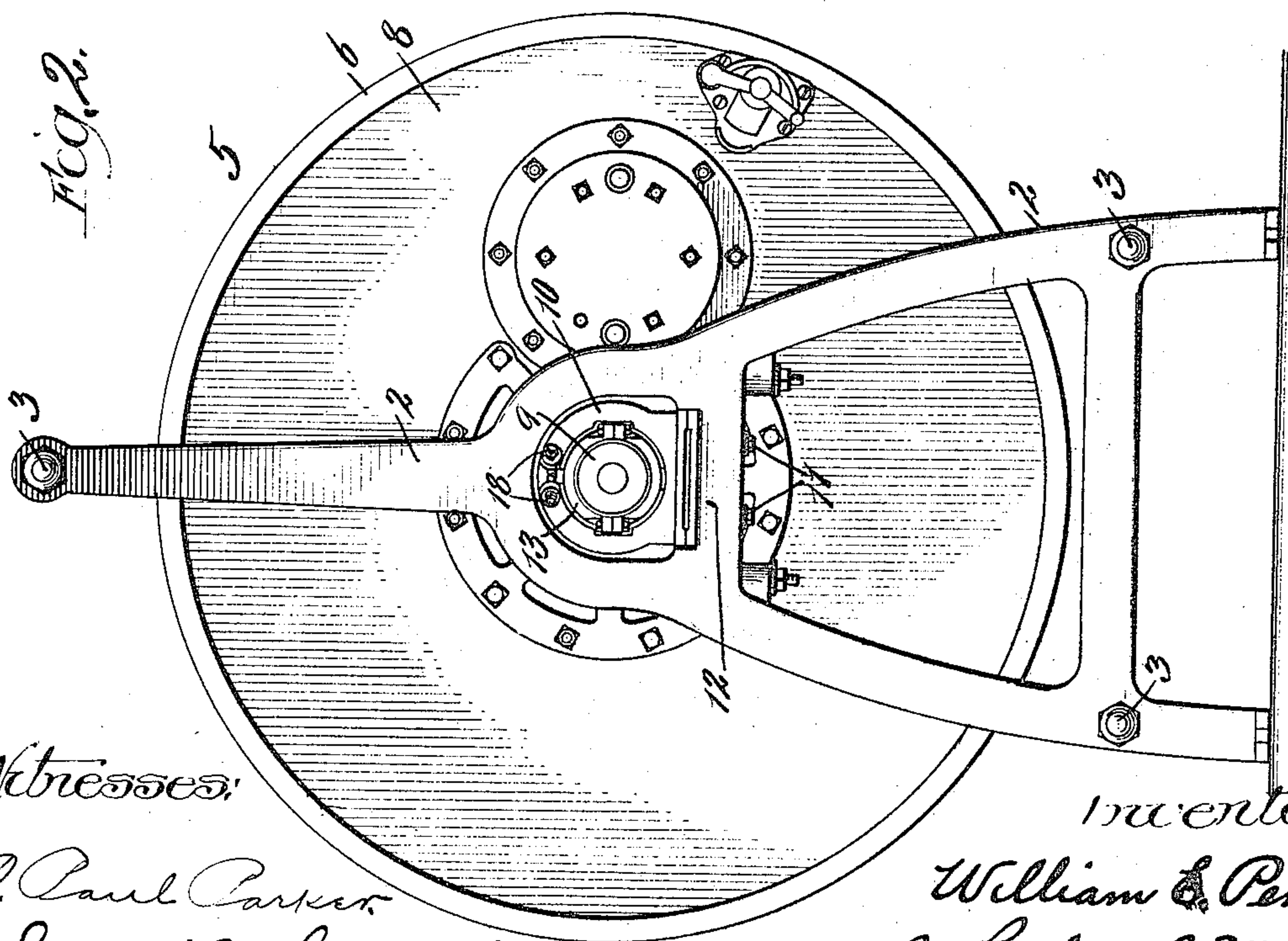
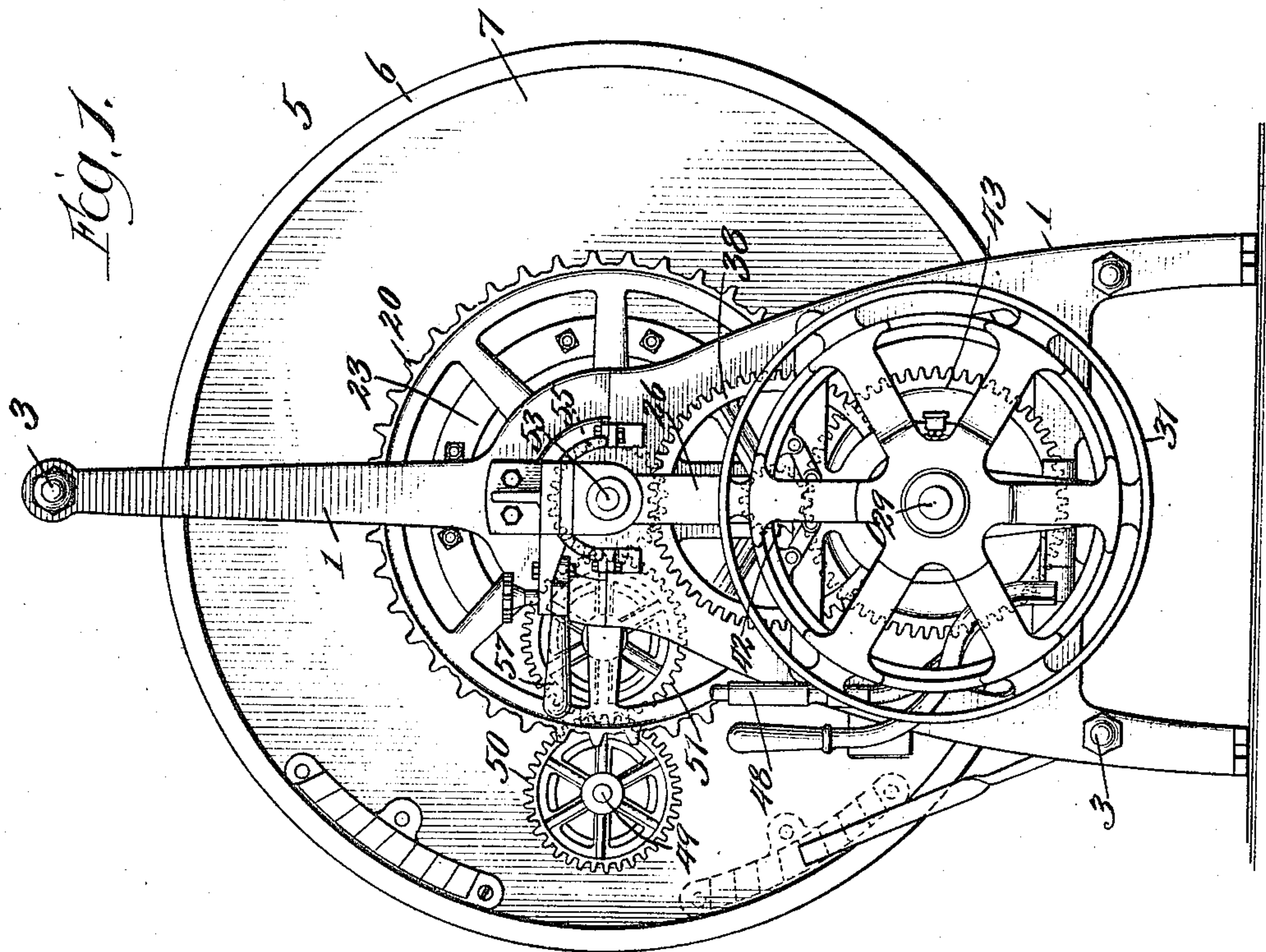


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W. E. PENN.  
CHURN AND BUTTER WORKER.  
APPLICATION FILED JAN. 11, 1909.

Patented Mar. 22, 1910.

2 SHEETS—SHEET 1.



Witnesses:

C. Paul Carter  
George L. Chindahl

Inventor:

William E. Penn  
By Luther L. Miller  
Atty.

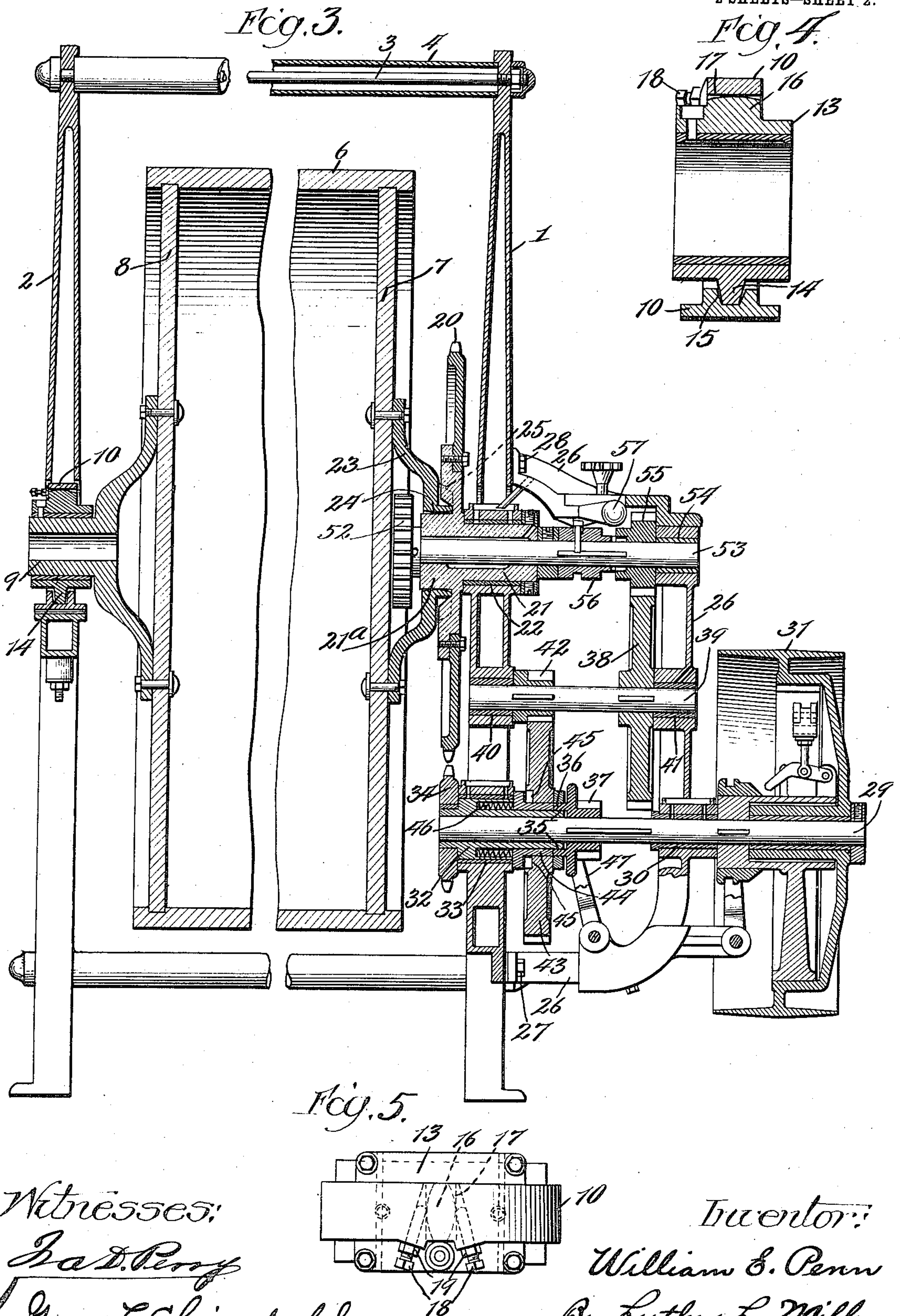


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2 SHEETS—SHEET 2.



Witnesses:  
Jas. D. Perry  
George L. Chindahl

Inventor:  
William E. Penn  
By Luther L. Miller.  
Atty.



# UNITED STATES PATENT OFFICE.

WILLIAM E. PENN, OF LAKEMILLS, WISCONSIN, ASSIGNOR TO CREAMERY PACKAGE MANUFACTURING COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

CHURN AND BUTTER-WORKER.

952,685.

Specification of Letters Patent. Patented Mar. 22, 1910.

Application filed January 11, 1909. Serial No. 471,798.

*To all whom it may concern:*

Be it known that I, WILLIAM E. PENN, a citizen of the United States, residing at Lakemills, in the county of Jefferson and State of Wisconsin, have invented certain new and useful Improvements in Churns and Butter-Workers, of which the following is a specification.

This invention relates particularly to churns and butter-workers of the type comprising a drum rotatably supported at its ends. Such drums are liable to distortion from various causes.

In the constructions commonly used at the present time the distortion just referred to injuriously affects the bearings for the drum, throws the drum out of proper relation to its driving mechanism, and may throw the parts of the driving mechanism out of proper position. It is one of the objects of this invention to provide improved bearings for the drum or body of the churn or butter-worker, which shall properly support the body notwithstanding the latter may become somewhat distorted.

Another object of the invention is to provide an improved driving means for churns and butter-workers.

In the accompanying drawings, Figure 1 is a front end elevation of a combined churn and butter-worker embodying the features of my invention. Fig. 2 is a rear elevation thereof. Fig. 3 is a vertical central section through the machine, parts being broken away to shorten the view. Fig. 4 is a detail sectional view of the rear end bearing for the drum. Fig. 5 is a top plan view of said bearing.

The frame of the machine, in the present embodiment, comprises the front end frame 1 and the rear end frame 2, said end frames being rigidly secured together by means of rods 3 extending through distance tubes 4. It will be understood, however, that the particular construction of the supporting framework is not material to the invention.

The drum or body 5 consists of the cylinder 6 and heads 7 and 8. As herein shown, the drum is supported at its ends. To the rear head 8 of the drum is fixed a gudgeon 9 which is supported in a bearing that is free to oscillate in vertical and horizontal planes. In the construction herein illus-

trated a cage or frame 10 is secured in the rear end frame 2 by means of bolts 11 extending through the portion 12 of said end frame into the base of said cage. The latter may be adjusted in height by placing spacing plates between said cage and the portion 12 of said end frame.

13 is a bearing block which may be a two-part construction, as shown in Fig. 2, said bearing block receiving the gudgeon 9 and being mounted in the cage or frame 10. Upon its lower side, the bearing block 13 has a frusto-conical stud 14 (Fig. 4) which is pivotally mounted in a socket 15 in the cage 10. The side walls of said socket are tapered at a greater angle than the stud 14 in order to permit said stud to rock in said socket.

Upon the upper side of the bearing block 13 is a lug 16 which lies within a groove 17 in the cage 10. As shown in Fig. 5, the side walls of said groove are straight, while the sides of the lug 16 are rounded to permit the bearing block 13 to rock in a horizontal plane. As indicated in Fig. 4, the upper end of the lug 16 is rounded to permit the bearing block 13 to oscillate in a vertical plane.

18 are screws seated in the cage 10 at opposite sides of the groove 17, the inner ends of said screws being arranged to lie at opposite sides of the lug 16. Said screws provide means for taking up any wear that may occur upon the lug 16 and the walls of the groove 17, and thus prevent side motion of the bearing block 13. The screws 18 may be locked in adjusted position by means of the lock nuts 19.

Referring now to the front end bearing, as illustrated in Fig. 3: 20 is a sprocket wheel having a hub 21, one end of which hub is rotatably mounted in a bearing 22 in the end frame 1. The other end 21<sup>a</sup> of the hub 21 is adapted to support the adjacent end of the drum 5. Upon the drum head 7 is fixed a spider 23 having a central bearing 24 to receive the hub 21<sup>a</sup> of the sprocket wheel 20. The walls of said bearing are convex, as shown, in order that the side bearing may rock upon the hub 21<sup>a</sup>. A driving engagement between the drum 5 and the sprocket wheel 20 is effected by suitable means, as, for example, lugs 25



upon the spider 23, fitting within recesses in the side of the sprocket wheel. Said recesses are large enough to permit of a slight rocking of the bearing 24 upon the pivot or hub 21<sup>a</sup>.

A bracket 26 is rigidly attached at its lower end to the end frame 1 at 27 and at its upper end to said end frame at 28. The drive shaft 29 of the machine is rotatably supported near one end in a bearing 30 in said bracket and carries upon its outer end a drive pulley 31. A hub 32 is rotatably mounted in a bearing 33 in the end frame 2 and rotatably supports the inner end of the drive shaft 29. Fixed to said hub is a sprocket wheel 34 to receive a chain (not shown) extending over the sprocket wheel 20. In one end of the hub 32 are formed recesses 35 to receive clutch teeth 36 upon a pinion 37 that has a spline connection with the drive shaft 29 and is slidable longitudinally of said shaft. When the pinion 37 is clutched to the hub 32 as shown in Fig. 3, power is communicated directly from the pulley 31 through the shaft 29, the pinion 37 and the hub 32 to the sprocket wheel 34 for rotating the drum, as during the churning operation.

When the butter is to be worked, it is desirable to rotate the drum at a lower speed than that used for churning. To this end, I have provided back gearing comprising a gear wheel 38 fixed upon a shaft 39 that is rotatably mounted in bearings 40 and 41 in the end frame 1 and the bracket 26, respectively. Said gear wheel is arranged to mesh with the pinion 37. Upon the shaft 39 is fixed a pinion 42 that meshes with a spur gear wheel 43 which is rotatably mounted upon the hub 32. The means for clutching the gear wheel 43 to the hub 32, in this instance, is arranged to operate automatically upon the disengagement of the pinion 37 from said hub. 44 are keys slidably mounted in the hub 32, and adapted to engage in recesses 45 in the spur gear wheel 43. Springs 46 tend to move the keys 44 into engagement with the gear wheel 43. One end of each of the keys 44 is arranged to extend into a recess 35 when the opposite end is within a recess 45. It will be seen that when the pinion 37 is moved into clutch engagement with the hub 32 the teeth 36 on said pinion push the keys 44 inwardly to uncouple the spur gear wheel 43 from the hub 32, and that when the pinion 37 is slid away from the hub 32 the springs 46 automatically move the keys 44 to connect the spur gear wheel 43 with the hub 32. The pinion 37 may be slid longitudinally of the drive shaft 29 by suitable means such as a fork 47 provided with an operating arm 48 (Fig. 1).

The butter working mechanism includes two shafts 49 extending longitudinally of

and journaled in the drum 5 and bearing upon their outer ends intermeshing gear wheels 50 and 51. The gear wheel 51 meshes at all times with a gear wheel 52 fixed upon the inner end of a shaft 53 which is journaled in the hub of the sprocket wheel 20 and in a bearing 54 in the bracket 26. The shaft 53 is driven only during the butter-working operation.

Rotatably mounted upon the shaft 53 is a pinion 55 that meshes with the spur gear wheel 38 upon the shaft 39. Slidably supported upon the shaft 53 is a clutch member 56 having a spline connection with said shaft, said clutch member being adapted to engage the hub of the pinion 55 to clutch the shaft 53 to said pinion when the butter working rolls are to be rotated. 57 is a hand lever for operating the clutch member 56.

In use, distortion of the drum heads or the cylindrical walls of the drum will not interfere with the proper operation of the machine. The bearing block 13 is free to oscillate in vertical and horizontal planes with relation to the cage or frame 10, and the bearing 24 likewise is free to rock with relation to the hub 21<sup>a</sup>. It will be seen that the driving mechanism is not rigidly connected to the drum, the latter being free to move slightly with relation to the sprocket wheel 20. The shafts 29, 39 and 53 being mounted in a rigid framework and being yieldingly connected with the drum through the parts 21<sup>a</sup>, 24, 25, are not affected by distortion of the drum and can not get out of alinement with one another.

I would have it understood that I do not limit myself to the details of construction herein set forth, for various modifications will occur to persons skilled in the art.

I claim as my invention:

1. A churn or butter worker comprising a rotary drum and means engaging the ends of said drum for supporting the latter, said means comprising a pivot fixed to the drum and a bearing block for the pivot, said block being supported to rock in horizontal and vertical planes.

2. A churn or butter worker comprising a rotary drum and means for supporting said drum, said means comprising a pivot fixed to the drum, a bearing block for the pivot, a pivot stud at the lower side of said block, a socketed portion to receive said stud, and means engaging the upper part of said bearing block and permitting horizontal and vertical oscillation of said block.

3. A churn or butter worker comprising a rotatory drum and means for supporting said drum, said means comprising a pivot fixed to the drum, a bearing block for the pivot, a pivot stud at the lower side of said block, a socketed portion to receive said stud, a stud at the upper side of said block, and



means engaging the last mentioned stud to permit horizontal and vertical oscillation of said block.

4. A churn or butter worker comprising a rotatory drum and means for supporting said drum, said means comprising a pivot fixed to the drum, a bearing block for the pivot, supporting means engaging the lower portion of said bearing block, a stud upon the upper portion of said block, said stud having rounded sides and a rounded upper end, and a grooved member in which said stud lies.

5. A churn or butter worker comprising a rotatory drum and means for supporting said drum, said means comprising a pivot fixed to the drum, a bearing block for the pivot, supporting means engaging the lower portion of said bearing block, a stud upon the upper portion of said block, said stud having rounded sides and a rounded upper end, a grooved member in which said stud lies, and means at opposite sides of said stud for taking up wear.

6. A churn or butter worker comprising a rotatory drum and means for supporting said drum, said means comprising a pivot fixed to the drum, a bearing block for the pivot, a pivot stud at the lower side of said block, a socketed portion to receive said stud, a stud at the upper side of said block, the last mentioned stud having rounded sides and a rounded upper end, a portion having a groove therein in which the last mentioned stud lies, and set screws mounted in the last mentioned portion, the inner ends of said screws being arranged to lie at opposite sides of the last mentioned stud.

7. A churn or butter worker comprising a rotatory drum and means for supporting said drum, said means comprising a suitably supported pivot, and a bearing fixed to one end of said drum, said bearing being adapted to permit of oscillatory relative movement between said pivot and said bearing.

8. A churn or butter worker comprising a rotatory drum and means for supporting said drum, said means comprising a suitably supported pivot, and a bearing fixed to one end of said drum, the bearing being adapted to receive said pivot, the walls of the opening in said bearing being rounded to permit of relative movement between said bearing and said pivot.

9. A churn or butter worker comprising a supporting frame and a drum, said frame comprising an end frame, and means for rotatably mounting the drum in the supporting frame comprising a cradle bolted to said end frame, a bearing block mounted in said cradle to oscillate in vertical and horizontal planes, and a gudgeon fixed to said drum and mounted in said bearing block.

10. A churn or butter worker comprising a rotatory drum, means for rotating said

drum, and a flexible connection between said drum and said driving means.

11. A churn or butter worker comprising a rotatory drum; means for rotating said drum comprising a wheel arranged concentric with said drum; and a loose driving connection between said drum and said wheel.

12. A churn or butter worker comprising a rotatory drum; means for rotating said drum comprising a suitably supported wheel having a hub; a bearing fixed to one end of said drum, said hub extending into said bearing; and means for obtaining a driving connection between said drum and said wheel, said means comprising a lug on one of said parts and a socket in the other part to receive said lug.

13. A churn or butter worker comprising a rotatory drum; a rigid framework; a driving mechanism supported in said framework adjacent to one end of said drum; means for supporting said end of said drum adapted to permit of relative movement between said drum and said driving means; and a driving connection between said drum and said driving means.

14. In a churn or butter worker, a rotatory drum, a framework, a drive shaft and a rotatory element mounted in said framework, two gear wheels fixed with relation to each other and mounted in said framework, a gear wheel having a spline connection with said drive shaft and arranged to mesh with one of the first mentioned gear wheels, a gear wheel arranged to mesh with the other of said first mentioned gear wheels and rotatably mounted on said rotatory element, means for connecting said rotatory element with the gear wheel mounted upon it, the splined gear wheel being adapted to clutch said rotatory element and operate said connecting means, and means for connecting said rotatory element to said drum.

15. In a churn or butter worker, a rotatory drum; a framework; a drive shaft; a rotatory element mounted in said framework; two gear wheels fixed with relation to each other and mounted in said framework; a pinion having a spline connection with said drive shaft and arranged to mesh with one of the first mentioned gear wheels; a gear wheel arranged to mesh with the other of said first mentioned gear wheels and rotatably mounted on said rotatory element; a spring-pressed key in said rotatory element adapted to engage the gear wheel mounted on said element, said pinion being adapted to clutch said rotatory element and move said key out of operative position; and means for connecting said rotatory element to said drum.

16. In a churn or butter worker, a rotatory drum; a framework; a hub rotatably mounted in said framework; a drive shaft rota-



ably mounted in said hub and said framework; two gear wheels fixed with relation to each other and mounted in said framework; a pinion having a spline connection  
 5 with said drive shaft and arranged to mesh with one of the first mentioned gear wheels; a gear wheel arranged to mesh with the other of said first mentioned gear wheels and rotatably mounted on said hub; means  
 10 for connecting said hub with the gear wheel mounted upon it, said pinion being adapted to clutch said hub; a rotatory element mounted in said framework and supporting said drum and having a driving connection  
 15 therewith, said drum being yieldingly connected with said element; and a driving connection between said element and said hub.

17. In a churn or butter worker, a rotatory drum; a framework; a driving element having  
 20 a hub rotatably mounted in said framework; a bearing attached to said drum and receiving said hub, said bearing permitting relative movement between said bearing and said hub; a loose driving connection between  
 25 said element and said drum; a shaft rotatably mounted in said hub and said framework; butter working means carried by said drum and geared to said shaft; and means for rotating said element and said shaft.

30 18. In a churn or butter worker, a rotatory drum; a framework; a hub rotatably mounted in said framework; a drive shaft mount-

ed in said hub and said framework; a back gear shaft mounted in said framework; a spur gear and a pinion fixed on said back  
 35 gear shaft; a pinion splined to said shaft and adapted to mesh with said spur gear; a spur gear rotatably mounted on said hub and arranged to mesh with the pinion on said back gear shaft; means for connecting said hub  
 40 to the spur gear wheel mounted upon it, said splined pinion being adapted to clutch said hub and operate said connecting means; a driving element having a hub rotatably mounted in said framework; a third shaft  
 45 supported in the last mentioned hub and said framework; a pinion loose on said third shaft and meshing with the spur gear on said back gear shaft; means for clutching  
 50 said third shaft to said last mentioned pinion; a bearing fixed to said drum and receiving the hub of said driving element, said bearing being adapted to permit relative movement between said bearing and said  
 55 hub; a loose driving connection between said element and said drum; a driving connection between the first mentioned hub and said element; and butter working means carried by said drum and geared to the third shaft.

WILLIAM E. PENN.

Witnesses:

L. F. ANDERSON,  
 ALICE SAECKER.