Jan. 20, 1942. L. WEINTRAUB 2,270,792

STERILIZING APPARATUS

Filed May 5, 1939 2 Sheets-Sheet 1

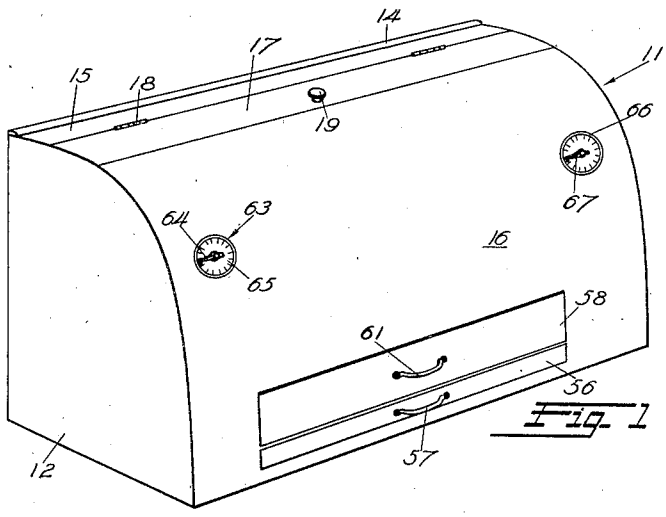


Fig. 1

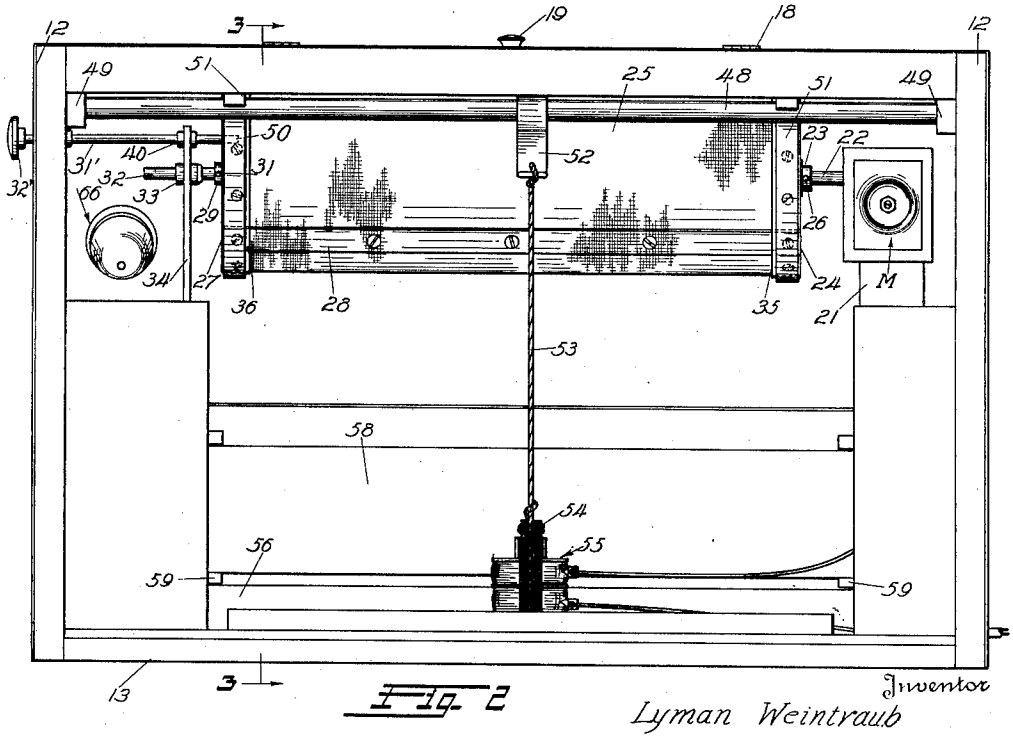


Fig. 2

Inventor

Lyman Weintraub

By Strauch & Hoffman

Attorneys

Jan. 20, 1942. L. WEINTRAUB 2,270,792

STERILIZING APPARATUS

Filed May 5, 1939 2 Sheets-Sheet 2

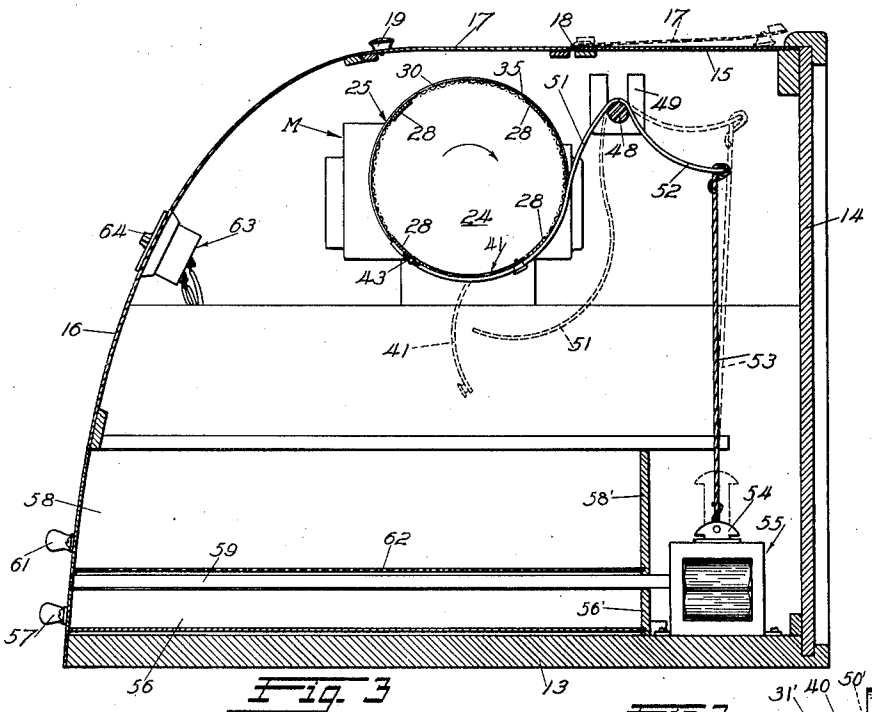


Fig. 3

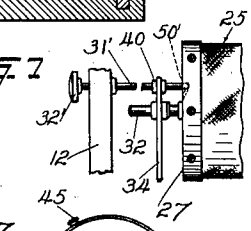


Fig. 7

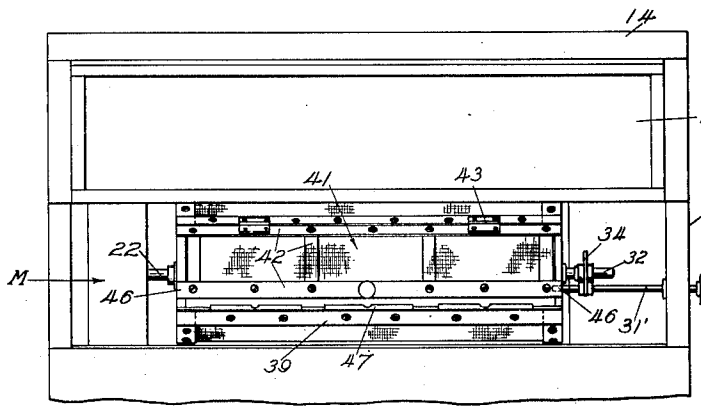


Fig. 4

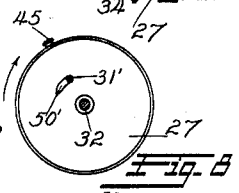


Fig. 8

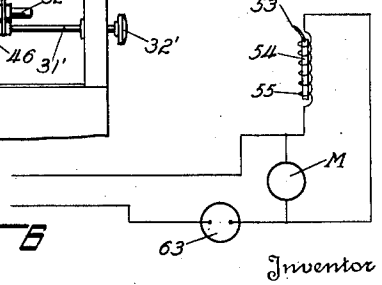


Fig. 6

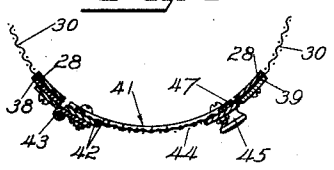


Fig. 5

Inventor

Lyman Weintraub

By Strauch & Hoffman

Attorneys

Patented Jan. 20, 1942

2,270,792

UNITED STATES PATENT OFFICE

2,270,792

STERILIZING APPARATUS

Lyman Weintraub, Ridgefield Park, N. J.

Application May 5, 1939, Serial No. 272,020

14 Claims. (Cl. 21—83)

This invention relates to methods and means for sterilizing, and is more particularly directed to apparatus and methods for uniformly exposing articles to be sterilized to fumes or vapors having disinfecting or germicidal characteristics.

By reason of more stringent sanitary regulations, considerable demand has arisen in beauty shops, barber shops and the like for suitable means to properly sterilize and disinfect the instruments employed. While prior devices have been suggested for this purpose, they have not proven satisfactory by reason of their relatively complicated structures, their necessity for considerable attention, and their inability to insure proper sterilizing of the instruments.

In overcoming the disadvantages of the prior art, it is a major object of this invention to provide novel methods and means for both sterilizing and storing under sterile conditions a number of instruments of the type used in beauty parlors, barber shops and the like such as permanent wave curlers, protectors, fibers and clamps, combs, metal clips, clippers, scissors, nail files, tweezers and similar instruments, the proper sterilizing and storage of such instruments being cared for automatically without any attention on the part of an attendant.

It is a further object of the invention to provide a sterilizer or the like which is capable of easily, uniformly and economically disinfecting and sterilizing all surfaces of a number of articles or instruments at the same time without injuring them.

A further object of the invention resides in the provision of a novel sterilizing apparatus or the like wherein instruments or articles in an apertured or mesh holder are uniformly exposed to disinfectant fumes as the holder is rotated or otherwise agitated for a predetermined period. More specifically, this period is automatically controlled, and the contents of the holder are automatically ejected therefrom upon a suitable tray at the end of the period, the operation taking place without the attention of an attendant.

A further object of the invention is to provide a novel sterilizing apparatus or the like wherein a rotatable article holder is provided with automatically operable door mechanism; and the holder is designed to automatically come to rest in a position for discharging its contents upon a tray below. More specifically, the door mechanism is electrically operated and the holder is electrically driven, and both are controlled by a single time switch.

A further object of the invention is to provide novel compact sterilizing apparatus or the like wherein a rotatable article holder is suspended in a sealed housing above a container or pan of disinfecting material so as to be exposed to the fumes arising therefrom, and wherein a mesh bottomed tray is slidably disposed between the holder and the container in the direct path of the rising fumes. In a practical embodiment of the invention the container is slidably mounted for recharging, and the article holder is easily accessible from a door at the top of the housing.

Still a further object of this invention includes the provision of a novel method of sterilizing instruments used in beauty parlors, barber shops and the like wherein the instruments are subjected for a predetermined period to agitation coupled with exposure to a sterilizing medium and are thereafter subjected to said medium while maintained stationary.

Further objects of the invention will presently appear as the description proceeds in connection with the appended claims and the annexed drawings in which:

Figure 1 is a perspective of a preferred embodiment of the apparatus illustrating the upper housing door and tray arrangements.

Figure 2 is a rear elevation with the back wall of the housing removed illustrating the cylinder drive and other mechanism within the interior of the housing.

Figure 3 is a side elevation in section illustrating further the mechanism within the interior of the housing, especially the door control for the cylinder.

Figure 4 is a top plan view of the housing with the upper door open and the article holder door partly open.

Figure 5 is a fragmentary section of the article holder illustrating the door structure.

Figure 6 is a diagrammatic view of the electrical circuit for the drive and control mechanism.

Figure 7 is a side elevation of a portion of the device as shown in Figure 2 with a modified type of holding means.

Figure 8 is an end elevation of the cylinder of Figure 7.

In its preferred embodiment, the invention comprises a housing or cabinet **11** having end walls **12**, a bottom wall **13**, a removable rear wall **14** (see Figure 3), a top wall **15** and a curved front wall **16** extending forwardly and downwardly from said top wall. A door **17**, mounted by means of suitable hinges **18** upon wall **15**, can be opened for access to the interior of the housing by pulling upwardly on knob **19**. Preferably door **17** is substantially gas tight.

Referring to Figure 2, a motor drive unit M is rigidly supported upon a base **21** within the housing and its drive shaft **22** extends into a collar **23** fixed to a cylindrical disc **24** serving as one end wall of a cylindrical article or instrument holder **25**. Shaft **22** is secured to collar **23** as by a set screw **26**.

Motor M may be either spring or electrically

driven, but preferably is an electric motor unit of the low power, slow speed type usually used for electrically driven phonograph turntables, normally driving shaft 22 at a speed of about fifty revolutions per minute. These units are inexpensive to operate and the slow speed is an important feature as will be later set forth.

The opposite end wall 27 of cylinder 25 is of the same shape and size as wall 24. These two walls have their peripheries rigidly secured to opposite ends of a series of rigid, flat, longitudinal bars 28 defining a rigid, cylindrical skeleton or frame.

Wall 27 has secured thereto a collar 29 suitably fastened, as by set screw 31, to a shaft 32 passing through a bearing collar 33 rigid with a support 34. Thus cylinder 25 is rotatably supported in bearings at each end, and when the motor M is deenergized, cylinder 25 is freely rotatable about its axis.

As illustrated in Figure 3, an apertured sheet 30 is wrapped about the entire periphery of cylinder 25 except between two adjacent bars 28 which define a doorway along the cylinder. Sheet 30 preferably comprises a strip of ordinary copper wire window screening, but may be any suitable perforate plate of thin metal or the like, and may be made in sections as desired instead of in a single piece.

At opposite ends of cylinder 25, screen 30 is preferably clamped to walls 24 and 27 by smooth surfaced metal bands 35 and 36, respectively. Screen 30 is also preferably attached securely to each bar 28 intermediate its ends by suitable screws or like fastening means as shown. As illustrated in Figure 5, one end of screen 30 is clamped between a bar 28 at one side of the doorway and a similar bar 38, while the other end of screen 30 is clamped between the bar 28 at the opposite side of the doorway and a superposed bar 39.

An arcuate shaped door 41, having a rigid, relatively heavy skeleton frame 42, is swingably mounted upon bar 38 by suitable hinges 43. The frame of door 41 is covered by a suitable screen 44, similar to screen 30, and is provided with a manual knob 45. Door 41 forms a part of the cylindrical wall of cylinder 25 when in closed position as shown in Figure 5. Inward movement of door 41 beyond the periphery of the cylinder is prevented by suitable extensions 46 contacting walls 24 and 27, and a stop strip 47 clamped between bars 28 and 39.

The weight of door 41 and the additional bars 38 and 39 adjacent the doorway provide an unbalanced arrangement which tends to bring cylinder 25 to a position of rest with the weighted portion disposed downwardly due to the action of gravity when the cylinder is not under the control of the motor. If desired, additional weights may be added to door 41.

As illustrated in Figures 2 and 3, a rock shaft 48 is supported in bearing yokes 49 secured to opposite end walls 12. At each end of cylinder 25, a rigid flat strap 51, secured to shaft 48 by bolts, welding or the like, extends downwardly and forwardly. The lower end of each strap is curved upwardly to fit part way about the periphery of cylinder 25 for a purpose to be later described, and preferably contacts bands 35 and 36 when in the full line position of Figure 3.

A crank arm 52 is rigidly secured to shaft 48 and extends rearwardly therefrom. A cable or link 53, of wire or any suitable material, connects arm 52 with the vertical core 54 of a solenoid 55 mounted on the bottom wall of the housing, preferably at the rear.

A slidable pan or container 56 is mounted at the bottom of the housing directly below cylinder 25 and is provided with an external handle 57 at the front housing wall. Container 56 may be made of any suitable material, such as metal or wood, but is preferably formed or treated to withstand chemical action by the disinfecting liquid or other material placed therein.

Directly above container 56, an article receiving tray 58 is slidably mounted on suitable guides 59 rigid with the housing, and is provided with an external handle 61 at the front wall. When the container 56 and tray 58 are in the closed position shown in Figure 3, their front walls comprise substantial continuations of wall 16 of the housing; and, if desired, suitable sealing strips may be provided at these walls for preventing escape of the disinfectant fumes.

The bottom wall 62 of tray 58 is apertured to permit fumes from container 56 to rise through the tray and directly to the cylinder 25 which is vertically spaced above tray 58. Wall 62 is preferably a perforated plate of suitable design but may be constructed in the manner of a sieve, screen, or other similar form as desired. It is necessary only that it be sufficiently perforate to permit free passage of the fumes or gas, sufficiently strong to withstand the weight of the articles dropped upon it, and resistant to any corrosive action of the disinfectant fumes or gas.

As shown in Figure 6, the electrical circuit is provided with a time switch 63 in one side of the line. Switch 63 is preferably mounted on housing wall 16 and is preferably of the self-winding clock mechanism actuated type wherein normally open contacts are engaged by actuation of a manually adjustable pointer knob 64 which travels over a calibrated dial 65 to set the clock mechanism to open the contacts after a predetermined time.

Also mounted on wall 16 is a clock operated sensible signal 66, preferably an alarm bell. This signal is of the type which can be set to sound the alarm after a predetermined period and is set by adjusting pointer knob 67. If desired, switch 63 can be provided with a signal and signal unit 66 dispensed with.

Switch 63 and signal 66 are units which can be purchased complete, and since this invention is not concerned with the specific structure of either, further description of the same is deemed unnecessary.

In operation, for sterilizing instruments or the like, door 17 is opened to the dotted line position shown in Figure 3. Switch 63 being open, the motor is deenergized and cylinder 25 may be easily manually rotated until door 41 is accessible by reaching through the opening uncovered by housing door 17. It has been discovered, in a practical form of the invention now in use, that the bearing supports for cylinder 25 provide sufficient friction for enabling the cylinder to be balanced with door 41 uppermost in the position illustrated in Figure 4.

Door 41 is then opened, and the instruments dropped loosely into holder 25. The weight of the instruments helps maintain cylinder 25 in balanced position. Doors 41 and 17 are then closed in order.

If it is desired to more positively retain cylinder or holder 25 in loading position while it is being loaded and until motor M is energized to revolve the cylinder, a pin or rod 31', as shown in

Figure 2, may be provided in wall 12 of the housing extending through a bearing member 40 in support 34. An aperture 50 is provided in the end wall 27 of cylinder 25 to be engaged by the pin when the cylinder is in position to be loaded. When the cylinder is to be loaded, it is locked in position by pushing pin 31' inwardly by handle 32' until the right end of the pin projects into aperture 50. After the cylinder is loaded, pin 31' is withdrawn simultaneously with the starting of the motor by turning knob 64.

Knob 64 is turned to a selected predetermined point on dial 65. This closes the switch contacts at 63 thereby energizing motor M and solenoid 55. Actuation of knob 64 also sets in motion a clockwork mechanism within the switch which will separate the switch contacts after a predetermined period, depending on the setting of knob 64. For sterilizing combs, clips and the like in beauty parlors, by the use of a disinfectant such as formaldehyde fumes, a period of fifteen minutes has been found satisfactory.

Simultaneously with the setting of switch 63, alarm 66 is set by adjustment of knob 67 to sound a bell when the predetermined period has expired.

The moment the contacts of switch 63 are closed solenoid 55 is energized to pull down core 54, thereby pulling down on one end of crank arm 52 to rock shaft 48 and straps 51 in a clockwise direction until straps 51 engage the periphery of cylinder 25 where they are maintained until the switch is opened. It will be noted that the lower end of each strap 51 extends a substantial distance about and along the under side of cylinder 25 when pulled into the full line position of Figure 3.

Simultaneously with energization of solenoid 55, motor M starts to rotate cylinder 25 slowly in a clockwise direction as reviewed in Figure 3. As cylinder 25 rotates, its periphery slidably engages straps 51 which prevent door 41 from swinging open due to gravity when it reaches the bottom position illustrated in full lines in Figure 3. Straps 51 are designed to extend far enough about cylinder 25 to prevent door 41 from swinging open until cylinder 25 has rotated to a position where the force of gravity exerted on the door tends to keep it closed.

The above described rock shaft parts and straps 51 are designed to maintain straps 51 in substantial bearing contact with cylinder 25, preferably at metal bands 35 and 36 to reduce wear; and care is taken to prevent straps 51 from engaging the cylinder with undue friction or braking effect.

As cylinder 25 rotates, the fumes arising from the disinfectant or other sterilizing material in container 56 pass directly upwardly through the apertured bottom of tray 58 to envelop the cylinder and its contents. The apertured or meshed wall of the cylinder permits the fumes to enter to treat the articles therein and the slow rotation of cylinder 25 tumbles the articles about and changes their relative positions so that every surface of each article is uniformly exposed to the treating fumes. Slow rotation of the cylinder prevents serious abrading action of the articles upon one another and guards the cylinder against injury as well.

When the predetermined period has expired, the switch contacts are automatically opened, deenergizing the motor and releasing core 54 which at once jumps to the dotted line position of Figure 3. Straps 51 are heavier than the combined weight of arm 52, cable 53 and core 54 and they therefore drop away from the cylinder under the influence of gravity to the dotted line position in Figure 3.

Cylinder 25 becomes freely rotatable upon deenergization of the motor and comes to rest after overcoming its inertia. Due to the preponderance of its weight adjacent or upon door 41, cylinder 25 tends to assume a position of rest with door 41 at the bottom. Since straps 52 are now removed, door 41 is now free to swing open downwardly due to gravity and the contents of the cylinder are thus automatically discharged into tray 58. The open position of door 41 is illustrated in dotted lines in Figure 3.

The alarm, sounding simultaneously with opening of the switch, signals the operator that the articles are ready for use; and they are maintained on tray 58 exposed to the disinfectant fumes until such use is desired. This rest period with exposure to the fumes from tray 56 insures further sterilization. Preferably all of the housing doors and joints are made substantially gas tight to prevent escape of the fumes.

While the invention has been above described as for sterilizing barber or beauty shop implements and articles, it is also capable of wide general use in sterilizing other types of instruments and articles such as doctors' and dentists' instruments. The chief advantage of the present apparatus over sterilizers now used in the prior art is that applicant's sterilizer insures uniform treatment of all surfaces of the articles or instruments, treatment which cannot be obtained merely by piling the articles loosely on a stationary tray and exposing them to treating fluid.

To facilitate the vaporization of the disinfecting fluid in pan 56, a heating unit of any suitable type such as an electrical resistance coil of conventional type may be placed in the frame of the unit immediately beneath pan 56 and controlled independently or through time switch 63.

It will be noted that both trays 56 and 58 have rear walls 56' and 58', respectively, which are substantially the same size as the apertures in the front wall 16 of the unit whereby when the trays are fully opened or pulled out, the rear walls of the trays function to seal the apertures and prevent the escape of fumes from the unit. This is important in insuring against the loss of disinfectant and in the release of the fumes which may give an objectionable odor to the interior of the shop or room where the unit is used.

Figures 7 and 8 illustrate a modified form of holding means for cylinder 25 while the latter is being loaded. A pin 31' is used as in Figure 2, the inner end thereof being preferably rounded. An aperture or recess 50' is provided in the end wall of cylinder 25 extending in a direction concentric to the axis of rotation of the cylinder. The depth of recess 50' gradually decreases as the cylinder revolves and the aperture goes past pin 31'. The angle made by the sloping wall of aperture 50' is such that pin 31' will maintain cylinder 25 in proper loading position until it is loaded. Then as motor M is energized to rotate cylinder 25, the rotation of the cylinder coupled with the sloping side of aperture 50' will automatically push pin 31' out of engagement with the aperture 50' so that it will cease to lock the cylinder in position and permit it to revolve freely. This arrangement eliminates the necessity for the operator manually withdraw-

ing pin 31' when the motor is started and insures automatic disengagement of pin 31'. This arrangement also prevents possible damage to the mechanism if the operator should start the motor and forget to withdraw pin 31' in the arrangement shown in Figure 2.

If desired pin 31' may be provided with a solenoid and the latter connected into the circuit with motor M or solenoid 54 so that the pin will be automatically withdrawn from engagement with the aperture in cylinder 25 when motor M is energized. In such an arrangement, pin 31' is combined with a solenoid in substantially the same manner as shown in Figure 6 at 53, 54 and 55.

The invention may be embodied in other specific forms without departing from the spirit or essential characteristics thereof. The present embodiment is therefore to be considered in all respects as illustrative and not restrictive, the scope of the invention being indicated by the appended claims rather than by the foregoing description, and all changes which come within the meaning and range of equivalency of the claims are therefore intended to be embraced therein.

What is claimed and desired to be secured by United States Letters Patent is:

1. In a sterilizing apparatus, a tray; a rotatable instrument holder disposed above said tray; a door on said holder operable to permit the discharge of articles from said holder to said tray; means to generate sterilizing fumes to sterilize said articles, and means for insuring that said holder, when at rest, has the door positioned to discharge said articles directly into said tray.

2. In a sterilizing apparatus, a tray; a rotatable instrument holder above said tray, a weighted door on said holder to insure that said holder, when not in rotation, is positioned to discharge articles from said holder directly into said tray, and means to generate sterilizing fumes for sterilizing the instruments in said holder and said tray.

3. In a sterilizing apparatus, a tray; a rotatable article holder above said tray; a swinging door on said holder; means for rotating said holder, said holder being connected to said rotating means so as to be freely rotatable about its axis when not being rotated by said means, and weighted to insure that it comes to rest with said door swinging downwardly with the door opening directly above said tray; and means to generate sterilizing fumes for sterilizing the articles in said holder and tray.

4. In a sterilizing apparatus, a rotatable article holder; a tray below said holder; means for slowly rotating said holder for a predetermined period; a door on said holder; means for automatically positioning and opening said door directly above said tray to discharge said articles into said tray at the end of said predetermined period, and means to generate sterilizing fumes for sterilizing the articles in said holder and tray.

5. In the sterilizing apparatus of claim 4, a sensible signal for indicating termination of said period.

6. In a sterilizing apparatus, a rotatable article holder; means to generate sterilizing fumes for sterilizing articles in said holder; a motor for rotating the same; a door on said holder; and time actuated means for controlling rotation of said motor and opening of said door.

7. In a sterilizing apparatus, a rotatable article holder; means to generate sterilizing fumes for sterilizing articles in said holder; an electric motor for rotating said holder; a door on said holder; electrical means for controlling said door; and a time operated switch for controlling said door controlling means and said motor.

8. In a sterilizing apparatus, a rotatable article holder; means to generate sterilizing fumes for sterilizing articles in said holder; a door on said holder; means for retaining said door in closed position while said holder is rotating; and means for automatically releasing said retaining means when said holder comes to rest.

9. In a sterilizing apparatus, a rotatable and substantially cylindrical article holder; means to generate sterilizing fumes for sterilizing articles in said holder; a hinged door extending along the cylindrical wall of said holder; means slidably engaging the cylindrical wall of said holder to maintain said door closed during rotation of said holder; and means for releasing said last named means after a predetermined period of rotation of said holder.

10. In a sterilizing apparatus, a rotatable cylindrical article holder; means to generate sterilizing fumes for sterilizing articles in said holder; a hinged door extending along the cylindrical wall of said holder; arcuate retaining means engaging said cylindrical wall to maintain said door closed during rotation of said holder; means for rockably supporting said retaining means; and means effecting rocking movement of said retaining means away from said wall to permit opening of said door.

11. In a sterilizing apparatus, a housing; a revoluble article holder in said housing; means to generate sterilizing fumes for sterilizing articles in said holder; a door in said holder; a door in said housing for access to said article holder; and means to hold said article holder in loading relation to said housing door.

12. In a sterilizing apparatus, a housing; a door in said housing; a revoluble article holder in said housing; means to generate sterilizing fumes for sterilizing articles in said holder; a door in said holder; means to drive said article holder; means to lock said article holder in loading relation to said housing door; and means to disengage said locking means when said driving means is actuated.

13. In combination, an apertured cylindrical article holder; means for rotating said holder about its axis for a predetermined period of time; a tray beneath said holder; means to generate sterilizing fumes for sterilizing articles in said holder and tray, and means for automatically ejecting the contents of said holder into said tray at the end of said time period.

14. In a sterilizing apparatus, a substantially sealed cabinet; means in said cabinet to receive and agitate articles to be sterilized; a receptacle to store said articles after treatment in said agitating means; a receptacle containing a quantity of disinfectant, the vapor of which effects sterilizing; and means on each of said receptacles to prevent the escape of vapors from said cabinet when said receptacles are in full closed or full open positions.

LYMAN WEINTRAUB.