No. 781,529. PATENTED JAN. 31, 1905.

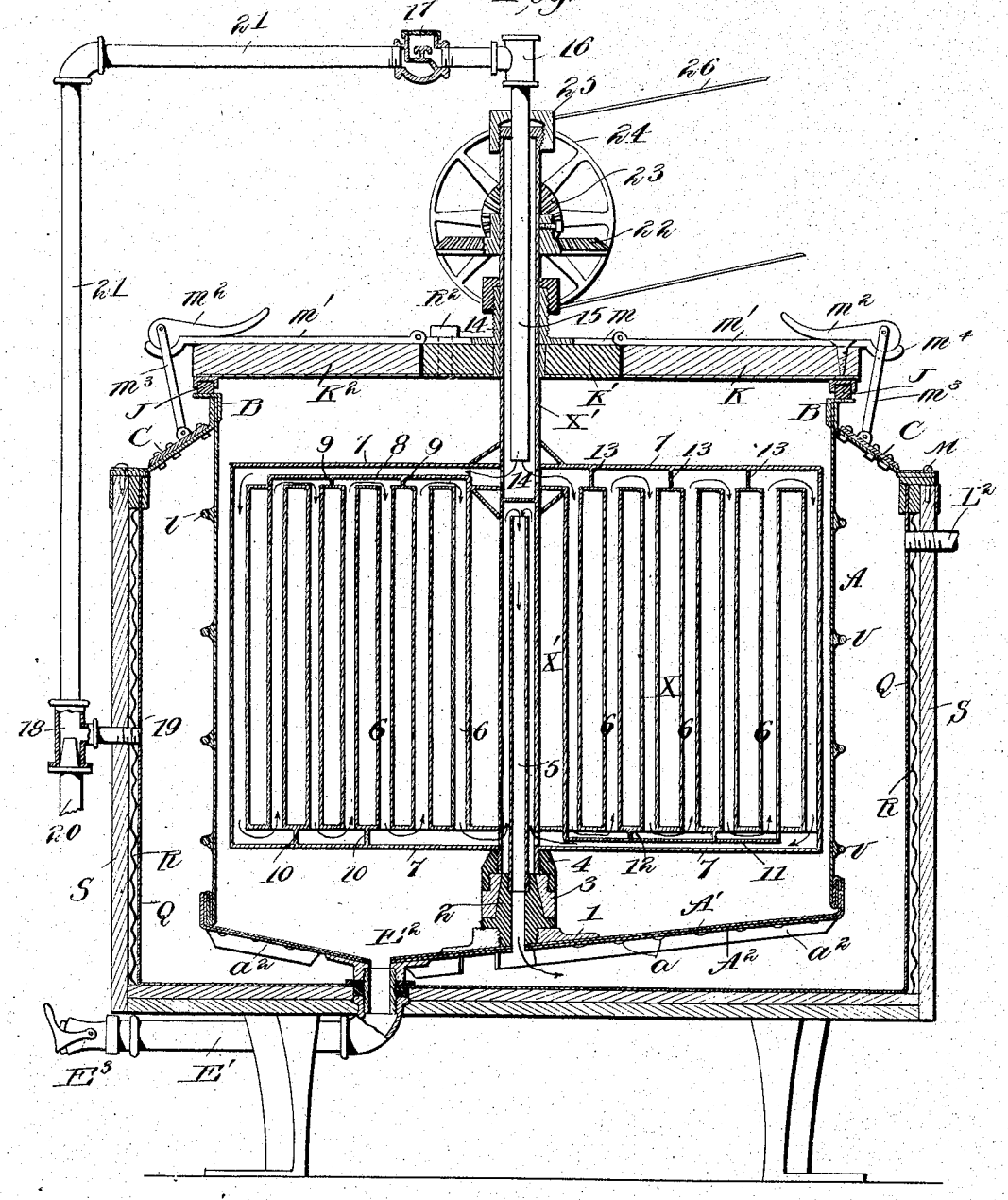
A. JENSEN.

LIQUID RIPENER.

APPLICATION FILED MAY 17, 1904.

4 SHEETS—SHEET 1.

Fig. 1.



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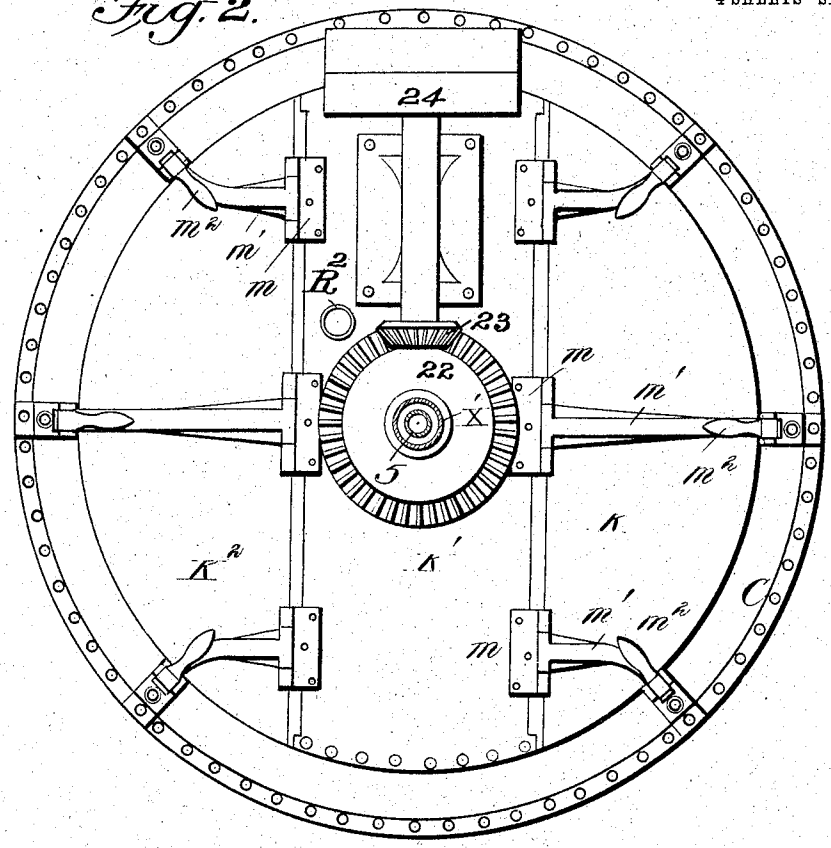
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4 SHEETS—SHEET 2.

Fig. 2.



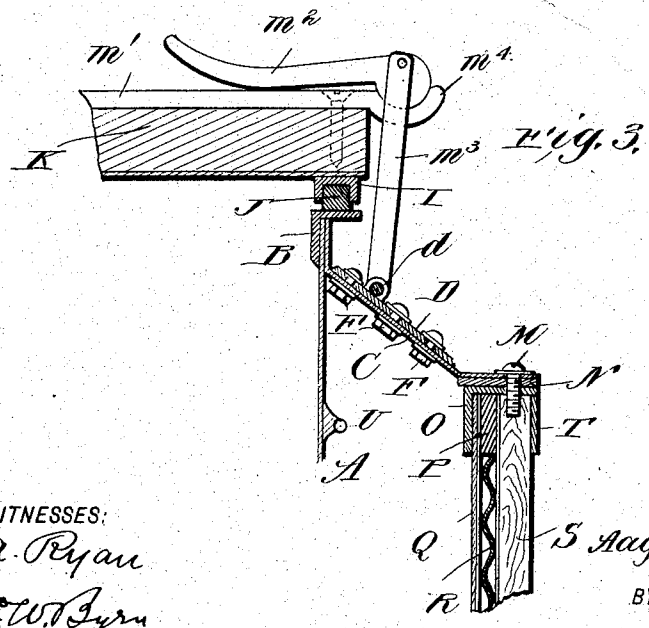


Fig. 3.

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4 SHEETS—SHEET 3.

Fig. 4.

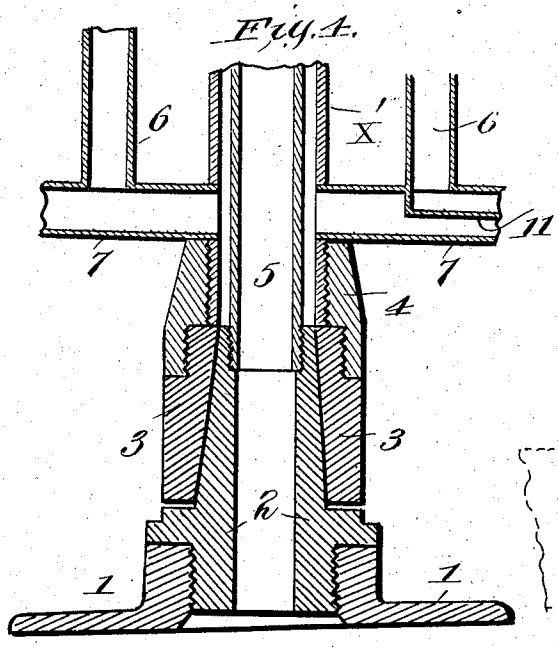


Fig. 5.

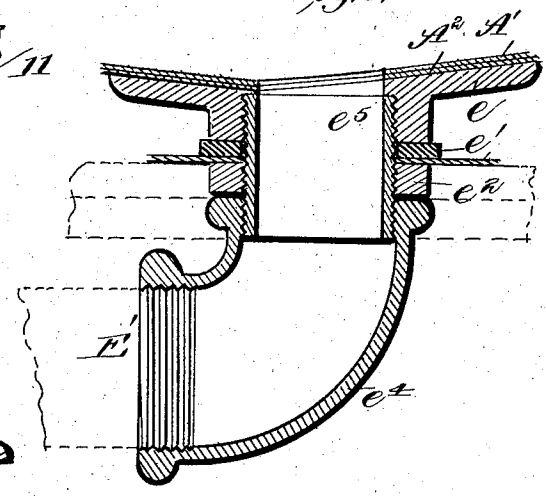
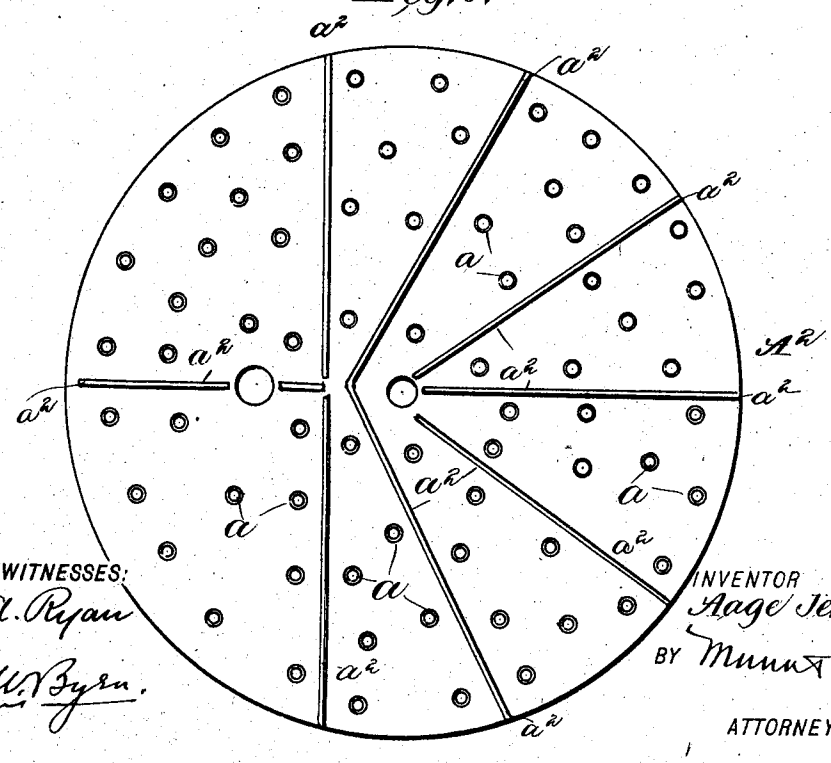


Fig. 6.



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4 SHEETS—SHEET 4.

Fig. 7.

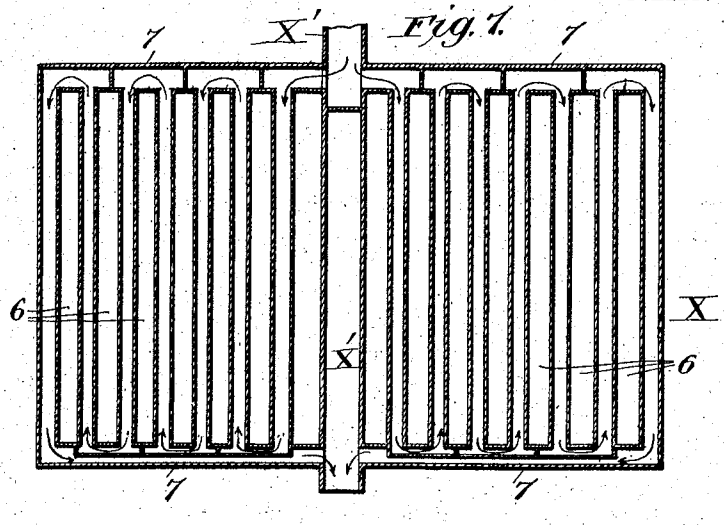


Fig. 8.

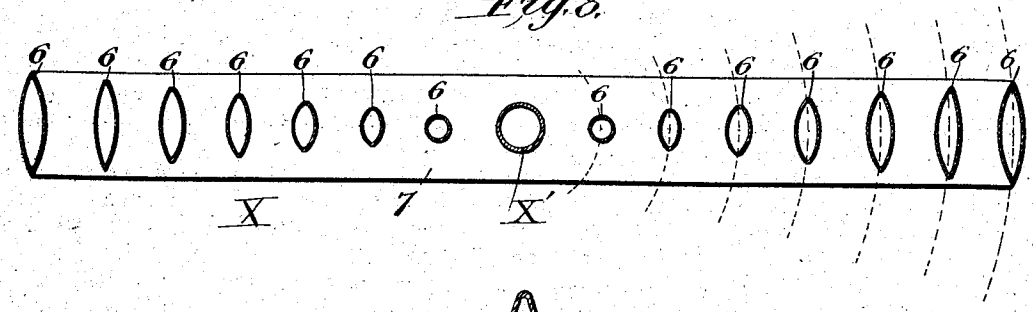
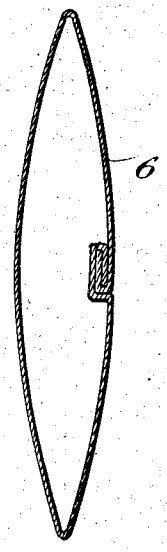


Fig. 9.



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No. 781,529. Patented January 31, 1905.

UNITED STATES PATENT OFFICE.

AAGE JENSEN, OF TOPEKA, KANSAS.

LIQUID-RIPENER.

SPECIFICATION forming part of Letters Patent No. 781,529, dated January 31, 1905.

Application filed May 17, 1904. Serial No. 208,388.

To all whom it may concern:

Be it known that I, AAGE JENSEN, a citizen of the United States, residing at Topeka, in the county of Shawnee and State of Kansas, have invented a new and useful Improvement in Liquid-Ripeners, of which the following is a specification.

My invention is in the nature of a device for cooling or heating and simultaneously agitating liquids—as, for instance, in ripening cream preparatory to churning it; and it consists in the novel construction and arrangement of receptacle with means for cooling or heating the cream, as may be desired, and at the same time agitating it, as will be hereinafter more fully described with reference to the drawings, in which—

Figure 1 is a vertical central section. Fig. 2 is a plan view. Fig. 3 is an enlarged vertical section through the breast of the tank; Figs. 4 and 5, enlarged detail sectional views showing the step-bearing and cream-outlet. Fig. 6 is a bottom plan view of the cream-receptacle. Fig. 7 is a vertical section, and Fig. 8 an enlarged horizontal section, of one of the gangs of pipes or tubes, and Fig. 9 is an enlarged cross-section of one of the tubes of the same.

In the drawings (see Figs. 1 and 3) the tank or outer casing is constructed as a vertical cylinder having its outer wall composed of wood staves S, with a lining of galvanized sheet-steel Q and a layer of corrugated sheet-asbestos R between the said lining and the staves. This corrugated sheet forms air-cells and has a layer of paper on each side of it, as seen in Fig. 3. The inner wall A of the receptacle is made of tinned copper of cylindrical shape and with a conical bottom, the lowest point of the bottom being offset laterally from the center and communicating at E^2 with a discharge-pipe E′, having a cut-off gate E^3.

Around the receptacle A is arranged a number of steel wire hoops U to reinforce or brace the said receptacle. At the top of the receptacle A is a circular angle-iron B, riveted and soldered to A.

C is an annular inclined breast fastened permanently to ring B at the top and fastened at the bottom edge to the upper edge of the outer casing by screws M, which (see Fig. 3) are threaded into an angle-iron rim O, with a rubber gasket N between.

T is a steel hoop arranged outside the upper ends of the wooden staves to hold them in place, and P is a wooden hoop arranged inside the staves and above the air-cells to prevent crushing the same. The horizontal flange of the angle-iron O covers the tops of the staves and the hoops T and P, and between the vertical flange of the angle-iron and the wooden hoop P is clamped the steel lining Q.

On top of the flanged ring B rests a cork packing-ring J, held in the groove of a channeled ring I, secured to the lower side of the hinged lid K.

The cover of the inner receptacle A is lined with tinned copper and is made in three sections K K′ K^2, of which the middle section, K′, is stationary and K and K^2 are lids or doors, connected by hinges m m' to the stationary portion. The sections m' of the hinges are extended to the circular edge of the hinged lids and are formed with curved seats m^4, that receive the cam-heads of short levers m^2. These levers are connected by links m^3 with the annular breast C, as follows, (see Fig. 3:) D is a brass casting fastened by screws F to the annular breast and having a loop d, in which is secured the pivot-pin of the links m^3. When the levers m^2 are thrown out of the seats m^4, the hinged side may be opened; but when the levers are in the position shown in Fig. 3 the cam-heads draw the lids tightly down, so that the cork packing J makes an air-tight joint.

The bottom of the receptacle A (see Fig. 1) is made of double thickness, the inner layer A′ being tinned copper and the outer layer A^2 of galvanized iron fastened together throughout the entire surface by numerous closely-placed rivets a, (see Fig. 6,) and the outer layer of galvanized iron is formed into vertical flanges a^2, radiating as shown. These ribs or flanges a^2 impart stiffness to the bottom, so as to enable it to properly sustain the central shaft and rotating gangs of tubes without vibration.

X represents the gang of tubes which are con-

nected to a central hollow shaft X', which shaft is provided with a special step-bearing at its lower end and at its upper end extends through a stuffing-box 14 in the middle stationary part K' of the cover. The step-bearing (see Figs. 1 and 4) consists of a circular plate 1, having an inclined bottom surface and a screw-threaded central hole. The inclined bottom surface is to fit the incline of the conical bottom of the cream-receptacle, since the lowest point of the conical bottom is eccentric to the shaft. Into the screw-threaded hole in the plate 1 is turned the lower screw-threaded end of a step-bearing 2. This step-bearing is made conical on its exterior surface and has a central hole through it to form a passage-way for liquids. Surrounding the exterior conical surface of bearing 2 is a swiveling sleeve 3, connected by a screw-thread with a sleeve 4, screwed onto the lower end of the hollow shaft X', so that this hollow shaft and its gang of tubes X and the sleeves 3 and 4 rotate together. The conical inner surface of sleeve 3 fits with a water-tight ground joint onto the conical exterior of step 2 and always wears to a water-tight fit. Into the upper end of the step-bearing 2 is screwed a stationary stand-pipe 5, which extends up to nearly the top of the rotary gang of tubes X. The gangs of tubes communicate with the top of the hollow shaft at 14 and communicate also at the bottom with the hollow shaft; but there is no passage-way through the hollow shaft from its upper end to its lower end; but fluids passing through have to pass through the gangs of tubes on each side of the hollow shaft.

The rotating gangs of tubes 6 are arranged vertically and parallel to each other and communicate at top and bottom with the horizontal pipes 7 7, which connect them with the hollow central shaft. The vertical tubes 6 are in cross-section of a sharpened elliptical shape, as seen in Fig. 9, with the major axis of the ellipse set tangential to the circle of rotation, as in Fig. 8, so that these thin tubes cut edgewise through the cream with the least resistance and also afford the largest superficial area for a given cross-section. These tubes also get continually larger from the center outward, as seen in Fig. 8. This is to give a larger volume of cooling or heating medium within in proportion to the larger quantity of cream which these outer tubes pass through in revolving through larger circles of cream. In this way I get a better distribution of heating or cooling effect from the gang of tubes throughout the body of cream in receptacle A.

The circulation of the heating or cooling medium through the gang of tubes X is directed through them in various ways. To cause the circulation to take place first through the outer tubes and then successively through the inner tubes, I construct the tubes as shown on the left-hand side of Fig. 1—that is to say, I locate in the upper horizontal pipe 7 a longitudinal partition 8 with short transverse partitions 9 9 in the lower half of this pipe, while in the bottom pipe 7 on the left-hand side the transverse partitions 10 extend all the way across the pipes. In this case the liquid passes from the space 14 in the hollow shaft horizontally over the top of longitudinal partition 8 to the outer tube, then descending it is turned up by the first partition 10 of the lower pipe and rises through the second tube from the outer one and after passing therethrough is turned down by the transverse partition 9 into the next inner parallel tube, and so on it continues to the bottom part of the central hollow shaft. On the right-hand side a longitudinal partition 11 is arranged in the lower pipe 7 with short transverse partitions 12 above it, while the top pipe 7 on this side is provided with transverse partitions 13, like the partitions 10 on the left-hand side. In this case the cooling or heating liquid passes down first through the inner tube and then up through the next outer tube until it reaches the outermost one, and then it returns beneath the longitudinal partition 11 to the bottom part of the hollow shaft X'. If desired, both sides of the gang of pipes may be made like the right-hand side of Fig. 1, as shown in Fig. 7, or both sides may be made like the left-hand side of Fig. 1. As the heating or cooling liquid passes into the lower end of hollow shaft X' it rises therein outside of stand-pipe 5 and overflowing into the upper end passes down through stand-pipe 5 and hollow step-bearing 2 and through the bottom $A' A^2$ of the cream-receptacle to the space outside the cream-receptacle and between it and the outer casing. The object of this stand-pipe 5 is to prevent the cream from passing out of the receptacle A in case the bottom bearings should become leaky, as the stand-pipe 5 rises to a point above the level of the cream in the receptacle A.

The cream-outlet E^2 from receptacle A, Fig. 1, is provided with a special connection (shown in detail in Fig. 5) in which a flanged plate e is secured to the conical bottom $A' A^2$ and is clamped to the sheet-metal lining of the bottom of the casing by a nut e^2 and rubber gasket e'. The socket of the plate e is drilled out and screw-threaded interiorly to receive a screw-nipple e^5, which has a screw connection with the plate e, the nut e^2, and also an elbow e^4, connecting with the discharge-pipe E'. The inner wall of the nipple e^5 is flush with the opening in plate e, which makes a smooth passage-way for the discharge of cream with no angles or crevices for the collection and retention of sour cream, thereby making a sanitary construction. This cream-outlet forms the only support for the bottom of the cream-receptacle, as seen in Fig. 1, and as the hollow conical step-bearing has no

support beneath it the value of the special construction of the bottom of the cream-receptacle will now be understood, the double bottom with stiffening-ribs preventing the vibration of the bottom from the action of the moving parts.

Where the hollow shaft X′ passes through the middle section of the cover, said shaft is provided above the stuffing-box 14 with a bevel-wheel 22, which is engaged by a bevel-pinion 23 on a short horizontal shaft, bearing at its outer end a driving-pulley 24. By this means the hollow shaft and gang of tubes are rotated. Above the bevel-gear the hollow rotary shaft X′ is connected to a stationary pipe 15 by means of a stuffing-box 25. This pipe is open at its upper end for the reception of cold water.

About midway the height of the receptacle on one side there is a noiseless steam-injection nozzle 18, which receives steam through the pipe 20 and through pipe connection 19 draws water from the space between the outer casing and the walls of the cream-receptacle. This steam-nozzle heats the water and sends it up the pipe 21 and through check-valve 17 into the top of pipe 15, which is connected by a T-coupling 16.

The hinged sections K K^2 of the cover when raised allow the cream to be introduced.

In the side of the outer wall of the casing near the top there is an overflow-pipe L^2 for water.

R^2 is an air-inlet, through which compressed air may be introduced on top of the cream to force the same through the outlet-pipe E′ and up through a connecting-pipe to any vessel located higher than the ripener.

The operation of my ripener is as follows: The cream-gate E^3 being closed, the cream is introduced into the space within the receptacle H through the covers K K^2 until the receptacle is filled and the cream surrounds exteriorly and completely immerses the gang of tubes X. Cold brine or ice water is now introduced through the top of pipe 15 and passes down the hollow shaft X′ to the point 14 and then traverses the interior of the gang of tubes X and passing out at the bottom rises to the top of stand-pipe 5 and descending through the same and through the hollow bearing 2 gains the space below the bottom of the receptacle A and rises between the same and the outer casing, escapes at the overflow L^2, carrying away the absorbed heat of the cream. As the water passes through the gang of tubes X the latter is slowly revolved, which causes every portion of the cream to be reached by the cooling stream of water in the tubes, and which tubes also act as an agitator to thoroughly stir the cream and render it of uniform consistency and temperature. When the cream has been sufficiently treated it is drawn off through the gates E^3. If instead of cooling the cream it is desired to warm it, steam is supplied through pipe 20, and this draws the water from around the receptacle A through pipe 19 and after heating it sends it through pipe 21 into the hollow shaft and the rotating gang of tubes, where it raises the temperature of the cream. This closed circulation of warm water from the annular space between the walls of the ripener into the steam-nozzle and through the hollow shaft and tubes to the annular space again may be continued until the proper temperature and ripening effect is secured.

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

1. A liquid-ripener comprising an outer vertical and cylindrical casing and an inner cylindrical receptacle, a hollow vertical shaft within the receptacle bearing a gang of tubes the upper end of which gang of tubes communicates with the upper end of the hollow shaft, and the lower end of which gang communicates with the lower end of said hollow shaft, the upper and lower ends of said hollow shaft having no communication with each other except through the gang of tubes, a hollow step-bearing for the lower end of the shaft effecting communication between the same and the annular space between the receptacle and casing and means for rotating the shaft and gang of tubes substantially as shown and described.

2. In a liquid-ripener, an outer casing, an inner receptacle, a revolving shaft with a gang of tubes arranged in the inner receptacle, said shaft having on its lower end a sleeve-bearing having a conical bore, and a step-plate with a hollow upright stem mounted on and projecting above the floor of the inner receptacle and having a conical exterior to fit the conical bore of the sleeve, so as to wear constantly to a liquid-tight fit and give passage to the water through the cream from the gang of tubes to the space between the outer casing and inner receptacle substantially as described.

3. A liquid-ripener having an inner and outer wall, a hollow shaft, a central hollow step-bearing for the shaft mounted concentrically on the bottom of the inner wall and opening therethrough, said bottom being made conical with its lowest point eccentric to or on one side of the shaft and having from said point an outlet-discharge for the cream substantially as described.

4. A liquid-ripener, comprising a double-walled receptacle, a vertical hollow rotary shaft carrying a gang of tubes communicating with the upper and lower ends of the shaft, a cover for the receptacle, a stuffing-box between the shaft and the cover, driving-gears connected to the hollow shaft above the cover, a stuffing-box at the top of the rotary shaft, a stationary pipe entering said stuffing-box, a branch pipe with check-valve connected with said stationary pipe, and a steam-injection nozzle con-

nected to said branch pipe and to the space between the two walls of the receptacle substantially as described.

5. A liquid-ripener comprising a receptacle and a hollow rotary shaft bearing a series of revolving circulation-tubes arranged vertically, the tubes having a gradually-increased cross-section from the center outwardly substantially as and for the purpose described.

6. A liquid-ripener comprising a receptacle, a hollow shaft bearing a series of circulation-tubes communicating with the hollow shaft at top and bottom and a stand-pipe rising through the hollow shaft and opening into the same at its upper end and opening at its lower end through the floor of the receptacle substantially as and for the purpose described.

7. In a liquid-ripener, a rotary gang of tubes comprising a hollow central shaft, a series of vertical parallel tubes, horizontal pipes connecting the tops and bottoms of the tubes to the hollow shaft, the horizontal pipes having at one end of the tubes, a longitudinal partition with transverse partitions on one side of said longitudinal partition and the horizontal pipes at the other ends of the tubes having transverse partitions extending all the way across, whereby the cooling or heating liquid is made to circulate through the tubes from the outermost one inward, or from the innermost one outward substantially as described and for the purpose set forth.

8. In a liquid-ripener, a receptacle having a revolving gang of circulation-tubes with central hollow shaft, and a vertical step-bearing supporting the same and comprising a perforated plate 1, a hollow step-bearing 2 screwed into the same and having a conical exterior, a sleeve 3 having a conical bore fitting the conical step, a stand-pipe 5 connected to the hollow step and extending up the hollow shaft to the upper end of the gang of tubes, and a sleeve 4 screwed to both sleeve 3 and the hollow shaft substantially as described.

9. A liquid-ripener having an inner receptacle with its bottom made of two layers of sheet metal united throughout their surfaces by rivets, the outer or lower layer of sheet metal being formed into ribs or flanges and the inner layer being smooth; in combination with a central step-bearing mounted on said bottom and an inclosing tank having a discharge-outlet communicating with and supporting the inner receptacle at an eccentric point substantially as and for the purpose described.

10. A liquid-ripener comprising a receptacle having a revolving gang of tubes and a vertical hollow shaft with central hollow step-bearing, the bottom of the receptacle being made lowest at an eccentric point and provided at such point with an outlet-pipe and said bottom being provided with stiffening ribs or flanges extending under the step-bearing to stiffen the floor against vibration substantially as described.

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Witnesses:
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