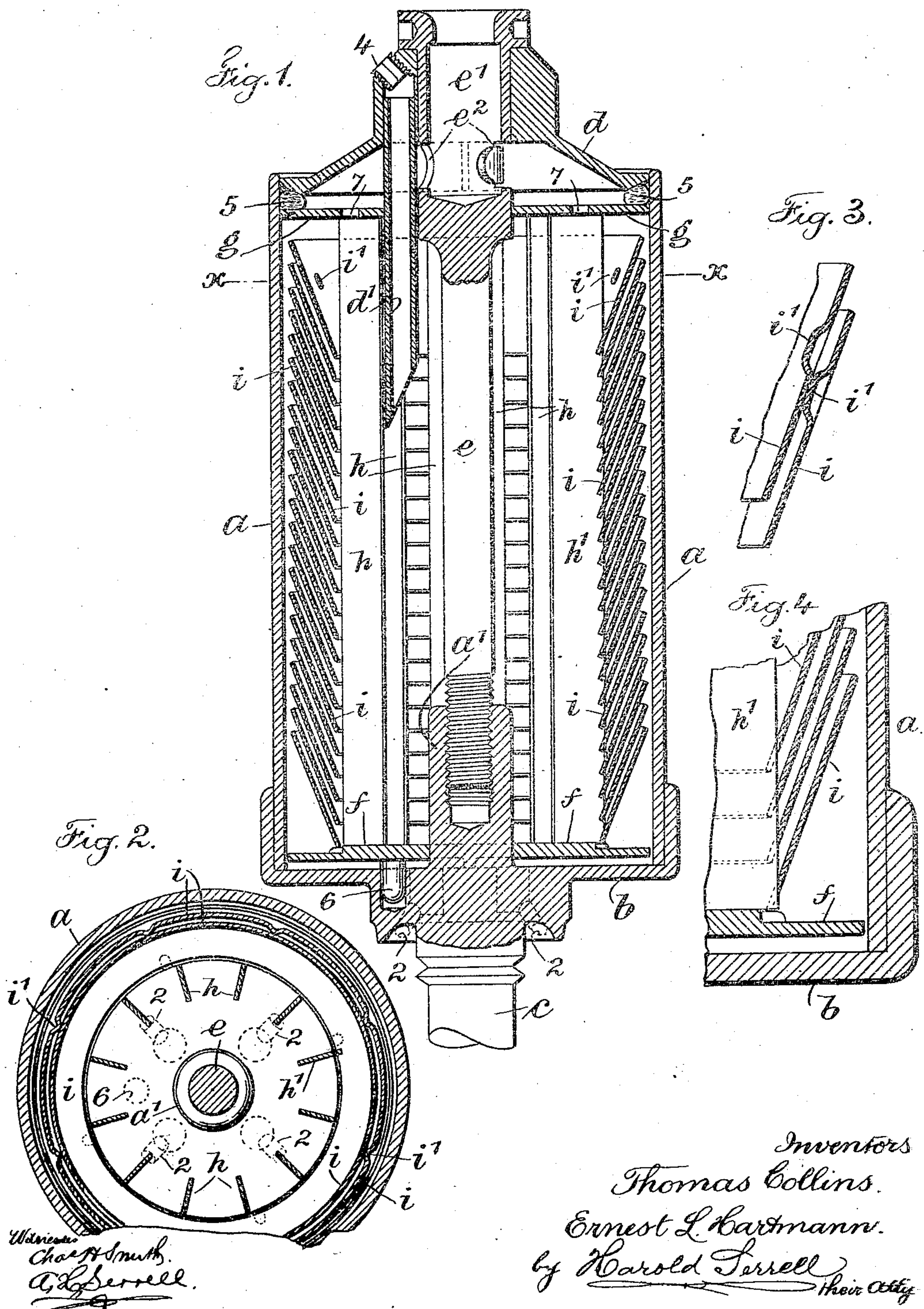


T. COLLINS & E. L. HARTMANN.
CENTRIFUGAL LIQUID SEPARATOR.
APPLICATION FILED AUG. 6, 1908.

944,321.

Patented Dec. 28, 1909.



UNITED STATES PATENT OFFICE.

THOMAS COLLINS AND ERNEST LOUIS HARTMANN, OF BAINBRIDGE, NEW YORK, ASSIGNORS TO AMERICAN SEPARATOR COMPANY, OF BAINBRIDGE, NEW YORK, A CORPORATION OF NEW YORK.

CENTRIFUGAL LIQUID-SEPARATOR.

944,321.

Specification of Letters Patent.

Patented Dec. 28, 1909.

Application filed August 6, 1908. Serial No. 447,276.

To all whom it may concern:

Be it known that we, THOMAS COLLINS and ERNEST LOUIS HARTMANN, both citizens of the United States, and residents of 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 is an improvement upon the devices shown and described in Letters Patent granted to us August 1st, 1905, No. 796,189 and No. 796,190, and the object of our invention is the production of a device more readily cleansed after use than either of the devices of said patents or those heretofore known to us. In said devices, the series of superposed nested annulus plates or rings forming part of the liner were soldered to ribs, which with the top and bottom annulus disks, constituted the liner. It has been very difficult to cleanse the liner, because these nested annulus plates were close together and were fixed in their position. The liner also has heretofore been made with parts which were separable for cleansing and were securely clamped for use,—but in this instance, it has been difficult to get the separated rings back in order and so prevent disturbing the balance of the machine. In the device of our invention, the conical superposed nested annulus plates or rings are mounted around the members of a centering cage, composed of a series of vertical bars and end annulus disks and said plates or rings are movable along said bars between said disks to a limited extent, so that any two of said plates or rings can be separated an appreciable distance for cleansing. These annulus plates or rings cannot rotate around said bars as they are each provided with a peripheral notch receiving the edge of one of said bars which projects slightly farther from the center of the cage than the rest. In use, the centrifugal action upon said loosely mounted nested annulus plates or rings is to keep them down in position without any motion. In the carrying out of our improvement, the said bars with the end annulus disks forming the cage, may be arranged radially to the axis of the cage or obliquely across radial lines, as shown and described in our aforesaid Letters Patent.

In the drawing, Figure 1 is a vertical

section and partial elevation representing the device of our invention. Fig. 2 is a sectional plan on the dotted line x, x , Fig. 1. Fig. 3 is a vertical section in enlarged size through two of the superposed or nested annulus plates, showing the means of separation, and Fig. 4 is a vertical section in enlarged size at the lower right hand corner of the device showing the means for preventing the rotation of the nested annulus plates.

The bowl structure preferably comprises the cylindrical portion a , its base b and spindle c , the bowl being revolved by the spindle at a high speed and by suitable means employed in this art. In the base of the bowl are ducts 2 of any desired number and size for the delivery of the blue milk.

A cover d is provided for the bowl, having a central aperture and in which an adjustable cream plug 4 is suitably placed, the cover being apertured below the cream plug to receive the cream tube d' which enters this aperture at the pleasure of the manufacturer, either being fastened to the cover or else to a part of the cage hereinafter described. The cover fits within the bowl and above a packing 5. A bolt e passes through the central aperture of the cover and down into the bowl and engages an interiorly threaded boss a' provided therefor, when the cover is in place, securing it and the liner hereinafter described, in position within the bowl.

The upper end of the bolt at e' is tubular with side discharge apertures e^2 , the milk to be treated being introduced into the centrifugal liquid separator through the tubular upper end of the bolt to be discharged into the bowl through the side apertures e^2 . A packing 5 comes beneath the periphery of the cover and between the same and the top of the liner. The liner comprises in part the base annulus disk f , the top annulus disk g and series of vertically arranged bars h . These last are reduced at their respective ends by preference, and pass through openings in the base and top annulus disks, to which they are securely riveted.

We have shown a pin 6 as connected to and depending from the base annulus disk f and adapted to enter an opening provided therefor in the base b of the bowl, the said base annulus disk passing over the boss a' in the

base of the bowl. The top annulus disk *g*, as is usual in these devices, is provided with a series of perforations 7, through which the milk as delivered on to the top annulus disk from the side discharge aperture *e*² passes through the disk *g* to the nested annulus plates or rings below for treatment.

It will be noticed from Figs. 1, 2 and 4 of the drawing, that the outer edges of all but one of the series of radially disposed bars *h* are at the same distance from the center or vertical axis of the centrifugal liquid separator. There is however, a bar *h'* forming one of the circularly arranged series, the outer edge of which projects beyond the concentric line of the other bars. This is shown particularly in Figs. 1 and 4.

i represents the superposed annulus nested plates or rings, the lower edges of which are of a less diameter than the upper edges; in other words,—these plates are outwardly flared from the lower end upward and they fit around the series of bars *h*. Each one is notched in the lower edge and receives the outer edge of the bar *h'*, the said bar *h'* locking them in position to the extent of overcoming any tendency to rotate. Each of these plates or rings *i* is provided with separating projections *i'*.

In our former patents we have provided the nested annulus plates or rings that are superposed, with separating projections which in each of the rings or plates extends from the inside outward. In the present invention however, we prefer these projections to extend from the outside inward and have so shown them, although we do not limit our invention in this respect.

We have shown in the present case, series of bars *h h'* as arranged on radial lines from the vertical axis of the centrifugal liquid separator. In our former patents hereinbefore referred to, these bars are shown as arranged obliquely to and crossing radial lines, but we do not limit our invention in this respect, as said bars may be arranged upon lines that are radial to the axis or obliquely across radial lines, as is shown in our aforesaid Letters Patent. In our present invention, while the superposed nested annulus plates or rings cannot revolve around the cage composed of the disks *f* and *g* and the bars *h* and *h'*, still said plates or rings *i* are free to be moved longitudinally of said bars *h h'* and are not in any sense of the word, soldered or fixed or held in position. Any number of these annulus plates or rings may be moved so as to open up a gap between two adjacent plates or rings and this may be done at any point in the ring of the liner, as it will be noticed from the drawing Fig. 1, that there is an appreciable gap between the upper edge of the uppermost plates or recesses and the under surface of the top disk *g* and this space is

the measure of movement imparted to any number or all of said nested plates or disks with the object of thoroughly washing and cleansing the same in any manner practiced in this art and to do the same thoroughly, whereas heretofore it has been a very difficult operation to cleanse the liner, because the nested plates or disks were not only close together but were securely held in position so as not to be in any sense of the word movable. As hereinbefore stated, we are aware of an instance where these nested annulus plates or disks were entirely removable and separable from one another and their holding cage, the same being clamped together for use, but in this case it has been difficult to get the spaced rings back in order so as not to disturb the balance of the machine.

We claim as our invention:

1. In a centrifugal liquid separator, a liner comprising rigidly connected end and intermediate members, and a series of loosely mounted nested conical liner plates or rings located between said end members and movable with said connected members.

2. In a centrifugal liquid separator, a liner comprising rigidly connected end and intermediate members, a series of loosely mounted nested conical liner plates or rings located between said end members and movable with the said connected members, and means for preventing the rotation of said conical plates or rings which at the same time permits a free longitudinal movement thereof.

3. In a centrifugal liquid separator, the combination with the bowl, the cover and a connecting bolt, of a liner comprising base and top annulus disks, a series of vertically arranged bars at their respective ends rigidly connected to the base and top annulus disks, a series of superposed nested annulus plates or rings surrounding the vertically arranged bars loosely and movable along the same to facilitate the cleansing of the liner and means for initially spacing apart the said annulus plates or rings a predetermined distance.

4. In a centrifugal liquid separator, the combination with the bowl, the cover and a connecting bolt, of a liner comprising base and top annulus disks, a series of vertically arranged bars at their respective ends rigidly connected to the base and top annulus disks, a series of superposed nested annulus plates or rings surrounding the vertically arranged bars loosely and movable along the same to facilitate the cleansing of the liner, and means for preventing said annulus plates or rings turning around on said bars.

5. In a centrifugal liquid separator, the combination with the bowl, the cover and a connecting bolt, of a liner comprising base and top annulus disks, a series of vertically

arranged bars at their respective ends connected to the base and top annulus disks, and the outer edge of one of said bars reaching a radius beyond the radius of the other bars and a series of superposed nested annulus plates or rings surrounding said bars and each notched to receive the outer edge of the aforesaid bar, whereby while said nested annulus plates are free to be moved along said bars, they are prevented by said outer edge and notch from rotating.

6. In a centrifugal liquid separator, the combination with the bowl, of a substantially inseparable rigidly connected group of members removable as a unit from the bowl and comprising end annulus disks, intermediate bars secured at their ends thereto and series of superposed nested annulus plates freely surrounding said bars and movable over the same between the end annulus disks which form stops therefor.

7. A liner for centrifugal liquid separa-

tors, comprising a series of circularly arranged bars, annulus disk members at the respective ends thereof rigidly secured thereto and the same forming a unitary centering cage, and a series of nested annulus plates mounted around and movable lengthwise of said bars.

8. A liner for centrifugal liquid separators, comprising a series of radially disposed circularly arranged bars, annulus disk members at the respective ends thereof rigidly secured thereto and the same forming a unitary centering cage, and a series of conical superposed nested annulus plates loosely mounted around and movable lengthwise of said bars.

Signed by us this 31st day of July 1908.

THOMAS COLLINS.

ERNEST LOUIS HARTMANN.

Witnesses:

EDSON C. BURDICK,

EARL A. WESTCOTT.