L. STURGES.
APPARATUS FOR PASTEURIZING MILK.
APPLICATION FILED NOV. 20, 1902.

Witnesses:

Inventor:

No model.
APPARATUS FOR PASTEURIZING MILK.


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To all whom it may concern:

Be it known that I, LEE STURGES, a citizen of the United States, residing at Elmhurst, in the county of DuPage, and State of Illinois, have invented certain new and useful Improvements in Apparatus for Pasteurizing Milk, of which the following is a specification.

This invention relates to improvements in apparatus more particularly designed for pasteurizing or sterilizing milk, although adapted for many other uses requiring a rapid heating or cooling of a fluid substance.

The object of the invention is to provide an improved construction in apparatus of this character; and it consists in the matters herein set forth and particularly pointed out in the appended claims.

In the accompanying drawings, Figure 1 is a sectional elevation of a construction embodying my improvement in one form. Fig. 2 is a top view thereof.

In said drawings, 1 designates an inclosing tank, and 2 and 3, respectively, outer and inner concentric cans or vessels rotatably mounted within the tank. Of these vessels the outer one, 2, is supported by a pivot 4, that projects downward from the center of a casting 5 on the bottom of the vessel into a bearing 6 on the bottom of the tank, a hardened steel ball 7 being herein shown as inserted in this bearing beneath the pivot to support the latter with the least possible friction. The inner vessel 3 is carried by a pivot 8, which projects upwardly from the casting 5 on the bottom of the outer vessel 2 into the interior of the latter. As herein shown, an inlet-tube 9, surmounted by a funnel 10, is secured axially within this inner vessel and opens through its bottom 11 into the space between the two vessels, and the bearing 12, which supports the inner vessel upon the pivot 8, is made in the form of a spider that is secured to the bottom 11 within the lower end of the tube 9. The upper ends of the two vessels are held concentrically by guides mounted at intervals around the circumference of the tank and consisting in this instance of a pair of driving-wheels 13 and a pair of driving-wheels 14. To adjustably support each pair of these wheels 13 and 14 upon the tank and to insure their normally fixed relation to each other, the top of the tank is provided with an iron rim 15, to which radially-projecting arms 16 are bolted, and the wheels themselves are journaled on bracket-arms 17, that are normally clamped at 18 to said radial arms. In the case of the driving-wheels the bracket 17 is bored out to form a bearing for the driving-shaft 19 and is also formed with a yoke 20, which encloses a bevel-gear 21 on this shaft, the two driving-wheels 14 being provided with bevelled gears 22, which intermesh with the gears 21 at their top and bottom and are thereby rotated in opposite directions when the shaft is turned by a driving-pulley 23 or otherwise.

In the operation of the apparatus the milk or other fluid to be treated is poured into the funnel 10, runs down through the tube 9 into the space between the bottoms of the vessels, and then rises between the concentric side walls to the top of the outer vessel, where it flows over into an annular trough 24, that is supported on the tank by brackets 25. An outwardly-projecting flange 26 at the extreme upper edge of the outer vessel projects far enough over this trough to insure the discharge into it of the milk rising between the vessels, and a somewhat wider flange 27 projects outwardly over the trough from the top of the inner vessel and prevents the fluid from being thrown over the trough. Outlet-superior 28 are furthermore formed in the inner vessel just above this flange 27, and any overflow of water from the vessel then runs down over the top of the flange 27 and drips into the tank 1.

In pasteurizing or sterilizing milk two sets of apparatus of this character will ordinarily be employed for the two operations of heating and cooling the milk. In the former case the hot water will be provided in the inclosing tank and inner vessel either by running hot water into them or by heating the water in them by steam introduced through pipes 29 and 30, controlled by valves 31 and 32, respectively. In the latter case the hot water will be replaced by cold water or brine, which may be used in any suitable manner or may be supplied through pipes instead of the hot water or steam. An overflow-pipe 33 serves to conduct off the waste water from the tank 1 and a spout 34 to conduct off the milk or other treated fluid from the trough.
The principal object of rotating the outer as well as the inner one of the two concentric vessels, but in an opposite direction, which is characteristic of this apparatus, is to prevent any of the undue heating or cooling of the milk, which is found liable to occur in apparatus of this character in which one vessel only is rotated, and the advantageous results of my improved construction in this respect are very noticeable. This burning or overheating of the milk is avoided by my apparatus because a more rapid movement of the vessels with respect to the milk between them is obtained where the vessels are rotated in opposite directions. In an apparatus employing vessels rotating together it has been found that the milk has sometimes imparted to it a disagreeable taste, due to the “burning” of the milk as it passes between the heated walls of the vessels. In practice I have found this to be entirely avoided by an arrangement of vessels revolved in opposite directions, so that the milk shall not linger in contact with the wall of either vessel.

It will be observed that a feature which contributes materially to the utility of my apparatus lies in driving the vessels by means engaging them at their upper edges above the liquid-level in the tank, whereby the necessity of extending a drive-shaft through the bottom of the tank and using a stuffing-box will be avoided. It will also be observed that the peculiar form of driving mechanism I employ serves the further purpose of an efficient antifriction guiding means for the cylinders. It will, however, be understood that various changes may be made in the details of the construction shown without interfering with its advantages or departing from the broad spirit of the invention claimed.

I claim as my invention—

1. In an apparatus of the character described, the combination with a tank, of an outer cylindric vessel mounted to rotate upon the tank upon a central pivot at the lower end of the vessel, an inner cylindric vessel mounted to rotate within the outer vessel upon a central pivot at their bottom, and guides supporting the vessels concentrically at their upper edges, including a pair of oppositely-rotating driving-wheels having frictional engagement with the vessels, substantially as described.

2. In an apparatus of the character described, the combination with a tank, of an outer cylindric vessel rotatably mounted within the tank at the lower end of the vessel, an inner cylindric vessel rotatably mounted within the outer vessel at their bottom, guides at intervals around the circumference of the tank, and a plurality of pairs of wheels mounted on the tank and engaging the vessels to support them concentrically at their upper edges, two of said wheels being oppositely rotated to drive the vessels in opposite directions, substantially as described.

3. In an apparatus of the character described, the combination with a tank, of an outer cylindric vessel rotatably mounted within the tank, an inner cylindric vessel rotatably mounted within the outer vessel, a plurality of pairs of wheels adjustably mounted at intervals around the upper rim of the tank and engaging the vessels to support them concentrically at their upper edges, two of said wheels being oppositely rotated to drive the vessels in opposite directions, substantially as described.

4. In an apparatus of the character described, the combination of a tank, of two concentric cylindric vessels having a pivotal support on the bottom of the tank, means for supplying liquid between the vessels and means for supplying liquid to the inner vessel and to the tank, and means engaging the rims of the two vessels at the point above the liquid-level of the tank, said means serving to guide and to rotate said vessels.

In testimony that I claim the foregoing as my invention I affix my signature, in presence of two subscribing witnesses, this 4th day of November, A. D. 1902.

LEE STURGES.

Witnesses:
HENRY F. CARTER,
K. A. COSTELLO.