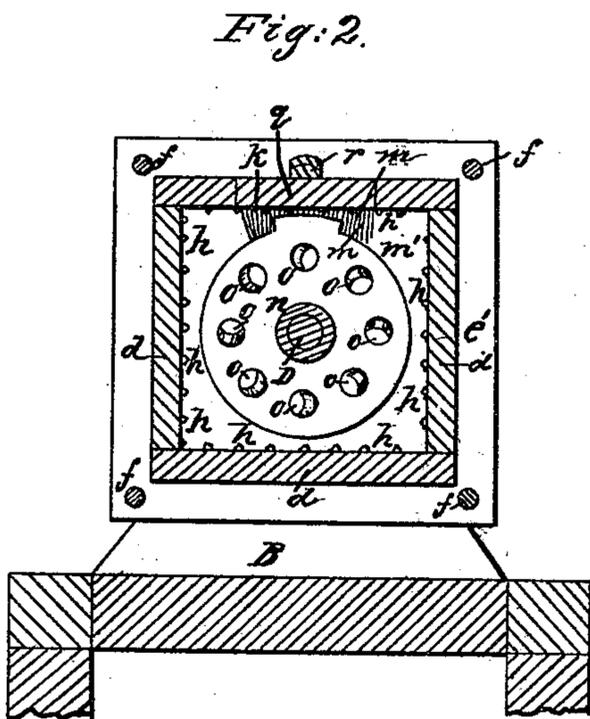
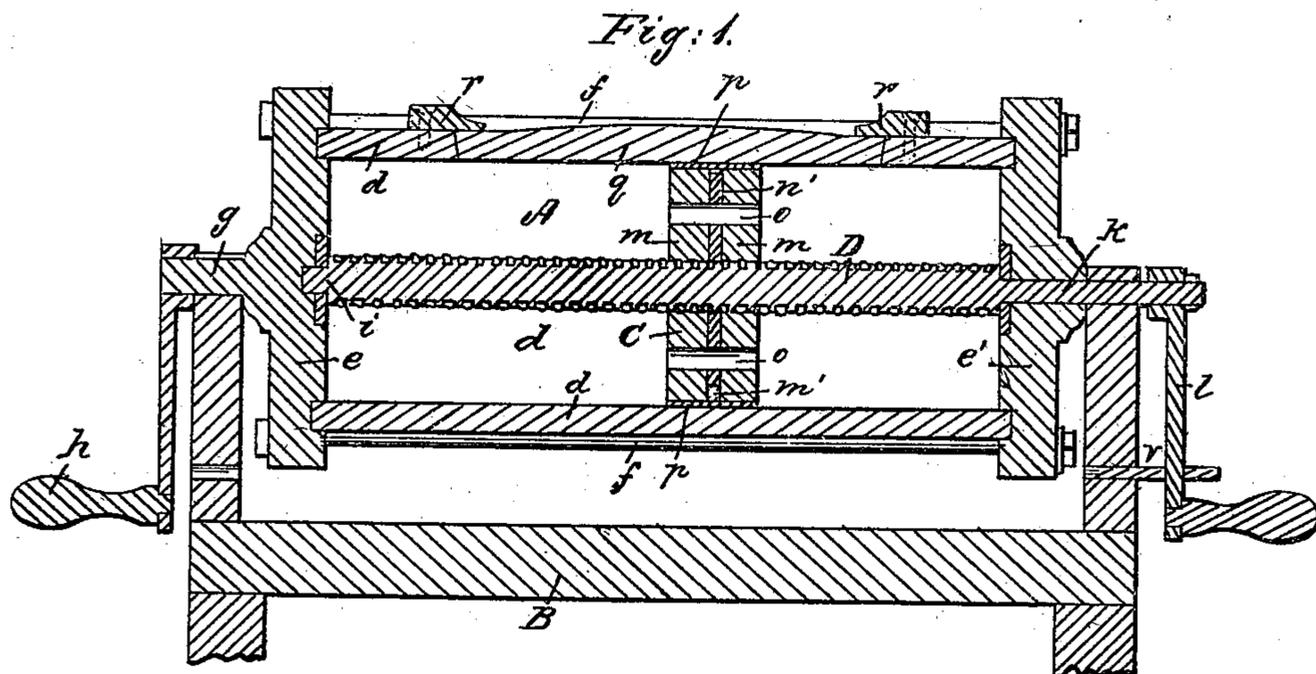


E. L. PRATT.

Churn.

No. 25,306.

Patented Aug. 30, 1859.



Witnesses:  
Sam Minton  
George Pfeiffer.

Inventor:  
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# UNITED STATES PATENT OFFICE.

E. L. PRATT, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO HIMSELF AND R. B. FITTS,  
OF SAME PLACE.

## CHURN.

Specification of Letters Patent No. 25,306, dated August 30, 1859.

To all whom it may concern:

Be it known that I, E. L. PRATT, of the city of Philadelphia and State of Pennsylvania, have invented a new and Improved Churn; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawings, making a part of this specification, in which—

Figure 1, is a vertical longitudinal section through its center; and Fig. 2, a transverse section of the same, through the middle of its diaphragm or piston—like letters, in both figures, indicating the same parts.

My invention consists in the employment within a prismatic churn case of a movable diaphragm or piston, operated so as to have a reciprocating motion, by means of a screw shaft, or its equivalent, which is placed longitudinally through the interior of the churn and adapted to be rotated by means of a crank-handle on its outer end; and also to admit of a rotary reciprocating motion of the said diaphragm upon the said screw as the body or case of the churn itself is rotated upon its journals—the said diaphragm having a series of grooves made across its edges for the passage of the cream in small streams from one side to the other of the same, as it is moved along therein in the longitudinal direction of the churn, whereby I am enabled to expedite the development of butter from the cream, and also to gather and press it firmly, in each end of the said churn, as it is developed.

My invention also consists in the peculiar manner, hereinafter described, of constructing the said diaphragm or piston with adjustable openings through it, so that, as the thickness of the cream to be churned varies, the openings or perforations mentioned may be readily adapted thereto.

In the drawings, A, represents the body or case of the churn; B the frame upon which it is supported at a proper height; C, the movable diaphragm or piston within the body or case (A); and D, the screw-shaft which supports the diaphragm.

The body or case (A), I usually construct of four side-pieces,  $d-d$ , of strong wood, united together at their edges by wood screws so as to produce a form having a rectangular cross section, and of two end pieces,  $e$  and  $e'$ , which are each grooved on one side

so as to let into them the ends of the said side-pieces ( $d-d$ )—the said end and side pieces being firmly secured together, so as to be water tight, by means of the four screw and nut bolts  $f-f$ . In the middle of the outer side of the end piece ( $e$ ), a journal  $g$ , is fixed and to which is fixed a crank-handle  $h$ .

Longitudinally through the center of the case (A), the screw shaft (D) is placed so that its one end shall be supported by a short journal  $i$ , in a depression made in the center of the inner side of the end piece ( $e$ ); while the other end is supported in a perforation, made through the center of the other end-piece ( $e'$ ), by a journal  $k$ , which projects beyond the frame (B), and has a crank handle  $l$ , fixed upon it—the two journals ( $i$  and  $k$ ) being each less in their diameters than the screw part of the said shaft (D), so as to produce shoulders on the latter which abut against the end pieces ( $e$  and  $e'$ ). The screw-shaft (D) has a four or five-threaded screw cut around it so as to carry the diaphragm or piston (C), (through the center of which it works in corresponding threads) rapidly from one inner end of the case (A) to the other, as the one is caused to rotate moderately in or upon the other.

The diaphragm or piston (C) is usually constructed of three strong, flat pieces of wood,  $m, m', m$ , secured firmly together, yet so as to permit a disk,  $n$ , which is cut loose from the middle piece and formed so that it may be operated by hand—it turning, on the shaft (D) as a center, backward and forward between the two outer pieces ( $m, m$ )—or so as to operate as an adjusting slide to either open, adjust, or close a circular series of holes,  $o-o$ , which are made transversely through the said diaphragm, substantially as indicated in the drawings. Transversely across each edge of this diaphragm (C), a series of small grooves,  $p-p$ , are made so as to form open communications between the two portions of the case (A) which may be on the two opposite sides of the said diaphragm (C)—the latter being, in size, adapted to slide with its four grooved edges nearly in close contact with the four respective sides of the case (A), substantially as shown in the drawings.

An oblong opening for giving free access to the interior of the case (A), is made through one of the sides ( $d$ ) of the same,

which is fitted with a lid or cover  $q$ , fastened by buttons  $r-r$ , or otherwise secured, so as to fit water-tight therein.

A pin,  $v$ , is inserted into either end of the frame (A) so as to prevent either the case (A), or the shaft (D), from being rotated, as occasion may require, in operating the churn.

Operation: The cream to be churned is placed in the case (A), the lid ( $q$ ) firmly secured thereon, and the pin ( $v$ ) inserted, as shown in the drawing, so as to prevent the shaft (D) from being rotated. The operator now takes hold of the crank handle ( $h$ ) and gives rotary motion to the case (A), thus causing the diaphragm or piston (C) to be forced, by the screw shaft (D), toward, and eventually against, one of the ends ( $e$  or  $e'$ ) of the said case (A), when he then gives an opposite rotary motion to the said case (A), and thus forces the said diaphragm (C) to the other end of the same, and so on—forcing the cream through the grooves ( $h-h$ ), and also through the series of perforations ( $o-o$ ), if the latter have been adjusted for the purpose, and so producing the crushing effect required, as well as an intimate exposure of the cream to the air, and at the same time producing a constant agitation in the cream, after it has passed through the diaphragm, by the action of the flat sides of the case upon the same—from its rotary motion, which latter action, even if the diaphragm (C) be dispensed with, it is believed will equal in its effect, in developing the butter, to the well known separate, rotary agitation or dasher in barrel-churns. During the operation of churning, as described, much of the butter will have become pressed in a mass at each end of the case (A); but, in order to gather and condense the whole of it in a solid condition at the said ends, the pin ( $v$ ) is withdrawn from connection with the handle ( $l$ ) and inserted so as to hold the handle ( $h$ ), when the operator, rotating the screw-shaft (D) by means of the said handle ( $l$ ), forces the butter up solidly, or into a condensed state, successively against each of the said ends  $e$  and  $e'$ —from whence it is afterward readily withdrawn by hand, entirely free from butter milk in its substance, and therefore ready for immediate salting.

In the operation described, it will be perceived that a distinct agitator or dasher is not requisite in this rotary churn; because, in its transverse section, it is quadrangular or four sided—each side serving to produce the same amount of agitation in the cream as would be produced by a distinct agitator or dasher; and that therefore the diaphragm not being used, or present, which may be the case if so desired—a larger capacity is left for cream; and, in either case, the most convenient access afforded for removing the

butter, and subsequently for cleansing the interior of the case A. It will also be perceived that the diaphragm or piston (C), by its rapidly reciprocating motion within the case, must necessarily cause the cream to be gradually forced to pass with great velocity and in small streams, through the numerous grooves ( $p-p$ ), across its edges, and consequently to be subjected, at each traverse of the said diaphragm or piston (C), to a powerful frictional or crushing action, which—on the theory that butter is in a state of insulation or enveloped in vesicles which are intimately mingled with the lacteal fluid drawn from the animal—is admirably adapted for producing the development required; that the cream, by the same operation of the said diaphragm or piston, is also intimately exposed to the air in the churn, and, in so far as the action of air may be concerned in aiding in the development of butter in the churning process, the action must be favorable—because the numerous streams which are thus forced out through the minute grooves ( $p-p$ ) must each be proportionately small in their transverse section and yet formed of the whole mass of the fluid contained in the case A. It will be perceived too, that the arrangement and operation of the series of the adjustable holes ( $o-o$ ), through the body of the diaphragm (C), being larger, will afford ample facilities for the same kind of crushing and aerating action when the cream is too thick to be forced rapidly enough through the grooves ( $p-p$ ), or as described. It will also be perceived that as the butter is developed, it will be gathered and pressed into contact with the ends of the case (A) by the action of the piston, as it arrives at either end, in the operation of churning; and finally, that when the whole of the butter has been developed, as described, the rotary motion of the case being stopped and so secured, by means of the pin ( $v$ ) or otherwise, the butter can be packed solidly, and entirely freed from buttermilk in its substance, in the ends of the case, by operating the screw shaft (D) alone, as described; and the butter subsequently be taken out by hand ready for salting, or in such a condensed state as will not require any further working for the removal of buttermilk.

The machine is simple in its construction, easily understood and operated, and is moreover, not any more liable to get out of order than a common barrel-churn.

Having thus fully described the construction and operation of my improved churn, and pointed out its utility, what I claim therein as new, of my invention, and desire to secure by Letters Patent is—

1. I claim, in combination with the rotary case or body (A) of a churn—a diaphragm or piston (C) adapted both to move upon,

and be moved by, a screw shaft (D), or its equivalent, placed horizontally in the said case as described—the said diaphragm (C) and shaft (D) being constructed and combined together as herein set forth.

5 2. I also claim the series of perforations (o—o) through the diaphragm or piston (C), in combination with the movable per-

forated adjusting disk or plate (n), or their equivalents—the same operating together, in the case (A), substantially as and for the purpose set forth and described.

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Witnesses:

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