(No Model.) 2 Sheets—Sheet 1.

P. EMBREE.

BUTTER WORKER.

No. 492,325. Patented Feb. 21, 1893.

Fig. 1.

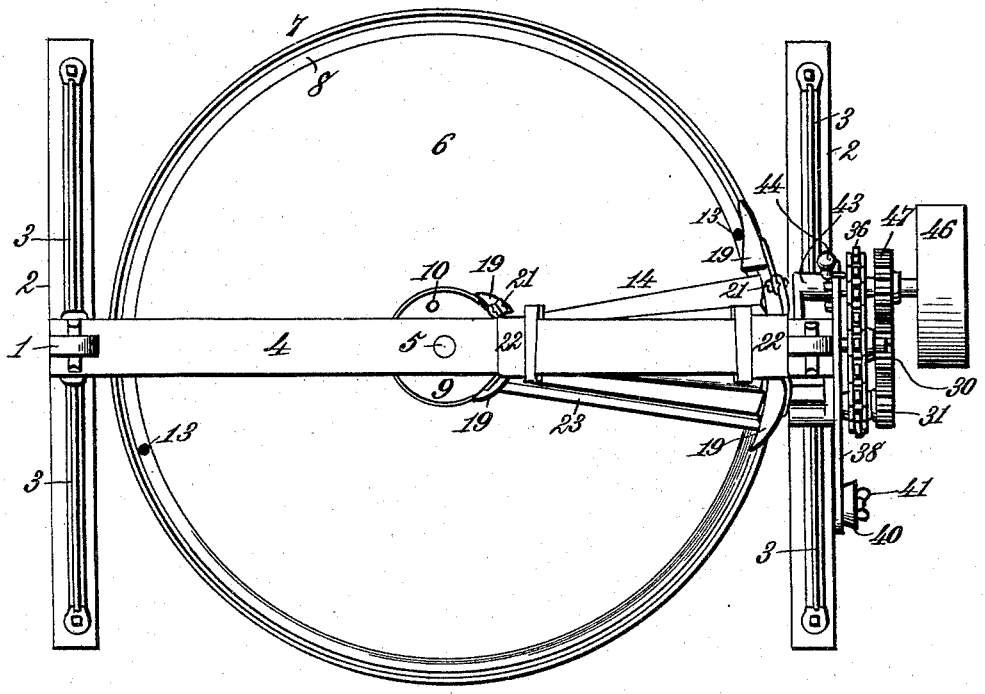
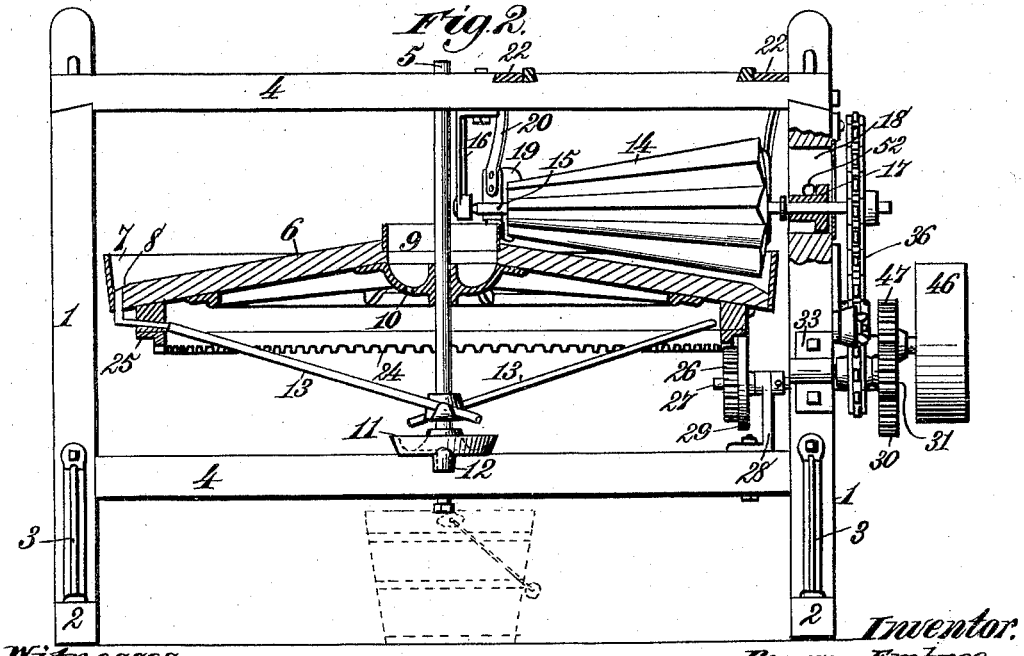


Fig. 2.



Witnesses.
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J. A. Rutherford.

Inventor.
Pearson Embree.
By James L. Norris.
Atty.

(No Model.) 2 Sheets—Sheet 2.

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Fig. 3.

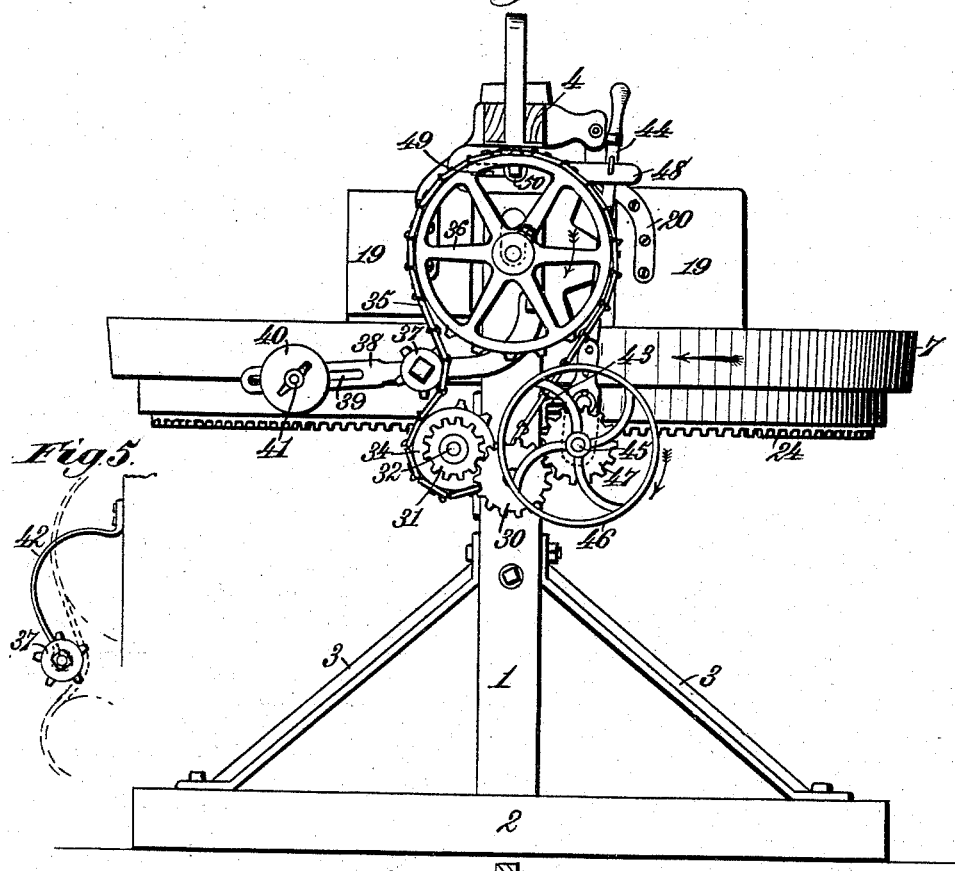


Fig. 5.

Fig. 6.

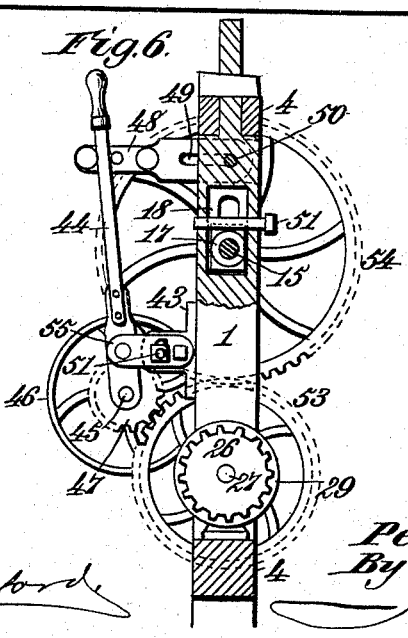


Fig. 4.

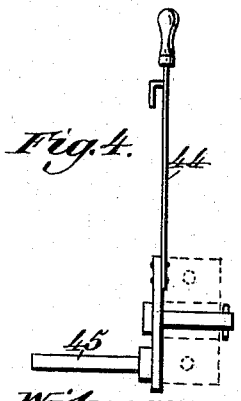
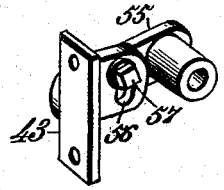


Fig. 7.



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Inventor:
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UNITED STATES PATENT OFFICE.

PEARSON EMBREE, OF WEST CHESTER, PENNSYLVANIA.

BUTTER-WORKER.

SPECIFICATION forming part of Letters Patent No. 492,325, dated February 21, 1893.

Application filed July 9, 1892. Serial No. 439,508. (No model.)

To all whom it may concern:

Be it known that I, PEARSON EMBREE, a citizen of the United States, residing at West Chester, in the county of Chester and State of Pennsylvania, have invented new and useful Improvements in Butter-Workers, of which the following is a specification.

This invention relates to improvements in the butter worker for which Letters Patent No. 167,084 were granted to me August 24, 1875.

One object of my present invention is to provide an improved arrangement of gearing through which the rotating table and revolving roller can be conveniently and economically actuated by power, with provision for enabling the roller to yield in a vertical direction according to variations in the quantity and consistency of the butter, in combination with a belt tightening device through which the tension of a chain belt forming part of the said gearing will be automatically regulated to corresponed with the rise and fall of the roller.

Another object of the invention is to provide a novel construction of shifting lever for effecting a quick engagement and disengagement of gears to start or stop the machine instantaneously.

Another object of the invention is to so construct and arrange the gears that immediately actuate the rotary table as to prevent all grinding or clogging in the action of said gears and impart to the table a steady and uniform rotary movement.

To these ends my invention consists in the peculiar features of construction, and novel combinations of devices in a rotary butter-worker as hereinafter more particularly described and claimed.

In the annexed drawings illustrating the invention—Figure 1 is a plan of my improved butter worker. Fig. 2 is a partly sectional elevation of the same. Fig. 3 is a side or end elevation of the machine. Fig. 4 is a view of the shifting lever. Fig. 5 illustrates a modification in the manner of supporting the belt tightener. Fig. 6 is a partly sectional elevation of the inner side of a portion of one of the machine frame standards or supports showing an arrangement of gears through which the rotary table and revolving roller can be actuated and illustrating an adjustable bearing for the shifting lever and band-pulley whereby the machine can be adjusted for use with either a straight or crossed power belt. Fig. 7 is a detail view of an adjustable bearing for the shifting lever.

Referring to the drawings, the numeral 1 designates two standards secured to foot pieces 2 and strengthened by braces 3 in any suitable or convenient manner. These standards 1 support the upper and lower cross bars 4 in which the vertical shaft 5 of the rotary table 6 is journaled. The upper face of the table is made conical or rising toward the center and is provided around its periphery with a rim 7 which assists in forming an annular channel 8 for the butter-milk. It is also provided at the center with a chamber 9 for collecting any milk that may be thrown toward the center by the action of the table and roller. In the bottom of this chamber 9 is an opening 10 for the escape of milk from said chamber to a basin 11 supported below the table and provided with an escape pipe 12 through which the milk can pass to a pail or other receptacle. The table is also provided with one or more tubes 13 leading from the buttermilk channel 8 to said basin.

Above the rotary table 6 is a conical fluted roller 14 mounted upon a shaft 15 which is journaled at its inner end in a hanger 16 that may be adjustably suspended from the upper cross bar 4 in such manner as to be capable of being shifted laterally so as to throw the shaft 15 out of line in a position at an angle to, or obliquely to, the radius of the rotating bed. The outer end of the roller shaft 15 is journaled in a bearing 17 which is capable of vertical movement in a slot 18 formed in one of the machine standards.

In front and rear of the fluted roller 14, at each end, are arranged butter-guides 19 attached to hangers 20 that may be adjustably suspended by means of set-screws 21 from brackets 22 on the upper cross-bar 4 in such manner as to permit adjustment of said guides to any desired elevation to prevent trituration of the butter which would tend to render it oily and unpalatable. By means of these guides the butter is kept away from

the rim 7 and central chamber 9 when the machine is in operation and is caused to pass properly under the fluted roller.

Between the front butter-guides is secured a clearer 23 which sits across the front of the fluted roller 14 for the purpose of clearing the same of any butter which may adhere thereto.

It may be observed that the construction and arrangement of the rotary table, the fluted roller and the adjustable butter-guides are substantially the same as shown and described in my hereinbefore mentioned patent. My present invention comprises, however, a novel combination of devices in a driving mechanism for imparting the required movements to said rotary table and fluted roller, including the provision of the vertically movable bearing 17 for one end of the roller shaft 15 whereby said fluted roller 14 is made capable of yielding in a vertical direction to accommodate itself to variations in the quantity and consistency of the butter under treatment.

My improvements also contemplate means for automatically regulating the tension or tautness of a chain belt, forming part of the driving gearing, according to changes in the elevation of the fluted roller; a shifting lever through which direct engagement and disengagement of the driving gears are quickly effected; and a novel arrangement of anti-friction gearing in connection with the rotary table whereby said table will receive a steady and uniform movement without any tendency to grinding or clogging of the gears.

By referring to Figs. 2 and 3 it will be seen that there is secured to the under side of the rotary table 6, near its periphery, a circular toothed rack or gear 24 having an annular flange 25 projecting horizontally from its outer side at a higher level than the teeth composing said circular rack. This rack 24 meshes with a spur gear 26 on the inner end of a short horizontal shaft 27 that is journaled partly in a bearing provided in one of the machine standards and partly in a bearing supported by a bracket 28 secured to the lower cross-bar 4 of the machine frame. Attached to or formed on the outer face of the gear 26 is an anti-friction disk or roller 29 which is of sufficiently greater diameter than the gear 26 to be capable of affording a bearing for the annular flange 25 of the circular rack 24, thereby sustaining the thrust of said rack and consequently preventing any grinding or wedging of the toothed surfaces of the rack 24 and gear 26 during the operation of the machine. By this manner of gearing the rotary table 6 it will at all times receive a steady and uniform movement, when the machine is in operation, without any tendency to backlash and with no wear on the gears from grinding or excessive friction. On the outer end of the shaft 27 is secured a spur gear 30, Figs. 1, 2 and 3, which meshes with a pinion 31 on a stud 32 supported by a bracket 33 attached to the front of one of the machine standards. The pinion 31 has attached thereto, or formed thereon, a sprocket or chain wheel 34 for attachment of a chain belt or sprocket chain 35 which also engages a larger sprocket or chain wheel 36 that is secured to the shaft 15 of the fluted roller. The chain belt 35 is automatically tightened by means of a small sprocket wheel 37 which, as shown in Fig. 3, may be carried by a swinging arm 38 having its inner end pivotally attached to the outer side of the machine standard. In the outer portion of this swinging arm 38 is a longitudinal slot 39 for attachment of a sliding or shifting weight 40 which, by means of a thumb-screw 41, can be adjusted and secured in any required position on said swinging arm to regulate the pressure to be exerten on the chain belt by the belt tightening sprocket.

Instead of employing the weighted swinging arm 38 the belt tightening sprocket wheel 37 may be carried by a spring arm or support 42, Fig. 5, that is attached to a convenient part of the machine frame.

It will be seen that by actuating the roller 14 through a chain belt or sprocket gearing provided with automatic belt tightening mechanism, the roller shaft 15 being mounted at one end in a vertically movable bearing 17 as hereinbefore described, the said roller will be free to rise and fall with variations in the quantity and hardness or softness of the butter.

Secured to the machine frame adjacent to the rear of the gear 30 is a bracket 43 that affords a bearing for a shifting lever 44, Fig. 4, the lower end of which is provided with a journal 45 for a band pulley 46 which carries a spur gear 47 that is adapted to mesh with the spur gear 30 through which the rotary table 6 and fluted roller 14 are actuated. By oscillating the shifting lever 44 in the proper direction the gear 47 can be quickly engaged with or disengaged from the gear 30 to start or stop the machine. The upper end of the lever 44 may be held in any desired position by means of a rack bar 48 that can be adjustably secured to the upper part of the standard 1 by means of a slot 49 and bolt 50 so that by a suitable adjustment of said bar the lever 44 can be secured in the required position according to the degree of mesh between the gears 30 and 47.

By reference to Fig. 6 it will be seen that if a vertical yield of the roller shaft 15 is not required the bearing 17 of said shaft may be held down by a bolt 51 passed through an opening 52, Fig. 2, in the machine standard. In this case the gears 30, 31, 34 and 36, Fig. 3, may be dispensed with and a large spur gear 53 be placed on the shaft 27 to mesh with a still larger spur gear 54 on the roller shaft 15; the gear 53 being actuated through the gear 47 carried by the band pulley 46 which is supported by the shifting lever 44 as before described, so that by oscillating the lever 44

the gear 47 may be engaged with or disengaged from the gear 53 to start or stop the machine.

In order to adapt the machine for the application of power through either a straight belt or a crossed belt the bracket 43 may be provided with an adjustable arm 55, Figs. 6 and 7, to which the lever 44 may be fulcrumed. The arm 55 may be adjustably connected with the bracket 43 by means of a slot 56 and bolt 57 that will enable the arm 55 to be raised or lowered and secured in the desired position to cause the gear 47 to mesh with either the lower gear 53 or the upper gear 54 according to whether a straight or crossed belt is employed for transmitting power to the machine. If a straight belt is used the arm 55 will be lowered to permit the gear 47 to be engaged with the lower gear 53 and if a crossed or twisted belt is applied to the band pulley 46 the arm 55 will be raised to enable the gear 47 to be engaged with the upper gear 54 so that in either case the intermeshing gears 53 and 54 will be revolved in the proper direction to effect the required movements of the rotary table 6 and fluted roller 14.

After the butter to be worked has been spread upon the rotary table 6 the machine will be put in operation by throwing the lever 44 into such position as to effect a proper engagement of the driving gears. It will be observed that the machine is so geared as to impart to the rotating table 6 a relatively slower motion than that of the fluted butter-working roller 14 under which the butter is carried by said table. During its rotation the fluted roller 14 works the butter up toward the center of the table away from the annular butter-milk channel 8 and forms in the butter a succession of radial corrugations along which the pressed out butter-milk readily escapes to the channel 8 and thence through the tubes 13 to the pail or other receptacle placed beneath the machine. The vertically yielding movement of which the roller 14 is capable is of great advantage in adapting the machine to the economical working of different grades of butter, with reference to its degree of hardness or softness, and by reason of the manner in which the machine is geared its entire operation is accomplished with smoothness and ease.

What I claim as my invention is—

1. The combination with the rotary table for supporting and carrying the butter to be worked, of the fluted conical roller having its shaft supported at its outer end in a vertically movable bearing, gearing connecting said table and roller and comprising chain wheels and a chain belt, and a sprocket-wheel belt-tightener engaged with said chain belt, substantially as described.

2. The combination of the rotary table for supporting and carrying the butter to be worked, the circular rack or gear secured to the under side of said table and provided with an annular horizontally projecting flange, a horizontal driving shaft having a spur gear meshing with said rack and provided with an anti-friction disk or roller of greater diameter than said gear and mounted on the outer side thereof in bearing contact with the annular flange on the outside of said circular rack, and a fluted conical roller arranged above the rotary table and having its shaft geared with the driving shaft of said table, substantially as described.

3. The combination with the rotary table for supporting and carrying the butter to be worked, the butter-working roller arranged above the table, and gearing connecting said table and roller, of a vertically adjustable shifting lever, a band pulley mounted on said shifting lever, and a gear carried by said band pulley and adapted to be engaged with the gearing that connects said rotary table and roller, substantially as described.

In testimony whereof I have hereunto set my hand and affixed my seal in presence of two subscribing witnesses.

PEARSON EMBREE. [L. S.]

Witnesses:

ALBERT H. NORRIS,

J. A. RUTHERFORD.