket 5. The outer sealing strip 14 is preferably made so broad or, when said sealing strip is formed by the bag itself (also applicable to the embodiment shown in Fig. 6) the bag is made so high that when it is folded over the upper edge 12 of the casing it projects somewhat under the closed lid 2 and is completely visible from without, whereby, after the closing of the container, the attendant may make sure that the bag is in its proper position and that the container is therefore completely germ-tight.

The invention is, of course, not to be considered as being limited to the embodiment of the sterilizing container according to the present invention as shown and described herein, as a great number of modifications regarding the various details of the arrangement may be carried out within the scope and spirit of the invention. Due consideration must be given to the fact, that the lid 2 shown unperforated in the drawings may, if desired, be made of perforated material, for instance netting as shown in Fig. 8, the lid in such case comprising double walls 2a and 2b with a filter paper 16 or a cloth of textile material inserted therebetween, so that germs are prevented from entering the container through the lid. The lid wall 2a is preferably secured by means of resilient clamps 17 arranged around the edge of lid wall 2b, in a recess in the lid wall 2b, whereby the filter paper 16 is preferably of somewhat greater diameter than that of the lid wall 2a, as shown in Fig. 8, so that its edge will project beyond the edge of the lid wall 2a, whereby it may be ascertained at a single glance, whether the filter paper 16 is in its proper position and the lid absolutely germ-tight.

It is, however, not necessary for the lid to be made of perforated material that the sterilizing steam may with certainty come in everywhere in the container; and besides this, a perforated lid causes rather considerable practical inconveniences.

What I claim and desire to secure by Letters Patent is:

1. A sterilizing container comprising an outer casing having a perforated lateral wall and a

bottom, a lid for closing said casing, a basket of perforated material removably supported in said casing, and a bag of germ-tight material permitting the passage of fluids therethrough and removably mounted between said casing and said basket.

2. A sterilizing container comprising an outer casing having a perforated lateral wall and perforated bottom, means for supporting said bottom of said casing in spaced relation to the surface supporting said casing and permitting free access of fluid to the underside of said bottom, a lid for closing said casing, a basket of perforated material and removably mounted in said casing, and a bag of germ-tight material permitting the passage of fluid therethrough and mounted between said casing and said basket.

3. A sterilizing container comprising an outer casing having a perforated lateral wall and a perforated bottom, a germ-tight lid for closing said casing, a basket of perforated material and removably mounted in said casing, and a bag of germ-tight material permitting the passage of fluid therethrough and removably mounted between said casing and said basket.

4. A sterilizing container comprising an outer casing having a perforated lateral wall and a perforated bottom, a basket of perforated material removably mounted in said casing, a germ-tight lid for closing said casing and germ-tight sealing the interior of said basket against the atmosphere, and a bag of germ-tight material permitting the passage of fluid therethrough and mounted between said casing and said basket.

5. A sterilizing container comprising an outer casing having a perforated lateral wall and a perforated bottom, holding means in said casing, a basket of perforated material mounted in suspended relationship on said holding means in said casing, a germ-tight lid for closing said casing and germ-tight sealing the interior of said basket against the atmosphere, and a bag of germ-tight material permitting the passage of fluid therethrough and mounted between said casing and said basket.

6. A sterilizing container comprising an outer casing having a perforated lateral wall and a bottom, an inwardly projecting circumferential rib arranged on the upper part of said casing, a basket of perforated material and fitting in said casing, an outwardly projecting circumferential rib on said basket for suspending said basket in said casing on said inwardly projecting rib, a germ-tight lid for closing said casing and germ-tight sealing the interior of said basket against the atmosphere, and a bag of germ-tight material permitting the passage of gas therethrough and mounted between said casing and said basket.

7. A sterilizing container comprising an outer casing having a perforated lateral wall and a bottom, an unperforated upper edge band on said casing, an inwardly projecting circumferential rib on said edge band, a basket of perforated material fitting in said casing, an unperforated upper edge band on said basket, an outwardly projecting rib on said edge band of said basket for suspending said basket in said casing on said inwardly projecting rib, a germ-tight lid for closing said casing and germ-tight sealing the interior of said basket against the atmosphere, and a bag of germ-tight material permitting the passage of gas therethrough and mounted between said casing and said basket.

8. A sterilizing container comprising an outer casing having a perforated lateral wall and a

bottom, a basket of perforated material mounted in said casing, a germ-tight lid for closing said casing, a bag of germ-tight material permitting the passage of gas therethrough and insertable between said casing and said basket, and means on said bag for engagement with said lid for obtaining a germ-tight sealing of the interior of said basket against the atmosphere.

9. A sterilizing container comprising an outer casing having a perforated lateral wall and a bottom, a basket of perforated material mounted in said casing, a germ-tight lid for closing said casing, a bag of germ-tight material permitting the passage of gas and mounted between said casing and said basket, and an upper edge portion on said bag being folded over the edge of said casing and clamped between said lid and said edge of said casing.

10. A sterilizing container comprising an outer casing having a perforated lateral wall and a bottom, a basket of perforated material mounted in said casing, a germ-tight lid for closing said casing, and a bag of germ-tight material permitting the passage of gas and mounted between said casing and said basket, said bag having an upper edge portion adapted to be folded over the edge of said casing being clasped between said lid and said upper edge of said casing and extending beyond the edge of said lid, so that it is completely visible from the outside of the container.

11. A sterilizing container according to claim 10, in which said upper edge portion of said bag is stronger than the rest of said bag.

12. A sterilizing container comprising an outer casing having a perforated lateral wall and a bottom, a basket of perforated material mounted in said casing, a germ-tight lid for closing said casing, and a bag of germ-tight material permitting the passage of gas and mounted between said casing and said basket, said bag having two upper edge parts of which one is folded over the edge of said basket and the other is folded over the edge of said casing for engagement with said lid for obtaining a germ-tight sealing of the interior of said basket against the atmosphere.

13. A sterilizing container comprising an outer casing having a perforated lateral wall and a bottom, a basket of perforated material mounted in said casing, a germ-tight lid for closing said casing, a bag of germ-tight material permitting the passage of gas and mounted between said casing and said basket, said bag having two upper edge parts of which one is folded over the edge of said basket and the other is folded over the edge of said casing for engagement with said lid for obtaining a germ-tight sealing of the interior of said basket against the atmosphere, and said other edge part projecting below said lid to a position where it is visible from the outside of the container.

14. A sterilizing container comprising an outer casing having a perforated lateral wall and a bottom, a basket of perforated material mounted in said casing, a germ-tight lid for closing said casing, a bag of germ-tight material permitting the passage of gas and mounted between said casing and said basket, said bag having two upper edge parts of which one is folded over the edge of said basket and the other is folded over the edge of said casing for engagement with said lid for obtaining a germ-tight sealing of the interior of said basket against the atmosphere, said other edge part projecting below said lid to a position where it is visible from without, and a rib on said

lid projecting downward between said two edge parts of said bag.

15. A sterilizing container according to claim 14, in which said upper edge part which is folded over the edge of said casing is strengthened relative to the rest of said bag.

16. A sterilizing container comprising an outer casing having a perforated lateral wall, a perforated bottom and an unperforated lid for closing said casing, a basket of perforated material in said casing, and a bag of germ-tight material

permitting the passage of gas therethrough and provided between said casing and said basket.

17. A sterilizing container comprising an outer casing having a perforated lateral wall and a perforated bottom, a double-walled perforated lid for closing said casing, a germ-tight filter means permitting the passage of gas between the walls of said double-walled lid, a basket in said casing, and a bag of germ-tight material permitting the passage of gas therethrough and provided between said casing and said basket.

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