

(No Model.)

C. D. HELLSTRÖM.

PROCESS OF SEPARATING FATS FROM EMULSIONS.

No. 436,133.

Patented Sept. 9, 1890.

Fig. 1.

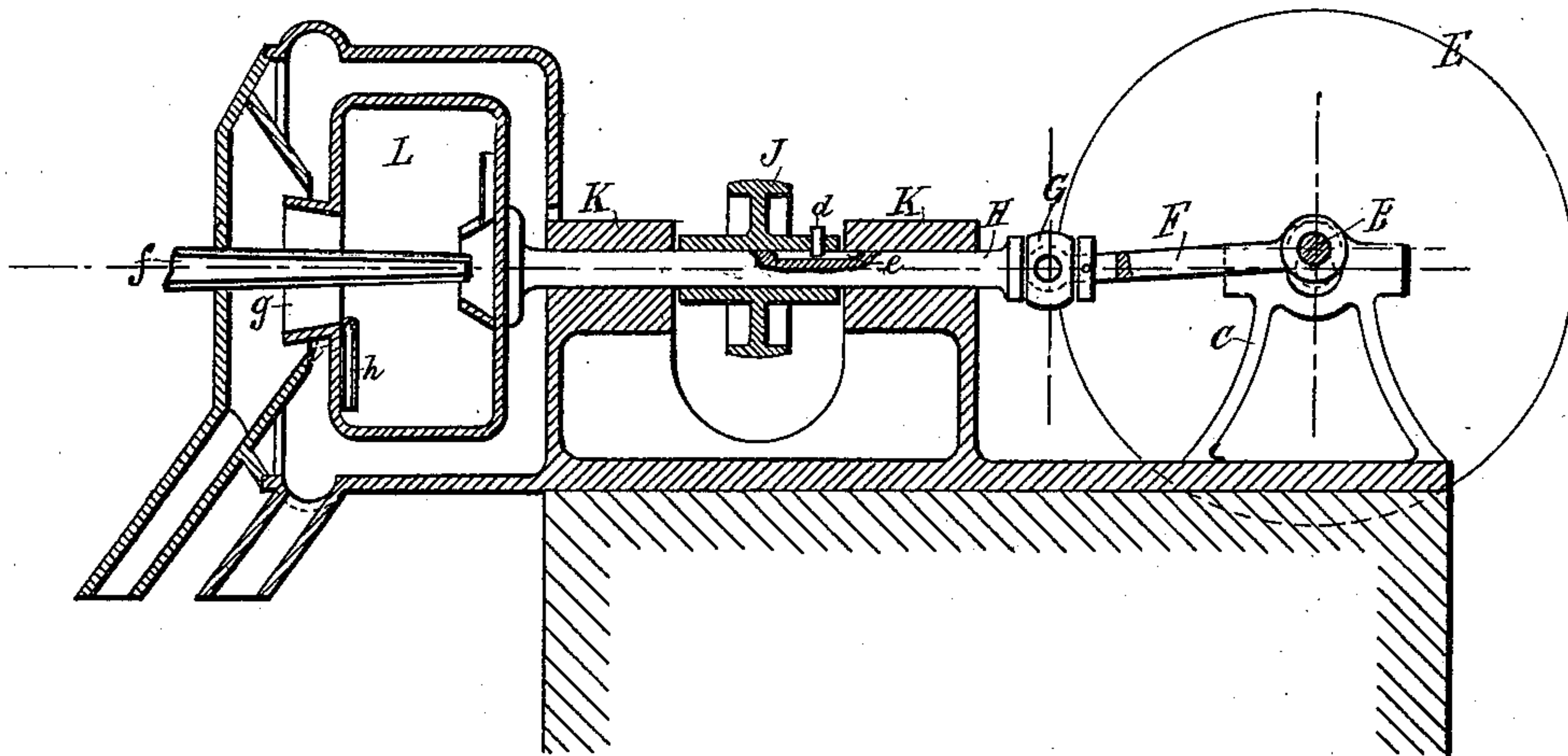
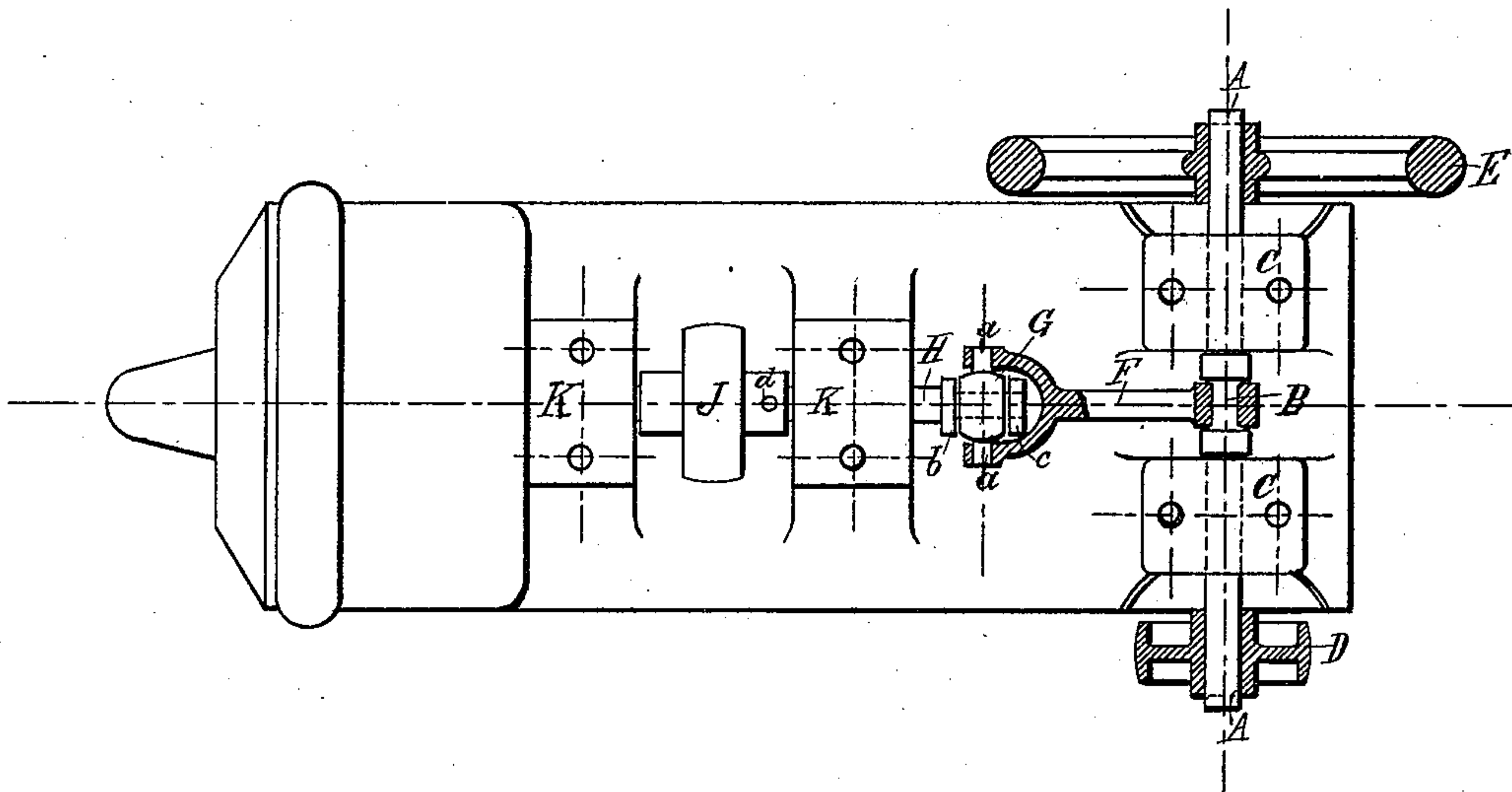


Fig. 2.



Witnesses:
Henry Huber
Weinherr

Inventor
Carl Didrik Hellström
by George Raegen
Attorneys.

UNITED STATES PATENT OFFICE.

CARL DIDRIK HELLSTRÖM, OF STOCKHOLM, SWEDEN.

PROCESS OF SEPARATING FATS FROM EMULSIONS.

SPECIFICATION forming part of Letters Patent No. 436,133, dated September 9, 1890.

Application filed April 24, 1890. Serial No. 349,327. (No specimens.)

To all whom it may concern:

Be it known that I, CARL DIDRIK HELLSTRÖM, a citizen of the Kingdom of Sweden, residing at Stockholm, Sweden, have invented
5 certain new and useful Improvements in a Process of Separating Fats from Emulsions; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which
10 it appertains to make and use the same.

In emulsions the fatty particles appear as globules of various sizes. For example, in milk the largest globules are about two hundred times greater in volume than the smallest. Each globule is surrounded by a coating
15 composed of the fluid in which the globule is contained. This coating reduces the buoyancy of the fatty globules in proportion to the size of the latter, and thus the smaller globules have no buoyancy whatever, and cannot be extracted or separated by centrifugal
20 action alone, except when the larger globules carry the smaller ones along with them. The path of the larger globules through the mass, when subjected to a centrifugal operation
25 solely, would be ordinarily an unbroken line; but if the emulsion is subjected to a temporary acceleration parallel with the axis of the centrifugal machine, so that the emulsion is
30 influenced by a temporary acceleration following the rotatory movement, and which is at right angles to the axis of the machine, the larger globules, owing to their buoyancy and
35 lesser density, will receive an axial movement in relation to the other particles; but if the temporary axial acceleration continuously changes its direction the larger globules will describe a zigzag course around the line, which
40 would have been their course if no axial acceleration had been provided, and consequently they will over and over again come in contact with the smaller globules, which
45 latter, on account of the coating surrounding them, would not participate in the relative movement. The separation of the globules is thus made more complete by this method. As the temporary axial accelerations are transmitted in the mass by pressure, and as
50 the particles are moved among each other, the larger globules will constantly strike against each other. The originally small particles of fat will very rapidly increase in size throughout

the entire mass. On the surface this enlargement of the fat-globules is augmented by the movements caused by the temporary axial accelerations. In the ordinary centrifugal operation the upper surface of the liquid is at
55 right angles to the resultant of the accelerations of the centrifugal force and gravity. If temporary accelerations be added, the upper surface has a tendency to assume a position
60 at right angles to the resultant of all three. As the temporary axial accelerations are variable in regard to strength and direction, the particles on the surface receive an undulatory
65 motion, and as this motion is absolutely symmetrical around the axis a section that is at right angles to the axis will be alternately extended and contracted, whereby the fat particles are caused to unite. Whenever two glob-
70 ules unite, a part of the liquid forming the coating surrounding the globules is separated, and thus the fat will appear on the inner part of the upper surface, separated more perfectly
75 from the liquid than when subjected to a centrifugal action only. When the temperature of the emulsion is such that the fatty particles are cooled, the transition of the same to a solid condition is accelerated by the re-
80 peated pressures and concussions. For example, if the milk at a temperature of 23° centigrade is treated in this manner butter is produced. By providing a continuous supply and discharge the entire process may be converted into a continuous one.
85

In the accompanying drawings, Figure 1 is a vertical longitudinal sectional view of a centrifugal machine provided with means for rotating it and for reciprocating in the direction of the length of its axis, and Fig. 2 is a
90 plan view, parts being shown in horizontal section.

Similar letters of reference indicate corresponding parts.

The shaft A, carrying the fly-wheel E, is suit-
95 ably mounted in bearings C and rotated by means of a belt passed over a pulley D on said shaft. A crank B of said shaft is connected with a connecting-rod F, provided at the opposite
100 end with a fork, in which a head G is mounted by means of pivots a, and through said head one end of the shaft H of the centrifugal machine L passes, the collars b and c being fixed on said shaft at opposite sides of the head G.

The shaft H is mounted to rotate in bearings K and to reciprocate in the same. Between the bearings K a sleeve carrying a pulley J is mounted on the shaft, which sleeve has a pin 5 *d* passing into a longitudinal groove *e* in the shaft M, so that when the pulley is rotated by means of a suitable belt the shaft H is rotated, and at the same time said shaft can be reciprocated by the shaft A.

10 *f* is a pipe for conducting the emulsion into the centrifugal machine.

g is the outlet-pipe. The whey passes out through the pipe *h* and the aperture *i*. If the crank is replaced by a cog-wheel, other accel-

15 erations can be produced.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

The method of separating fats from emulsions, which consists in subjecting the emul- 20 sions simultaneously to centrifugal force and to temporary accelerations parallel or nearly so with the axis on which the centrifugal force is generated, substantially as set forth.

In testimony whereof I affix my signature in 25 presence of two witnesses.

CARL DIDRIK HELLSTRÖM.

Witnesses:

WILHELM DAHLGREN,
WALDEMAR BOMAN.