

[54] **STERILIZING APPARATUS FOR MEDICAL INSTRUMENTS**

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[58] **Field of Search** ..... 21/87, 105, 103, 99; 206/63.2 R, 72, 46 FC, DIG. 24; 220/23.83, 23.86, 17

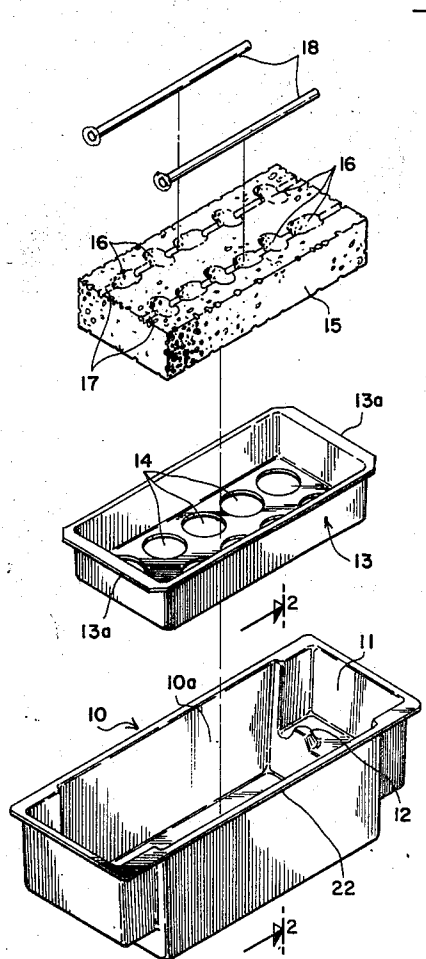
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[57] **ABSTRACT**

A sterilizing apparatus for delicate medical instruments comprising an immersion basin, into which the sterilizing solution is poured, and a plastic carrier tray having a cellular block of material disposed therein for carrying the medical instruments and submerging them in the sterilizing solution in the immersion basin. Both the tray and the block of material have a plurality of apertures provided therein to permit free flow of the sterilizing solution over the medical instruments. The tray and block of material may also be used to sterilize the instruments by means of a sterilizing gas.

**6 Claims, 4 Drawing Figures**



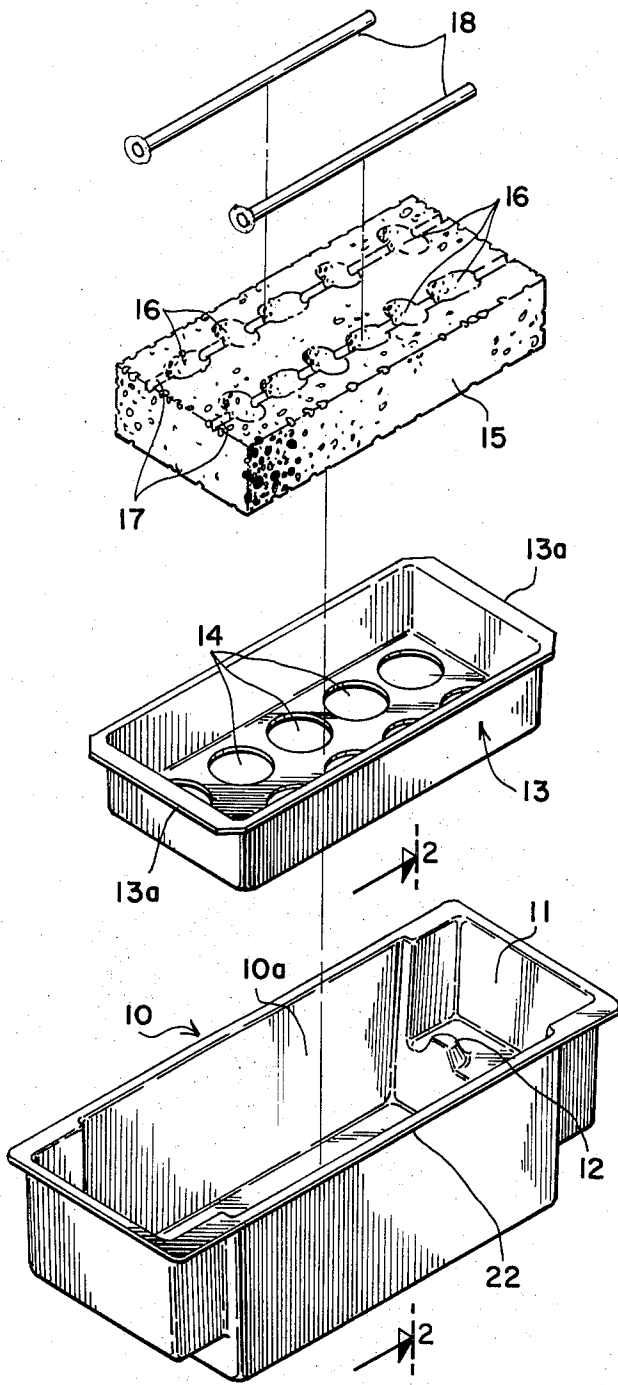


Fig. 1.

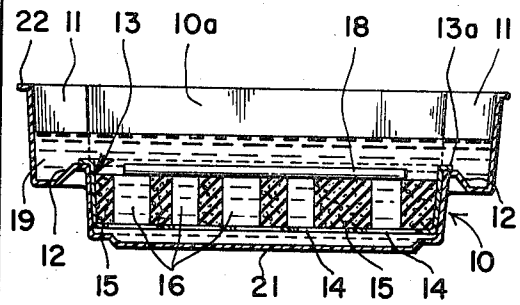


Fig. 3.

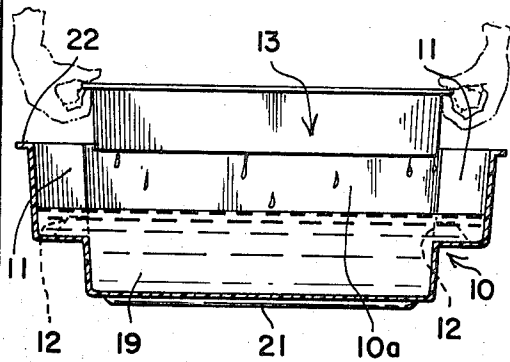


Fig. 4.

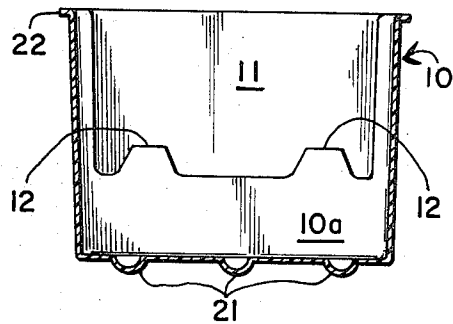


Fig. 2.

## STERILIZING APPARATUS FOR MEDICAL INSTRUMENTS

The present invention relates to a sterilizing apparatus, and in particular, to a cold solution sterilizing apparatus for delicate medical instruments, such as cystoscopes, bronchoscopes, laparoscopes, peritonoscopes, panendoscopes, and resectoscopes.

Delicate medical surgical instruments, such as those used in urological operations, and those mentioned above, are very easily damaged by mishandling. Generally, these instruments comprise long tubes having a plurality of series lenses disposed therein which enable the medical doctor to examine the patient. At one end of the long tubes, containing lenses, is usually an eyepiece for visualization through the lens. During a typical operation, five or six of these delicate instruments may be used. Before and after operations, these instruments must be sterilized. The sterilization process is carried out in cold sterile solutions, since warm or hot solutions, or alcohol, might damage the lenses or loosen them from the adhesives which secure the lenses to the inside of the tubes.

These medical instruments are very expensive, costing up to a thousand and more dollars each. The repair of these instruments is concomitantly expensive when damaged. In the typical hospital, however, low paid, unskilled hospital personnel are usually responsible for the care and cleaning of these instruments. Such persons do not appreciate the value of these instruments, or their extreme fragileness, and often drop them or improperly sterilize them, thus damaging the instruments. The resulting repair bills for these instruments are very high.

Accordingly, the present invention provides a sterilizing apparatus comprising a substantially rectangular-shaped immersion basin in which a cold solution is poured for sterilizing the medical instruments; a plastic tray having a plurality of apertures in its lower surface which is disposed in the cold solution in the immersion basin; and a block of cellular, porous material, disposed in the plastic tray, and having grooves provided in its top surface for receiving and supporting the medical instruments. A plurality of apertures extend through the material and permit the flow of the sterilizing solution through the block of material and the plastic tray over the instruments. The immersion basin has a pair of outwardly extending shelves at each end, from which a plurality of upwardly-extending support members project for engaging flanges on the plastic tray and supporting the plastic tray, the block of material and the medical instruments in the cold solution. The shelves and support members allow the hands of the person sterilizing the instruments to be placed in each end of the immersion basin adjacent the ends of the plastic tray so that the medical instruments may be placed in or removed from the cold solution without handling.

It is therefore an object of the present invention to provide a sterilizing apparatus for delicate medical instruments in which the instruments may be placed in or removed from a sterilizing solution without manual handling.

It is also an object of the present invention to provide a sterilizing apparatus for medical instruments which reduces the likelihood of damage to these instruments during sterilization.

It is a further object of the present invention to provide a sterilizing apparatus for medical instruments which is simple in design, easy to manufacture, and simple and reliable in its operation.

Other objects and features of the present invention will become apparent from the following detailed description taken in connection with the accompanying drawings. It is to be understood, however, that the drawings are designed for the purpose of illustration only, and not as a definition of the limits and scope of the invention.

In the drawings, wherein similar reference numerals denote similar elements throughout the several views:

FIG. 1 is an exploded, perspective view of a sterilizing apparatus constructed in accordance with the present invention;

FIG. 2 is a cross-sectional view of the immersion basin of the sterilizing apparatus taken along section 2—2 of FIG. 1;

FIG. 3 is a cross-sectional side view of the sterilizing apparatus, shown in use during the sterilization of the medical instruments; and

FIG. 4 is another cross-sectional view of the sterilizing apparatus, in which the plastic tray, cellular material and medical instruments are being removed from the immersion basin by a person sterilizing the instruments.

Referring to the drawings, there is shown a plastic immersion basin 10, a plastic support tray 13 for disposal in the immersion basin, and a rectangular block of cellular, porous material 15 for disposal in the tray and for supporting the medical instruments 18. Immersion basin 10 has a deep, rectangular-shaped submersion portion 10a in which the cold sterilizing solution 19 is poured and the medical instruments, tray and block 15 are submerged. The basin has a pair of rectangular-shaped shelves 11 at each end, in which a plurality of upwardly extending support members 12 are disposed. Shelves 11 and support member 12 are integrally formed with the immersion basin. Flange 22 extends completely around the upper periphery of the immersion basin to facilitate easy gripping of the basin.

Plastic tray 13 is provided with a plurality of circular apertures 14 in its lower surface which permit the sterilizing solution to flow through the tray when it is submerged and drain therefrom when the tray is removed. Flanges 13a provided at each end of tray 13 are supported by support members 12 when the tray is placed in immersion basin 10. The dimensions of block of material 15 are slightly less than the interior dimensions of tray 13 so that the block of material may be slidably disposed therein. Block of material 15 has a plurality of vertically disposed, oval-shaped apertures 16 extending entirely therethrough which permit the liquid sterilizing solution to flow through the block over the medical instruments. Grooves 17 are disposed longitudinally in the upper surface of the block of material and have a depth corresponding to the approximate radius of medical instruments 18 so that the instruments may be securely disposed therein. Longitudinal ribs 21 are integrally formed on the bottom surface of the immersion basin for supporting the sterilizing apparatus.

FIGS. 3 and 4 show the sterilizing apparatus during use. Medical instruments 18 are placed in grooves 17 on block of material 15 by the medical doctor after or before their use in an operation. Block of material 15

is preferably a porous, sponge-like plastic material, such as polyurethane, having cellular apertures, to permit air and the sterilizing solution to flow freely through the block of material. Oval-shaped apertures 16 are disposed in a linear arrangement along grooves 17 so that the medical instruments span the apertures when placed in the grooves. Block of material 15 is preferably placed into tray 13 before the instruments are placed in grooves 17. The tray, which is also preferably constructed of plastic material, block of material and medical instruments are then inserted into immersion basin 10 and sterilizing solution 19 so that flanges 13a engage support members 12 and tray 13 is disposed in the sterilizing solution as illustrated in FIG. 3. The outer dimensions of the plastic tray are approximately the same as portion 10a of immersion basin 10, so that the tray fits securely and snugly within the lower portion of the immersion basin and is guided to and from its mounting position in the basin by the interior walls adjacent support members 12 and shelves 11 of the immersion basin.

When plastic tray 13 and the medical instruments are placed in the immersion basin in the sterilizing solution, the fluid flows upwardly through apertures 14 and 16, and through block of material 15, over medical instruments 18. The sterilizing solution may be of any suitable type, such as, for example, formalin, "Urolocide," or "Cidex." After the medical instruments have been soaked in the sterile solution for a predetermined time, generally under 15 minutes, tray 13 is removed from the immersion basin to a bath of sterile water, after which they are air dried to ready them for use. The tray is placed in the immersion basin and removed therefrom by the person sterilizing the instruments by placing his hands in shelves 11 and lowering or raising tray 13 to or from support members 12 by gripping flanges 13a. The walls of portion 10a of the immersion basin guide tray 13 to and from its position on support members 12.

It should be noted that the medical instruments may also be sterilized by using a gas, such as ethylene oxide. If this method is used, immersion basin 10 is not necessary, and only tray 13 and block of material 15 would be used to support the medical instruments when they are exposed to the sterilizing gas. However, regardless of whether the instruments are sterilized by gas or fluid solution, the instruments do not have to be handled by the personnel sterilizing them, since the instruments can be transported to and from the sterilizing apparatus by tray 13 and block of material 15. The supporting material 15 which holds the instruments may also be a plastic support material with multiple holes to permit the fluids to drain through the holes in the material.

While only a single embodiment of the present invention has been shown and described, it will be obvious

to those persons skilled in the art that many changes and modifications may be made thereunto without departing from the spirit and scope of the invention.

What is claimed is:

1. Apparatus for sterilizing medical instruments with a sterilizing solution comprising:
  - a carrier tray for supporting and transporting the medical instruments during the sterilizing process, said tray including a plurality of apertures disposed in the lower surface thereof;
  - a block of resilient material having at least one elongated groove provided in the top surface thereof and disposed in said carrier tray for receiving and supporting the medical instruments in the tray during transportation and sterilization thereof;
  - an immersion basin for containing the sterilizing solution and for receiving said carrier tray and resilient block, said basin having a depth sufficient to submerge the medical instruments in the carrier tray in the sterilizing solution;
  - end flanges integrally formed at each end of the carrier tray; and
  - means disposed in the immersion basin for engaging the end flanges of the tray and supporting the tray in the immersion basin.
2. The sterilizing apparatus as recited in claim 1, wherein said immersion basin tray supporting means comprises a pair of outwardly extending shelves, integrally formed therewith at each end, disposed a selected distance vertically upwardly from the bottom of said immersion basin, for supporting said end flanges of said tray when said tray is disposed in said immersion basin during the sterilization of the medical instruments.
3. The sterilizing apparatus as recited in claim 2, wherein said immersion basin further comprises a plurality of support members, integrally formed with said shelves of said immersion basin and extending upwardly from the surface of said shelves, for engaging said end flanges of said tray and supporting said tray above the surface of said shelves, so as to permit easy removal of said tray and the medical instruments from said immersion basin.
4. The sterilizing apparatus as recited in claim 3, wherein the outer dimensions of said carrier tray are substantially the same as the inner dimensions of said immersion basin so that said carrier tray is guided by the interior walls of said immersion basin into and out of said basin.
5. The sterilizing apparatus as recited in claim 3, wherein said block of material is a cellular porous material.
6. The sterilizing apparatus as recited in claim 5, wherein said block of material is polyurethane.

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