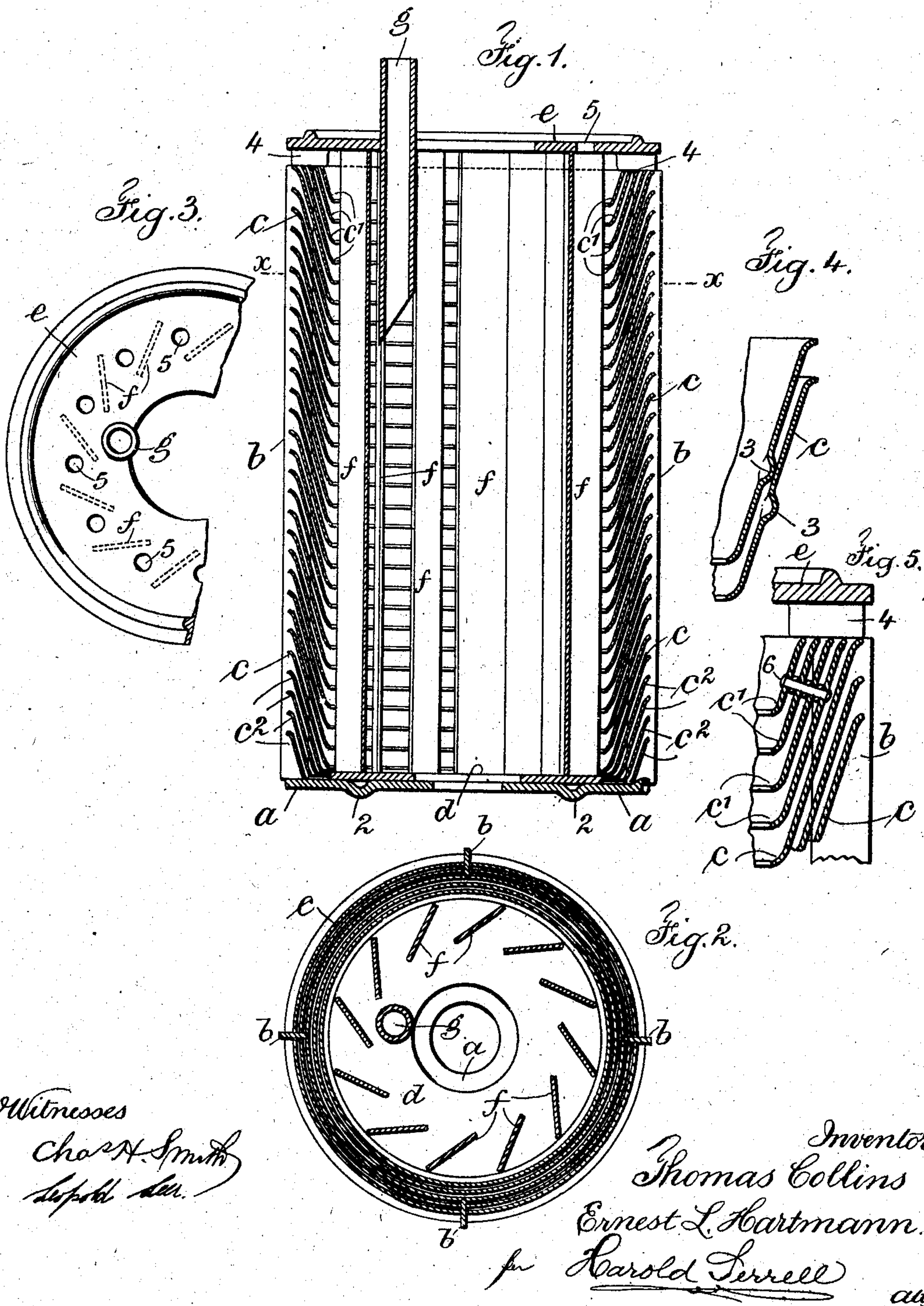


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T. COLLINS & E. L. HARTMANN.
CENTRIFUGAL LIQUID SEPARATOR.

APPLICATION FILED FEB. 27, 1905.



Witnesses

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CENTRIFUGAL LIQUID-SEPARATOR.

No. 796,190.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that we, THOMAS COLLINS and ERNEST LOUIS HARTMANN, citizens of the United States, residing at Bainbridge, in the county of Chenango and State of New York, have invented an Improvement in Centrifugal Liquid-Separators, of which the following is a specification.

Our invention relates to improvements in centrifugal liquid-separators, with the object of more quickly and effectively acting upon the liquid to separate the same into its constituents.

In centrifugal separators as heretofore constructed, with a liner of a series of superimposed or nested plates, and as shown and described in our application of even date herewith, these plates have all been of the same width in cross-section. Consequently above and below said series of plates there have been annular apertures of triangular transverse area unavailable in the operation of the centrifugal separator.

In carrying out our invention we employ series of gradually-narrowing annulus plates, preferably both above and within and also below and outside of the series of full-width plates, which augment the active surfaces effective in the separation of the liquid into its constituents.

In the drawings, Figure 1 is a vertical section and elevation of the liner and the inner member of a centrifugal liquid-separator, showing the features of our improvement. Fig. 2 is a cross-section of the same on the dotted line $x x$ of Fig. 1. Fig. 3 is a partial plan of the parts shown in Fig. 1. Fig. 4 is a vertical cross-section in large size, showing two of the superimposed or nested annulus plates and the devices for separating the one from the other; and Fig. 5 is a cross-section in larger size of a series of gradually-narrowing annulus plates.

In the drawings we have not shown the bowl, the cover, or the bolt, as the same are not essential.

The liner comprises the lower apertured disk-base a , preferably having depressions in the upper surface which form projections 2 on the under surface and serve to raise the disk-base off the bottom of the bowl. The vertical radial bars b are secured at their lower ends in a spaced-apart relation to the disk-base a ,

and the series of superimposed or nested annulus plates c are notched to receive the said bars b , and they are soldered thereto, so as to form a smooth and liquid-tight union. These annulus plates c are provided with means for separating the same and maintaining them at a predetermined distance apart, which means are preferably the separating projections 3. (Shown plainly in Fig. 4.)

c' represents four parallel annulus plates set at a predetermined distance from one another, agreeing with the predetermined distance of the plates c , and which are of varying width and all of which are narrower than the plates c and which occupy the triangular transverse area below the upper edge of the uppermost annulus plate c and within its inner lower edge. c'' represents four parallel annulus plates below and outside of the lowermost full-size annulus plate c , substantially filling the triangular transverse area directly above the apertured disk-base a , bounded by the same and by the lowermost plate c . It will be apparent that these plates increase the available effective surfaces of the annulus plates in separating the liquid into its constituents, because the narrower or uppermost plate c' is immediately in position for use for the incoming milk or liquid through the perforations 5 of the annulus disk e , while the plates c' at the lower end increase to the same extent the available surfaces of the plates for the final separation of the liquid into its constituents.

In the drawings we have shown the inner member as of the same construction as described and shown in our application of even date herewith and consisting of the bottom annulus disk d , adapted to pass freely down within the annulus plates c and c' , the top annulus disk e , and the intermediate blades f , which in cross-section are set obliquely to radial lines from the axial center of the separator and which are preferably placed vertically, although we do not limit ourselves in this respect.

The disk e is shown as provided with lugs 4 on the under surface, adapted to bear on top of the bars b or the upper edges of the plates $c c'$, so as to raise the disk e an appreciable distance above the plates. Said disk is also provided with the perforations 5 between the blades f and through which the liquid to be separated into its constituents passes to come in contact

with the surfaces of the blades, and g is a cream-discharge tube placed vertically with an inclined lower end and secured to the disk e .

In the operation of the device the milk or other liquid to be separated is delivered upon the disk e , passes through the perforations 5, and by the centrifugal motion onto the surfaces of the blades f , from there to the upper and inner surfaces first of the plates c' and then of the plates c , the principal separation of the liquid into its constituents being effected near the upper end of the bowl by the combined action of the blades f , the plates c' , and the uppermost of the plates c , the lower plates c and the lower outer plates c^2 effecting the final separation and the short plates c' and c^2 combining with the long plates c to increase the efficiency of the apparatus to a marked degree, insuring not only the most perfect separation of the liquid into its constituents, but a separation because of the increased area available in the shortest space of time.

The outermost of the annulus plates c^2 is at its lower edge preferably securely connected by solder to the upper surface of the disk-base a , and the respective lower edges of the series of annulus plates c^2 are at an acute angle to the plane of the disk-base a , or, in other words, progressively increase in their distance therefrom.

Fig. 5, illustrating a cross-section in larger size of a series of gradually-narrowing annulus plates, shows that they are preferably connected by one or more rivets 6, because the shorter of the annulus plates are away from contact with the bars b , while the outer portions of the longer plates are connected by solder to the vertical radial bars b .

We claim as our invention—

1. In a centrifugal liquid-separator, a liner comprising a series of similar spaced-apart nested annulus inclined plates, a support for the same and a series of annulus plates gradually narrowing in width and parallel with said series of plates and at one end thereof.

2. In a centrifugal liquid-separator, a liner comprising a series of similar spaced-apart, nested annulus inclined plates, a support for the same and a series of annulus plates gradually narrowing in width and parallel with said series of plates and at the respective ends thereof.

3. In a centrifugal liquid-separator, a liner comprising a series of similar spaced-apart nested annulus plates inclined downward toward the axis of the liner, a support for the same, and series of gradually-narrowing annulus plates parallel therewith, in one set above and within the liner and in another set below and outside of the main series of plates.

4. In a centrifugal liquid-separator, a liner comprising a series of similar spaced-apart nested annulus plates inclined downward toward the axis of the liner, a support for the

same, series of gradually-narrowing annulus plates parallel therewith, in one set above and within the liner and in another set below and outside of the main series of plates, the outer plate of the lower series being soldered at its lower edge to the support.

5. In a centrifugal liquid-separator, a liner comprising a series of spaced-apart nested annulus inclined plates, a support for the same and a series of gradually-narrowing annulus plates parallel therewith and at one end thereof, in combination with an inner member having a top disk extending over the liner and having lugs on its under side adapted to rest upon the top edges of the series of plates and raise the said disk above the same to provide a space for the separating action of the machine.

6. In a centrifugal liquid-separator, a liner comprising a series of spaced-apart nested annulus plates of equal width and inclined downward toward the axis of the liner, means for connecting and for supporting the same, a series of gradually-narrowing annulus plates parallel with one another and with the aforesaid series of annulus plates and at one end thereof, the upper edges of said narrowing annulus plates being on a level and the inner edges in the same vertical plane with the edges of the main series of plates.

7. In a centrifugal liquid-separator, a liner comprising a series of spaced-apart nested annulus plates of equal width and inclined downward toward the axis of the liner, means for connecting and for supporting the same, a series of gradually-narrowing annulus plates parallel with one another and with the aforesaid series of annulus plates and at one end thereof, the upper edges of said narrowing annulus plates being on a level and the inner edges in the same vertical plane with the edges of the main series of plates, and a second set of gradually-narrowing annulus plates below and outside of the main series of annulus plates with the outer edges of said plates in the same vertical plane with the outer edges of the main series of plates, and the inner edges at an acute angle to the plane of the supporting device of said main series of plates.

8. In a centrifugal liquid-separator, a liner comprising a main series of spaced-apart nested annulus inclined plates, a support for the same and a series of gradually narrowing annulus plates parallel therewith and below and outside of the main series of plates, the lower edges of said plates progressing downward toward the outer plate.

Signed by us this 21st day of February, 1905.

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