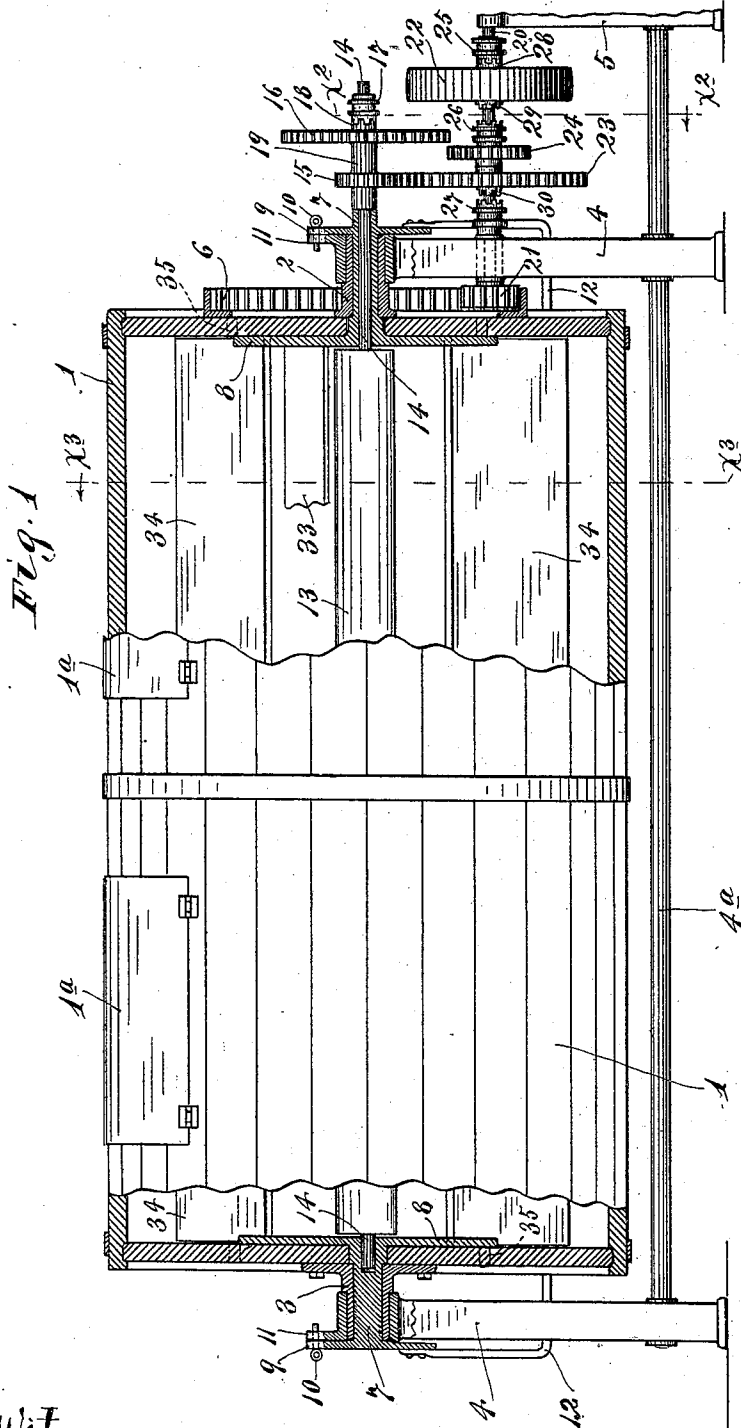


D. W. PAYNE.
 COMBINED CHURN AND BUTTER WORKER.
 APPLICATION FILED SEPT. 26, 1910.

991,639.

Patented May 9, 1911.

2 SHEETS-SHEET 1.



Witnesses,
 A. H. Opsahl.
 E. C. Skinkle

Inventor
 D. W. Payne.
 By his Attorneys,
 William Merchant

991,639.

D. W. PAYNE.
COMBINED CHURN AND BUTTER WORKER.
APPLICATION FILED SEPT. 26, 1910.

Patented May 9, 1911.

2 SHEETS—SHEET 2.

Fig. 2

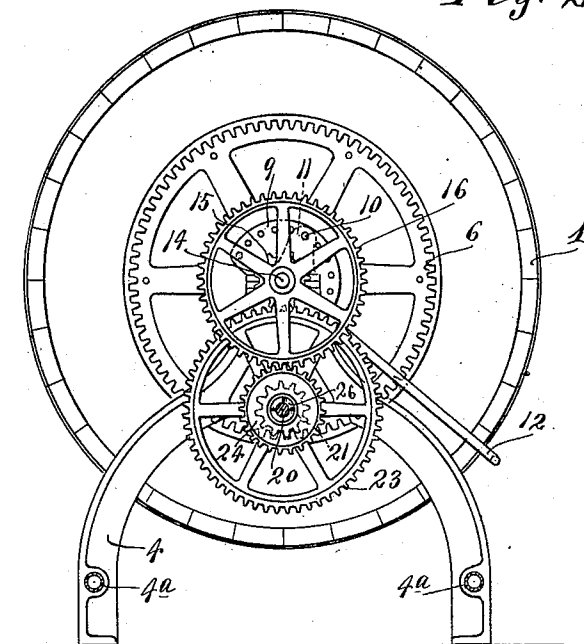
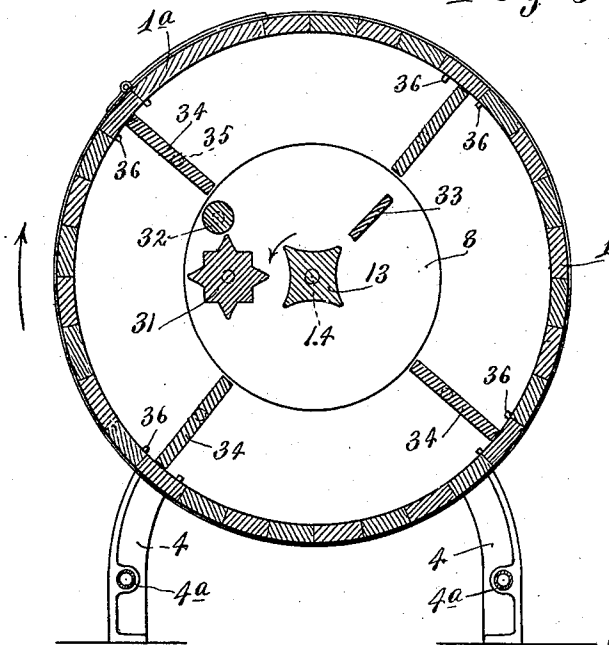


Fig. 3



Witnesses.
A. H. Opsahl.
C. C. Skinkle

Inventor
D. W. Payne.
By his Attorneys
William Merchant

UNITED STATES PATENT OFFICE.

DARIUS W. PAYNE, OF MINNEAPOLIS, MINNESOTA.

COMBINED CHURN AND BUTTER-WORKER.

991,639.

Specification of Letters Patent.

Patented May 9, 1911.

Application filed September 26, 1910. Serial No. 583,750.

To all whom it may concern:

Be it known that I, DARIUS W. PAYNE, a citizen of the United States, residing at Minneapolis, in the county of Hennepin and State of Minnesota, have invented certain new and useful Improvements in Combined Churn 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 invention has for its object to provide an improved combined churn and butter worker, and to this end the invention consists of the novel devices and combinations of devices hereinafter described and defined in the claims.

In the accompanying drawings which illustrate the invention, like characters indicate like parts throughout the several views.

Referring to the drawings: Figure 1 is a view partly in elevation and partly in vertical longitudinal section showing the improved machine; Fig. 2 is a view chiefly in end elevation with some parts sectioned on the line $x^2 x^2$ of Fig. 1; and Fig. 3 is a transverse vertical section taken on the line $x^3 x^3$ of Fig. 1.

The numeral 1 indicates a horizontally disposed rotary drum provided with the customary peripheral doors 1^a. At the ends of the drum are hollow trunnions 2 and 3 that are rigidly secured to the heads of the drum and are journaled in bearings formed in the upper ends of pedestal brackets 4, which latter are shown as rigidly tied together at their lower portions by tie bars or rods 4^a that project at one end and are secured to a supplemental bearing pedestal 5. The hollow trunnion 3 has a flanged inner end that is bolted or otherwise rigidly secured to the adjacent drum head. The tubular trunnion 2 is shown as formed integral with the arms of a large internal gear 6 that is bolted, or otherwise rigidly secured to the adjacent drum head.

Extended completely through the hollow trunnions 2, and through the drum heads, are sleeves 7, which, at their inner ends are rigidly secured to lower supporting heads 8, shown as a disk-like form but capable of any suitable outline. At their outer ends the sleeves 7 are provided with perforated lock segments 9 that are adapted to be ad-

justably secured, by pins 10, or other suitable device, to lugs 11 on the upper extremities of the bearing pedestals 4. The two lock segments 9, are rigidly connected to the arms of an adjusting bail 12 that embraces one side of the drum. When the pins 10 are removed the segments 9, and hence, the corresponding lower supporting heads 8, are adapted to be given simultaneous oscillatory movements, and when the said pins are applied to said parts, are adapted to be locked in any one of several positions, this being for an important purpose which will hereinafter more clearly appear.

Located within the drum is an axial roller 13, the shaft 14 of which, at one end, is journaled in a rear sleeve 7, which sleeve is preferably closed at its outer end. At its other end, the roller shaft 14 is journaled in the front sleeve 7, projects forward therefrom and is provided with a pair of loose gears 15-16, and a half-clutch 17. The half-clutch 17 is mounted to slide on, but is connected to rotate with, the shaft 14 and is adapted to be engaged with the half clutch 18 on the hub of the gear 16. The two gears 15 and 16 are connected by a common sleeve 19, which, of course, is loose on the shaft 14.

Located below the shaft 14 and journaled in suitable bearings on the front pedestal bracket 4 and on the supplemental pedestal 5 is a counter shaft 20 provided at its rear end with a spur pinion 21 that meshes with the internal gear 6. Loosely mounted on the shaft 20 is a driving pulley 22 and a pair of spur gears 23 and 24. The gear 23 meshes with the relatively small gear 15 and the gear 24 is adapted to be engaged by lateral movement with the gear 16. Mounted to rotate with, but to slide on the shaft 20 are three half clutches 25, 26 and 27. The half clutch 25 is engageable with a half clutch 28 carried by the hub of the pulley 22; and the half clutch 26 is engageable with the half clutch 29 also carried by the hub of the pulley 22; and the half clutch 27 is engageable with the half clutch 30 carried by the hub of the loose gear 23. The half clutch 26 is rigidly secured to the hub of the relatively small gear 24, and hence, rotates and slides therewith. When the half clutch 26 is engaged with the half clutch 29, the gear 24 will be moved into mesh with the gear 16. Suitable levers, not shown,

will, in practice, be provided for moving the half clutches 17, 25, 26, and 27 and for holding the same in their set positions.

Within the drum is a large butter worker 5 roller 31 which is located adjacent to the axial roller 13, extends parallel therewith and has trunnions that are loosely journaled in the adjustable but non-rotary bearing heads 8. A small auxiliary roller 32 is also 10 preferably journaled in the heads 8 and is located just above and slightly outward of the roller 31. Rigidly secured at its ends to the heads 8 is an oblique stop board 33 which serves to prevent the butter from being 15 thrown over the top of the roller 13. The rollers 13, 31 and 32 and the stop board 33 make up a sort of a hopper which receives the butter from the lifting flights 34 carried by the drum. These lifting flights 20 34 are approximately radially disposed and will extend from the heads 8 outward to or approximately to the shell of the drum. As an additional feature of novelty, these lifting flights 34 at their ends are pivotally connected 25 to the heads of the drum at 35 so that they are permitted limited oscillatory movements between stops 36 applied to the shell of the drum and engageable with the outer edges of the said flights. Preferably, the 30 pivots 35 are located forward of the transverse centers of the lifting flights for a purpose which will presently appear.

The drum is designed to be rotated in the direction of the arrow marked adjacent 35 thereto of Fig. 3.

In the churning action, the drum is driven at relatively high speed directly from the shaft 20 through the pinion 21 and internal gear 6 at such times the axial roller 13 is 40 preferably allowed to remain idle. To accomplish this action the pulley 22 which is constantly driven by the power driven belt, not shown, is connected to the shaft 20 by engagement of the half clutch 25 and 29. 45 This serves to rotate the said shaft 20, and hence, the driven pinion 21. To prevent rotation of the gears 15, 16, 23 and 24 at such times, the half clutch 26 is disengaged from the half clutch 29 and the half clutch 50 27 is disengaged from the half clutch 30.

When the butter is to be worked, the half clutch 25 is disengaged from the half clutch 28 and the half clutch 27 is engaged with the half clutch 30 and the half clutch 26 55 is moved into engagement with the half clutch 29, which latter movement, as stated, throws the gear 24 into mesh with the gear 16. At the same time, the half clutch 17 is lifted into engagement with the half clutch 60 18 so that the axial working roller 13 will be driven with the gears 15 and 16. Under this adjustment, the counter shaft 20 will be driven through the gears 24, 16, 15 and 23 at a very much lower speed than the driving 65 pulley 22, and the working roller 13 will

be rotated at a much higher rate of speed than the drum and in reverse direction from the direction of rotation of said drum.

The lifting flights 34 will in succession 70 collect and pick up the butter from the bottom of the drum and carry the same upward on to the rising side of the drum and deposit the same on the rollers 13 and 31. While the flights are lifting the butter, their 75 outer portions will be forced backward or downward against the lower coöperating stop 36 and will be held in such an engagement until the flight reaches such elevation that the butter begins to slide therefrom on to the roller 32 and from thence on 80 the rollers 13 and 31. Under this sliding action of the butter the greater weight thereof will be shifted to the inner edge of the flight and the flight will suddenly tilt upward at its outer edge as far as permitted 85 by the coöperating upper stop and this action has a tendency of accelerating the delivery of the butter from the flight and preventing the same from carrying the butter over and beyond the stop board 33. 90

As already indicated, the heads 8 are capable of adjusting so as to set the rollers and the stop board 33 in proper position to receive the butter from the lifting flights. 95 Different amounts of butter in different speeds of rotation of the drum will, to a considerable extent, vary the proper position of the said working rollers.

As is evident, the butter dropped upon the rollers 13 and 31 will be worked or 100 forced downward between the said two rollers. Both the roller 32 and the stop board 33 assist in holding the butter in position above the rollers 13 and 31 and directing the same between the said working rollers. In- 105 asmuch as the working rollers do not travel with the drum but occupy always operative positions, and inasmuch as the butter is at all times kept supplied to the rollers, the working action will be continuous and a 110 highly efficient churn is thereby produced.

After the butter has been worked and it is desired to collect the butter upon the rollers and stop board, the half clutch 17 115 is disengaged from the half clutch 18 so that the positively driven working roller 13 is stopped. This prevents butter from being carried between the rollers and permitting the same to accumulate on the said rollers 120 and stop board so that it may be removed from the churn.

What I claim is:

1. The combination with a rotary drum having non-rotary roller supporting heads 125 within the drum, of working rollers journaled to said heads, the one thereof being located at the axis of the drum, and means for positively rotating the said axially located roller.

2. The combination with a rotary drum 130

having non-rotary roller supporting heads within the drum, of working rollers journaled to said heads, the one thereof being located at the axis of the drum, and means for positively rotating the said axially located roller, and means for imparting oscillatory adjustments to the said non-rotary supporting heads.

3. The combination with a rotary drum having internal lifting flights, of non-rotary supporting heads located within the drum, working rollers journaled to said heads, and means connecting the said heads at the ends of the drum for imparting common oscillatory adjustments thereto.

4. The combination with a rotary drum having internal lifting flights, of supporting heads within said drum, cooperating working rollers journaled to said heads, one thereof being located at the axis of the drum, means for positively rotating the said axially located working roller and stop board applied to the said heads adjacent to said working rollers, substantially as described.

5. The combination with a rotary drum having internal lifting flights, of supporting heads within said drum, cooperating working rollers journaled to said heads, one thereof being located at the axis of the drum, means for positively rotating the said axially located working roller and a stop board applied to the said heads adjacent to said working rollers, and an idle guide roller journaled to said heads and located adjacent to the eccentrically located working roller, substantially as described.

6. The combination with a horizontally disposed rotary drum provided with internal lifting flights, of supporting heads with said drum, working rollers journaled to said heads, and an adjusting bail embracing the exterior of the drum and connected to said heads for imparting common oscillatory adjustments thereto, substantially as described.

7. The combination with a horizontally disposed rotary drum provided with internal lifting flights, of supporting heads with said drum, working rollers journaled to said heads, and an adjusting bail embracing the exterior of the drum and connected to said heads for imparting common oscillatory ad-

justments thereto, and cooperating lock devices at the opposite ends of the drum for rigidly but adjustably securing the said heads in different positions, substantially as described.

8. The combination with a horizontally disposed rotary drum having one or more internal lifting flights, of non-rotary supporting heads within said drum, working rollers journaled to said heads, one thereon being axially located and having its shaft extended to the exterior of the drum, a gear carried by one head of the drum, a counter shaft having a pinion engaging said drum gear, a driving pulley on said counter shaft, cooperating speed reducing gears on the said counter shaft and on the said projecting roller shaft, and clutch devices for connecting the said driving pulley and gears to the said counter shaft and roller shaft at will, substantially as described.

9. The combination with a horizontally disposed rotary drum of working rollers within said drum, one thereof being axially located and having the shaft projecting at the exterior of the drum, a gear on one head of the drum, a counter shaft provided with a pinion meshing with the gear drum, a driving pulley on said counter shaft, intermeshing gears on said counter shaft and roller shaft, and clutch devices for connecting said driving pulley to said counter shaft and to the gears of said counter shaft at will, substantially as described.

10. The combination with a horizontally disposed rotary drum having working rollers therein and provided with lifting flights pivoted to the heads of said drum with freedom for limited oscillatory movements, the pivotal supports of the said flights being located radially inward from the transverse centers of said flights but radially outward from the inner edges of the said flights, substantially as described.

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

DARIUS W. PAYNE.

Witnesses:

F. D. MERCHANT,
HARRY D. KILGORE.