Feb. 2, 1926. 1,571,872

E. R. ULRICH

STERILIZING DEVICE

Filed July 27, 1923 3 Sheets-Sheet 1

Fig. 1

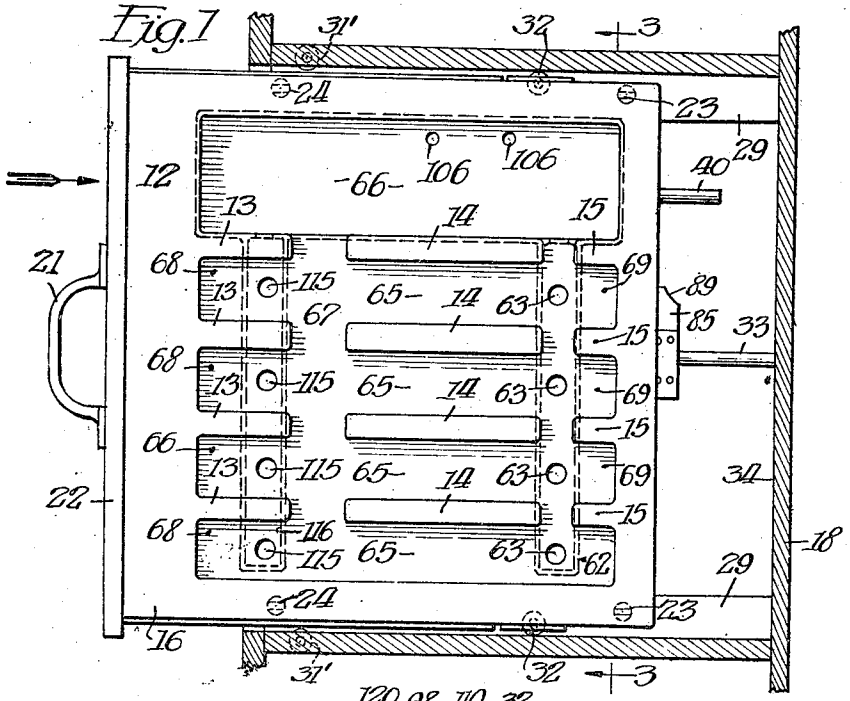
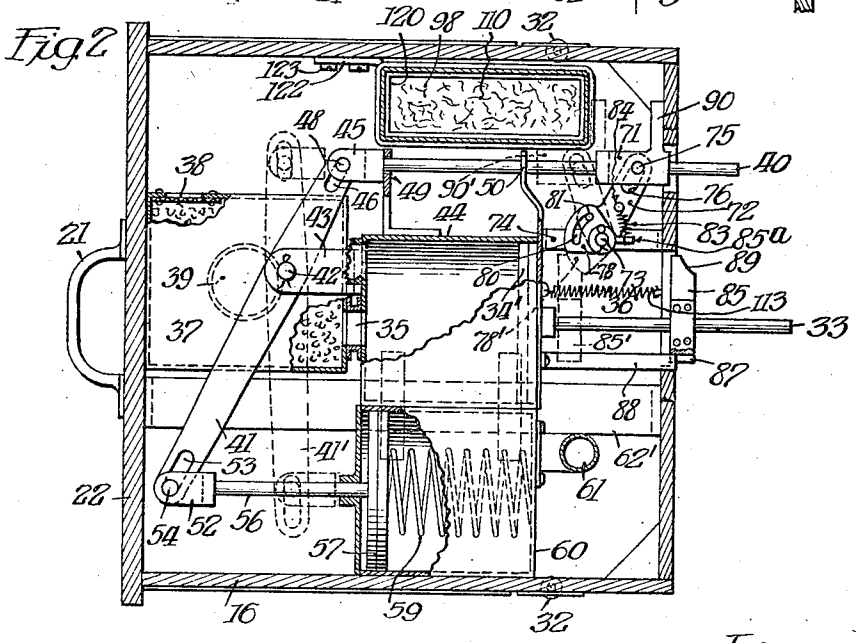


Fig. 2



Inventor:
Edward R. Ulrich,
By George S. Innes Atty.

Feb. 2, 1926. 1,571,872

E. R. ULRICH

STERILIZING DEVICE

Filed July 27, 1923 3 Sheets-Sheet 2

Fig. 3

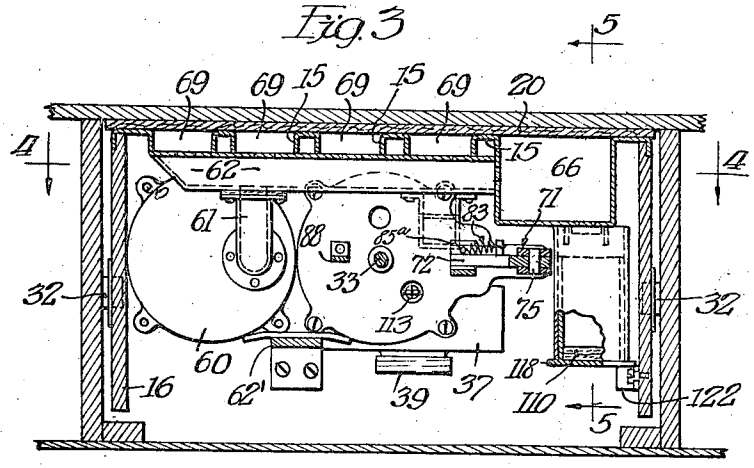
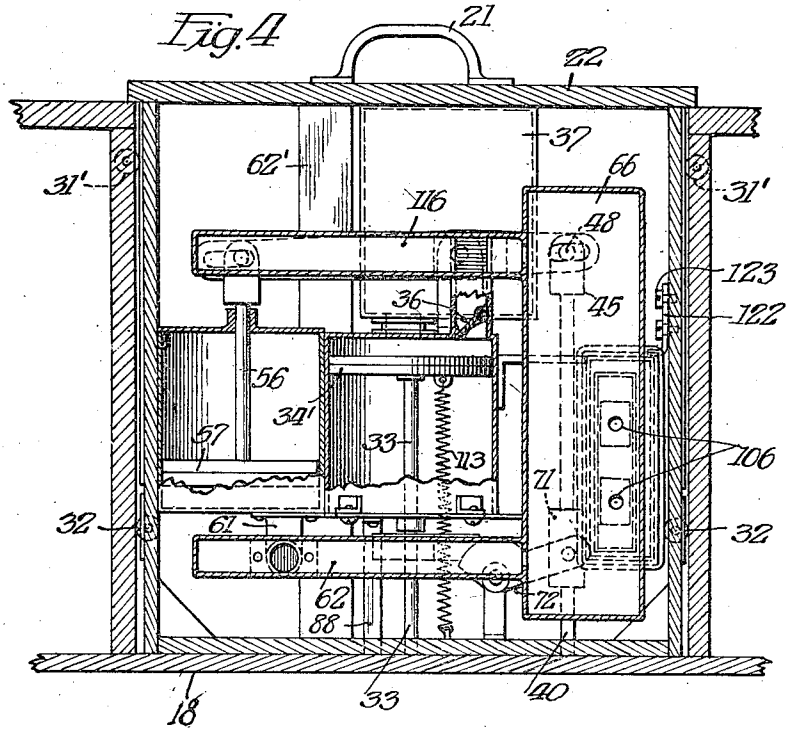


Fig. 4



Inventor:
Edward R. Ulrich,
By George S. Sines Atty.

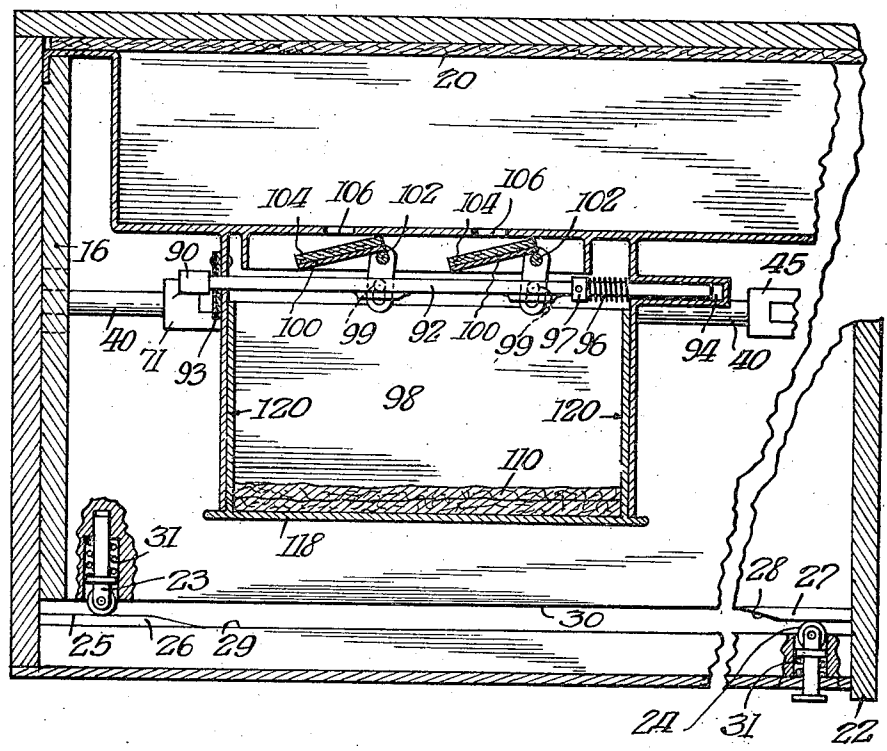
Feb. 2, 1926. 1,571,872

E. R. ULRICH

STERILIZING DEVICE

Filed July 27, 1923 3 Sheets-Sheet 3

Fig. 5



Inventor:
Edward R. Ulrich,
By George S. Bines
Atty.

Patented Feb. 2, 1926. 1,571,872

UNITED STATES PATENT OFFICE.

EDWARD R. ULRICH, OF CHICAGO, ILLINOIS.

STERILIZING DEVICE.

Application filed July 27, 1923. Serial No. 654,177.

To all whom it may concern:

Be it known that I, EDWARD R. ULRICH, a citizen of the United States, and a resident of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Sterilizing Devices, of which the following is a specification.

The invention relates to improvements in sterilizing devices, the general object of which is to provide a drawer or similar container for holding objects to be sterilized; such as medical, dental, chiropodist or barber instruments, for example.

In carrying out the invention, a drawer having a sterilizing compartment or tray for containing the objects to be sterilized is provided. Contiguous to the said compartment is a connected chamber for containing the sterilizing substance; the said substance being preferably a solid or liquid which will volatilize more or less readily so that sterilizing gas will be emitted from the chamber and permeate the said sterilizing compartment.

The passage-way connecting the said chamber for containing the sterilizing substance and the sterilizing compartment is controlled by a pair of valves; the said valves being effective to close the passage-way at the initial opening or withdrawing of the drawer from its compartment, and then to become non-effective at the time the drawer is finally returned to its normally closed position in its compartment. That is to say, the initial portion of the opening movement of the drawer will seal the sterilizing compartment from the chamber containing the sterilizing substance and the final portion of the movement of the drawer in its being closed will serve to open the sterilizing chamber with relation to the sterilizing compartment. Thus, while the drawer sterilizing compartment is more or less open to the air, the sterilizing agent is sealed against gaseous escape, and when the drawer is closed the sterilizing agent gas is free to permeate the sterilizing compartment of the drawer.

It will appear that each time the drawer is withdrawn from its compartment a certain amount of the sterilizing gas will be salvaged from the sterilizing chamber, and practically the balance of the contained gas thereof will be withdrawn into an intermediate reservoir cylinder container to be ejected through the purifier into the outside air, the quantity of gas ejected into the outside air being thereafter supplied from the chamber containing the sterilizing agent after the drawer has been returned to its normally closed position.

The general operation of the invention being now clear, reference is had to the accompanying drawings in which:

Fig. 1 shows a top plan view of the drawer and its compartment wherein the top of the said compartment has been removed to show the sterilizing tray 12.

Fig. 2 shows a top plan view of the drawer shown in Fig. 1 with the tray 12 removed, and certain elements contained in the drawer broken away.

Fig. 3 shows a section of Fig. 1 at the section line indicated by the indexes 3—3.

Fig. 4 shows a top plan view of the drawer and containing compartment of Fig. 3 at the section line indicated by the indexes 4—4.

Fig. 5 shows an elevation of the drawer and containing compartment of Fig. 3 at the section indicated by the indexes 5—5.

Referring to Fig. 1, the instrument tray 12 has dividing ridges 13 extending at right angles from the left-hand plane edge of the tray. Ridges 14 extend longitudinally in the tray, and short dividing ridges 15 aligning with ridges 13 and 14, respectively, extend from the right-hand plane edge. The top faces of the ridges 13, 14 and 15 are flush with each other and the top plane of the tray 12. The depressed spaces defined by the walls of the ridges 13, 14 and 15 are used to store instruments, or the like, for sterilization.

The tray 12 forms the top of the drawer element 15 wherein the top of the tray 12 is flush with the top edge of the drawer.

A drawer compartment 18 normally encloses the drawer 16; the drawer being adapted to slidably co-operate with the said compartment 18. The inside face of the top of the drawer compartment 18 has a felt facing 20 as shown in Fig. 5. In order that the drawer will be adapted to be easily withdrawn from its compartment by means of the handle 21 attached to the front panel of the drawer 16, an automatically adjusting caster 23 is fitted depending from the under side of each of the rear two corners of the drawer, and a similar pair of casters

24 is fitted upright at each of the front corners of the drawer compartment 18. A narrow plain run-way 25 having a beveled approach portion 26 is provided at each side at the rear of the drawer compartment co-operative with the casters 23, respectively. Also, at each of the front corners of the drawer and depending therefrom is a narrow plain run-way 27 (similar to the run-way 26, but inverted) having a beveled approach portion 28. The casters thus serve to support the drawer when it is drawn out of its compartment; the caster 23 rolling on the edge of the inside surface 29 of the drawer compartment bottom and the caster 24 rolling on the edge 30 of the bottom of the drawer. The resilience of the spiral springs 31 serves to overcome the weight of the drawer and the contents thereof when the drawer is being pushed to its normal closed position as shown in Fig. 5, so as to elevate and slidably seat the top face of the tray 12 against the felt facing 20 to seal the gaseous contents of the tray in the spaces between the ridges 13, 14, and 15, and the plane border edge, though the drawer rolls freely when withdrawn and the casters have rolled off the run-ways 26 and 27, respectively.

A stationary idler roller 31′ is placed at the middle of the inside face of the sides of the drawer compartment near the front opening thereof to reduce side friction. A like roller 32 is mounted at the middle of the outside faces of the drawer near the rear end thereof. The drawer will thus roll without surface friction against the inside faces of the bottom and vertical sides of the drawer compartment, and it will likewise roll on the front rollers 23 and the rear rollers 24 without surface friction when withdrawing the drawer after the drawer has been withdrawn far enough for the casters 23 to engage the face 29. Under the latter condition, the sealing pressure of the tray 12 against the felt 20 is removed.

The drawer in Fig. 1 is in its partly withdrawn position wherein the piston-rod 33 is in engagement with the rear inside face 34 of the drawer compartment. Moving the drawer outwardly from its drawn position will cause the piston-rod 33 to be disengaged from the rear drawer compartment face 34; the further outward movement of the drawer causing no operative effect on the mechanism contained in the drawer, about to be described.

Assume that the drawer has been withdrawn from its compartment and is being replaced, and has reached the position shown in Fig. 1, wherein the mechanism of the drawer will be in the position shown in Fig. 2. Upon further closure movement of the drawer into its compartment the piston-rod 33 will be operated due to its contact with the rear inside face 34 of the drawer compartment. This will cause the piston-head 34′ to be driven to the left to exhaust any contained air or gas through the screened cylinder opening 35 (and against the seated check-valve 36) into the rectangular purifying chamber 37, containing a purifying agent and through the screened opening 38 to the outside air. The purifying agent may be introduced and removed through the circular screwed cap 39 by removing the drawer from its compartment and inverting it so that the said cap will be upward. The purifying chamber may be removed as it is held in place by friction between the inside of the front drawer panel and the face of the opening 35.

When the piston-head 34′ has partly operated and expelled a portion of the air or gas contained behind it, the rod 40 comes into contact with the rear inside face 34 of the drawer compartment and is also pushed to the left so the oscillating lever 41 will swing about its pivot-pin 42 held by the rigid shackle-bracket 43 attached to the cylinder 44. The rod 40 has a shackle-coupling 45 for co-operating the rod 40 and the lever 41, there being a slotted portion 46 in the lever 41 to permit the shackle-pin 48 to slide, in view of the rigid bearings 49 and 50 on brackets attached to the cylinder 44, through which bearings the rod 40 slides. A shackle-coupling 52 has parts 53 and 54 corresponding to parts 46 and 48 respectively. The piston-rod 56 connecting the piston-head 57 is subject to the resilience of the compression spiral spring 59, so as the rod 40 is moved to the left under the closing movement of the drawer the piston-head 57 will be driven to the right to compress the spring 59 and exhaust the contents of the cylinder through the pipe 61, the duct 62 and thence through the orifices 63 into the sterilizing compartment involved in the connecting depressions 65, 66, 67, 68 and 69 in which are resting the objects to be sterilized.

The rectangluar metal block 71 interposed as an element of the rod 40 is slotted so that the lever 72, which is pivoted on the pin 73 which is attached to the bracket 74 which secures the cylinder 44 to the rear inside face of the drawer will be operated with the reciprocations of the rod 40 through the co-operation of the pin 75 passing through the slot 76 in the lever 72 and the walls of the block 71 through which the lever 72 passes as a tongue, thus forming a toggle joint. A segment shaped pawl 78 having a concentric slot 80 is freely pivoted on the pin 73, which latter pin also pivots the lever 72. A pin 81 rigidly attached to the lever 72 passes through the slot 80. A retracting spiral spring 83 is attached between a stud 84 on the lever 72 and a pin 85ª projecting radially from the apex of the pawl. The

pawl 78 being freely pivoted on the pin 73, the said pawl will be normally maintained in its drawn position relative to the lever 72 under the tension of the spring 83. However, if the pawl 78 is turned clock-wise about the pivot-pin 73 and then released it will return to the relative position shown in the drawing under the resilience of the spring 83. A rectangular metal cross-head block 85 is rigidly secured to the piston-rod 33. One end of the block 85 has a groove portion 87 which registers with a rigid tongue guide 88. The slide 88 also acts as a brace between the cylinder 44 and the rear inside face of the drawer 16. The other end of the block 85 has a curved face 89 which corresponds with the radius of the circumference of the face of the segment 78.

When the rod carrying block 85 is moved to the left and engages the segment 78, it causes the segment 78 to revolve clockwise about its pivot-pin 73, it being noted that when the block 85 has nearly approached the engagement of the segment 78, the movement of the rod 40 will tend to cause the segment 78 to assume the dotted position 78′, which position it is prevented from assuming due to the position then assumed by the block 85. However, as the block 85 moves to the left as the drawer is pushed to its normal closed position by the operator, the block 85 will pass beyond the lower edge of the segment 78 whereupon the segment 78 will rotate counter-clockwise under tension of the spring 83, into the position shown by the dotted lines 78′, the block then being at the left of the segment 78 in the position shown by the dotted lines 85′. This latter position will be attained just before the drawer has become seated in its normally closed position. The contents of the cylinder 44 is not now completely exhausted but the contents of the cylinder 60 containing the piston-head 57 has by this time been exhausted back into the sterilizing compartment, the lever 41 now being in the position indicated by the dotted lines 41′.

By reference to Fig. 5, it will be noted that as the block 71 approaches its extreme left position, the valve stem 92 is engaged endwise by bracket 90, and pushed through its packed joint 93 and tubular bearing 94, against the resilience of the spring 96 spiraled around the said stem 92, and held between the collar 97, which is rigidly attached to the stem 92, and the inside face of the chamber 98. Pins 99 on the stem 92 cooperate with slotted levers passing through the stem as a tongue and attached to the valves 100 and pivoted by the pins 102 to brackets attached to the inside upper wall of the chamber 98. The valves 100 have felt facings 104 which fit over the orifices 106 when the stem 92 is at its extreme left position, and which occupy the drawn position when the block 71 is at its extreme left (in Fig. 2) position and its bracket 90 will have then moved the stem 92 to its drawn position. The stem 92 being under the tension of the spring 96 when the valves 100 are in the drawn position, when the bracket 90 moves from its drawn position to the right (in Fig. 2) the stem will follow and seat the valves to close the orifices 106. The stem 92 is movably co-operative with the bracket 90 over a very small portion of the extreme portion of the last movement of the rod 40, as it approaches its left extremity shown by the dotted lines 90′ (in Fig. 2), consequent to the final seating of the drawer in its compartment.

From the foregoing, it will be clear that the sterilizing agent held by the felt material 110 in the chamber 98 will not be in communication with the sterilizing compartment by way of the orifices 106 at any position of the drawer 16, excepting its seated position.

Assume that the drawer is being opened. The rod 40 will move to the right under the resilience of the spring 59, as the drawer is unseated and is being withdrawn. The pin 81 is at the upper end of the slot 80, the spring 83 having rotated the segment counter-clockwise behind the block 85 after the block 85 passed its engagement therewith. As the lever 72 rotates clockwise under the influence of the rod 40 moving to the right, the segment 78 will be rotated clock-wise under the influence of the pin 81 until the face 89 of the block 85 has been disengaged. The piston-rod 33 will now be free to restore until it encounters the inside face 34 of the rear panel of the drawer compartment under the influence of the resilience of the retractile spring 113, which was extended as the piston-head 34′ was moved to the left to exhaust the contents of the cylinder 44, described.

As the piston-head 57 retracts during the time the rod 40 moves to the right under the influence of compression spring 59 to the point of releasing the piston-rod 33 its piston-head creates a vacuum to exhaust gas from the sterilizing compartment through the orifices 63, duct 62 and pipe 61. Then, as the piston-rod 33 retracts under the influence of spring 113 upon being released after the piston-head 57 has reached the left as shown in the drawing, the piston head 34′ will create a vacuum behind it to exhaust more gas from the sterilizing compartment by way of the orifices 115, duct 116, check-valve 36 through the left cylinder-head of the cylinder 44.

The chamber 98 has a telescoping bottom 118 which contains the felt material 110, there being four telescoping sides 120 attached to the said bottom 118, two end sides

only being shown in section. A latch 122 held under the friction of two screws 123 serves to hold the telescoping member in position and to release it by manual operation, so it may be removed to renew the sterilizing agent, for example.

It will be understood that the foregoing described sterilizing device illustrative of my invention has been by way of example only, and, therefore, I do not wish to be limited to the exact or to the approximate construction set forth in the disclosure. The mechanical details, as well as its general organization, may be modified widely as to form of container, and as to the method of application of the principles, without departing from the scope of my invention as defined by the terms of the subjoined claims.

I claim:

1. In a sterilizer, a sliding drawer, a gas generating chamber, a sterilizing compartment, a first and a second reservoir, means for conducting gas from the generating chamber to the sterilizing compartment, means for drawing a portion of the gas contents of the sterilizing compartment into only the said first reservoir, means for drawing a portion of the gas contents of the sterilizing compartment into only the said second reservoir, and automatic means for replacing the contents of only the said first reservoir into the sterilizing compartment.

2. In a sterilizer, a sliding drawer, a gas generating chamber, a sterilizing compartment, a first and a second reservoir, means for conducting gas from the generating chamber to the sterilizing compartment, means for drawing a portion of the gas contents of the sterilizing compartment into only the said first reservoir, means for drawing a portion of the gas contents of the sterilizing compartment into only the said second reservoir, and automatic means for replacing the contents of only the said first reservoir into the sterilizing compartment and for discharging the contents of only the second reservoir.

3. In a sterilizer, a sliding drawer, a gas generating chamber, a sterilizing compartment, a first and a second reservoir, means for conducting gas from the generating chamber to the sterilizing compartment, automatic means for drawing a portion of the gas contents of the sterilizing compartment into only the said first reservoir, automatic means for drawing a portion of the gas contents of the sterilizing compartment into only the said second reservoir, and automatic means for replacing the contents of only the said first reservoir into the sterilizing compartment.

4. In a sterilizer, a sliding drawer, a gas generating chamber, a sterilizing compartment, a first and a second reservoir, means for conducting gas from the generating chamber to the sterilizing compartment, means for drawing a portion of the gas contents of the sterilizing compartment into only the said first reservoir, means for thereafter drawing a portion of the gas contents of the sterilizing compartment into only the said second reservoir, and automatic means for replacing the contents of only the said first reservoir into the sterilizing compartment.

5. In a sterilizer, a sliding drawer, a gas generating chamber, a sterilizing compartment, a first and a second reservoir, means for conducting gas from the generating chamber to the sterilizing compartment, automatic means for drawing a portion of the gas contents of the sterilizing compartment into only the said first reservoir, automatic means for drawing a portion of the gas contents of the sterilizing compartment into only the said second reservoir, and automatic means for replacing the contents of only the said first reservoir into the sterilizing compartment and for discharging the contents of only the said second reservoir.

6. In a sterilizer, a sliding drawer, a gas generating chamber, a sterilizing compartment, a first and a second reservoir, means for conducting gas from the generating chamber to the sterilizing compartment, means for drawing a portion of the gas contents of the sterilizing compartment into the said first reservoir, means for thereafter drawing a portion of the gas contents of the sterilizing compartment into only the said second reservoir, and automatic means for replacing the contents of only the said first reservoir into the sterilizing compartment and for discharging the contents of only the said second reservoir.

7. In a sterilizer, a sliding drawer, a gas generating chamber, a sterilizing compartment, a reservoir, means for conducting gas from the generating chamber to the sterilizing compartment, means for drawing a portion of the gas contents of the sterilizing compartment into the said reservoir consequent to opening the drawer, and means for replacing the contents of the reservoir into the sterilizing compartment consequent to the closing of the drawer.

8. In a sterilizer, a sliding drawer, a gas generating chamber, a sterilizing compartment, a reservoir, means for conducting gas from the generating chamber to the sterilizing compartment, means for drawing a portion of the gas contents of the sterilizing compartment into the said reservoir consequent to opening the drawer, means for confining the gas in its said generating chamber consequent to the opening of the drawer, and means for replacing the contents of the reservoir into the sterilizing compartment and for again per-

mitting the gas to again flow from the generating chamber to the sterilizing chamber consequent to the closing of the drawer.

9. In a sterilizer, a strilizing chamber, a gas generating chamber, a reservoir, a closure for the sterilizing compartment, means for conducting gas from the generating chamber to the sterilizing compartment, means for drawing a portion of the gas contents of the sterilizing compartment into the said reservoir consequent to the opening of the said closure, and means for replacing the contents of the reservoir into the sterilizing compartment consequent to the closing of the said closure.

10. In a sterilizer, a sterilizing chamber, a gas generating chamber, a reservoir, a closure for the sterilizing compartment, means for conducting gas from the generating chamber to the sterilizing compartment, means for confining the gas in its said generating chamber, means for drawing a portion of the gas contents of the sterilizing compartment into the said reservoir and for confining the gas into the said generating chamber consequent to the opening of the said closure, and means for replacing the contents of the reservoir into the sterilizing compartment and for restoring the flow of the gas between the gas generating chamber and the sterilizing compartment consequent to the closing of the said closure.

In witness whereof, I have hereunto subscribed my name this 23 day of July, A. D., 1923.

EDWARD R. ULRICH.