

No. 844,678.

PATENTED FEB. 19, 1907.

G. J. KAPLAN.
COMBINED CHURN AND BUTTER WORKER.
APPLICATION FILED JUNE 18, 1906.

2 SHEETS—SHEET 1.

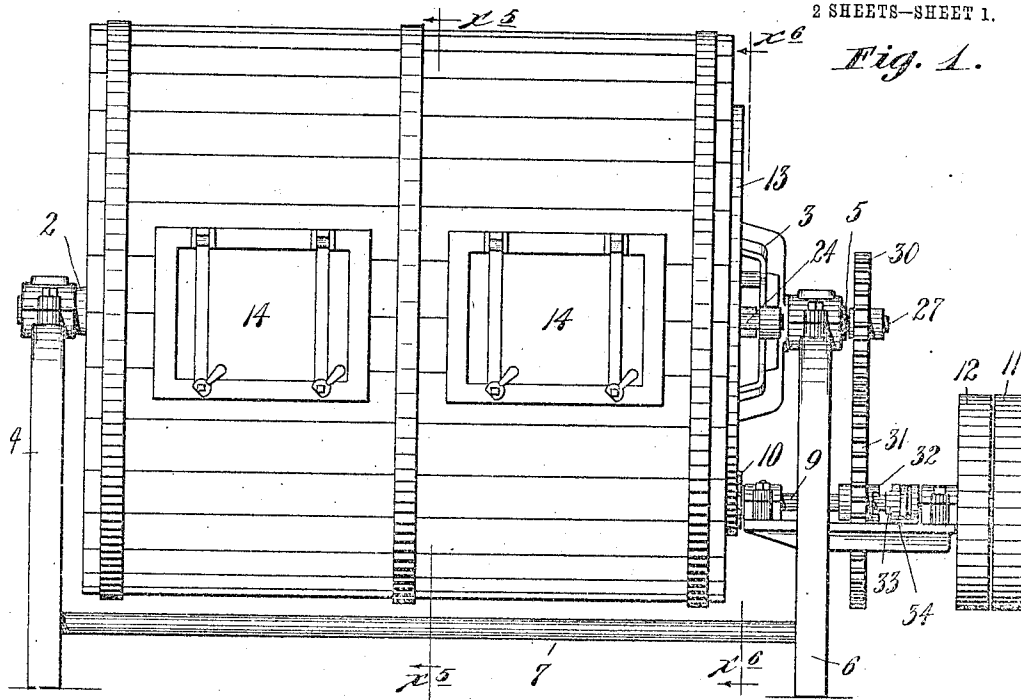


Fig. 2.

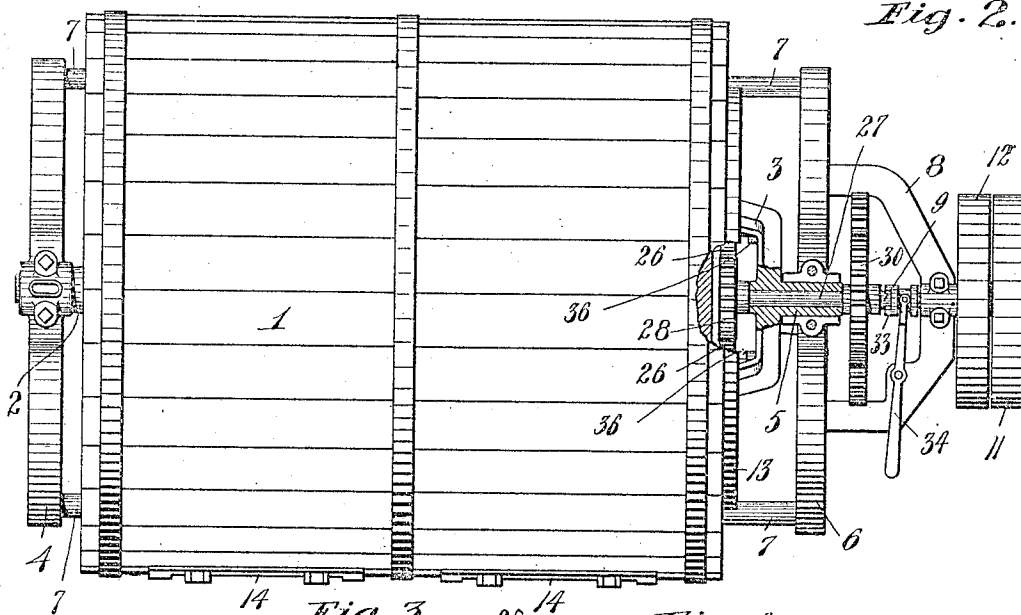
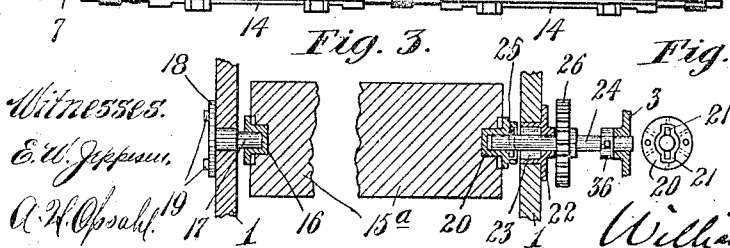


Fig. 3.

Fig. 4.



Witnesses.

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2 SHEETS—SHEET 2.

Fig. 5.

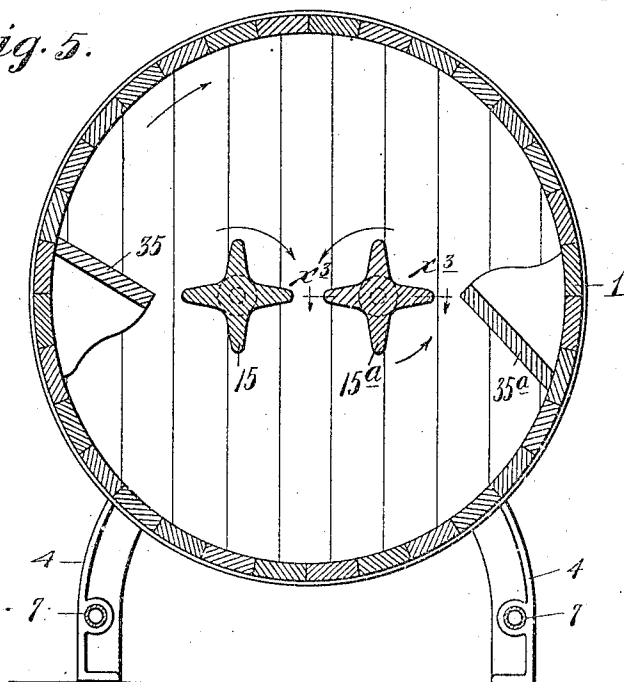
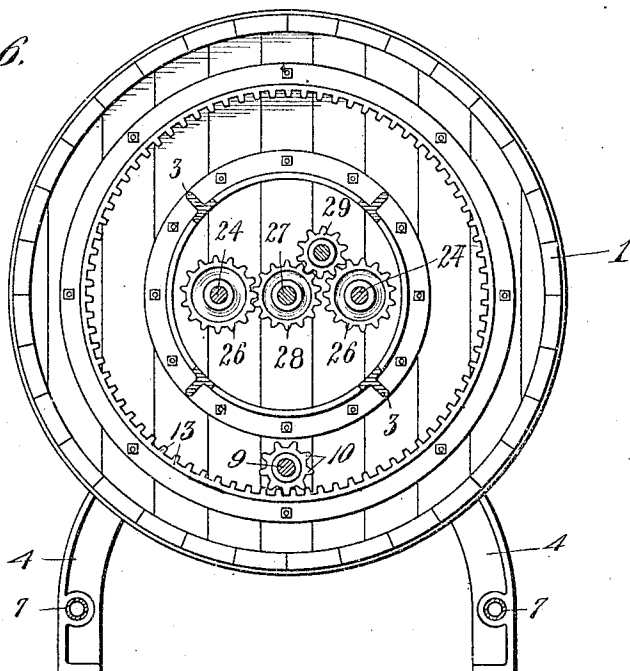


Fig. 6.



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UNITED STATES PATENT OFFICE.

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COMBINED CHURN AND BUTTER-WORKER.

No. 844,678.

Specification of Letters Patent.

Patented Feb. 19, 1907.

Application filed June 18, 1906. Serial No. 322,220.

To all whom it may concern:

Be it known that I, GODFREY J. KAPLAN, a citizen of the United States, residing at Owatonna, in the county of Steele and State of Minnesota, have invented certain new and useful Improvements in Combined Churns and Butter-Workers; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My present invention relates to combined churns and butter-workers, and, generally stated, has for its objects to simplify the construction and improve the action thereof.

To the above ends the invention consists of the novel devices and combinations of devices hereinafter described, and defined in the claims.

One of the salient features of this invention is directed to the construction and arrangement of parts whereby the drum and the rollers or rotary parts within the same may be driven at the same speed both in the churning and butter-working actions, thus making unnecessary the use of a two-speed drive in order to adapt the machine for use both to churn and work the butter.

The invention also involves other novel features of construction, as will hereinafter more fully appear.

The invention is illustrated in the accompanying drawings, wherein like characters indicate like parts throughout the several views.

Referring to the drawings, Figure 1 is a view in side elevation, showing the improved churn. Fig. 2 is a plan view of the same. Fig. 3 is a detail with parts broken away, taken through one of the so-called "paddle-rollers" in the drumheads on the line $x^3 x^3$ of Fig. 5. Fig. 4 is a detail in end elevation, showing one of the roller-shaft bearings. Fig. 5 is a vertical section taken transversely through the machine on the line $x^5 x^5$ of Fig. 1, and Fig. 6 is a transverse vertical section taken on the line $x^6 x^6$ of Fig. 1.

The numeral 1 indicates the rotary drum of the machine, which drum is horizontally disposed, has fixed heads, one of the heads being provided with a rigidly-secured gudgeon 2 and the other head having a rigidly-secured spider-bracket 3. The gudgeon 2 is

journaled in a suitable bearing of a bearing-bracket 4, and the spider-bracket 3 is provided with a hollow gudgeon 5, that is journaled in a suitable bearing of a bearing-bracket 6. As shown, the bearing-brackets 4 and 6 are rigidly connected at their lower side portions by long tie-rods 7. The bearing-bracket 6 is provided with a horizontally-extended skeleton bearing-shelf 8, having suitable bearings in which a counter-shaft 9 is journaled. This counter-shaft extends below but parallel with the axis of the drum, and at its inner end it is provided with a spur-pinion 10 and at its outer end is shown as provided with a loose pulley 11 and a fixed pulley 12. The pinion 10 meshes with a large internal ring-gear 13, that is secured to the adjacent head of the drum 1. The drum 1 is shown as provided with the usual doors 14 for affording access thereto to the interior thereof when open.

Mounted within and carried by the drum is a pair of deeply-corrugated reversely-driven so-called "paddle-rollers" 15 and 15^a. These paddle-rollers are located on opposite sides of the axis of the drum and are so spaced that a passage for the butter which is worked between the rollers is provided at the axis of the drum. At their left-hand end (directions being taken with respect to Figs. 1, 2, and 3) the rollers 15 and 15^a are provided with countersunk bearing-caps 16, that are journaled on gudgeons 17, that project inward through the left-hand head of the drum and are secured to or formed integral with bearing-plates 18, which in turn are detachably secured to the said drum by means of wood-screws 19 or other suitable devices. At their other or right-hand ends the said two rollers are provided with countersunk bearing-caps 20, which are like the bearing-caps 16, except that they are provided at their outer portions with diametrically-extended pin-seats 21.

Secured, as shown, to the right-hand head of the drum and set partly into the same in axial alinement with the adjacent bearing-caps 20 of the two rollers are shaft-bearings 22, that are provided with diametrically-extended pin-seats 23. Short roller-driving shafts 24 are journaled in the shaft-bearings 22 and in the spider-bracket 3. The projecting ends of these shafts 24 normally en-

gage with the respective bearing-caps 20 of the said rollers, and the said shafts are provided with diametric driving-pins 25, that normally engage the pin-seats 21 of said bearing-caps, so that the said shafts and rollers are then connected for common rotation. It will of course be understood that the bearing-caps 16 and 20 are secured for rotation with the respective rollers. Secured to the shafts 24, just outside of the shaft-head of the drum, are small spur-gears 26.

Journalled in and extending through the hollow gudgeon 5 of the spider-bracket 3 is a short counter-shaft 27, which at its inner end is provided with a small gear 28, that meshes with the gears 26 of that one of the shafts 24 which is connected to the paddle-roller 15. The gear 28 also meshes with an intermediate gear 29, that is loosely journalled to the adjacent head of the drum and meshes with the gear 26 of the shaft 24, that is connected to the roller 15^a. A larger spur-gear 30 is secured to the outer end of the counter-shaft 27. On the lower or driving counter-shaft 9 is a relatively large spur-gear 31, that meshes with the said gear 30. The spur-gear 31 is loosely journalled on the shaft 9, but is held against axial movements thereon and is provided with a half-clutch 32. The half-clutch 32 is adapted to be engaged by a half-clutch 33, that is mounted to slide on but to rotate with the shaft 9 and, as shown, is adapted to be moved at will by a shipper-lever 34, pivoted to the bearing-shelf 8 of the bearing-bracket 6.

Within the drum, adjacent to the roller 15, is a lifting-shelf 35, that preferably extends from end to end of the drum and is so disposed that it will lift the butter on the rising side of the drum and lift the same onto the said roller 15 or between said roller 15 and the roller 15^a. At the opposite side of the drum, adjacent to the roller 15^a, is a similar lifting-shelf 35^a, which not only serves to lift the butter and to deliver the same against the roller 15^a, but acts as an abutment and coöperates with the said roller 15^a to work the butter downward between said shelf 35^a and said roller 15^a when the two are moving upward on the rising side of the drum.

The rollers, as well as the drum, should be driven both in the churning and butter-working actions, and the said parts will be so driven when the fixed pulley 12 and shaft 9 are driven and the said half-clutch 33 is engaged with the half-clutch 32 of the loose gear 31. Assuming the drum to be driven in the direction of the arrow marked thereon in Fig. 5, the two rollers will be driven as indicated by the arrows marked adjacent thereto in said view. In the butter-working action, under that part of the rotation of the drum which carries the lifting-shelf 35 upward on the rising side of the drum, the said

shelf will deliver the butter onto the roller 15, which rotates in the same direction as the drum, and the butter thus raised will be worked downward between the two rollers 15 and 15^a. Under the other half of the rotation of the drum, which carries the shelf 35^a upward on the rising side of the drum, the said shelf carries the butter against the roller 15^a, which is rotated in a direction reverse to the direction of the rotation of the drum, and the said roller 15^a will then cut and crowd the butter downward through the passage between the said roller 15^a and shelf 35^a. This latter-noted action will be more clearly understood by observing Fig. 5 when the said view is turned upside down. In the butter-working action the long projecting ribs of blades of the so-called "paddle-rollers" 15 and 15^a in addition to the actions above noted have a paddling or patting action on the butter, which is very much like that of a hand-operated butter-working paddle. In the churning action the blades of the said rollers strike in rapid succession the cream directed thereto by the lifting-shelves and produce concussions which are very conducive to rapid churning. Said lifting-shelves themselves continuously raise and drop the cream within the drum, producing other concussions which also hasten the churning action of the cream.

After the cream has been churned it is desirable to give the drum several rotations without rotating the rollers on their own axes, and this action is produced when the drum is rotated, while the half-clutch 33 is thrown out of engagement with the half-clutch 32 of the roller-driving gear 31.

When it is desired to remove the rollers 15 and 15^a, or either thereof, the driving-shafts 24 are drawn outward, so that their driving-pins 25 are moved out of the seats 21 of the bearing-caps 20 and are drawn into the seats 23 of the shaft-bearings 22. These outward movements of the shaft 24 carry the inner ends thereof out of the said bearing-caps 20.

Where the parts are constructed with sufficient play, the loosened ends of the rollers may then be swung sidewise and the rollers moved endwise, so as to carry the bearing-caps 16 off from the gudgeons 17 of the bearing-plates 18. Where there is not sufficient play to permit the removal of the rollers in the manner above described, the bearing-plates 18 must be removed, so as to draw their gudgeons 17 outward and out of the bearing-caps 16. In either case the rollers may very easily be removed from working positions within the drum. Normally the shafts 24 are held against endwise movements by collars 36, that are secured to said shafts by set-screws or similar devices.

I claim as my invention—

1. In a combined churn and butter-worker, the combination with a drum and a pair of

coöperating reversely-driven paddle-rollers working therein, one on each side of the axis thereof, and carried by said drum under all movements thereof, abutments carried by said drum and coöperating with said rollers, and means for driving the said drum and rollers in a continuous direction, substantially as described.

2. In a combined churn and butter-worker, the combination with a drum and a pair of coöperating reversely-driven paddle-rollers working therein, on opposite sides of the axis thereof, which rollers are carried by said drum under all movements thereof and have shafts that project through one of the fixed heads of said drum, of a single-speed drive geared to said drum and to the projecting shafts of said rollers, for imparting constant rotary movements to said drum and rollers, both in the churning and butter-working actions, substantially as described.

3. In a combined churn and butter-worker, the combination with a drum, of a pair of paddle-rolls carried by said drum and laterally spaced within the same, on opposite sides of the axis thereof, means for rotating said drum and for driving said paddle-rolls in opposite directions, a lifting device within said drum for delivering butter on the rising side of the drum to that roller which is driven in the same direction as the drum, and a butter-lifting abutment at the opposite side of said drum, arranged for coöperation with that roller which is rotated reversely to the rotation of the drum, to work the butter

downward on the rising side of the drum, substantially as described.

4. In a device of the kind described, the combination with a drum having a roller working therein, of a gudgeon connecting one end of said roller to one drumhead, and a driving-shaft journaled in the other drumhead and provided with a driving projection, the inner end of which shaft and the driving projection thereof are engageable and disengageable with seats in the adjacent end of said roller by endwise movements of said shafts, substantially as described.

5. In a device of the kind described, the combination with a rotary drum, of a roller working therein, bearing-caps 16 and 20 applied to the ends of said roller, said cap 20 having pin-seats 21, a gudgeon applied to one drumhead and engageable with said bearing-caps 16, a shaft-bearing 22 applied to the other drumhead and provided with pin-seats 23, and an endwise-movable shaft 24 having a driving-pin 25, the inner end of said shaft being engageable and disengageable with the said bearing-cap 20, and said driving-pin 25 being engageable and disengageable with the pin-seat 21 thereof by endwise movements of said shaft, substantially as described.

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

GODFREY J. KAPLAN.

Witnesses:

F. A. DUNHAM,
F. W. CLETON.