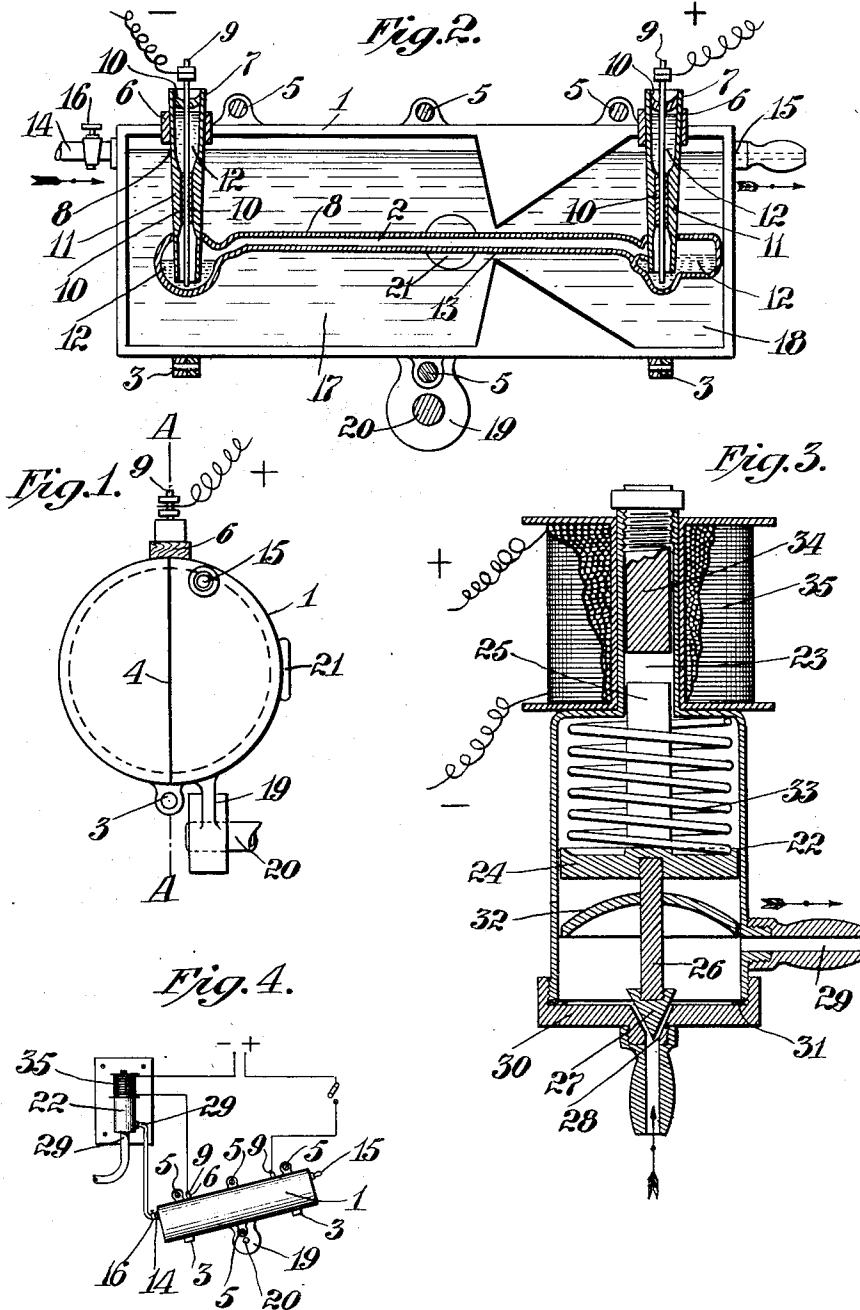


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 APPARATUS FOR THE STERILIZATION OF LIQUIDS.
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1,051,350.

Patented Jan. 21, 1913.



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UNITED STATES PATENT OFFICE.

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APPARATUS FOR THE STERILIZATION OF LIQUIDS.

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Specification of Letters Patent.

Patented Jan. 21, 1913.

Original application filed February 2, 1910, Serial No. 541,626. Divided and this application filed August 25, 1910. Serial No. 578,966.

To all whom it may concern:

Be it known that I, THOMAS NOGIER, a citizen of France, residing at 11 Rue de la Charite, Lyon, France, have invented new and useful Improvements in Apparatus for the Sterilization of Liquids, of which the following is a specification.

This invention relates to an apparatus to be employed in the sterilization of liquids and more particularly in the sterilization of clear alimentary water deprived of colloidal substances.

This application is division of my pending application Serial No. 541,626, filed February 2, 1910.

In the accompanying drawings showing an illustrative embodiment of this invention, and in which the same reference numeral refers to similar parts in the several figures:—Figure 1 is an end elevation of one of said parts constituting the container or reservoir 1 in which the sterilization is produced. Fig. 2 is a section on the line A—A of Fig. 1 and shows the second part of the apparatus constituted by an electric mercury vapor lamp. Fig. 3 is a section illustrating on a larger scale, the disposition or construction of the third part of the apparatus which consists of an automatic and adjustable distributing valve for the water. Fig. 4 is a diagrammatic view showing the parts in their assembled positions.

The reservoir 1 preferably made of aluminium is formed of two parts hinged together as at 3, 3 and adapted to be hermetically connected along the line 4 by means of screws or bolts 5, the joint 4 being preferably packed with a thin sheet of rubber.

At its upper part the reservoir 1 is provided with two openings hermetically closed by means of rubber stoppers 6 each traversed by a vertical member 7 of the burner 2, the jacket or inclosing member 8 of which is constructed entirely of quartz or other substance permeable to rays of short wave length. The metallic electrodes 9 traverse at 10 a suitable packing and are connected at their upper ends to the current conductors. Each vertical member 7 is preferably formed of quartz and is provided intermediate its length with a lining 11, of any suitable material.

Mercury is introduced into the chambers

12, which are formed in the members 7, above the lining 11.

The axis of the horizontal tube 2 connecting the two vertical members or tubes coincides generally with the axis of the reservoir 1. The latter is divided into two chambers 17 and 18 of unequal area connected by a restricted orifice 13 giving passage to the aforesaid horizontal tube 2 of the burner.

The water is introduced through the pipe 14 and flows out through the tube 15. A cock 16 is provided for regulating the output and owing to the effects of pressure it is preferable that this cock is arranged on the feed tube 14 rather than on the delivery tube. In the chamber 17 a reduction of pressure is produced and in the chamber 18 the sterilization is completed under the best possible conditions since the orifice 13 causes all the liquid to impinge upon the lamp and spread thereover in a thin layer.

The lower part of the reservoir 1 carries a bearing 19 traversed by a shaft 20 acting as a support for the device and allowing it to be oscillated to produce the ignition of the lamp. An inspection opening 21 provided with a crystal glass window permits of ascertaining if the lamp is in action but the automatic controller shown in Fig. 3 prevents the necessity for constant surveillance. The window 21 is of smoked crystal to protect the eyes of the observer. The said controller comprises a cylinder 22 surmounted by a second cylinder 23 of much smaller diameter. In said cylinder 22 is adapted to move a piston 24 which is not tightly packed therein. This piston is connected at one side to a soft iron rod 25 and at the other side by means of a rod 26 to a copper cone 27 or valve adapted to more or less close or open the inlet 28 for the liquid which latter flows out through the tube 29 which is in communication with the liquid inlet pipe 14 of the reservoir 1. It will be seen that the inlet for liquid into the controller is fixed to the bottom of a cap 30 closing the cylinder 22 and is preferably made of copper of sufficient strength to form a support for said controller. Suitable packing 31 is provided to insure a tight joint, between the cap 30 and cylinder 22. The rod 26 traverses a copper cap 32 provided to prevent the liquid coming in contact with

the soft iron of the piston, the said cap being fixed to the rod 26. A spring 33 tends to maintain the liquid inlet 28 in normally closed condition. The upper part of the cylinder 23 is interiorly screw threaded for reception of the threaded part of a soft iron rod or core 34 and the cylinder 23 is surrounded by a coil 35 the wire of which is of a convenient size to attain the desired effort that is to say to lift the piston rod 25 by the core 34 when the current operating the lamp passes through the coil, the controller being arranged in the lamp circuit for this purpose.

The position of the core 34 can be adjusted by screwing it in its support in such a manner that during the passage of the current, that is to say, during the illumination of the lamp, the cone valve 27 is raised, the piston 24 compressing the spring proportionally to the strength of the current. If during the action of the lamp the intensity of the current is reduced, the valve descends as the diminution continues and again ascends when the intensity increases.

It will be obvious that the area of the inlet for the liquid into the controller varies in proportion to the intensity of action of the lamp and consequently a simple automatic and certain regulation of the supply of liquid is effected, thus insuring the sterilization of said liquid being effected under the best conditions.

The apparatus can be started from a distance and it is sufficient to cut off the current to stop the flow of liquid into the reservoir 1.

In case of accidental interruption of the current the construction described automatically prevents liquid passing through without being sterilized.

The dimensions and details of the apparatus can be varied according to requirements and the apparatus is applicable for sterilizing various liquids.

By modification of the dimensions the sterilizing apparatus and also the controlling apparatus described is suitable, equally well for the sterilization of small or large quantities of water. The said apparatus is also applicable for the treatment of water not under pressure, as well as for water under pressure, the strength of the spring 33 being chosen or adjusted accordingly.

What I claim as my invention and desire to secure by Letters Patent of the United States is:—

1. An apparatus for sterilization of liquids comprising in combination a reservoir for the liquid a mercury vapor lamp therein permeable to rays of short wave length, an automatic liquid controller in communication with said reservoir and an electric circuit including said lamp and controller.

2. Apparatus for the sterilization of liquids comprising in combination a reservoir for the liquid divided into two chambers of unequal area in communication by a restricted aperture, a mercury vapor lamp in said reservoir permeable to rays of short wave length and comprising vertical members connected by a horizontal member traversing said aperture, an automatic liquid controller in communication with said reservoir and an electric circuit including said lamp and controller.

3. Apparatus for the sterilization of liquids comprising in combination a reservoir for the liquid divided into two chambers of unequal area in communication by a restricted aperture, a mercury vapor lamp in said reservoir permeable to rays of short wave length and comprising vertical members connected by a horizontal member traversing said aperture, an automatic liquid controller in communication with said reservoir, and comprising a reservoir having inlet and outlet for liquid, a valve adapted to control said inlet and a solenoid adapted to operate said valve, and an electric circuit including said lamp and solenoid.

4. In apparatus for treating liquids by means of ultra-violet rays the combination of a valve adapted to admit liquid to the apparatus, a lamp capable of emitting ultra-violet rays, and means for retarding the passage of liquid through said valve in accordance with the current taken by the lamp.

5. In apparatus for treating liquids by means of ultra-violet rays the combination of a valve, an electro-magnet adapted to operate said valve, a lamp capable of emitting ultra-violet rays connected in series with said electro-magnet, said valve being constructed to retard the passage of water in accordance with the degree to which the electro-magnet is energized.

6. In apparatus for sterilizing liquids by means of ultra-violet rays the combination of a pipe leading to the sterilizing apparatus, a valve in said pipe, an electro-magnet adapted to operate said valve, a vapor electric device constituting a source of ultra-violet rays, said electro-magnet being connected in the same circuit as the vapor electric device.

7. In apparatus for sterilizing liquids by means of ultra-violet rays the combination of a sterilizing chamber, an inlet pipe leading to said sterilizing chamber, a valve in said pipe, a lamp capable of admitting ultra-violet rays and means for controlling said valve in accordance with the current consumed by the lamp.

8. A sterilizing apparatus comprising an outer vessel provided with a thickened wall, a second wall disposed adjacent to said

thickened wall and made of material transparent to ultra-violet rays, means for sending ultra-violet rays through said last-mentioned wall, and means for causing milk to
5 flow between said second-mentioned wall and said thickened portion of said first-mentioned wall.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

THOMAS NOGIER.

Witnesses:

GASTON JEANNIAUX,
THOMAS N. BROWN.