T. CASCADEN, JR.

GRINDING MILL.

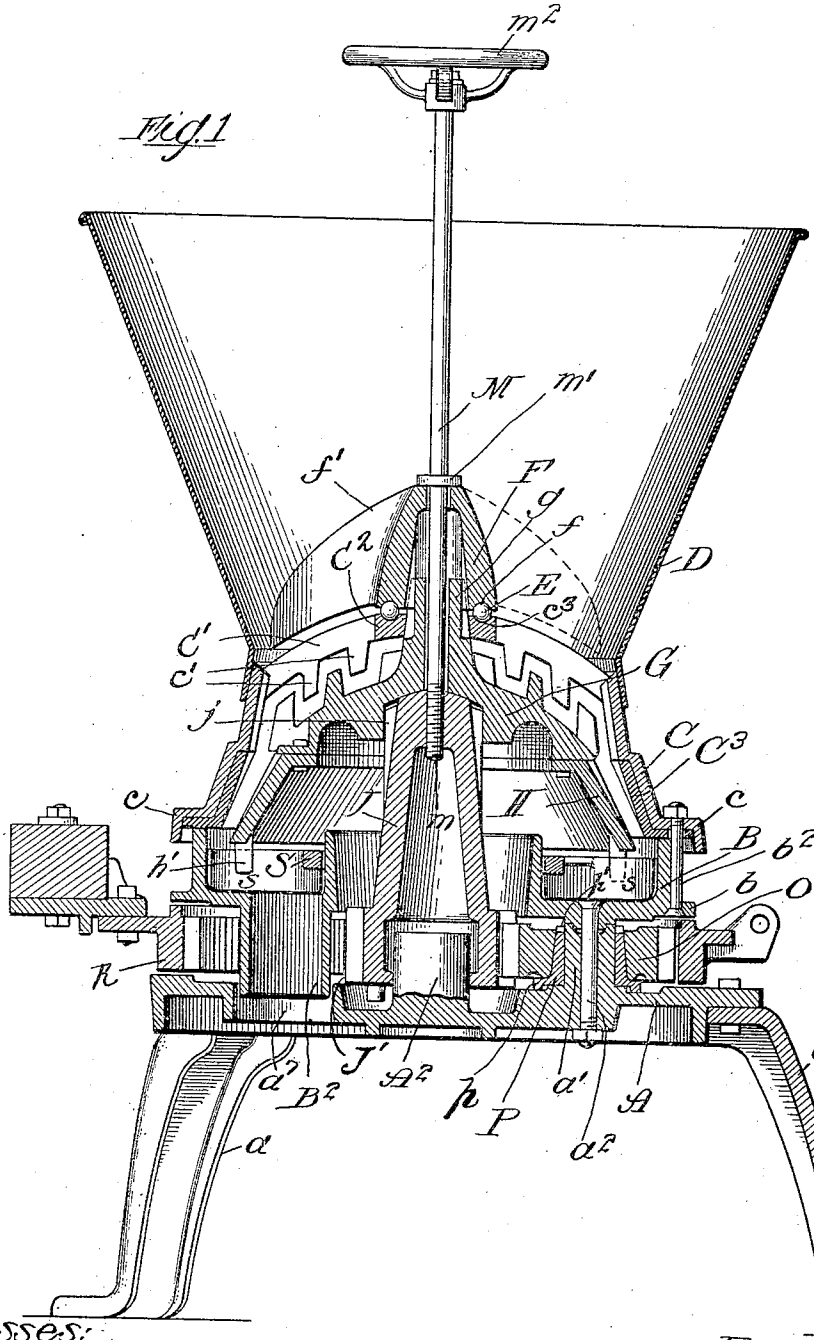
APPLICATION FILED JAN. 3, 1905.

948,466.

Patented Feb. 8, 1910.

2 SHEETS—SHEET 1.

Fig. 1



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2 SHEETS—SHEET 2.

Fig. 2.

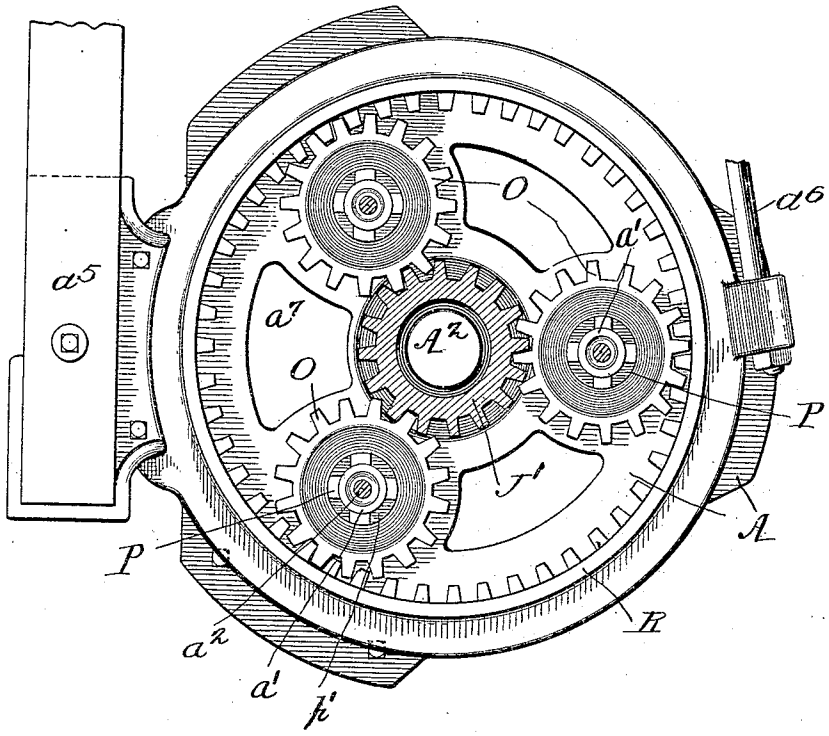


Fig. 3.

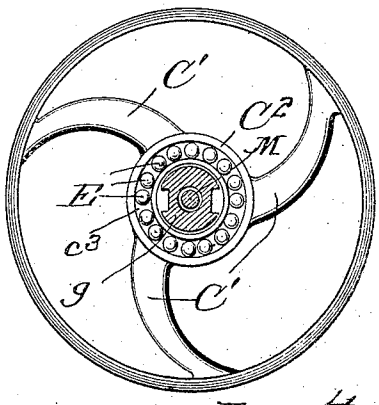
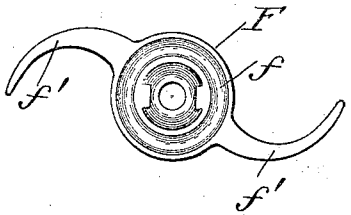


Fig. 4.



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UNITED STATES PATENT OFFICE.

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GRINDING-MILL.

948,466. Specification of Letters Patent. Patented Feb. 8, 1910.

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To all whom it may concern:

Be it known that I, THOMAS CASCADEN, Jr., a citizen of the United States, residing at Waterloo, in the 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, reference being had to the accompanying drawings, forming part of this specification.

My present invention has relation more particularly to that class of grinding mills commonly employed for grinding corn or other grain to be used as food for stock, such mills being generally known as "feed mills"; and more particularly does my invention relate to feed mills of that type in which multiplying gear mechanism is employed for imparting to the grinding ring or rings a higher speed or revolution than that at which travels the sweep that is drawn by the horses.

The invention consists in the features of novelty hereinafter described, illustrated in the accompanying drawings and more particularly pointed out 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 with the gear mechanism in position, the raised part of the central gear being shown in section. Fig. 3 is a detail plan view of the top of the outer shell, the hub and adjusting rod of the rotary cone being shown in section. Fig. 4 is a detail inverted plan view of the cob breaker.

The base A of the mill consists preferably of a casting that is sustained upon suitable legs a, or other convenient supports. From the base A rise a plurality of studs a', and upon these studs is supported the bottom of the conveyer pan B, this pan being securely held by bolts a^2 passing therethrough and through the studs a' and base A. The conveyer pan B is shown as provided with an annular flange b at its base, and through this flange will pass suitable retaining bolts b^2, whereby the shell C is held in position upon the conveyer pan B, the upper ends of the bolts b^2 passing through the flanged base c of the shell C. A hopper D rises from the top of the shell C in familiar manner. The top of the shell C is provided with the usual breaker arms C′ having depending teeth c' adapted to coöperate with the teeth upon the upper portion of the grinding cone. The inner ends of the arms C′ are connected by a hub C^2 that is formed upon its upper surface with an annular raceway c^3, within which are placed anti-friction balls E. Upon these anti-friction balls E bears the hub F of the cob breaker, this hub being formed with an annular raceway f at its bottom to receive the balls E. From the hub F of the cob breaker project the arms f' in usual manner.

Within the hub F of the cob breaker projects the hub g of the cone G, this hub g being suitably keyed to the cob breaker hub F as shown, so that these parts shall revolve in unison. The cone G carries at its base the grinding ring H that coöperates with the fixed grinding ring C^3 carried at the base of the shell C.

Within the cone G extends an upright casting J that is preferably formed in piece with the central pinion J′, and, through the top of this casting J extends the threaded end m of an adjusting rod M that passes loosely through the cone hub g and the cob breaker hub F and is provided with a shoulder m' adapted to bear upon the top of the cob breaker hub F. The casting J is keyed to the cone G, preferably by providing the exterior of the casting or part J with ribs j adapted to enter corresponding seats formed in that part of the under side of the cone adjacent thereto. The adjusting rod M is provided with a hand-wheel m^2, or other convenient means for turning it, and it will be readily understood by those familiar with this class of mills that by turning the hand-wheel m^2 the casting J and the cone G can be raised or lowered in order to vary the position of the grinding wheel H, with respect to the outer grinding wheel C^3. By providing the anti-friction balls E beneath the cob breaker hub F, it will be seen that the weight of the cob breaker, cone and central gear pinion is carried by these anti-friction balls and the power necessary to drive the parts is thereby materially reduced.

The gear pinion J′ meshes with a plurality of gear pinions O that are mounted upon the studs a' rising from the base A of the mill. In order to materially reduce the friction incident to the revolution of the

pinions O upon their journal studs a', I have provided these journal studs with loose sleeves P of anti-friction metal, these sleeves being preferably formed with base flanges p to sustain the pinions O, and with tapered outer faces setting loosely within the correspondingly tapered openings of the gear pinions O. The upper ends of the sleeves P are preferably formed with notches p', so as to permit oil or a like lubricant that may be delivered to the top of the pinions to pass freely down around the journal studs and the sleeves. This feature of providing the pinions O with the loose sleeves P is of importance not only because it insures a more accurate and easy working of the gears, but also enables cast gears to be more effectively employed. Outside the gears O, and meshing therewith, is the annular drive wheel R, to which is secured in any suitable or convenient manner, the usual beam a^5 and rod a^6, to which the draft team will be attached. The annular drive gear R is interposed, as shown, between the base A and the base flange b of the conveyer pan B.

In order to maintain the central gear pinion J' in accurate mesh with the gear wheels O, and, hence, insure the easy movement of the gears, I provide the base A of the mill with a central cylindrical stud A^2 that sets within the gear pinion J', this stud A^2 being of sufficient length to properly position the gear pinion J', notwithstanding the vertical movement of the gear pinion incident to the adjustment of the grinding rings. The stud A^2, I regard as an important feature of the invention. It should also be noted that the gear pinion J' is wider than the intermediate pinions O so that it will properly mesh with these pinions in its different adjusted positions.

The conveyer pan B will be provided upon its interior with any suitable form of conveyer, such, for example, as a ring S having radial arms s, certain of these arms being engaged by lugs h' projecting from the inner grinding ring H and serving to impart revolution to the conveyer. The bottom of the conveyer is shown as provided with a depending spout B^2, whereby the ground material will be delivered through an opening a^7 formed in the base A of the mill.

The operation of the parts above described will be readily understood by those familiar with this class of mills and need not be particularly described.

While I have set forth what I regard as the preferred construction of my invention, it is manifest that the details above set out may be varied without departure from the spirit of the invention, and that features of the invention may be employed without its adoption as an entirety.

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 a stationary outer shell having an annular grinding ring, of a revoluble cone or part within the stationary shell provided with a grinding ring, a conveyer pan below said inner cone, a conveyer in said pan driven by said cone, a central gear pinion below said cone having a vertically extending hub or part formed integral therewith and projecting through a central opening in said conveyer pan and engaging and keyed to said cone, said cone and said central gear pinion being adjustably sustained within the stationary outer shell above the base of the mill, an outer annular rack, intermediate gear pinions between said rack and said central pinion, studs projecting upwardly from the base of the mill whereon said intermediate pinions are journaled and a fixed stud or post projecting upwardly from the base of the mill over which an opening in said central adjustable pinion fits, said central pinion being of greater width than the intermediate pinions to properly mesh therewith in its different adjusted positions, substantially as described.

2. In a grinding mill, the combination with a stationary shell provided at its top with breaker arms having a central hub, of a cob breaker, the hub whereof is mounted upon the hub of said breaker arms, an inner revoluble cone below said breaker arms and keyed to said cob breaker hub, a central gear pinion below and keyed to said cone, a central adjusting screw having a flange engaging the cob breaker hub and an end portion threaded into said gear pinion to adjustably support said pinion and said cone from said cob breaker hub, means for driving said gear pinion, and a centering stud therefor projecting upwardly from the base of the mill for a limited distance within said gear pinion, substantially as described.

3. In a grinding mill, the combination with a stationary outer shell having an annular grinding ring, and with a revoluble inner cone or part provided with a grinding ring, of means for imparting revolution to said inner cone, comprising a central gear pinion having an opening therein, a stud formed integral with the base of the mill and extending a limited distance into the opening of said central gear pinion, gear pinions engaging said central pinion and an outer annular gear for imparting revolution to said pinions.

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