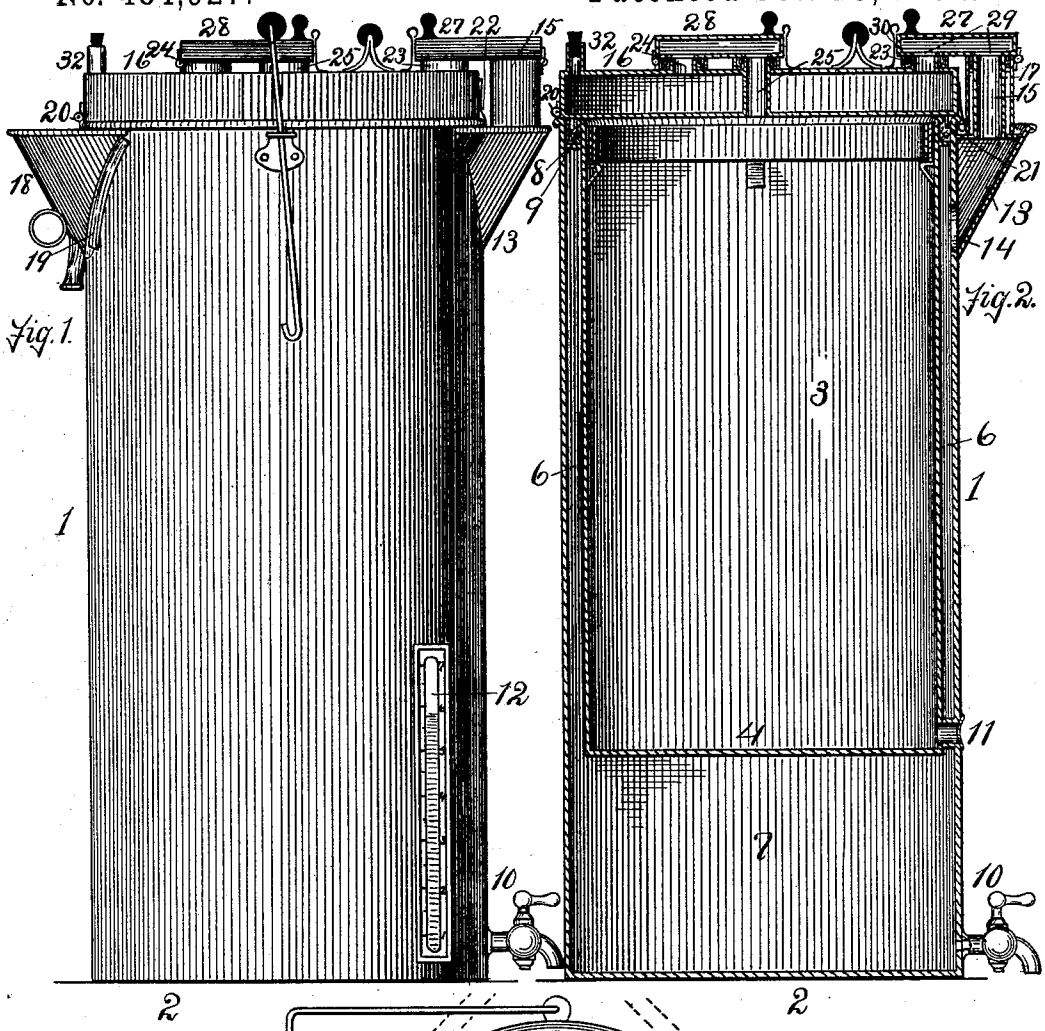
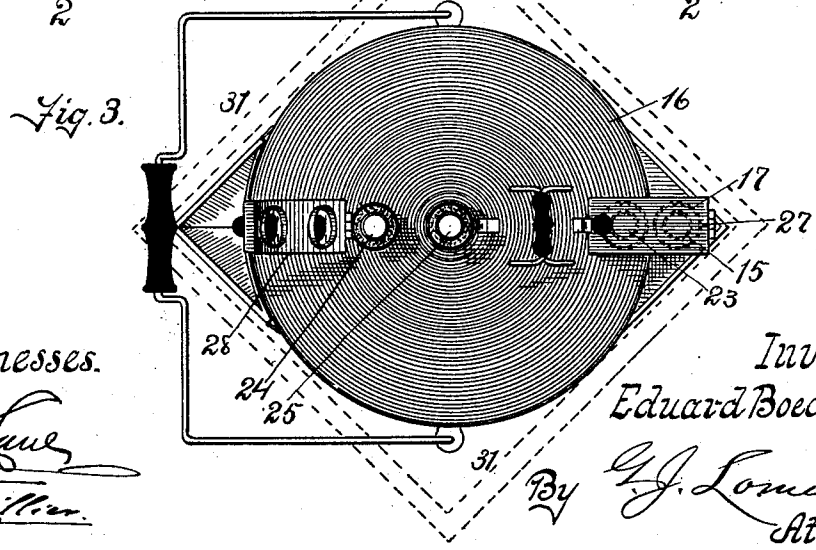
(No Model.)

E. BOECKMANN.

STERILIZER FOR SURGICAL INSTRUMENTS, &c.

No. 484,927. Patented Oct. 25, 1892.





Witnesses.

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STERILIZER FOR SURGICAL INSTRUMENTS, &c.

SPECIFICATION forming part of Letters Patent No. 484,927, dated October 25, 1892.

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To all whom it may concern:

Be it known that I, EDUARD BOECKMANN, having declared my intention of becoming a citizen of the United States, residing at St. Paul, in the county of Ramsey and State of Minnesota, have invented certain new and useful Improvements in Sterilizers; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the figures of reference marked thereon, which form a part of this specification.

My invention relates to improvements in thermic sterilizers by current steam of 212° Fahrenheit, which has proven to be a powerful germicide and is easily produced, more particularly adapted to meet the demands of the practical operating surgeon, as well as the demands of modern surgical science—to wit, first, sterilization by current steam of surgical instruments without damage to same by oxidation (rust) or corrosion, which, as an experimental fact, can be accomplished if the instruments are heated dry to, or nearly to the temperature of boiling water (212° Fahrenheit under an atmospheric pressure) before the current steam, which must be free from carbonic acid, is let on; second, sterilization by current steam of gauzes, cottons, &c., (dressings,) without wetting them, (an absolute requirement of modern aseptic surgery,) which can be accomplished if said stuffs are heated dry to the temperature of boiling water before the current steam is let on and, after steaming, again heated dry until all steam is expelled from the sterilizing-chamber; third, sterilization by current steam of other necessaries in surgical operations, such as operating-shirt, towels, &c., without wetting them, which can also be accomplished in manner and under conditions last above named; fourth, sterilization by boiling of a sufficient water-supply; fifth, aseptic preservation of sterilized dressings, shirts, towels, &c.; sixth, heating and drying of dressings, &c.; seventh, accommodation and adaptability in and portability of the means for above; eighth, safety and simplicity in the construction of the means for above; ninth, economy in the construction of the means for above.

The objects of my improvement are, first, by means of one instrument or mechanism to combine and supply the means to satisfy said demands in different and more practical and useful form than has heretofore been obtained; second, to afford facilities for introducing the steam into the sterilizing-chamber from above instead of from below by means of a hollow cover and connecting-tubes and steam-conductors, and at the same time by means of grooves filled with cotton preserving in a cheap and simple manner comparative steam-tightness at all points of connection of the different parts. I attain these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation of my improved sterilizer; Fig. 2, a central vertical section of the same; Fig. 3, a top view showing one of the steam-conductors open.

Similar figures refer to similar parts throughout the several views.

The cylinder 1, with copper bottom 2, constitutes the boiler. The interior cylinder 3, with flat bottom 4, constitutes the sterilizing-chamber. The outer and inner cylinders 1 and 3 are about half an inch apart, more or less, according to the size of the apparatus, leaving an open space 6 between the cylinders, forming, together with the space 7 between the bottoms of the cylinders, a water and steam space. The cylinders 1 and 3 are attached and hermetically closed at 8 about half an inch below the upper rims of both cylinders, forming groove 9, in which is placed loose cotton. From the boiler and near the bottom is a faucet 10. From the sterilizing-chamber 3 and near the bottom thereof there is a cylindrical opening 11 to the exterior of but sealed from the boiler. Attached to the boiler is a glass gage 12, by means of which the level of the water in the boiler may be observed. The water-inlet 13 connects with the boiler at 14 and opens in form of a tube 15 about an inch (more or less) above the cover 16, hereinafter mentioned. Around the tube 15, but sealed from the boiler, is a cylinder 17, forming, with the tube 15, a groove which is filled with cotton. The boiler is filled by means of an adjustable funnel 18, inserted into the tube 15 and removed to its place and held by clasps 19 when not in use.

Covering the sterilizing-chamber is a double and hollow lid or cover 16, forming a steam-space within, hinged at 20, and underneath and around the rim of the cover is a flange 21, which when the lid is closed presses down upon the cotton in groove 9. The lid when closed is held in place by means of a spring-clasp 22. From the top of and communicating with the steam-space in the hollow cover and immediately opposite the tube 15 is a tubular opening 23 of the same elevation and with like cylinder, groove, and cotton filling as specified in and about tube 15. The groove around each of the tubes specified is formed by means of an annular wall surrounding the projecting end of the tube and at a slight distance from the same. From the top of and communicating with the hollow cover is another tubular opening 24 in all respects like 23, with cylinder, groove, and cotton filling as specified in and about tube 15. Vertically through the center of the lid and sealed from the steam-space therein is a cylindrical opening 25, communicating with the sterilizing-chamber and projecting above the cover in like manner with like cylinder, groove, and cotton as other tubes above mentioned. From the top of the hollow lid, immediately above the hinge, and communicating with the steam-space therein is another tube 32, stopped with a common cork, except when used for emptying out of the lid water accumulated by condensation of steam.

Hinged at tube 15 is a hollow steam-conductor 27, with two tubular openings 29 on the under side thereof, having surrounding flanges 30 of such size and shape that when closed down upon the tubes 15 and 23 the tubes from the steam-conductor fit into the grooves about the former. Hinged at tube 24 is another steam-conductor 28, with two tubular openings on the under side thereof, having surrounding flanges similar to 30 of such size and shape that when closed down upon the tubes 24 and 25 the tubes from the steam-conductor fit into the grooves about the former. The steam-conductors are held in place by spring-clasps.

To use the sterilizer, raise or open the steam-conductor 27 and insert the funnel 18 into the tube and water-inlet 15 and fill the boiler with water, pouring same through the funnel, but leaving a few inches for steam-space. Fill sterilizing-chamber with instruments and stuffs to be sterilized. Close cover 16 and steam-conductor 27, leaving steam-conductor 28 open. Place the apparatus over the fire. When the water comes to a boil, the steam thereby generated will rise and fill all steam-space between the cylinders 1 and 3 and in the hollow cover, escaping at tube 24. The sterilizing-chamber by means of the boiling water and steam-jacket is thus, with contents, heated dry. The water being kept boiling, the temperature in the sterilizing-chamber will in the course of half an hour approximate 212° Fahrenheit, and the steam may then be conducted into the sterilizing-chamber without danger of condensation to any appreciable degree. To do this, close the steam-conductor 28 down upon the tubes 24 and 25. Current steam will then, free from carbonic acid, pass from the boiler through the lid, connecting-tubes, and steam-conductor into the sterilizing-chamber from above and will, by reason of its specific gravity being lighter than that of air, penetrate and diffuse itself to all parts of the sterilizing-chamber and the contents thereof, escaping at the opening 11. The water being still kept in a boil a temperature of at least 212° Fahrenheit will be preserved in the sterilizing-chamber. After thus steaming for half an hour the sterilization will be complete, and, the sterilizer being uncovered, the contents of the sterilizing-chamber will be found to be dry. The instruments, if any, are then removed and placed in a vessel of sterilized water drawn from the faucet 10. The cover is thereupon again closed, the steam-conductor 27 replaced as above, the steam-conductor 28 opened, and the opening or steam-escape closed with cotton. The steam in the sterilizing-chamber will soon entirely escape, leaving the contents in the sterilizing-chamber warm, perfectly dry, and sterilized. When steam no longer escapes through opening 25, the sterilizer is removed by its handle and carried to its proper place convenient to the surgeon's use. While the cooling process takes place it is desirable to keep the steam-conductor 27 open to prevent the boiler from being drawn in. The cover and steam-conductor 28 being closed the contents of the sterilizing-chamber will remain sealed and ready for use.

The outer cylinder 1 is usually for portable sterilizers made of tin-plate, with copper bottom, twenty inches high and nine inches in diameter. The inner cylinder 3, also made of tin-plate, is eight by fourteen inches. This sterilizer will take one and one-half gallons of water, and the sterilizing-chamber will hold sufficient bandages and dressings for several operations of ordinary magnitude and necessary instruments of any length up to and including forceps, and the supply of sterilized water will also be found sufficient.

For transportation the sterilizer should be placed in a wooden box or case 31. (Indicated by dotted lines in Fig. 3.) When not otherwise in use, the sterilizer can be used for preserving sterilized bandages and dressings, keeping them in the sterilizing-chamber, with cover and steam-conductor 28 closed and steam-escape 11 filled with cotton.

I am aware that prior to my invention steam-sterilizers have been made. I do not therefore claim, broadly, as my invention the use of steam for such purpose.

What I do claim as my invention, and desire to secure by Letters Patent, is—

1. In a sterilizing apparatus, the combination of the outer boiler and inner sterilizing-chamber sealed from the boiler, a hollow cover

closing both boiler and chamber, tubes leading from boiler, chamber, and cover to the exterior, and hinged and adjustable steam-conductors attachable to said tubes from said boiler and cover and to said tubes from cover and chamber, substantially as specified, whereby steam generated in the boiler may be conveyed around said chamber for the purpose of ante-heating, post-heating, or drying said chamber and contents or through said chamber for the purpose of sterilization.

2. In a sterilizing apparatus, an outer boiler or water-receptacle, a sterilizing-chamber within said boiler and sealed therein near the top, a hollow cover closing both boiler and inner chamber, tubes opening outside of said boiler, communicating, respectively, with the interior of said chamber, cover, and boiler, a discharge-tube for said cover, and hinged and adjustable steam-conductors adapted to connect said boiler-tube with the tube leading from said cover or with the tubes leading from said cover and chamber, or both, substantially as and for the purpose specified.

3. In a sterilizing apparatus, an outer boiler or water-receptacle, a sterilizing-chamber within said boiler and sealed therein near the top, a hollow cover closing both boiler and inner chamber, tubes opening outside of said boiler and communicating, respectively, with the interior of said cover, with said inner chamber at the top, and with said boiler above the water-line, discharge-tubes opening from said cover and chamber, and adjustable steam-conductors adapted to connect said boiler-tube with the tube leading from said cover and the tubes leading from said cover and chamber, substantially as and for the purpose specified.

4. In a sterilizing apparatus, an outer boiler or water-receptacle, a sterilizing-chamber within said boiler and sealed therein near the top, a hollow cover closing both boiler and inner chamber, tubes opening outside of said boiler, communicating, respectively, with the interior of said chamber and with said boiler above the water-line, the tube leading from said chamber passing through said cover, but closed with reference to the interior thereof, tubes opening from the interior of said cover, an annular wall surrounding the outer end of each of said tubes, forming a groove for holding cotton packing, and two adjustable steam-conductors adapted to connect said cover-tubes with said boiler and chamber tubes, respectively, each conductor having depending annular flanges adapted to enter said packing-grooves, substantially as specified.

5. In a sterilizing apparatus, the combination of the outer boiler and inner sterilizing-chamber sealed from the boiler, a hollow cover closing both boiler and chamber, tubes leading from the top of said boiler, chamber, and cover to the exterior, a discharge-tube leading from the bottom of said chamber, and hinged steam-conductors attachable to said boiler and cover tubes or to said upper chamber and cover tubes, or both, substantially as specified, whereby steam generated in the boiler may be conveyed either around or through the chamber.

6. In a sterilizing apparatus, the combination of the outer boiler and inner sterilizing-chamber sealed from the boiler, a hollow cover closing both boiler and chamber and having a depending flange fitting and adapted to close down into a circumferential cotton-filled groove at the top of said boiler, tubes leading from boiler, chamber, and cover to the exterior, and hinged steam-conductors attachable to said boiler and cover tubes or to said cover and chamber tubes, or both, and adapted to close down and fit into cotton-filled grooves surrounding said tube-openings, whereby the steam generated in the boiler may be conveyed around or through the chamber without escaping through interstices between said cover and boiler or between tubes and conductors.

In testimony whereof I affix my signature in presence of two witnesses.

EDUARD BOECKMANN.

Witnesses:
PETTER. G. PETTERSEN,
J. SILLIER.