

No. 622,918.

Patented Apr. 11, 1899.

H. FELDMEIER.
COMBINED CHURN AND BUTTER WORKER.

(Application filed Jan. 11, 1899.)

(No Model.)

3 Sheets—Sheet 1.

Fig. 2.

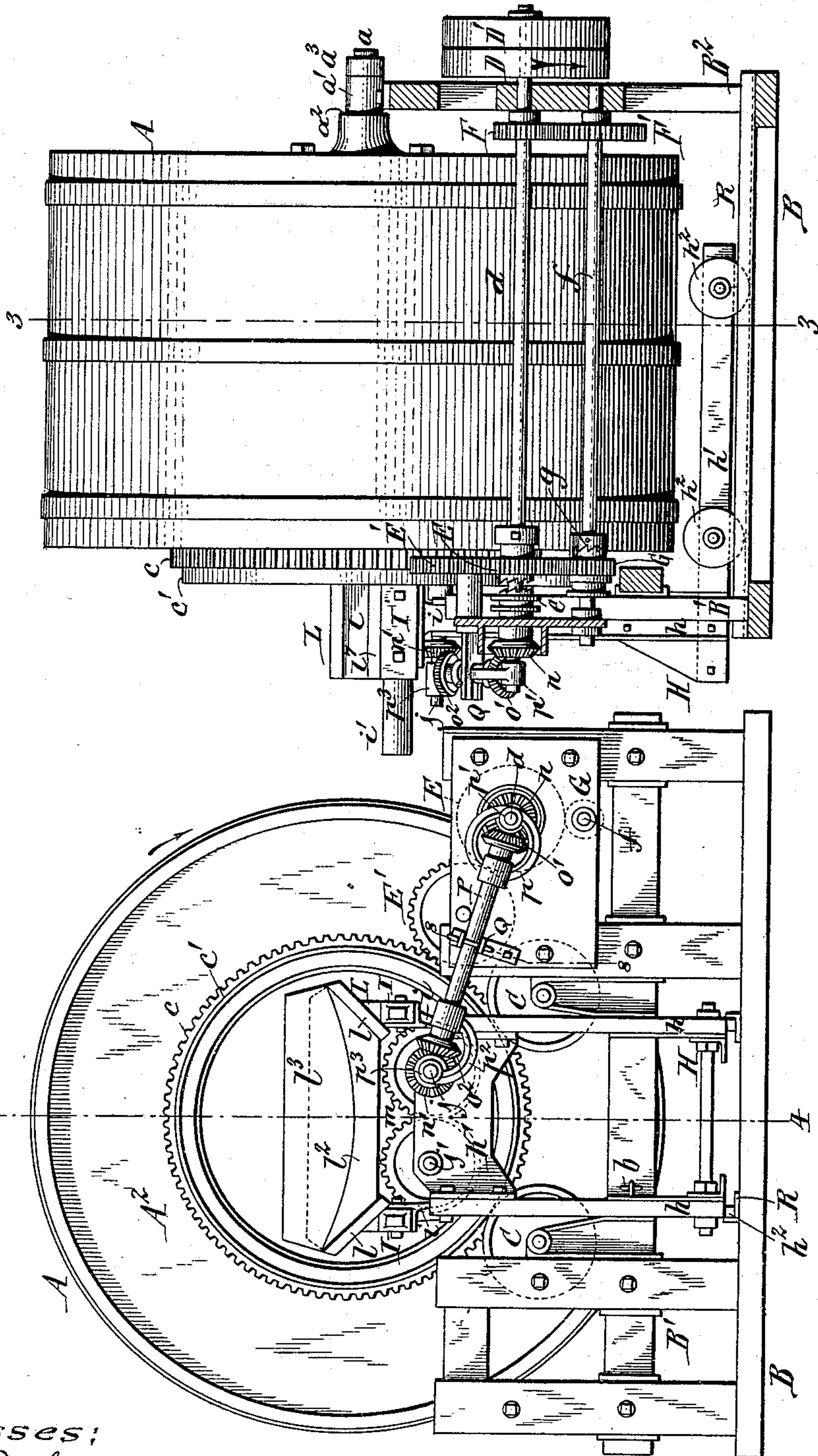


Fig. 1.

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Fig. 4.

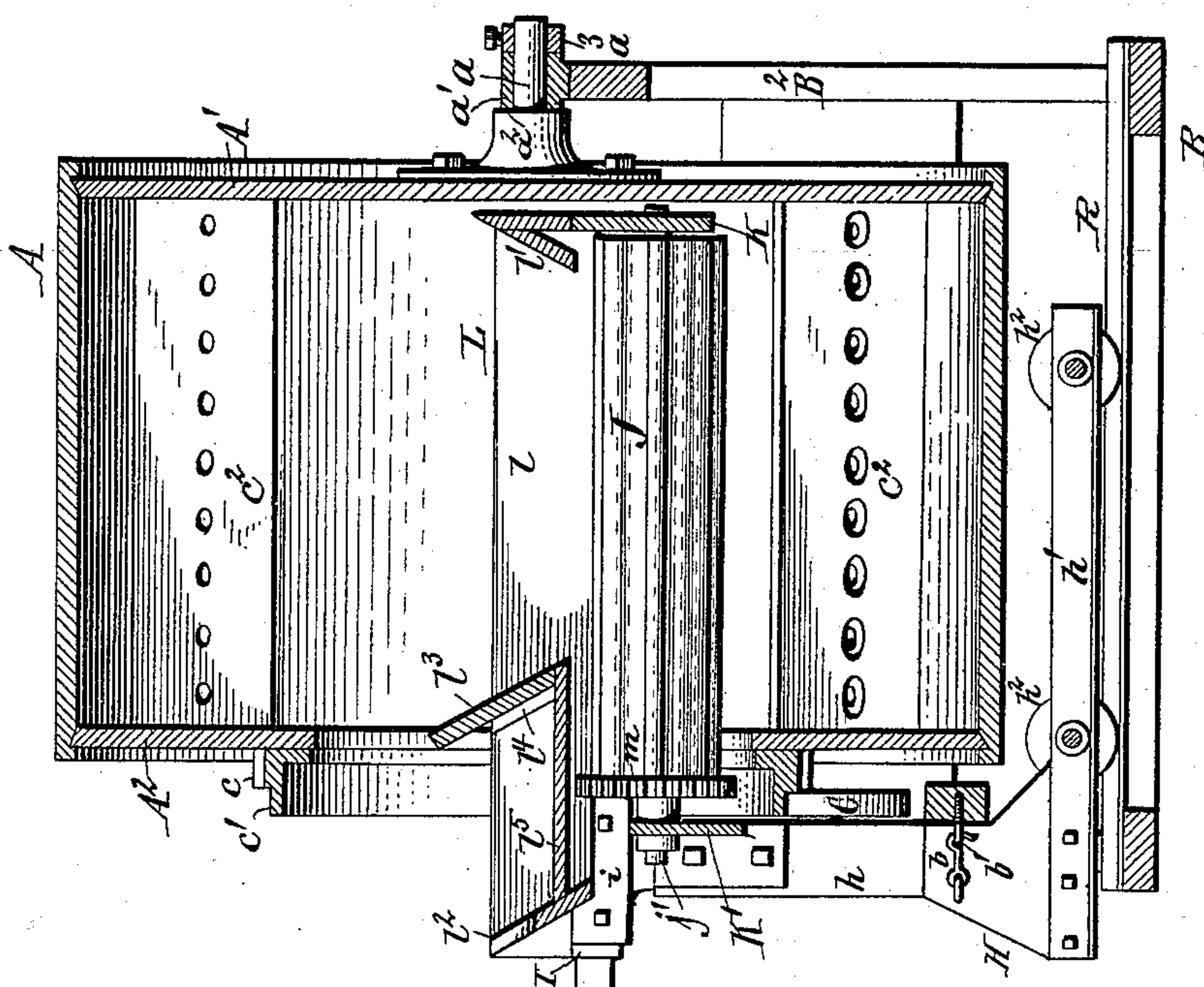
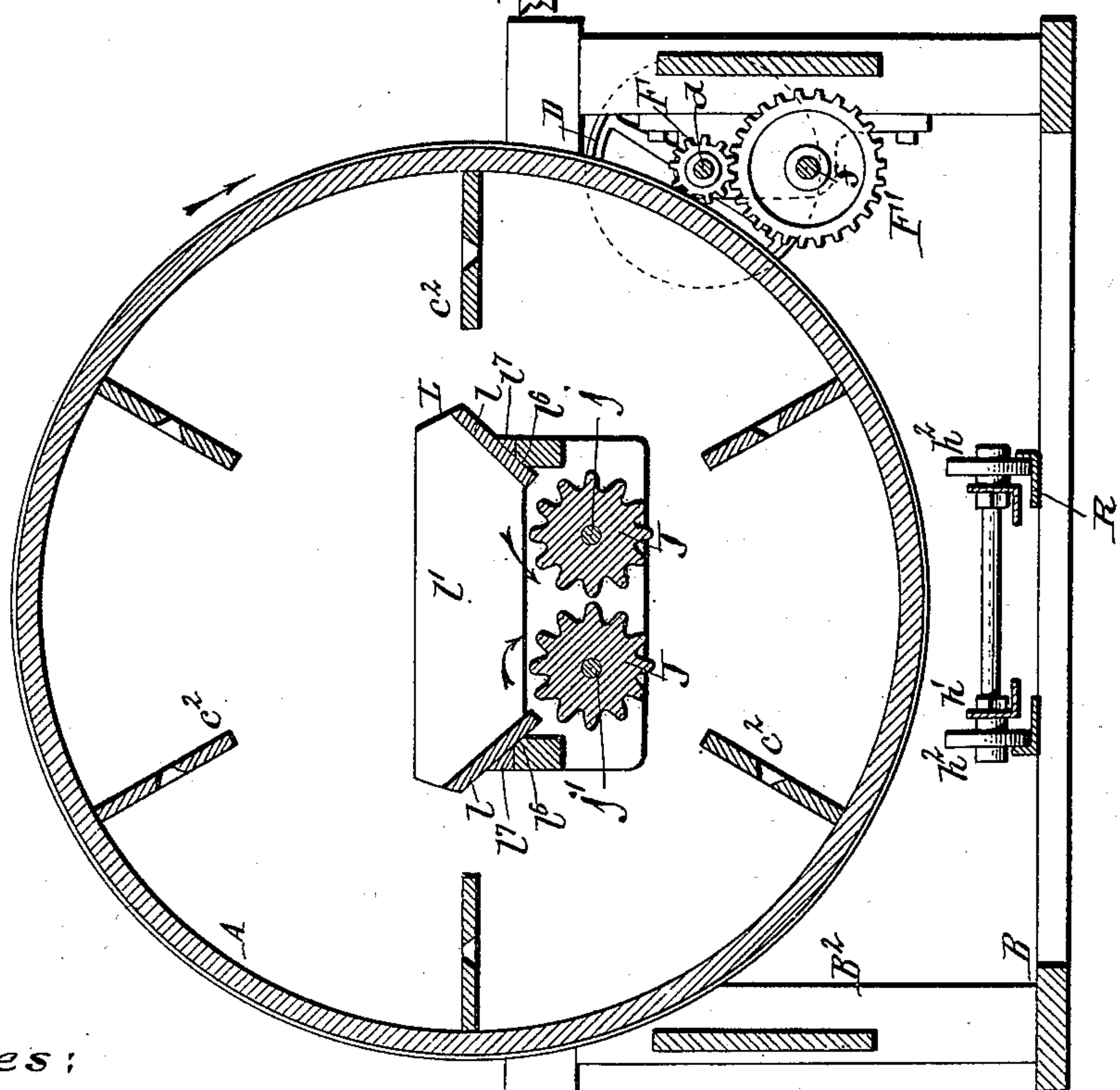


Fig. 3.



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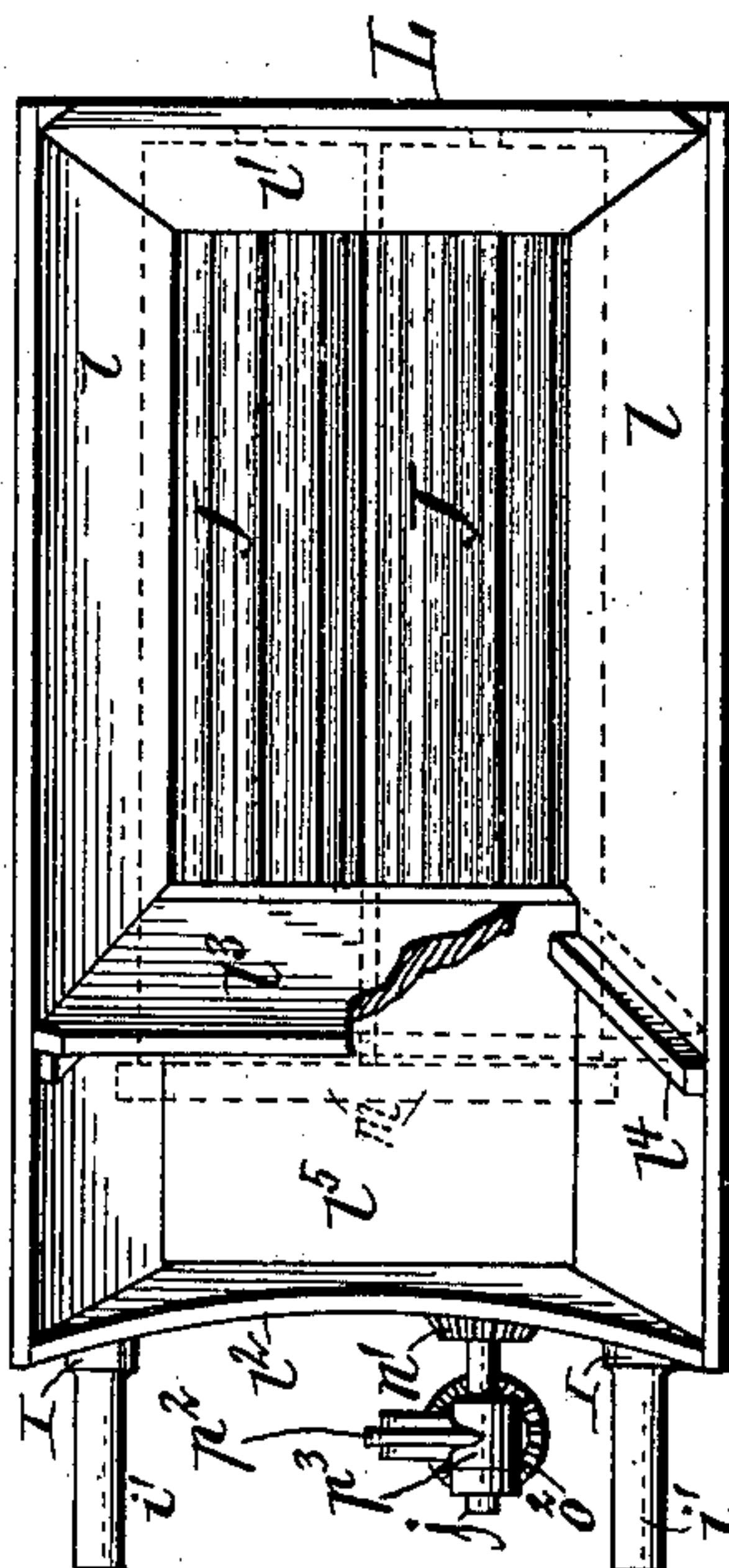
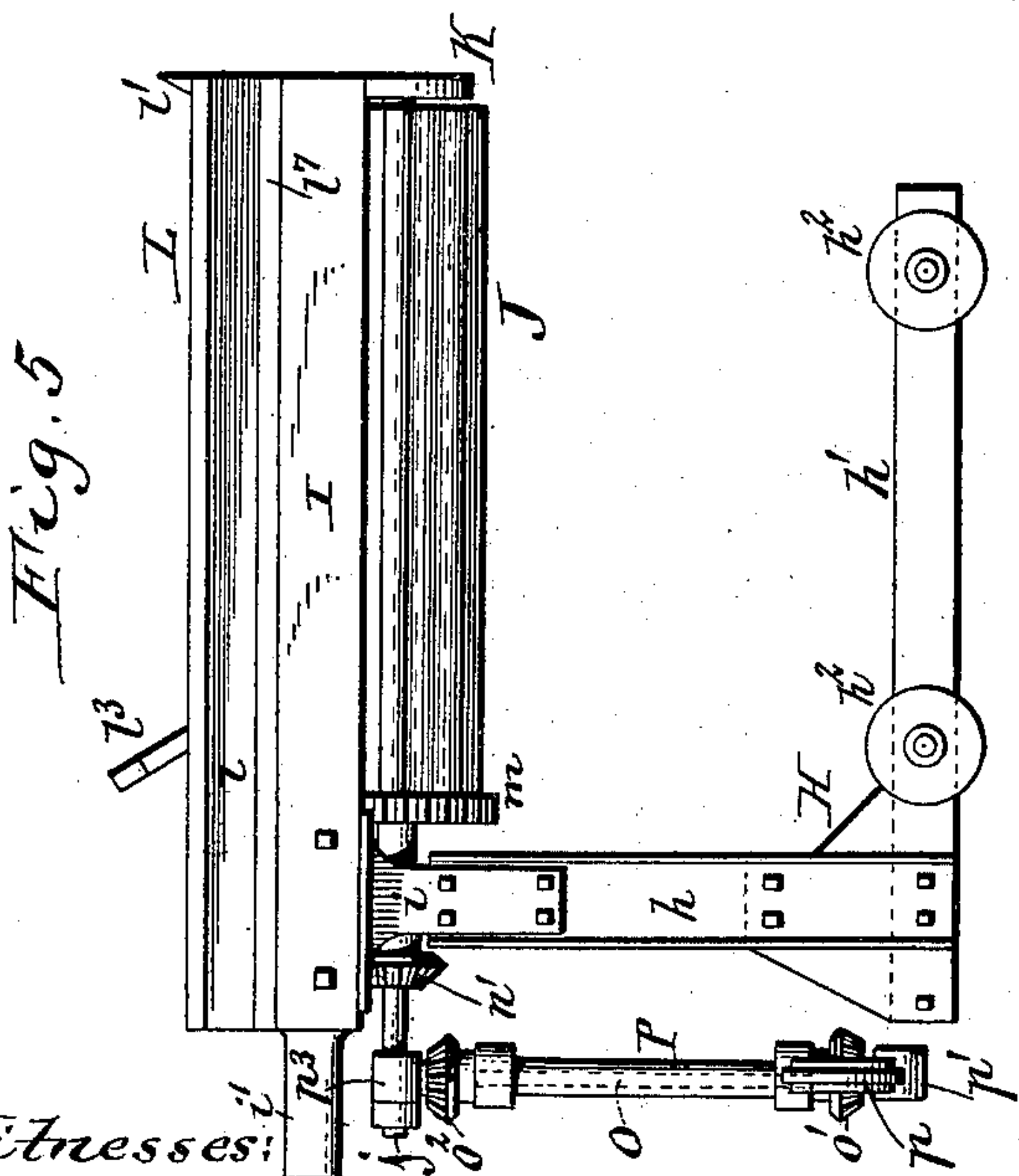
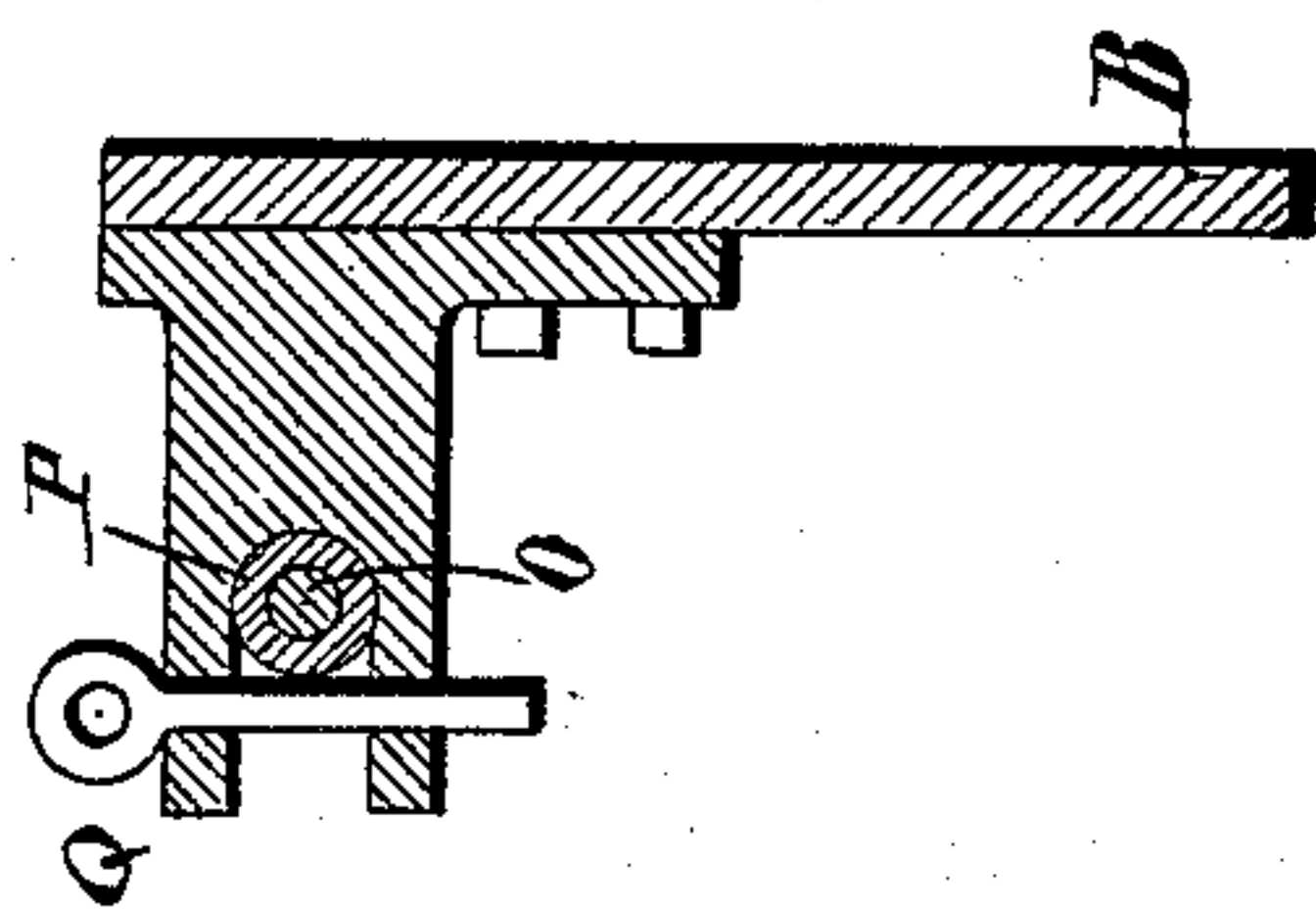
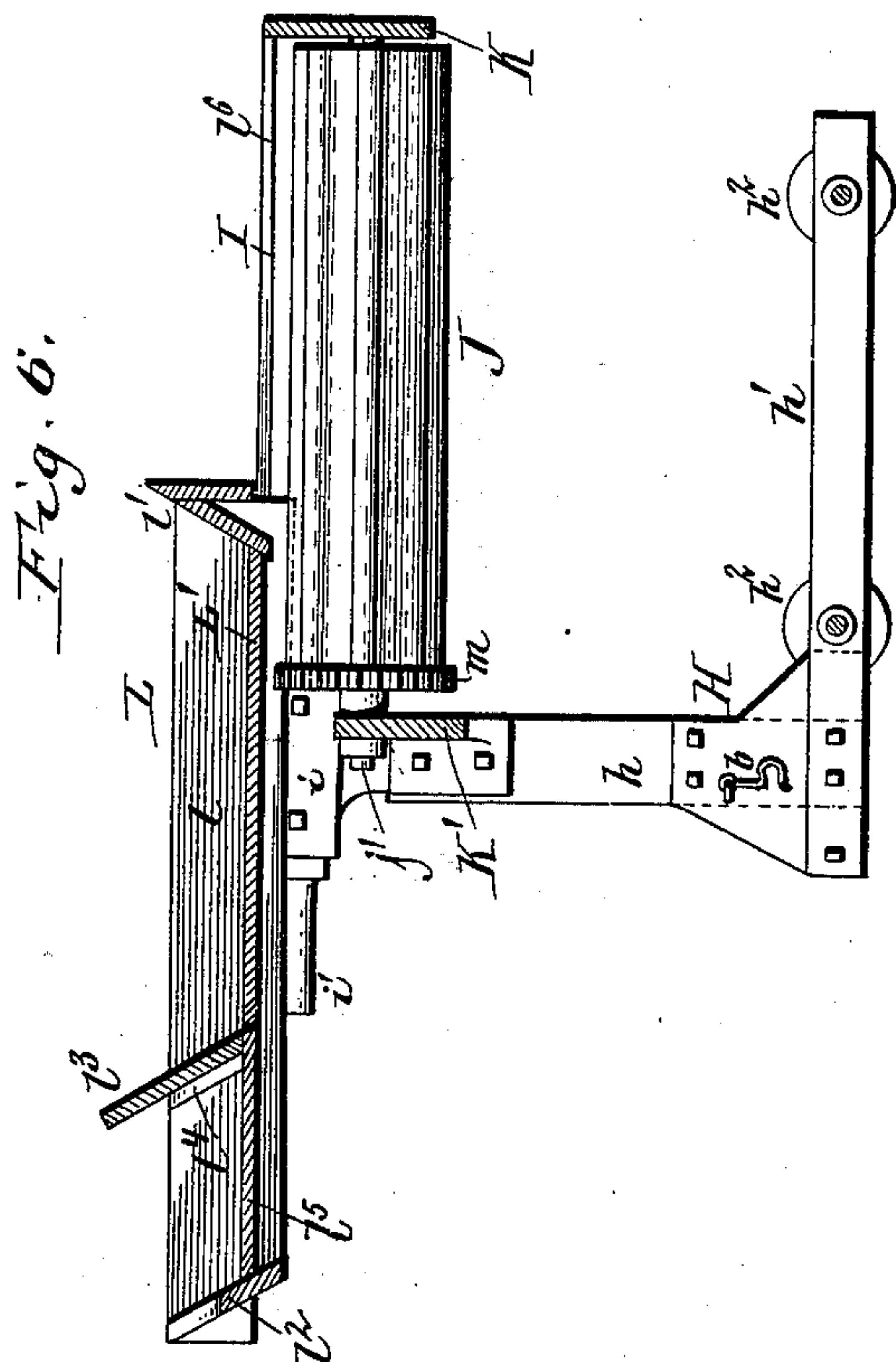
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(No Model.)

3 Sheets—Sheet 3.



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UNITED STATES PATENT OFFICE.

HARVEY FELDMEIER, OF LITTLE FALLS, NEW YORK, ASSIGNOR TO D. H. BURRELL & CO., OF SAME PLACE.

COMBINED CHURN AND BUTTER-WORKER.

SPECIFICATION forming part of Letters Patent No. 622,918, dated April 11, 1899.

Application filed January 11, 1899. Serial No. 701,824. (No model.)

To all whom it may concern:

Be it known that I, HARVEY FELDMEIER, a citizen of the United States, residing at Little Falls, in the county of Herkimer and State of New York, have invented new and useful Improvements in a Combined Churn and Butter-Worker, of which the following is a specification.

This invention relates to that class of machines which contain a rotary drum or cylinder in which the churning operation is carried on and which also contain butter-working rollers by which the butter is worked when the churning is completed and the buttermilk has been drawn off.

The object of this invention is to mount the butter-working rollers independently of the churn, so that the butter-working apparatus can be entirely removed from the churn when not required for use, leaving the churn unencumbered by such apparatus and enabling one butter-working apparatus to be used in two or more churns, thereby simplifying and cheapening the machinery, permitting the parts to be thoroughly inspected and cleaned, and gaining other advantages.

In the accompanying drawings, consisting of three sheets, Figure 1 is a front elevation of a rotary churn and butter-worker provided with my improvements. Fig. 2 is a side elevation thereof, partly in section. Fig. 3 is a vertical cross-section of the same in line 3 3, Fig. 2. Fig. 4 is a vertical longitudinal section in line 4 4, Fig. 1. Fig. 5 is a side elevation of the butter-working apparatus detached from the churn. Fig. 6 is a longitudinal vertical section of the butter-working apparatus with the hopper drawn forward on the supporting-bars out of its working position. Fig. 7 is a top plan view of the butter-working apparatus, partly in section. Fig. 8 is a vertical section in line 8 8, Fig. 1, on an enlarged scale, showing the fastening device by which the cross-shaft of the butter-worker is held in place.

Like letters of reference refer to like parts in the several figures.

A represents the rotary drum or cylinder of the churn, supported in any suitable manner in a stationary frame, which may be com-

posed of a base-frame B, an upright front frame B', and a similar rear frame B².

The rear head A' of the drum is a disk, which closes the rear end of the drum tightly and carries at its center a rearwardly-projecting journal *a*. The latter turns in a bearing *a'*, which is secured to the rear frame B² and in which the journal is held against longitudinal movement by any suitable means—for instance, by a shoulder *a*² and a collar *a*³, as shown in Fig. 2.

The front head A² of the drum is annular in form and provided with a large central opening, which is closed for churning in the usual manner by a removable disk or head. (Not shown in the drawings.) The front head A² is provided around this central opening with a forwardly-projecting circular flange composed of a gear-rim *c*, which is arranged adjacent to the head A², and a plain-faced rim *c'*, which projects farther toward the front and is slightly smaller in diameter than the gear-rim. The latter is used for driving the drum and the plain rim *c'* for supporting its front end on two rollers C, which are mounted on its inner side with flights or wings *c*² of any suitable construction, those shown in the drawings being perforated to permit the buttermilk to drain off.

d represents the driving-shaft, which is arranged horizontally on one side of the drum and journaled in the front and rear frames B' B². This shaft is provided at its rear end with tight and loose pulleys D D' and near its front end with a gear-wheel E, which is geared with the gear-rim *c* by an interposed idler-wheel E' for driving the drum.

f represents a horizontal counter-shaft which is arranged below the driving-shaft and driven from the same by a pinion F and gear-wheel F', arranged on the rear portions of these shafts.

G represents a pinion which is mounted on the front portion of the counter-shaft and which meshes with the gear-wheel E on the driving-shaft. The gear-wheel E is mounted loosely on the driving-shaft, but can be coupled to the shaft by a clutch *e*, arranged on the front side of said wheel. The pinion G

is mounted loosely on the counter-shaft, but can be coupled to the same by a clutch *g*, arranged on the rear side of the pinion. The pinion F, gear-wheel F', pinion G, and gear-wheel E are so proportioned that when motion is transmitted to the drum directly through the driving-shaft *d* and gear-wheel E the drum is rotated at the proper speed for churning, while when motion is transmitted to the drum indirectly through the pinion F, gear-wheel F', counter-shaft *f*, pinion G, and gear-wheel E the drum is rotated with the proper speed for working the butter, which speed is slower than the churning speed. For driving the churn directly from the driving-shaft *d* the gear-wheel E is coupled to the driving-shaft *d* and the pinion G is uncoupled from the counter-shaft *f*. For driving the churn indirectly through the counter-shaft the gear-wheel E is uncoupled from the driving-shaft *d* and the pinion G is coupled to the counter-shaft.

The butter-working apparatus is constructed as follows:

H represents a carriage or portable frame having at its front end two posts or standards *h*, arranged side by side, and at the lower ends of the standards a base-frame *h'*, provided with wheels *h*² and projecting rearwardly from the standards. The standards carry at their upper ends two horizontal supporting-bars I, which are secured at their front ends to the upper ends of the standards by brackets *i* and which project rearwardly from the standards or in the same direction in which the base-frame *h'* projects therefrom. The front ends of the bars I terminate in handles *i'*, which are taken hold of by the operator for moving the carriage about. J J represent the butter-working rollers, which are arranged between and below the side bars I. These rollers may be of any suitable construction and are represented as corrugated rollers in the drawings. *j j'* represent the shafts of these rollers, which are journaled at their rear ends in a cross piece or plate K, which is secured to the rear ends of the bars I and depends below the same, and at their front ends in a cross piece or plate K', which is secured between the upper ends of the standards *h*.

L represents a hopper which is arranged above the rollers and rests loosely upon the bars I. This hopper is composed of inclined side boards *l*, a rear board *l'*, and a front board *l*² and is provided with a removable intermediate board *l*³, which is inclined backwardly and located at such a distance from the rear end of the hopper that when the butter-working apparatus is in its working position in the churn this intermediate board stands in the opening of the front head and prevents any butter from escaping through this opening. This intermediate board is supported on the inner side of the hopper by any suitable means—for instance, by inclined cleats *l*⁴, secured to the inner sides of the side

boards of the hopper. The hopper is provided with a fixed bottom *l*⁵, which extends from the front board *l*² to the intermediate board *l*³. The inner corners of the bars I are beveled, as shown at *l*⁶ in Fig. 3, and the inclined side boards *l* of the hopper rest against these inclined faces *l*⁶ and are provided on their under sides with triangular strips *l*⁷, by which the hopper rests on the horizontal upper faces of the bars I. The hopper rests in this manner loosely on the bars I and can be moved back and forth on the same.

L' represents a removable bottom board, which is placed in the hopper when the butter has been sufficiently worked and it is desired to collect and remove the butter. This bottom board extends from the intermediate board *l*³ to the rear board *l'* and is beveled at its sides and ends, so as to rest snugly against the inner lower portions of the side boards *l*, rear board *l'*, and bottom *l*⁵ of the hopper.

The two butter-working rollers are geared together by gear-wheels *m*, arranged at the front ends of the rollers and behind the standards.

The roller-shaft *j*, which is nearest the driving-shaft *d*, is extended forwardly beyond the standards and carries in front of the standards the gearing by which the rollers are driven from the driving-shaft *d*. The latter is provided at its front end, in front of the front frame B', with a bevel-wheel *n*. The roller-shaft *j* is provided with a similar bevel-wheel *n'*, and motion is transmitted from the wheel *n* to the wheel *n'* by a transverse connecting-shaft O, which carries at its ends bevel-wheels O' O², meshing, respectively, with the wheels *n* and *n'*. The shaft O is journaled in a tubular housing P, which carries at its outer end a circular frame *p*. The latter surrounds the bevel-wheel O' and is provided beyond this wheel with a sleeve *p'*, which can be slipped on the projecting end portion of the driving-shaft *d* and by which the outer end of the tubular housing is supported on this shaft. The housing P carries at its inner end a semicircular frame or curved arm *p*², which extends beyond the bevel-wheel O² and is provided with a sleeve *p*³, by which the inner end of the housing P is hung on the projecting portion of the roller-shaft *j*.

When the butter-working apparatus is disconnected from the churn, the housing P, containing the transverse shaft O, with its bevel-wheels O' O², hangs loosely on the front end of the roller-shaft *j*, as represented in Fig. 5. In this condition of the butter-working apparatus the latter can be freely moved about on the floor to any desired position. When it is desired to use the apparatus in the churn for working the butter, the opening in the front head of the churn is uncovered and the butter-working apparatus is so moved by the operator that its hopper and rollers are inserted into the drum of the churn through the open head thereof, while its base-frame projects underneath the drum, as represented

in Figs. 2 and 4. In this position of the apparatus its standards *h* bear against the front frame *B'* of the churn, to which the standards may be secured by suitable fastening devices—for instance, by hooks and eyes *b b'*.

In order to facilitate the introduction of the rollers and hopper into the drum in the proper working position, a track *R*, of angle or other suitable rails, may be arranged on the base-frame *B* lengthwise under the churn, upon which the wheels of the roller-carriage are run and which guides and confines the carriage to its proper position. These rails rest upon the cross-pieces of the bottom frame *B*, and when that frame projects above the floor a suitable sloping approach can be arranged on front of the bottom frame for guiding the wheels of the carriage from the floor to the rails. The transverse shaft *o* is now engaged, with its bevel-wheels *o' o''*, respectively, with the bevel-wheel *n* on the driving-shaft *d* and the bevel-wheel *n'* on the roller-shaft *j* by slipping the sleeve *p* at the outer end of the housing onto the driving-shaft and then moving the housing backwardly until both wheels *o o'* are properly in mesh with the wheels *n n'*. The housing *P* is then secured in this position by a clasp *Q*, which is attached to the front frame *B'* and which embraces the housing. The bottom board *L'* is removed from the hopper *L*, and the clutches on the driving-shaft and counter-shaft are so shifted that the drum is driven at the proper slow speed indirectly through the counter-shaft. Power is now applied to the driving-shaft, and the drum and the rollers are rotated. The wings of the drum elevate the butter and deliver the same into the hopper *L*, from which it passes between the rollers, by which it is worked and from which it drops upon the lower portion of the drum to be again elevated. When the butter has been sufficiently worked, the drum is stopped, while the rotation of the rollers is continued. This clears the rollers and the hopper of butter. The intermediate board *l''* is then removed from the hopper and the loose bottom board *L'* is placed in the same, so that the bottom of the hopper, composed of the fixed board *l''* and the removable board *L'*, now extends without break from the front to the rear of the hopper. The drum is then started, and as the butter drops on the hopper it is spread by a spade or ladle until a sufficient quantity has accumulated. The hopper is then drawn out of the drum on the supporting-bars *I* to such a distance that the operator can conveniently remove the butter from the hopper. When the hopper has been emptied, it is pushed back into place in the drum and another batch of butter is collected and removed. This operation is continued until all the butter has been removed from the drum. During this operation of filling and emptying the hopper the frame and rollers of the butter-working apparatus remain in their working position in relation to the drum and

are not disturbed, only the hopper being moved out and back.

This construction of the butter-working apparatus and its arrangement with reference to the drum of the churn enables one working apparatus to be used successively with several churns, thereby doing away with the necessity of providing each churn with a working apparatus. It locates the working rollers very low in the churn, whereby ample space is provided above the rollers for a large receiving-hopper and the interior of the churn is well exposed to view. The operation of working can therefore be well observed and can be stopped at the proper time, so that overworking can be avoided. This construction also permits the uniform salting of the butter, because the salt can be thrown from time to time upon the butter as the latter goes through the rollers. The large hopper insures the complete delivery of the butter to the rollers and prevents butter from falling down on one side or against the sides of the rollers, where the butter would be liable to become pasted against the side boards of the hopper. The butter is readily removed when finished, and the working apparatus, as well as the interior of the churn, can be thoroughly and conveniently examined and cleaned when the operation is finished and the working apparatus has been removed from the churn.

I claim as my invention—

1. The combination with a rotary drum having an open head and its stationary supporting-frame, of a portable carriage or frame detached from the drum and its supporting-frame, and butter-working rollers mounted on said independent carriage or frame and adapted to be inserted into the drum through the open head thereof and to be removed therefrom by moving said carriage or frame toward or from the drum and its supporting-frame, substantially as set forth.

2. The combination with a rotary drum having an open head and its stationary supporting-frame, of a portable carriage, adapted to be moved about on the floor, and butter-working rollers supported on said carriage and adapted to be inserted into the drum through the open head thereof and to be removed therefrom by moving the carriage in the proper direction, substantially as set forth.

3. The combination with a rotary drum having an open head and its stationary supporting-frame, of a portable carriage or frame, adapted to be moved about independent of the drum and its supporting-frame, butter-working rollers supported on said carriage or frame and a hopper arranged on said carriage or frame above said rollers, said rollers and hopper being adapted to be inserted into and removed from the drum through the open head thereof by moving said portable frame or carriage toward or from the drum and its supporting-frame, substantially as set forth.

4. The combination with a rotary drum having an open head, of a removable butter-

worker, adapted to be placed in said drum through said open head and composed of a supporting-frame, butter-working rollers, a hopper arranged above said rollers and a removable bottom adapted to be placed in said hopper, substantially as set forth.

5. The combination with a rotary drum having an open head and its stationary supporting-frame, of a portable carriage or frame adapted to be moved about independent of the drum and its supporting-frame, butter-working rollers supported in said carriage or frame, a hopper arranged on said carriage or frame above said rollers, and a removable bottom adapted to be placed in said hopper for collecting the butter delivered to the same, said rollers and hopper being adapted to be inserted into the drum through the open head thereof, substantially as set forth.

6. The combination with the butter-working rollers and their supporting-frame, of a hopper arranged above said rollers and capable of bodily movement on said supporting-frame in the longitudinal direction of said rollers, substantially as set forth.

7. The combination with the butter-working rollers, of a supporting-frame having longitudinal side bars arranged on opposite sides of said rollers, and a hopper mounted on said side bars and capable of movement on said bars in the longitudinal direction of said rollers, substantially as set forth.

8. The combination with a rotary drum having an open head, of a butter-worker adapted to be placed in said drum through said open head and composed of a supporting-frame having its upper portion projecting into said drum, butter-working rollers mounted in said upper portion of the frame, and a hopper supported on said upper portion of the frame above said rollers and capable of movement on the frame in the axial direction of the drum, substantially as set forth.

9. The combination with the butter-working rollers, of a hopper arranged above said rollers and provided with a removable intermediate board, a fixed bottom in front of said intermediate board and a removable bottom in rear of the same, substantially as set forth.

10. A portable butter-worker adapted to be combined with a rotary drum having an open head and containing a carriage having its base-frame and its upper horizontal portion extending from its upright portion rearwardly, or in the same direction, and butter-working rollers arranged in the upper portion of said carriage, substantially as set forth.

11. A portable butter-worker adapted to be combined with a rotary drum having an open head and containing a carriage having its base-frame and its upper horizontal portion extending from its upright portion rearwardly or in the same direction, butter-working rollers arranged in the upper portion of said carriage, and a hopper arranged on said carriage above said rollers, substantially as set forth.

12. The combination with a rotary drum having an open head, of a portable carriage or frame adapted to be moved about independent of said drum, butter-working rollers supported on said carriage or frame, a driving-shaft arranged on one side of said drum and connected with the same to rotate the same, and a detachable cross-shaft geared at one end with said driving-shaft and at the other with said rollers, substantially as set forth.

13. The combination with a rotary drum having an open head, of a portable carriage or frame adapted to be moved about independent of the drum, butter-working rollers supported on said carriage or frame, a driving-shaft arranged on one side of said drum and connected with the same to rotate the same, a cross-shaft provided at its ends with bevel-wheels which mesh with bevel-wheels on the driving-shaft and on one of the roller-shafts, and a housing in which said cross-shaft is journaled and which is provided at its ends with sleeves by which it is connected with the driving-shaft and one of the roller-shafts, substantially as set forth.

Witness my hand this 6th day of January, 1899.

HARVEY FELDMEIER.

Witnesses:

GEO. R. HITCHCOCK,
GRIFFITH PRICHARD.