

No. 813,325.

PATENTED FEB. 20, 1906.

C. M. RUNYAN.
BUTTER CHURN.

APPLICATION FILED AUG. 10, 1905.

FIG. 1.

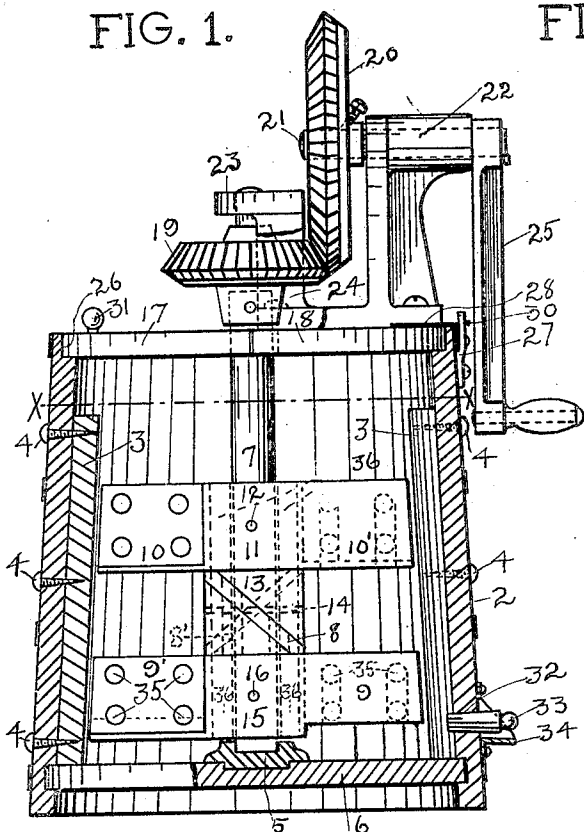


FIG. 2.

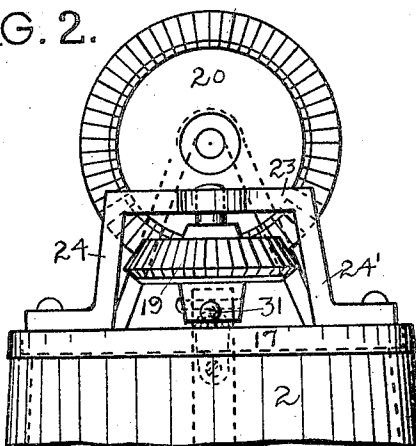


FIG. 5.

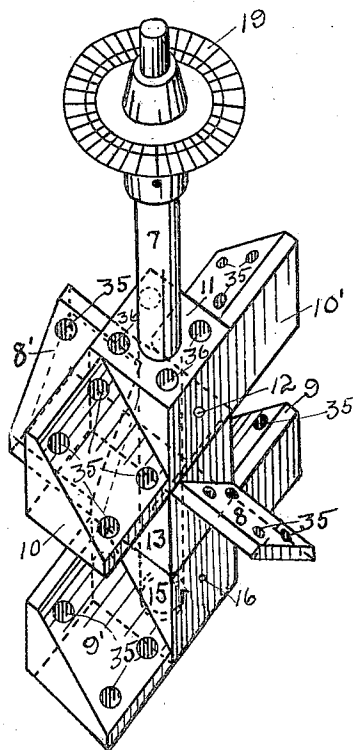


FIG. 3.

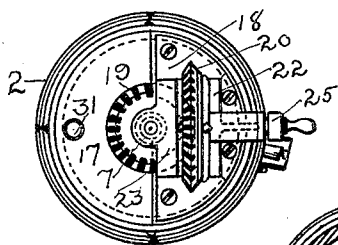


FIG. 6.

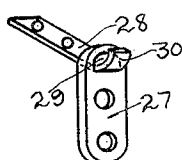
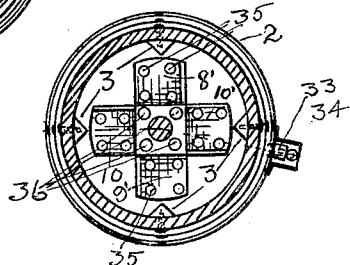


FIG. 4.



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BUTTER-CHURN.

No. 813,325.

Specification of Letters Patent.

Patented Feb. 20, 1906.

Application filed August 10, 1905. Serial No. 273,664.

To all whom it may concern:

Be it known that I, CLAY MORTON RUNYAN, a citizen of the United States, residing at Elyria, in the county of Lorain and State of Ohio, have invented certain new and useful Improvements in Butter-Churns, of which the following is a specification.

This invention relates to churns, and has particular reference to the construction of the dasher and the relative arrangement of the blades or paddles thereof.

The object of the invention is to provide a construction which will produce a maximum of agitation with a minimum of parts and to provide for the free admission of air into and throughout the body of the cream.

Another object of the invention is to provide a dasher which through its operation upon the body of cream will tend to draw or force air into the churn and to permit the prompt escape of the gas which is generated by the agitation of the cream. An important factor in the production of good butter is to supply the vacuums produced by the escaping gases with pure air as promptly as possible; and my invention is designed to not only intensify the conditions which tend to produce the gases by agitation, but to facilitate the escape of the gases and their instantaneous replacement with air.

A still further object of the invention is to provide a construction which entirely eliminates metal parts from the interior of the churn by providing a dasher the hub and blades or paddles of which are made of wood and of such form that the dasher may readily be made from a single block or piece of wood.

The invention consists in the novel construction and arrangement of parts hereinafter described in detail, illustrated in the drawings, and incorporated in the claim.

In the accompanying drawings, which illustrate my invention, Figure 1 is an elevation, partly in section, of a churn embodying my invention. Fig. 2 shows the upper part of the churn, taken on a vertical plane at right angles to the vertical plane of Fig. 1. Fig. 3 is a top plan view of the churn. Fig. 4 is a horizontal section taken substantially on line X X of Fig. 1. Fig. 5 is a perspective view of the dasher, and Fig. 6 shows the details of the cover-latch.

Referring to the drawings, 2 represents a churn-body of ordinary construction.

3 3 are four wedge-shaped strips of wood fastened vertically to the inner wall of the body or receptacle 2 by means of screws passing through the sides of the vessel from the outside and partly through the strips 3. The latter are breakers arranged to prevent uniform rotation of the body of cream around the sides of the vessel. A thrust-bearing 5, made of wood, is secured to the bottom of the vessel through a mortise-and-tenon connection, as shown in Fig. 1. The shaft 7, supported in said bearing, carries a series of paddles 8 8', 9 9', 10 and 10'. These paddles are arranged in pairs, each pair having an integral hub. The pair 10 10' is integral with the hub 11, secured to the shaft 7 by means of a wooden pin 12, which passes through hub 11 and shaft 7. The pair 8 8' is integral with the hub 13, which is secured by means of a pin 14, and the pair 9 9' is integral with the hub 15, secured to the shaft by means of a pin 16. The pairs 9 9' and 10 10' are arranged in the same vertical plane, and the pair 8 8' is arranged in a plane at right angles to the plane of the other pairs. The upper end of the shaft extends through the cover for the vessel 2, and said cover is made in two semicircular parts 17 and 18, in the meeting edges of which are recesses which together form a circular opening for the shaft. The latter has upon its upper end a miter-gear 19, meshing with a similar, but preferably larger, gear 20, mounted on a shaft 21, having its bearing in a bracket 22, suitably secured to the part 18 of the cover. The bracket 22 is constructed to provide a bearing for the extreme upper end of the shaft 7, as well as for the shaft 21. The bearing for shaft 7 is in the form of a horizontal bar having a pair of legs 24 24' projecting upwardly from the base of the bracket 22. 25 is the crank by means of which the dasher is rotated. The two parts of the cover are seated in an annular recess 26 in the form of a rabbet cut in the upper edge of the vessel or tub 2. The part 18, which carries the bearings for the driving-gear shafts, is removably fastened in place by means of two straps 27 and 28, the former secured to the vessel or tub 3 and the latter to the part 18. In the strap 27 is an

eye 29, which receives a hook portion 30 of the strap 28. The cover portion 17 is provided with a knob 31, by means of which it may be raised, so that access may be had to the interior of the tub. The part 17, being entirely free of the part 18, the latter and the bearings thereon are not ordinarily disturbed for the purpose of opening the churn. To remove the dasher, the cover portion 18 is tilted slightly to raise the lower end of the shaft out of its socket in the bearing 5 and to permit release of the hook 30. The usual drain-hole 32, normally closed by a plug 33 and provided with a spout 34, is provided for draining the buttermilk or water used for washing the interior of the churn.

The most important feature of my improved churn resides in the formation and arrangement of the paddles of the dasher. As shown in Fig. 5, these paddles are all inclined, the inclinations being in the direction of rotation of the shaft 7, but the inclinations of the upper and lower surfaces of the different paddles vary for the purpose of counteracting the tendency to rotary motion in the body of cream which the paddles would otherwise induce. The paddles 8 and 8' are, to that end, not only arranged at different angles of inclination relatively to each other, but at different angles relatively to the other paddles. The paddles 8 and 8' are, furthermore, in the form of boards of uniform thickness throughout, while the paddles 9 9' and 10 10' are wedge-shaped. Again the pair of paddles 9 9' have both their upper and lower surfaces arranged in inclined planes, while the paddles 10 10' have their lower surfaces arranged in horizontal planes. I do not wish to be understood as confining myself to the exact arrangement of paddle-surfaces described in the foregoing, because each paddle may have each of its surfaces arranged in a plane not occupied by any of the surfaces of the other paddles, the essence of the arrangement residing in the variations of inclination which prevents the formation of uniform currents and induces the greatest possible agitation with the production of vacuums and consequent induction of air at a rapid rate. The inclinations of the paddles carries successive portions of cream upwardly, leaving vacuums underneath, and the variations of inclination cause the cream thus lifted up an incline to be dashed against a succeeding surface having a different incline, thus suddenly changing its direction of motion and increasing the agitation or the process of breaking up the globules. Provision is made for the prompt admission of air to the vacant spaces which are created by the paddles in the form of a series of holes 35, extending vertically through the different

paddles. Similar holes 36 are also made through the paddle-hubs. The latter holes, as shown in Fig. 1 by dotted lines, are open to the bottom of the tub or vessel 2 by being arranged so that they are at least partially lateral of the upper surface of bearing 5. To further insure free passage of air downwardly through the tubes 36, I leave a suitable space between the lowest hub 15 and the bearing 5. All of the paddles have comparatively sharp forward edges, which are designed to separate the cream, a part of which slides up the inclined upper face of the paddle, then comes in contact with the upper face of the next higher paddle. Between the separated parts of the cream or, in other words, underneath each paddle a vacant space is formed, and as the upwardly-moving portion or the cream is immediately caught on the following paddle a fair share of said portion will be elevated to the top of the highest paddle, the action being something like that of a water-screw, except that there is a gap between each paddle and its next succeeding paddle, and air is freely admitted through the holes in the paddles underneath the portions of cream which are carried upwardly. The relative arrangement of the under surfaces of the different paddles also, by reason of their varying inclinations relatively to each other, exert considerable influence toward intensifying the agitation by deflecting the currents that strike said surfaces. This complete agitation of the mass of cream, together with the constant admission of air, and thereby the maintenance of a uniform temperature throughout the body of liquid, are the two most important conditions requisite for the rapid formation of a uniform quality of butter.

Another important advantage derived from the construction of my dasher is that the wedge action of the paddles effects thorough agitation of the cream with a comparatively small amount of resistance upon the operating-crank. This resistance is so light that a child can operate the churn with ease. The action produced by the dasher upon a body of cream is such that the churn may be thoroughly washed by simply pouring the water or washing compound into the churn and working the dasher as when churning butter.

The board-dashers 8 and 8' may be made with sharp or "knife" edges, if preferred. The same is true of the wedge-shaped paddles.

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

In a churn, a dasher consisting of a rotary shaft, a series of pairs of paddles having integral hubs mounted on said shaft, each of said

paddles having a face, or faces, arranged in a plane which intersects all of the planes in which the faces of the other paddles are arranged, said paddles and hubs having air passages or perforations therein, the air-passages through said hubs forming air-tubes which communicate with the air above and below said dasher.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

CLAY MORTON RUNYAN.

Witnesses:

W. G. ALLEN,
D. T. ALGER.