No. 746,629. PATENTED DEC. 8, 1903.

G. GEER.

CHURN.

APPLICATION FILED JUNE 23, 1903.

NO MODEL. 2 SHEETS—SHEET 1.

Fig. 1.

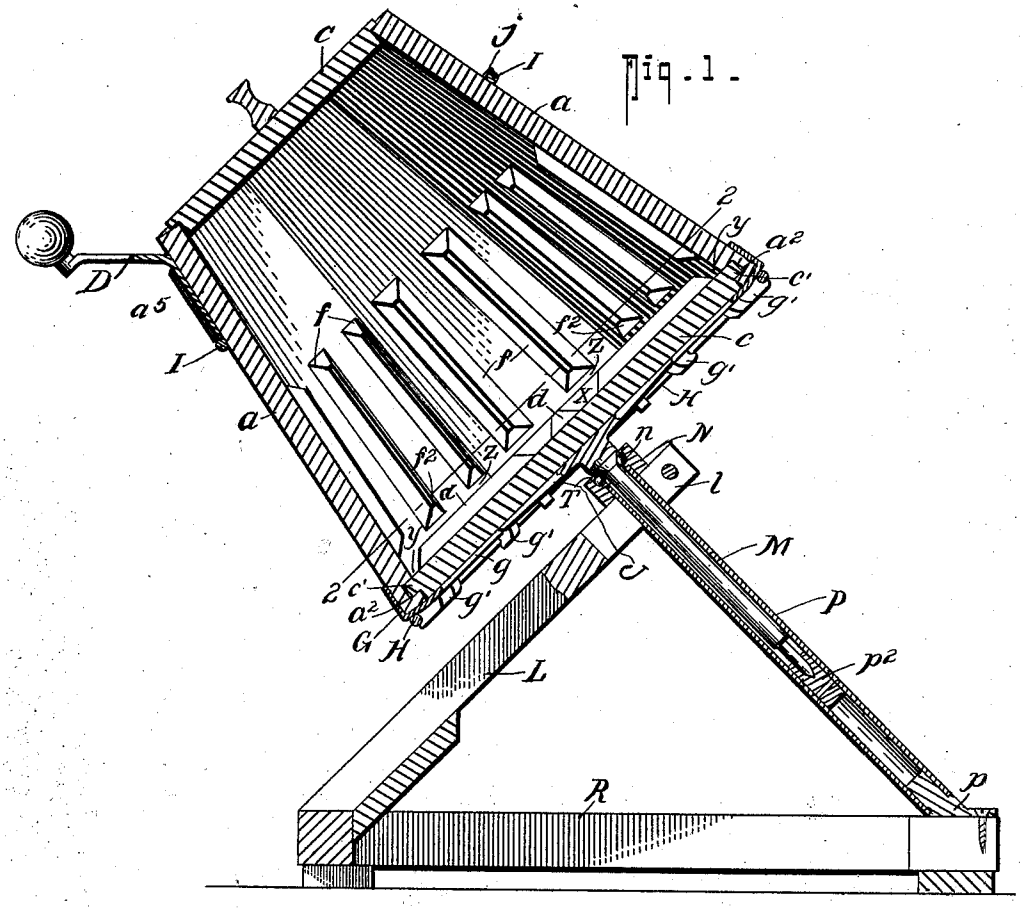
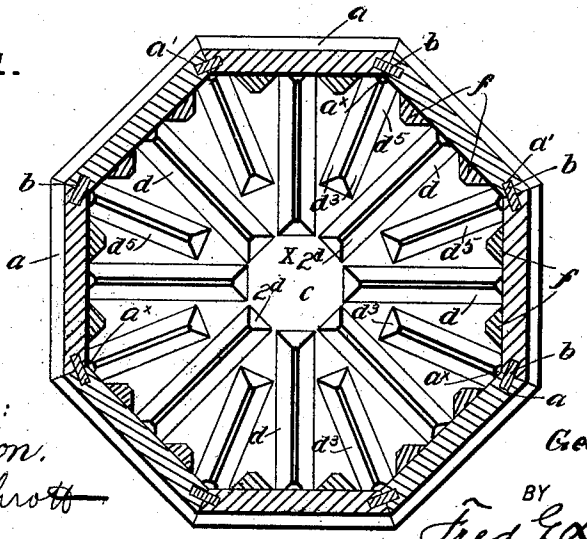



Fig. 2.




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NO MODEL. 2 SHEETS—SHEET 2.

Fig. 3.

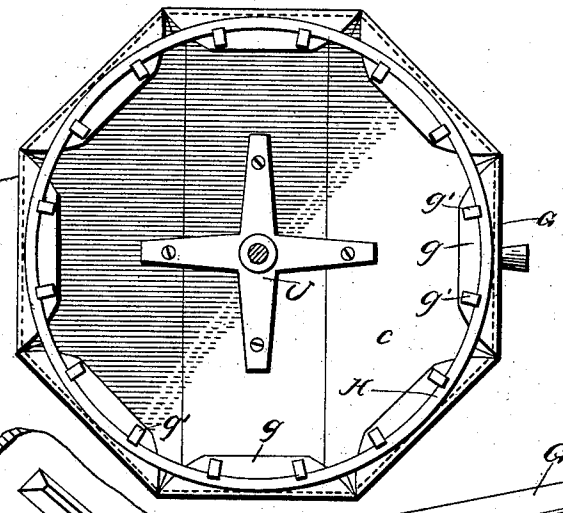



Fig. 5.

Fig. 6.

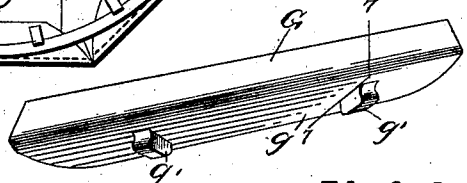



Fig. 7.

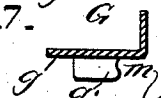



Fig. 4. A

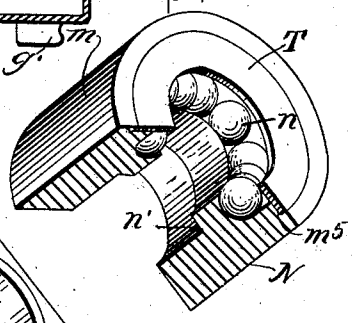






Fig. 4.

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No. 746,629. Patented December 8, 1903.

# UNITED STATES PATENT OFFICE.

GEORGE GEER, OF RICHMOND, VIRGINIA, ASSIGNOR OF ONE-HALF TO CHARLES E. BUEK, OF RICHMOND, VIRGINIA.

## CHURN.

SPECIFICATION forming part of Letters Patent No. 746,629, dated December 8, 1903.

Application filed June 23, 1903. Serial No. 162,822. (No model.)

*To all whom it may concern:*

Be it known that I, GEORGE GEER, residing at Richmond, in the county of Henrico and State of Virginia, have invented certain new and useful Improvements in Churns, of which the following is a specification.

My invention is in the nature of an improved churn of that type in which the churn-body is revolubly mounted in an oblique position, provided with cleats or ribs on its inner walls, and in which the churning action is effected by violent agitation caused by the dashing of the cream against the said cleats or ribs under a whirling or centrifugal force; and primarily my invention seeks to provide an improved churn of the character stated of a simple and economical construction, easily manipulated, and by which the cream can be effectually converted into butter with a minimum amount of time and labor.

With the above objects in view and others to be referred to my invention comprehends a churn comprising a tapering body of polygonal shape in cross-section formed of jointed staves, a bottom member interlocked with the said staves, and a special arrangement of boltless and screwless clamping devices and hoop members for securing the said staves and the bottom in a water-tight connection and automatically yieldable with respect to the expansion and contraction of the wooden staves and bottom that form the said churn-body.

In its more complete nature my invention includes a special construction of polygonal-shaped (preferably octagonal) body having a pendent shaft, an obliquely-disposed bearing for the said shaft, and a novel correlative arrangement of the side and bottom cleats or ribs within the body, all of which will be hereinafter fully described, and specifically pointed out in the appended claims, reference being had to the accompanying drawings, in which—

Figure 1 is a longitudinal section of my improved churn. Fig. 2 is a transverse section of the churn-body, taken substantially on the line 2 2 of Fig. 1. Fig. 3 is an inverted plan view of the churn-body. Fig. 4 is a detail view of the upper end of the bearing for the churn-body shaft and the detachably-held ball-bearing cap or rest. Fig. 5 is a detail view of the peculiar correlative arrangement of the bottom and side wall cleats or ribs. Fig. 6 is a detail view of one of the detachable clamp members hereinafter specifically referred to; and Fig. 7 is a cross-section taken on the line 7 7 of Fig. 6.

In its practical construction my improved churn comprises a body, preferably octagonal in cross-section, formed of a series of tapering wooden staves $a$ $a$, whose opposing edges have longitudinal grooves $a'$ $a'$, adapted to receive wooden tongue-strips $b$, which are wedged in the said grooves $a'$ $a'$ to produce water-tight joints between the edges of the staves, the taper of the said staves being such that the lower or bottom end of the body is of a much greater diameter than the top portion, as clearly shown in Fig. 1.

The bottom $c$ may be formed of a single piece of wood or a number of sections, as shown, joined water-tight and cut to a hexagonal shape to snugly fit in the lower end of the sides of the body and to provide for a water-tight joint between the said bottom $c$ and the side staves $a$. The latter have alining grooves $a^2$ $a^2$ adapted to receive the tongue members $c'$ on the edges of the bottom $c$, as shown.

By referring now more particularly to Fig. 2 it will be noticed the bottom $c$ has a series of radially-disposed cleats or ribs $d$ $d$ on the upper face thereof, which are made fast to the said body in any approved manner, and when the said body $c$ has the shape shown in the drawings the said cleats $d$ are preferably provided one for each stave in the body, and the said cleats $d$ have such position with respect to the several staves as to lie centrally on the staves, and they are of such length that their inner ends extend to near the central axis of the body, but not up to the said axis, whereby to provide a space $x$ between the said inner ends of the cleats, and the outer ends of the said cleats $c$ also stop short of the lower end of the body-staves $a$, whereby to leave a space $y$ between them and the outer wall of the churn-body, the reasons for which will presently appear, and the said cleats $d$, hereinafter termed the "long cleats," have the upper edge of their inner and outer ends beveled rearwardly, as at $d^2$, for a pur-

pose also hereinafter defined. A second set of cleats $d^5$ are radially mounted on the bottom $c$, and they are shorter than the long cleats $d$, and they are disposed alternately with the long cleats and in lines radial with the angle-corners $a^\times$ of the body, and the said short cleats $d^5$ have their ends beveled, as at $d^3$, similar to the bevels of the ends on the long cleats.

A pair of long cleats $f\,f$ are fixedly held on the inner face of each stave, and they are arranged to straddle the long bottom cleats $d$, whereby one cleat $f$ projects between a long and a short bottom cleat, as best shown in Figs. 2 and 5, from which and Fig. 1 it will be observed the said cleats $f\,f$ do not extend down to the bottom $c$ and have their lower ends terminate in a plane above the tops of the bottom cleats, whereby peripheral passages or spaces $z$ are provided at the extremities of the bottom cleats of a depth greater than that of the said bottom cleats, and the said lower ends of the cleats $f\,f$ are beveled upwardly, as indicated by $f^2$.

C designates a removable cover, and D a handle adapted to engage a socket $a^5$ on the upper end of the body. (See Fig. 1.)

In assembling the body the side staves are first joined at their upper end with each other through the medium of the cleats $b$, and their lower ends are then closed against each other and the tongued edges of the bottom.

For conveniently and effectively clamping the lower ends of the staves in an interlocked engagement with each other and the bottom of the tub without the aid of screws, bolts, &c., I provide a series of clamps G, one for each side portion of the body. The clamps G each consist of an angle-iron whose base and vertical portions are so bent with respect to each other that the base portion $g$ will project over and lie flat against the under side of the tub-bottom and the vertical member will snugly fit against the side of the tub, as clearly shown in the drawings. The base portion $g$ of each clamp G has pendent integral lugs $g'\,g'$, which are disposed relatively to each other, so that when all of the clamp members $g$ are in place they are disposed in a circular plane. (See Fig. 3.)

H designates an endless hoop formed of stout spring-steel, which has a diameter to permit of its being pressed over all of the pendent lugs $g'\,g'$, (see Fig. 3,) whereby by reason of its spring or contraction it draws all of the clamps G radially inward and causes the lower ends of the side staves to pull up close against each other and the edge of the bottom member.

By reason of the peculiar correlation of the side staves, the bottom, the clamp G, and the hoop H, I am enabled in an economical and convenient way to positively hold the bottom of the tub in a fluid-tight connection under the varying expansion or contraction of the wooden sides and bottom member thereof.

It will be readily apparent from the drawings that in fitting the hoop H over the lugs $g'\,g'$ the same becomes more or less drawn at angles at the points between each pair of lugs $g'$, and by reason thereof should the wooden body expand the hoop under the tendency of the expansion of the wooden body to pull or draw it radially outward would the more tightly bear against the said lugs $g'$ and force the clamps G radially inward, and through the contraction of the bottom of the tub and the sides thereof the said ring or hoop H assumes a more perfect circle, and thereby all tendency of slack in the hoop H is overcome.

To hold the upper end of the tub members in a tight connection, a tight spring-hoop I is slipped over the upper end thereof and forced down tight and held from springing back by brads $j$, driven into the staves at a point just over the hoop.

J designates a spider-casting which is fixedly secured to the under side of a tub-bottom B, and the said casting has a pendent shaft M, provided with a cone-shaped bearing-collar adapted to turn upon the bearing-balls $n$, held within a ball-race formed in a detachable block N, which is provided with a socket $n'$ to fit upon the upper end of the hollow gas-pipe bearing P, which is obliquely mounted and whose upper end is fixedly held in the split portion $l$ of a brace-bearing L, that extends from the base-frame R.

The lower end of the pipe-bearing P has a shoe portion $p$, provided with a flange for conveniently bolting or screwing the same to the outer end of the rim R, as shown.

The balls $n$ are held in the ball-race by a ring T, which is sprung in a socket $m^5$ in the collar $m$. (See Fig. $4^a$.)

The lower end of the shaft N has a step-bearing in a plug $p^2$ in the pipe P, as clearly shown in Fig. 1.

From the foregoing, taken in connection with the accompanying drawings, it is believed the complete construction and the manner of operating my churn will be readily understood.

By reason of the oblique position of the tub the bulk of the contents thereof will at all times submerge the rib portions of the side walls and the bottom, and the mounting of the tub is also such as to make the operation of the same very convenient and with but a requirement of a minimum exertion of manual power. By giving the tub a quick rotation the contents are thrown radially and centrifugally against the angle-corners of the tub and dashed or separated by the radial ribs on the bottom and the ribs on the sides thereof, and as the ribs on the bottom at the central or axial point are separated the cream is caused to gather and thicken centrally in a whirling condition about the central axis of the tub, with the butter constantly gathering against the sides thereof. The churning action is greatly facilitated by reason of the cream being broken up by the radial ribs on the bottom into the clearly-defined streams

toward and against the vertical ribs on the inner side of the tub, where they are again broken by the said vertical ribs, and the butter and cream are caused to whirl around in the annular space between the lower ends of the vertical ribs and the inner ends of the radial ribs, the bevel edges of the several ribs preventing a choking action at any part of the churn.

The mounting of the churn and the interior construction thereof are such that the butter can be readily removed by taking off the top and the churn can be quickly and perfectly cleaned. The buttermilk can be drawn off through the plugged opening which is in line with the annular channel or space Z.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. As an improvement in churns, a supporting-frame including an obliquely-disposed bearing and a tub having a pendent axial shaft rotatably mounted in the said obliquely-disposed bearing, said tub including a bottom provided with a series of radially-disposed ribs on its upper face whose inner ends are separated to provide a central unribbed surface, and whose outer ends terminate short of the sides of the tub, and vertically-disposed tub sides whose lower ends terminate in a plane above the bottom ribs whereby an annular space is provided at the bottom of the tub, for the purposes described.

2. As an improvement in churns of the character described; a supporting-base, an obliquely-held tub rotatably mounted on the said base, said tub being of polygonal shape in cross-section, a series of long radially-projected ribs on the tub-bottom whose inner ends are separated and whose outer ends stop short of the side walls of the tub, said long ribs being disposed centrally with respect to the several angle-walls of the tub, a second set of ribs on the bottom located intermediate the long ribs, said second set of ribs being shorter than the long ribs and disposed in radial alinement with the angle-corners of the tub-body and vertical ribs on each of the said walls of the tub whose lower ends terminate in a plane above that of the bottom ribs, as set forth.

3. As an improvement in churns whose tub is obliquely and rotatably supported, a tub composed of side staves having internal alining grooves on their lower ends and tongue-and-groove connections for the edges thereof, a bottom having tongue portions to engage the alining internal grooves in the lower ends of the side staves, a series of angle-clamps adapted to lap the lower ends of the several side staves and the bottom, and a radially-yieldable means for joining with all of the angle-clamps, for the purposes described.

4. In a churn of the character stated; a tub composed of tapering staves having edged grooves, tongues for engaging said grooves, said staves each forming an angle side-wall section of the tub, and each having an internal groove at the lower end, a bottom having an angle-shaped perimeter provided with tongues to engage the grooves in the lower ends of the staves, a series of angle-plates adapted to lap over the bottom and the lower outer ends of the side sections, one for each of said side sections, said plates having pendent lugs, the lugs on the several plates being disposed in concentric circular alinement, and an endless spring-metal loop adapted to be sprung over the said concentrically-disposed lugs, as set forth.

5. In a churn as described, the combination with the tapering body formed of a series of detachable side staves joined to produce a polygonal-shaped tub in cross-section, a bottom detachably joined with the side staves, a series of detachable angle-plates adapted to lap the lower edge of the sides and bottom of the tub, each plate having pendent lugs disposed in a concentric circular alinement, an endless metal hoop adapted to be sprung over the said concentrically-disposed lugs, and a second hoop adapted to be driven over the upper end of the tapering body, and means for securing said hoop, as set forth.

6. In a churn as described, the combination with the base including the obliquely-disposed pipe-bearing and the diagonal brace in which the upper end of the said bearing is supported, a collar having a ball-race and bearing-balls therein detachably mounted on the upper end of the said pipe-bearing, the latter having a solid portion; of the tub, a spider-frame secured to the under side of its bottom having an axially-projected shaft to slip into the pipe-bearing, said shaft having a stepped member to engage the solid portion of the said bearing and provided with a cone-collar to engage the bearing-balls in the bearing-collar, said tub having radial and vertically-disposed dasher-ribs on its bottom and side walls, as set forth.

GEORGE GEER.

Witnesses:
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GEO. B. BRIGGS.