

UNITED STATES PATENT OFFICE.

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SCOTLAND.

CENTRIFUGAL CREAMER.

SPECIFICATION forming part of Letters Patent No. 646,182, dated March 27, 1900.

Application filed July 20, 1896. Serial No. 599,903. (No model.)

To all whom it may concern:

Be it known that we, JOHN LAIDLAW, engineer, and JAMES WRIGHT MACFARLANE, manager, residing in the city of Glasgow, Scotland, have invented certain new and useful Improvements in Centrifugal Machines for Separating Fluids of Different Densities, of which the following is a specification.

Our invention relates to improvements in apparatus for separating fluids of different specific gravities by centrifugal action, and is more particularly applicable to the separation of cream from milk, and has for its object not only to simplify and cheaper the construction, but to give greater milk-space.

Our invention also relates particularly to improvements on that form of centrifugal machine which is shown and described in United States Letters Patent No. 591,770, granted to John Laidlaw and bearing date October 12, 1897, which comprises a drum, an annular liner located within the drum, so as to leave an annular space between the walls of the liner and the drum, and radial vanes and a cone provided with lateral holes and located within the central opening of the liner.

Our invention consists in substituting for the former annular liner another construction of liner, which increases the capacity of the machine, as hereinafter described and claimed.

In carrying our invention into practice by preference we stamp out from sheets of tin, copper, or other suitable metal circular sectional flat plates, each formed with a large central opening and having grooves or channels forming horizontal involute curved passages or ducts extending from the central opening to the circumference, so shaped that when they are built up in series and consolidated or joined together, so as to form a complete annulus or annular liner, (which is effected by being placed in a bath of molten tin or other metal or alloy or by being bolted or otherwise connected,) the horizontal involute passages or ducts for the milk in the liner are curved to the radius, so that each passage or duct shall form a complete involute curve and lie parallel to each other, or the stamped

plates may be placed one upon the other and held together by the pressure of the drum-cover or other suitable means, and in order to obviate any difficulty in having the plates thus arranged, coming together in the exact manner necessary to leave the passage between them, a thin disk or sheet of metal may be interposed between each plate, which will have the further advantage of subdividing the passages or ducts longitudinally, and thus affording more surface in contact with the milk, which assists the removal of the cream.

In order that our invention may be properly understood and readily carried into effect, we have hereunto appended an explanatory sheet of drawings, which we will now proceed to describe.

Figure 1 is a vertical axial section of a centrifugal drum and annular liner. Fig. 2 is a horizontal section taken on the line V W, Fig. 1. Fig. 3 is a section taken on the line X Y, Fig. 2, drawn to an enlarged scale. Fig. 4 is a section taken on the line X Y, Fig. 2, drawn to an enlarged scale and showing a modification of the construction of the sectional plates. Fig. 5 is a section taken on the line X Y, Fig. 2, drawn to an enlarged scale and showing a further modification of the sectional plates. Figs. 6 and 7 are modifications of the construction shown in Figs. 4 and 5, respectively.

A is the vertical drum, and B is the annular liner, having a large central opening and which, as will be seen from Fig. 3, is made up of circular, sectional, flat, grooved, or channeled plates C, which when sweated with tin or otherwise joined together form the lateral passages or ducts D, each constituting an involute curve from the radius extending from the central opening to the circumference, by which the milk is divided into small quantities. Y Y' is the generating-circle from which the involutes are drawn. X Y is the tangent to that circle, intersecting the involute curves at right angles.

Referring to Figs. 4 and 5, E are disks or sheets of metal which may be interposed between the sectional plates C for the purpose already referred to. Although these figures

show the passages in the same relation as in Fig. 3, it will be seen that the sectional plates do not necessarily require to be placed with grooves corresponding, so long as the disk is

5 between them, as in Figs. 6 and 7.

F is a cone having lateral holes f and central opening f' , and V are radial vanes located within the central opening of the annular liner.

10 Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is—

1. A centrifugal machine for separating liquids of different densities comprising a drum, an annular liner built up of sectional flat plates having a large central opening and grooves or channels forming horizontal passages or ducts extending from the central

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opening to the circumference of the liner and providing complete involute curves to the radius, and the radial vanes, and the cone provided with holes and a central passage and

located within the central opening of the liner, substantially as described.

2. A centrifugal machine for separating liquids of different densities comprising a drum, an annular liner built up of sectional flat plates, having a large central opening and grooves or channels forming horizontal passages or ducts extending from the central opening to the circumference of the liner and providing complete involute curves to the radius, the plain disks located between the plates; and the radial vanes, and a cone provided with holes and a central passage and located within the central opening of the liner; substantially as described.

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In testimony whereof we have signed our names to this specification in the presence of two witnesses.

JOHN LAIDLAW.

JAMES WRIGHT MACFARLANE.

Witnesses:

JOHN LIDDLE,

JOSEPH HENRY PEARSON.