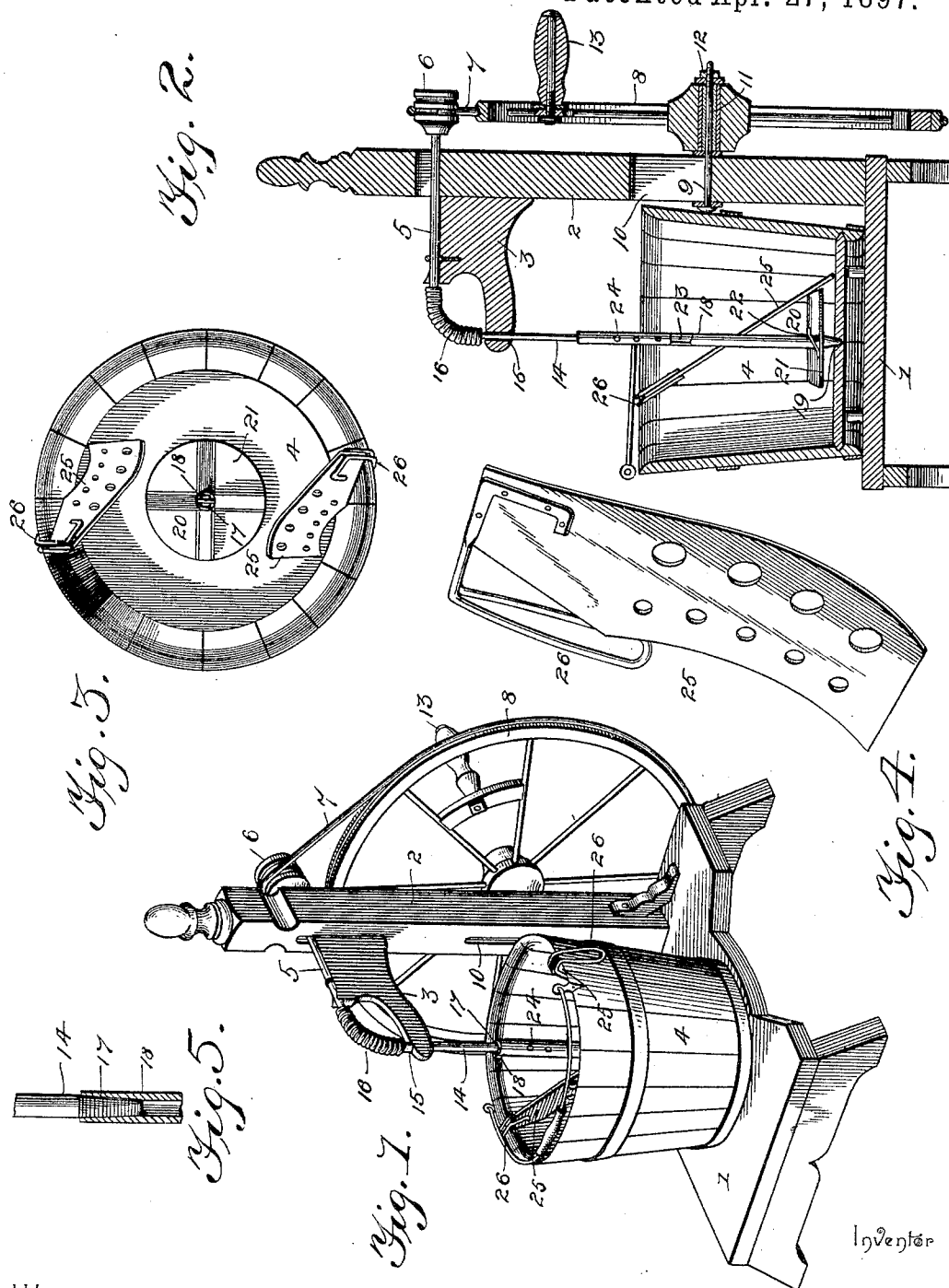


(No Model.)

G. A. NORCROSS.
CHURN.

No. 581,609.

Patented Apr. 27, 1897.



Witnesses

E. H. Monroe
D. D. [Signature]

By his Attorneys.

George A. Norcross

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UNITED STATES PATENT OFFICE.

GEORGE A. NORCROSS, OF SAN ANTONIO, TEXAS.

CHURN.

SPECIFICATION forming part of Letters Patent No. 581,609, dated April 27, 1897.

Application filed July 2, 1895. Serial No. 554,751. (No model.)

To all whom it may concern:

Be it known that I, GEORGE A. NORCROSS, a citizen of the United States, residing at San Antonio, in the county of Bexar and State of Texas, have invented a new and useful Churn, of which the following is a specification.

My invention relates to a dasher and operating mechanism therefor adapted for use particularly in connection with churns, but designed also to be employed as an agitator for ice-cream freezers and similar machines.

The objects in view are to provide an improved dasher for producing a partial vacuum at the bottom of the vessel by repelling the liquid in the vessel, said vacuum being supplied by air admitted through a tubular dasher-staff and having outlets in rear of the blades of the dasher, deflectors or breakers being used in connection with the dasher to counteract the centrifugal action of the latter and force the liquid inward or toward the axis of rotation, and, furthermore, to provide simple and efficient means for communicating motion to the dasher from a driving-shaft, said communicating means performing the additional function of supporting the upper end of the dasher-staff and maintaining the parts in their proper relative positions without fastening devices.

Further objects and advantages of this invention will appear in the following description, and the novel features thereof will be particularly pointed out in the appended claims.

In the drawings, Figure 1 is a perspective view of a churn constructed in accordance with my invention. Fig. 2 is a vertical central section of the same. Fig. 3 is a plan view of the dasher and churn-tub, showing the deflectors or breakers in operative position. Fig. 4 is a detail view of one of the deflectors detached. Fig. 5 is a detail section of the joint between the dasher-staff and the stem or driven shaft.

Similar numerals of reference indicate corresponding parts in all the figures of the drawings.

1 designates a base from which rises a standard 2, having an approximately horizontal arm 3, which projects over the base and hence over the churn tub or body 4,

which is adapted to be supported by the base. Mounted in suitable bearings upon this horizontal arm and the contiguous portion of the standard is a driving-shaft 5, carrying a small belt-pulley 6 or its equivalent, and this belt-pulley receives motion through a belt 7 from a driving-wheel 8, mounted upon a stub-shaft projecting rearwardly from the standard. In the construction illustrated in the drawings said stub-shaft consists of a bolt 9, fitted in a vertical slot 10 in said standard, with the head of the bolt in contact with the front surface of the standard; a sleeve 11, fitted upon the rearwardly-projecting portion of the bolt and bearing at one end against the rear surface of the standard, and a nut 12, threaded upon the extremity of the bolt and bearing against the outer end of the sleeve, whereby the stub-shaft may be adjusted vertically to vary the tension of the belt and may be locked at the desired adjustment by tightening said nut. The nut also prevents the wheel from vibrating upon the sleeve which forms its bearing. The driving-wheel may be rotated by any suitable or preferred means, either mechanical or manual, but in the drawings I have shown the same provided with a handle 13.

In connection with the driving-shaft above described I employ a stem or driven shaft 14, mounted for rotation and vertical sliding movement in a bearing 15, formed vertically in the extremity of the horizontal arm 3. Said stem or driven shaft is connected to the driving-shaft to receive motion therefrom by means of a flexible coupling-shaft 16, the main function of the latter being to convey rotary motion from a driving-shaft, which is arranged in a horizontal position, to a driven shaft, which is arranged in a vertical position. The lower extremity of the stem or driven shaft is made cross-sectionally angular to engage a correspondingly-shaped socket 17 in the upper end of the dasher-staff 18, said staff being stepped at its lower extremity in a suitable depression or socket 19 in the bottom of the churn tub or body 4 or other vessel in connection with which the improved mechanism is employed. The additional function performed by the flexible shaft is to hold the angular extremity of the stem or

driven shaft in engagement with the socket in the upper end of the dasher-staff, and hence the coupling-shaft must possess flexibility and resilience and must be so arranged as to cause, when unobstructed, an endwise downward movement of the stem or driven shaft.

The arrangement above described of the driving and driven shafts at right angles to each other, with the flexible coupling arranged to form an arc connecting the contiguous extremities of said shafts, secures this dual function of the coupling.

The dasher 20, which is carried by the dasher-staff, consists, in the construction illustrated, of a horizontal imperforate circular disk or plate 21, provided with a plurality of upwardly and rearwardly inclined deflecting-blades 22, the function of the blades, which are disposed in radial positions, being to force the liquid contents of the churn tub or body upwardly from the plane of the dasher and thereby produce a partial vacuum at the bottom of the tub or body in rear of each blade, the immediate return of the liquid to the plane of the disk after having been forced upward by a blade being prevented by the inertia of the liquid. The air necessary to supply the vacuum produced by the dasher is admitted through the bore 23 of the dasher-staff, said staff being tubular in construction and extending to a point above the plane of the top of the churn tub or body. Suitable inlet-openings 24 communicate with the bore near the upper end of the dasher-staff, and an outlet-opening 24^a is formed in the staff in rear of and contiguous to each blade, whereby the displacement of liquid by each blade is supplied by a separate opening.

In practice the rapid rotation of the dasher necessary to produce the desired influx of air at the bottom of the tub produces sufficient centrifugal action to cause the contents of the tub or body to seek the sides of the tub and eventually to expose the dasher, and in order to prevent this action and cause the contents to be thrown over the dasher and exposed to the upward current of air I employ deflectors or breakers 25, arranged in inclined positions contiguous to the sides of the tub, said devices being inclined downward and forward in the direction of rotation of the dasher and being perforated to avoid offering too great resistance to the current of the liquid. Thus the deflectors or breakers serve to throw the contents of the churn inward and thereby counteract the centrifugal action and prevent the dasher from being exposed, and hence the air inducted by the action of the dasher in passing upward through the churn tub or body to escape at the top thereof is forced to pass through the liquid, and in so doing to separate the butter from the milk.

In the construction illustrated in the drawings I employ an ordinary water-bucket as the churn tub or body, and the only change

of construction necessary therein is the formation of a slight depression or socket at the center of the bottom thereof to receive the lower extremity of the dasher-staff, and in order to provide for the application of the deflectors or breakers I provide the same at their upper extremities with spring-arms 26, adapted to extend over the upper edge of the bucket and bear against the outer surface thereof, said arms being arranged approximately parallel with the outer edges of the deflectors. Either one or more of these deflectors or breakers may be employed, according to the speed of rotation of the dasher and the amount of the contents of the bucket, and the means provided for their attachment to the bucket enable them to be arranged in any desired position to secure efficiency of operation.

The flexible and elastic or resilient coupling-shaft is illustrated in the drawings as being constructed of coiled spring-wire, but in practice I have found that rubber hose possesses the same qualities of longitudinal expansion or extension and torsional elasticity necessary to communicate rotary motion and resist longitudinal or endwise pressure, and hence necessary to communicate motion from the driving to the driven shaft and at the same time maintain the latter in engagement with the dasher-staff. This construction enables me to avoid the use of fastening devices for connecting the stem and dasher, and hence provides for the mounting and dismounting of the dasher with facility and celerity.

A further advantage of the above-described construction resides in the fact that the upward deflection of the liquid contents of the receptacle produces a positive displacement contiguous to and in communication with the outlet-openings of the dasher-staff irrespective of the weight of the contents of the receptacle and the depth at which the dasher is operated, whereby vertical adjustment of the dasher to suit the depth of the contents in the receptacle is unnecessary.

As above indicated, I desire it to be understood that the mechanism herein described may be employed in connection with an ice-cream freezer or other machine in which a corresponding operation of the dasher and co-operating parts is necessary, and, furthermore, in adapting it to its several analogous uses various changes in the form, proportion, and the minor details of construction may be resorted to without departing from the spirit or sacrificing any of the advantages of this invention.

Having described my invention, what I claim is—

1. The combination of a dasher seated at its lower end, a driving-shaft, and a flexible and axially-expansible coupling-shaft arranged to communicate rotary motion to the dasher-staff and to hold the latter seated, substantially as specified.

2. The combination of a dasher-staff stepped at its lower end in a depression or socket, a

stem mounted in alinement with the dasher-
staff for rotary and axial movement, said stem
and staff having interlocking extremities
adapted to be held in operative relation by
5 endwise pressure of the stem toward the staff,
a driving-shaft, and a flexible coupling-shaft
connecting said stem to the driving-shaft to
communicate rotary motion from the shaft to
the stem and being axially expansive to yield-
10 ingly hold the stem in operative relation with

the staff, and also hold the dasher-staff in the
depression or socket in which its lower ex-
tremity is stepped, substantially as specified.

In testimony that I claim the foregoing as
my own I have hereto affixed my signature in 15
the presence of two witnesses.

GEORGE A. NORCROSS.

Witnesses:

JOHN H. SIGGERS,
DAISY C. TAYLOR.