(No Model.)

O. ANDERSSON.

BUTTER MAKING MACHINE.

No. 456,529. Patented July 21, 1891.

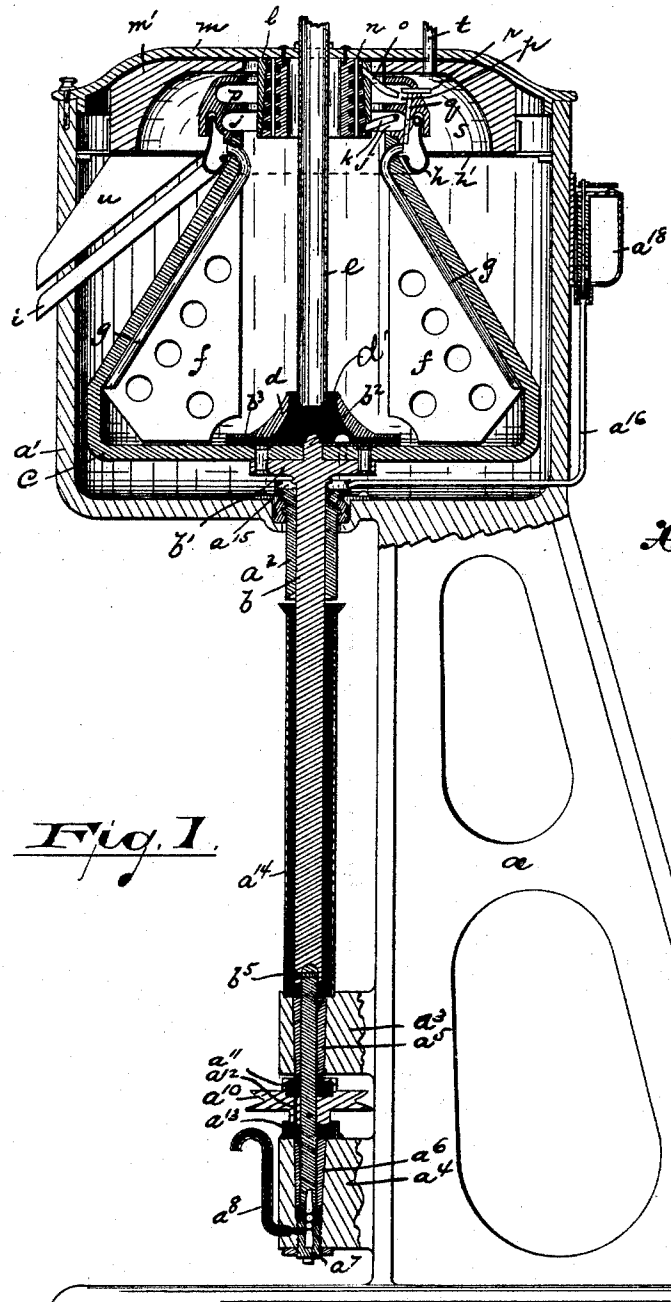


Fig. 1.

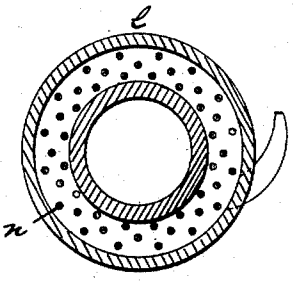


Fig. 2.

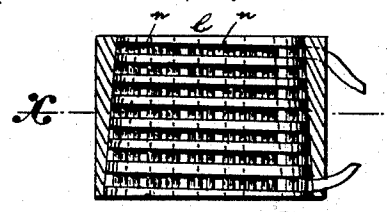


Fig. 3.

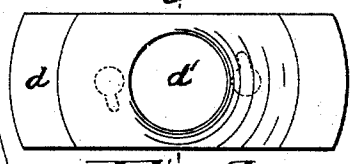


Fig. 4.



Fig. 5.

Witnesses

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UNITED STATES PATENT OFFICE.

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BUTTER-MAKING MACHINE.

SPECIFICATION forming part of Letters Patent No. 456,529, dated July 21, 1891.

Application filed October 10, 1890. Serial No. 367,683. (No model.)

To all whom it may concern:

Be it known that I, OSCAR ANDERSSON, a citizen of Sweden, residing at Newark, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Butter-Making Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

The object of this invention is to facilitate churning or separating the cream from the milk and the butter from the cream by a continuous process; and it consists in the improved butter-making apparatus having the arrangements and combinations of parts substantially as will be hereinafter set forth.

Referring to the accompanying drawings, in which like letters indicate corresponding parts in each of the several figures, Figure 1 is a central vertical section of the improved butter-making machine. Figs. 2 and 3 are horizontal and vertical sections showing in detail and on an enlarged scale a certain spiral chamber in which the butter is separated from the cream, the section of Fig. 2 being taken on line x; and Figs. 4 and 5 are a detail plan of a certain "spreader" and a section of the same on line y.

In said drawings, a indicates a bed casting or frame having at the top thereof a stationary bowl or tank a', having at its bottom a perforation in which a spindle-bearing a^2 is secured and through which a vertical spindle b extends to a rotary bowl c within said tank. The said spindle supports said bowl c and transmits motion thereto. At the lower part of said bed or frame are formed integral bearings a^3 a^4, in which separable tubular bearings a^5 a^6 are arranged, and in the lowest of said integral bearings is an adjustable cup-bearing a^7, screwed into the bottom of said bearing a^4 and providing a chamber in which a plurality of hardened steel balls are placed. On said balls the extremity of the spindle bears, as shown. The balls are arranged vertically one above another and are independently movable, whereby the friction on the spindle and said balls is greatly reduced and the wear distributed.

An oil-exit a^8 from the oil-chamber is provided, through which clean oil may have a free passage to a suitable receptacle, from which it may be poured into the reservoir a^{18}, hereinafter referred to.

Between the bearings a^3 a^4 is arranged the belt-pulley a^{10}, which is fastened upon and transmits motion to the spindle b, which in turn transmits it to the bowl c. The said pulley is of peculiar construction, in that it is provided with an oil-chamber a^{11}, provided with an oilway a^{12}, through which the oil may drop or fall into a chamber a^{13}, formed above the spindle-bearings a^4 a^6, from which chamber the said oil is free to gravitate and lubricate the bearings of the spindle and afterward fall into the chamber, from which the oil-exit a^8 leads. In the chamber a^{11} the oil is given a rapid rotary motion by the spindle, and as a result the heavier matters—such as metal wearings and dirt—are forced outward by centrifugal force and deposited against the sides of the chamber a^{11}, from which it may be removed from time to time. The oil is led into the chamber a^{13} by a downward extension of the pulley and into the chamber a^{11} by an extension of the bearing a^5, as will be evident.

Between the bearings a^3 a^2 the spindle is incased by a tubular jacket a^{14}, which conducts the lubricant from the upper to the lower bearing. At the top of the bearing a^3 is formed a cup a^{15}, into which the oil is led through a small tube a^{16} from the receptacle or reservoir a^{18}, formed or secured at the side of the frame or tank a' or other place or position in any suitable manner. The flow of lubricant from the said reservoir may be regulated or controlled by a valve.

At the top of the spindle b is formed a flat head b', on which the rotary bowl c is secured by rivets or similar means or devices, the said head being provided with a central conical projection b^2, which extends through the bottom wall or partition of the rotary bowl and serves as a starter in spreading the milk as it falls thereon. At the center of the bottom of the bowl is a separable receptacle d, having a central opening d' at the top to receive the milk-supply duct e and at the bottom

having radial openings b^3, through which the milk may flow under the influence of centrifugal force occasioned by the rapid rotation of the bowl. Said bowl is wide at the bottom and contracted at the top and is provided with wings f, by means of which the motion of the bowl is transmitted to the liquid contents thereof. The rapid rotation of the milk causes a separation of the cream from the skim-milk, and the latter being heavier is forced to the outside and through a tube or tubes g upward into an annular gutter or cup h, fixed upon a plate h' at the top of the tank. From the gutter h the skim-milk passes off through a chute or tube i from the machine. The cream passes upward on the inner surface of the skim-milk and into a chamber j, formed in a head fastened upon the rapidly-rotating bowl, where it is caught by a short tube k and directed into a spiral or helical chamber or duct l, formed in a sectional block fastened upon the cover m of the tank, the said helical chamber being stationary and the cream passing therethrough because of the force from behind. The said spiral chamber is broken in its course by pins n, Fig. 2, by which the flow of the cream is very much broken, and as a result the cream is churned and the butter separated from the buttermilk. After passing through the spiral chamber and being churned the butter and buttermilk are forced out through a tube o into an upper chamber p in the rotating head, where the two are separated because of the rotary motion communicated thereto, the heavier buttermilk forming an outer layer in said chamber and the butter an inner layer. The outer layer of buttermilk is caught by a tube q and is conducted downward and out into the gutter h, while the butter is caught by another tube r and conducted out into the butter-chamber s, formed above the plate h'.

The parts of the machine are made separable as far as possible to enable the machine to be readily cleaned, and to this end the spreader is held to the bottom of the bowl by a species of bayonet-joint, as illustrated in Fig. 4, and is thus readily removable therefrom, and the bowl and spindle may be lifted from their bearings by simply unkeying the pulley or disconnecting the spindle-sections at b^5. The spiral chamber is made in separable sections, and thus it may be readily cleansed.

A water-inlet t may be provided to supply water to the butter to wash the same, and a chute or exit-passage u leads the water and butter together from the chamber s, the water acting both to purify the butter and as a vehicle for conveying it from the chamber.

The cover may be provided with a wooden cover-lining m', on which the butter is thrown to secure a better granulation as it is forced from the rotating chamber p.

By the construction described the cream is extracted from the milk by centrifugal force; but the butter is extracted from the cream by a slower motion through a stationary chamber, and is thus given more time to form into appreciable lumps and is not beaten or formed into what may be termed an "emulsion."

Having thus described the invention, what I claim as new is—

1. The improved butter-making machine herein described, combining therein a centrifugal cream-separator consisting of a tank and rotary shaft and bowl for separating the cream from the skim-milk, a churn arranged at the top of said separator, a stationary cream-collector connected with the churn, said churn having means for forming the butter from said cream, and a rotary chamber to receive the butter and buttermilk from the churn and separate the two, substantially as set forth.

2. The improved butter-making machine herein described, combining with the rotary cream-separating bowl to separate the cream from the buttermilk by centrifugal force, a chamber at the top of said churn, a stationary churn arranged to receive the cream continuously from said chamber and form the butter therefrom, and a rotary chamber connected with said rotary bowl, receiving the butter and buttermilk from said churn and separating the same, whereby the butter may be collected and the buttermilk thrown off continuously, substantially as herein set forth.

3. The combination of the tank a', a rotary bowl having wings, a milk-supply e, exit g for the centrifugally-forced skim-milk, a rotary cream-chamber, a fixed churn having a tube extending into said cream-chamber, and a rotary chamber to receive the churned cream and separate the butter from the buttermilk by centrifugal force, substantially as set forth.

4. In a butter-making machine, the combination of the rotary bowl having a head with chambers p and j therein, a fixed block having spiral passages broken by pins, and tubular extensions thereof projecting into said chamber, and ducts q and r, leading from said chamber j, substantially as set forth.

5. In combination with the spindle, rotary bowl, and tank, a reservoir a^{18}, tube a^{16}, bearing a^2, jacket a^{14}, bearing a^5, pulley a^{10}, having chamber a^{11}, bearing a^6, having chamber a^{13} thereover, and exit a^8, all said parts being arranged and combined substantially as and for the purposes set forth.

6. In combination with a rotary spindle, a bowl stationed thereon broad at the bottom and contracted at the top, ducts for leading the buttermilk from the bowl, a head attached to the top of said bowl, provided with chambers p j, and a stationary churn made in sections and arranged to receive the cream from one chamber before and deliver it to the other after being churned, substantially as and for the purposes set forth.

7. In combination with the tank having a rotary bowl therein provided with chambers p and j, means for operating said bowl, a sup-

ply-duct *e* and a cover *m*, a stationary churn arranged on said cover to receive the cream from one chamber of said bowl and deliver it to another, and means for directing the cream from one of said chambers into the churn and directing it from thence into the other of said chambers, substantially as and for the purposes set forth.

8. In a butter-making machine, the combination of a tank having a cover, a spindle extending through the bottom of said tank and supporting a bowl, an annular gutter or trough fixed at the outside of said bowl and chutes for leading fluids therefrom, a chambered head fastened to the bowl, and a grooved block having the course of the fluid therethrough broken, as described, and ducts for leading the fluid from one of the chambers into said block and therefrom to the other chamber, and ducts for leading the butter to receptacles therefor, all said parts being arranged and combined substantially as and for the purposes set forth.

In testimony that I claim the foregoing I have hereunto set my hand this 7th day of October, 1890.

OSCAR ANDERSSON.

Witnesses:

CHARLES H. PELL,

OSCAR A. MICHEL.