

A. NEVEU.

APPARATUS FOR STERILIZING LIQUIDS BY MEANS OF ULTRAVIOLET RAYS.

APPLICATION FILED JUNE 19, 1911.

1,038,631.

Patented Sept. 17, 1912.

2 SHEETS—SHEET 1.

Fig. 1

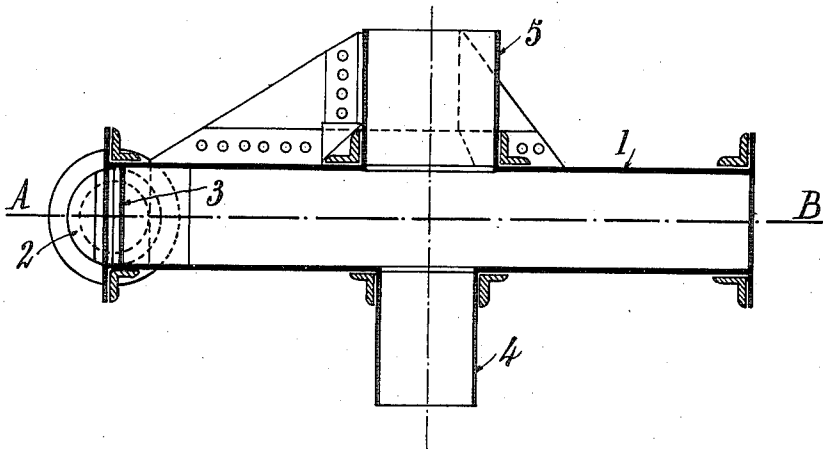
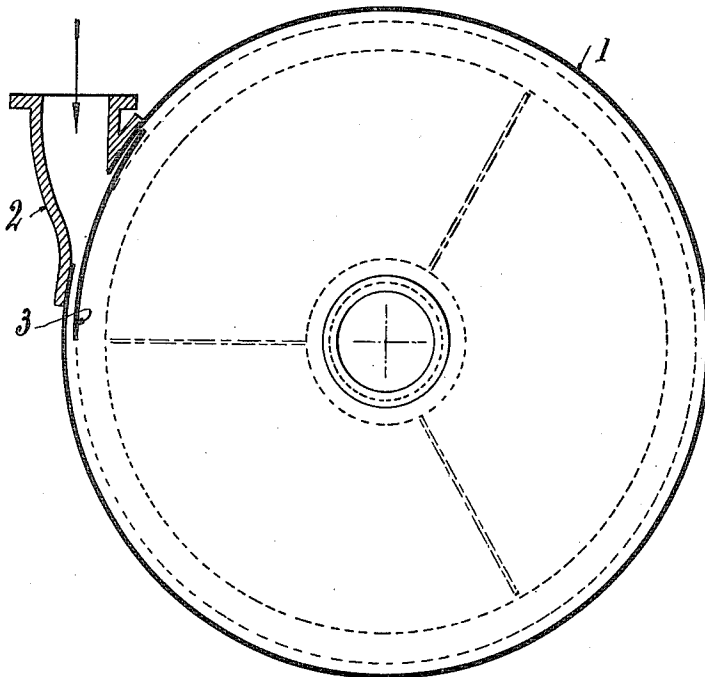


Fig. 2



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Fig. 3

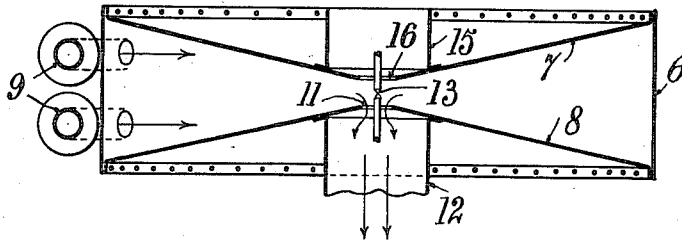
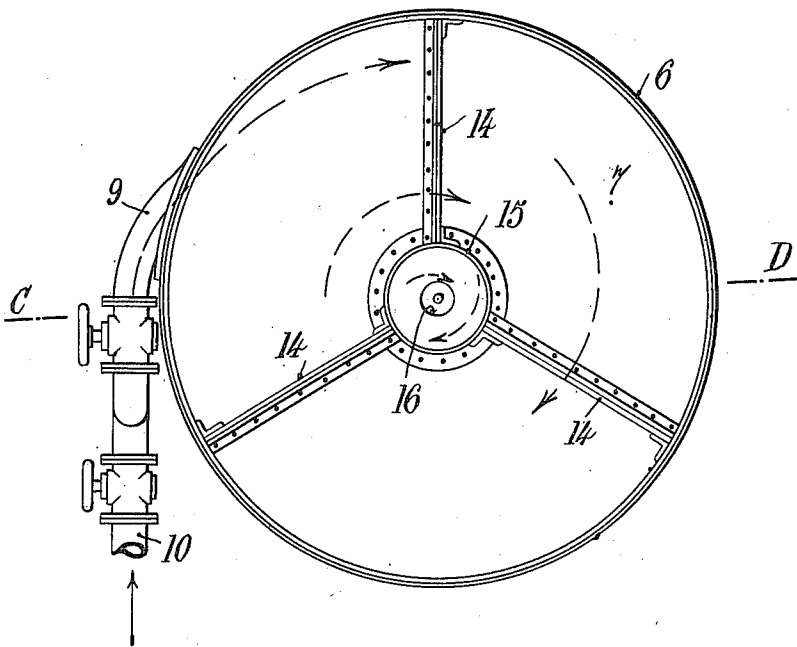


Fig. 4



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UNITED STATES PATENT OFFICE.

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APPARATUS FOR STERILIZING LIQUIDS BY MEANS OF ULTRAVIOLET RAYS.

1,038,631.

Specification of Letters Patent.

Patented Sept. 17, 1912.

Application filed June 19, 1911. Serial No. 633,955.

To all whom it may concern:

Be it known that I, ALFRED NEVEU, a citizen of the French Republic, residing at 13 Rue Vignon, Paris, Department of the Seine, France, have invented certain new and useful Improvements in Apparatus for Sterilizing Liquids by Means of Ultra-violet Rays, of which the following is a specification.

In the apparatus known at present and employed for sterilizing liquids by means of ultra-violet rays, the sources which emit the ultra-violet rays are either arranged at a certain height above the liquid or immersed in the liquid itself.

Disadvantages are connected with these two methods of procedure.

In the first case the whole of the ultra-violet rays which are emitted from the part of their source that is not turned directly toward the liquid, exercise no effect on the latter or at least only a very slight effect if a reflector be employed, the consequence of which is an important loss of effectiveness.

In the second case the source of ultra-violet rays must be surrounded by a double casing of quartz in order to prevent any condensation of the substance contained in it, mercury for example, on its sides. This condensation in fact puts an end to the ultra-violet rays. The necessity of having a double side or wall causes considerable complication in the construction of the apparatus, and a large increase in its cost price. On the other hand this double casing causes a loss in the efficiency owing to absorption.

The present invention consists in an apparatus intended to obviate these disadvantages and in which nearly the whole of the rays emitted by the source is utilized without the necessity of providing the latter with a double casing.

This apparatus is illustrated by way of example in the accompanying drawings:

Figure 1 is a vertical section of the apparatus. Fig. 2 is a horizontal section through A B in Fig. 1. Fig. 3 a vertical section through C D in Fig. 1. Fig. 4 of another apparatus of the same kind. Fig. 4 is a plan thereof.

The apparatus consists substantially of a metal cylinder 1 of relatively little height and provided with a junction pipe 2

through which the liquid enters. This pipe is of circular section in its exterior part so that it can be connected with any system of pipes whatever. The arrangement on the side of the cylinder is such that the liquid is forced to pass through an opening 3 of rectangular section of the same height as the cylinder 1, but a width of a few millimeters only. The liquid, which is under pressure is rapidly rotated, the consequence of which is that when the cylinder 1 is full the level of the liquid is centrally depressed above the outlet pipe 4, so as to leave a cavity which assumes practically the form of a paraboloid of revolution.

By lowering a source of ultra-violet rays through the passage 5, in the direction of the axis of this cavity, absolute certainty is assured that the whole of the liquid that escapes through the pipe 4 will be sterilized. The sterilization will in fact be very complete, in consequence of the relatively long time, during which the liquid is exposed to the action of the ultra-violet rays.

Owing to this arrangement the source of ultra-violet rays is below the upper level of the liquid, so that nearly the whole of the ultra-violet rays is utilized, without any complication in the construction or increase in the cost price of the apparatus.

It is of course understood that the intensity of the source of ultra-violet rays and the dimensions of the sterilizer vary according to the quantity of liquid to be sterilized in a given time. When the apparatus is necessarily of large dimensions, particularly as regards height, it is desirable, for the purpose of insuring homogeneous illumination even at short distances, especially if the luminous source employed be practically reduced to one point, to replace the flat bases of the cylinder by truncated cones, the angle of the summit of which is such that the whole vat may be swept by the effective radiation, without shadows being thrown. This arrangement has the further advantage of increasing the strength of the apparatus. The apparatus in this case consists substantially of a vat 6 with cylindrical sides. The two bottoms of the vat are formed by truncated cones 7 and 8 the summits of which are opposite each other. The liquid may, for example, be introduced through one or more tubular bodies 9 which join onto a supply pipe 10. The liquid which is

gyrated, fills the vat 6 and passes out through the opening 11, and the pipe 12 after being exposed to the action of the ultra-violet rays emitted by the luminous source 13 during the whole time it remained in the vat. As this source is very near the discharge opening 11, the bactericidal action of the ultra-violet rays is exerted with the maximum of serviceable effect at the very moment when the liquid leaves the apparatus. This latter rests on legs or is supported by any other suitable means. As the weight of the liquid it contains may be considerable, it is advisable that the bottoms should be reinforced by ribs 14 fixed on the sides 6 and on the pipe 12 in the case of the lower ribs, and on the rim 15 in the case of the upper ribs. The luminous source is lowered through the rim 15 and the openings 16 and 11 to the center of the cavity formed by the liquid in consequence of the rapid gyration to which it is subjected. The dimensions of the apparatus and the intensity of the source of ultra-violet rays vary according to the quantity of liquid to be treated in a given time.

What I claim and desire to secure by Letters Patent is:

1. An apparatus for sterilizing liquid, by the aid of ultra-violet rays, comprising a cylindrical receptacle provided with an inlet orifice extending tangentially to its peripheral wall and a centrally arranged outlet in its bottom, and means for conducting liquid under pressure to the inlet.

2. An apparatus for sterilizing liquid, by the aid of ultra-violet rays, comprising a stationary receptacle having an interior cy-

lindrical chamber provided with an inlet orifice in the side wall and a centrally arranged outlet in its bottom, of means for introducing liquid into said chamber under pressure so that it will rapidly rotate therein and form a depression above the outlet, for the purpose described.

3. An apparatus for sterilizing liquid, by the aid of ultra-violet rays, comprising means for causing a body of liquid to revolve at such rate as to provide a central depression therein, and a source of light extending into said depression.

4. An apparatus for sterilizing liquid, by the aid of ultra-violet rays, comprising a receptacle having alined openings in its top and bottom walls, means for supplying liquid under pressure to said receptacle through a tangentially arranged inlet in the side wall, and a source of light adapted to be introduced into the receptacle through an opening in the top thereof.

5. An apparatus for sterilizing liquid, by the aid of ultra-violet rays, comprising a casing having an interior chamber of cylindrical form provided in the side wall with the tangentially arranged inlet orifice and having an outlet arranged centrally of its bottom, said chamber decreasing in depth from its side wall to the outlet, and a source of light arranged within the shallower portion of the chamber.

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

ALFRED NEVEU.

Witnesses:

DEAN B. MASON,
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