

Davis

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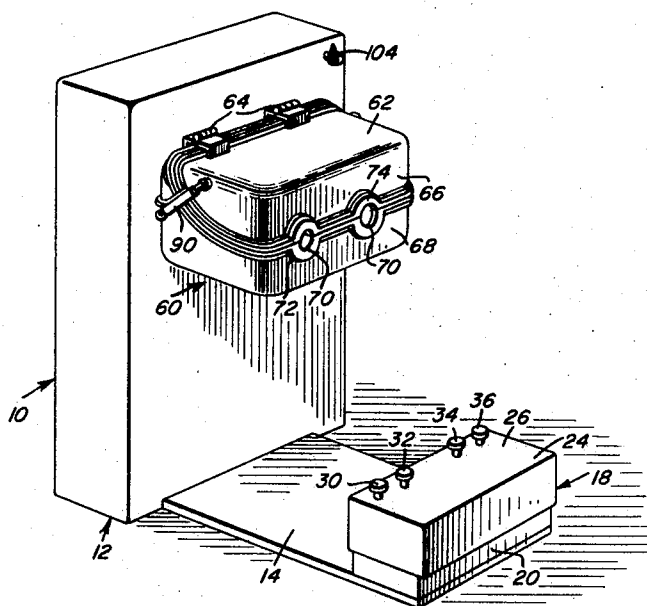
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A housing into which the hands and forearms may be inserted and subject to sequential cleansing steps preparatory to performing aseptic surgery. The housing includes openings through which the forearms are sealing received and spray cleaning means for sequentially spraying soap, bactericide and alcohol solutions completely about the external surfaces of the hands and adjacent forearms portions disposed within the housing. In addition, means is provided whereby heated and filtered air may be subsequently blown over the cleansed forearms and hands prior to their being removed from within the housing.

10 Claims, 4 Drawing Figures



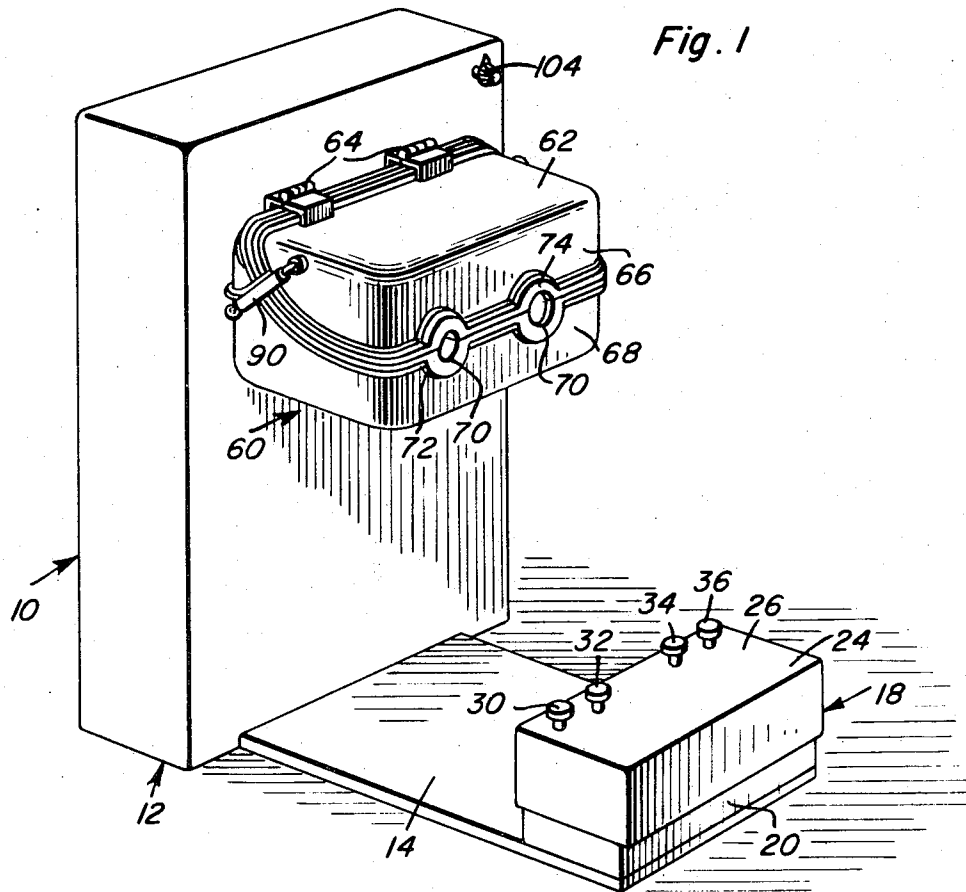
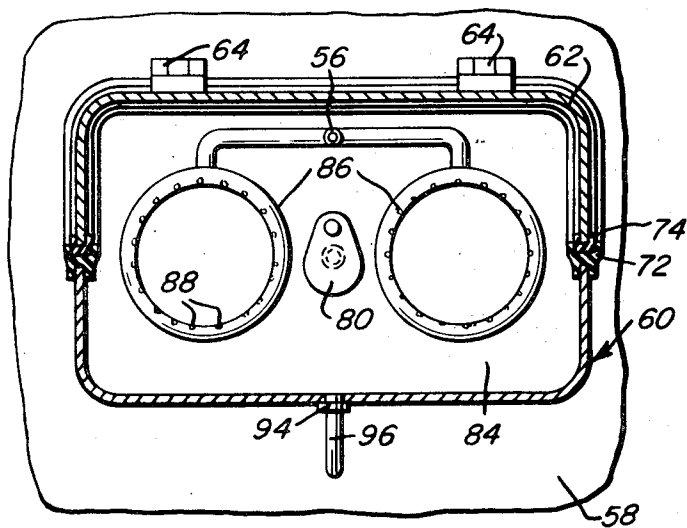


Fig. 4

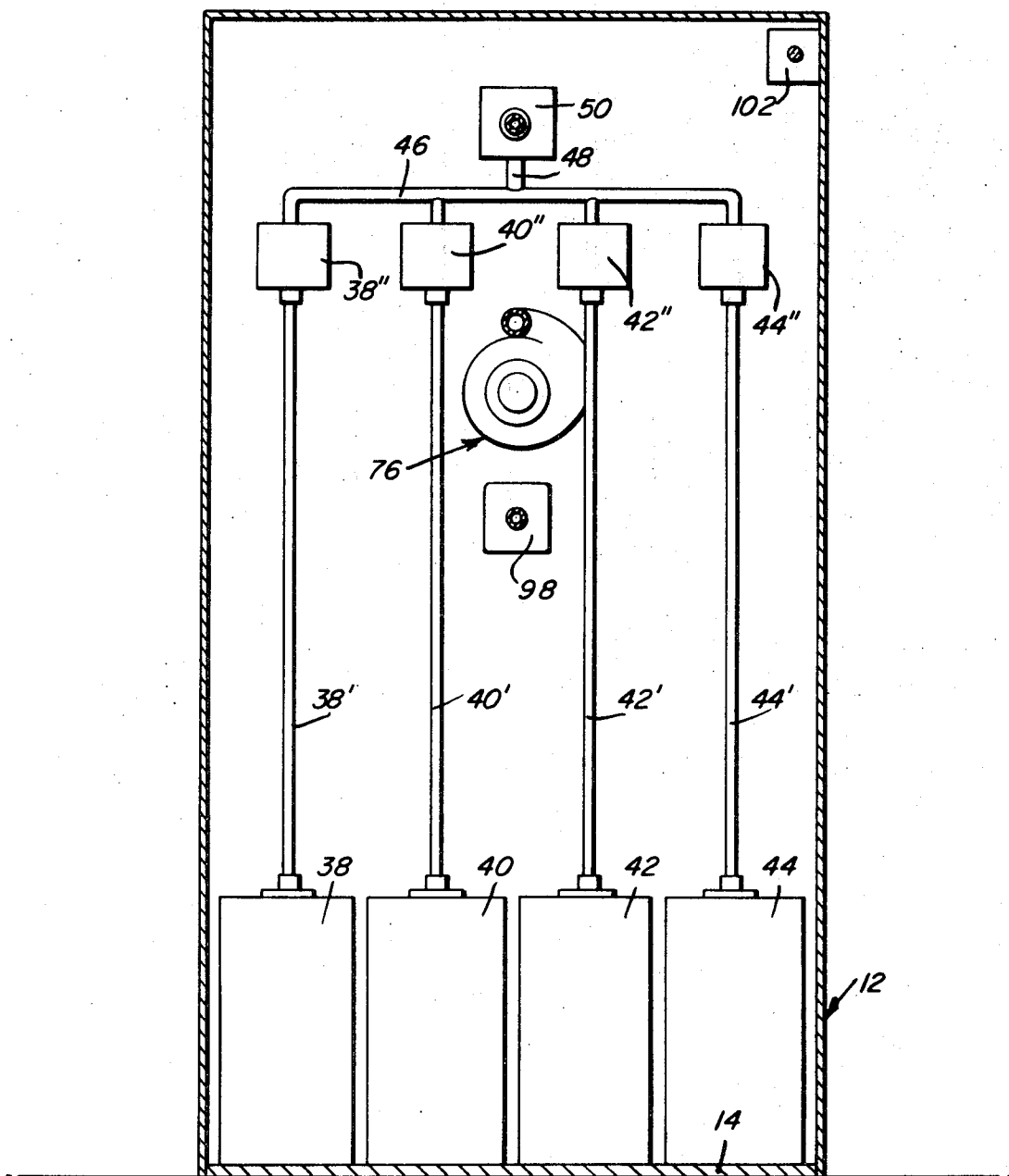


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Fig. 3



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CLEANING AND STERILIZING DEVICE

The cleaning and sterilizing device of the instant invention includes a support from which a housing is supported at a predetermined elevation and the support further includes a platform disposed in front of and below the housing which is adapted to be stood upon by the person using the sterilizing device. The housing includes a pair of arm receiving openings which open forwardly in a horizontal direction and spray cleaning heads are disposed within the housing for spray cleaning the hands and adjacent forearm portions of a person utilizing the device. However, inasmuch as the hands and forearms are received within the housing with the forearms substantially horizontally disposed and in predetermined laterally spaced relation according to the spacing between the forearm receiving openings within the front wall of the housing, the platform and housing are supported from the main support for relative vertical shifting whereby each user of the cleaning and sterilizing device may adjust the height of the housing relative to the platform according to his or her height.

The housing includes axially spaced and aligned circular spray heads through which the hands and adjacent forearm portions of the user are received and the spray heads are operable to sequentially spray fine streams of water mixed with soap and antiseptic solutions onto the hands and forearms of the user and to thereafter successively rinse the hands and adjacent forearm portions with clear water (either tap or pre-sterilized), an antiseptic solution and finally alcohol. Further, the housing includes drying structure whereby warm dry and filtered air is diverted into the chamber for driving the external skin surfaces of the hands and adjacent forearm portions of the user as well as the internal walls of the housing and the entire cleaning process is automatically controlled by a timer-type actuating mechanism operable to sequentially effect the various sprays and thereafter the discharge of drying air into the housing.

The main object of this invention is to provide an apparatus which may be readily used by doctors and nurses for cleaning their hands and adjacent forearm portions preparatory to performing and assisting in aseptic surgery.

Another object of this invention is to provide a cleaning and sterilizing device in accordance with the preceding object which will produce less micro-trauma to the skin than conventional cleaning processes.

Still another object of this invention is to provide a cleaning apparatus which will be operable to automatically to dry the hands and adjacent forearm portions after their having been sprayed with cleaning and rinsing solutions thereby eliminating the necessity of drying the hands and forearms with towels prior to donning gloves.

A final object of this invention to be specifically enumerated herein is to provide a hand and forearm cleaning apparatus in accordance with the preceding objects which will conform to conventional forms of manufacture, be of simple construction and easy to use so as to provide a device that will be economically feasible, long lasting and relatively trouble free in operation.

These together with other objects and advantages which will become subsequently apparent reside in the

details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming a part hereof, wherein like numerals refer to like parts throughout, and in which:

FIG. 1 is a perspective view of the hand and forearm cleaning and sterilizing device of the instant invention;

FIG. 2 is an enlarged fragmentary vertical sectional view taken substantially upon the plane passing through the center of the assemblage illustrated in FIG. 1;

FIG. 3 is a vertical sectional view taken substantially upon a plane indicated by the section line 3—3 of FIG. 2; and

FIG. 4 is a vertical sectional view taken substantially upon the plane indicated by the section line 4—4 of FIG. 2.

Referring now more specifically to the drawings, the numeral 10 generally designates the hand and forearm cleaning and sterilizing device of the instant invention which includes a support structure referred to in general by the reference numeral 12 including a horizontal base plate 14 and an upright hollow standard 16 supported at its lower end from the base plate 14.

The front marginal edge portion of the base plate 14 has a platform assembly 18 supported therefrom and the assembly 18 includes an upwardly opening housing bottom 20 including a bottom wall 22 which rests upon and is secured to the base plate 14 and a downwardly opening housing top 24 including a top wall 26. An upstanding extendable motor in the form of a fluid cylinder 28 is secured at its upper and lower ends to the top wall 26 and bottom wall 22 and the top wall 26 includes push-type actuator switches 30, 32, 34 and 36 whose actuator portions project upwardly above the top wall 26. The switches 30 and 32 are electrically connected to an electric motor driven hydraulic pump assembly (not shown) for causing extension and retraction, respectively, of the fluid cylinder 28 and the switches 34 and 36 serve functions to be hereinafter more fully set forth.

The lower end of the standard 16 encloses vented fluid tanks 38, 40, 42 and 44 for containing soap, a bactericide, alcohol and any other suitable liquid, respectively. The tanks or containers 38, 40, 42 and 44 include discharge lines 38', 40', 42' and 44', respectively, having solenoid valves 38'', 40'', 42'', and 44'', respectively, disposed therein and the lines 38', 40', 42' and 44' open into a header pipe 46 into which the inlet end of one inlet neck 48 of a motor driven fluid pump 50 opens. The fluid pump also includes inlet necks 52 and 54 for communication with sources of hot and cold water and an outlet line 56 extends from the outlet port of the pump 50 through the front wall 58 of the standard 16.

A housing referred to in general by the reference numeral 60 is supported from the front wall 58 forwardly of the latter and the housing 60 includes a hinged cover 62 hingedly supported from the remainder of the housing as at 64. The cover 62 includes a front wall portion 66 which coacts with the front wall portion 68 of the housing 60 to close the forward end of the housing and the confronting edge portions of the wall portions 66 and 68 are provided with coacting recesses opening toward each other to define a pair of forearm receiving

openings 70 having seal strips 72 and 74 extending thereabout. The seal strips 72 and 74 also serve to form a fluid tight seal between abutting wall portions of the housing 60 and the hinge cover 62.

An electric motor driven blower assembly referred to in general by the reference numeral 76 is mounted within the standard 16 and includes an outlet pipe 78 opening into the rear of the housing 60 through a flap valve 80. The blower assembly 76 includes internal heating means (not shown) and the inlet for the blower assembly 76 opens through the rear wall 80 of the standard 16 and is provided with a suitable filter 82.

The pump outlet line or pipe 56 projects through the front wall 58 and the rear wall 84 of the housing 60 and thereafter opens into two pairs of annular spray heads 86 including inner peripheral outlet openings 88. Each pair of spray heads 86 is axially aligned with a corresponding opening 70 and additional annular spray heads 86 may be provided if desired.

A pair of fluid motors 90 are operably connected between the housing 60 and the closure cover 62 therefor and may be actuated by any suitable means (not shown) for opening and closing the cover 62. Further, the bottom wall 92 of the housing 60 includes a drain fitting 94 to which the inlet end of a drain pipe 96 is secured and the drain pipe 96 has a motorized pump 98 operatively associated with its discharge end, the pump 98 discharging into any suitable drain hose or pipe 100.

A timing mechanism 102 is supported by the upper portion of the front wall 58 and includes a timer control knob 104 which is engageable by a person standing on the platform assembly 18 in front of the housing 60.

The switches 34 and 36 comprise an on switch for electrically actuating the timing mechanism 102 and an emergency off switch for terminating operation of the cleaning and sterilizing at any point during its cleaning cycles.

In operation, a person wishing to clean his hands and adjacent forearms initially places himself upon the top wall 26 of the platform assembly 18 and actuates the switches 30 and 32 in order to adjust the elevation of the top wall 26 relative to the housing 60 by extending or retracting the fluid cylinder 38. Thereafter, that person may activate the on switch 34 after properly setting the timer control knob 104 of the timer 102 and place his hands and adjacent forearms within the open housing 60. Thereafter, if the fluid motors 90 are electrically controlled by the timer 102, the closure cover 62 will swing to the closed solid line position thereof illustrated in FIG. 2 of the drawings and the motorized pump 50 will be actuated together with the solenoid valve 38'' in order to pump warm water and soap solution into the spray heads 86 for discharge therefrom on the external surfaces of the hands and adjacent forearm portions of the person using the device 10. Subsequently, the solenoid actuated valve 38'' will be closed and the solenoid actuated valve 40'' will be opened under the control of the timer 102 and warm water and antiseptic solutions from the tank or container 40 will be pumped to the spray heads 86. Thereafter, the solenoid valve 40'' will be closed and the solenoid valve 42'' will be opened whereupon an alcohol rinse may be discharged from the spray heads 86. If other rinsing solutions are desired, they may be

placed within the container or tank 44 and subsequently discharged through the spray heads 86.

In any event, after the spraying operations have been completed, the timer 102 terminates operation of the motorized pump 50 and initiates operation of the electric motor driven blower assembly 76 and attendant heating element whereby warm, filtered and dry air will be blown into the interior of the housing 60 for drying the skin on the hands and adjacent forearm portions of the user as well as the internal surfaces of the housing 60. After the blower assembly 76 is operated for a predetermined time, the timer 102 will terminate operation of the blower assembly 76 and the extensible motors 90 will be actuated to swing the cover 62 toward the open phantom line position thereof illustrated in FIG. 2 of the drawings. At this point, the device 10 will automatically terminate operation and be disposed in readiness for use by the next person.

The foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly all suitable modifications and equivalents may be resorted to, falling within the scope of the invention.

What is claimed as new is as follows:

1. A hand and forearm spray cleaning machine including a housing having one wall in which at least one hand and forearm receiving opening is formed having a horizontal center axis, and spray head means supported within said housing inwardly of said one wall spaced apart along and about the center axis of said opening, said spray head means including means for discharging jets of fluids delivered thereto generally radially inwardly toward the center axes, means for supplying fluid under pressure to said spray head means, said machine including a support from which said housing is supported at an elevation with said one wall comprising a forwardly facing front wall, a platform disposed forwardly of an upstanding plane containing said front wall and at an elevation below said opening, said platform and housing being supported for relative vertical adjustment.

2. The combination of claim 1 wherein said housing is stationarily supported from said support.

3. The combination of claim 1 wherein said spray head means includes a plurality of axially spaced and aligned frame-like spray heads disposed generally coaxial with said center axis.

4. The combination of claim 3 wherein said center axis is generally horizontally disposed.

5. The combination of claim 1 wherein said one wall has a pair of spaced openings formed therethrough, each of said openings having a set of said spray head means operatively associated therewith.

6. The combination of claim 1 including a plurality of fluid containers in said housing, the last mentioned means including means for supplying fluid from each of said containers to said spray head means.

7. The combination of claim 6 wherein said last mentioned means also includes foot engageable control means supported from said platform operative, when actuated, to sequentially pump fluid from said container to said spray head means.

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8. A hand and forearm spray cleaning machine including a housing having one wall in which at least one hand and forearm receiving opening is formed having a horizontal center axis, and spray head means supported within said housing inwardly of said one wall spaced apart along and about the center axis of said opening, said spray head means including means for discharging jets of fluids delivered thereto generally radially inwardly toward the center axes, means for supplying fluid under pressure to said spray head means, and means operative to pump filtered heated air into said housing.

9. A hand and forearm spray cleaning machine including a housing having one wall in which at least one hand and forearm receiving opening is formed having a horizontal center axis, and spray head means supported within said housing inwardly of said one wall spaced apart along and about the center axis of said opening, said spray head means including means for discharging jets of fluids delivered thereto generally radially inwardly toward the center axes, means for supplying

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fluid under pressure to said spray head means, said housing including a hinged closure cover portion which may be swung to an open position affording ready access to the interior of said housing, said closure cover portion and said housing including closely opposing sets of corresponding marginal edge portions when said closure cover is in the closed position, at least one set of opposing edge portions defining diametrically opposite sides of said opening and being provided with resilient seal means for forming a relatively good air tight seal about a forearm projecting through said opening.

10. The combination of claim 9 wherein said machine includes power means operative to selectively swing said closure cover portion between open and closed positions, whereby a person using the machine may remove his forearm and hand from the machine without contamination thereof by contact of his forearm or hand with any external portion of the machine.

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