

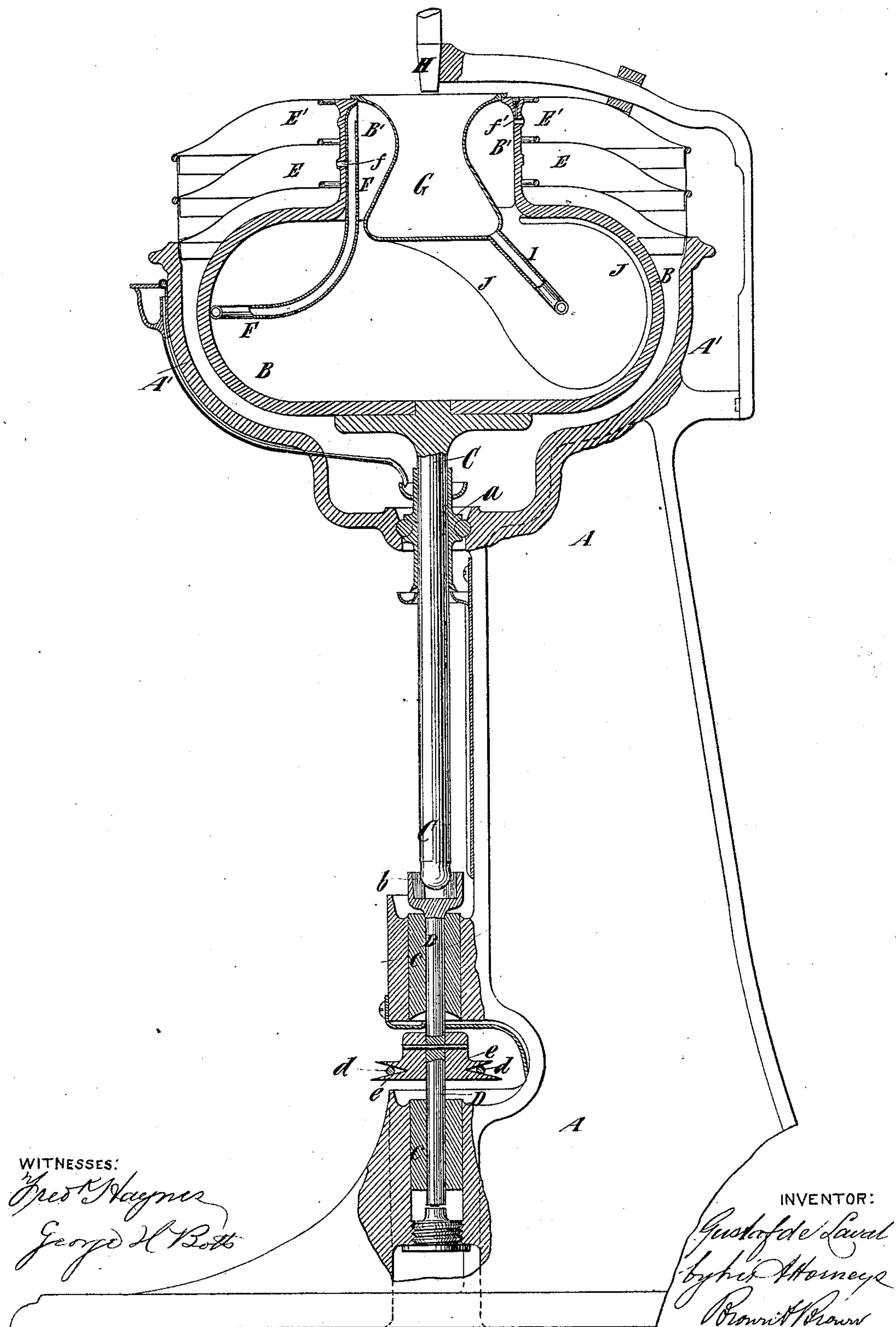
(No Model.)

G. DE LAVAL.

APPARATUS FOR SEPARATING FLUIDS.

No. 249,731.

Patented Nov. 15, 1881.



UNITED STATES PATENT OFFICE.

GUSTAF DE LAVAL, OF STOCKHOLM, SWEDEN.

APPARATUS FOR SEPARATING FLUIDS.

SPECIFICATION forming part of Letters Patent No. 249,731, dated November 15, 1881.

Application filed August 26, 1881. (No model.)

To all whom it may concern:

Be it known that I, GUSTAF DE LAVAL, of Stockholm, in the Kingdom of Sweden, have invented certain new and useful Improvements in Apparatus for Separating Fluids of Different Specific Gravities, of which the following is a specification.

My invention relates to apparatus in which the mixed fluids to be separated are introduced into a rotary centrifugal chamber or drum, in which the two or more fluids composing the mixed fluid are separated from each other by centrifugal force, and are delivered through separate discharge nozzles or pipes.

The object of my invention is to provide a machine of very simple construction, which may be readily cleaned without the necessity of unscrewing bolts and nuts, and as such machines are largely used for creaming milk, facility for cleaning is of great importance.

The invention consists, essentially, in the combination, with a hollow centrifugal chamber adapted to rotate about a vertical axis and having an upward prolongation or neck, of a supply-reservoir supported in said prolongation or neck, and a blade extending from said reservoir into and nearly to the periphery of said chamber, whereby the mixed fluid introduced into the chamber from the supply-reservoir is caused to rotate positively with said chamber.

It also consists in details of construction and combinations of parts hereinafter described.

The accompanying drawing represents a central vertical section of my improved apparatus.

A designates a vertical column or frame, provided with a broad base or foot and surmounted by a hemispherical basin or shell, A'.

B designates a hollow chamber adapted to rotate rapidly in said basin or shell A', and fixed upon a vertical shaft, C. The shaft C is mounted in a bearing, a, near its upper end, and its lower end, which is rounded or hemispherical in shape, fits in a socket, b, upon the upper end of a driving-shaft, D, which is mounted in bearings c, and may be rotated by a belt or band, d, passing around a pulley, e, thereon. The weight of the chamber B and the shaft C throw considerable weight upon the socket b, and while the driving-shaft D is rotated positively the shaft C is rotated through

its frictional contact with the said socket. The chamber B has at its upper side or end a cylindrical prolongation or neck, B', which is concentric with the axis of rotation of the said chamber, and has in it two discharge-openings, f f', which communicate respectively with annular receptacles E E', arranged one above another around the neck B', and supported on the basin or shell A'.

F designates a pipe leading from near the internal periphery of the chamber B to the prolongation or neck B', to the side of which it is secured, and which communicates with the outlet-opening f. As here shown, said pipe is prolonged slightly above the opening f, and both ends thereof are open, so that any suitable device may be shoved through the pipe from end to end for cleaning it thoroughly.

G designates a supply-reservoir which is arranged in the neck or prolongation, and which laps over and is supported by the upper end thereof. This reservoir is supplied with the mixed fluid to be separated through a pipe, H, and extending therefrom down into and out toward the periphery of the chamber B is a pipe, I, through which the fluid enters said chamber. The said reservoir G is also provided, in proximity to the pipe I, with a radial blade, J, which extends down into the chamber B and outward nearly to the periphery thereof, and said blade is very advantageous, because it causes the fluid in the chamber to rotate more positively with the latter, and thus facilitates the separation of the mixed fluid into its component fluids. The blade J is permanently attached to the reservoir G; but it is not attached in any way to the chamber B, although it rests against the lower portion of the prolongation or neck B' at one point, to steady it.

In the operation of my invention the mixed fluid—such as milk—is allowed to flow from the pipe H into the reservoir, and thence through the pipe I into the chamber B, while the latter is rapidly rotated. The milk is separated into skim-milk and cream, the former of which, being the heavier, goes to the extreme internal periphery of the chamber, while the latter, being lighter, is nearer the center thereof. As the supply of liquid to the chamber is augmented the skim-milk is forced through

the pipe F and opening *f* into the receptacle, E, for skim-milk, while the cream is forced upward through the prolongation or neck B' and flows through the opening *f'* into the receptacle, E', for cream.

The reservoir G may be removed and very readily cleaned, together with the tube I and blade J, and the large prolongation or neck B' affords great facility for cleaning the chamber B.

My improved apparatus can be readily cleaned without removing or unscrewing bolts or nuts, and hence is particularly desirable for creaming milk, in which operation cleanliness is of the utmost importance.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In a centrifugal fluid-separator, the combination of a hollow centrifugal chamber adapted to rotate about a vertical axis, and having an upward prolongation or neck, a supply-reservoir for fluid, supported in said prolonga-

tion or neck, and a blade extending from said supply-reservoir into and nearly to the periphery of said chamber, substantially as and for the purpose specified.

2. The combination, with the hollow centrifugal chamber B, having the prolongation or neck B', of the central reservoir, G, the blade J, and the inlet-pipe I, substantially as specified.

3. The combination of the chamber B and its neck or prolongation B', with discharge-openings *f f'*, the supply-reservoir G, with its blade J and supply tube or pipe I, the annular receptacles E E', and the pipe F, substantially as described, and as illustrated in the accompanying drawing.

GUSTAF DE LAVAL.

Witnesses:

F. ENGEL,

F. CLAIRMONT.