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DRY STERILIZER CABINET

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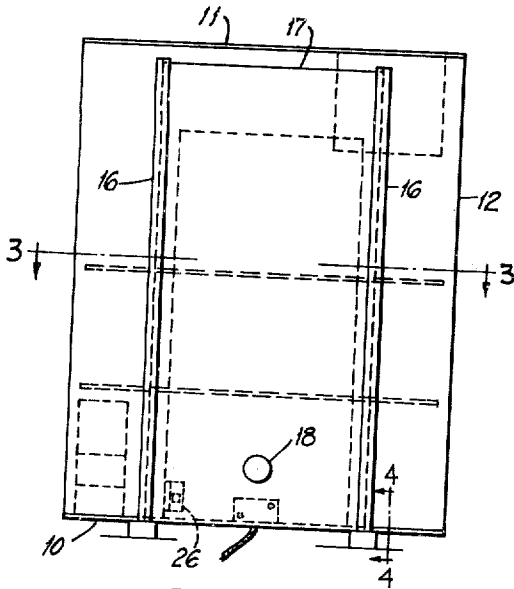


Fig. 1

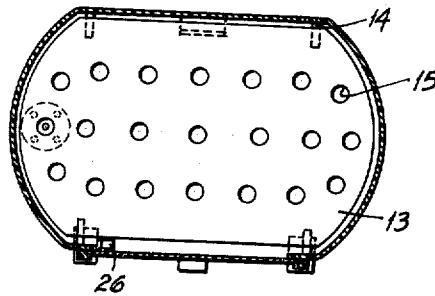


Fig. 3

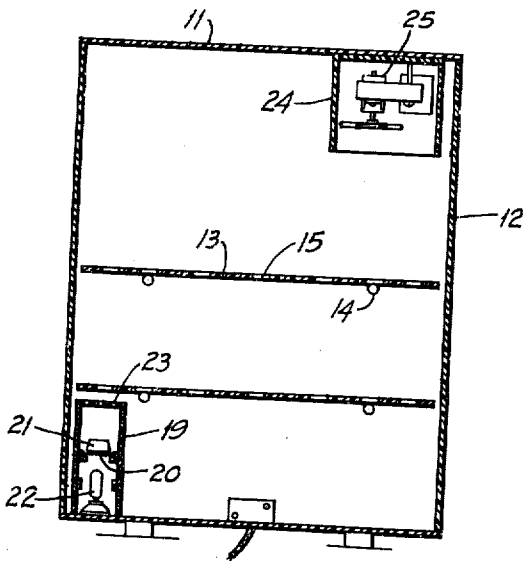


Fig. 2

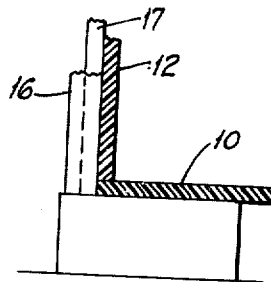


Fig. 4

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DRY STERILIZER CABINET

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3 Claims. (Cl. 21—91)

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This invention relates to a portable dry-sterilizer cabinet.

The sterilization, or disinfection at least, of various items used in connection with the practice of medicine, those used by barbers, etc., is widely practiced. Probably the most common devices make use of steam, boiling water, or a fluid containing a disinfecting and/or sterilizing agent. For example, barbers and beauty operators are wont to store combs not in use in a container of such fluid, in such manner that the combs are substantially immersed in the fluid. Not all the items a barber uses, however, are susceptible to this type of treatment. For example, the storage of a brush in any aqueous liquid renders the bristles so soft as to be substantially useless; electrically operated devices such as clippers and cutters obviously cannot be immersed in a liquid or subjected to steam; therefore, wet sterilizers are not satisfactory in many fields where sterilization is highly desirable.

The use of steam or hot water is not generally practiced by barbers, but is used by doctors and dentists in sterilizing forceps, scalpels and other manipulative devices which they use. Such sterilizers require attention for they must be supplied with water; to be convenient to use, manipulative adjuncts, such as pedals and the like, to open and close the cover in order to avoid burning the operator's hand, must be provided.

Dry sterilizers, on the other hand, have not been particularly suitable, since they are slow in operation and uncertain of results as applied to certain items such as hairbrushes, which require a considerable penetrative ability of the agent utilized. Thus, a brush has been found not to have been satisfactorily disinfected from B. anthracis one and one-half hours after having been placed in a common type of dry sterilizer using formaldehyde. Formaldehyde vapor appears to have very little natural penetrative ability; it does not get into the tiny crevices, though it is quite able to kill the germ when it comes in contact with it.

A major object of my invention is to provide an easy-to-use cabinet, including apparatus capable of vaporizing such a fumigant as formaldehyde, for sterilizing or disinfecting such articles as combs, brushes, razors, clippers, surgical instruments, etc., in a relatively short period of time.

A specific object of my invention is to provide a sterilizing cabinet containing a fumigant vaporizer and a circulating fan both controlled by the operation of the access door, so as to minimize loss of the active agent.

Other objects will appear in the course of the description.

In the drawing, Figure 1 is an elevation of the cabinet.

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Figure 2 is a vertical section substantially on a center line of the cabinet.

Figure 3 is a horizontal section on line 3—3 of Figure 1.

Figure 4 is a detail section on line 4—4 of Figure 1.

The cabinet includes the bottom 10, the top 11 and sides 12, going to make up a complete enclosure. Any desired plurality of shelves 13 is provided, in this instance, two. These shelves are of an area corresponding to, but less than, the cross sectional dimensions of the cabinet, and are spaced from the walls at all sides by their support on the pins 14, as is best shown in Figure 4. The shelves further include a multiplicity of apertures 15 to permit circulation of the cabinet atmosphere.

Channel members 16 are provided at the sides of the opening, which is preferably on one of the wider sides of the cabinet, and a door 17 slides vertically in these channels, operated by a knob 18.

In a lower corner of the cabinet, which is generally of a rectangular cross section vertically, is located the fumigant vaporizer referred by the reference character 19. As shown in Figure 2 in section, this includes a shelf 20 to support a fumigant tablet 21, and an electric lamp or other electric heater 22. The container, or vaporizer 19, has apertures 23 in order to permit volatilized fumigant to pass from the container into the atmosphere of the cabinet. The tablet can be made up by incorporating formaldehyde in a plaster of Paris tablet as in Ressler, U. S. Patent 1,408,535, or as in British Patent 17,464 of 1897.

In an upper opposite diagonal corner is an air circulator referred generally by the reference numeral 24 and containing a fan 25.

The fan and the heater are connected together electrically and under the control of a switch 26, which is so positioned and of such a nature as to be operable and operated by the door 17. Thus, when the door 17 is in its closed position, the switch is closed and the heater and fan operate. When the door is raised for access to the shelves, the switch is open and the heater and fan are disconnected from the current supply.

One of the major features of the device so far described is the spacing of the shelves throughout their periphery from the walls of the cabinet. This is particularly valuable because of the fact that the various articles placed upon the shelves for sterilization in many instances will close over so many of the perforations 15 as seriously to interfere with circulation of the fumigant. With these spaces around the edges of the shelves, this cannot happen.

Careful tests have been made of a device made in accordance with the above description and the results of these tests are indicated in the

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tables below. In each table, columns I are with the fan idle, columns II are with the fan operating, other conditions identical.

(1) *B. anthracis* (causative organism of anthrax). Tooth brushes were used for this experiment. A three day old agar slant culture of *B. anthracis* was washed with 5 ml. sterile physiological saline solution. The suspension was then heated to 80° C. for 30 minutes in order to destroy the vegetative cells. 0.3 ml. of this suspension was pipetted on each tooth brush. While the brushes were still damp, they were placed in the sterilizer for varying periods of time. Bacterial counts were then made on each tooth brush. The average of two counts is reported.

Time in Minutes	I Bacterial Count	I Percent Destroyed	II Bacterial Count	II Percent Destroyed
Control.....	48,000	0	42,000	0
1/2.....	46,000	4	34,000	19
1.....	39,000	9	18,200	54
2.....	25,000	48	8,200	81
5.....	21,200	56	920	98
10.....	10,000	79	0	100
15.....	5,000	90		
30.....	0	100		

(2) *Cl. welchii* (causative organism of gas gangrene). Experiment 1 was repeated using spores of *Cl. welchii*. Anaerobic conditions of incubation were employed. The average of two counts is reported.

Time in Minutes	I Bacterial Count	I Percent Destroyed	II Bacterial Count	II Percent Destroyed
Control.....	43,000	0	46,000	0
1/2.....	42,000	2	40,000	18
1.....	39,000	9	23,100	50
2.....	32,000	26	11,600	75
5.....	27,000	37	810	98
10.....	6,000	86	0	100
15.....	3,000	93		
30.....	0	100		

(3) *Staphylococcus aureus*. The experiment on brushes was repeated with a suspension of *Staphylococcus aureus*. Since these organisms do not produce spores, the suspension was not heated before the test.

Time in Minutes	I Bacterial Count	I Percent Destroyed	II Bacterial Count	II Percent Destroyed
Control.....	41,000	0	38,000	0
1/2.....	38,000	8	20,300	47
1.....	30,000	27	6,400	83
2.....	27,500	33	93	98
5.....	11,200	73	0	100
10.....	780	98		
15.....	0	100		

(4) *Streptococcus pyogenes*. Experiment 3 was repeated with *streptococcus pyogenes*. Counts were made on blood plates.

Time in Minutes	I Bacterial Count	I Percent Destroyed	II Bacterial Count	II Percent Destroyed
Control.....	39,000	0	52,000	0
1/2.....	37,000	5	18,100	65
1.....	26,000	33	10,400	80
2.....	22,000	44	485	99
5.....	12,200	69	0	100
10.....	990	97		
15.....	0	100		

It will be seen that the positive circulation of the fumigant-air mixture has a remarkable effect upon the efficiency of operation of the device.

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It will therefore be seen that I have provided a very effective and convenient apparatus for the purpose of disinfecting and sterilizing various articles.

In operation, the heater 22 and the fan 25 can be operated continuously if utilization of the cabinet is severe, that is, if the articles in the cabinet are being constantly removed and replaced with others to be sterilized. In ordinary use, as in the average barber shop or beauty shop, usually it is only necessary to operate the heater over a short period of time during the morning and again during the afternoon; usually from five to ten minutes' operation of the heater results in sufficient vaporization of the formaldehyde to provide an atmosphere saturated with formaldehyde sufficient for the sterilization of many articles, even though the door is opened from time to time to remove and replace articles in the cabinet. The fan can be permitted to operate for a somewhat longer period of time to insure adequate circulation of the atmosphere over the articles to be sterilized. The heat from the vaporizer and the fan motor also raises the temperature of the cabinet atmosphere, making the latter more effective as a sterilizing medium and as a drying medium.

The cabinet is particularly economical in utilization of formaldehyde because of the provision of the sliding door, which can be moved from closed to an open position and returned without any particular disturbance of the atmosphere within the cabinet. As a result, the formaldehyde loss upon each opening and closing of the door is very slight.

I claim:

1. In a dry sterilizer, a cabinet of generally rectangular vertical section, an opening in a vertical side, channel members on each side of the opening, a door sliding vertically in said channel members, a plurality of perforated shelves having their edges spaced from the sides of the cabinet, a fumigant vaporizer in a lower corner and including an electric heater, an electric fan in an opposite upper corner, an electrical circuit for supplying current to the heater and the fan, and a switch in the said circuit and physically located so as to be operable by the said door to close the circuit when said door is in its closed position.

2. In a dry sterilizer, a cabinet providing an enclosure and having a top and a bottom spaced apart with an intermediate shelf extending horizontally of said cabinet and providing only a limited restriction upon circulation of the atmosphere in the cabinet, a fumigant vaporizer positioned in a lower corner of the cabinet to vaporize a fumigant vapor in the cabinet, and a fan in an upper diagonal corner of the cabinet for forcing the atmosphere in the cabinet forcefully from the top of the cabinet toward the bottom thereof.

3. In a dry sterilizer, a cabinet providing an enclosure and having a top and a bottom spaced apart with an intermediate shelf extending horizontally of said cabinet and providing only a limited restriction upon circulation of the atmosphere in the cabinet, said cabinet having a door slidable vertically to open and close the cabinet, a fumigant vaporizer positioned in a lower corner of the cabinet to vaporize a fumigant vapor in the cabinet, and a fan in an upper diagonal corner of the cabinet for forcing the atmosphere in the cabinet forcefully from the top of the cabinet toward the bottom thereof.

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No references cited.