

No. 700,775.

Patented May 27, 1902.

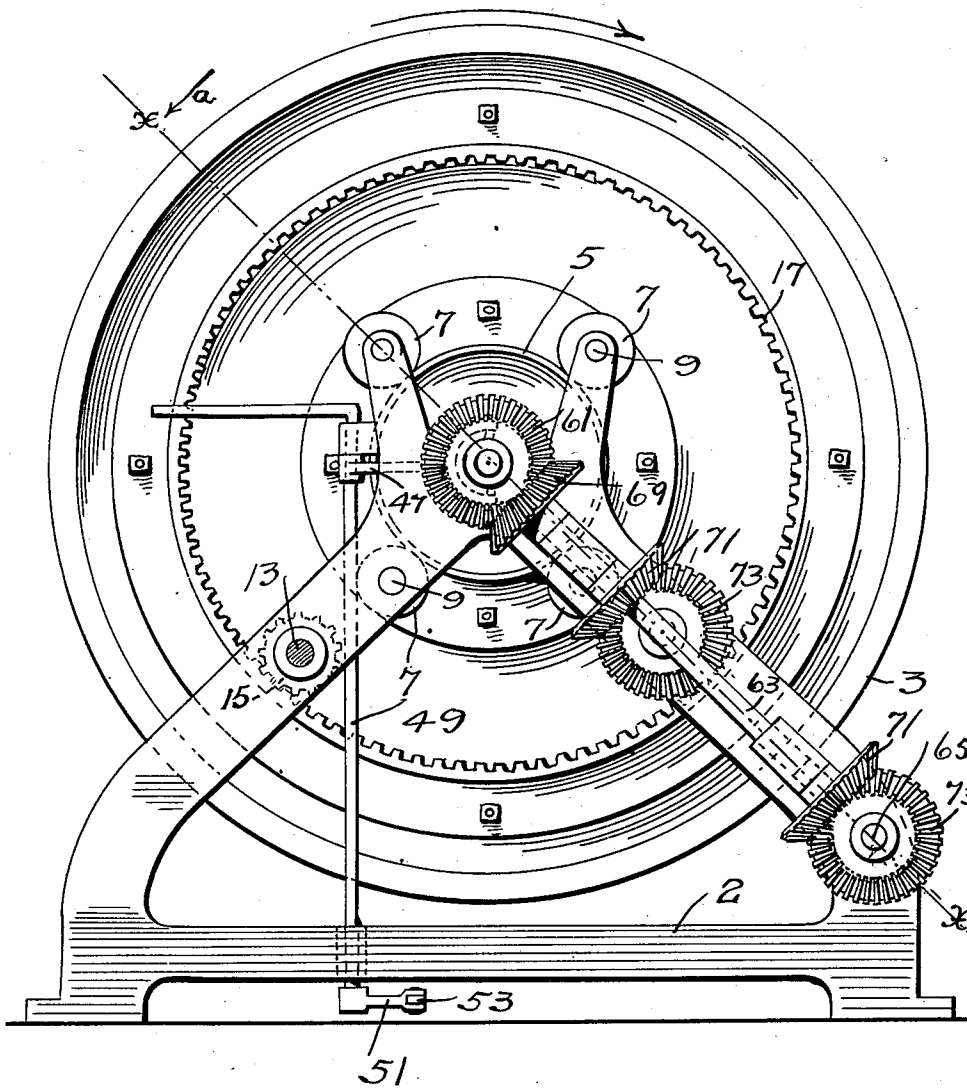
T. J. HOWE.  
COMBINED CHURN AND BUTTER WORKER.

(Application filed Nov. 1, 1901.)

(No Model.)

4 Sheets—Sheet 1.

FIG. 1.



WITNESSES  
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BY Paul & Paul  
HIS ATTORNEYS

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4 Sheets—Sheet 2.

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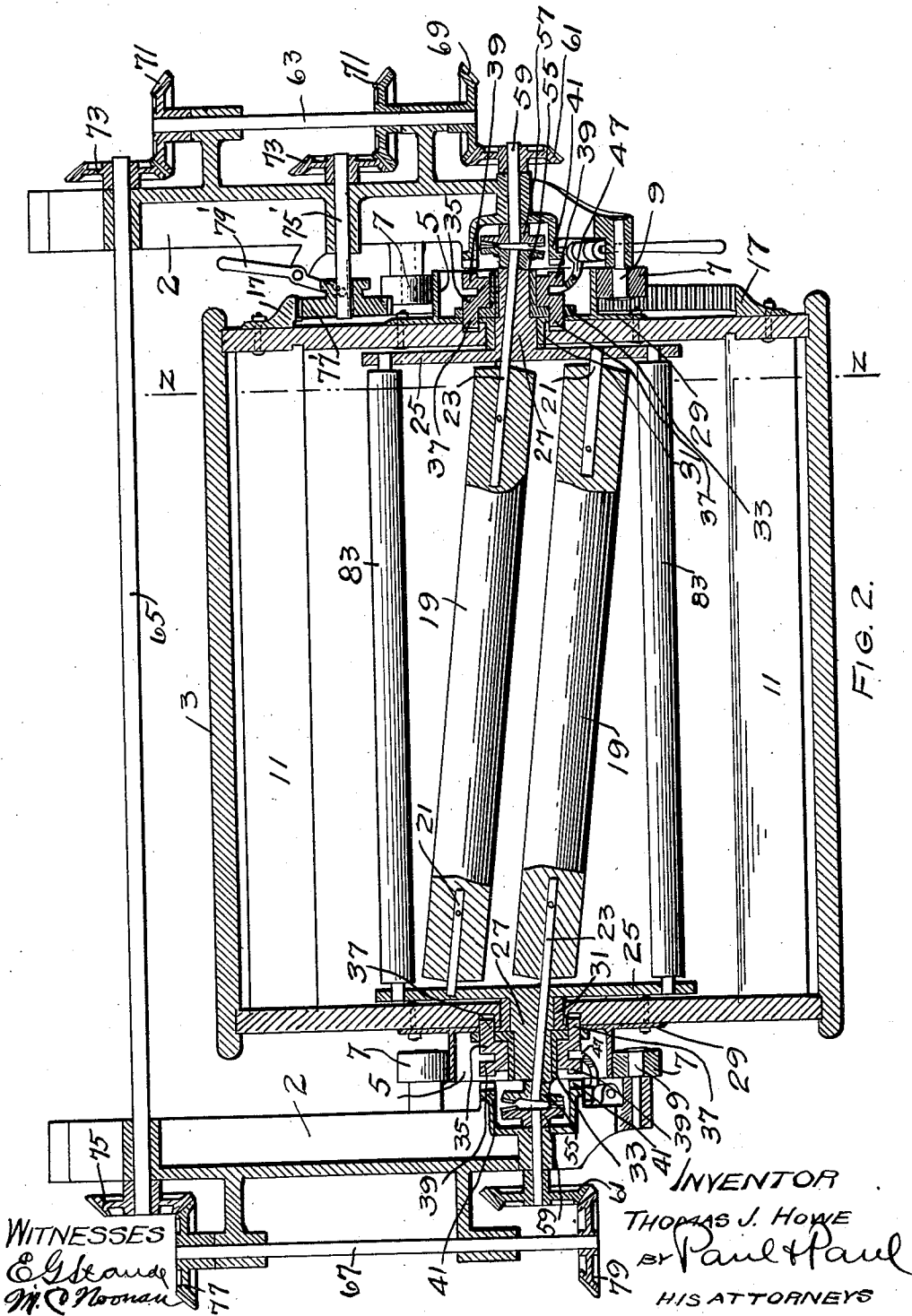


FIG. 2.

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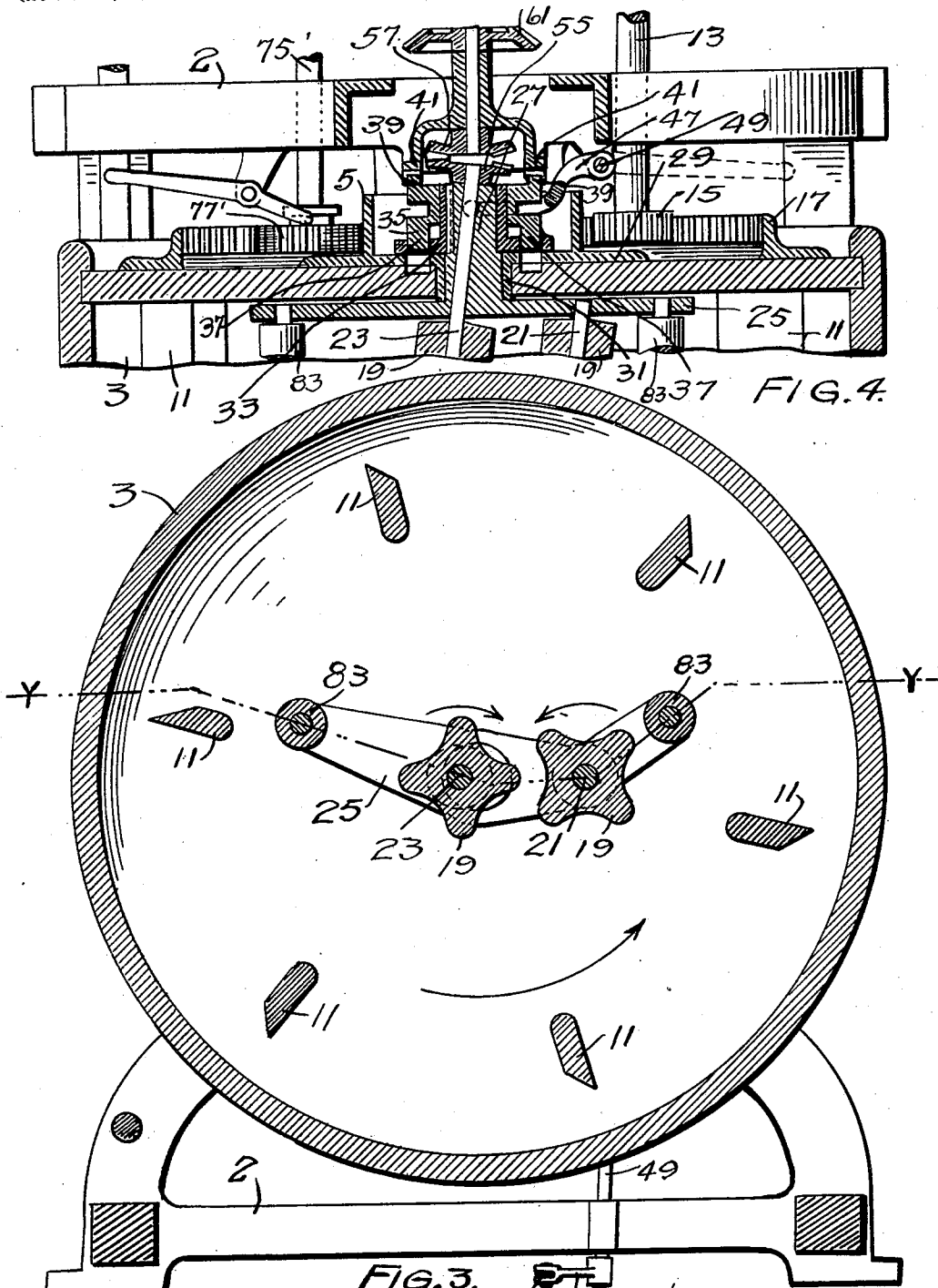


FIG. 3.

WITNESSES  
*E. G. Seaman*  
*M. R. Nonan*

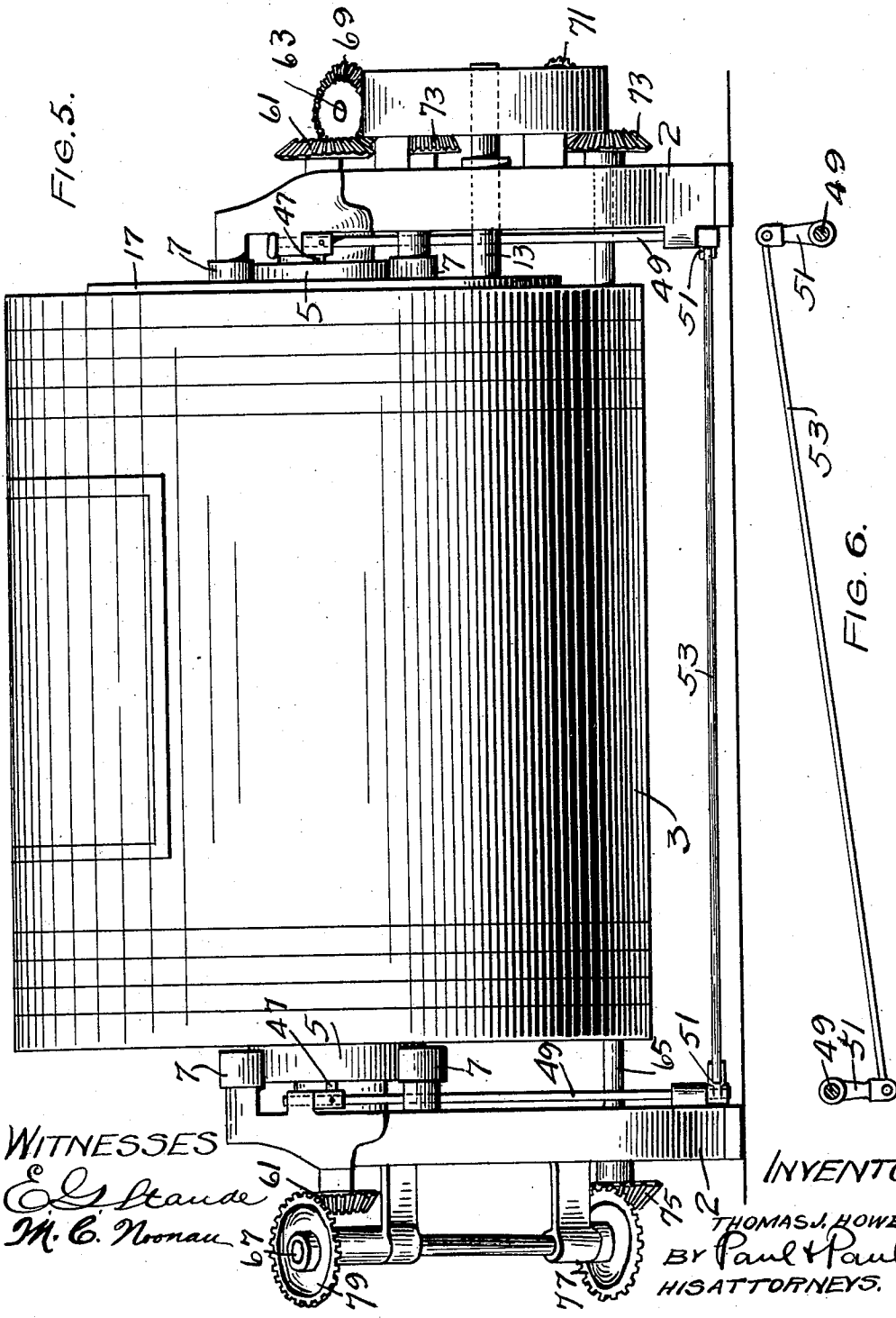
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4 Sheets—Sheet 4.



# UNITED STATES PATENT OFFICE.

THOMAS J. HOWE, OF OWATONNA, MINNESOTA.

## COMBINED CHURN AND BUTTER-WORKER.

SPECIFICATION forming part of Letters Patent No. 700,775, dated May 27, 1902.

Application filed November 1, 1901. Serial No. 80,728. (No model.)

*To all whom it may concern:*

Be it known that I, THOMAS J. HOWE, of Owatonna, county of Steele, State of Minnesota, have invented certain new and useful Improvements in a Combined Churn and Butter-Worker, of which the following is a specification.

This invention relates to improvements in that class of combined churns and butter-workers which include a revoluble drum with rotating butter workers or rolls therein, said rolls being adapted to whirl with the drum during the churning operation and to remain in a fixed position within the churn-drum during the rotation of the drum in the butter-working operation; and the objects I have in view are to provide a machine of this class in which the butter-working rolls are supported and are adapted to be operated without the employment of any loose head or equivalent device at one or both ends of the churn-drum.

My invention consists generally in a combined churn and butter-worker provided with a revoluble drum having therein butter-working rolls arranged parallel or substantially parallel to each other, the axis of one roll being coincident or substantially coincident with the axis of the drum at one end of the drum and the axis of the other roll being substantially coincident with the axis of the drum at the other end of the drum.

My invention further consists in means for rotating one of the butter-working rolls through one end of the drum and means for rotating the other roll through the other end of the drum.

My invention consists, further, in the constructions and combinations hereinafter described, and particularly pointed out in the claims.

In the accompanying drawings, forming part of this specification, Figure 1 is an end elevation of a combined churn and butter-worker embodying my invention. Fig. 2 is a longitudinal section on line *xx* of Fig. 1 looking in the direction of arrow *a*. Fig. 3 is a transverse vertical section on line *zz* of Fig. 2. Fig. 4 is a plan section on line *yy* of Fig. 3. Fig. 5 is a side elevation. Fig. 6 is a detail.

In all of the drawings, 2 represents a suitable frame, which may be of any preferred construction and formed of any suitable material. Supported upon this frame is a revoluble drum 3, which may be formed of any suitable size and of any suitable material. This drum is provided at each end with a ring-gudgeon 5; and these gudgeons are supported upon rollers 7, mounted upon suitable studs 9 upon the frame 2. The drum is provided with suitable flights 11 of any preferred construction and arranged in any suitable manner. These flights elevate the butter and drop it upon the butter-working rolls in the usual manner. The drum is rotated upon its bearings by any suitable means. I have here shown a driving-shaft 13, provided with a pinion 15, that meshes with an internal ring-gear 17, secured upon one end of the drum. In practice means will be provided for driving the shaft 13 at different speeds for churning and butter-working. Arranged in the drum are the parallel or substantially parallel butter-working rolls 19. These rolls are provided with suitable journals 21 and 23, that are mounted in cross-heads 25. There is one of these cross-heads at each end of the drum, and each cross-head is provided with a hub 27, that extends centrally through the end or head of the drum. Means are also provided by which the hubs 27 and cross-heads 25 may be locked to the head of the drum, and thereby caused to whirl or turn with the drum, or may be locked to the frame of the machine, and thereby held in a stationary position while the drum is rotating.

The end of the drum is preferably provided with a disk 29, which has a sleeve 31 projecting centrally through the head of the drum and receiving the hub 27 on the cross-head 25. A tight joint is formed between the hub 27 and the sleeve 31. The ring-gudgeon 5 is preferably formed upon or secured to the disk 29. Secured to the hub 27 of the cross-head outside of the disk 29 is a flanged sleeve 33, and mounted upon this sleeve is a sliding clutch 35. This clutch is provided with fingers 37, which project into and are adapted to project through the flanged ring 33. It is also provided with lugs or fingers 39, adapted to be brought into engagement with a sta-

tionary clutch member 41, secured upon the frame of the machine. An annular groove is formed in the clutch 35, and this is engaged by a forked lever 47 or other suitable means, whereby said clutch may be shifted. When it is desired to lock the cross-head to the drum, the clutch is moved so as to cause the fingers 37 to engage openings in the disk 29 or in the head of the drum. (See Fig. 2.)

When it is desired to hold the cross-heads stationary while the drum revolves, the clutch is shifted so as to cause its lugs or projections 39 to engage the stationary clutch member 41. (See Fig. 4.) The cross-head and the means for supporting and holding it are preferably duplicated at the opposite ends of the drum, and the clutch-shifting levers 47 are preferably connected by means of the vertical rods 49, the crank-arms 51, and connecting-rod 53, so that both clutches may be simultaneously operated from either end of the machine. I also provide suitable means whereby one roll may be driven through one end of the drum and the other roll may be driven through the other end of the drum. As here shown, the journal 23 of each roll extends through the corresponding cross-head hub 27, the opening to receive said journal being at a slight angle to the axis of the drum, but being nearly coincident with said axis through its entire length and practically so at the outer end of the journal. Mounted upon this journal is a suitable beveled gear 55, which meshes with a corresponding bevel-gear 57 upon the shaft 59. The shaft 59 is mounted in suitable bearings upon the frame of the machine. I prefer to employ at each end of the machine the journal 23, extending through the cross-head hub and connected, as described, with a suitable shaft 59. I also prefer to simultaneously drive the shafts 59 from the drum. It is obvious, however, that these shafts may be driven in any suitable manner, either from the drum or otherwise. I have here shown each of the shafts 59 provided with a suitable miter-gear 61, and these gears are connected so that the shafts are driven at the same speed by means of the shafts 63, 65, and 67 and the gears 69, 71, 73, 75, 77, and 79. These shafts are supported in any suitable manner, preferably upon the frame of the machine. For imparting motion to these shafts I preferably provide upon one of them—for instance, the shaft 63—a suitable miter-gear 71, that engages a miter-gear 73 upon a short shaft 75'. The shaft 75' is provided with a pinion 77', splined upon said shaft and adapted to slide thereon and to be brought into or out of engagement with the ring-gear 17. A suitable lever 79' is provided, preferably pivoted upon the frame of the machine and engaging the hub of said gear, for the purpose of moving the same into or out of engagement with the ring-gear 17.

If preferred, I may employ a ring-gear 17 upon each end of the drum and also provide

a pinion 77' at each end of the drum capable of being thrown into or out of engagement with said ring-gear and making suitable connection between said pinion and the roll-journal 23, whereby the shaft 65 and some of the other parts of the gearing herein described may be dispensed with.

In fact, many modifications of the construction and arrangement of the gearing will readily suggest themselves to a skilled mechanic. I prefer, however, to use the arrangement of gearing herein shown and described, as thereby the rolls are always maintained in the proper relation to each other and are positively driven at the same speed. The cross-heads may also support suitable rollers or bars 83, arranged, preferably, parallel with the axis of the drum and serving to aid in carrying the butter to the working-rolls.

The operation of the machine will be readily understood from the foregoing detailed description. The drum is supplied with the cream in the ordinary way and the cross-heads are locked to the drum, so that as the drum is rotated the cross-heads, the rolls 19, and the rollers or bars 83 whirl with the drum and assist in agitating the cream. When the churning operation is completed and it is desired to work the butter, the cross-heads are released from the drum and locked to the frame of the machine by means of the clutches 35. The journals 23 are now connected to their driving means, which is preferably the ring-gear upon the drum, to which connection is made by the sliding pinion 77'. As the drum is now rotated the cross-heads will remain stationary and the rolls 19 will revolve upon their axes, turning inward toward each other. The butter will be carried up by the flights 11 and dropped upon said rolls and passed between them, and will thereby be suitably worked. When the butter has been sufficiently worked, the pinion 77' may be disconnected from the ring-gear and the rolls will now cease to revolve, and a further rotation of the drum will cause the butter to be carried up and deposited upon the tops of the rolls, where it will be accessible to the operator through a suitable door or opening in the wall of the drum.

I do not limit myself to the details of the construction herein shown and described, as it will be obvious that the same may be modified in many particulars without departing from my invention. It will be seen also that, if preferred, the rolls 19 may be turned upon their axes while the cross-heads are locked to the drum and while the rolls and cross-heads are being whirled with the drum.

I claim as my invention—

1. The combination, with a revoluble drum, of rolls arranged therein and substantially parallel to each other, the axis of one roll being substantially coincident with the axis of the drum at one end of the drum, and the axis of the other roll being substantially co-

incident with the axis of the drum at the other end of the drum, means for operating said drum, and means for operating said rolls.

2. The combination, with a revoluble drum, of a pair of rolls arranged in said drum, the axis of one roll being substantially coincident with the axis of the drum at one end of the drum, and the axis of the other roll being substantially coincident with the axis of the drum at the other end of the drum, means for revolving said drum, and means for revolving said rolls, substantially as described.

3. The combination, with a revoluble drum, of cross-heads arranged in said drum and each provided with a suitable hub extending through a central opening in the head of the drum, a pair of rolls mounted in said cross-head, one of said rolls having a journal extending through the cross-head hub at one end of the drum, and the other roll having a journal extending through the cross-head hub at the other end of the drum, and means connected with said journals for driving said rolls.

4. The combination, with a revoluble drum, of cross-heads arranged in said drum, each of said cross-heads provided with a hub, projecting centrally through the head of the drum, means for locking said hub and cross-heads to the heads of the drum or to the frame of the machine, substantially as described.

5. The combination, with a revoluble drum, of cross-heads arranged therein, hubs on said cross-heads projecting centrally through the heads of the drum, a pair of rolls mounted in said cross-heads, the journal of one roll projecting through one of the cross-heads and its hub and a journal of the other roll projecting through the other cross-head and its hub, means for locking said cross-heads and hubs to the drum or to the frame of the machine, means for rotating said drum, and means for rotating said rolls, substantially as described.

6. The combination, with a revoluble drum, of cross-heads arranged within said drum, means extending centrally through the heads of the drum for supporting said cross-heads, a pair of rolls mounted in said cross-heads, each of said rolls having one of its journals extending through one head of the drum,

means for rotating said drum, and means connected with said roll-journals for rotating said rolls.

7. The combination, with a revoluble drum, of cross-heads arranged in said drum and each having a hub projecting centrally through one head of the drum, a pair of rolls mounted in said cross-heads, one of said rolls having a journal extending through one of said hubs and the other roll having a journal extending through the other hub, means for rotating said drum, and means for connecting said journals with said drum, whereby said rolls may be simultaneously rotated from said drum, substantially as described.

8. The combination, with the revoluble drum, of the cross-heads mounted therein and each provided with a hub extending through a central opening in the head of the drum, a clutch arranged upon each of said hubs and adapted to lock the cross-head and hub to the drum or to the frame of the machine, means for rotating said drum and means for rotating said rolls while said cross-heads are held stationary, substantially as described.

9. The combination, with a revoluble drum, of cross-heads arranged in said drum and each having the hub projecting centrally through head of the drum, a pair of rolls mounted in said cross-heads, one of said rolls having a journal extending through one of said hubs and the other roll having a journal extending through the other hub, beveled gears connected to said journals and means for operating said gears, substantially as described.

10. The combination, with the revoluble drum of the cross-heads provided with central hubs extending through the heads of the drum, a sliding clutch arranged to lock said cross-head to the drum or to the machinery-frame and suitable rolls arranged to said drum and mounted in said cross-heads, substantially as described.

In witness whereof I have hereunto set my hand this 26th day of October, 1901.

THOMAS J. HOWE.

In presence of—

A. C. PAUL,

A. M. SULLIVAN.