No. 825,897. PATENTED JULY 17, 1906.

A. FAY.

BUTTER SEPARATOR.

APPLICATION FILED OCT. 10, 1904.

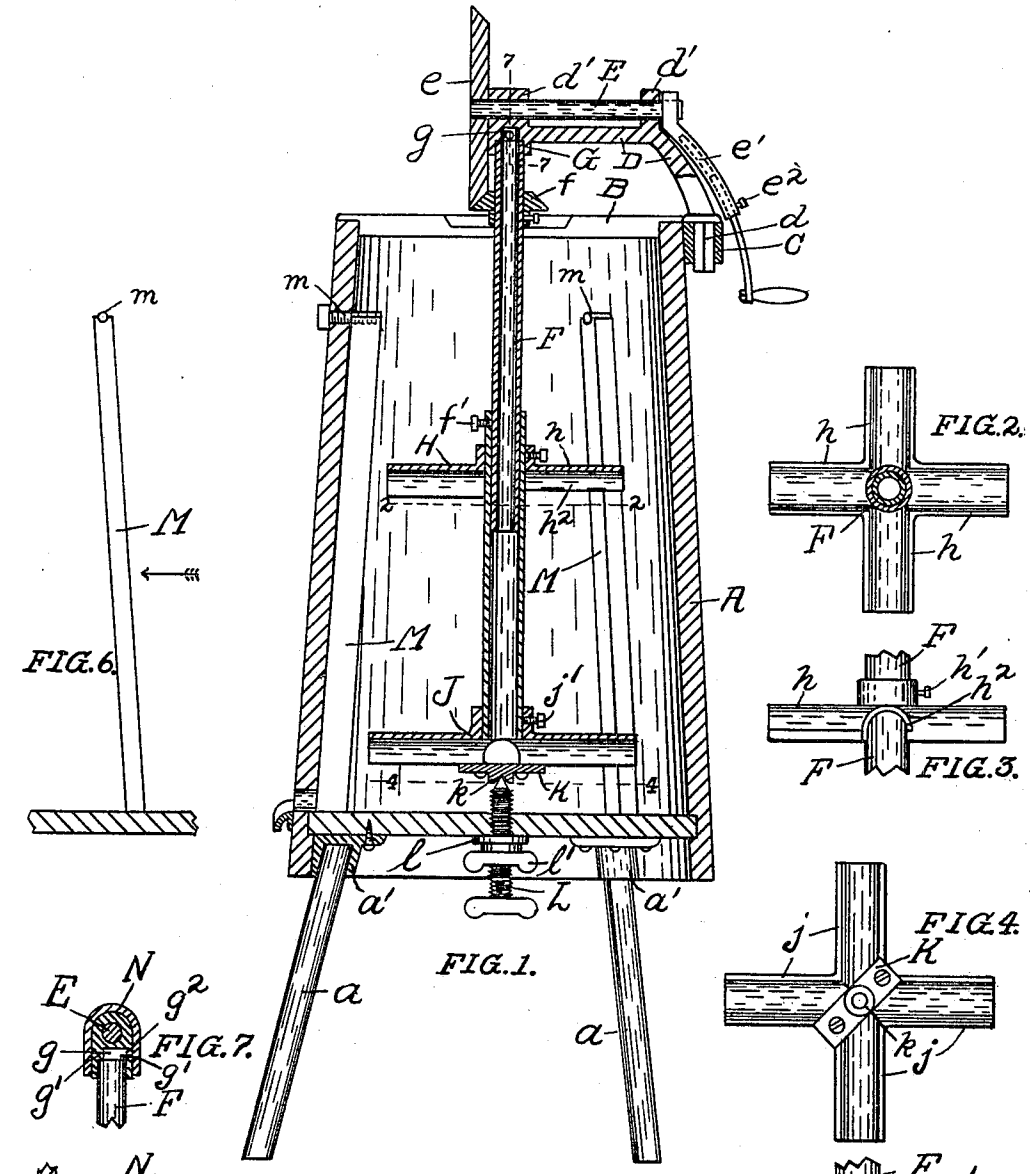

FIG. 1.

FIG. 6.

FIG. 2.

FIG. 3.

FIG. 4.

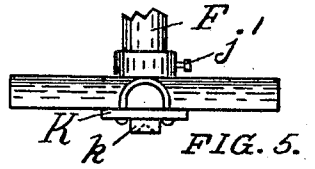

FIG. 5.

FIG. 7.

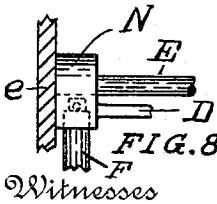

FIG. 8.

Witnesses

David McEvoy.

Agnes B. Gleason.

Inventor

Alpheus Fay

By Attorneys

Parkinson & Richards

UNITED STATES PATENT OFFICE.

ALPHEUS FAY, OF LOUISVILLE, KENTUCKY, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, OF TWO-THIRDS TO LEON L. SOLOMON, OF LOUISVILLE, KENTUCKY.

BUTTER-SEPARATOR.

No. 825,897. Specification of Letters Patent. Patented July 17, 1906.

Application filed October 10, 1904. Serial No. 227,875.

To all whom it may concern:

Be it known that I, ALPHEUS FAY, a citizen of the United States, residing at Louisville, in the county of Jefferson and State of Kentucky, have invented certain new and useful Improvements in Butter-Separators, of which the following is a specification.

The object of my invention is to provide improved means for extracting butter from sweet milk or cream by the introduction of air into the milk or cream during the process. The means employed for this purpose are simple and easy to operate and keep clean, readily taken apart and assembled, and easily packed for shipping and adjustable for easy running and for change in power or speed.

My invention consists in the combination and arrangements of parts hereinafter described and claimed.

In the drawings, Figure 1 is a sectional elevation of a separator embodying my invention; Fig. 2, a sectional bottom plan view on line 2 2 of Fig. 1; Fig. 3, an elevation of Fig. 2; Fig. 4, a sectional bottom plan view on line 4 4 of Fig. 1; Fig. 5, an elevation of Fig. 4; Fig. 6, an elevation showing the method of mounting the damming-strips on the interior wall of the separating-chamber; Fig. 7, a section on line 7 7 of Fig. 1, showing the cap for controlling the supply of air; and Fig. 8, a side elevation of Fig. 7.

The body A of the separator is of the ordinary upright type, provided with legs *a*, secured in sockets *a'* on the bottom thereof. An ordinary lid B, divided into two halves, is provided for closing the top of the separator. On the outside of the body at the top is secured a bracket C, having a vertical socket for the reception of a stem *d* on a bracket D. The stem *d* and its socket are preferably square in shape to keep the bracket D in position. The upper portion of bracket D is substantially horizontal and extends over the top of the separating-chamber, as shown. Lugs *d'* are provided on bracket D and bored to form bearings for shaft E, which carries beveled gear *e*, rigidly secured thereto. A crank-handle *e'* is secured to shaft E and is rendered adjustable in length by means of set-screw e^2. The beveled gear *e* meshes with a beveled gear *f* on a vertical hollow shaft F, which is rotatably mounted in the separator-chamber A and extends through a suitable opening in lid B. By mounting the gear *e* on the end of shaft E and the shaft F inside of gear *e* the connection between gears *e* and *f* is protected by gear *e* and the danger of the dress or fingers of the operator becoming entangled between said gears is obviated. At its upper end shaft F is given a rotatable bearing in a socket G on the under side of bracket D. The upper portion *g* of the socket G is made smaller than the lower portion to correspond with the bore in the upper portion of shaft F and to form an annular shoulder *g'*, against which the upper end of shaft F bears. A hole g^2 affords access of air to the upper end of the bore in shaft F. The shaft F is made in two telescoping parts secured together by means of set-screw *f'* and carries two agitators H and J, mounted near its middle and bottom, respectively. The agitator H consists of four channeled cross-arms *h*, made in one casting, as shown, and secured to shaft F by means of a set-screw *h'*. In order to increase the agitation caused by arms *h* as they revolve, I make the forward side h^2 of each channel shorter than the rearward side, so as to cause the milk or cream to enter the channels and be thrown out forcibly by the centrifugal force. The agitator J consists of four channeled cross-arms *j*, made in one casting, as shown, and secured to shaft F by set-screw *j'*. Both walls of the channels are made the same height, since in this case the shaft F does not extend below the agitator, so that the center portion of the agitator between the channels is open for access of milk or cream from below.

It will be noted that as agitator J is rotated the center portion of the channels remains practically stationary and without centrifugal force, so that the milk or cream is free to flow up into that portion of the channels. As the outer portions of the channels are traveling rapidly, the milk or cream therein is influenced strongly by the centrifugal force and forcibly expelled from the ends of the arms. The tendency to thus create a vacuum forces the milk or cream, which naturally rises at the center, out into the operative portions of the channels, whence it is forcibly discharged. Thus it will be seen that a constant and rapid flow is induced across the open lower end of shaft F, with the result that air is drawn from the bore thereof by

the friction of the passing fluid and introduced into the fluid. A bridge K, carrying a bearing-block *k*, is secured to agitator J, as shown, and a pointed set-screw L is mounted in the bottom of the chamber A in such position as to furnish a bearing for bearing-block *k*. Washer *l* and jam-nut *l'* prevent leaking around screw L and serve to secure it in any desired position. By this arrangement an adjustable bearing with a minimum of friction is obtained for the lower end of shaft F.

At intervals on the inner periphery of chamber A, I secure damming-strips M, which interfere with the continuous circular movement of the milk or cream and cause violent agitation thereof. These strips M have an upper bearing against pins or bolts *m* and a lower bearing against the bottom of the chamber A. The strips are made longer than the vertical distance from pins *m* to the bottom, so that to secure the strips in position all that is necessary is to engage the upper concave end with pin *m* while in an inclined position and force the lower end of the strip toward the vertical through the pin. As the strip is longer than the vertical distance from the pin to the chamber-bottom, it must jam between the two, and thus be locked in position. The strip is inclined toward the direction from which the milk or cream flows against it, so that the force of the flow tends to press the strip farther toward the vertical, and thus more securely lock it in position. The direction of flow of the milk or cream is indicated by the arrow in Fig. 6.

By making the shaft F in two telescoping sections I am enabled to adjust its length to obtain the proper relation between shafts E and F for the true engagement between gears *e* and *f* and can disconnect the two parts, so that they can be shipped within chamber A. Set-screw L, besides furnishing a practically frictionless bearing for the shaft F, permits delicate adjustments in the position thereof to insure the proper relation between shafts E and F. By adjusting the length of crank-handle *e'* different speeds and degrees of power may be imparted to shaft F.

I have learned from experience that in treating sweet milk or cream the introduction of air aids materially in the separation; but with sour cream the introduction of air is detrimental. I have therefore provided a cap N, adapted to fit over bracket D and close opening g^3 to exclude the air when desired.

While I have shown and described the preferred means for carrying my invention into effect, this is capable of variation without departing from the spirit of the invention. I therefore do not wish to be confined to the exact construction shown in the drawings; but

What I claim as new, and desire to secure by Letters Patent, is—

1. In a butter-separator, the combination of a separating-chamber; a hollow shaft, made in two telescoping sections adjustably secured together; a bearing-block carried by said shaft and provided with a conical bearing-recess; an adjustable set-screw mounted in the bottom of said chamber and provided with a conical point engaging the recess in said bearing-block; an agitator adjustably secured to said shaft at a distance above the bottom; an agitator at the bottom of said shaft and adapted to induce a flow of fluid across the lower end of the shaft, and means for rotating said shaft, substantially as specified.

2. In a butter-separator, the combination of a separating-chamber; a hollow shaft, made in two telescoping sections, adapted to be adjustably secured together and rotatably mounted in said chamber; means for rotating said shaft; an agitator on said shaft, at a distance above the bottom of said chamber, consisting of a plurality of radiating arms having channels open at the bottom, the forward wall of said channels being shorter than the rearward wall; and an agitator at the bottom of said shaft, consisting of a plurality of radiating arms having equal-walled channels open at the bottom and adapted to induce a flow of fluid across the lower end of said shaft, substantially as specified.

3. In a butter-separator, the combination of a separating-chamber; a hollow shaft, made in two telescoping sections adapted to be adjustably secured together; a bearing-block carried by said shaft and provided with a conical bearing-recess; an adjustable set-screw mounted in the bottom of said chamber and provided with a conical point engaging the conical recess in said bearing-block; means for rotating said shaft; an agitator on said shaft, at a distance above the bottom of said chamber, consisting of a plurality of radiating arms having channels open at the bottom, the forward wall of said channels being shorter than the rearward wall; and an agitator at the bottom of said shaft, consisting of a plurality of radiating arms having equal-walled channels open at the bottom and adapted to induce a flow of fluid across the lower end of said shaft, substantially as specified.

4. In a butter-separator, the combination of a separating-chamber; a hollow shaft, made in two telescoping sections adapted to be adjustably secured together; a bearing-block carried by said shaft and provided with a conical bearing-recess; an adjustable set-screw mounted in the bottom of said chamber and provided with a conical point engaging the conical recess in said bearing-block; a washer around said set-screw and bearing against the outside of the bottom of the chamber; a jam-nut on said set-screw bearing against said washer; means for rotating said shaft: an agitator on said shaft, at a dis-

tance above the bottom of said chamber, consisting of a plurality of radiating arms having channels open at the bottom, the forward wall of said channels being shorter than the rearward wall; and an agitator at the bottom of said shaft, consisting of a plurality of radiating arms having equal-walled channels open at the bottom and adapted to induce a flow of fluid across the lower end of said shaft, substantially as specified.

5. In a butter-separator, the combination of a separating-chamber; a hollow shaft, made in two telescoping sections adapted to be adjustably secured together and rotatably mounted in said chamber; a bracket mounted on said chamber; a shaft mounted in said bracket; an adjustable crank-handle for operating said last-named shaft; a beveled gear on said last-named shaft; a bearing in said bracket for said telescoping shaft, located inside of the beveled gear; a beveled gear on the telescoping shaft meshing with the first-named gear on the inside; an agitator on said telescoping shaft, at a distance above the bottom of said chamber, consisting of a plurality of radiating arms having channels open at the bottom, the forward wall of said channels being shorter than the rearward wall; and an agitator at the bottom of said telescoping shaft, consisting of a plurality of radiating arms having equal-walled channels open at the bottom and adapted to induce a flow of fluid across the lower end of said shaft, substantially as specified.

ALPHEUS FAY.

Witnesses:
HATTIE MARIE FAY,
W. E. DURVECK.