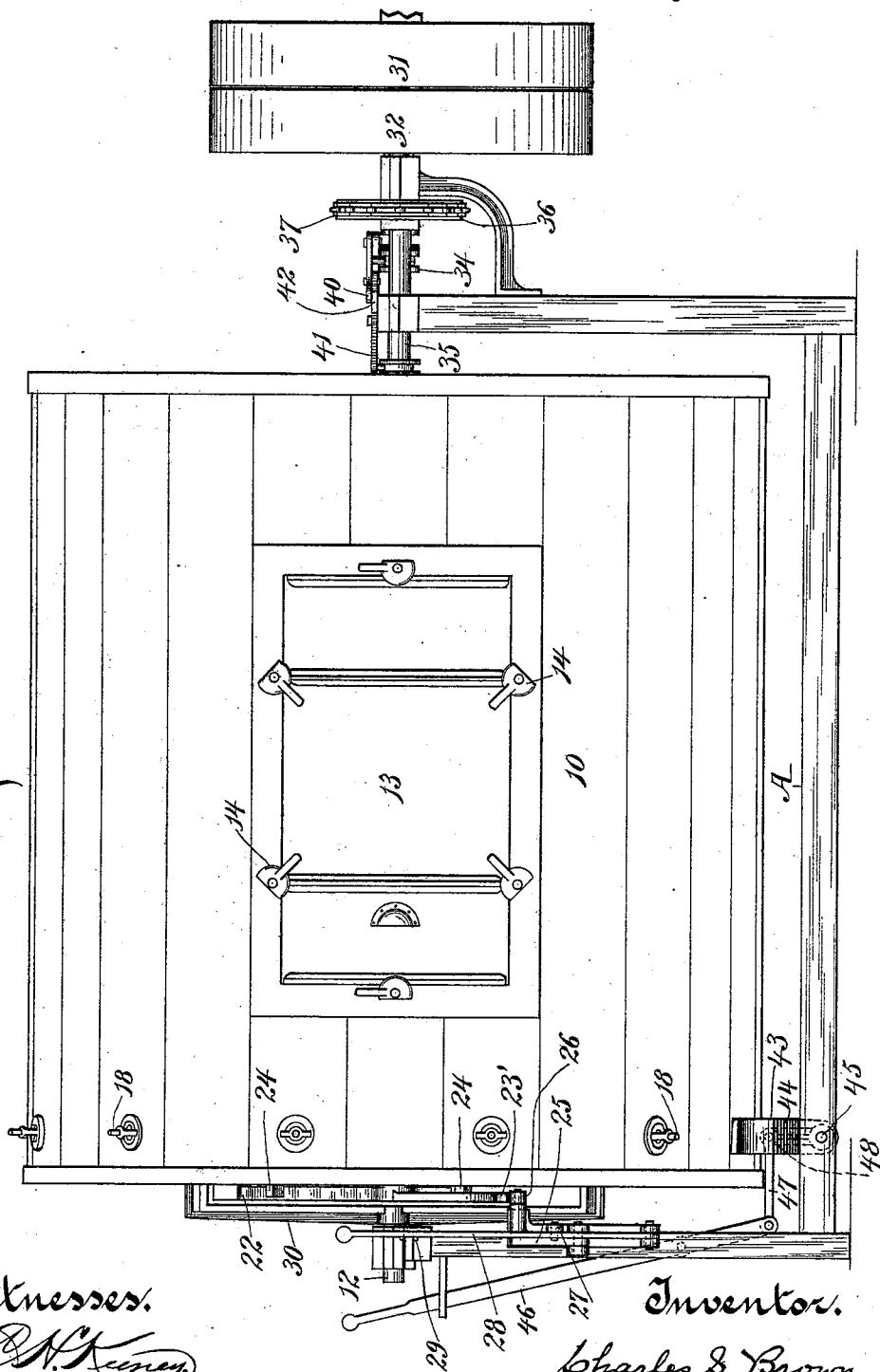


C. S. BROWN.
COMBINED CHURN AND BUTTER WORKER.

No. 539,570.

Patented May 21, 1895.

Fig. 1.



Witnesses.

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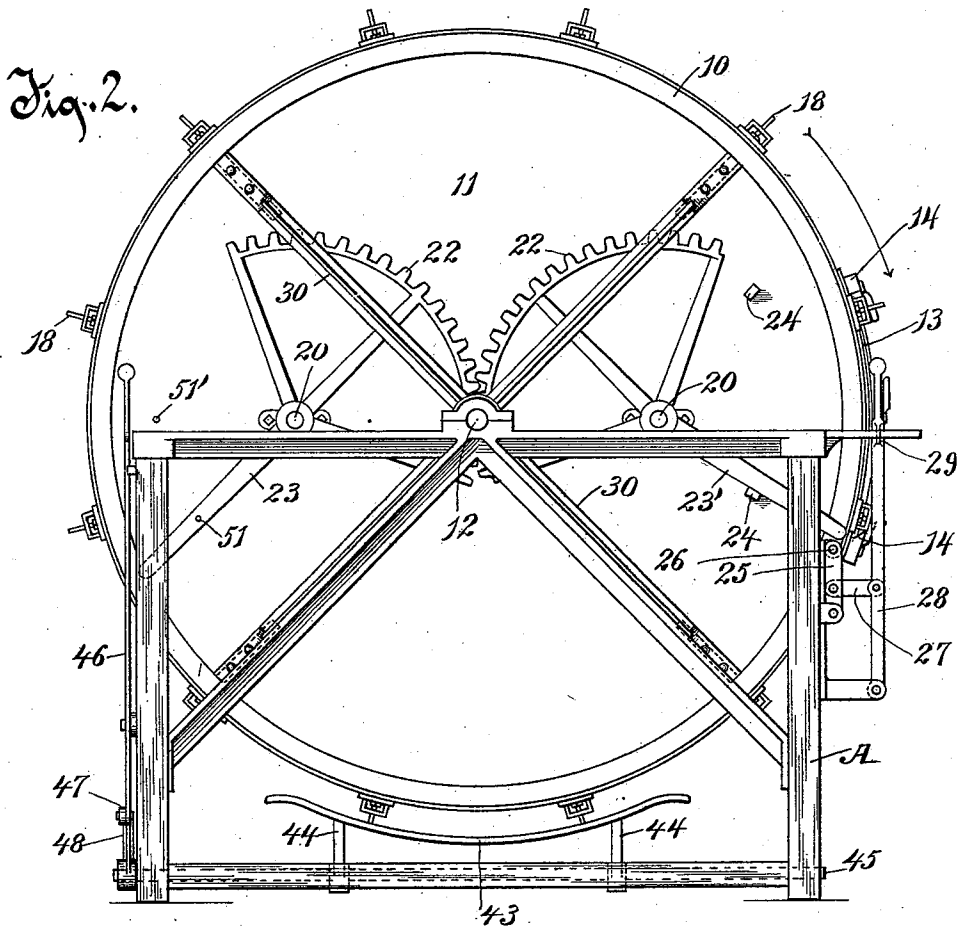


Fig. 5.

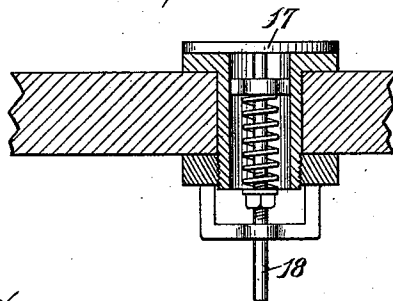
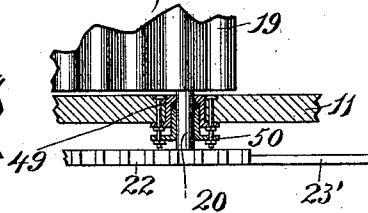


Fig. 6.



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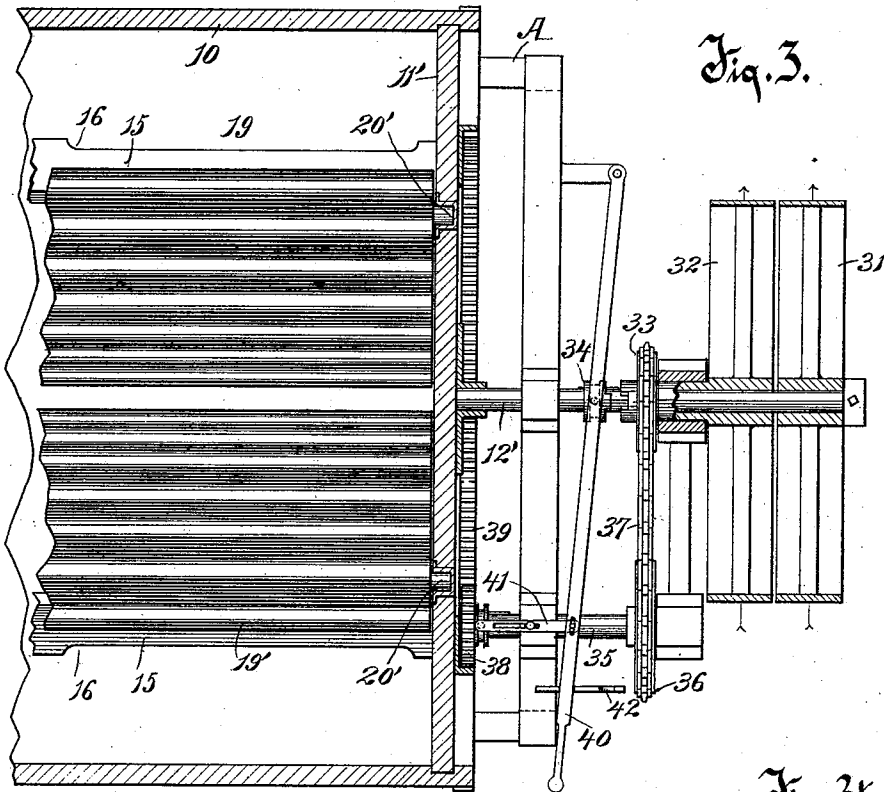


Fig. 3.

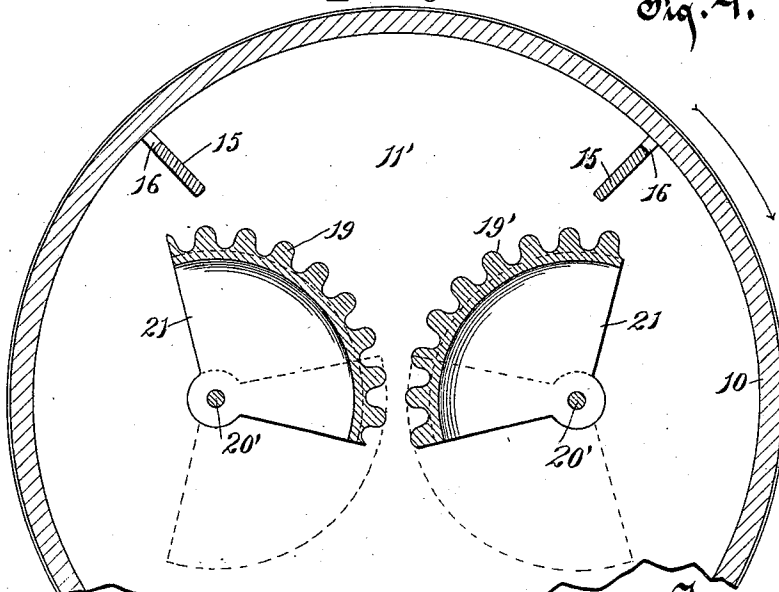


Fig. 4.

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UNITED STATES PATENT OFFICE.

CHARLES S. BROWN, OF LAKE MILLS, WISCONSIN, ASSIGNOR TO F. B. FARGO & CO., OF SAME PLACE.

COMBINED CHURN AND BUTTER-WORKER.

SPECIFICATION forming part of Letters Patent No. 539,570, dated May 21, 1895.

Application filed October 15, 1894. Serial No. 525,852. (No model.)

To all whom it may concern:

Be it known that I, CHARLES S. BROWN, of Lake Mills, in the county of Jefferson and State of Wisconsin, have invented a new and useful Improvement in a Combined Churn and Butter-Worker, of which the following is a description, reference being had to the accompanying drawings, which are a part of this specification.

My invention relates to improvements in a churn and butter worker of the class in which each machine is adapted for use either as a churn or as a butter worker; the mechanism being so constructed that by certain changes, which can be made at will, in the position and in the relation of parts to each other, the machine can be used either as a churn or as a butter worker.

The invention consists of the mechanism and its parts and combinations, as herein described and claimed, or their equivalents.

In the accompanying drawings, Figure 1 is a side elevation of the complete machine. Fig. 2 is an elevation of the front end of the machine. Fig. 3 is a central horizontal section of a fragment of the drum with fragments of the roller segments therein and mechanism related mechanically thereto, shown partly in plan and partly in horizontal section. Fig. 4 is a transverse section of the drum and roller segments medially, part of the drum being broken away for convenience of illustration. Fig. 5 is a detail of a liquid-discharging valve located in the drum. Fig. 6 is a detail of the journal-box and gland in connection with the journal of a roller-segment.

The drum 10 is provided with closed front and rear ends 11, 11', and gudgeons 12, 12' are fixed to the ends of the drum, by which the drum is supported revolvably on the frame A. The drum is also provided with an aperture closed by the door 13, which is secured in place detachably by the cam buttons 14. Through this door-closed aperture access is had to the interior of the drum, for inserting and removing the contents thereof. The drum is also provided interiorly with longitudinally disposed slash-boards or buckets 15 arranged at distances apart, and projecting inwardly radially from the shell of the drum. These buckets are provided with apertures 16,

adjacent to the shell of the drum, adapted for the escape of milk or water therethrough. The drum is also provided with a series of apertures arranged circumferentially in a common radial plane, preferably near one end of the drum and closed by the spring-actuated valves 17, each valve being provided with an outwardly projecting stem 18. These valve-closed apertures are adapted for the escape of milk or water from the drum, when it is used as a butter worker.

In the drum there are two corrugated segmental butter-working devices 19, 19'. These devices consist of two roller segments, substantially as long as the chamber of the drum, each being provided with arbors 20, 21' by which they are mounted, parallel with the axis of the drum, and adjacent to but opposite each other, the arbors being therefor journaled in the ends of the drum. The arbors 20 at the front, extend through the end 11 of the drum, while the arbors 20' at the rear are journaled liquid tight in the end or head 11' of the drum. These roller segments consist preferably of segmental shells corrugated longitudinally on their outer arc surfaces, and these shells are fixed on radial segmental blades or frames 21, 21', which frames are rigidly secured to the arbors 20, 20'. These roller segments are so disposed in the drum that their arc surfaces are adjacent and opposite to each other, forming complementary pressure surfaces, between which the butter, falling from above, is received and is passed between them as these surfaces are oscillated downwardly. For oscillating these roller segments concurrently, the segments are provided with segmental racks 22, 22' fixed on the arbors 20 outside of the drum, which racks are reversely disposed and mesh with each other. These arbors are also each provided with a radially projecting stem or arm 23, 23' one of which 23 projects from the arbor at a right angle to the chord of the arc of the shell 22, and the other 21' projects from the other arbor 20, at an angle oblique to the chord of the other arc 22. This variation in the angle of the arms 23, 23' to the chords of the arcs 22, 22 is provided so that when one of these arms is tilted by passing a relatively fixed tripping arm, the other arm will be

thrown into position to engage the same tripping arm, and in passing it will throw the first arm again into position to be engaged by the tripping arm. Stops 24, 24' are fixed in and project from the end of the drum, which stops are adapted to engage the arm 23' and limit the movements of the arms and the segments 19, 19'.

For tripping the arms 23, 23', and thereby oscillating the roller segments 19, 19' an arm 25 is pivoted on the frame and is provided with an anti-friction roller 26 in its free extremity, which roller is adapted to receive the thrust and bearing of the arms 23, 23', when the tripping arm 25 is in the path of the arms 23, 23' in the position shown in Fig 2. For putting this tripping arm into or throwing it out of action, it is connected by a link 27 to a hand lever 28 pivoted at one extremity to a projecting portion of the frame. The hand lever 28 is slightly elastic and is provided with a little rib 29 adapted to enter notches therefor in the frame, and thereby to be locked in position.

At the front end of the machine the gudgeon 12 is integral with the spider 30, the extremities or feet of which spider are secured rigidly to the end or head 11 of the drum near its periphery. The legs of this spider are offset a little from the head 11, so as to provide space between them and the head, for the racks 22, 22'.

At the rear end of the drum the gudgeon 12' is secured rigidly to the end or head 11' centrally. This gudgeon 12' is provided with a loose pulley 31 and a loose driving pulley 32, which pulley is provided with a hub having a sprocket wheel 33 thereon. A collar 34 splined on the gudgeon 12' is adapted to clutch the hub of the pulley 32 and hold the drum to revolution with the pulley. A countershaft 35, journaled in the frame, is provided with a sprocket wheel 36, on which a sprocket belt 37 runs from the sprocket wheel 33. A pinion 38, splined on the countershaft 35, meshes with the annular rack 39 fixed on the head of the drum. A lever handle 40 pivoted at one extremity to the frame, is provided with a spanning finger that rides in an annular groove in the collar 34, and is adapted for shifting the collar 34 into and out of clutch with the hub of the pulley 32. A link 41, pivoted at one extremity to the lever-handle 40, is provided at its other extremity with a spanning finger riding in an annular groove in the hub of the pinion 38, whereby the lever handle is adapted also for shifting the pinion 38 into and out of mesh with the rack 39. The lever handle 40 is slightly elastic and is thereby adapted to take into and be released from a rack 42 on the frame, whereby the lever-handle is releasably locked in position. When in the position shown in Fig. 3 in which the pinion 38 is in mesh with the rack 39, the motion communicated through the pulley 32, the sprocket belt 37, and the pinion 38, to the drum, produces a compara-

tively slow rotation of the drum, and is such as is required when the machine is in use as a butter worker. When the machine is to be used as a churn, the lever handle 40 is shifted so as to release the pinion 38 from the rack 39 and to clutch the gudgeon 12' rotatably to the pulley 32, whereby the motion of the pulley 32 is communicated directly to the drum, thereby revolving it more rapidly, as is desirable when used as a churn.

A rigid strap or plate 43, curved to correspond with the circumference of the drum, is fixed rigidly on radial arms 44 on the rock-shaft 45, which rock-shaft is journaled in the frame, and a hand lever 46 pivoted medially on the frame is connected by a link 47 to a radial arm 48 fixed on the rock-shaft 45, whereby the plate 43 may be lifted into or dropped out of the path of the valve-stems 18. This plate when in the path of the valve-stems is adapted to lift the valves 17 as they pass the plate, during the rotation of the drum and thereby permit milk or water to escape therefrom, the plate being located below the drum therefor.

In Fig. 6 a suitable journal box 49 and gland 50, is shown, for packing the journals 20 in the head 11. Any other equivalent means of packing the journals may be used.

When the machine is used as a churn it is desirable that the roller segments 19, 19' should remain stationary relative to the drum, and for this purpose a convenient means of securing them stationary in a desirable position is a pin thrust through an aperture 51 in the stem 23 and inserted in an aperture 51' in the head 11, the stem being rotated to a position that the apertures 51 and 51' register with each other.

When this machine is used as a churn the operation in a general way is as follows: Milk being put into the drum and the aperture therefor closed by the door 13, and the roller segments 19, 19' being locked in position by a pin in the apertures 51, 51', the tripping arm 25 being also out of the path of the stems 23, 23', and the plate 43 dropped below the path of the valve stems 18, the pulley 32 is clutched to the gudgeon 12' and the drum is revolved with comparative rapidity by motion communicated to it through the pulley 32. This is continued until the butter is separated from the milk. Thereupon the milk being removed from the drum, either through the door aperture or by lifting one or more of the valves 17, the machine is made to serve as a butter worker, by withdrawing the pin in the apertures 51, 51', putting the tripping arm 25 into the path of the stems 23, 23', and shifting the pinion 38 into mesh with the rack 39, thereby at the same time releasing the gudgeon 12' from the pulley 32, and by lifting the plate 43 into the path of the valve stems 18. When the mechanism is thus disposed, the motion communicated to the drum will be comparatively slow. The butter being at the bottom of the drum is carried up by the buckets

nearly to the top and is dumped therefrom on to the segments 19, 19' which segments being in the position shown in Figs. 2 and 3 are oscillated by the stem 23' coming in contact with and passing the tripping arm 25, whereby the butter is pressed and passed downwardly between the segments, falling on the bottom of the drum, to be again carried to the top by the succeeding bucket and to fall on the segments being then in a similar position relative to each other, and to be again passed down between the segments by the oscillating thereof, caused by the stem 23 coming in contact with and passing the tripping arm 25, as the drum revolves.

The rack 42 is broken away on Fig. 1, to show mechanism at the rear thereof.

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

1. In a churn and butter worker, the combination with a revoluble drum having tight heads, of a pair of complementary oscillating pressure segments in the drum parallel with its axis, and means for oscillating the segments substantially as described.

2. In a churn and butter worker, the combination with a revoluble drum having tight heads, of a pair of complementary oscillating pressure segments in the drum parallel with its axis, means for co-incidentally oscillating the segments and buckets in the drum longitudinally thereof at distances apart projecting inwardly from its circumferential shell, substantially as described.

3. In a churn and butter worker, the combination with a revoluble drum having tight heads, of a pair of complementary oscillating pressure segments in the drum parallel with its axis, and segmental racks meshing with each other on the journals of the pressure segments, outside the drum, substantially as described.

4. In a churn and butter worker, the combination with a revoluble drum having tight heads, of a pair of complementary oscillating pressure segments in the drum parallel with its axis, segmental racks meshing with each other on the journals of the pressure segments, outside the drum, and radial arms or stems rigid with the journals at different angles to the chords of the segments, substantially as described.

5. In a churn and butter worker, the combination with a revoluble drum having tight heads, of a pair of complementary oscillating pressure segments in the drum parallel with its axis, segmental racks on the journals of the pressure segments meshing with each other outside the drum, radial arms or stems rigid with the journals at different angles to the chords of the segments, and a tripping device located in the path of the stems, adapted by contact with the stems as they

revolve with the drum, to shift the stems and oscillate the segments, substantially as described.

6. In a churn and butter worker, the combination with a drum having tight heads, and oscillating segments therein, of segmental racks on the journals of the segments meshing with each other outside the drum, radial stems fixed to the racks and stops on the head of the drum to limit the oscillation of the racks, substantially as described.

7. In a churn and butter worker, the combination with a drum having heads, and oscillating segments therein, of segmental racks on the journals of the segments meshing with each other outside the drum, radial stems fixed to the racks, and means for locking the racks and segments to the drum, substantially as described.

8. In a churn and butter worker, the combination with the drum and oscillating butter-working devices therein having radial stems affixed thereto, of a tripping arm pivoted on a fixed support, and means for putting the tripping arm into and out of the path of the stems, substantially as described.

9. In a churn and butter worker, the combination with a drum, of a supporting gudgeon fixed to one head of the drum centrally, a loose driven pulley running on said gudgeon, means for clutching the pulley to the gudgeon, a countershaft connected operatively to the driven pulley, an annular rack fixed on the head of the drum, and means for gearing the countershaft operatively and releasably to the rack on the drum, substantially as described.

10. The combination with the revoluble drum of a churn and butter worker, said drum having tight heads, of a gudgeon fixed to one head of the drum, a loose driven pulley on the gudgeon, a clutch collar splined on the gudgeon adapted to engage the driven pulley and hold the drum to the motion of the pulley, a countershaft belted to the driven pulley, a pinion splined on the countershaft, an annular rack on the head of the drum with which the pinion gears releasably, and a hand lever pivoted on the frame provided with a finger riding in an annular groove in the clutch collar and connected by a link having a finger riding in an annular groove in the hub of the pinion, said lever handle being adapted to shift the collar and the pinion into and out of action concurrently, substantially as described.

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

CHARLES S. BROWN.

Witnesses:

A. H. PARKER,

A. W. GREENWOOD.