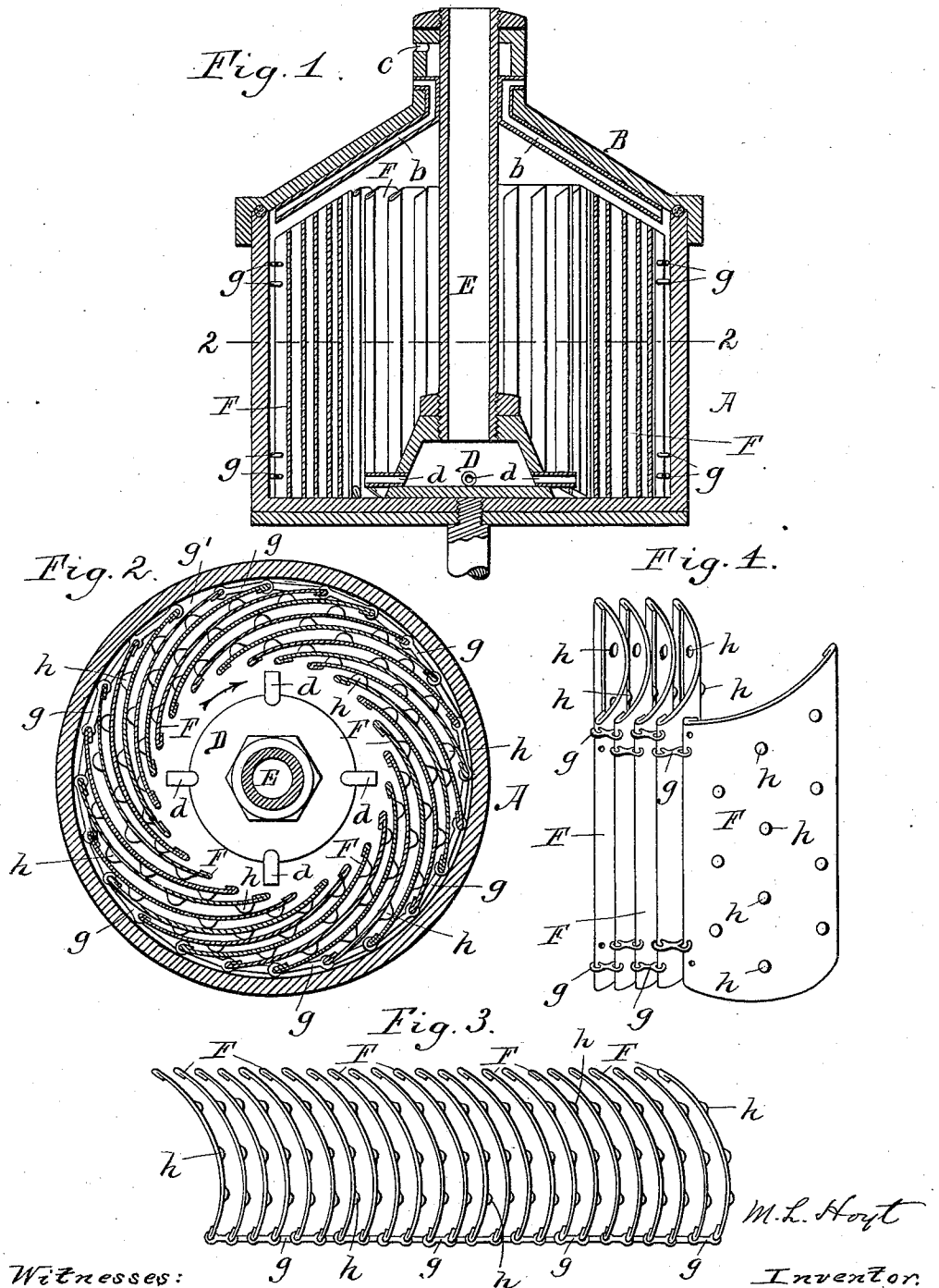


M. L. HOYT.
CENTRIFUGAL LIQUID SEPARATOR.

No. 574,607.

Patented Jan. 5, 1897.



Witnesses:

T. Spitzer, Wilhelm.

Chas. F. Burkhardt.

By: Wilhelm H. H. H.

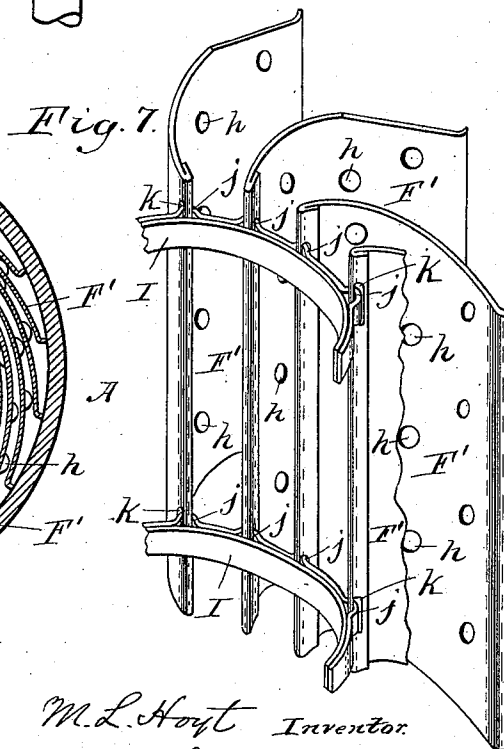
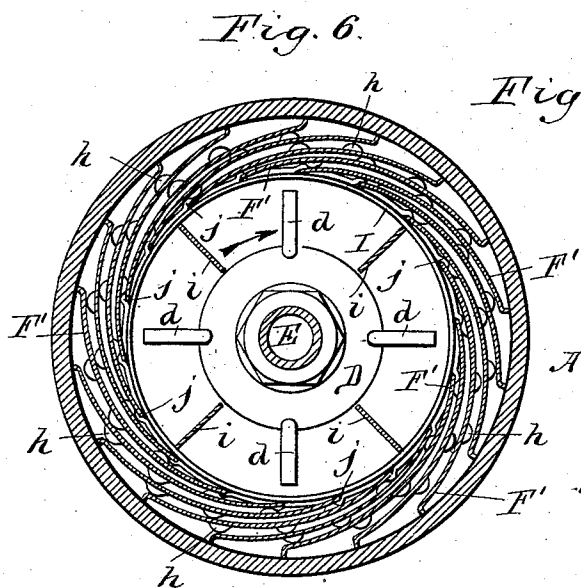
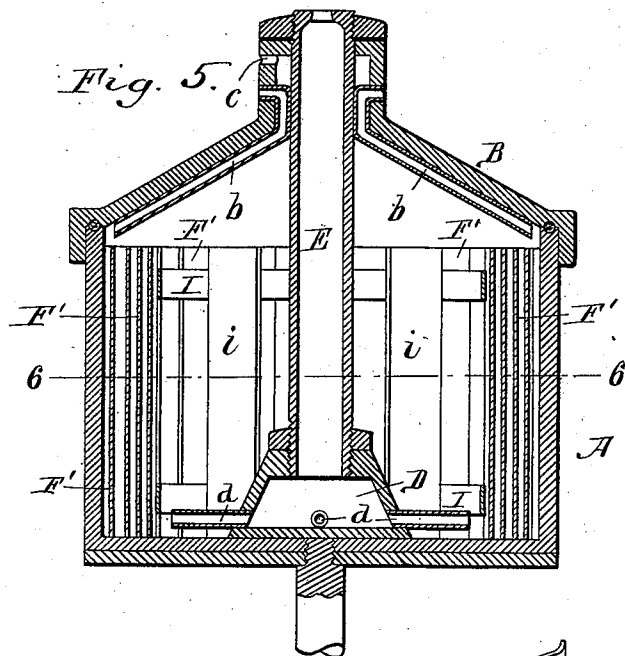
Inventor.

Attorneys.

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Attorneys.

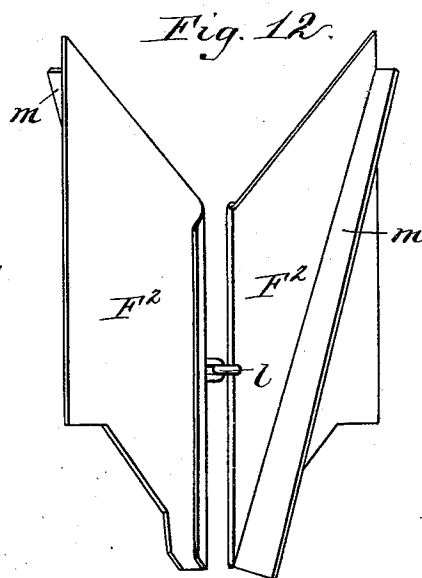
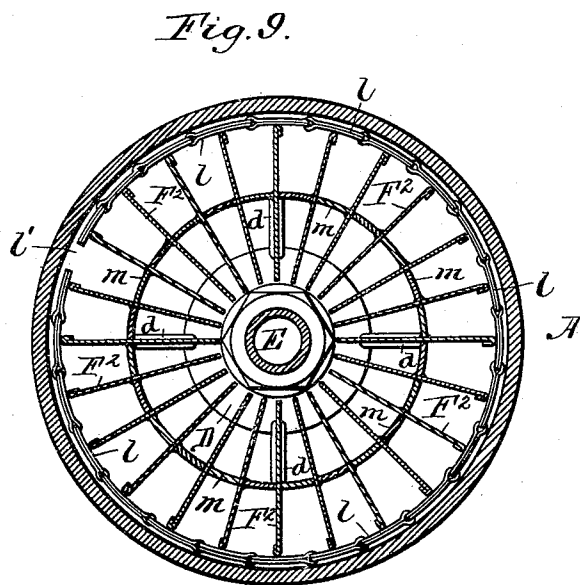
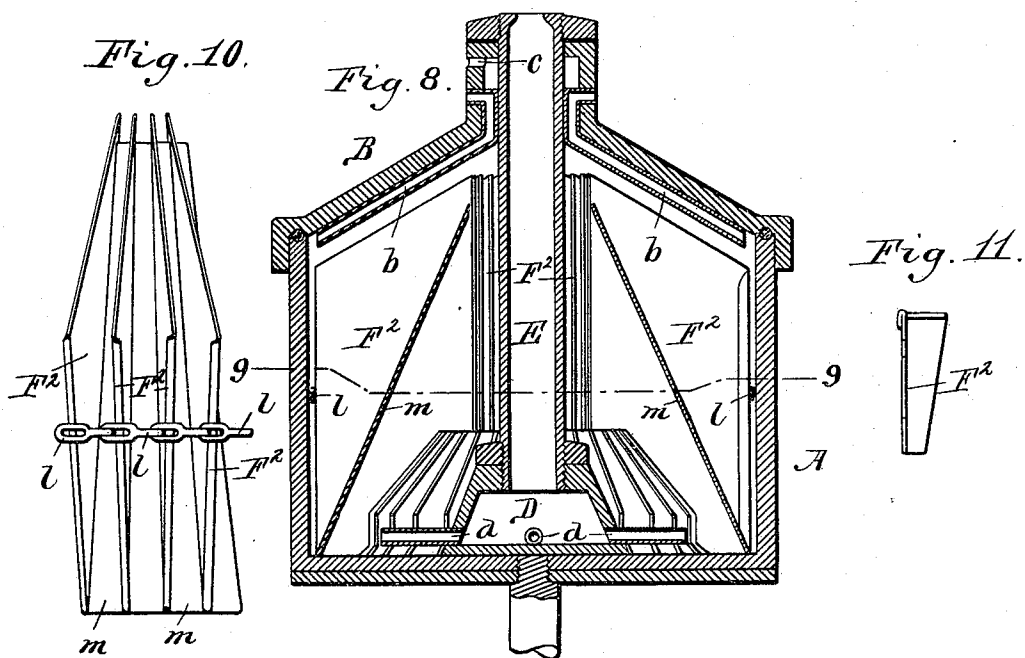
(No Model.)

3 Sheets—Sheet 3.

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Attorneys

UNITED STATES PATENT OFFICE.

MATTHEW L. HOYT, OF BIRCHTON, NEW YORK, ASSIGNOR TO D. H. BURRELL & CO., OF LITTLE FALLS, NEW YORK.

CENTRIFUGAL LIQUID-SEPARATOR.

SPECIFICATION forming part of Letters Patent No. 574,607, dated January 5, 1897.

Application filed October 23, 1894. Serial No. 526,705. (No model.)

To all whom it may concern:

Be it known that I, MATTHEW L. HOYT, a citizen of the United States, residing at Birchton, in the county of Saratoga and State of New York, have invented a new and useful Improvement in Centrifugal Liquid-Separators, of which the following is a specification.

This invention relates to the division contrivances which are used in the bowls of centrifugal liquid-separators, such as centrifugal creamers, for increasing the separating capacity of the bowl and for increasing the efficiency or closeness of the separation.

The object of my invention is to so construct the division contrivance that it can be readily inserted into the bowl and removed therefrom and that when it has been removed from the bowl its members or blades can be readily separated or spread out for cleaning the same without requiring the members or blades to be detached from each other.

In the accompanying drawings, consisting of three sheets, Figure 1 is a sectional elevation of a centrifugal liquid-separator provided with my improved division contrivance in which the members are composed of spiral upright blades which are movably connected at their outer edges. Fig. 2 is a horizontal section in line 2 2, Fig. 1. Fig. 3 is a top plan view, on a reduced scale, of the division contrivance removed from the bowl and spread out in a straight line. Fig. 4 is a perspective view of some of the blades of the division contrivance. Fig. 5 is a sectional elevation of a centrifugal liquid-separator provided with my improved division contrivance in which the members or blades are movably connected at their inner edges. Fig. 6 is a horizontal section in line 6 6, Fig. 5. Fig. 7 is a perspective view of some of the blades of this construction. Fig. 8 is a sectional elevation of a centrifugal liquid-separator provided with my improved division contrivance in which the members or blades are movably connected at their outer edges and provided with upwardly-tapering side flanges. Fig. 9 is a horizontal section in line 9 9, Fig. 8. Fig. 10 is a side elevation of some of these blades. Fig. 11 is a bottom plan view of one of these blades. Fig. 12 is a perspective view of some of these blades.

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

A represents the bowl of a centrifugal liquid-separator, which may be of any usual or suitable construction. As shown in the drawings, the bowl is provided with the usual removable cover B, which contains the skim-milk-escape pipes *b* and the cream-discharge *c*, and with a feed-cup D, having outwardly-projecting discharge-pipes *d*, and a central feed-pipe E.

F represents the members or blades of the division contrivance, which are arranged in the liquid-space of the bowl. These blades, as shown, are curved and are arranged eccentric around the axis of the bowl, preferably with their concave sides forwardly in the direction in which the bowl rotates, as indicated by the arrow in Fig. 2. Blades arranged in this manner intersect the radial lines of the bowl and greatly facilitate the separation of the compound liquid. While I prefer to employ curved blades, I do not wish to limit myself to the same, as other forms of blades which intersect the radial lines may be employed. These blades may rest directly upon the bottom of the bowl outside of the feed-cup, as represented in Fig. 1, and have their upper edges cut off obliquely to correspond with the taper of the cover. The blades are movably attached to each other at their outer or peripheral edges by suitable devices—for instance, by links *g*—so as to form a connected flexible row or series, as indicated in Fig. 3. The connection is broken between two of the blades, as at *g'*, so that the system of blades can be spread out when removed from the bowl, as represented in Fig. 3, or can be rolled up into cylindrical form for insertion in the bowl, as represented in Fig. 2. As the blades are movably connected each blade can be swung away from the adjoining blade on either side, as indicated in Fig. 4, when the system of blades has been removed from the bowl, so as to give ample room for cleaning each side of each blade, which would not be practicable if the blades were rigidly secured in their operative position, as the space between the adjoining blades is very narrow when the blades are in their operative position in the bowl.

In order to hold the blades at the proper distance apart when they are in their operative position in the bowl, each blade is provided on one side with spacing projections *h*.

5 These projections may be formed by indenting the blades when the latter are made of a material which permits of that operation—for instance, of tin—or they may be made separate and secured to the plates. Under the
10 strains resulting from centrifugal force the system of blades expands until the blades rest with their outer edges, or with the links connecting them at their outer edges, against the inner side of the bowl, whereby the blades
15 are supported against the strains resulting from centrifugal force. The inner and outer edges of the blades may be turned, rolled, or folded over, as indicated in Fig. 4, for strengthening the edges.

20 In the construction of my invention represented in Figs. 5, 6, and 7 the spiral blades *F'* are movably connected at their inner edges to horizontal rings or hoops *I*—for instance, by loops *j*—secured to the outer sides of the
25 rings and engaging in upright slots *k*, formed in the blades, near the inner edges thereof. In this construction each blade can be swung on its hinges to one side or the other when the system of blades is removed from the bowl, thereby affording free access to each side of
30 each blade for cleaning the same. The flexible connections of the blades with the rings also permits each blade, when in the bowl, to swing with its outer edge against the inner
35 side of the bowl under the pressure resulting from the centrifugal action, thereby supporting each blade against the bowl. The rings are preferably provided on their inner sides with radial plates *i* for compelling the liquid
40 within the system of blades to rotate with the bowl. In this construction the blades cannot be spread out in a straight row when the rings are continuous and rigid, as shown; but, if desired, each ring may be cut or divided and
45 made of flexible material.

In the construction of my improvement represented in Figs. 8, 9, 10, 11, and 12 the blades *F*² are arranged radially and are movably connected at their outer edges by links
50 *l*, the connection being broken between two of the blades, as at *l'*. Each radial blade is provided on one side with a laterally-projecting flange or strip *m*, which extends obliquely from the outer lower corner of each blade to
55 the inner upper corner thereof. These side flanges taper upwardly, so that when the system of blades is rolled up into cylindrical form these upwardly-tapering side flanges constitute together a cone which extends ob-
60 liquely through the liquid-space of the bowl, while the blades themselves stand radially in the liquid-space, partly outside and partly inside of the cone formed by the side flanges. The upper edges of the blades are preferably
65 cut off obliquely on their outer sides, as shown, to correspond with the tapering form of the cover, and their lower edges are cut

away on their inner sides to clear the feed-cup and its discharge-pipes. The side flanges serve not only to form a conical wall which
70 extends obliquely through the liquid-space of the bowl from the bottom toward the cream-discharge, but also serve as stops or spacing-ribs, which hold the blades at the proper distance apart when arranged in the bowl. 75

In the constructions represented in Figs. 1 to 7 the full milk enters the liquid space of the bowl at the bottom thereof and outside of the cream-wall. The milk passes into the spaces between the vertical spiral blades and
80 ascends between the blades. During this upward movement the cream is separated from the blue milk by the centrifugal action, the cream particles passing inwardly to the cream-wall or zone and the blue-milk particles out-
85 wardly into the zone adjacent to the inner side of the bowl. The separated cream and blue milk are discharged from the bowl in the usual manner.

In the construction represented in Figs. 8
90 to 12 the full milk enters the conical space within the oblique upwardly-tapering side flanges of the blades and is there subjected to centrifugal action, whereby the cream is separated from the blue milk, the cream particles moving inwardly to the cream-wall or
95 zone and the blue-milk particles moving outwardly against the inner sides of the side flanges, along which they move downwardly or to the large end of the conical inclosure
100 formed by these flanges. The blue-milk particles pass around the lower edges of these side flanges into the outer space of the bowl, in which they are subjected to a further separation, the cream particles moving inwardly
105 against the outer sides of the side flanges and following the latter upwardly, while the blue-milk particles are driven into the outer zone of the liquid and flow along the inner surface of the bowl upwardly to the skim-milk-dis-
110 charge pipes.

I claim as my invention—

1. The combination with the bowl of a centrifugal liquid-separator, of a division contrivance arranged within the liquid-space of
115 the bowl and consisting of a circumferential series of upright division-blades which are loosely connected with each other and capable of swinging out and supporting themselves at their outer edges against the peripheral wall
120 of the bowl, substantially as set forth.

2. The combination with the bowl of a centrifugal separator, of an expansible division contrivance consisting of a series or row of
125 division-blades connected with each other by movable joints, the ends of the series being disconnected from each other, whereby the series of blades can be arranged in the bowl circumferentially or in a circular form and can support themselves against the inner side
130 of the bowl, substantially as set forth.

3. The combination with the bowl of a centrifugal liquid-separator, of a division contrivance arranged within the liquid-space of

the bowl and consisting of a series or row of upright division-blades which intersect the radial lines of the bowl and which are connected with each other by movable joints, substantially as set forth.

4. The combination with the bowl of a centrifugal liquid-separator, of a division contrivance arranged within the liquid-space of the bowl and consisting of a series or row of upright division-blades which intersect the radial lines of the bowl and which are provided with spacing projections and are connected with each other by movable joints, substantially as set forth.

5. The combination with the bowl of a cen-

trifugal liquid-separator, of a division contrivance arranged within the liquid-space of the bowl and consisting of a series or row of upright division-blades which intersect the radial lines of the bowl and links which connect the upright edges of adjacent blades at one side of the series or row of blades, substantially as set forth.

Witness my hand this 15th day of October, 1894.

MATTHEW L. HOYT.

Witnesses:

EDWIN B. QUACKENBUSH,
SAMUEL S. NEWTON.