

June 7, 1932.

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SURGICAL STERILIZER

Filed Oct. 26, 1929

2 Sheets-Sheet 1

Fig. 1

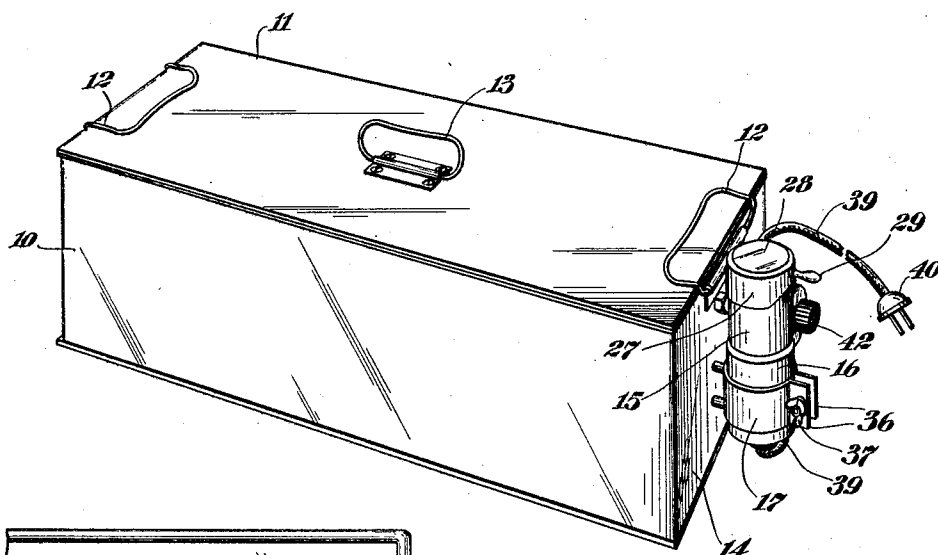
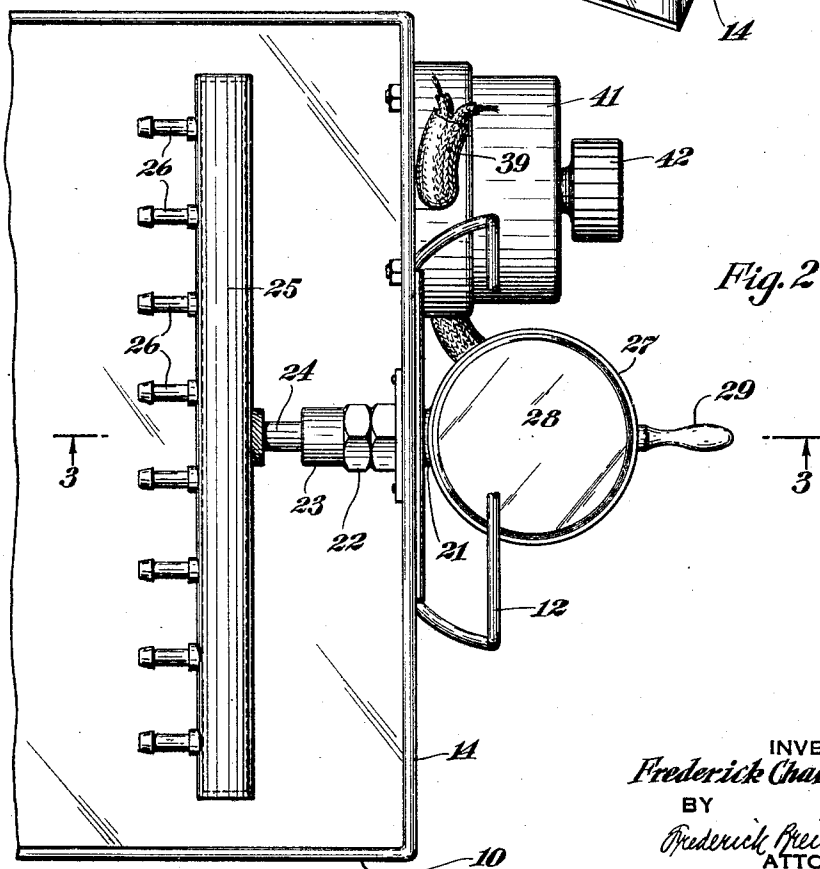


Fig. 2



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Fig. 3

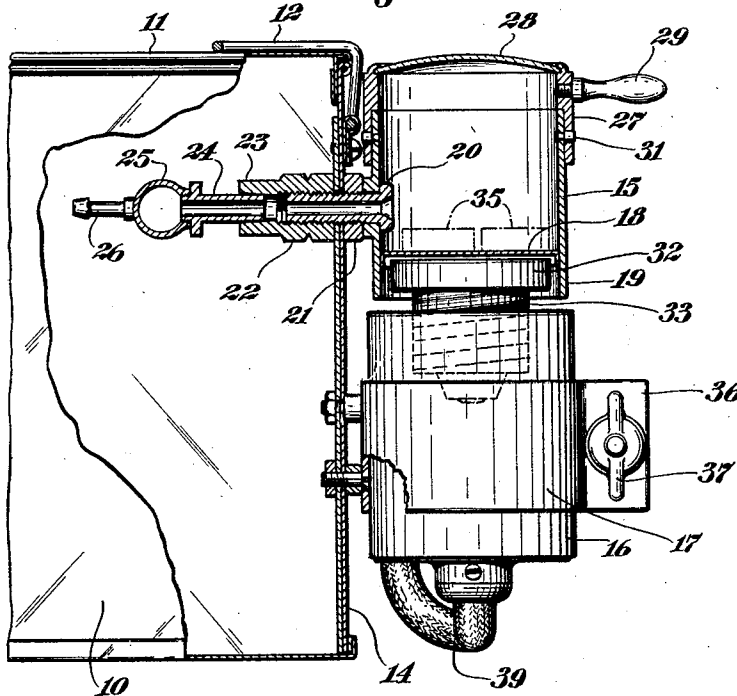
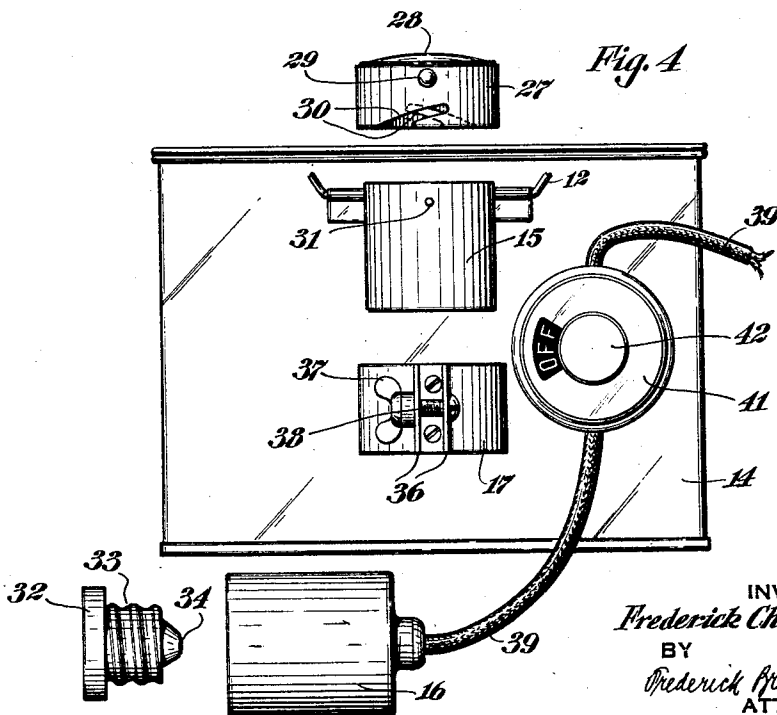


Fig. 4



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SURGICAL STERILIZER

Application filed October 26, 1929. Serial No. 402,600.

My present invention relates generally to surgical apparatus, and has particular reference to a sterilizer for surgical instruments and the like.

5 It is a general object of my invention to provide an improved instrument-sterilizer of the type wherein a solid vaporizable fumigant is employed, such as formaldehyde in the form of tablets. This general type of
10 sterilizer has become widely popular for a number of obvious reasons, the formaldehyde being a potent sterilizing medium, being readily available in the convenient form of tablets, and the avoidance of steam-generating apparatus or the like resulting in
15 compactness and simplicity.

In apparatus of this general character, the ascertainment of rate of vaporization has been impossible heretofore without considerable annoyance, including an opening of the
20 main sterilizing box. It is of course necessary to ascertain the rate of vaporization so that assurance may be had that fumes are still being generated and so that additional
25 fumigant may be added when necessary. On the other hand, an opening of the main sterilizer box is highly objectionable because of the extremely dangerous character of the fumes and because of the loss thereof.

30 My present invention has for one of its objects the provision of a sterilizer wherein the amount of fumigant may be constantly observed without opening the box, and wherein additional fumigant may be added from time
35 to time, whenever it is observed to be necessary, without disturbing the main box or permitting unnecessary or dangerous escape of fumes.

Furthermore, in the apparatus heretofore
40 customarily employed, any inspection or replacement of other parts of the fumigating apparatus, such as for example, a replacement of the electric heating unit usually employed for causing vaporization, has been
45 beset with similar difficulties. As a general rule, the burning out of a heating unit has necessitated a re-shipment of the entire apparatus to the factory, and this is of course highly undesirable. My present invention
50 provides an improved construction wherein

an extremely simple type of electrical heating unit is employed and wherein the same may be readily inspected and replaced if necessary without disturbing the apparatus
55 as a whole, and particularly without disturbing or opening either the main sterilizing box or the chamber in which the fumigant is being vaporized.

One of the main features of my invention, whereby the foregoing advantages, and
60 others, are achieved, lies in providing a sterilizer wherein the fume-generating apparatus is mounted in its entirety exteriorly of the main sterilizing box. Not only does this arrangement permit me to provide means for
65 constantly inspecting the interior of the chamber which carries the fumigant, and enable me to provide an association of parts whereby rapid and convenient disassembly is possible for replacement or inspection, but it
70 also results in additional advantages due to the fact that the interior of the main sterilizing box is kept constantly at a substantially low temperature. For example, certain
75 instrumentalities, such as catheters, are not capable of withstanding heat, and in any sterilizer wherein the heating unit is positioned within the box there is a likelihood of damaging certain instruments, such as catheters, telescopes, etc., not only because of the heat
80 generated in the box by the heating unit, but also by accidental actual contact between such instruments and the source of heat.

Accordingly, my present invention provides a sterilizer which not only has all the
85 advantageous characteristics of the type wherein a solid fumigant is used (as distinguished from sterilizers utilizing boiling water, steam, or the like), but it also obviates a number of the disadvantages heretofore
90 encountered in this general type of solid fumigant sterilizer.

Other features of my invention will be clear to those skilled in the art after this specification has been read, and consist in the pro-
95 vision of extremely simple parts and the arrangement thereof in simple structural relationship so that the entire apparatus is not only extremely compact and inexpensive to manufacture, but also highly reliable and effi-
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cient in operation and capable of rapid and ready refueling or repair with a minimum of trouble and expense.

For the attainment of the foregoing objects and such other objects as may hereinafter appear or be pointed out, I have constructed a device embodying the features of my invention and illustrated in the accompanying drawings, wherein—

Figure 1 is a perspective view of a sterilizing apparatus of the present character;

Figure 2 is an enlarged plan view of the right-hand portion of the apparatus of Figure 1, with the cover of the main sterilizing box removed;

Figure 3 is a cross-sectional view taken substantially along the line 3—3 of Figure 2; and

Figure 4 is an end elevational view showing certain of the parts in disassembled condition.

I provide the customary rectangular box 10, preferably of polished and attractive metal, this box being adapted to receive the instruments, catheters, and similar devices and tools to be sterilized. The box is provided with a cover 11 which is preferably held in firm association with the box by means of clamps or the like 12, and which is readily removable by means of the handle 13 when it is desired to insert or remove instruments. One of the main features of my construction lies in the fact that there is no apparatus appertaining to the fumigation positioned or mounted within the box 10, except of course the inlet end of a fume conduit, and possibly a fume distributor associated with said inlet end. The entire interior of the box is therefore available, so far as space is concerned, for instruments to be sterilized.

The compact and efficient nature of my present invention will be appreciated when I point out that in Figure 1 the entire fume-generating apparatus is shown at the right in association with the right-hand end or side wall 14 of the box 10. This apparatus consists of two principal parts, viz., the chamber 15 adapted to receive the fumigant and the electrical receptacle 16 positioned beneath the chamber 15 and adapted to accommodate a heating unit in a readily removable manner. The receptacle 16 is itself secured to the wall 14 in a detachable manner, as by means of the clamp 17, and it is possible to withdraw the entire receptacle 16, as shown most clearly in Figure 4, for the purpose of gaining access to the electric heating unit.

Referring to Figure 3, I have shown the fume-generating apparatus in greater detail. The chamber 15 is substantially cylindrical and is mounted closely adjacent to the side wall 14 with its axis substantially vertical. It is provided with the floor or base 18, which is of extremely thin metal in the nature of a

diaphragm, and is provided further with the depending skirt portion 19 whose purpose will be presently described. The chamber 15 is secured to the wall 14 by means of a bolt 20, and nothing more. Furthermore, the bolt 20 is constructed hollow so that it serves at one and the same time as a securing means and also as a fume conduit which extends from the interior of the chamber 15 into the interior of the box 10. More particularly, it will be noted that in the form shown, the head of the bolt 20 is positioned within the chamber 15; a spacing washer or nut 21 is positioned between the chamber 15 and the wall 14; and a nut 22 engages the interior externally-threaded end of the bolt 20 where it projects into the box 10.

The free end 23 of the nut 22 is not threaded and is slightly tapered, the nut thereby serving as a convenient means for securing thereto in a removable and frictional manner the rearwardly projecting neck 24 of a fume distributor shown most clearly in Figure 2. This distributor consists of a transverse conduit 25 which carries not only the rearwardly projecting neck 24, but also the spaced, forwardly projecting distributor nipples or outlets 26. The latter are frequently used by surgeons for sterilizing such hollow or tubular instruments as catheters, these catheters being applied over the ends of the nipples 26 so that the fumes will pass directly through them.

The construction which my invention provides is such that the distributor 25 is not necessarily a fixture and may be removed where it is not desired. Furthermore, since none of the fume-generating apparatus is within the box 10, the use of the distributor 25 does not interfere with convenient access to such fume-generating apparatus.

In accordance with my invention, the chamber 15 is provided with a transparent removable cover, and I have illustratively shown a cylindrical cover 27 provided with the glass or similarly transparent top 28 and also with the handle 29. The cover is provided with the bayonet slots 30 and is adapted to fit over the upper end of the chamber 15 so that pins 31 carried by the latter will engage within the slots 30. The cover is readily removed and reapplied by merely grasping the handle 29 and giving the cover a slight rotative movement.

The electrical receptacle 16 is nothing more than the commercial form of socket, preferably of porcelain or the like, and readily available on the market. It is substantially cylindrical and is positioned beneath the chamber 15 in axial alignment with the latter. In its upper end, it is adapted to receive a heating unit 32 of well known type and provided with the threaded neck 33 and the central terminal 34. The heating unit 32 is therefore readily applicable and removable

from the receptacle or socket 16 in a manner which will be clearly understood.

In accordance with my invention, I provide means for securing the receptacle 16, and with it the unit 32, in a readily detachable manner to the wall 14, and in such a way that the heating unit 32 may be made to project upwardly into the skirt portion 19, as shown most clearly in Figure 3. This not only hides the heating unit, but serves as a protection therefor, and also results in maximum efficiency thereof because of its close and shielded proximity to the floor 18. In Figure 3, I have illustratively shown a pair of formaldehyde tablets 35 resting upon the floor 18, and it will be readily seen that the heat from the unit 32 passes in an efficient manner through the floor 18 and causes the desired vaporization of the tablets 35.

The means which I have shown for securing the receptacle 16 to the box 10 consists of a substantially circular clamp 17 having the parallel ends 36 projecting outwardly. The ends 36 are capable of being secured together or loosened with respect to each other by means of a wing nut 37 cooperating with a threaded stud 38. In other words, when it is desired to remove the receptacle 16, it is necessary only to loosen the wing nut 37 by a slight degree, whereupon the entire receptacle 16 may be withdrawn downwardly into the position shown in Figure 4. In this position, the heating unit 32 may be inspected, withdrawn, or replaced with extreme facility. To replace the receptacle 16, this procedure is simply reversed, it being inserted upwardly through the clamp 17 into the position of Figure 3, whereupon the wing nut 37 may be tightened. If it is desired to adjust the heat, it is only necessary to adjust the receptacle 16 axially by a slight degree so as to space the unit 32 to the desired amount from the floor 18.

An insulated cable or cord 39 extends from the bottom of the receptacle 16, through a suitable switch, and to a suitable attachment plug, such as that shown at 40 in Figure 1. The switch need not necessarily be attached to the box 10 at all, in which case a removal of the receptacle 16 enables the latter, together with its cable and plug, to be completely withdrawn from the apparatus, where desired. In certain cases, it is advantageous, however, to mount the switch upon the box 10, and I have shown such an arrangement in the drawings, the switch 41 being of the well known character wherein a manually rotatable knob 42 controls the making and breaking of the electric circuit.

The extreme simplicity of my structure, from the standpoint of manufacture, assembly, and use, is shown most clearly perhaps in Figure 4, wherein the several parts are in disassembled condition. The apparatus is compact and uncumbersome, and is totally

devoid of the bulkiness and complexity typical of many well known and prior sterilizers.

So far as efficiency of use is concerned, it is obvious that the extent of vaporization may be constantly observed without opening either the box 10 or the chamber 15, but merely by looking through the window 28. When it is seen that the tablets are almost completely vaporized, it is necessary only to remove the cover 27, drop another tablet or so into the chamber 15, and then immediately replace the cover. Similarly, should the apparatus fail to function, the electric heating unit may be readily inspected, and replaced if necessary, in less than a minute's time by merely withdrawing the receptacle 16 and again replacing it. All this inspection, refueling, and possible repair, may be readily accomplished without affecting the box 10, and hence without releasing dangerous fumes and interrupting the continuance of sterilization.

I do not claim broadly the employment of a solid fumigant in connection with a surgical sterilizing apparatus, nor even the combination with a sterilizing box of a fume-generating apparatus employing an electric heating unit or the like. I do claim, however, those particular features of construction, set forth with particularity in the appended claims, and as the result of which my present sterilizing apparatus embodies the outstanding advantages and marked improvements over the sterilizers at present known or used. However, it will be obvious that changes in the details herein described and illustrated for the purpose of explaining the nature of my invention may be made by those skilled in the art without departing from the spirit and scope of the invention as expressed in the appended claims. It is therefore intended that these details be interpreted as illustrative, and not in a limiting sense.

Having thus described my invention and illustrated its use, what I claim as new and desire to secure by Letters Patent is—

1. In a surgical-instrument sterilizer, a substantially rectangular box adapted to receive the instruments to be sterilized, a chamber on the exterior of one side wall of said box and adapted to receive a solid vaporizable fumigant, and a hollow bolt securing said chamber to said side wall and serving thereby as a fume conduit, a nut associated with said bolt on the interior of said box, and a fume distributor removably associated with said nut.

2. In a surgical-instrument sterilizer, a substantially rectangular box adapted to receive the instruments to be sterilized, a chamber on the exterior of one side wall of said box and adapted to receive a solid vaporizable fumigant, and a hollow bolt securing said

chamber to said side wall and serving thereby as a fume conduit, a nut associated with said bolt on the interior of said box, and a fume distributor removably associated with said nut; said distributor comprising a transverse conduit with a series of spaced forwardly projecting outlet nipples, and a rearwardly projecting neck adapted to be associated with said nut in alignment with said bolt-conduit.

3. In a surgical-instrument sterilizer, a substantially rectangular box adapted to receive the instruments to be sterilized, a substantially cylindrical chamber on the exterior of a side wall of said box and adapted to receive a solid vaporizable fumigant, said chamber having a depending skirt portion and being provided with a removable transparent cover, a hollow bolt securing said chamber in axially-vertical position to said side wall and serving also as a fume conduit, and an electric heating unit detachably secured to the exterior of said side wall beneath said chamber, said heating unit being accommodated in said skirt portion.

4. In a surgical-instrument sterilizer, a substantially rectangular box adapted to receive the instruments to be sterilized, a substantially cylindrical chamber on the exterior of a side wall of said box and adapted to receive a solid vaporizable fumigant, said chamber having a depending skirt portion and being provided with a removable transparent cover, a hollow bolt securing said chamber in axially-vertical position to said side wall and serving also as a fume conduit, an electric heating unit, and an electrical receptacle for said unit and detachably secured to said side wall beneath said chamber so that the heating unit will project upwardly therefrom into said skirt portion.

5. In a surgical-instrument sterilizer, a substantially rectangular box adapted to receive the instruments to be sterilized, a substantially cylindrical chamber on the exterior of a side wall of said box and adapted to receive a solid vaporizable fumigant, said chamber having a depending skirt portion and being provided with a removable transparent cover, a hollow bolt securing said chamber in axially-vertical position to said side wall and serving also as a fume conduit, a cylindrical electrical receptacle positioned beneath said chamber in axial alignment therewith, means for securing said receptacle in a readily detachable manner to the exterior of said side wall, and an electric heating unit removably carried by the upper end of said receptacle and adapted to project upwardly into hidden and protected position within said skirt portion.

6. In a surgical instrument sterilizer, a box adapted to receive the instruments to be sterilized, a chamber adapted to receive a solid fumigant which is vaporizable under heat, said chamber being mounted in its en-

tirety on the exterior of said box and alongside of the latter, a conduit extending from said chamber into said box, a heating apparatus carried by the box and mounted in association with said chamber for vaporizing the fumigant in said chamber, and a transparent removable cover for said chamber adapted to permit access to the interior of said chamber independently of the sterilizing box and adapted to permit inspection of the fumigant in said chamber independently of an opening thereof.

In witness whereof, I have signed and sealed this specification this 23 day of October 1929.

FREDERICK CHARLES WAPPLER.

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