No. 669,060.

Patented Feb. 26, 1901.

T. CASCADEN, JR.

GRINDING MILL.

(No Model.)

(Application filed Jan. 16, 1899.)

2 Sheets—Sheet 1.

Fig. 2.

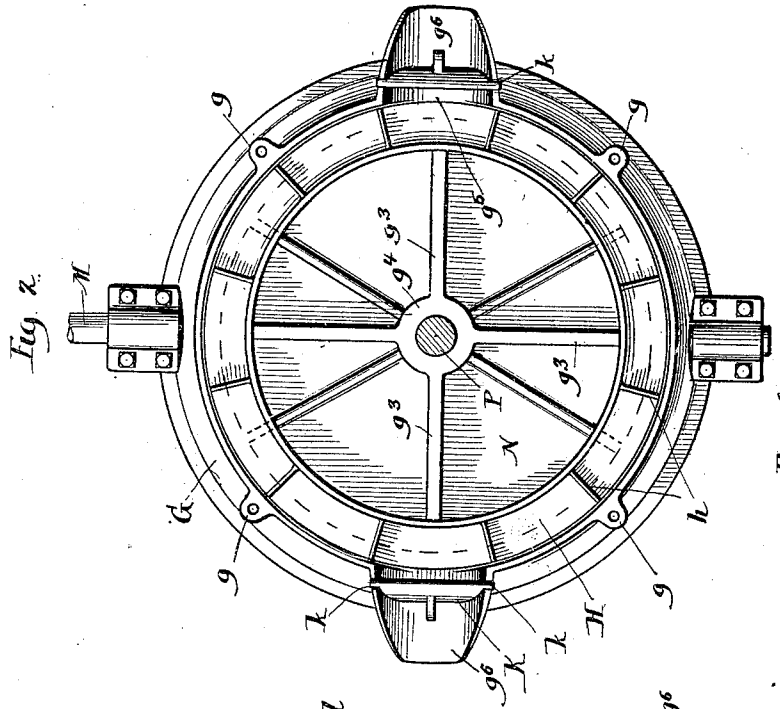


Fig. 2a.

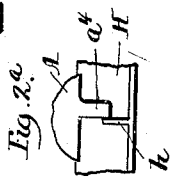
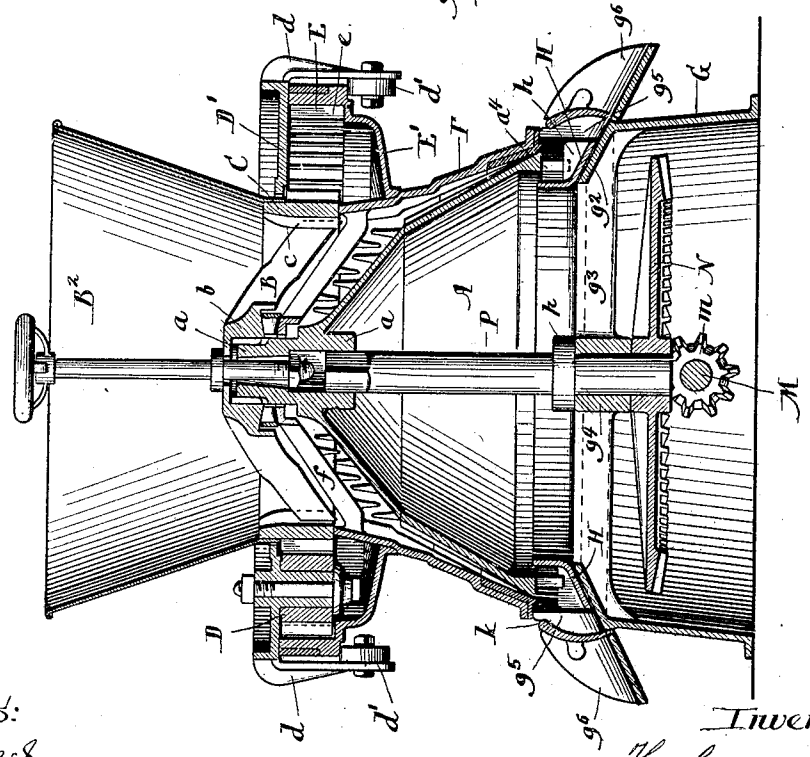


Fig. 1.



Witnesses:
Fred Gulack
Alberta Adamick

Inventor:
Thos. Cascaden Jr.
By Penn & Fisher
his Attorneys

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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Fig. 5.

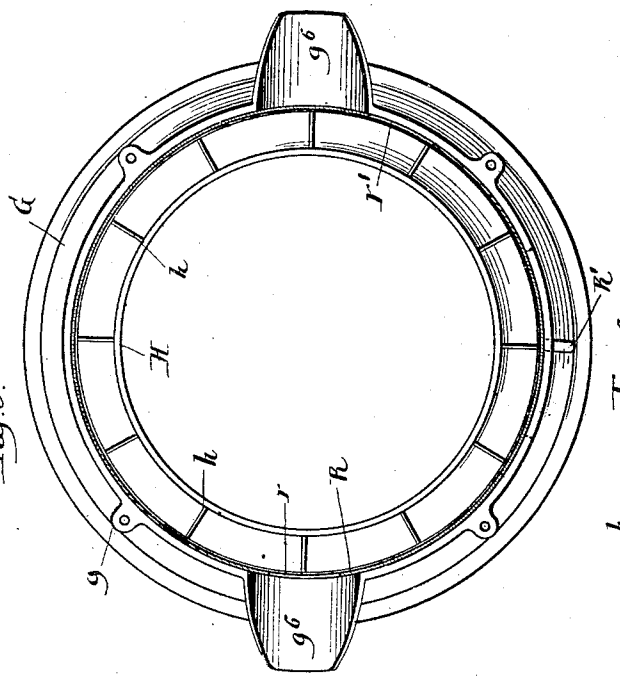


Fig. 6.

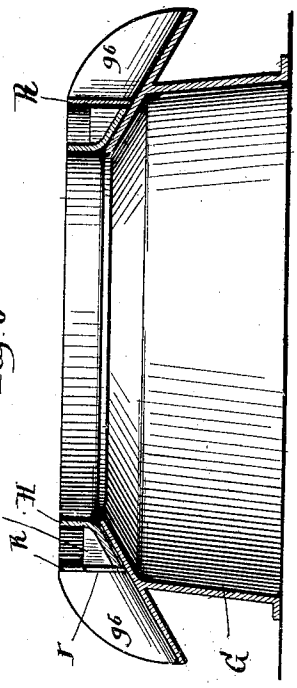


Fig. 3.

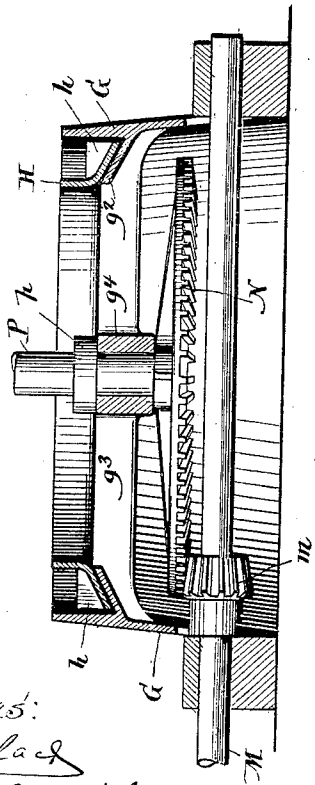
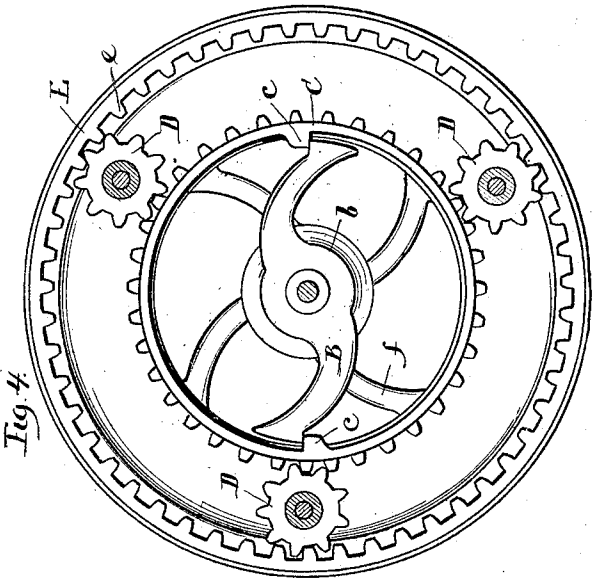


Fig. 4.



Witnesses:
Fred'g Clark
Alberta Adamick

Inventor:
Thos. Cascaden Jr.
By Pierce & Fisher
his Attorneys.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

THOMAS CASCADEN, JR., OF WATERLOO, IOWA.

GRINDING-MILL.

SPECIFICATION forming part of Letters Patent No. 669,060, dated February 26, 1901.

Application filed January 16, 1899. Serial No. 702,240. (No model.)

To all whom it may concern:

Be it known that I, THOMAS CASCADEN, Jr., a resident of Waterloo, in the county of Blackhawk, State of Iowa, have invented certain new and useful Improvements in Grinding-Mills, of which I do declare the following to be a full, clear, and exact description.

This invention has for its objects, first, to provide an improved construction of metal base for supporting a feed-mill, the base being furnished with means for receiving and for delivering outside thereof the ground grain as it issues from between the grinding members of the mill, and, second, to so construct the base that suitable gearing may be located therein in order to utilize such gearing as a horse-power for the driving of light machinery, such as cream-separators, feed-cutters, corn-shellers, or the like.

The invention has also for its object to improve the construction of mill in other respects, the details of which will be hereinafter fully set forth, illustrated in the accompanying drawings, and particularly defined in the claims at the end of this specification.

Figure 1 is a view in central vertical section through a feed-mill embodying my invention. Fig. 2 is a plan view of the base portion of the mill, the upper part being removed and the vertical shaft being shown in section. Fig. 2^a is a detail view in elevation, showing the manner in which the conveyer-ring is driven from the inner cone. Fig. 3 is a view in central vertical section through the base of the mill. Fig. 4 is a plan view of the mill with the feed-hopper removed, the shafts of the orbitally-movable pinions being shown in section. Fig. 5 is a plan view of a mill, showing the modified construction of gate for controlling the feed-discharge spouts. Fig. 6 is a view in vertical section through the base shown in Fig. 5.

In the accompanying drawings I have shown my invention as applied to a triple-geared sweep-mill of the type set forth in an application filed in the United States Patent Office by William F. Davis and myself under date of November 23, 1898, Serial No. 697,382. It is preferred to embody the invention in this type of triple-geared mill, because in this way greater speed may be given to the gear mechanism or horse-power at the base of the mill. Manifestly, however, the invention may be applied to a plain sweep-mill—that is to say, to a sweep-mill in which the grinders are driven by a sweep without intermediate gearing for increasing the speed of the grinders. In the mill shown by the accompanying drawings, as in that set forth in the above-mentioned application of William F. Davis and myself, the inner cone A of the mill is provided at its center with a cone-post *a*, over which sets the hub *b* of the cob-breaker B, the arms of the cob-breaker being arranged to engage with lugs *c* upon the inner face or annular rack-bar C, having outwardly-facing teeth. With the teeth of the rack-bar C mesh the pinions D, that are carried by an annular top plate D′, to which the sweep will be connected in any suitable manner for attachment of the team. Around the annular rack C extends the outer rack E, having inwardly-facing teeth *e*, that also engage with the orbitally-movable pinions D. From the plate D′ extend the arms *d*, carrying rollers *d*′, that engage the lower edge of the annular rack E and serve to hold the parts in position. The rack E is sustained by the depending plate E′, that rests upon the outer grinding-shell F of the mill, as in the hereinbefore-mentioned application for Letters Patent.

The grinding-shell F sets around the cone A and at its bottom is provided with a grinding-ring to coöperate with a corresponding grinding ring or surface at the base of the cone A, and the top of the shell F is provided with inwardly-extending arms *f*, formed integral with the hub that encircles the cone-post *a*. The above-mentioned features of construction being found in the aforesaid application for Letters Patent will be readily understood by reference thereto and as they form no part of the present invention need not be more fully described.

The bottom of the shell F rests upon a base G, the upper edge of which is shown as provided with lugs *g*, that will be connected by bolts to corresponding lugs projecting from the base of the shell F. The upper part of the base G is preferably formed with an inwardly-extending plate or part g^2, preferably cast integral with the arms g^3 and central hub g^4, and upon this plate g^2 will rest the conveyer-ring H. As shown, this ring consists of a

casting the outer surface of which is partitioned by radial ribs h, and the top of the ring H is shown as extending slightly above the base-line of the cone A. In the upper wall of the base G are formed discharge-openings g^5, from which lead the discharge-spouts g^6, through which the ground grain will be delivered into suitable baskets or receptacles located adjacent the base. In Figs. 1 and 2 of the drawings I have shown the discharge-openings g^5 as closed by gates K, these gates being formed with offset lugs k, that engage seats in the sides of the spout g^6, the lower ends of the gates K being adapted to enter openings formed in the base of the spouts, these openings serving to engage the lower ends of the gates, and thereby preventing their swinging outward under the pressure of the ground grain. It is not essential, however, that the base of the spouts be formed with openings, as other provision may be made for preventing the outward movement of the gates, nor does this provision of openings for receiving the ends of the gates form any part of the invention.

From the construction of parts as thus far defined it will be seen that when revolution is imparted to the annular top plate D′ and the pinions D carried thereby revolution at an increased speed will be given to the cob-breaker arms B and to the inner cone A. The material to be ground being placed within the hopper B^2 will pass downward between the cone A and shell F and as it is ground will be delivered onto the conveyer-ring H. From the lower edge of the cone depend lugs a^4, adapted to engage with the ribs h of the conveyer-ring H, thereby causing this ring to revolve with the cone. Hence it will be seen that as the ground feed passes onto the conveyer-ring it will be brought opposite the discharge-openings g^6 and will pass from the discharge-spout that has its gate K removed or open. I prefer to employ plural discharge-spouts, since it is manifest that by such construction the operation of the mill may be carried on continuously without danger of any wasting of grain incident to the changing of baskets or receptacles wherein the ground grain is caught as it issues from the mill, because when the gate at one spout is open the gate at the other spout will be in closed position.

One advantage of the parts above described is that the mill is supported upon a substantial base, which is more effective than the common wooden base ordinarily employed in mills of this character, and by the use of a suitable conveyer (and preferably the conveyer-ring above described) the discharge of the ground feed can be effected at the side of the base or without the necessity of stopping the operation of the mill. A more important characteristic of my invention is, however, that it enables the base of the mill to be provided with a horse-power or gearing by which other machines commonly employed about a farm—such as cream-separators, feed-cutters, corn-shellers, or the like—may be driven. The iron base G forms a substantial support for the shaft M, that will be journaled in suitable bearings in the base G. Upon the shaft M is keyed a bevel-pinion m, that will engage with the teeth or bevel gear-wheel N, that is keyed to the lower end of the vertical shaft P. This shaft P has its lower end journaled in the hub g^4 of the spider frame at the top of the base, while the upper end of the shaft P is squared and sets within the corresponding opening in the cone-post a. The connection between the post a and the upper end of the shaft p is such as to permit an independent vertical movement of the cone with respect to the shaft. The shaft P is shown as provided with a collar p, that rests upon the top of the hub g^4. Hence it will be seen that when revolution is imparted to the cone A in manner above described corresponding revolution will be imparted to the shaft P and to the bevel gear-wheel N, and the engagement of the gear-wheel N with the pinion m will impart a higher speed of revolution to the shaft M, whereby any machine, such as a cream-separator or the like, may be driven.

Instead of using individual gates K for closing the discharge-spouts g^6 (when plural spouts are used) I may employ a ring R, set within the upper part of the base, this ring having two openings r and r', either of which may be brought coincident with the corresponding feed-discharge opening g^5. The ring R is provided with a handle R′, whereby it may be shifted, this handle extending through a slot formed in the upper part of the base G, as indicated by dotted lines in Fig. 5. It will thus be seen that when the handle R′ is turned in one direction, so as to bring the openings r opposite the corresponding discharge-spout g^6, the opening r' will be moved away from the opposite discharge-spout, thereby shutting off the discharge of ground feed through such spout. By this means one of the discharge-spouts can be opened and the other closed by the same operation.

It will be seen that inasmuch as the conveyer for the ground feed is located in the upper part of the base and in such position as to receive the grain as it issues from between the grinding members of the mill and deliver it outside the base all danger of the discharge of the feed onto the gear-wheels within the base is avoided.

It will be readily understood that, if desired, the mill may be driven by a suitable engine conveniently attached to the horizontal shaft that extends into the base of the mill, and in this way if the invention be applied to a plain sweep-mill any desired speed may be given to the grinding members.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a grinding-mill, the combination with an outer grinding-shell and an inner, revoluble, grinding-cone, of a base therefor provided with a laterally-extending supporting-flange, discharge-openings located immediately above said flange and a conveyer-ring comprising a closed bottom portion resting directly upon said supporting-flange, located beneath the discharge-space between said cone and shell, extending inwardly beyond the lower edge of said cone and provided at its inner edge with an upwardly-extending circular flange, said conveyer-ring being suitably connected to said cone to revolve therewith, whereby the ground grain will fall directly upon the closed bottom of said ring and be conveyed thereby to said discharge-openings.

2. In a grinding-mill, the combination with an outer grinding-shell and an inner, revoluble, grinding-cone, of a base therefor provided with a laterally-extending supporting-flange, discharge-openings located immediately above said flange and a conveyer-ring comprising a closed bottom portion resting directly upon said supporting-flange, extending inwardly beyond the lower edge of said cone and provided with upwardly-extending radial ribs and at its inner edge with an upwardly-extending circular flange, said conveyer-ring being suitably connected to said cone to revolve therewith, whereby the ground grain will fall directly into the pockets formed by said closed bottom and said vertically-projecting flange and ribs and be conveyed thereby to said discharge-openings.

3. In a grinding-mill, the combination with an outer grinding-shell and an inner, revoluble, grinding-cone, of a base therefor provided with an outwardly-inclined, supporting-flange, discharge-openings located immediately above said flange, a conveyer-ring comprising a closed, outwardly-inclined bottom portion resting directly upon said inclined supporting-flange, extending inwardly beyond the lower edge of said cone, and provided with upwardly-extending, radial ribs, and at its inner edge and a circular flange projecting upwardly inside of the lower edge of said cone, and downwardly-extending lugs on said cone for engaging said radial ribs to rotate said conveyer-ring, whereby the ground grain will fall directly into the pockets formed by said closed bottom and said vertically-projecting flange and ribs and be conveyed thereby to said discharge-openings.

4. In a grinding-mill, the combination with an outer grinding-shell and an inner, revoluble, grinding-cone, of a metal base for supporting said parts provided with a laterally-extending supporting-flange and an internal shaft-support, discharge-openings in the outer wall of said base immediately above said supporting-flange, a conveyer-ring comprising a closed bottom resting directly upon said supporting-flange, located beneath the discharge-space between said cone and shell, extending inwardly beyond the lower edge of said cone and provided at its inner edge with an upwardly-extending vertical flange, said conveyer-ring being connected to said cone to revolve therewith, a vertical shaft for revolving said cone mounted on said shaft-support, a horizontal drive-shaft extending through said base and intermeshing gearing mounted on said shafts, whereby the ground grain falls directly upon the closed bottom of said conveyer-ring and is conveyed thereby to said discharge-openings through which it is delivered outside of said base.

THOMAS CASCADEN, JR.

Witnesses:
JOS. L. LEAVITT,
IRA RODAMAR.