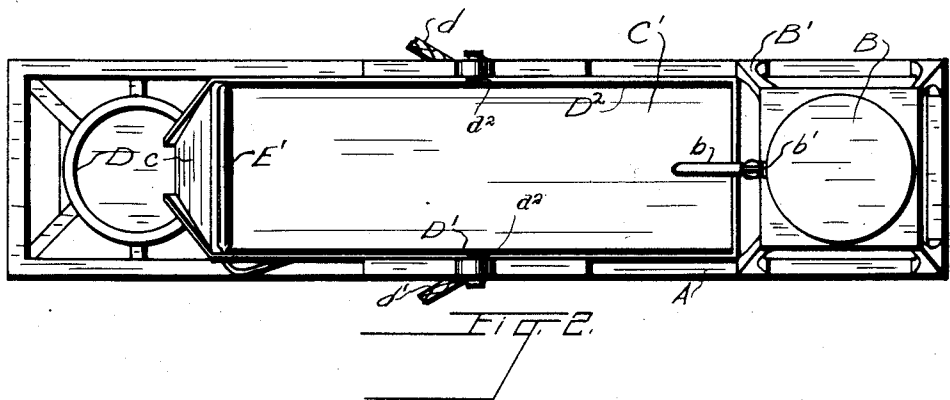
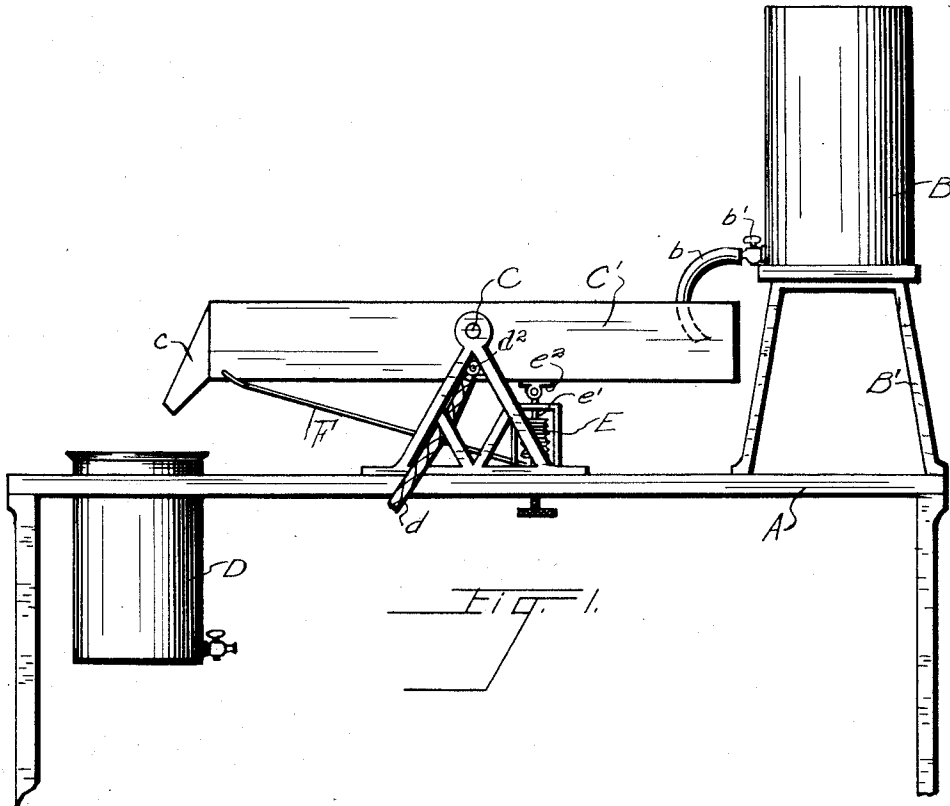


H. B. RUDD.
 APPARATUS FOR ELECTRICALLY TREATING LIQUIDS.
 APPLICATION FILED SEPT. 22, 1919.

1,360,447.

Patented Nov. 30, 1920.



Witnesses
 Wm Piper
 Wells Goodhue

Inventor
 Harry B. Rudd.
 By *Wm. King* Atty.

UNITED STATES PATENT OFFICE.

HARRY B. RUDD, OF AKRON, OHIO, ASSIGNOR TO THE ELECTROPURE DAIRY COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION.

APPARATUS FOR ELECTRICALLY TREATING LIQUIDS.

1,360,447.

Specification of Letters Patent. Patented Nov. 30, 1920.

Application filed September 22, 1919. Serial No. 325,308.

To all whom it may concern:

Be it known that I, HARRY B. RUDD, a citizen of the United States, residing at Akron, Summit county, Ohio, have invented certain new and useful Improvements in Apparatus for Electrically Treating Liquids, of which the following, taken in connection with the drawing, is a description.

My invention has for its object the production of an apparatus designed to be used in the treatment of liquids by electricity, having for its primary object the destruction of any organic life contained therein, such for instance as bacteria in milk.

Another object of my invention is to provide an apparatus for electrically treating liquids, preparatory to sterilizing the same, wherein the temperature of the liquid is raised fifty degrees more or less before the final treatment is given to it.

Another object of my invention is to provide mechanism for automatically controlling the passage of the liquid through the receptacle in which the liquid is being treated, so that as the liquid enters the receptacle at one end at any temperature, it leaves the receptacle at the opposite end at a certain predetermined temperature and the liquid itself becomes the medium for affecting its discharge, the entire operation being accomplished automatically.

My invention further consists in details of construction and in the arrangement of the several parts of my improved apparatus wherein certain important advantages are attained and the device rendered simpler and less expensive and otherwise more convenient and advantageous for use, as will be hereinafter more fully set forth.

In the accompanying drawings, I have illustrated what I now consider to be the preferred form of an embodiment of my invention, and in these drawings,

Figure 1, is a side elevation of the apparatus, and Fig. 2, is a top plan view of the same.

Referring to the drawings, A represents a suitable support or table for the different parts of my apparatus, and this support may be of any convenient height desired. The receptacle B rests upon an elevation B' at one end of the table A. This receptacle contains the liquid to be treated, which may be water, milk, fruit juices or any other liquid containing organic life. It is pos-

sible, in the transit of the liquid through the apparatus hereinafter described to pass currents of electricity through the same to either destroy or render inactive any organic life contained in the liquid, thereby making it possible to purify and preserve the said liquid for an indefinite length of time.

b is a discharge tube, extending from said receptacle, and b' is a valve controlling the passage of liquid therethrough. Pivotedly supported at C in suitable bearings, mounted upon the table A, is an elongated trough like receptacle C' which is inclosed at the intake end thereof and provided at the opposite end with a discharge spout, c, from whence the liquid passes into a receptacle D suitably supported in the table A.

Arranged upon each side of the elongated receptacle C are electrodes D—D', which electrodes are preferably in the form of plates, extending practically the entire length of the receptacle C on the inside thereof. Connected therewith are the terminal wires, d—d' which extend to any suitable source of electrical energy not here shown; said wires also having connection with the electrodes D'—D² through the wall of the receptacle C' at d².

E is a thermostat positioned in a suitable housing e' which is arranged beneath and secured to the elongated receptacle C'. This thermostat may be any well known self acting apparatus, designed for regulating temperatures by the unequal expansion of a liquid or other gases contained therein. In the thermostat here shown I have found in practice, that ether operates very satisfactorily for this purpose.

F is a tube extending from the expansion chamber E of the thermostat through the wall C' of the receptacle to the bulb E' which is preferably positioned transversely of the receptacle at the discharge end thereof.

e' is a rod extending from the expansible chamber of the thermostat to the wall of the receptacle C' to which it is attached at e².

When the liquid at whatever temperature it may be in the receptacle B discharges into the receptacle C' said receptacle is positioned preferably although not necessarily in a horizontal plane. The flow of the liquid into the receptacle causes said receptacle to tilt downwardly at the intake end

thereof. By the current of electricity passing through the wires $d-d'$ and the electrodes $D'-D''$ to and through the liquid contained in the receptacle, said liquid is heated to any temperature desired.

In the apparatus here shown, I propose to use the mechanism, preferably as a preheating mechanism for the further and more complete treatment or sterilization process of treating liquids which forms the basis of another application. In this construction, I propose to raise the temperature of the liquid in the receptacle B from whatever temperature it may be originally, to discharge from the receptacle C' at approximately eighty five degrees Fahr. This is accomplished by allowing the liquid to pass in a stream from the receptacle B to the receptacle C' where it comes in contact with the electric current which passes through it from both sides of the receptacle. As the liquid progresses toward the exit end of the receptacle C', its temperature is gradually rising until it reaches the ether filled bulb E'.

The rise in temperature causes the thermostat to act through the expansible chamber E to elevate the intake end of the receptacle C' which is moved upwardly with the expansion of the chamber E' until the thermostat tilts said receptacle C' from a horizontal plane to a position inclining downwardly at the exit end of the receptacle.

The action of the thermostat is such that as the temperature of the liquid in receptacle C' rises, the action of the thermostat causes the receptacle to incline sufficiently to discharge its contents by gravity into the receptacle D.

As the liquid is constantly moving from the intake end to the discharge end of the receptacle, its duration in transit is determined by the angle of the receptacle, which in turn determines the heating of the liquid being treated.

In the use of the words "electrical currents" or "currents of electricity" throughout this specification, alternating currents of electricity are utilized in the apparatus herein disclosed, which currents enter the liquid through the electrodes $D'-D''$, having connection with the wires $d-d'$, as clearly shown in Fig. 2, of the drawing.

I claim:

1. In an apparatus for electrically treating liquids, a receptacle movably mounted in a horizontal plane, a supply reservoir discharging liquid into the aforesaid receptacle, electrodes in said receptacle, and means for automatically causing the discharge of the liquid from the receptacle at a predetermined temperature.

2. In an apparatus for electrically treating liquids, an elongated receptacle pivotally mounted at the center thereof, electrodes arranged in said receptacle, said electrodes

having connection with a source of electrical energy, means for supplying liquid at one end of said receptacle, and means for automatically causing the discharge of said liquid at a predetermined temperature.

3. In an apparatus for electrically treating liquids, an elongated receptacle pivotally mounted in a horizontal plane, electrodes arranged on opposite sides of said receptacle, said electrodes having connection with a source of electrical energy, and a thermostat controlling the passage of said liquid and automatically causing the discharge of the same at a predetermined temperature.

4. In an apparatus for electrically treating liquids, a receptacle tiltingly mounted in a suitable frame, means for causing a flow of liquid through said receptacle, means for causing electric currents to flow from electrodes in said receptacle into, and through said liquid, and means for automatically tilting said receptacle to discharge the liquid at a predetermined temperature.

5. In an apparatus for electrically treating liquids, an elongated receptacle movably mounted in a horizontal plane, means for causing a flow of liquid through said receptacle, means for causing electric currents to pass into and through the liquid in the receptacle, and thermodynamic mechanism operating to tilt said receptacle to an inclined position and discharge the liquid passing therethrough.

6. In apparatus for electrically treating liquids, a receptacle, electrodes arranged on opposite sides of said receptacle, and means for controlling the discharge of liquid from said receptacle at a predetermined temperature.

7. Apparatus for purifying, sterilizing, or aging liquids, comprising a substantially flat runway on which the liquid may flow in a continuous stream, a series of electrodes flush with the surface of said runway, and operative electrical connections for said electrodes.

8. Apparatus for purifying, sterilizing, or aging liquids, comprising a runway over which the liquid may run in a continuous stream, means to automatically adjust the angularity of the runway according to the temperature of the liquid, means subdividing said runway electrically whereby the stream of liquid will be subdivided electrically, the stream of liquid being a part of the electrical circuit and operative electrical connections.

9. An apparatus for treating milk including a continuous runway free from obstruction from end to end and electrodes in said runway positioned to be engaged by the milk in its passage through the runway but not interrupting its passage through the runway.

10. An apparatus for treating milk including a continuous runway, electrodes in said runway, and temperature responsive means to control the discharge of milk from
5 said runway.

11. An apparatus for treating milk including a continuous runway, electrodes in said runway, and means to control the discharge of milk from said runway at a pre-
10 determined temperature.

12. Apparatus for purifying milk, comprising a runway through which milk may run in a continuous stream, electrodes in said runway with which the milk comes in
15 contact as it passes through the runway, the milk being a part of the electric circuit, and an operative electrical connection for said electrodes, temperature responsive means to control the flow of milk whereby the milk

is held until it is heated to a predetermined 20 temperature before it is discharged from said runway.

13. An apparatus for treating milk, including a runway free from transverse obstruction from end to end, and electrodes in 25 said runway positioned to be engaged by the milk in its passage through the runway without diverting the straightway course of the milk through the runway, and temperature responsive means controlled by the 30 temperature of the milk in the runway, whereby the discharge of the milk from the runway is regulated so that the milk is discharged from said runway at a predetermined temperature. 35.

In testimony whereof I have signed this specification.

HARRY B. RUDD.