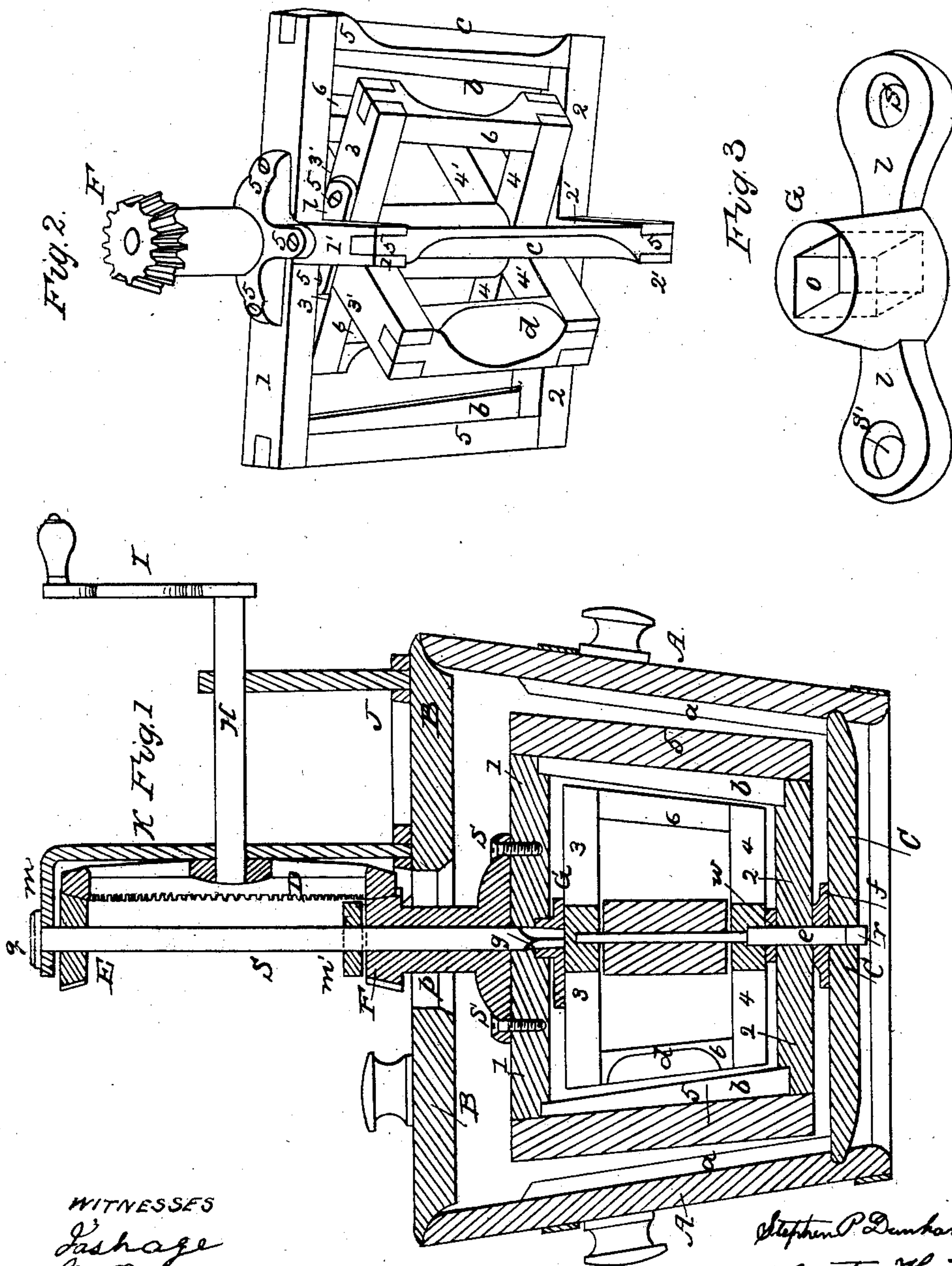


DUNHAM & HIPPLE.

Churn.

No. 27,894.

Patented April 17, 1860.



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# UNITED STATES PATENT OFFICE.

STEPHEN P. DUNHAM AND A. HIPPLE, OF KILBOURNE, OHIO.

## CHURN.

Specification of Letters Patent No. 27,894, dated April 17, 1860.

*To all whom it may concern:*

Be it known that we, STEPHEN PAYNE DUNHAM and AUSTIN HIPPLE, of Kilbourne, in the county of Delaware and State of Ohio, have invented certain new and useful Improvements in Churns; and we do hereby declare the following to be a full and exact description of the same, reference being had to the accompanying drawings and the letters and figures of reference marked thereon, the same making a part of this specification.

In the said drawings: Figure 1 is a section of the body of the churn, the dashers, and gearing made by a vertical plane, passing through the middle of the churn, and the axis of the driving shaft, H, the shafting H, S, and the pieces *e*, and *r* however being shown entire. Fig. 2 is a perspective view of the dashers, as they appear when connected for churning; and Fig. 3 is a similar view, on an enlarged scale of the journal attached to the inner dasher; shown also in section as G, Fig. 1.

The vessel A, A, Fig. 1, may be cylindrical or conical; but it is here represented of the latter form.

Through the bottom, C, C, at its center a vertical and cylindrical perforation is made, and of such a diameter as to admit the pivot-bolt *e*, as a step for which a short rod *r*, is inserted into it from beneath, to any convenient distance, and then securely fixed. A bearing and guide plate, *f*, of proper thickness having a circular opening of such diameter as to allow the socket-bolt to pass through without binding, is screwed centrally on the upper surface of the bottom C, C, so that this opening or bearing, and the perforation just described form a continuous passage.

To the inner wall of the vessel A, A, four thin strips or webs—only two of which, *a*, *a*, are shown in Fig. 1—are permanently secured at equal distances apart, extending from the bottom C, C, in direction of the joints of the staves, to about the height of the upper arms of the outer dasher.

The outer dasher is constructed by joining at right angles the two upper and equal

arms, 1, 1, and 1', 1', Fig. 2, in such a manner that their ends may be equi-distant from the central point of their intersection. The two lower arms 2, 2, and 2', 2', also equal to each other, are joined in the same way, and the corresponding ends of the upper and lower arms are then firmly united by side pieces, 5, 5, and 5', 5'. The outer and left hand edge of each side-piece, for nearly the whole of its length, is removed in such a manner as to leave a hollow space, *c*, increasing uniformly in depth from one end to the middle, and then decreasing the middle to the other end of the side piece.

To the inner surface of each of these side pieces and connecting with the upper and lower arms, a web, *b*, similar to those of the vessel, is permanently fixed. The inner dasher is constructed in a similar manner, viz., with upper arms, 3, 3, and 3', 3', lower arms 4, 4, and 4', 4', and side pieces 6, 6, and 6' 6'—with the exceptions, that it is the outer and right instead of left hand edge of each side piece that is removed; and that there are no webs to be fixed to these side pieces. In the lower arms, at their common intersection a cylindrical cavity is made extending from their under surface to *n*, Fig. 1, a distance equal to about one half of their thickness. It should be of a diameter sufficient to receive the pivot bolt *e* and allow the free rotation of the dasher on and around it.

At their central point of intersection, a cylindrical passage is made quite through the lower arms of the outer dasher, wide enough to allow free rotation around the pivot-bolt, which is passed through it. The upper arms of this dasher are likewise bored through at a like point, from the under toward the upper side; but the surface of this opening must conform in shape and dimension to that of the journal G Fig. 3 on which this dasher is supported and around which it rotates. Centrally over the outer orifice of this opening a pinion F Fig. 2 having a hollow arbor or sleeve, is screwed or otherwise secured by means of the perforated lugs *s*, *s*. The frames of these dashers should be conformable to the vessel, and they should always be so constructed as that



the side pieces of each should be as close, without contact, and as nearly parallel as possible to the webs which they respectively have to pass.

5 The cover of the churn, B, B, Fig. 1, has a circular opening, *p*, of such diameter as to encompass the sleeve of the pinion, F, without contact. It is divided into two equal and separable parts. On one of these parts is  
10 firmly secured the base plate, J, carrying the vertical bearing standards, *k*, *k'*, on which is hung the shaft H. To the inner end of this shaft, the driving wheel, D, is keyed, while the winch I is secured to the other end.

15 The standard *k* which spreads out into a plate, *m*, having a circular opening, or bearing for the shaft, S, is of such length, as after being bent at right angles at a proper height to clear the driving wheel, it extends  
20 so far inward that the center of this circular opening in the plate is perpendicularly over the center of the bottom of the vessel.

From the base plate there project two branches which, after turning under the  
25 lower side of the driving wheel, D, terminate in the plate, *m'*. This plate also has an opening or bearing, the center of which is likewise perpendicularly over that of the bottom, C,—the three centers being thus in  
30 line.

One end, *g*, of the shaft S is worked up square, to fit, without play, into the square socket, *o*, cut in the journal, G, Fig. 3. The pinion, E, is keyed on the shaft at such a  
35 distance from the other end, that when this pinion is in line, and in gear with the upper teeth of the driving wheel, D, a sufficient length of shaft will project beyond the plate, *m*, for the attachment of the collar or button,  
40 *q*, by which both the pinion and its shaft will be permanently hung in gear.

The journal, G, being inserted in the cavity made for it in the upper arms of the outer dasher, the inner dasher is placed  
45 within the outer, the washer, *w*, is interposed between the lower arms of both, and the pivot bolt, *e*, is inserted in the perforations made for it. The dashers are then placed upright in the vessel, so that the free end of  
50 the pivot-bolt, *e*, will pass through the bearing plate *f* till it reaches the step, *r*. The journal, G, is now secured to the inner dasher by screwing or bolting it on the upper arms of the latter, by means of its lugs, *l*, *l*, and  
55 their holes, *s*, *s'*. The shaft, S, is now passed through the hollow arbor of the pinion, F, and when its squared end, *g*, is properly seated in the socket, *o*, of the journal, G, the teeth of the pinion, F, will engage with those  
60 of the lower part of the driving wheel, D, that half of the churn cover, carrying the base plate with the attached gearing, will be close down on the vessel, A, A, as shown in Fig. 1, and the churn will be ready for

use. By a series of manipulations the re- 65  
verse of these, and succeeding each other in an inverted order, the churn can in a few moments be separated into its several parts for the purposes of cleansing and repair. This facility of repair—a matter of conse- 70  
quence in all constructions,—is mainly due to the simple means devised for connecting the dashers with each other, and with the driving gear, and constituting one of our improvements. 75

Being prepared for use, as just described, with the milk or cream in the vessel, A, the churn is thus operated: The wheel, D, when made to rotate by continuously turning the  
80 winch, I, in the direction in which the hands of a watch would move,—drives around the inner dasher, by means of the pinion, E, and its connections, in such a way, that its side pieces, *b*, and *c*, move with their hollows, *d*, toward and facing the webs, *b*, of  
85 the outer dasher; while at the same time it causes the outer dasher, by means of the pinion, F, to rotate in the contrary direction, with its hollow, *s*, *c*, &c., facing and moving toward the webs, *a*, and *c*, secured  
90 on the wall of the vessel, A,—its own webs, *b*, and *c*, moving toward the hollows, *d*, of the inner dasher. The effects of these rotations may be thus briefly summed up:—The  
95 cream is projected by the surfaces of the hollow *s*, *c*, onto the wall of the vessel, by which it is constrained to take up a circular motion till obstructed by the webs, *a*, and reflected by them in currents, toward the  
100 middle of the vessel, and with a velocity increasing as the distances between these hollows and webs diminish.

The combined action of the hollows, *d*, and webs, *b*, on the fluid is of a similar character but rather greater in effect, owing to  
105 the motion of the dashers toward each other giving rise to another set of currents crossing the first in more than one direction. As a consequence, the whole mass of cream is soon thrown into violent commotion. But  
110 little consideration is required to show that the agitation thus produced is by far more intense than it would have been, had the side pieces of the dashers, been simply beveled instead of hollowed, and the webs omitted  
115 in the construction of this churn. It is plain therefore, that, as the number of oil-globules broken up is proportionate to the intensity with which they are agitated, a greater  
120 quantity of butter is produced, in the same time, by the combined action of hollows and webs, than could be effected by the action of side pieces without webs and merely beveled.

Having thus described the construction 125  
and operation of our improved churn, we would state that we do not claim the mechanism of a driving wheel geared with two

pinions, for the purpose of rotating in opposite directions, the dashers connected with said pinions; but that

We do claim—

- 5 The combination of the hollow *s, c*, of the side pieces of the outer dasher, with the webs, *a*, attached to the inner wall of the vessel *A'*, together with the combination of the hollow *s, c*, of the side pieces of the inner

dasher with the webs, *b*, attached to the side 10 pieces of the outer dasher, when these combinations are made and arranged, as, and for the purposes specified.

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Witnesses:

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