





# UNITED STATES PATENT OFFICE.

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## COMBINED TEMPERING-VAT, CHURN, AND BUTTER-WORKER.

SPECIFICATION forming part of Letters Patent No. 706,118, dated August 5, 1902.

Application filed January 16, 1900. Serial No. 1,633. (No model.)

*To all whom it may concern:*

Be it known that I, PHILIP M. SHARPLES, a citizen of the United States of America, and a resident of Westchester, in the county of Chester and State of Pennsylvania, have invented certain new and useful Improvements in a Combined Tempering-Vat, Churn, and Butter-Worker, of which the following is a specification.

My invention relates to butter-making mechanism; and my main object is to provide a single machine which will in itself be capable of effecting the different operations necessary to convert the cream into finished butter. The advantages resulting from thus combining in a single machine the capacity for effecting the series of operations heretofore carried on successively in two or more separate mechanisms consist not only in the saving of first cost of apparatus and of valuable room, but also in the saving of unnecessary handling, and particularly in the improved quality of product resulting from the entire avoidance of exposure of the easily-affected material operated on.

Heretofore the cream after being separated from the whole milk has been first subjected to a "tempering" operation, whereby it is "ripened" for churning, this being effected in a special apparatus. The succeeding operations of churning and working have been carried on either in two separate machines or in a "combined churn and worker." My improved machine is adapted not only to effect all of these operations without requiring any handling or transfer of the cream except from the cream-separator directly into the machine, but it is also adapted to carry on either one of the operations independently of the others, if desired.

The features of my invention are fully described in connection with the accompanying drawings and are particularly pointed out in the claims.

Figure 1 is a longitudinal sectional view of a machine embodying my invention, one of the paddles and one of the working devices only being shown. Fig. 2 is a partial cross-

sectional view indicating different positions of the working devices.

A represents a vessel, preferably of cylindrical form, having heads  $A'$  and  $A^2$ , provided with hollow gudgeons which are mounted in bearings  $CC'$  and which receive a central shaft or bar B, extending longitudinally through the vessel, said shaft, as shown, being extended entirely through the gudgeon  $a$  of the head  $A'$  and being adapted to be secured either to the fixed bearing C or to the rotary vessel A, as hereinafter described.

The vessel A is provided with a series of paddles E, which are made hollow, as shown, and are carried between the heads of the vessel and connected together, so as to form a continuous passage for liquid by pipes  $E^2$ , which pass alternately through the heads  $A^2$   $A'$ , while the unconnected end paddles of the series are connected, respectively, to an inlet-chamber  $a'$ , formed in the gudgeon  $a$ , and to an outlet-chamber  $a^2$  in the same by means of an inlet-pipe  $E'$  and an outlet-pipe  $E^3$ , respectively, as indicated. The liquid which is to be circulated through the connected hollow paddles may be supplied to the gudgeon-chamber  $a$ , as shown, by means of an annularly-chambered feed-sleeve D, fixedly mounted on the projecting shaft B and arranged to form a liquid-tight connection with the rotating gudgeons, while the circulated liquid returned to the chamber  $a^2$  may be delivered therefrom in any preferred manner.

As thus described it will be understood that my improved machine is adapted to serve as a cream vat and ripener and also as a churn, the cream being tempered in order to better control the ripening by circulating a liquid of any desired temperature through the connected paddles while the latter are being slowly rotated with the loaded vessel and being subsequently churned, as usual, without transfer to another vessel, thus avoiding the exposure and expense incident to such additional handling. Also inasmuch as it is similarly advantageous to effect the required working of the butter without incurring such exposure and expense I provide, in connection with the



tempering and churning mechanism already described, a working device within the vessel A, so arranged as to be either put into working action by the rotation of the vessel or to be locked against such action, as desired. This butter-working mechanism comprises, as shown, a working device, preferably in the form of a longitudinally-arranged bar or rollers G, carried by links H, which have their inner ends pivoted at  $f$  to arms F, fixed to the central shaft B, the length of these arms and of the connecting-links being such as to cause the working device G to be swung in an arc  $g$  by the passage of each paddle E of the slowly-rotated vessel, the central shaft B and connected arms F being rigidly held during this action by fixing the former at  $b$  to the bearings C<sup>2</sup>. The movement of each link H upon its pivotal connection  $f$  is, as shown, limited in each direction by stops  $f'$  and  $f''$ , so as to allow the roller G to swing a limited distance both above and below the radial line  $f^3$  and so that said roller approaches nearest to the inner wall A<sup>3</sup> of the vessel at an intermediate point of the roller's movement. The roller G in its upward swing moves inward on the arc  $g$  sufficiently to allow the paddle E by which it has been moved to pass it, as indicated at G', after which it falls to its lowermost position in the arc  $g$ , only to be again raised by the next succeeding paddle E.

The working of the butter, as will be readily understood, is effected by the action of the roller G upon the mass of butter carried upward by the paddles E, which may be not only pressed against the paddles by the fall of said roller, but is also pressed against the wall of the vessel by the movement of the same in the arc  $g$ .

During the tempering and churning operations the working action of the bar or roller G in connection with the paddles E is not required, and I therefore provide for conveniently dispensing with this action when desired. This I accomplish, as shown, by locking the roller mechanism to the rotary vessel, so that it, together with the shaft B, will simply rotate with the vessel, which I accomplish by merely removing the pin  $b$ , which fixes the central shaft B to the bearing, turning the shaft until the arms F and rollers G assume the dotted position, indicated in Fig. 2, with the latter held against the paddles E, and then pinning the shaft B to the vessel, as at  $b'$ , so that shaft and all will rotate with the latter.

It will be understood that the arm F, from which the roller G is shown suspended, would most naturally be swung upward, so as to lock the link H in contact with the upper paddle E instead of with the lower one, as indicated by the dotted lines, which latter would in such case represent a roller and link attached to the second (lower) arm F.

It will be seen that the paddles E in connection with the vessel A are thus adapted

to serve in addition to the ordinary function of agitators in churning, first, in connection with means for circulating liquid through them as tempering devices for the cream, and, second, in connection with the wall of the vessel and the working devices in effecting the working of the butter. The whole series of operations are thus effected not only in a single machine, but without handling or exposure of the material at any stage of the process.

It is obvious that the mechanism specifically shown and described may be considerably modified without departing from the spirit of my invention.

What I claim is—

1. A combined tempering-vat, churn, and butter-worker comprising a rotary vessel having a series of paddles, means for circulating liquid through said paddles and one or more working devices within said vessel adapted to be operated by the rotation of the latter.

2. A combined tempering-vat, churn, and butter-worker comprising a rotary vessel having a series of paddles, means for circulating liquid through said paddles during the rotation of the vessel, working devices within said vessel adapted to be operated by the rotation of the latter, and means for locking said working devices.

3. A combined churn and butter-worker comprising a rotary vessel having a series of paddles, and one or more working devices mounted on fixed pivots within the vessel and arranged to be raised by a passing paddle and thereafter to fall in the path of a succeeding paddle.

4. A combined churn and butter-worker comprising a rotary vessel having a series of paddles, and working devices mounted on fixed pivots within the vessel and arranged to be raised by each passing paddle and thereafter to fall in the path of a succeeding paddle, the swing of said working devices being first toward and then away from the wall of the vessel.

5. A combined churn and butter-worker comprising a rotary vessel having a series of paddles and one or more working devices eccentrically pivoted within the vessel and arranged to swing between adjacent projecting paddles of the rotating vessel in an arc of reduced radius approximately tangent to the wall of the vessel substantially as set forth.

6. A combined churn and butter-worker comprising a rotary vessel having a series of paddles, one or more working devices eccentrically pivoted within the vessel and arranged to swing between adjacent projecting paddles of the rotating vessel in an arc of reduced radius approximately tangent to the wall of the vessel, and stops to limit said swing substantially as set forth.

7. A combined churn and butter-worker comprising a rotary vessel having a series of



paddles, one or more working devices eccentrically pivoted within the vessel and arranged to swing approximately at a tangent to the wall thereof, and means for attaching said  
5 pivoted devices to the vessel so as to be fixedly rotated therewith, substantially as set forth.

8. A combined churn and butter-worker comprising a rotary vessel having a series of  
10 paddles, a shaft having fixed thereto one or more carrying-arms, working devices con-

nected to said arms so as to be capable of a limited swinging movement thereon, and means for rigidly attaching said shaft with its connections to the rotary vessel when desired substantially as described. 15

Signed by me at Westchester, Pennsylvania, this 29th day of December, A. D. 1899.

PHILIP M. SHARPLES.

Witnesses:

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