

C. H. LOEW & A. RUETSCHI.
PASTEURIZER.
APPLICATION FILED DEC. 30, 1909.

1,017,777.

Patented Feb. 20, 1912.

3 SHEETS—SHEET 1.

Fig. 1.

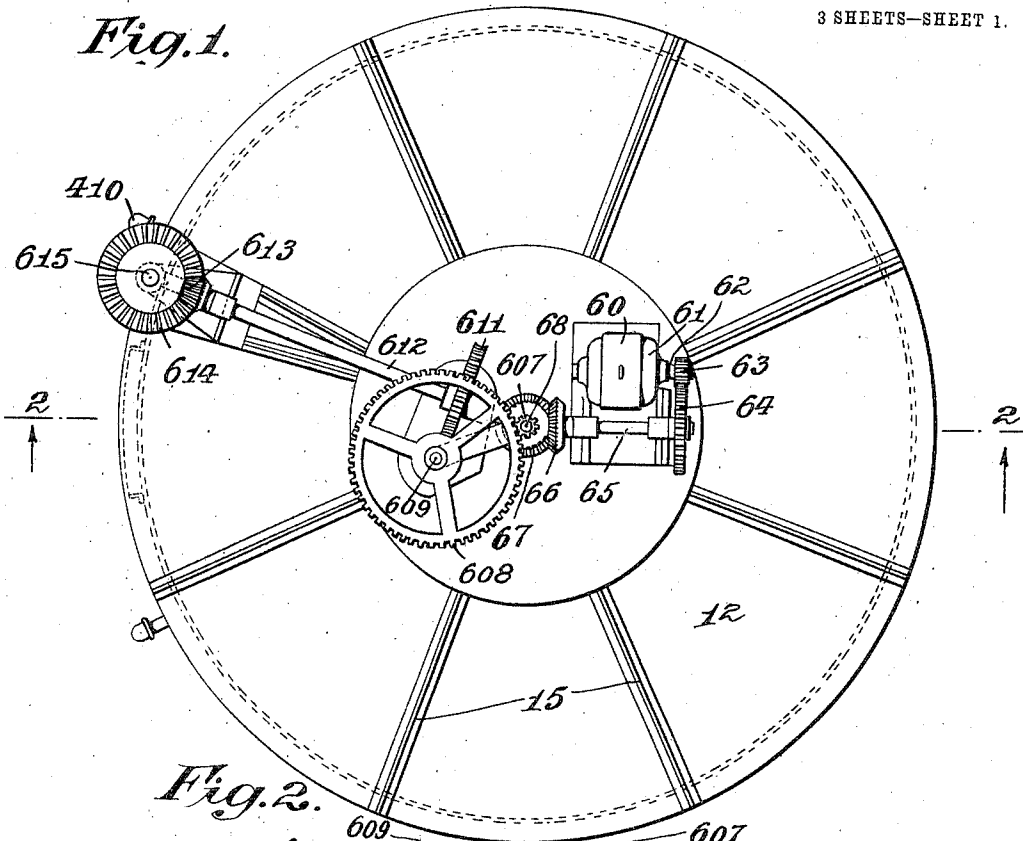
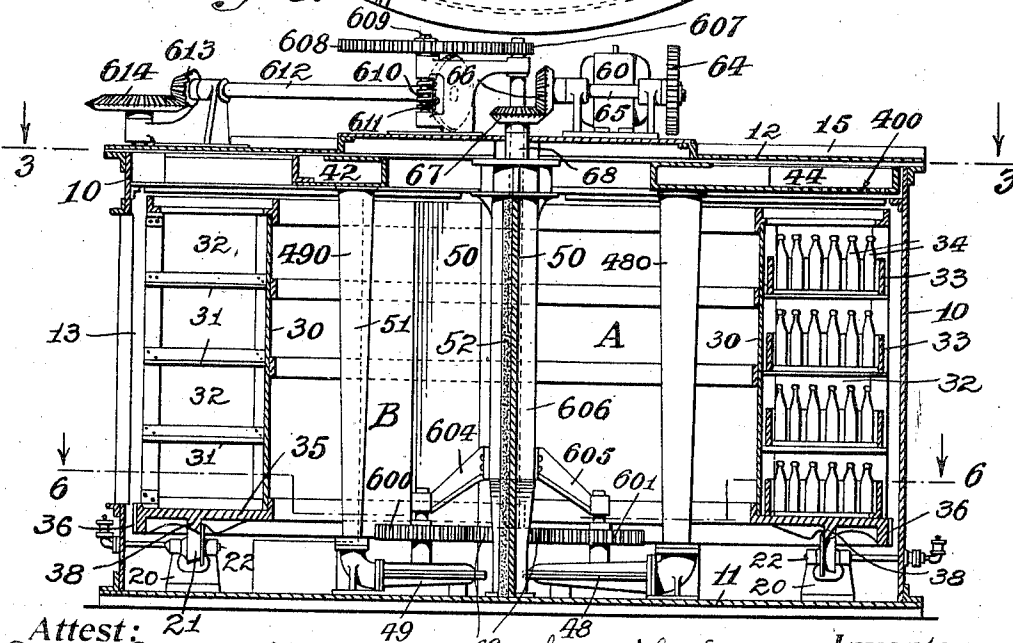


Fig. 2.



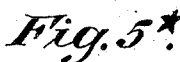
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3 SHEETS—SHEET 2.



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3 SHEETS—SHEET 3.

Fig. 6.

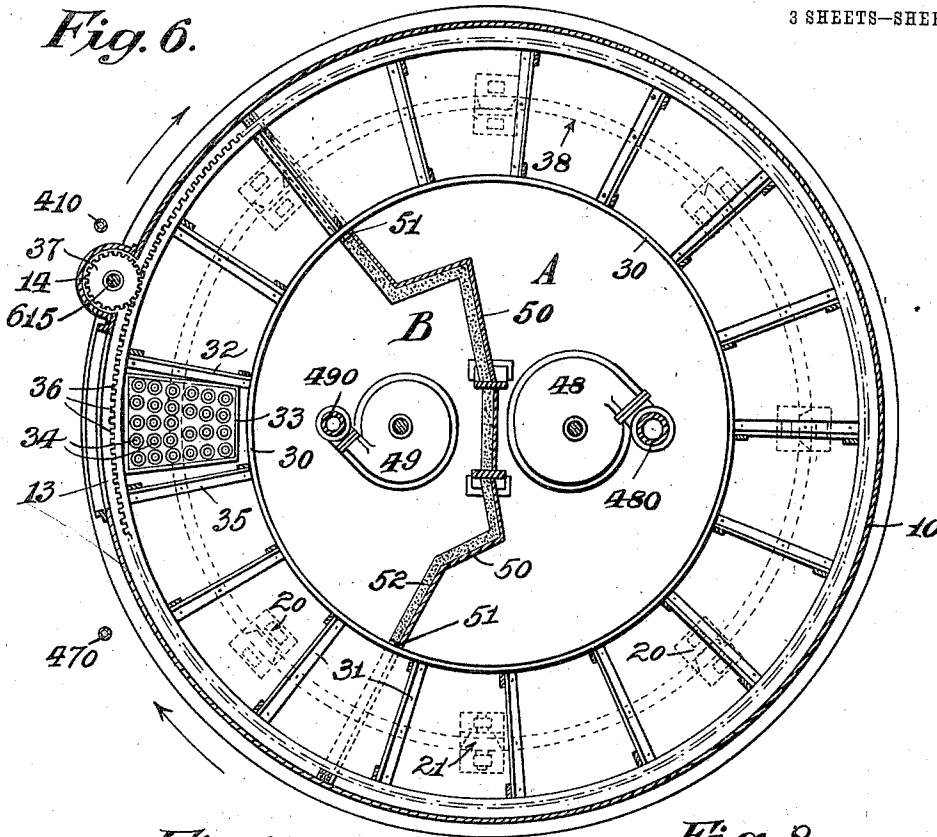


Fig. 7.

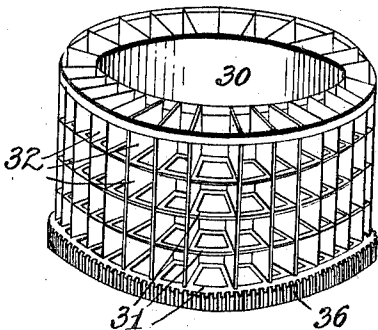


Fig. 8.

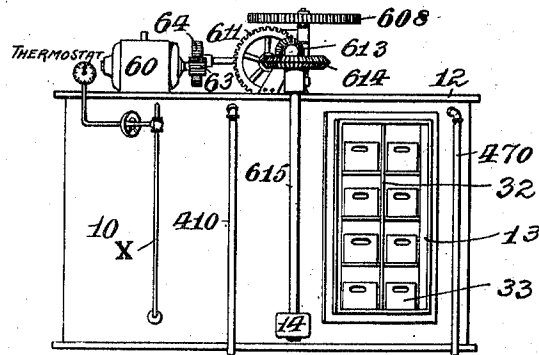
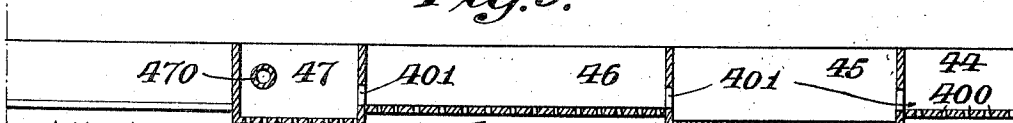


Fig. 9.



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UNITED STATES PATENT OFFICE.

CHARLES H. LOEW, OF LAKEWOOD, AND ARNOLD RUETSCHI, OF CLEVELAND, OHIO,
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PASTEURIZER.

1,017,777.

Specification of Letters Patent.

Patented Feb. 20, 1912.

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To all whom it may concern:

Be it known that we, CHARLES H. LOEW and ARNOLD RUETSCHI, citizens of the United States, the said CHARLES H. LOEW residing at Lakewood, Cuyahoga county, Ohio, and the said ARNOLD RUETSCHI residing at Cleveland, Cuyahoga county, Ohio, have invented certain new and useful Improvements in Pasteurizers, of which the following is a specification.

This invention relates to apparatus intended primarily to be employed in the pasteurization of beer in bottles and its novelty consists in the construction and adaptation of the parts as will be more specifically hereinafter pointed out.

In the drawings Figure 1 is a top plan view of an apparatus embodying the invention; Fig. 2 is a partial vertical section on the plane of the line 2—2 in Fig. 1 and an elevation of the parts back of the section plane; Fig. 3 is a plan view of the parts beneath the plane 3—3 in Fig. 2; Fig. 4 is a vertical circular section through the water pans along the line 4—4 in Fig. 3; Fig. 5 is an elevation of the transverse portion and a vertical section of adjacent parts; Fig. 5* is a detail sectional view showing the partition between the two compartments of the casing and the overflows from said compartments; Fig. 6 is a horizontal section on the plane of the line 6—6 in Fig. 2 and a plan view of the parts beneath that plane; Fig. 7 is a detail of the revolving carrier on a small scale; Fig. 8 is an elevation of the outside of the apparatus when the parts are assembled and Fig. 9 is a vertical circular section through the pans along the line 9—9 in Fig. 3.

In the drawings 10 is the shell, or outer casing, of the apparatus made preferably of sections of sheet metal secured together in any usual manner and of a generally circular or polygonal outline in cross section. It is provided with a bottom 11 and top 12 so that it has a cylindrical shape and at one side it is provided with a suitable aperture 13 so that access may be had to the revolving truck or carrier which it is adapted to contain. At a convenient place on its outer surface it is provided with an offset chamber indicated at 14 adapted to contain a portion

of the power transmitting mechanism as hereinafter described. T-shaped radial ribs 15 serve to stiffen and strengthen the structure.

At suitable intervals along the bottom of the casing and near its vertical shell, are arranged bearings 20 adapted to support rollers 21 provided with shafts 22. The longitudinal axes of the rollers and their shafts are preferably radially arranged with respect to the vertical axes of the shell 10 and the rollers themselves are preferably frusto-conical in shape with their smaller ends pointing inwardly. These rollers are adapted to serve as rolling supports for the revolving truck or carrier on which the beer bottles are placed during the pasteurizing operation.

The revolving truck or carrier comprises an inner cylindrical or polygonal shell 30, divided by horizontal partitions 31 and radially arranged vertical partitions 32 into a series of compartments each one of which is adapted to receive a tray 33 in which are placed the bottles 34 of beer to be treated. The truck or carrier is provided with a horizontal annulus 35 along its lower edge and which annulus is provided with teeth 36 forming a large gear firmly secured to or made integral with such truck. The teeth 36 are adapted to mesh with the teeth of a pinion 37 arranged in the offset chamber 14. Beneath the annulus 35 is a projecting annular rib 38 having its lower edge sloping obliquely inward to engage the frusto-conical surfaces of the rollers 21. This construction prevents the truck from tipping outwardly and serves to keep it in circular adjustment.

The water supply system is arranged immediately beneath the top 12 of the casing 10 and above the revolving truck or carrier. It comprises a series of pans or chambers 41, 42, 43, 44, 45, 46, and 47 arranged in circular succession and suitably secured to the top or sides of the casing in any usual manner. Each pan has a perforated bottom 400 and each pan communicates with the adjacent pan by means of lateral apertures indicated at 401. The pans 41, 43, 45 and 47 are somewhat deeper than the others. The pan 44 is supplied with hot water from a suitable

source of supply through a pump indicated at 48 and a pipe 480 leading therefrom to the pan. The pans 41 and 47 are each supplied with cold water through pipes 410 and 470 connected to a source of water supply, for instance the city water mains. A pump indicated at 49 and pipe 490 leading therefrom to the pans 42 and 46 serve to keep the cold water in circulation.

A diaphragm or partition 50 vertically arranged across the casing serves to divide the space within the carrier into two compartments. This partition abruptly drops at 51 when it reaches the inner drum 30 of the carrier and extends radially to the outer casing 10 beneath the plane of movement of the geared annulus 35, so that while it divides the bottom portion of the casing into two chambers, it divides only the portion of the casing inside the carrier into two chambers above the plane of such movement. This partition is of any suitable material preferably of sheet metal, but is provided with a sheathing of asbestos or similar non-conducting material indicated at 52. Referring to Figs. 3 and 4, it will readily be seen that this partition practically divides the apparatus into a chamber A substantially coincident with the circular extent of the hot water pan 44 and into another chamber B smaller than this.

The power transmitting mechanism comprises the following parts: 60 is a motor of any suitable size and construction mounted in a housing 61 on the top of the apparatus. 62 is its main shaft carrying a driving pinion 63 adapted to mesh with a spur gear 64 mounted on a shaft 65 on which is secured a miter gear 66 adapted to mesh with a similar miter gear 67 mounted upon and adapted to rotate a vertical shaft 68 located in suitable bearings in the frame of the apparatus. Near its lower end this shaft 68 carries a pinion 69 which meshes with and drives two pinions one 600 adapted to drive the cold water pump indicated at 49 and the other 601 adapted to drive the hot water pump indicated at 48, the shafts 602 and 603 of these pumps being adapted to rotate in suitable bearings formed in brackets 604 and 605 extending from a framework 606 which surrounds the shaft 68.

To the upper end of the shaft 68 is secured a pinion 607 which meshes with and drives a gear 608 the shaft 609 of which is provided with a worm 610 which meshes with a worm gear 611 the shaft 612 of which, through two beveled gears 613 and 614 rotates a shaft 615 arranged outside of the casing 10 and upon the lower end of which is mounted the pinion 37 which meshes with the teeth 36 of the annulus and so rotates the revolving truck or carrier.

The mode of using the apparatus is as follows: The motor 60 is first started to

actuate the power transmitting mechanism. This, operating through the described train of mechanism, causes the revolving truck or carrier slowly to revolve on its rollers 21 inside of the casing 10, and actuates the hot and cold water pumps 48 and 49. At the same time cold water is turned into the pipes 410 and 470 from the city mains. The parts are so proportioned that the carrier revolves very slowly, and in practice in the described apparatus it revolves only once an hour. The hot water pump 48 is then connected to the source of hot water supply. Preferably the bottom of the chamber A is used for that purpose water being supplied thereto in suitably quantity and heated by steam supplied through a pipe passing into the same, as shown at *x* in Fig. 8. The hot water is by means of the pump 48 delivered to the pan or chamber 44. By means of a thermostat stationed at a suitable place in the current of water the steam delivery can readily be automatically controlled and the water in this pan maintained at any desired temperature. This is a usual expedient in the art and needs no further description. The water in this pan should be kept at above a pasteurizing temperature because it parts with some of its heat rapidly as will presently be described. The cold water is delivered to the pans 41 and 47 by the pipes described. The hot water is delivered to the pan 44. From this latter pan it passes at either end through the apertures 401 to the pans 43 and 45, and when these pans are filled it flows into the pans 42 and 46 where it meets the cold water from the pans 41 and 47. By this arrangement as the bottoms of all the pans are perforated there is a constant spray or series of jets of hot water descending from the pan 44 upon the carrier and consequently upon the bottles which it contains. There is likewise a similar constant spray of relatively cold water descending from the pans 41 and 47, and inasmuch as the supply of water to the pans 41, 44 and 47 is greater than the amount that will pass through the bottoms of said pans, it will be evident that the water will overflow into the pans 42, and 43, and consequently the water from both the pan 44 on the one hand and the pans 41 and 47 on the other mingle and mix in the pans 42 and 43 on the one side and 45 and 46 on the other there is a similar constantly descending spray from each of these pans, the water in the pans 42 and 46 being warmer than that in the pans 41 and 47 and the water in the pans 43 and 45 being warmer than that in the pans 42 and 46 and cooler than that in the pan 44. The water from the pans 41, 42 and 43 on the one side and the pans 47, 46 and 45 on the other side of the door 13 collects in the bottom of the compartment B and is raised by the pump 49 and delivered to the pans

42 and 46. As it mingles in the bottom of the tank it is of about the temperature of the water in these pans and it is there delivered in the interests of economy. It will thus be seen that the hot water in compartment A is constantly in circulation, the water in the pan 44 being kept at a substantially uniform temperature and that the colder water in compartment B is constantly in circulation, but that there are three zones of falling water on each side of this compartment, being zones of gradually increasing temperature on the one side and gradually diminishing temperature upon the other side. Suitable overflows, as *a* and *b*, (see Fig. 5*) are provided at the bottom of the casing so that the hot and cold water will not pass over the partition 50 and mingle.

The water supply and circulation system having been established and supposing the carrier to be moved in the direction of the arrows as indicated in Figs. 3 and 6, the workman places the bottles of beer in the trays 33 completely filling a vertical series of compartments in the carrier. As the carrier slowly revolves he fills the next vertical series and so on. As the carrier revolves it brings this series of compartments first under the pan 41. This is filled with cold water which is descending in a shower. It would usually be somewhere about 70° Fahr. and would have no injurious effect on the bottles which would probably be at a temperature of from 45° to 55° Fahr. By the time the carrier passed completely through this zone of descending water the bottles and the beer within them would be of substantially that same temperature of 70° Fahr. As the carrier continues to revolve it brings the bottles beneath the pan 42 and under the influence of the water descending therefrom which would usually be at a temperature of about 90° Fahr. The carrier still continuing to revolve, the bottles are next brought beneath the pan 43 and subjected to the action of the water descending therefrom at a temperature of 120° Fahr. Then passing out of this zone the bottles are brought beneath the pan 44 from which the water descends at a temperature of about 140° Fahr. and they continue to be subjected to this temperature during the whole time that that portion of the carrier revolves beneath the pan 44. In the described apparatus this takes more than half an hour and the beer is completely and thoroughly pasteurized during this travel. As the carrier continues to revolve the bottles pass successively beneath the pan 45 from which the water descends at a temperature of above 120° Fahr. the pan 46 from which it descends at a temperature of about 90° Fahr. and the pan 47 from which it descends at a temperature of about 70° Fahr., thus gradually cooling it to the temperature

of the outside air or of the bottling house. As the series of vertical compartments containing the pasteurized beer are brought opposite the door 13 the trays 33 with the bottles are removed by the workman who fills the compartments with a fresh lot of bottles to be treated. The horizontal shelves of the carrier on which the trays 33 rest and the trays themselves are perforated so that the falling water coming from the pans above the carrier passes from one shelf and one tray to the one beneath it and the bottles are practically in a body of falling water all of the time that they are under treatment.

The advantages of this system of pasteurization are considerable. In the first place it combines the spraying system with a continuous operation. The bottles are kept unmoved in substantially the same horizontal plane while passing through the successive zones of treatment and consequently there is no liability of breakage through movement or handling. The variation in temperature of the beer is so gradual that the bottles never break because of expansion or contraction. The apparatus is placed directly on the floor and requires no reconstruction of the floors or walls of the building in which it is operated. But one workman, who may be a boy, or an unskilled laborer, can readily handle all of the bottles and move and handle more than one at a time, usually twenty-seven in a tray so that much time and labor is saved. The water employed can be repeatedly used. The hot water has not lost much of its heat when it reaches the bottom of the apparatus and but little steam is required to restore its initial temperature. The division of the apparatus into two compartments also saves heat. The cost of the power to operate the mechanism is much less than that required for moving flexible carriers through large bodies of water. Moreover the operations being conducted inside of one casing there is little escape of heat through conductivity.

What we claim as new is:

1. In an apparatus of the class described an upright casing, a drum shaped carrier horizontally movable therein, the bottom of the carrier being arranged above the floor of the casing, a transverse partition dividing the space within the carrier drum and under the carrier into compartments, and means for supplying a pasteurizing agent at different temperatures to the different compartments and to the articles on the carrier as the same pass therethrough.

2. In an apparatus of the class described an upright casing, a drum shaped carrier horizontally movable therein, and a transverse partition whereby the casing is divided into two compartments in the space inside of the carrier-drum and means for supplying water at different temperatures to the

different compartments and to the articles on the carrier as said carrier passes there-through.

3. In an apparatus of the class described an upright casing, a drum shaped carrier horizontally movable therein, the bottom of the carrier being arranged above the floor of the casing, and a transverse partition dividing the space within the carrier drum and under the carrier into compartments and means for supplying water at different temperatures to the different compartments and to the articles on the carrier as said carrier passes therethrough.

4. In an apparatus of the character described, a series of water containers arranged in continuous series, means for discharging the contents of each container in the form of a spray, means for supplying hot water to the central container and cold water to one or more of the other containers and allowing it to overflow into the adjacent containers, and means for carrying articles to be treated through such spray.

5. In an apparatus of the character described, a series of water containers arranged in continuous series, means for discharging the contents of each container in the form of a spray, means for supplying hot water to the central container and cold water to the terminal containers, and means for carrying articles to be treated through such spray.

6. In an apparatus of the character described, a series of water containers arranged in continuous series, means for discharging the contents of each container in the form of a spray, means for supplying hot water to the central container and cold water to the terminal containers and water at an intermediate temperature to the intermediate set of containers, and means for carrying articles to be treated through such spray.

7. In an apparatus of the character described, a movable carrier and a system for supplying water in the form of a spray to the carrier comprising a series of water containers provided with perforated discharge openings, and means for supplying hot water to the middle one of the series, and cold water to the end ones of the series and allowing the hot and cold water so supplied to mix in the intermediate ones of the series.

8. In an apparatus of the character described, a movable carrier and a system for supplying water in the form of a spray to the carrier comprising a series of water containers provided with perforated discharge openings, and means for supplying hot water to the middle one of the series, and cold water to the end ones of the series and allowing the hot and cold water so supplied to mix in the intermediate ones of the series in combination with means for using the hot water over and over again.

9. In an apparatus of the character described, a movable carrier and a system for supplying water in the form of a spray to the carrier comprising a series of water containers provided with perforated discharge openings, and means for supplying hot water to the middle one of the series, and cold water to the end ones of the series and allowing the hot and cold water so supplied to mix in the intermediate ones of the series in combination with means for using the hot water over and over again consisting of a collector and means for renewing the initial heat of the hot water as it is returned to its container.

10. In an apparatus of the character described, a movable carrier and a system for supplying water in the form of a spray to the carrier comprising a series of water containers provided with perforated discharge openings, and means for supplying hot water to the middle one of the series, and cold water to the end ones of the series and allowing the hot and cold water so supplied to mix in the intermediate ones of the series in combination with means for using the hot water over and over again, and using the water mixed in the intermediate containers over and over again.

11. In an apparatus of the character described, a movable carrier and a system for supplying water in the form of a spray to the carrier comprising a series of water containers provided with perforated discharge openings, and means for supplying hot water to the middle one of the series, and cold water to the end ones of the series and allowing the hot and cold water so supplied to mix in the intermediate ones of the series in combination with means for using the hot water over and over again, and using the water mixed in the intermediate containers over and over again, the means in each instance consisting of collectors and pumps.

12. In an apparatus of the character described, a series of drip pans circularly arranged, means for supplying the pan centrally arranged with hot water, the pans on each side of it with water at a lower temperature, the pans on each side of those with water at yet a lower temperature and the terminal pans with cold water in combination with means for collecting the water from the central pan and returning it there to after renewing its initial temperature, means for collecting the mixed water from all the other pans and returning it to two of such pans one on each side of the central pan and further means for preventing the mingling of the water falling from the hot water pan and the other pans consisting of a partition of non-conducting material arranged in a line with the boundaries of the hot water pan, and means for presenting

articles to be pasteurized successively to the falling water of different temperatures.

13. In an apparatus of the character described, a series of drip pans circularly arranged, means for supplying the pan centrally arranged with hot water, the pans on each side of it with water at a lower temperature, the pans on each side of those with water at yet a lower temperature and the terminal pans with cold water in combination with means for collecting the water from the central pan and returning it there-to after renewing its initial temperature and means for collecting the mixed water from all the other pans and returning it to two of such pans one on each side of the central pan, further means for preventing the mingling of the water falling from the hot water pan and the other pans consisting of a partition of non-conducting material arranged in a line with the boundaries of the hot water pan and an overflow device for each collector, and means for subjecting materials to be pasteurized successively to the falling water of different temperatures.

14. In an apparatus of the character described, a series of drip pans circularly arranged, means for supplying the pan centrally arranged with hot water, the pans on each side of it with water at a lower temperature, the pans on each side of those with water at yet a lower temperature and the terminal pans with cold water, the central pan being much longer circularly than the other pans, means for forming the water from the different pans into sprays of different temperatures, and means for subjecting material successively to the sprays of different temperature.

15. In an apparatus of the character described, a series of drip pans circularly arranged, means for supplying the pan centrally arranged with hot water, the pans on each side of it with water at a lower temperature, the pans on each side of those with water at yet a lower temperature and the terminal pans with cold water in combination with means for collecting the water falling from the central pan and separate means for collecting the water falling from the other pans, and means for subjecting articles to be pasteurized successively to the falling water from the different pans.

16. In an apparatus of the character described, a series of drip pans circularly arranged, means for supplying the pan centrally arranged with hot water, the pans on each side of it with water at a lower temperature, the pans on each of those with water at yet a lower temperature and the terminal pans with cold water in combination with means for collecting the water falling from the central pan and separate means for collecting the water falling from the other pans consisting of a water collect-

ing chamber divided into two compartments along a line coincident with the lines of contact between the central pan and its adjacent pans, and means for subjecting articles to be pasteurized successively to the falling water from the different pans.

17. In apparatus of the character set forth, the combination with a carrier that rotates on a substantially vertical axis, of means for forming a spray having different temperatures and directing such spray at different temperatures along the path of travel of the carrier and upon said carrier.

18. In apparatus of the character set forth, the combination with a carrier that rotates on a substantially vertical axis, of means located above the carrier and conforming generally to its path of movement for spraying liquid at different temperatures along the path of travel of the carrier and downwardly upon said carrier.

19. In apparatus of the character set forth, the combination with means for causing two spaced streams of liquid of different temperatures to commingle, means for forming a body of spray therefrom having a gradually varied temperature from one portion of the body to another, and means for passing material through the body of spray thus formed.

20. In apparatus of the character set forth, the combination with spaced conduits, of perforated receptacles for receiving supplies from said conduits, means for supplying liquid through the conduits, means for raising the temperature of one supply above that of the other, perforated connections between the receptacles, in which the overflow from said receptacles intermingle, and means for passing material to be treated beneath the perforations and through the spray of varied temperature formed thereby.

21. In apparatus of the character set forth, the combination with a casing and a partition separating the same into two compartments, of means for delivering a spray at a pasteurizing temperature into one of the compartments, means for delivering a spray at a lower temperature into the other compartment, and means for transporting material to be pasteurized first into the compartment having the spray of lower temperature, thence into the compartment having the spray of the pasteurizing temperature, and afterward back into the first mentioned compartment.

22. In apparatus of the character set forth, the combination with an article carrier that is rotatable on a substantially vertical axis, of a curved spray-producing means located thereabove and discharging downwardly thereonto, means for delivering liquid at a comparatively high temperature to the central portion of the spray-producing means, and means for supplying liquid at a

lower temperature to the end portions of said spray-producing means, thereby providing a field of spray that is traversed by the article carrier and that has end portions cool and an intermediate portion hot.

23. In apparatus of the character set forth, the combination with an article carrier that is rotatable on a substantially vertical axis, of a curved spray-producing means located thereabove and discharging downwardly thereonto, means for delivering liquid at a comparatively high temperature to the central portion of the spray-producing means, and means for supplying liquid at a lower temperature to the end portion of said spray producing means, said spray-producing means including portions located between the liquid-supplying means of high and low temperature, in which portions said liquid supplies mingle to form a spray of an intermediate temperature.

24. In apparatus of the character set forth, the combination with an article carrier that is rotatable on a substantially vertical axis, of a curved spray-producing means located thereabove and discharging downwardly thereonto, means for delivering liquid at a comparatively high temperature to the central portion of the spray-producing means, means for supplying liquid at a lower temperature to the end portions of said spray-producing means, thereby providing a field of spray that is traversed by the article carrier and that has end portions cool and an intermediate portion hot, and a wall, forming compartments through which the article carrier passes, one of said compartments receiving the spray from both the colder ends of the field and the other compartment receiving the intermediate hotter spray.

25. In apparatus of the character set forth, the combination with an article carrier that is rotatable on a substantially vertical axis, of a curved spray-producing means located thereabove and discharging downwardly thereonto, means for delivering liquid at a comparatively high temperature to the central portion of the spray-producing means, means for supplying liquid at a

lower temperature to the end portions of said spray-producing means, thereby providing a field of spray that is traversed by the article carrier and that has end portions cool and an intermediate portion hot, a wall, forming compartments through which the article carrier passes, one of said compartments receiving the spray from both the colder ends of the field and the other compartment receiving the intermediate hotter spray, and means for elevating the collected liquid from the compartments back to the respective portions of the spray-forming means.

26. In apparatus of the character set forth, the combination with a casing having an opening in one side, of an article carrier rotatably mounted in said casing on a substantially vertical axis, means located on opposite sides of the opening for spraying liquid at a relatively low temperature on the carrier on opposite sides of said opening, and means for spraying liquid at a higher temperature on the carrier between the points where the liquid of low temperature is sprayed.

27. In apparatus of the character set forth, the combination with a casing having an opening in one side, of an article carrier rotatably mounted in said casing on a substantially vertical axis, means located on opposite sides of the opening for spraying liquid at a relatively low temperature on the carrier on opposite sides of said opening, means for spraying liquid at a pasteurizing temperature on the carrier substantially midway between the points where liquid of low temperature is sprayed, and means for spraying liquid of gradually varied temperature between the spray of low temperature and that of the pasteurizing temperature.

Witness our hands this 23d day of December, 1909, at Cleveland, Ohio.

CHARLES H. LOEW.
ARNOLD RUETSCHI.

Witnesses:

ALBERT A. KAISER,
WILLIAM F. BIERMANN.