

UNITED STATES PATENT OFFICE.

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IMPROVEMENT IN CHURNS.

Specification forming part of Letters Patent No. 43,227, dated June 21, 1864.

To all whom it may concern:

Be it known that we, J. N. MCINTIRE and JOHN RANKIN, of New York, county of New York, in the State of New York, have invented certain new and useful Improvements in Churns; and we do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, making part of this specification.

Our invention relates to certain new and useful improvements in churns, and has for its object the production of a churn in which the cream shall first pass through a preliminary dasher or breaker and thence to a screw-dasher, which has its beaters so arranged on the horizontal shaft as to feed in opposite directions from the center of the shaft, (longitudinally,) and also a churn in which the main driving-gear may be very readily shifted to mesh with either the pinion which drives the breaker-shaft or the pinion which drives the main dasher-shaft, or with both said pinions, as circumstances may require; and to these ends our invention consists in the employment of a screw-dasher, substantially as described hereinafter, in which the beaters are arranged to form two helical curves, running in different directions from the middle of the shaft toward either end; and our invention further consists in the employment, in connection with the main screw-dasher, of a peculiarly-constructed preliminary dasher or breaker, substantially as hereinafter more fully explained; and our invention further consists in a novel method of arranging the main driving-gear on an eccentric stud with a shipper-clutch, in such manner that by turning the main gear's stud in its bearing the said gear may be set to run in mesh with either or both of the pinions.

To enable those skilled in the art to make and use our invention, we will now proceed to describe more fully the construction and operation of our improved churn, referring by letters to the accompanying drawings, in which—

Figure 1 is an end view of one of our improved churns. Fig. 2 is a longitudinal vertical section of the same at the line *x x*, Fig. 1. Fig. 3 is a detail section at *z z*, Fig. 1. Fig. 4 is a detail section at *y y*, Fig. 2. Fig. 5 is a detail inner side and top view of breaker-case, and Fig. 6 is an end view of eccentric stud and its box or bearing.

Similar letters indicate the same part in the different views.

A is the box of the churn, which is made rectangular and which is provided with a suitable cover or top, B, and through which, near the bottom, runs longitudinally the screw-dasher shaft C. (See Fig. 2.) This shaft C is provided with beaters *d* and *d'*, in a manner to be presently explained, and is readily removable from the churn, and is rotated through the medium of a pinion, E, on the stud D, as will now be explained. The stud D, as seen at Fig. 2, is hung in a metallic box, *j*, let into and secured in any desirable manner in the end of box A. Said stud D has keyed on its outer end a pinion, E, while its inner end is squared and projects sufficiently far inside the box A to extend into the square socket of the ferrule *i*, which is fast on one end of the shaft C. It will be then understood that if the pinion E be rotated the shaft C will also be made to rotate. The other end of shaft C is provided with another ferrule, *g*, in the face of which is formed a conical depression coincident with the center or axis of shaft C, in which depression fits the conical or tapering end of a set-screw, *h*, which works in a female screw, *f*, and when screwed in forms a journal for one end of shaft C to run on. It will be seen that by turning out the thumb-screw *h* that end of shaft C adjacent to it will be released, and that the whole shaft may be then readily extricated from its bearings and removed from the churn-box. One half of the beaters, *d*, are so shaped and arranged on shaft C as to form a helical curve or screw running from about the middle of said shaft toward one end, (that nearest gear E,) and the other half of said beaters, *d'*, are so shaped and arranged on said shaft C as to form a screw-curve running from about the middle of said shaft toward its other end, (that nearest the screw *h*,) so that if we turn the shaft C in a given direction the tendency of the beaters *d* and *d'* will be to feed the contents of the box A from the middle toward each end of the same, as illustrated by the red arrows in Fig. 2. In the same vertical line with stud D (see Figs. 1 and 2) is hung a stud or short shaft, G, which runs freely in a box, *p*, let into the end of box A, not far from its top. On the outer end of said shaft is keyed a pinion, F, and on the inner end is secured a breaker-wheel or preliminary

dasher, H, which runs within a metallic case, I, which is locked to the inner surface of the end of box A, in a manner to be presently explained. The breaker-wheel H is formed with numerous rectangular arms, *o*, radiating from a hub and bounded by a rim, *m*, of the form shown, and about midway between the rim *m* and the hub of said breaker-wheel is formed an auxiliary or intermediate rim, *n*. The object of and advantage from this peculiar form of breaker-wheel is a division of the stream of cream as it enters through the channel or passage Q into a greater number of parts, and to throw the particles of cream more toward the flat surface or disk portion of case I, which portion is provided with curved radiating ribs *w*. (See Fig. 5.) The said case I is also provided with numerous parallel ribs, *y y*, running across its inner curved face. *r r* and *s* are three projecting ears, which are formed on the case I, and which pass into loops or staples *u u* and *t*, on the inner surface of box A, to hold the case I in position around the breaker-wheel. *v* are numerous small openings in the case I, through which the cream makes its escape, as illustrated by the small black darts in Fig. 2. The formation of the case I is clearly seen at Figs. 2, 4, and 5.

The cream may be supplied to the passage *q* from a vessel, which we propose to make with a chute or funnel-like portion to fit into the mouth of said conduit *q*. On each end of the box A, on the interior and adjacent to the ends of the screw-dasher, are arranged ribs T², against the angular edges of which the sacks of cream are thrown and broken by the action of the screw dasher. The main driving-gear L is provided with a suitable handle, P, by which it is rotated, and is hung to turn freely on a stud, *c*. This stud *c* is formed with an eccentric portion, *c*², which runs in a bearing box, Z, in which it is also capable of sliding little longitudinally. The box Z is formed with or has cut in it three tapering grooves, as seen tinted in black at Figs. 3 and 6, into which catches the spring-clutch. (Represented in red tint at Figs. 3 and 6.) This spring-clutch is secured at its inner end to the eccentric *c*² in a groove formed therein, (tinted in black,) and has its outer end enlarged and shaped to correspond with the shape of the notches or grooves in box Z. (See Fig. 3.)

e is a short handle or hand-lever, the hub or collar of which is secured to the stub *c*.

To understand the operation of this shifting mechanism, let us suppose the eccentric *c*² to be clutched into the box Z by means of its spring catch being locked into one of the notches of the latter, as seen at Fig. 3, and the gear L in mesh with both pinions E and F, as seen at Fig. 1. Now, if we take hold of the handle *e* and press the eccentric stud toward the box A until the points 4 and 5 of gear L and box Z come in contact, we shall cause the spring-catch to be forced down in the groove in eccentric *c*² and its enlarged end to pass out of the notch in box Z into the

plain smooth portion of the interior of said box. Now, if we turn the eccentric *c*² around into its box Z by pulling on the handle *e*, and at the same time slide said eccentric outward again, it will directly be clutched again by the spring-catch coming into the next one of the notches of the box Z, and the center of stud *c* will now be shifted from that seen at small red circle 1, Fig. 1, to that illustrated at 2, and the gear L will now be in mesh with only the pinion E. In like manner the center of *c* (which is the center of the gear L) may be shifted to red circle 3, Fig. 1, when the gear L will be thrown in mesh with only the pinion F. It will be observed that this mode of shifting the main gear L is exceedingly simple and effective and involves very little complication of machinery.

After what has already been said a few explanations of the general operation of the whole apparatus will be sufficient to enable those skilled in the art to thoroughly comprehend our several features of improvements: Cream being supplied to the interior of case I through the conduit *o* in the usual manner, the main gear L is rotated, and the requisite motions thereby imparted to the pinions E and F, and through them to the main dasher C *d* and the preliminary dasher or breaker wheel H. As the cream enters the case I, it is caught by the rapidly-rotating wheel H and dashed about in the case I until it escapes through the small opening *v*.

It will be understood that the auxiliary rim *n* has a tendency to prevent the cream from descending and escaping so soon as it otherwise would, and it will be seen that in consequence of the peculiar shape of the wheel H and the combination of straight and radial ribs *y* and *w* the particles of cream are much more agitated and more deflected from wheel to case, and vice versa, than heretofore, and the globules containing the particles of butter are more effectually broken open, before the cream leaves the case I. As the cream is broken up, or the minute sacks are fractured, the cream escapes, as indicated by the black arrows at Fig. 2, and, falling into the body of the churn, is acted upon by the dasher C. This dasher collects and works together the floating particles of butter, and from its peculiar construction, hereinbefore explained, tends to work the butter from the center of the box toward each end, as illustrated by the red arrows, thereby causing the broken sacks, which contain particles of butter, to be thrown against the ribs T² and be more completely extricated from the particles of butter. By reversing the motion of gear L the dasher C may be made to congregate the particles of butter in a mass near the center of the churn and perfectly and economically work it. After the butter has been sufficiently churned and worked the buttermilk is drawn off through a plug or faucet, T.

Having fully explained the construction and operation of our improved churn, what

we claim therein as new, and desire to secure by Letters Patent, is—

1. The employment of a dasher having its beaters so formed and arranged as to feed the contents toward each end of the box, as specified, in combination with the vertical breaker-ribs T^2 , the whole arranged to operate as and for the purpose set forth.

2. The employment of the breaker-wheel H, constructed and operating as specified, in combination with a surrounding or inclosing case formed with ribs w and y and exits v , the whole constructed and operating as set forth.

3. Hanging the main gear L on an eccentric stud, c c^2 , in combination with the spring-catch and notched box Z, the whole arranged to operate as and for the purpose set forth.

In testimony whereof we have hereunto set our hands and seals.

J. N. McINTIRE. [L. S.]
JNO. RANKIN. [L. S.]

In presence of—

M. M. LIVINGSTON,
HENRY MORRIS.