UNITED STATES PATENT OFFICE.

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METHOD OF CRYSTALLIZING MARGARIN.

1,345,657.

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To all whom it may concern:

Be it known that we, ANDERS CARL AUGUST ZEUTHEN and MARTIN LARSEN, subjects of the King of Denmark, residing at Silkeborg, in the Kingdom of Denmark, have invented certain new and useful Improvements in Methods of Crystallizing Margarin, of which the following is a specification.

According to the method generally used in margarin factories for separating (crystallizing) margarin, animal or vegetable, from the emulsion by means of direct or indirect cooling of the emulsion with water, and subsequent washing, comparatively great quantities of water of comparatively low temperature are required.

The object of the invention is to decrease the quantity of water and the amount of cold required. The invention is principally characterized in that the emulsion and the water are moved in relation to each other in such a manner that at the same time that each has its principal direction of movement, they are thoroughly mixed with each other, by the aid of mechanical means, and thus, while they pass the same, suitably long course, either in the same or opposite directions, or partly in the same and partly in opposite directions, they perform other movements at several points in this course, owing to the influence of the mechanical means, the emulsion and the margarin thereby being subjected, in an effective manner, to the influence of the water and the cold.

Instead of the here presupposed direct cooling, the invention admits of indirect cooling, the emulsion being exposed to the effect of mechanical stirring-members while it is being conducted through the aforesaid cooling course, where it is indirectly cooled.

The apparatus required for the performance of the invention is principally restricted to a combination of an emulsor with a crystallizing or cooling course of the aforesaid kind, both functioning continuously, thus a plant considerably simpler than those generally used in margarin factories.

In the drawing, Figures 1, 2, and 3 show schematically, by way of example, a form of construction of the crystallization course of the aforesaid kind, in longitudinal section, plan, and transverse section, respectively. Figs. 4–7 are transverse sections through other forms of construction.

In a trough 7 there is journaled a shaft 8 carrying a number of wings 9 and having an exterior driving member 10. At one end the trough is prolonged by an upward-slanting pipe 11, or a spout, with one or more worms 12. At this end of the trough there is a water-supply 13. At the opposite end of the trough the emulsor 14 with the outlet 15 are disposed, and here, in the trough, 16 there is disposed an overflow 16 for the water.

When the emulsor is functioning, and the water is let on, the emulsion from the outlet 15 will thus flow down into a mass of water which moves in the direction of the lower arrow 17, and will itself move in the direction indicated by the upper arrow 18 toward the pipe or spout 11. Simultaneously with the revolution of the wing-shaft 8, 9 and the worm 12, the emulsion and water in the trough 7 will be thoroughly mixed with each other. The warm emulsion from the outlet 15 will meet comparatively warm water, which is just about to flow out through the overflow pipe 16, while, as it proceeds, the emulsion meets colder and still colder water. Owing to the function of the wing-shaft, there is the very best possible equalization of temperature in every transverse section of the trough, and furthermore, the separation and washing of the margarin is promoted, so that the required quantity of water is comparatively small. The wings 9 have such a shape that they work the mixture toward the water-supply, where the trough is open, the oblique pipe, or spout, 11 acting as water-lock. The separated margarin will here be kneaded and raised by the worm 12, and if, in the trough 7 or at some other point, there is added the necessary amount of salt, etc., the margarin will leave the apparatus at the mouth 19 in a finished condition.

The trough, and therewith the main direction of movement of the emulsion and the water, need not be straight, but may be U-shaped, zig-zag, etc. Instead of a single trough with a single wing-shaft, it is possible, as shown in Fig. 4, to use a double trough 7 and 70, with two shafts 8 and 80, whose wings 9 and 90 mesh into each other. The transverse section-profile of the trough may be varied in many different ways. It may, e. i., be circular, as shown in Fig. 5, or it may be closed in some other way. By the term "wings" there may also be understood...
several different members, cast or made of plates, plane or tortuous, perforated or not perforated, and covering a greater or smaller portion of the transverse section of the trough, depending upon how much or how little it is desired to damp up the current of water. Fig. 6 shows an example of a “wing” 9 in the shape of a circular, plane, or tortuous disk with a segment 20 cut out. One or more such disks may eventually be disposed between or alternating with the more open wings 9, according to Figs. 3—5, such an arrangement being shown at 9′, Figs. 1 and 2.

When this method is performed in such a manner that indirect cooling is entirely or partially used, either the trough may be furnished with cooling-jacket 21, Fig. 7, or the shaft and wings may be made hollow as at 22 and be connected with the pipe containing the supply of cooling means, or both methods may be used simultaneously. The apparatus used for kneading the margarin may, of course, be of any other suitable kind than that here shown.

We claim—

1. A method of crystallizing margarin, which consists in causing the emulsion and a cooling agent to travel through a common course and transversely moving the emulsion and cooling agent relative to each other during such travel.

2. A method of crystallizing margarin by means of cooling the emulsion with a cooling fluid, characterized in that the emulsion and the cooling fluid are moved in relation to each other in such manner that while they are running through the same course, one is by mechanical means also caused to perform transverse movements in relation to the other.

3. A method of crystallizing margarin by means of cooling the emulsion with a cooling fluid, characterized in that the emulsion and the cooling fluid are moved in relation to each other in such manner that while they are running through the same course, one is by mechanical means also caused to perform transverse movements in relation to the other, the equalization of the temperature at every point of the course being as perfect as possible.

4. A method for crystallizing margarin by means of cooling of the emulsion with a cooling fluid, characterized in that the emulsion and the cooling fluid are moved in relation to each other in such manner that while they are running in the same course in opposite directions, one is by mechanical means also caused to perform transverse movements in relation to the other.

5. A method for crystallizing margarin by means of cooling of the emulsion with a cooling fluid, characterized in that the emulsion and the cooling fluid are moved in relation to each other in such a manner that while they are running through the same course, they are by mechanical means also caused to perform transverse movements in relation to each other.

In testimony, that we claim the foregoing as our invention, we have signed our names in presence of two subscribing witnesses.

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Witnesses:
P. HOFMAN BAUJ,
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