Nov. 14, 1933. K. E. GOLDEN 1,934,704

ELECTRICAL STERILIZING APPARATUS

Filed April 29, 1931

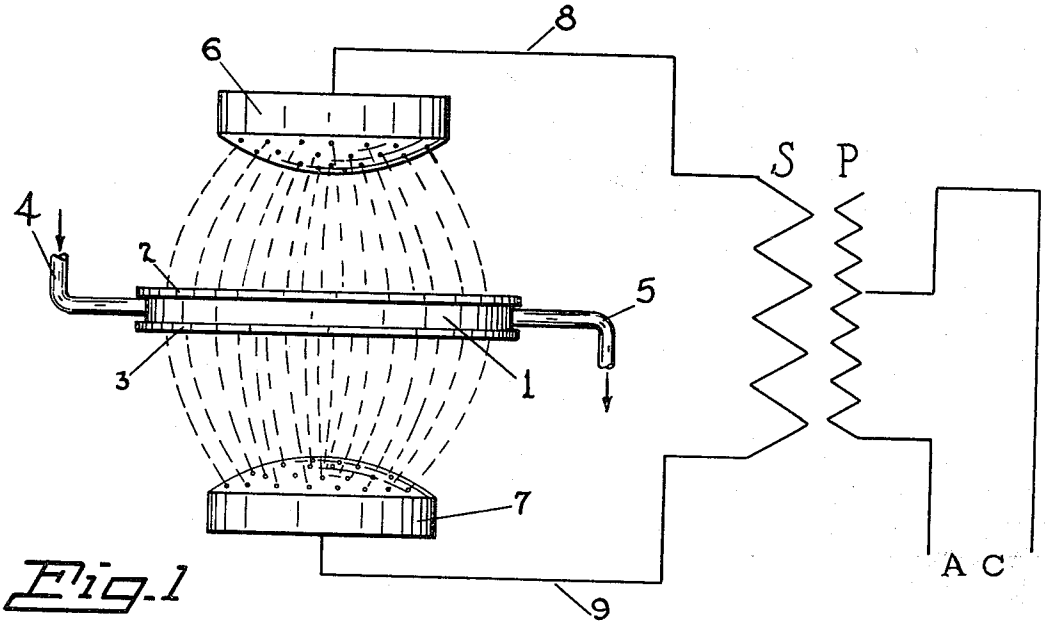

Fig. 1

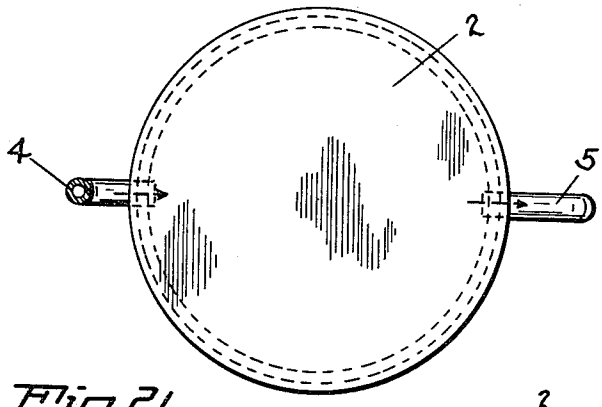

Fig. 2

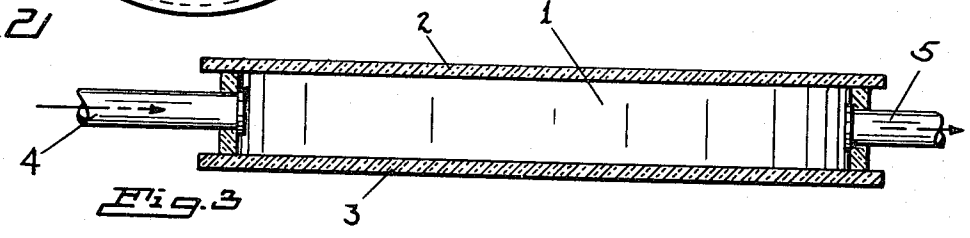

Fig. 3

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Patented Nov. 14, 1933 1,934,704

UNITED STATES PATENT OFFICE

1,934,704

ELECTRICAL STERILIZING APPARATUS

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Application April 29, 1931. Serial No. 533,865

3 Claims. (Cl. 175—311)

My present invention relates to an improved electrical sterilizing apparatus for destroying bacteria existing in flowing liquids, and for eliminating the propagation of bacteria by sterilizing the liquid. In carrying out my invention the liquid or fluent material to be treated or sterilized is passed through a container, and while in transit the liquid is subjected to the electrical treatment of an electro-static flux, generated exterior of the container, but passing therethrough, and also through the contents of the container for the destruction of bacteria that may be contained in the liquid or fluent material.

By the utilization of the apparatus of my invention, the liquid, as milk, or other fluent material, is passed through a preferably closed container that is fashioned with walls of dielectric material, which walls and material will permit the transmission of the electrical energy or force without conduction.

For the purpose of passing the electro-static flux through the container and its contents I utilize a pair of opposed flux concentrators that are relatively adjustable with respect to the container and located in a secondary circuit, and associated with the primary circuit of a transformer that is connected with a suitable source of high frequency currents of electricity.

The invention consists in certain novel combinations and arrangements of parts as will hereinafter be more fully set forth. In the accompanying drawing I have illustrated one complete example of the physical embodiment of my invention wherein the parts are combined and arranged according to one mode I have thus far devised for the practical application of the principles of my invention.

Figure 1 is a diagrammatic view of the apparatus of my invention with its electrical connections, showing the movement of the electro-static flux by dotted lines, and indicating the movement of the liquid or fluent material by arrows.

Figure 2 is a top plan view of the container in which the liquid or fluent material is treated as it passes therethrough.

Figure 3 is a sectional view of the closed container.

In the present exemplification of my invention I have shown as the container, a flat cylindrical vessel 1 having closed top 2 and bottom 3, with an inlet or feed pipe 4 and a discharge or outlet pipe 5, located at diametrically opposite points of the flat cylindrical container. The body of the container, including its top and bottom walls, and the two pipes 4 and 5 adjacent to the container are fashioned of glass or other dielectric material that will permit transmission or passage of the electric energy or flux but without conduction.

Inasmuch as the currents of electrical force have a tendency to pass around the exterior of the vessel, it is desirable that the vessel or container shall be of such diameter or other dimensions as to eliminate this tendency, and to insure the passage of the electrical current, perpendicularly, through the body of the flat cylindrical container, and through the contents of the container.

The liquid, as milk, or other fluent material, is delivered from a suitable source of supply to the container through the feed or inlet pipe, and, after flowing across the interior of the container, is discharged through the outlet or discharge pipe 5 to a suitable receiving vessel.

The flowing liquid is subjected to the electrical treatment by the use of two opposed flux concentrators or electrodes 6 and 7, preferably located above and below the flat cylindrical container, and adjustable relatively to the container to compensate for varying degrees of intensity, and to insure the proper resonance to the life to be destroyed, of the electrical energy discharged between the two concentrators.

As is well known, the bacteria have a fundamental vibrating point, or point of vibration at which life is destroyed, and I find by actual practice that a voltage of approximately 65,000 volts, operating at approximately 470,000 cycles per second, obtains the best results in the destruction of the bacteria.

The electrode or flux concentrator 6 is connected by wire 8 to the secondary winding S of a transformer, and the concentrator 7 is also connected therewith by wire 9 to form a secondary circuit. The primary winding P of the transformer is connected by wires A and C to a suitable source of supply for high frequency electrical energy, as indicated in Figure 1.

The flow of the electrostatic flux between the two concentrators 6 and 7 is indicated by means of the dotted lines in Figure 1, and it will be apparent that, in passing through the dielectric walls of the flat container, the electrical energy also reaches the liquid or fluent material flowing through the container, with the result that any living bacteria are destroyed, and subsequent propagation is prevented by the sterilization of the flowing liquid.

Thus by actual practice in my process of treatment, I find that bacteria, like other materials, have a fundamental point of vibration, or point

of resonance, with the electrical energy, and at which the bacteria is destroyed, and by the employment of the apparatus herein described and illustrated, bacteria and other deleterious matters are destroyed by means of the radiant, electrical energy, developed through the use of a high voltage electro-static flux concentration or field. As above stated, the frequency of the oscillation of the energy is approximately 470,000 cycles per second, and the voltage of said oscillations is approximately 65,000 volts.

Having thus fully described my invention, what I claim as new and desire to secure by Letters Patent is:—

1. An apparatus for electrically sterilizing liquids comprising a dielectric, closed container having inlet and outlet pipes, a pair of opposed flux concentrators at opposite sides of the container, and connections to said concentrators for generating an electrostatic flux between the concentrators and through the container and its contents.

2. An apparatus for electrically sterilizing fluent material comprising a dielectric closed container and means for passing the fluent material therethrough, a pair of opposed flux concentrators at opposite sides of the container, and connections to said concentrators for generating an electrostatic flux between the containers and through the container and its contents.

3. An apparatus for electrically sterilizing fluent material comprising a closed dielectric container and means for passing fluent material therethrough, a pair of relatively adjustable, opposed flux concentrators at opposite sides of the container, a transformer having a secondary circuit connected with said concentrators, and a high frequency primary circuit connected with the transformer.

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