No. 622,393. Patented Apr. 4, 1899.

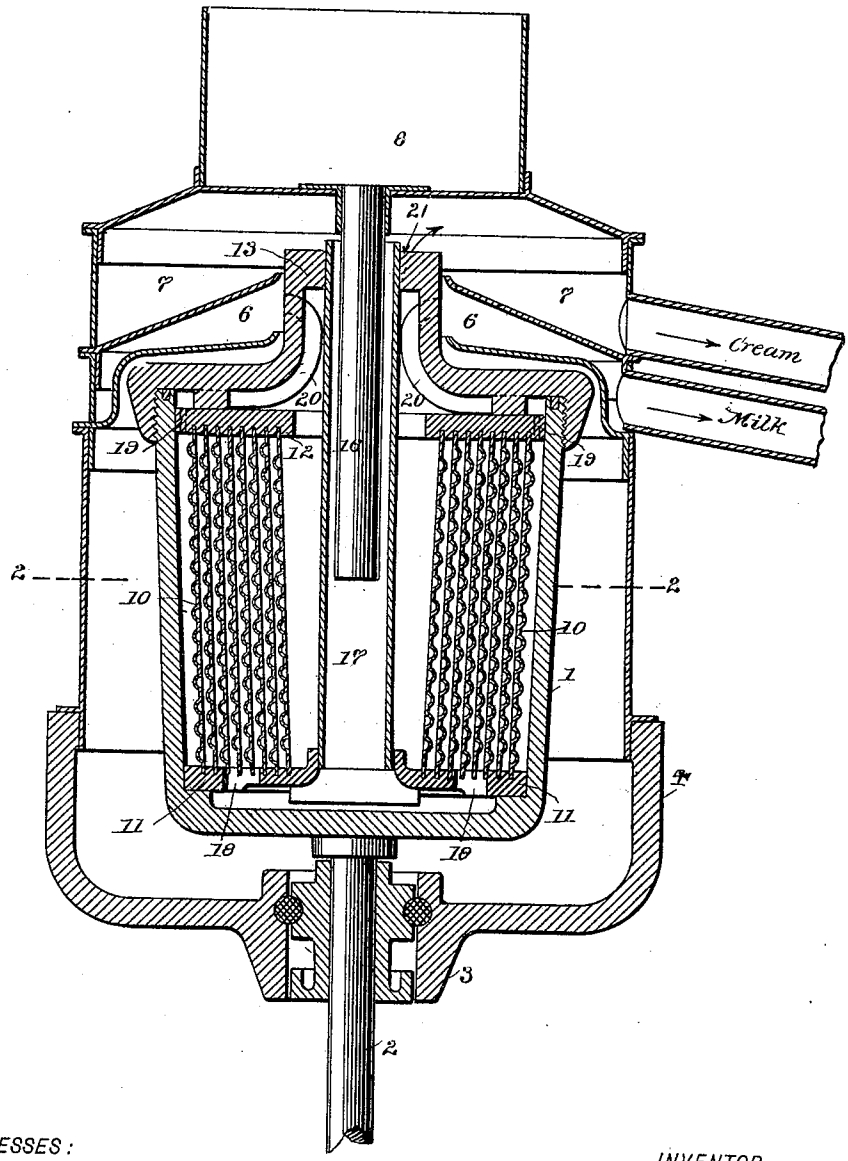
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CENTRIFUGAL CREAM SEPARATOR.

(Application filed Feb. 4, 1898.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.



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(No Model.) 2 Sheets—Sheet 2.

Fig. 3.

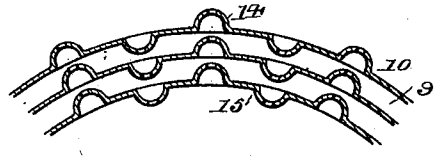


Fig. 2.

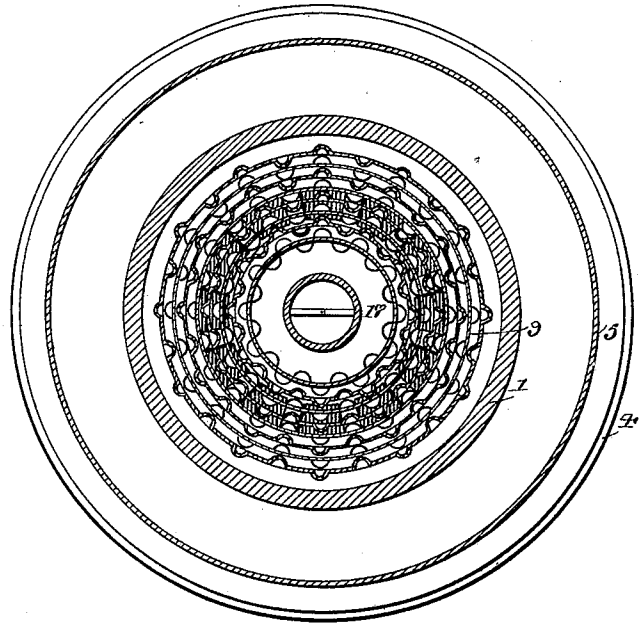
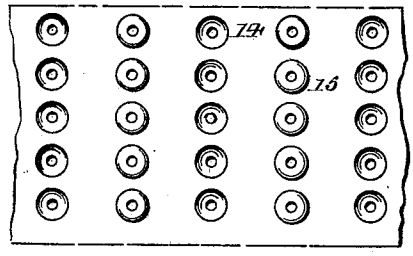


Fig. 4.



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UNITED STATES PATENT OFFICE.

ALBAN H. REID, OF PHILADELPHIA, PENNSYLVANIA.

CENTRIFUGAL CREAM-SEPARATOR.

SPECIFICATION forming part of Letters Patent No. 622,393, dated April 4, 1899.

Application filed February 4, 1898. Serial No. 669,067. (No model.)

To all whom it may concern:

Be it known that I, ALBAN H. REID, of Philadelphia, county of Philadelphia, and State of Pennsylvania, have invented a new and useful Improvement in Centrifugal Separators, of which the following is a specification.

This invention relates to a centrifugal separator designed more particularly for separating cream from blue milk; and it consists in an improved construction having in view the rapid, effective, and thorough separation of these elements.

The invention also consists in the details of construction and combination of parts hereinafter described and claimed.

In the accompanying drawings, Figure 1 is a vertical central section, part in elevation, of my improved apparatus. Fig. 2 is a horizontal section on the line 2 2 of Fig. 1. Fig. 3 is a horizontal section, on an enlarged scale, of a portion of three adjacent separating-cylinders. Fig. 4 is a view, in the nature of a development, of a section of one of the separating-cylinders.

Referring to the drawings, 1 represents a rotary separating-bowl fixed on the upper end of a driving-shaft 2, driven in any suitable manner, and revolving near its upper end in a bearing 3, sustained by a fixed frame 4. This is surmounted by a casing 5, inclosing the bowl and provided with an annular blue-milk-discharge chamber 6, an annular cream-discharge chamber 7 above the milk-chamber, and a milk-supply reservoir 8.

The annular space within the bowl beyond the cream-wall is divided into a series of concentric vertical spaces 9, formed by a series of concentric separating cylinders or partitions 10, seated at their lower ends in grooves in a ring-plate 11, fixed a slight distance above the bottom of the bowl. The upper ends of the partitions are seated in concentric grooves in the under face of a ring-plate 12, fixed within the bowl near its upper end, the bowl above this plate being contracted in the form of a neck 13. These cylinders or partitions are preferably formed of sheet metal, and each is formed with a series of hollow protuberances 14 and 15, projecting from the opposite faces of the partition alternately outward and inward, respectively, as clearly shown in Fig. 3, and each protuberance is provided with an opening for the passage of the blue milk and cream, respectively. The partitions are so arranged that the outwardly and inwardly extending protuberances will extend in lines radiating from the center of the bowl, the result being that a series of radial alternate outwardly and inwardly extending passages are formed, through which the blue milk and cream will flow, respectively, outward and inward. The size of the protuberances and arrangement of the cylinders are such that the former will extend through the spaces 9 between the cylinders, the apex of each protuberance terminating at the open base of the adjacent one, the result being that these protuberances will form, in fact, practically continuous radial passages leading in the opposite directions, the outwardly-extending protuberances communicating directly with the outer side of the space 9 and the inwardly-extending protuberances communicating directly with the inner side of the space 9.

The bowl being supplied in the manner presently to be described with the milk to be separated and it being rapidly revolved, the blue milk, owing to its greater specific gravity, will by centrifugal action arrange itself along the outer side of each space 9 between the partitions and will cause the cream to occupy the inner side of the spaces. The milk thus arranged will find an exit through the outwardly-extending protuberances and will flow outward in radial lines through these protuberances and through the spaces between the cylinders. The cream, on the other hand, will flow inwardly and find an exit in the opposite direction toward the center of the bowl through the inwardly-extending protuberances and will flow in radial lines through these protuberances to the inner portion of the bowl.

It will be seen that owing to the fact that the protuberances extend wholly, or substantially so, through the spaces between the partitions there will be no liability of the blue milk and cream mixing in these spaces, the protuberances forming practically continuous passages through the spaces, and the result will be a rapid and thorough separation of the blue milk and cream, the former flowing at once to the outer side of the bowl and the latter to the inner portion or cream-wall.

The milk to be separated is supplied to the wall in the spaces between the partitions from the reservoir S and flows downward through a vertical central pipe 16, terminating about midway of the length of the bowl. From this pipe the milk flows into a surrounding tube 17, fixed to the inner edge of the ring-plate 11 and communicating with the space between said ring-plate and the bottom of the bowl. The upper end of this tube terminates at the top of the neck of the bowl. The ring-plate is formed with a series of openings 18, forming a communication between the space beneath the ring-plate and the space between the partitions, and the milk from the central tube 17 will flow through these openings and fill the spaces between the partitions. The separated blue milk after flowing outward, as described, through the outwardly-extending protuberances enters the annular space adjacent to the wall of the bowl and flows upward through openings 19 in the upper ring-plate and in pipes 20, extending upward and outward through the neck of the bowl and discharges into the annular milk-chamber before alluded to. The cream flowing inward occupies the space inward of the inner cylinder and flows upward around the tube 17 and issues through openings 21 in the neck of the bowl into the annular cream-chamber.

In the operation of the apparatus the prime milk from the reservoir is allowed to flow upward in the spaces between the partitions until the spaces are filled, when motion is imparted to the bowl to cause the separation of the blue milk and cream, and the supply of whole milk is then regulated according to the rapidity with which the separation is effected. It is seen, therefore, that the milk to be separated is first divided in its prime condition into a series of concentric layers between the partitions and that on the rotation of the bowl the separation of each layer takes place independently, the separation in this manner being more quickly and thoroughly effected than if the entire contents of the bowl were treated as a whole.

By the expression "concentric spaces" in the specification and claims is not necessarily meant spaces with a common center, but any arrangement where the spaces surround each other, whether parallel or not.

I propose to form the separating cylinders or partitions greatest in diameter at their upper ends, which will facilitate their assemblage one within the other.

Having thus described my invention, what I claim is—

1. In a centrifugal separator a rotary separating-bowl having a series of partitions fixed therein forming concentric spaces, said partitions each provided with outwardly and inwardly extending protuberances projecting through or nearly through the spaces between the partitions and formed with openings for the passage of the milk and cream respectively.

2. In a centrifugal separator a rotary bowl having a series of partitions fixed therein forming concentric spaces, said partitions each provided with hollow protuberances extending alternately outward and inward through the spaces between the partitions and having openings for the passage of the milk and cream respectively, and the apex of each protuberance terminating adjacent to the open base of the next protuberance.

In testimony whereof I hereunto set my hand, this 27th day of January, 1898, in the presence of two attesting witnesses.

ALBAN H. REID.

Witnesses:

EDWARD H. JACOB,

WM. E. ANDERSON.