

No. 627,740.

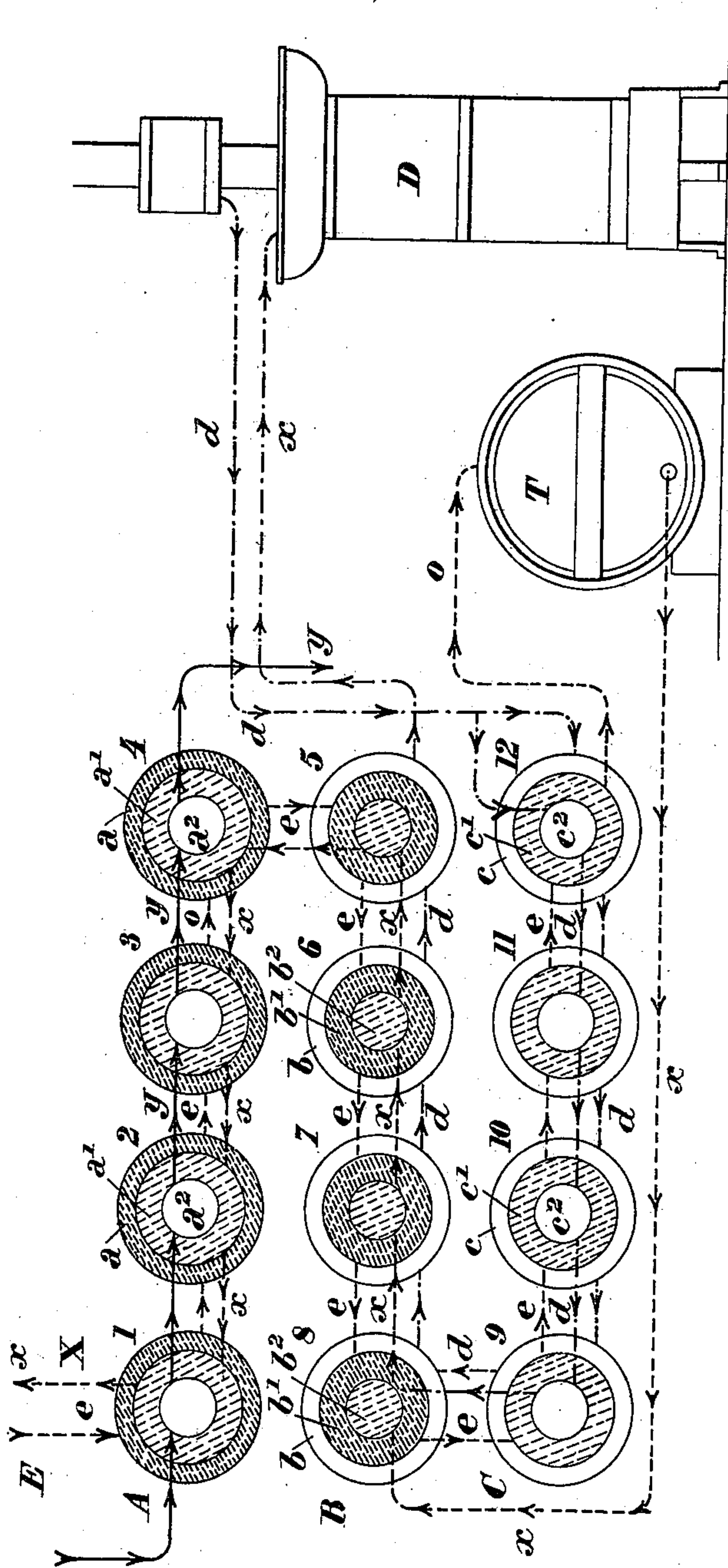
Patented June 27, 1899.

O. STREUBEL.

PROCESS OF AND APPARATUS FOR STERILIZING AND PASTEURIZING WINES OR OTHER LIQUIDS.

(Application filed Nov. 9, 1898.)

(No Model.)



Witnesses,
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atly

UNITED STATES PATENT OFFICE.

OTTO STREUBEL, OF PARIS, FRANCE.

PROCESS OF AND APPARATUS FOR STERILIZING OR PASTEURIZING WINES OR OTHER LIQUIDS.

SPECIFICATION forming part of Letters Patent No. 627,740, dated June 27, 1899.

Application filed November 9, 1898. Serial No. 695,966. (No model.)

To all whom it may concern:

Be it known that I, OTTO STREUBEL, a citizen of the Republic of France, residing at Paris, France, have invented a certain new and useful Improvement in Processes of and Apparatus for Sterilizing or Pasteurizing Wines or other Liquids, (for which I have applied for Letters Patent in France under date of April 15, 1898; in Germany, October 11, 1898; in Austria, October 14, 1898; in Hungary, October 13, 1898; in Switzerland, October 10, 1898; in Tunis, October 20, 1898, and in Russia, October 6 and 18, 1898;) and I do hereby declare that the following is a full, clear, and exact specification of the same.

This invention relates to an apparatus for sterilizing or pasteurizing wines and other liquids by systematic heating to the temperature requisite for destroying all the germs. I effect this object by means of the apparatus which I shall now proceed to describe and which is illustrated diagrammatically in the accompanying drawing.

My object has been to provide a simple apparatus having a large output and which shall be capable of being easily cleaned in all its parts.

The wine or other liquid to be treated enters the apparatus at the atmospheric temperature, becomes heated to the desired degree, and leaves the apparatus at a temperature which is practically the same as that at which it entered. The heating-water issuing from the boiler at the sterilizing temperature passes into the apparatus and gives up to the material to be treated a portion of its heat, and it then returns to the boiler. A circulation of cold water comes in contact with the sterilized material in the last portion of its course and removes from it all excess of heat.

By the arrangement of my apparatus I obtain a maximum of useful effect with a given quantity of heat by utilizing the sterilized material as a means for heating the material to be treated in the first portion of its course, this said material to be treated acting then as an agent for cooling the sterilizing material. In this manner I obtain a heating effect which is absolutely systematic and almost theoretical, the sole loss of heat being that due to the heat carried away by the cold water which comes in contact with the ster-

ilized material in the last portion of the course of the latter.

My apparatus consists of twelve similar sets of tubes, each set composed of three concentric tubes 1 2 3 4 5 6 7 8 9 10 11 12, arranged in three horizontal series or rows A B C. In the outer, intermediate, and inner spaces of each of these tubes (which spaces I shall designate for greater clearness by the letters a a' a^2 b b' b^2 c c' c^2) the liquid to be treated, the cold water, the hot water, and the treated liquid circulate in the manner which I shall now describe.

The liquid to be treated arrives first at E in the space a of the tube 1. Then it passes successively into the spaces a of the other tubes of the row A, as indicated by the arrows e , and it enters the space b' of the tube 5. Thence it passes through the spaces b' of the tubes 6, 7, and 8 and the spaces c' of the tubes 9, 10, 11, and 12. At this point of its course the sterilization is generally completed; but in order to render this sterilization quite perfect I preferably allow the sterilized liquid to remain for some minutes in a vat or cask T. From this cask the liquid passes into the spaces b^2 of the tubes of the row B, then into the spaces a' of the tubes of the row A, following the course indicated by the arrows x , and it leaves by the end of the tube 1 at X.

The course of the wine in the apparatus is indicated, as will be seen, by dotted lines.

The heating-water of the desired temperature comes from a suitable boiler D into the spaces c and c^2 of the tubes of the row C, (following the direction indicated by the arrows d ,) whence it passes into the spaces b of the tubes of the series B. Thence it returns to the boiler. Its course is indicated by dash-dotted lines.

The cold water circulates in the spaces a^2 of the tubes of the row A, following the course indicated by full lines and the direction of the arrows y .

It is easy to perceive that, first, in the tubes of the row A the sterilized liquid circulates between the cold water and the cold liquid to be treated; second, in the tubes of the row B the liquid to be treated circulates between the hot water and the sterilized liquid; third, in the tubes of the row C the liquid to be treated circulates between two currents

of hot water. Thus the liquid to be treated is first heated by contact with the sterilized liquid in the row A. It then circulates between the sterilized liquid and the hot water, then between two currents of hot water, circulating in the spaces c c^2 of the row C. After having been sterilized it is cooled in the row B by contact with the liquid to be treated and in the row A by contact simultaneously with the liquid to be treated circulating in the spaces a and with the cold water circulating in the spaces a^2 .

The tubes of my apparatus are preferably horizontal; but, if required, I may arrange them vertically according to the particular purpose in view and also to the locality or the nature of the materials to be treated.

My apparatus may also be employed as a refrigerator, if required. This conversion may be made immediately by causing cold water to flow along the circuit described hereinbefore for the hot water. The cleansing is also very easy. As the various tubes are straight and are connected at their ends by means of disconnectible joints, all parts of the apparatus can be reached with the aid of a suitable brush.

I do not intend to limit my invention to the above-described apparatus, and I reserve the right of altering at will the arrangements shown in the drawing, and especially the number and dimensions of the tubes or rows of tubes. I may also alter the direction of the flow of the liquids by means of suitably-arranged baffle-plates, &c.

I claim—

1. The process of treating liquids by heat, which consists in heating a liquid from within and from without by means of a suitable heating agent, then partially cooling the treated liquid from without by means of the liquid to be treated, and simultaneously heating the latter from without by the same heating agent, then finally cooling the treated liquid from within and from without by a cooling agent and said liquid to be treated respectively, for the purpose set forth.

2. The process of treating liquids by heat, which consists in causing the liquid to flow from a reservoir to a receiver, heating such liquid to the required temperature by a suitable agent flowing through and about such liquid, causing the liquid on its way to be heated to flow about the treated liquid and the heating agent about the liquid to be treated, and finally causing a cooling agent to flow through the treated liquid and the liquid on its way to be treated about said treated liquid before the latter reaches the receiver, for the purpose set forth.

3. The process of treating liquids by heat, which consists in causing the liquid to flow from a reservoir to a receiver, heating such liquid to the required temperature by a suit-

able agent flowing through and about the liquid in an inverse direction, reversing the flow of the heated liquid and causing it to flow through the liquid on its way to be heated, while the heating agent is caused to flow about the latter, then causing a cooling agent to flow through and the liquid on its way to be heated about the treated liquid on its way to the receiver, for the purpose set forth.

4. Apparatus for treating liquids by heat, comprising a battery of vessels arranged in series, each vessel composed of three concentric chambers, a source of supply of a heating and of a cooling agent, and connections organized to cause the liquid to be treated to flow from a source of supply successively through the outer chambers of the first series of vessels, through the intermediate chambers of the second series of vessels, through the intermediate chambers of the last series of vessels, back through the central chambers of the second series and through the intermediate chambers of the first series of vessels to a receiver, and to cause the heating agent to flow through the outer and inner chambers of the third series of vessels and through the outer chambers of the second series, and the cooling agent through the inner chambers of the first series of such vessels, for the purpose set forth.

5. Apparatus for treating liquids by heat, comprising a battery of vessels arranged in series each vessel composed of three concentric chambers, a source of supply of a heating and of a cooling agent, and connections organized to cause the liquid to be treated to flow from a source of supply successively through the outer chambers of the first series of vessels, through the intermediate chambers of the second series of vessels, through the intermediate chambers of the last series of vessels back through the central chambers of the second series, and through the intermediate chambers of the first series of vessels to a receiver, and to cause the heating agent to flow through the outer and inner chambers of the third series of vessels and through the outer chambers of the second series, and the cooling agent through the inner chambers of the first series of such vessels, in combination with an intermediate receiver and connections connecting the same with the intermediate chamber of the last vessel of the third series and with the inner chamber of the first vessel of the second series, for the purposes set forth.

In witness whereof I have hereunto set my hand, this 29th day of October, 1898, in the presence of two subscribing witnesses.

OTTO STREUBEL.

Witnesses:

R. H. BRANDON,
J. ALLISON BOWEN.