United States Patent [19]

Folus

[11] **3,742,187**

[45] **June 26, 1973**

[54] **INOCULATION AND TRANSFER LOOP AND STERILIZER**

[75] Inventor: **Stanford G. Folus**, Randallstown, Baltimore, Md.

[73] Assignee: **Becton, Dickinson & Company**, East Rutherford, N.J.

[22] Filed: **Oct. 22, 1970**

[21] Appl. No.: **83,268**

[52] **U.S. Cl.** **219/240**, 21/89, 128/303.1, 195/120, 195/127, 219/233, 219/242, 219/533

[51] **Int. Cl.** **H05b 3/00**, A61l 3/00, C12b 1/02

[58] **Field of Search** 195/127, 120; 21/81, 21/85, 89, 54, 102; 128/303.1, 303.12, 303.14; 219/221–242, 533; 30/140

[56] **References Cited**

UNITED STATES PATENTS

2,511,192	6/1950	Barroso	219/240
2,820,877	1/1958	Oates	219/247
2,134,378	10/1938	Rosenthal	219/479
2,714,650	8/1955	Werner	219/247
1,679,756	8/1928	Allen	219/247
2,421,125	5/1947	Krebs	30/140
2,101,913	12/1937	Meyer	219/233 X
3,436,171	4/1969	Weichselbaum et al.	219/242 UX
2,051,759	8/1936	Turpin et al.	219/242 X
2,310,844	2/1943	Draeger	219/233 X
3,168,640	2/1965	Rosenthal	219/242

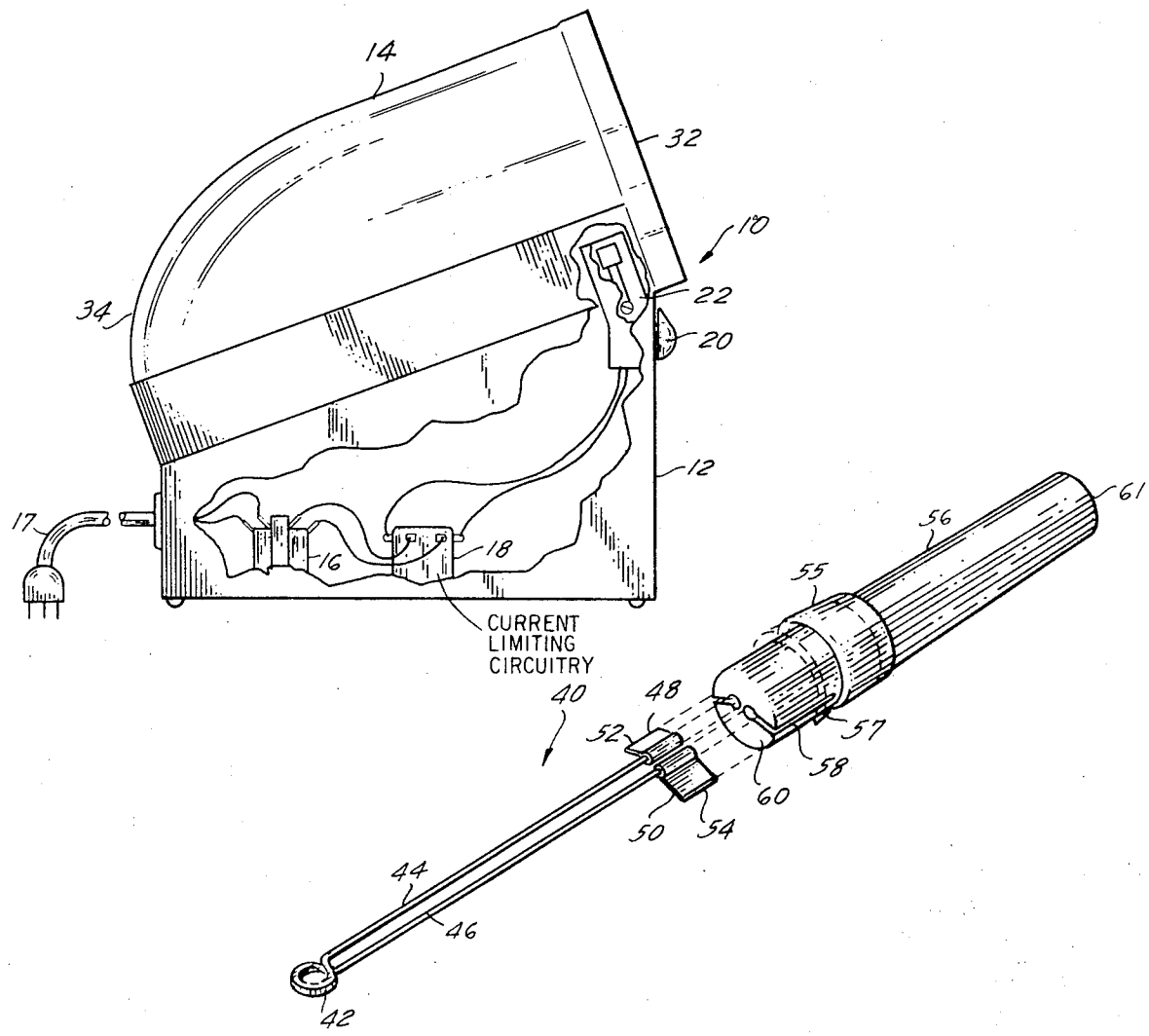
Primary Examiner—A. Bartis

Attorney—Kane, Dalsimer, Kane, Sullivan & Kurucz

[57] **ABSTRACT**

An improved sterilizer is provided for inoculation and transfer loops, needles, and other instruments formed of metals of high electrical resistance. The sterilizer includes a member having a V-shaped groove therein adapted to receive and support an instrument. A pair of electrodes are positioned on opposite sides of the groove so that an instrument resting in the groove completes the electrical circuit between the electrodes. The sterilizer also includes a removable hood having a single opening at one end disposed above the electrodes. An improved instrument designed to insure proper contact with the sterilizer electrodes is also provided. The instrument includes a loop and a pair of transverse tabs which extend outwardly from extensions of the loop for a distance greater than that between the electrodes.

2 Claims, 4 Drawing Figures



PATENTED JUN 26 1973

3,742,187

SHEET 1 OF 2

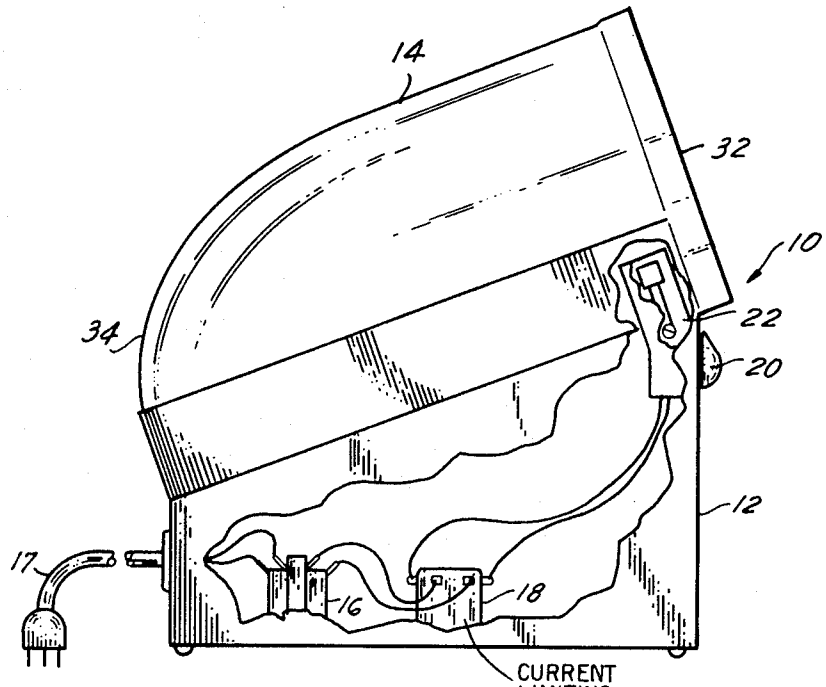


FIG. 1.

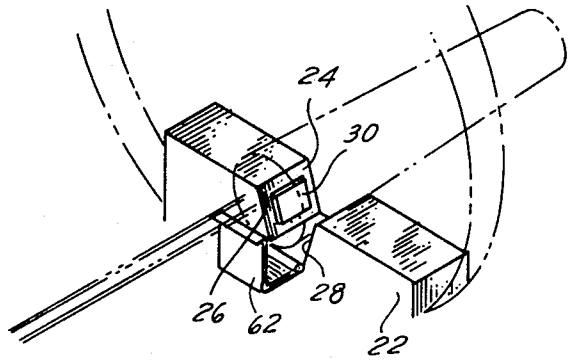


FIG. 2.

STANFORD G. FOLUS
INVENTOR

BY
Kane, Dalsimer, Kane, Sullivan & Kurucz
ATTORNEYS

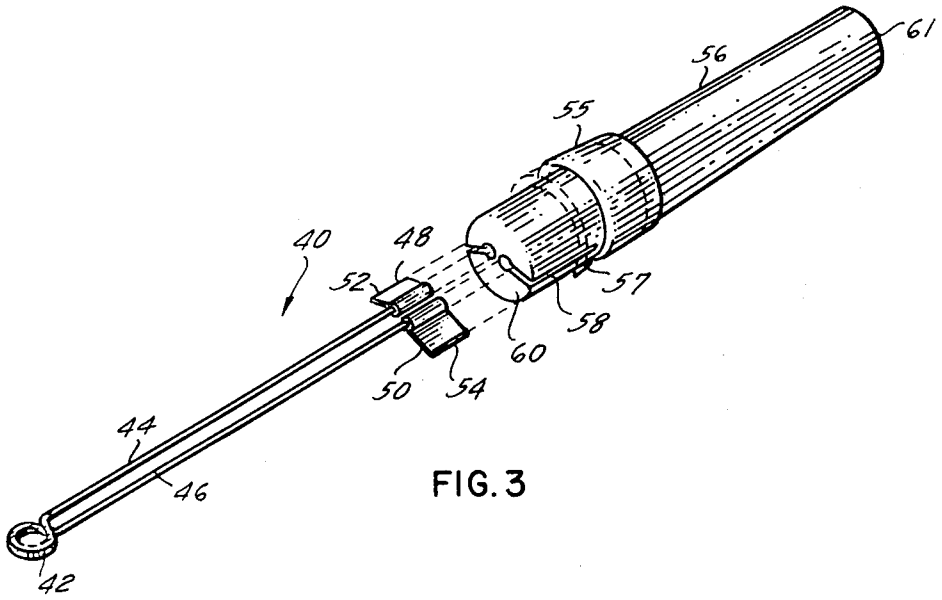


FIG. 3

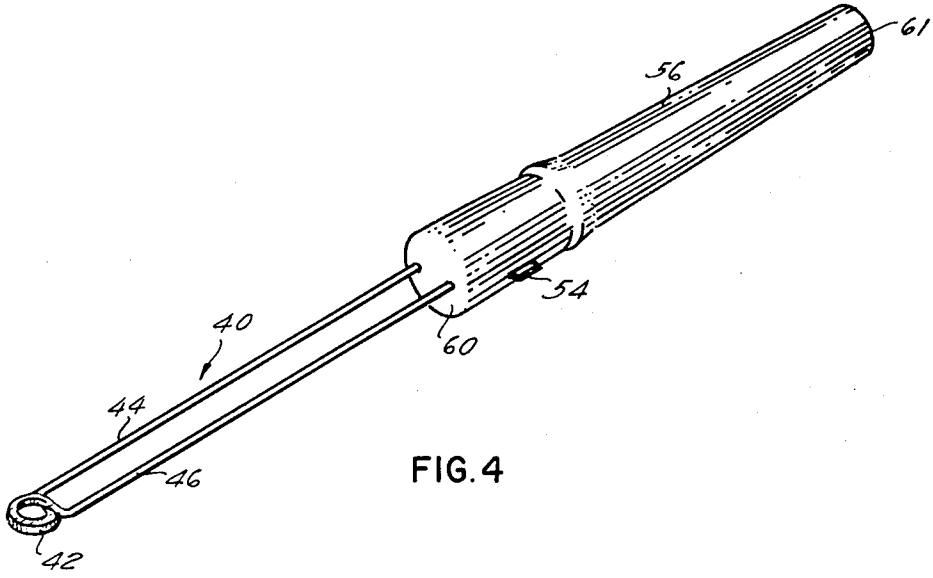


FIG. 4

STANFORD G. FOLUS
INVENTOR

BY
Kane, Dalsimer, Kane, Sullivan & Kurucz
ATTORNEYS

INOCULATION AND TRANSFER LOOP AND STERILIZER

BACKGROUND OF THE INVENTION

The present invention relates to a sterilizer particularly adapted for use in sterilizing inoculation and transfer needles, loops, or other similar instruments by igniting microorganisms which may collect on the instruments. Such instruments are commonly used in microbiology laboratories for transferring microorganisms from one vessel or container to another, such as from a culture to a nutrient medium. The instruments generally are formed in the shape of an elongated wire rod or needle having a loop at one end. The diameter of the loop and wire gauge may be calibrated to precisely control the amount of microorganisms transferred. A suitable handle or wand may be attached to the nonlooped end of the instrument to facilitate handling.

Heretofore, it has been common to clean and sterilize such instruments by exposing the microorganism carrying loop to the open flame of a Bunsen burner. This procedure is undersirable for several reasons, the most important of which recognizes the dangers inherent in having an exposed flame in a work area and the danger of spattering when ignition occurs. This latter danger is of particular importance where pathogenic microorganisms are being transferred.

In U. S. Pat. Nos. 2,134,378 and 3,436,171 two electrical devices for sterilizing inoculation instruments are disclosed. Both these devices, however, have several drawbacks, the most important being that they either require that the sterilizer be constantly on or that the technician periodically turn the sterilizer on prior to each use. Also, these instruments require that the technician shift the instrument in his hand in order to utilize the sterilizer. This type of maneuver is tiring for the technician and further, is dangerous since it increases the possibility of contamination during use.

In view of the above, it is the principal object of the present invention to provide a device for use in the sterilization of instruments formed of electrically conductive materials and particularly inoculation and transfer loops and needles which is automatically activated when an instrument is placed in position for sterilization. Another object is to provide such a device which overcomes the disadvantages of the prior art devices and which is relatively simple in construction, formed of a minimum number of parts and may be produced and marketed economically.

SUMMARY OF THE INVENTION

The above and other beneficial objects and advantages are attained in accordance with the present invention by providing a device for use in the sterilization of instruments formed of electrically conductive material comprising a support structure supporting thereon first and second electrodes. The electrodes are fixed to the support structure and disposed at an acute angle with respect to each other so as to define a V-shaped groove between them. The support structure and electrodes are contained within a hood having a single opening at one end and the hood inclines downwardly from the open end.

In use, an instrument is inserted into the hood through the open end and allowed to rest on the electrodes. The instrument thus serves to complete the

electrical circuit between the electrodes so that the current flowing through the instrument serves to heat it. When the instrument is removed from the electrodes, the circuit is automatically opened and the sterilizer is thus turned off without requiring any additional step to be performed by the technician.

An improved inoculation and transfer instrument particularly adapted for use with the present sterilizing device is also provided. The instrument comprises a length of wire of high electrical resistance material, such as Nichrome, having a loop formed in the approximate midsection. Both ends of the wire extend longitudinally from opposite sides of the loop in the same direction and terminate in contact tabs which extend transverse to the longitudinal axis of the instrument in opposite directions. The tabs are designed so that the distance between the free tip of each tab is greater than the distance between the two electrodes of the sterilizing device.

The instrument is used with a wand or handle formed of an insulative material such as plastic. The wand comprises an elongated member having a pair of opposed slits extending longitudinally from one end which extend radially inwardly from opposed surfaces. The cross sectional dimension of the wand measured between the slits is less than the distance from tip to tip of the instrument tabs so that when the instrument is placed in the wand, each tab extends radially outwardly beyond the outer surface of the wand. Since the dimension between the free tips of the tabs is greater than the distance between the electrodes of the sterilizing device, when the instrument is positioned in the V groove each tab contacts one of the electrodes. The instrument wand and sterilizer are also provided with complementary stops designed to engage each other when the instrument tabs are aligned with the electrodes to insure proper contact.

BRIEF DESCRIPTION OF THE DRAWINGS

In the accompanying drawings:

FIG. **1** is a partially cutaway side elevational view of a sterilizing device in accordance with the present invention;

FIG. **2** is a fragmentary perspective view of the electrode configuration of the sterilizing device;

FIG. **3** is an exploded perspective view of an inoculation loop particularly adapted for use with the present device; and

FIG. **4** is an alternate embodiment of the loop of FIG. **3**.

DETAILED DESCRIPTION OF THE PREFFERED EMBODIMENT

Reference is now made to the drawings wherein the present invention is illustrated in detail and wherein similar components bear the same reference numeral throughout the several views.

In FIG. **1**, a sterilizing device **10**, in accordance with the present invention is illustrated. The sterilizing device includes a base **12** and hood **14**. The base contains a transformer **16** and suitable current limiting circuitry **18** which is controlled by a variable switch **20** mounted to the front of the unit. Such circuitry is well-known to persons familiar with the art and may be formed of conventional, readily available components. The transformer **16** has a line cord **17** connected to its input terminals to permit connection to a power source through

a conventional outlet. A block of insulative material 22 is mounted to the top of the base close to the front of the unit. A V-shaped groove 24 extends downwardly into block 22 from the top surface at the approximate midpoint. The groove 24 is defined by surfaces 26 and 28 which are disposed at an acute angle with respect to one another.

An electrode in the form of a contact terminal 30 is secured to surface 24 and a similar terminal is secured to surface 28. Each of the terminals is connected to one of the output leads of the current limiting circuitry 18. The terminals comprise strips of highly conductive material, such as copper, and cover the major portion of their associated insulator block surfaces.

The entire top of the base 12 is designed to be covered by a removable hood 14. The hood, is designed to seat snuggly on top of the base forming an enclosure about the base. The hood should be formed of an autoclavable material such as Lexan or any other suitable material, preferably a transparent material. One end of the hood defines a wide opening providing access to the enclosure. As will be noted from FIG. 1, the base and hood incline downwardly from the open end 32 to a closed end 34. It may also be noted that the electrodes are positioned proximal the open end 32. It has been found that if the hood slopes downwardly at an angle of about 35°, the sterilizer may be used by a technician without requiring that he shift the position of the instrument in his hand from the normal transferring position. This angle also insures that all aerosols released during the sterilization process will be trapped within the hood.

In FIG. 3 an inoculation loop which may readily be sterilized with the sterilizing device 10 is illustrated. The instrument is designed with a bend configuration which provides for a precise loop to pick up the desired aliquots and yet retain the proper current path for total sterilization. To this end, the instrument 40 comprises a work zone in the form of loop 42 formed in a wire of high resistance material such as nichrome wire. The loop 42 is in the approximate center of the wire. A pair of parallel legs 44 and 46 extend rearwardly from the ends of the loop. The legs each terminate in a contact tab, 48 and 50 respectively, which is formed of a highly conductive material, such as copper. The tabs extend toward free tips 52 and 54 generally transverse to the longitudinal axis of the instrument and the spacing between the free tips 52 and 54 is somewhat greater than the distance between the sterilizer electrodes.

A wand or handle 56 is provided for association with the loop. The handle comprises an elongated, generally cylindrical member having a forward end 60 and rearward end 61. A pair of opposed radial slits 58 extend rearwardly from the forward end 60. Each of the slits also extends radially inwardly from the outer periphery of the wand for a distance less than the transverse length of an associate tab (50 or 52) of the instrument so that the tips 52 and 54 of the tabs extend beyond the outer surface of the wand. A longitudinally shiftable ferrule 55 is provided about the handle 56. The ferrule, when shifted forwardly is designed to compress locking humps 57 molded onto the handle to lock the instrument 40 in position. Accordingly, when the ferrule 55 is in a rearward position as depicted in FIG. 3, the slits 58 are sufficiently shifted to receive the opposed tabs. However, when the ferrule is shifted forwardly, it serves to squeeze the slits together by compressing the humps 57 thereby locking the instrument in position.

The instrument and handle may be separable as shown in FIG. 3, or, alternately they may be permanently joined such as by potting the slits with a suitable potting compound as shown in FIG. 4. In either event, the free ends 52 and 54 of the tabs extend beyond the outer surface of the wand. The wand should be formed of an insulating material and be of a diameter which renders it comfortable in the hand of the user.

In use, current is supplied to the present sterilizer 10 by plugging cord 17 into a suitable outlet. No current will flow since the sterilizer circuit is interrupted between the electrodes. To sterilize the instrument 40 utilizing the device 10, all that is necessary is for the user to insert the device within the wide mouth opening 32 of the hood and allow the exposed tab tips 52 and 54 to rest on contacts 30. This will automatically close the circuit through the instrument and in a short time cause the wire to glow cherry red and burn off any matter disposed on the wire. It should be noted that the sterilizer may accommodate instruments of various lengths since electrical contact occurs at the tabs. To facilitate the registry of the tabs 52 and 54 with the contact, a stop 62 may be provided at the forward end of the insulating block 22. This stop is suitably positioned and dimensioned to engage the forward end 60 of the wand and prevent further insertion of the wand into the housing when the tabs are aligned with the contacts. The V-shaped groove and the disposition of the contacts on the surfaces defining the groove insures a good electrical contact being made each time the device is used. The current applied to the instrument and hence, the rate at which sterilization occurs may be regulated by suitably adjusting knob 20 so that rapid sterilization without burning of the loop may be obtained for a variety of instruments of varying diameter.

Having thus described the invention, I claim:

1. In combination: an inoculation and transfer loop formed of a high resistance, electrically conductive material; a work zone on said loop; first and second leg portions on said loop spaced apart from each other and disposed on opposite sides of said work zone and electrically connected thereto; and a sterilizing device for said loop, said sterilizing device including a support structure including a top surface and having a V-shaped groove extending downwardly from said top surface, said groove being defined by a pair of surfaces disposed at an acute angle with respect to one another; a first electrode affixed to one surface of said groove insulated therefrom, a second electrode affixed to the other surface of said groove and insulated therefrom, said electrodes being spaced apart from one another; means for interconnecting said first and second electrodes to the output terminals of a power supply; and a hood enclosing said entire support structure including said electrodes, said hood including surfaces at one end defining an opening providing the only access opening to said electrodes, said electrodes being disposed proximal to said hood opening and said hood sloping downwardly from said opening to an opposite end, said electrodes being spaced apart from each other a distance somewhat less than the distance between said loop leg portions whereby each of said leg portions may engage one of said electrodes to close the circuit between said electrodes through said loop.

2. The invention in accordance with claim 1 further comprising a tab formed of electrically conductive material affixed and electrically connected to each leg and extending transverse to the longitudinal axis of said legs, each tab extending away from the opposite leg, said tabs adapted to comprise the points of engagement between said loop leg portions and the electrodes.

* * * * *