(No Model.) 2 Sheets—Sheet 1.

I. BOGART.

CHURN.

No. 347,916. Patented Aug. 24, 1886.

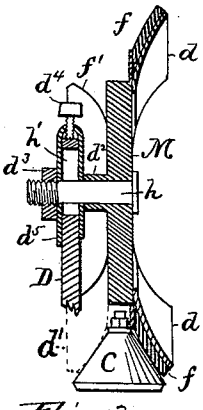

Fig. 3.

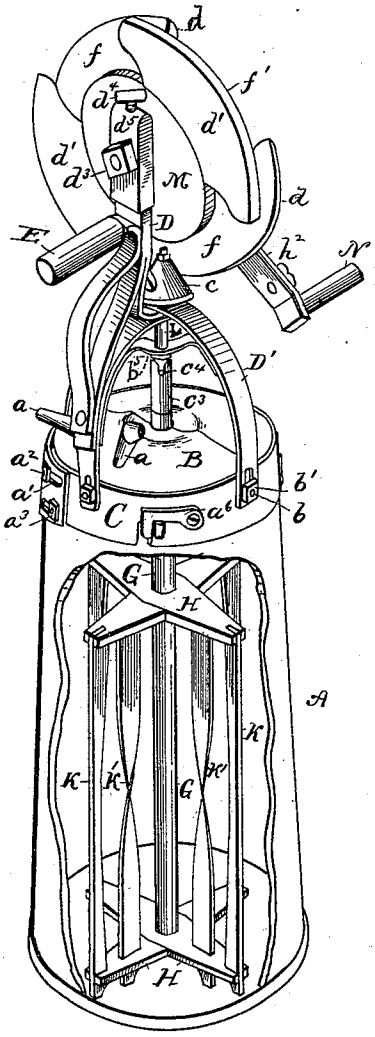

Fig. 1.

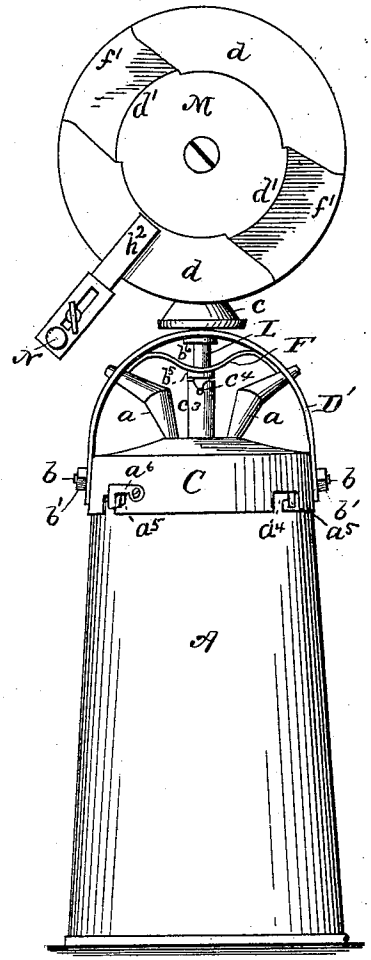

Fig. 2.

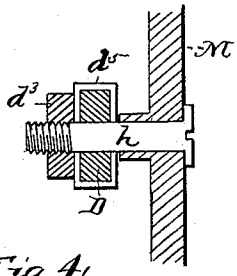

Fig. 4.

Witnesses
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G. B. Towles

Inventor
Isaac Bogart
By his Attorney W. Burris.

(No Model.) 2 Sheets—Sheet 2.

I. BOGART.

CHURN.

No. 347,916. Patented Aug. 24, 1886.

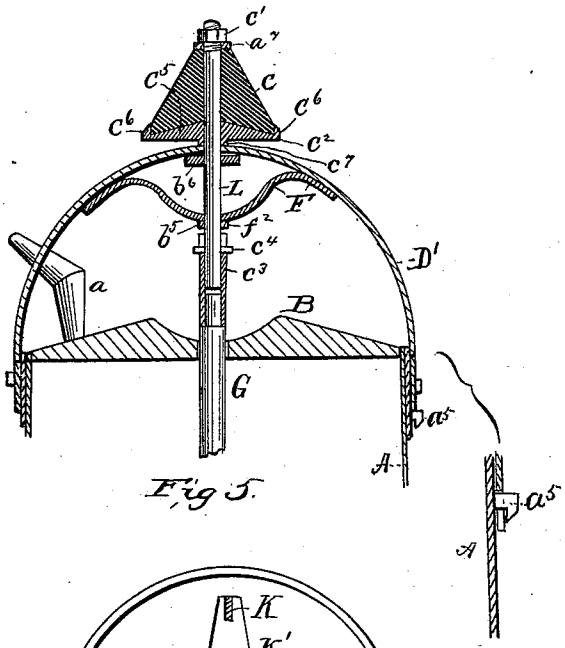

Fig 5.

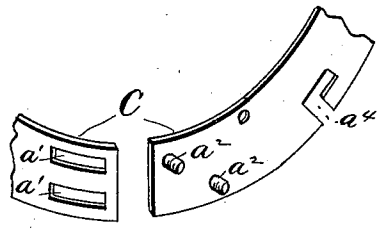

Fig 6.

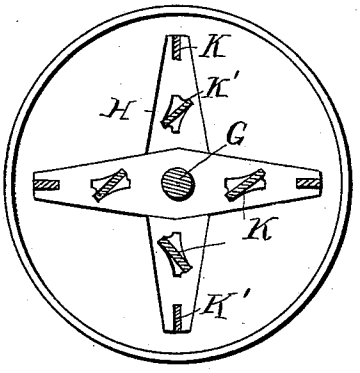

Fig. 7.

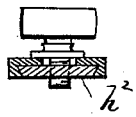

Fig. 8.

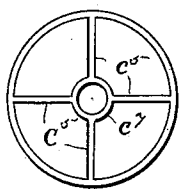

Fig. 9.

Witnesses
Wm. Rauchbauer
G. B. Towles.

Inventor
Isaac Bogart
By his Attorney W. Burris

UNITED STATES PATENT OFFICE.

ISAAC BOGART, OF DANA, INDIANA, ASSIGNOR OF ONE-HALF TO JULIUS C. GROVES, OF SAME PLACE.

CHURN.

SPECIFICATION forming part of Letters Patent No. 347,916, dated August 24, 1886.

Application filed December 8, 1885. Serial No. 185,073. (No model.)

To all whom it may concern:

Be it known that I, ISAAC BOGART, a citizen of the United States of America, residing at Dana, in the county of Vermillion and State of Indiana, have invented certain new and useful Improvements in Churns, never before patented in any country, and of which the following is a specification, reference being had therein to the accompanying drawings.

My invention relates to improvements in reversible vibrating churn-dashers; and it consists in the construction and combinations of the dasher and its operating devices, as hereinafter fully set forth and claimed.

In the accompanying drawings, Figure 1 is a perspective view of a churn having my improvements attached, and a portion of the churn-cylinder broken away to show the dasher. Fig. 2 is a right side elevation. Fig. 3 is a vertical section of the adjustable wheel-bearings. Fig. 4 is a cross-section of the wheel and its bearings. Fig. 5 is a vertical section, enlarged, through the dasher-shaft and bevel-wheel. Fig. 6 is a perspective view of the adjustable band detached. Fig. 7 is a cross-section of the churn and dasher blades and shaft. Fig. 8 is a cross-section, enlarged, of the adjustable crank-lever. Fig. 9 is a plan of the washer detached.

A designates the body of a churn having a head, B, in two sections, one section being provided with perforations to receive tubes *a a*, to admit air in the churn, and the escape of air and gas from the churn during the churning operation, to avoid forcing the cream through the joints around the head and dasher-shaft. These tubes are formed with elbows, and are larger in diameter at the elbows than at their ends, for the purpose of preventing the cream from being forced out through the tubes. The inclined position of the upper portions of the tubes prevents the liability of anything falling into them.

C designates an adjustable band, one end of which is provided with slots a', to receive the threaded bolts a^2, attached to the other end of the band. These bolts are provided with set-nuts a^3. By means of these devices the band is adjustable to the size of the churn. The band is provided with transverse slots a^4, to receive the hooked studs a^5, attached to the body of the churn, forming the well-known bayonet-fastening. At one of the transverse slots of the band is pivoted a hook, a^6, in position to catch over the stud a^5, as shown, to prevent the band from moving horizontally during the churning operation.

D designates a standard attached to or formed on the curved supports D′, the lower ends of which are provided with slots to receive threaded bolts on the band, which bolts *b* are provided with set-nuts b', by means of which devices the supports are adjustably attached to the band.

E is a handle formed on or attached to the standard for steadying the churn during the operation of churning.

F designates a shaft-bearing formed on or attached to the under side of the curved support D′.

G is the dasher-shaft, the lower end of which is stepped upon a suitable bearing on the bottom of the churn, and the upper portion of this shaft is extended through a central hole in the head B.

Radial arms H are attached to the dasher-shaft, to the inner portion of which arms are attached the spiral dasher-blades K′, and to the outer portions of which arms are attached the concave blades K.

L designates a shaft having its bearings at b^5 b^6, upon the upper portion of which shaft is mounted the conic friction-wheel *c*, which is secured in place by a threaded nut, c', and washer a^7, on the upper end of the shaft, and by a peculiarly-constructed washer, c^2, securely fastened to the shaft under the wheel. The middle portion of the washer is thickened upward, and the upper surface is provided with radial ribs c^5, extending from the shaft to the rim, which is provided with the upwardly-extended peripheral flange c^6, for securely holding in place the friction-wheel. The ribs are forced by the pressure of the nut at the top into the lower surface of the friction-wheel when it is made of an elastic substance, or fit in grooves formed on the lower surface of the wheel, if not of an elastic substance, thus preventing the wheel from revolving on the shaft, and the peripheral flange serves to prevent an elastic wheel from spreading under pressure and to hold the wheel, of what-

ever material, more securely in place. The lower side of the washer is provided with a hub, c^7, extended downward, and trued on its lower surface to form a smooth bearing on the curved support D′.

The upper end of the dasher-shaft is provided with a slotted ferrule, c^3, to receive the transverse pins c^4 on the lower end of the shaft L, forming a detachable coupling of shaft L with the dasher-shaft. These shafts being thus coupled together, the lower portion of shaft L supports the upper portion of the dasher-shaft free from bearing upon the churn-head. The shaft L may be extended above the pinion into an additional bearing. (Not shown.)

M designates a wheel having double segmental flanges *d d′*, provided with grooves or other suitable devices for securely holding in place the friction-bearings *f f′*. This wheel is provided with a hub, d^2, and is mounted on a shaft, *h*, one end of which is threaded and extended through a slot, *h′*, in the standard D, and through the adjustable box d^5, constructed to fit loosely and slide vertically over the upper portion of the standard D. The shaft *h* is held in place in the standard and box by a set-nut, d^3. The upper end of the box d^5 is provided with a set-screw, d^4, the lower end of which impinges upon the top of the standard for adjusting the friction-bearings *f f′* so as to give them the required pressure upon the friction-wheel.

The segmental flanges *d d′* are all the same size, and are located so that the spaces between the flanges on one side of the wheel come opposite the flanges on the other side of the wheel; and the friction-bearings on the flanged wheel are made to correspond in width and inclination with the length and inclination of the bearing-surface of the friction-wheel.

N designates a crank-handle attached to the side of the wheel opposite to the standard.

It is evident that the greater the quantity of cream in the churn the greater the resistance to the dasher and the more power required to operate the dasher. To provide for this varying resistance and requisite force, the crank-lever h^2 may be made adjustable in length, as shown, or in any other suitable manner, so that it may be lengthened or shortened, as required by the varying quantity of cream in the churn. By means of the adjustable connection of the supports D′ with the band, and the adjustable shaft *h*, the friction-wheel *c*, and the flanged wheel M are readily adjustable vertically, so as to adjust the friction-bearings to the friction-wheel, and to take up the wear produced in use. A collar, f^2, may be fastened on the shaft L, immediately below the bearing b^5, which collar and the washer c^2 hold the shaft in place vertically. The bearing-surface of the friction-wheel may be smooth or corrugated, but either the bearing-surface of this wheel or the friction-bearings *f f′* of wheel M must be elastic, and these friction-bearings are so constructed and arranged as that the instant one of the bearings *f* is disengaged from the friction-wheel, one of the bearings *f′* will engage the wheel. There being two segmental flanges *d* and friction-bearings *f* on one side, and two flanges *d′* and friction-bearings *f′* on the other side of the wheel, as shown, it is readily seen that each revolution of the wheel will reverse the motion of the dasher, so as to rotate it twice each way, while a wheel having only one bearing or gearing on each side would give the dasher only half the number of reverse movements. The friction-bearings being all the same length and the same distance apart, each reverse movement of the dasher will be precisely the same in the distance traveled or number of its rotations. By this means a continuous movement of the cream in one direction is prevented, and the frequent rapid reversion of the movement of the dasher causes violent agitations of the cream while the spiral-shape blades on the inner portion of the dasher tend to produce upward and downward currents through the cream, and the outer concave blades tend to throw the cream from the outer to the inner portion of the churn, thus thoroughly and rapidly converting the cream into butter.

The standard and its supports, with the shaft-bearings and the flanged wheel, may all be cast or otherwise made of malleable or wrought iron, or of any other suitable material.

When there may be a small quantity of cream in the churn, or for any other reason the churn needs to be steadied, the operator holds the handle E by one hand, while he turns the crank with the other hand.

What I claim as new, and desire to secure by Letters Patent, is—

1. In a reversible vibrating churn-dasher, the wheel M, provided with the double friction-bearings *f f′*, in combination with the friction-wheel *c*, mounted upon a shaft coupled to the dasher-shaft, substantially as and for the purposes described.

2. The combination, with the wheel M, mounted upon the vertically-adjustable shaft *h*, and provided with the double friction-bearings *f f′*, of the friction-wheel *c*, mounted on the shaft L, arranged in vertically-adjustable bearings b^5 b^6, and coupled to the dasher-shaft G, substantially as and for the purposes described.

3. The combination of the churn A, the adjustable band C, the standard D, the vertically-adjustable supports D′, provided with the shaft-bearings b^5 b^6, the friction-wheel *c*, mounted upon the shaft L, coupled to the dasher-shaft G, the flanged wheel M, mounted upon the vertically-adjustable shaft *h*, and the friction-bearings *f f′*, attached to the wheel, substantially as and for the purposes set forth.

4. The combination, with a churn cover, of the elbowed ventilating-tubes *a a*, larger in diameter at their elbows than at their ends,

and having their upper portions inclined from a vertical line, substantially as and for the purpose set forth.

5. The combination of the rotating shaft L, jointed to the dasher-shaft G, the friction-wheel c, mounted on the shaft L, the washer c^2, provided with radial ribs c^5, peripheral flange c^6, and bearing-hub c^7, and the bearings b^5 b^6, substantially as and for the purposes described.

In testimony whereof I affix my signature in presence of two witnesses.

ISAAC BOGART.

Witnesses:

CARLISLE B. DAIS,

JNO. E. BIESLAND.