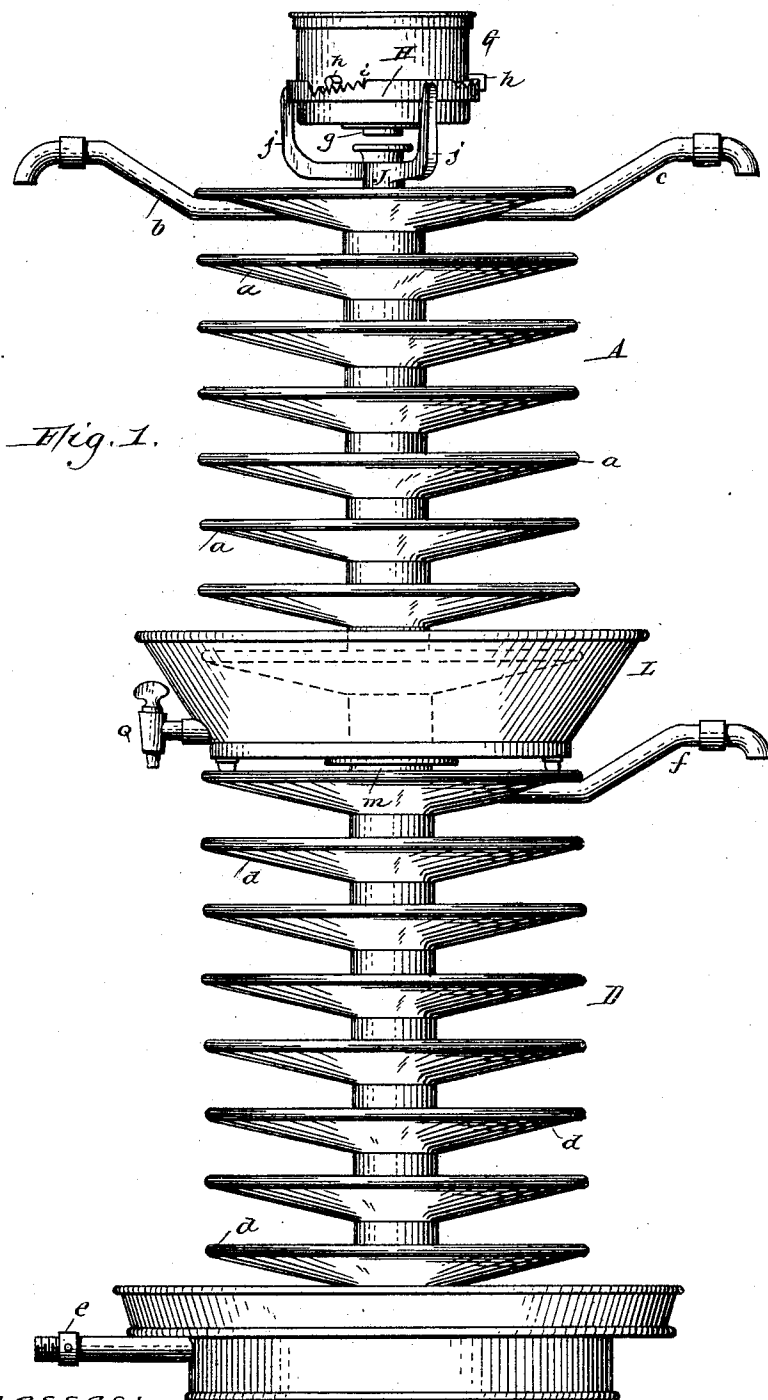


J. L. JÖNSSON.

APPARATUS FOR HEATING AND COOLING MILK.

No. 486,642.

Patented Nov. 22, 1892.



Witnesses:

Theo. L. Popp.
Emil Neuhart

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Attorneys

(No Model.)

3 Sheets—Sheet 2.

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Fig. 2.

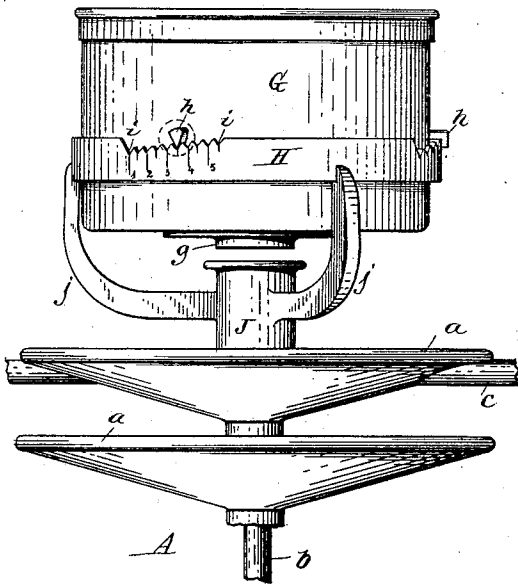


Fig. 3.

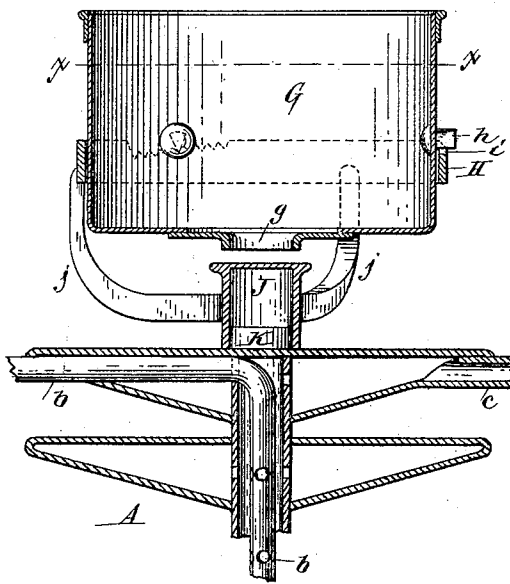
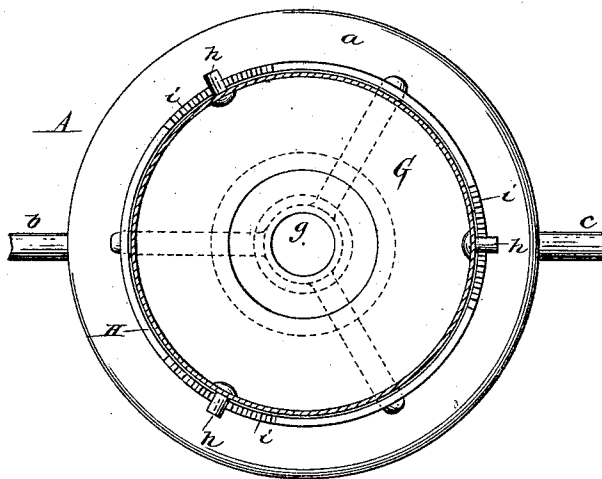


Fig. 4.



Witnesses:

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(No Model.)

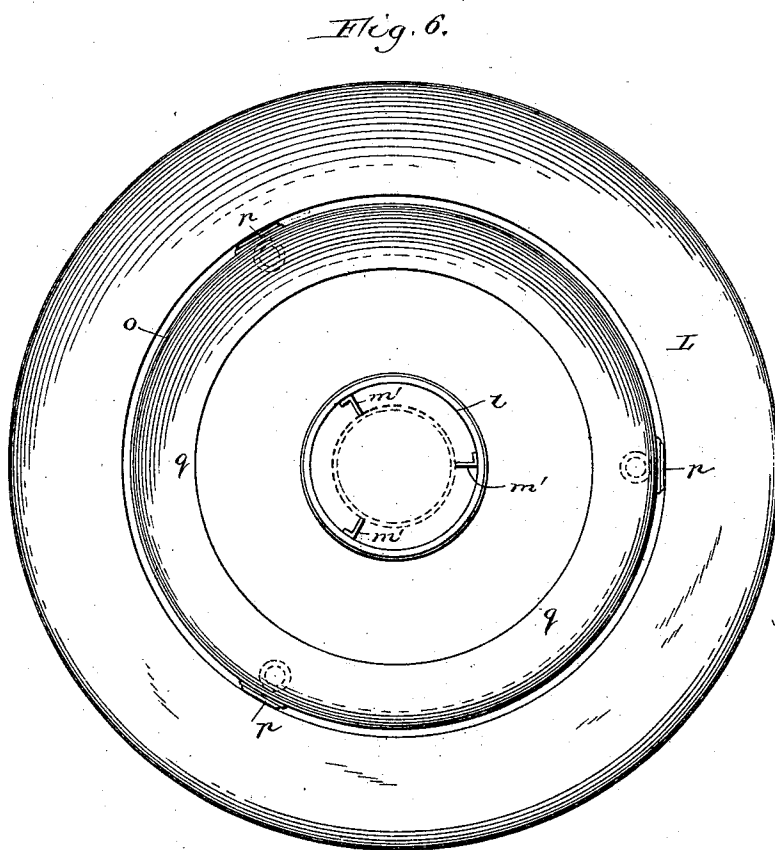
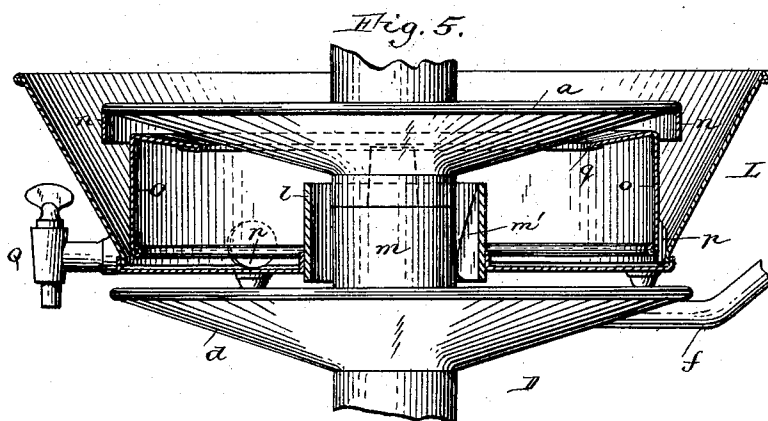
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By Wilhelm Popp.
Attorneys.

UNITED STATES PATENT OFFICE.

JOHAN LUDVIG JÖNSSON, OF STOCKHOLM, SWEDEN, ASSIGNOR TO THE
AKTIEBOLAGET SEPARATOR, OF SAME PLACE.

APPARATUS FOR HEATING AND COOLING MILK.

SPECIFICATION forming part of Letters Patent No. 486,642, dated November 22, 1892.

Application filed September 29, 1890. Serial No. 366,549. (No model.)

To all whom it may concern:

Be it known that I, JOHAN LUDVIG JÖNSSON, a subject of the King of Sweden and Norway, residing at Stockholm, in the Kingdom of Sweden, have invented new and useful Improvements in Apparatus for Heating and Cooling Milk, &c., of which the following is a specification.

This invention relates to an apparatus for heating milk, cream, and other alimentary liquids to the point at which the germs of fermentation are destroyed and for quickly cooling the liquid to the temperature at which it can be placed in bottles or other vessels for transportation or at which it can be further treated.

My invention has particular reference to such an apparatus, which consists of superposed hollow cells or sections over which the liquid flows and through which the heating and cooling media circulate.

The objects of my invention are to construct a simple feed-cup which can be quickly adjusted to increase or reduce the volume of liquid which flows from the feed-cup upon the top section of the apparatus and to provide means for holding the heated liquid a certain length of time after it has been heated and before it is admitted to the cooler in order to insure the destruction of the germs by heat.

In the accompanying drawings, consisting of three sheets, Figure 1 is an elevation of a combined heating and cooling apparatus containing my improvements. Fig. 2 is an elevation of the feed-cup on an enlarged scale. Fig. 3 is a vertical section of the same. Fig. 4 is a horizontal section in line *x x*, Fig. 3. Fig. 5 is a sectional elevation, on an enlarged scale, of the receiver interposed between the heater and the cooler. Fig. 6 is a top plan view of the same.

Like letters of reference refer to like parts in the several figures.

A represents the heater composed of superposed hollow sections or cells *a*, which are filled with water and are heated by steam introduced through a central perforated pipe *b*. The surplus of heated water resulting from the condensation of steam escapes through the overflow-pipe *c*.

D represents the cooler arranged below the

heater and composed of hollow sections or cells *d*, through which cold water circulates, which enters the bottom section through the pipe *e* and escapes from the top section through the pipe *f*.

G represents the feed-cup arranged centrally over the top section of the heater and provided in its bottom with a central discharge-orifice *g*.

H is an annular frame in which the feed-cup is supported by arms *h*, which project laterally from the cup and of which three are preferably employed. These arms are made angular or V-shaped with the edge turned down and rest in V-shaped notches *i*, formed in the upper side of the annular frame. An inclined series of these notches is provided for each arm, so that by turning the cup in the frame and supporting each arm in a higher or lower notch the cup can be raised or lowered. The notches of each series are numbered correspondingly to facilitate the adjustment. The annular frame is supported upon the top section of the heater by a sleeve J and arms *j*, extending from the sleeve to the frame. The sleeve J rests upon the top section and is held against lateral displacement by a head or boss *k* on the section. The top of the sleeve is closed and stands underneath the discharge-orifice of the feed-cup, so that the open space between the sleeve and the orifice controls the discharge of the liquid from the cup. By raising and lowering the cup this space is increased or reduced. It is obvious, however, that the same result would be obtained by placing the discharge-orifice of the feed-cup directly over the top of the upper section.

L represents a receiver, which is arranged between the heater and the cooler for the purpose of holding the heated liquid a sufficient length of time to enable the heat to act upon the germs before the liquid is cooled. This receiver consists of an annular trough which is arranged around and below the lowest section of the heater. The inner wall or ring *l* of this trough surrounds the stem *m*, which connects the lowest section of the heater with the top section of the cooler, and is made somewhat larger in diameter than this stem to form an annular passage through which the heated

liquid flows down upon the cooler. The ring 7 is provided on its inner side with ribs m' , which center the receiver on the stem m . The lower section of the heater is provided at its periphery with a depending flange n , which causes the liquid to drip off and prevents it from following the inclined lower side of the section. O represents an annular curtain or partition which is arranged within the receiver underneath the lowest section of the heater and which compels the heated liquid escaping from this section to descend to the bottom of the receiver before it can rise and flow over the inner ring 7. This curtain is supported with its lower edge at a short distance above the bottom of the receiver by feet p and is preferably provided at its top with a flange q , projecting inwardly underneath the bottom section of the heater. The vertical wall of the curtain is arranged inwardly of the depending flange n of the lower section of the heater, so that the liquid passes down outside of the curtain. The heated liquid escaping from the heater descends between the outer wall of the receiver and the curtain and rises on the inner side of the curtain until it reaches the top edge of the inner ring, when it overflows upon the cooler. In this manner the heated liquid is held a certain time before it is subjected to the action of the cooler, and this time is controlled by the capacity of the receiver and the rapidity of the feed. By increasing the feed the time is shortened and by decreasing it it is lengthened.

It is obvious that the adjustable feeder may be applied directly to a cooler when the liquid is already heated and requires simply to be cooled.

Q represents a faucet applied to the outer wall of the receiver and through which the contents can be drawn off.

I claim as my invention—

1. A combined liquid heater and cooler consisting of a surface heater which receives and heats the liquid, a receiver which is arranged below said heater and which is provided with means whereby the heated liquid is detained temporarily, and a surface cooler which is arranged below said receiver and which receives the heated liquid therefrom and cools the same, substantially as set forth.

2. In a combined liquid heater and cooler, the combination of a surface heater which receives and heats the liquid, a receiver which intercepts the heated liquid and which is provided with an overflow whereby the escape of the liquid is retarded, and a surface cooler which receives the heated liquid from the receiver and cools the same, substantially as set forth.

3. In a combined liquid heater and cooler, the combination of a variable feeder, a sur-

face heater which receives the liquid from the feeder and heats the same, a receiver which is arranged below said heater and which is provided with means whereby the heated liquid is detained temporarily, and a surface cooler which is arranged below said receiver and which receives the heated liquid therefrom and cools the same, substantially as set forth.

4. The combination, with an apparatus for changing the temperature of a liquid, provided in its top with an upwardly-projecting head, of a frame provided with a central sleeve fitting over said pin and a feed-cup capable of vertical adjustment in said frame and provided with a discharge-orifice over said sleeve, substantially as set forth.

5. The combination, with an apparatus for changing the temperature of a liquid, having at its top a receiving-surface for the liquid, of a feed-cup provided with a discharge-orifice over said receiving-surface and with laterally-projecting arms and a supporting-frame surrounding the feed-cup and provided with inclined series of notches for engagement with said arms at different elevations, substantially as set forth.

6. The combination, with the heater, of a receiver arranged underneath the heater and provided with a central overflow and a cooler arranged underneath the receiver and receiving the liquid from said overflow, substantially as set forth.

7. The combination, with a heater and a cooler arranged below the same and connected therewith by a stem, of an annular receiver having its inner ring provided with internal centering projections around said stem, substantially as set forth.

8. The combination, with a heater and a cooler, of an intermediate annular receiver provided with an internal curtain which compels the heated liquid to pass to the bottom of the receiver before it can rise to the overflow, substantially as set forth.

9. The combination, with the annular receiver provided with a central overflow, of an internal curtain having feet by which its lower edge is supported above the bottom of the receiver, substantially as set forth.

10. The combination, with the heater having a depending flange secured to the periphery of the lower section thereof, of a receiver arranged below and around the lower section of the heater and a cooler which receives the heated liquid from the receiver, substantially as set forth.

Witness my hand this 6th day of September, 1890.

JOHAN LUDVIG JÖNSSON.

Witnesses:

E. F. CAASE,
STEN ERICSSON.