

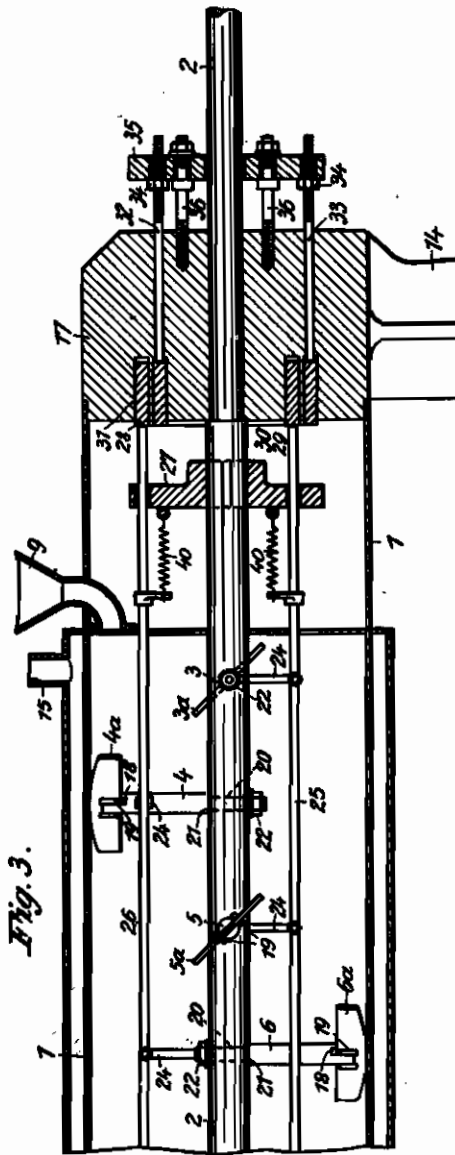
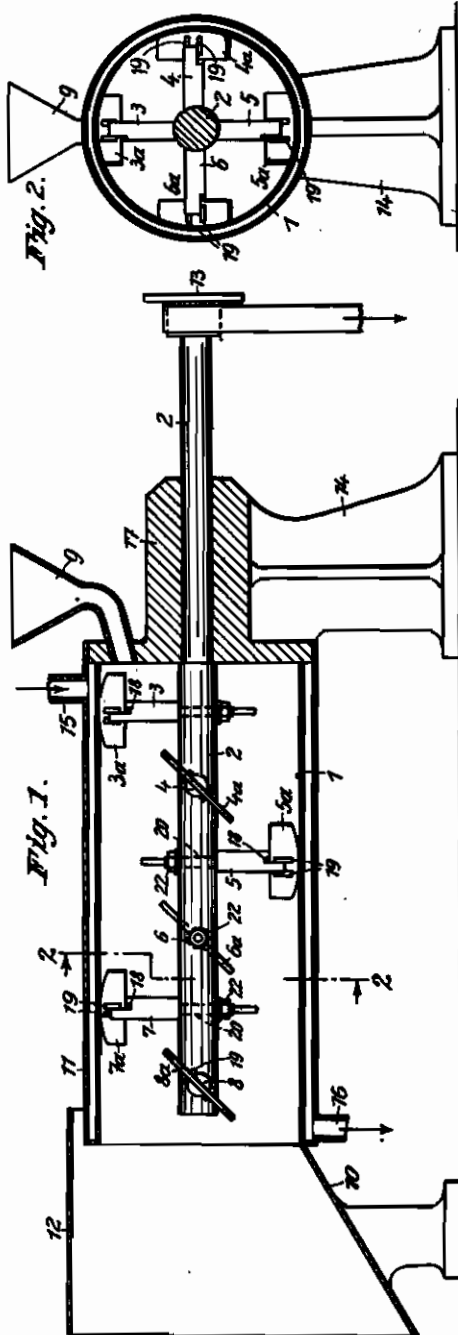
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PROCESS OF AND APPARATUS FOR  
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# ALIEN PROPERTY CUSTODIAN

## PROCESS OF AND APPARATUS FOR MAKING BUTTER FROM CREAM

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My invention relates to improvements in the process of and apparatus for making butter from cream, and the objects of the improvements are, first, to provide a process by means of which the butter is separated from the cream within an exceedingly short period of time, second, to provide a process which is effective in so far as a high proportion of the butter is separated from the cream, third, to provide a process which is economical, and fourth to provide a process, by means of which the butter may be continuously separated from a stream of cream. Further, an object of the improvements is to provide an apparatus which is simple in construction and effective in operation, and which may be set with its operative parts into different positions, whereby it is adapted to the character of the cream, the temperature and other atmospheric conditions. With these and other objects in view my invention consists in spreading the cream into a film, and agitating all the portions of the said film so as to transform the same first into a foam and then agglomerating the particles of butter. In the preferred process the said film is made to move from a supply thereof past the agitating device or devices and to a discharge. Any suitable method may be provided for thus shaping the cream into a film, but I prefer to make use of centrifugal action, the cream being made to flow into a cylindrical drum having agitating devices mounted therein close to the inner surface of the circumferential wall of the drum, the said drum and agitating devices being rapidly rotated relatively to each other for spreading the cream on the surface of the circumferential wall of the drum. Preferably the agitating devices are shaped so that by the said relative rotary movement they influence the flow of the film from the supply to the discharge resulting from the hydrostatic fall of the incoming liquid.

For the purpose of explaining the invention an example embodying the same has been shown in the accompanying drawing, in which the same reference characters have been used in all the views to indicate corresponding parts. In said drawing

Fig. 1 is a sectional elevation showing the apparatus,

Fig. 2 is a sectional elevation taken on the line 2—2 of Fig. 1, and

Fig. 3 is a detail plan view showing the agitating device of Fig. 1 with certain modifications.

Referring now to the figures, the apparatus comprises a cylindrical drum 1 fixed to a suitable upright 14 and having a jacket 11 connected with

intake and delivery pipes 15 and 16 for circulating a heating or cooling medium therethrough. The said drum has a supply 9 for the cream and a discharge 10 in the form of a gutter. Preferably the said gutter 10 is suitably supported on the floor. Preferably the said gutter forms the bottom part of a jacket disposed around the delivery end of the drum and adapted to gather the matter delivered from the drum.

Coaxially of the drum 1 a shaft 2 is provided which is rotatably mounted in a suitable bearing 17 provided in the upright 14 and which is provided with suitable driving means such as a belt and pulley 13 for rapidly rotating the same say at a circumferential-velocity of from 15 to 20 meters per second. On the said shaft agitating members are mounted which consist of blades 3a, 4a, 5a, 6a, 7a and 8a mounted on radial members 3, 4, 5, 6, 7, and 8 secured to the shaft 2, the said blades being mounted on the said members so as to be in contact with or near the circumferential wall of the drum 1. The blades 3a to 8a may be made from wood or other suitable material. As shown, the said blades are mounted on the members 3 to 8 so as to be radially shiftable thereon, and as shown, they are guided in slots 18, cleats 19 being secured to the blades for holding the same in position within the said slots 18. Thus, blades are thrown by centrifugal action into contact with the circumferential wall of the drum 1. But I wish it to be understood that my invention is not limited to the manner of mounting the blades so that they are in sliding engagement with the drum 1. The blades 3a to 8a are disposed angularly of the longitudinal axis of the drum and so that they are adapted gradually to move the cream from the supply 9 to the gutter 10. The successive blades are displaced at right angles around the shaft 2, and preferably they are inclined in different senses as appears from a comparison of Fig. 1 and 3. The blades 3a, 5a and 7a are mounted at comparatively large angles to the axis of the drum, and they are set so as to move the film of cream from the supply 9 to the discharge 10, and the blades 4a, 6a and 8a are mounted in the opposite sense and so as to have the tendency to move the cream in the opposite direction. But the angle of inclination of the blades 4a, 6a and 8a is smaller than that of the blades 3a, 5a and 7a, so that the combined action of all the blades is a movement of the cream towards the discharge. By thus inclining the blades in different senses the particles of the cream are thrown by the successive blades against one another.

I wish it to be understood that I do not limit myself to the construction shown in the figures, in which the blades are inclined in different senses.

Preferably the members 3 to 8 are mounted so that the angularity of the blades may be varied, and as shown, means are provided for thus varying the angularity during the operation of the apparatus. As shown more particularly in Fig. 3, the members 3 to 8 are guided in diametrical bores 20, and they are held in position in the said bores by means of shoulders 21 and nuts 22. To the members 3 to 8 arms 24 are fixed, and the arms 24 of the members 3, 5 and 7 and of the members 4, 6 and 8 are connected respectively to rods 25 and 26 disposed longitudinally of the shaft 2. The said rods are guided in a collar 27 fixed to the shaft 2, and they bear with their inner ends on rings 28 and 29 embedded in circumferential grooves 30 and 31 made in the upright 14, springs 40 being provided for holding the rods 25 and 26 in contact with the rings 29 and 28. The said rings 28 and 29 are adapted to be pushed inwardly by means of rods 32 and 33. For shifting the rods 32 and 33 suitable means are provided. As shown the said rods are screw-threaded at their outer ends and they carry nuts 34 bearing on a disk 35 fixed to the upright by means of screws 36. I have found that the adjustment of the blades is valuable in such cases where the character of the cream to be treated in the apparatus varies. In such cases in which cream of uniform character is treated in the apparatus, the blades may be set in the proper position once for all, either by means of the mechanism described herein or by means which are more simple in construction.

The operation of the apparatus is as follows: The drum is either heated or cooled by means of a suitable heating or cooling medium supplied through the pipes 15 and 16, the shaft 2 is rapidly rotated, and cream is supplied through the intake 9. By the rapid rotation of the first blade 3a the said cream is thrown against the circumferential wall of the drum 1 and spread thereon into a thin film. By the inclined position of the blade 3a the said film is gradually moved to the left and towards the discharge 10. When the film gets into the space covered by the blade 4a it is acted upon by the said blade in the opposite sense the said blade having the tendency to move

the film from the left to the right. Thus the particles of the cream are thrown against each other. But by reason of the greater angularity of the blade 3a the general direction of the movement is such, that the film gradually moves from the right to the left. During such movement all the particles of the film are successively agitated by the blades, and the cream is first transformed into a foam and thereafter the butter is formed, whereupon the mass is delivered through the gutter 10 with the globules of butter agglomerated therein.

I have found that by the high agitation of the cream by the blades, and by the action of the blades on the thin film all the particles of butter are energetically rubbed on one another and on the wall of the drum, and that thereby the butter is rapidly agglomerated.

The cream should be acted upon by the blades without interruption, and therefore the length of the blades is such that the cylindrical paths of the adjacent blades meet or overlap each other. Further, it is important that the blades move close to the circumferential wall of the drum, so that their action on the thin film is insured, though it is not always necessary that the blades are in sliding engagement with the said wall.

In the construction shown in the figures, in which the shaft 2 is rotatable, the blades 3a to 8a are thrown into sliding engagement with the wall of the drum by centrifugal action, the said blades being shiftable in the slots 16.

The matter delivered from the drum is still subject to centrifugal action and therefore I provide the hood 12 by means of which the matter is gathered.

It is important that the cream passing through the drum is continuously aerated for removing vapors developed during the operation and for forming the cream into foam, and for this purpose the drum is opened at least at its delivery end, so that air or other gaseous fluid which may be preferred has free access to the interior of the drum.

By the word "sense" as used herein, I mean angularity.

In the operation of the apparatus I have found that the butter is separated from the cream within 12 or 15 seconds.

WILLI FRITZ.