No. 747,610. PATENTED DEC. 22, 1903.

P. R. JANNEY.

GRINDING MILL.

APPLICATION FILED NOV. 9, 1900.

NO MODEL. 4 SHEETS—SHEET 1.

Fig. 1.

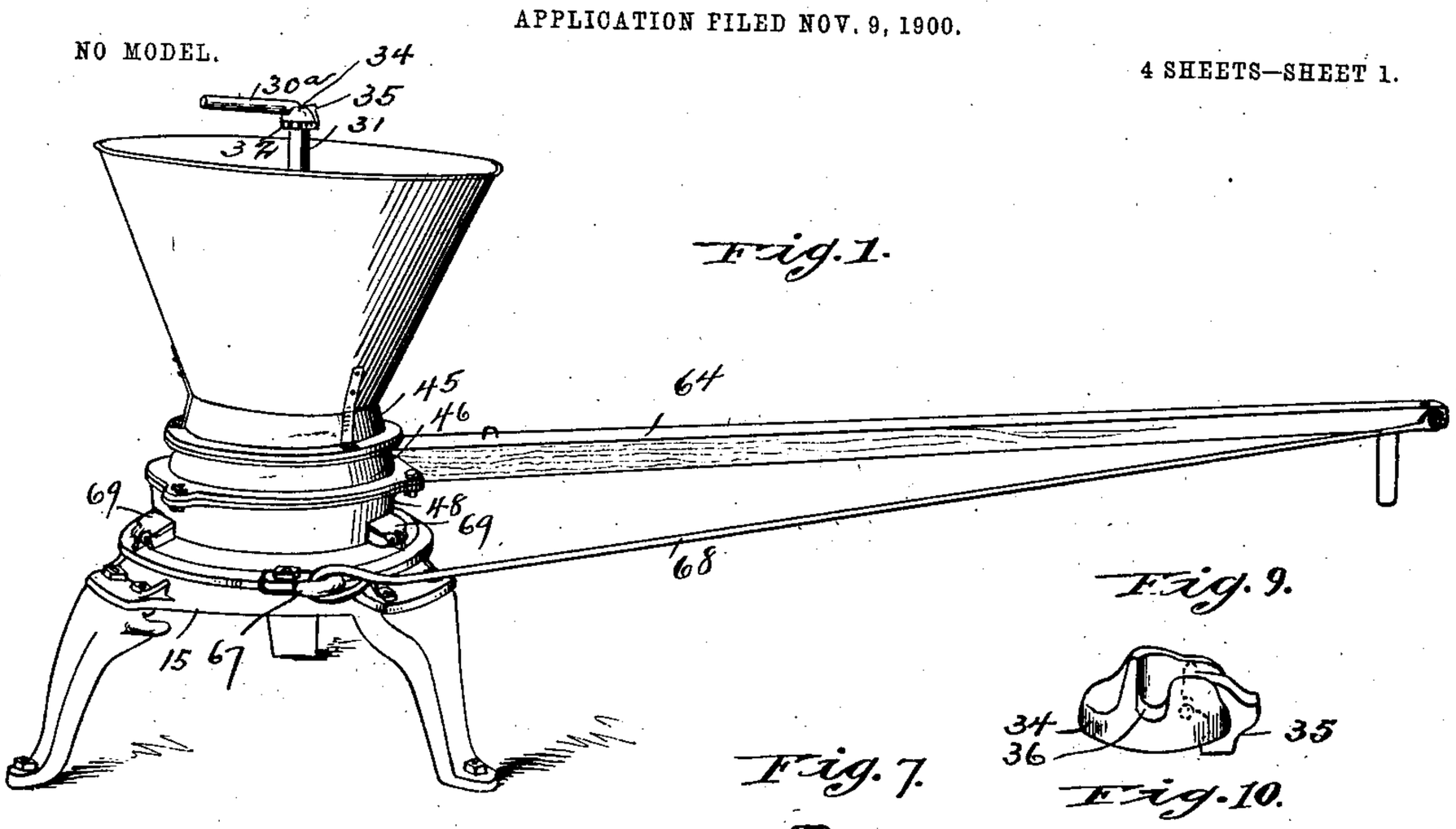


Fig. 3.

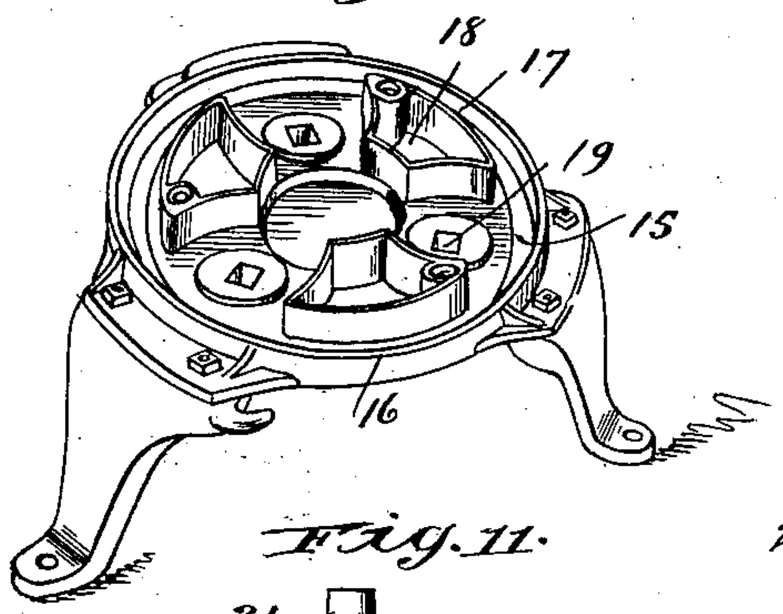


Fig. 11.

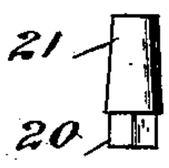


Fig. 7.

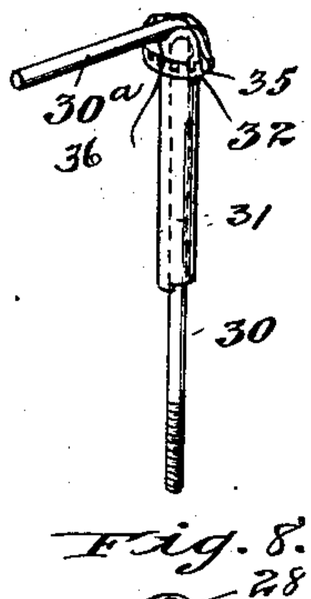


Fig. 8.

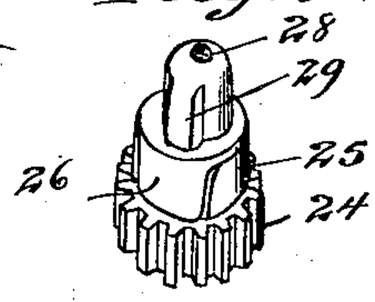
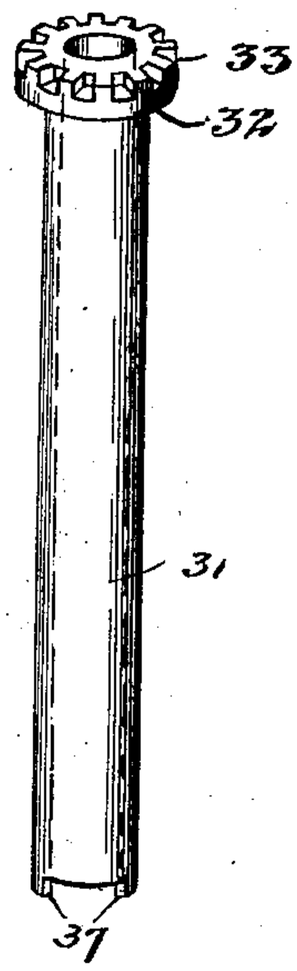


Fig. 9.

Fig. 10.



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NO MODEL. 4 SHEETS—SHEET 2.

Fig. 2.

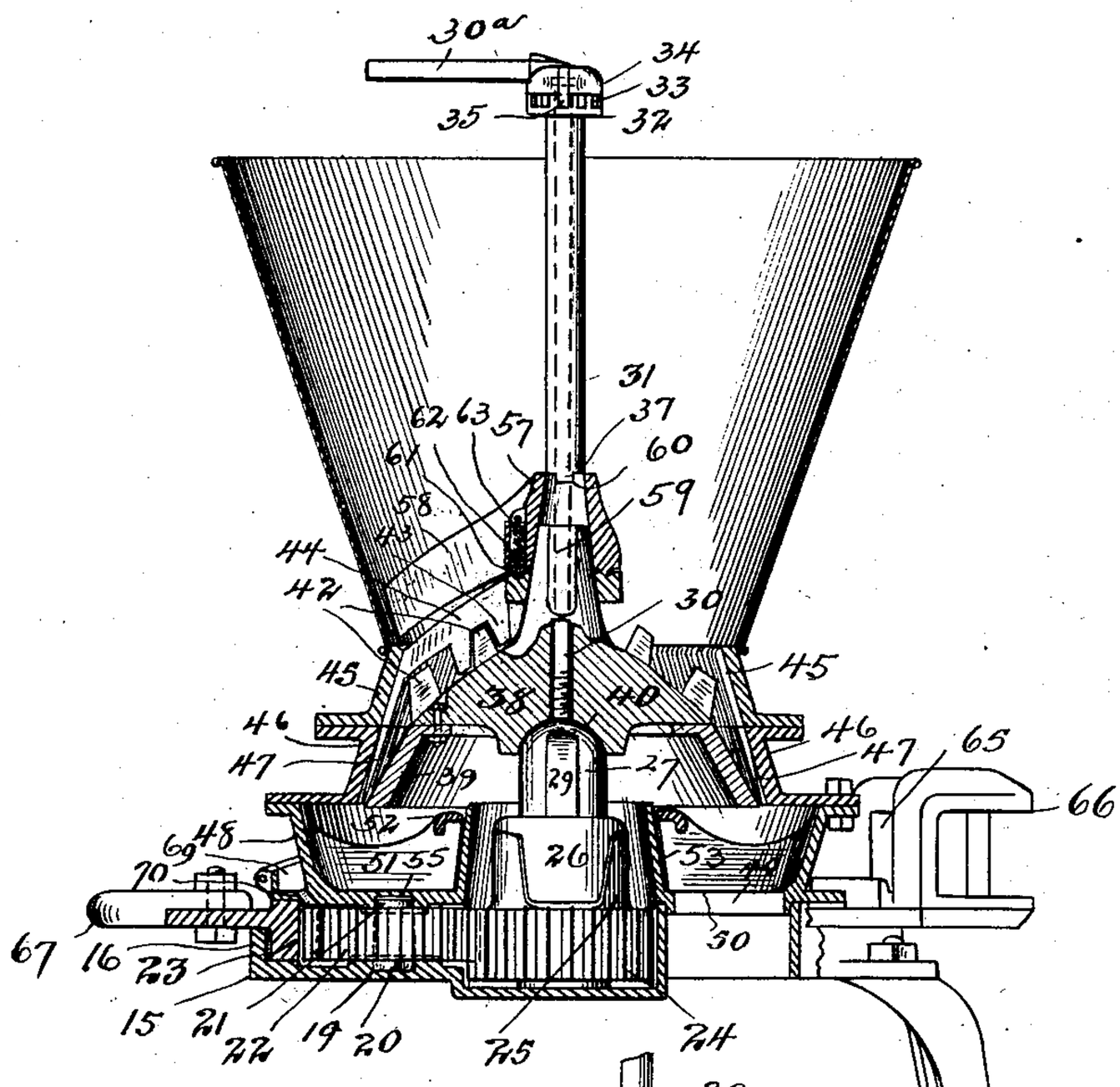


Fig. 6.

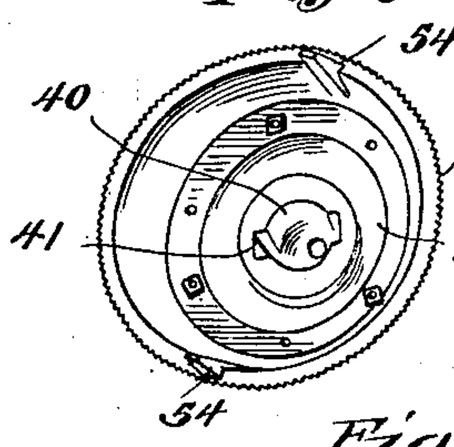
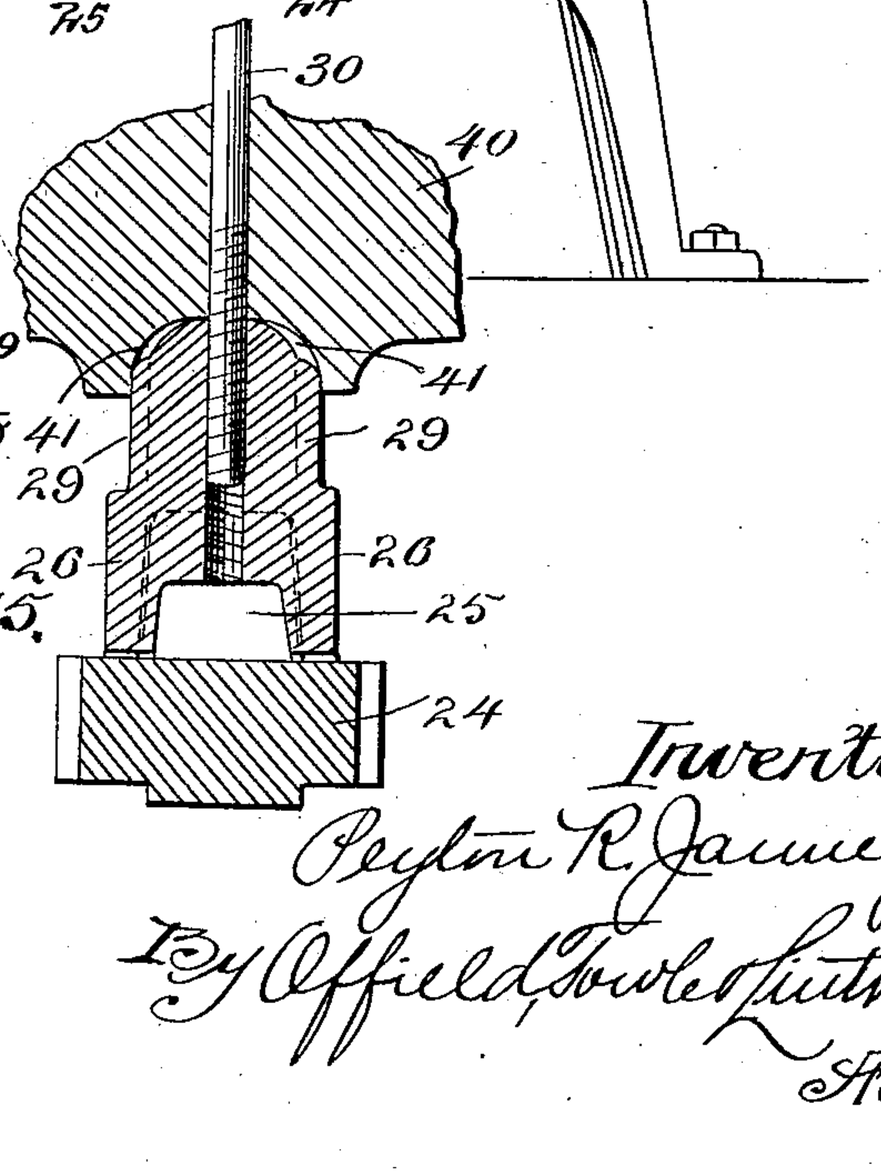


Fig. 15.



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NO MODEL. 4 SHEETS—SHEET 3.

Fig. 4.

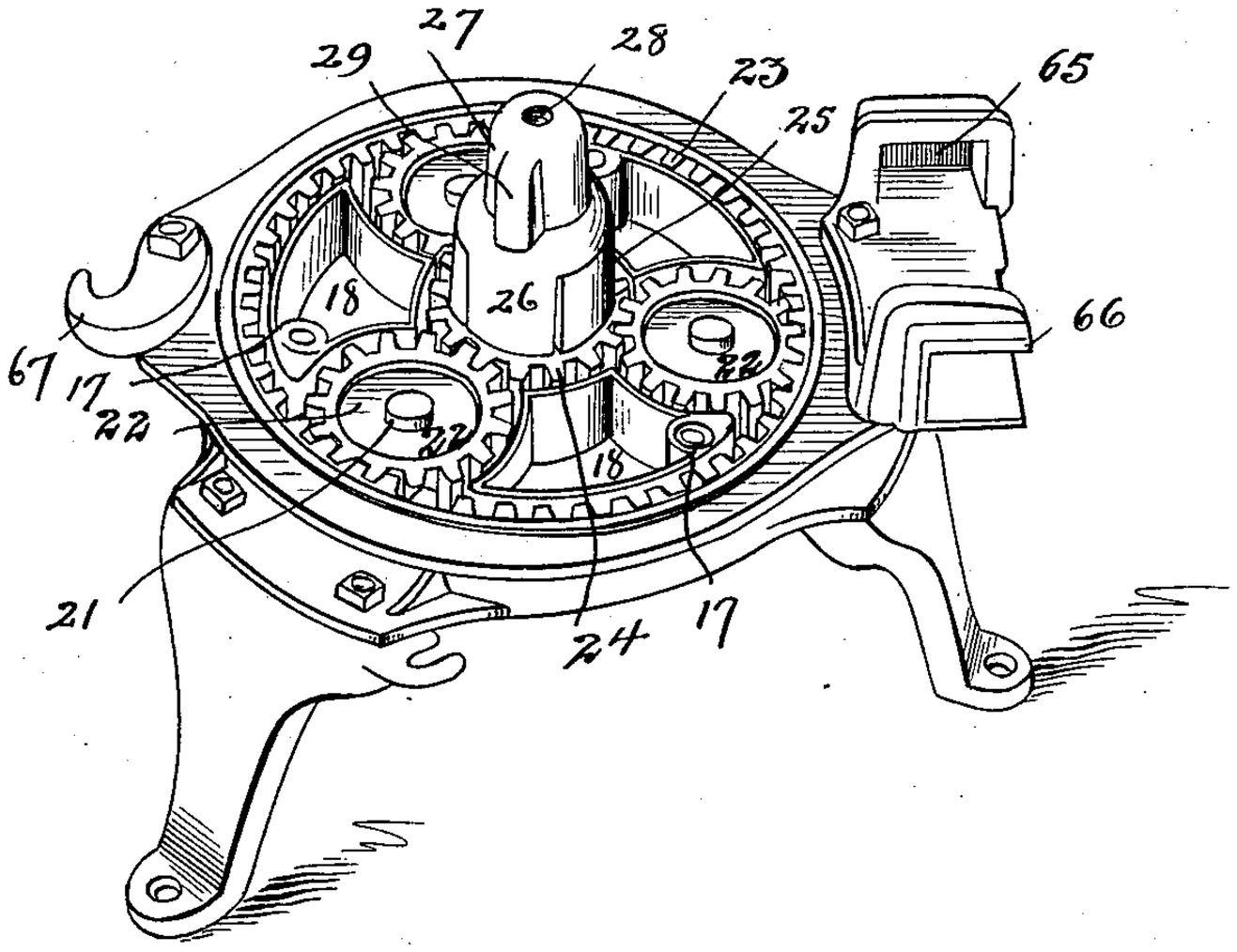
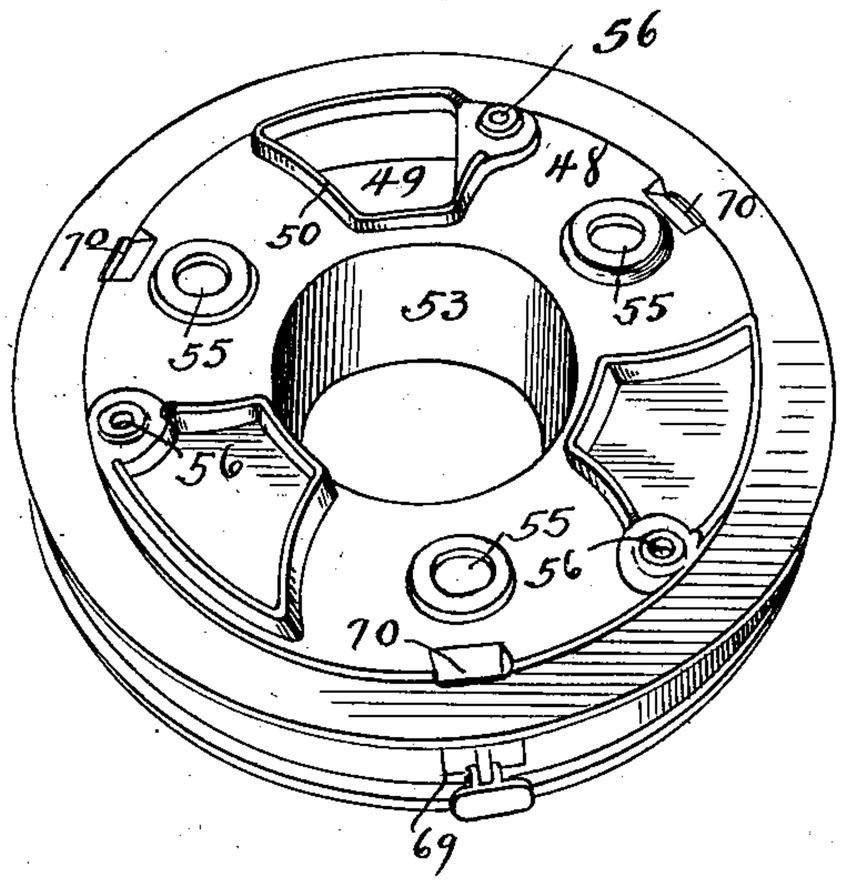


Fig. 5.



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No. 747,610. PATENTED DEC. 22, 1903.

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NO MODEL. 4 SHEETS—SHEET 4.

Fig. 12.

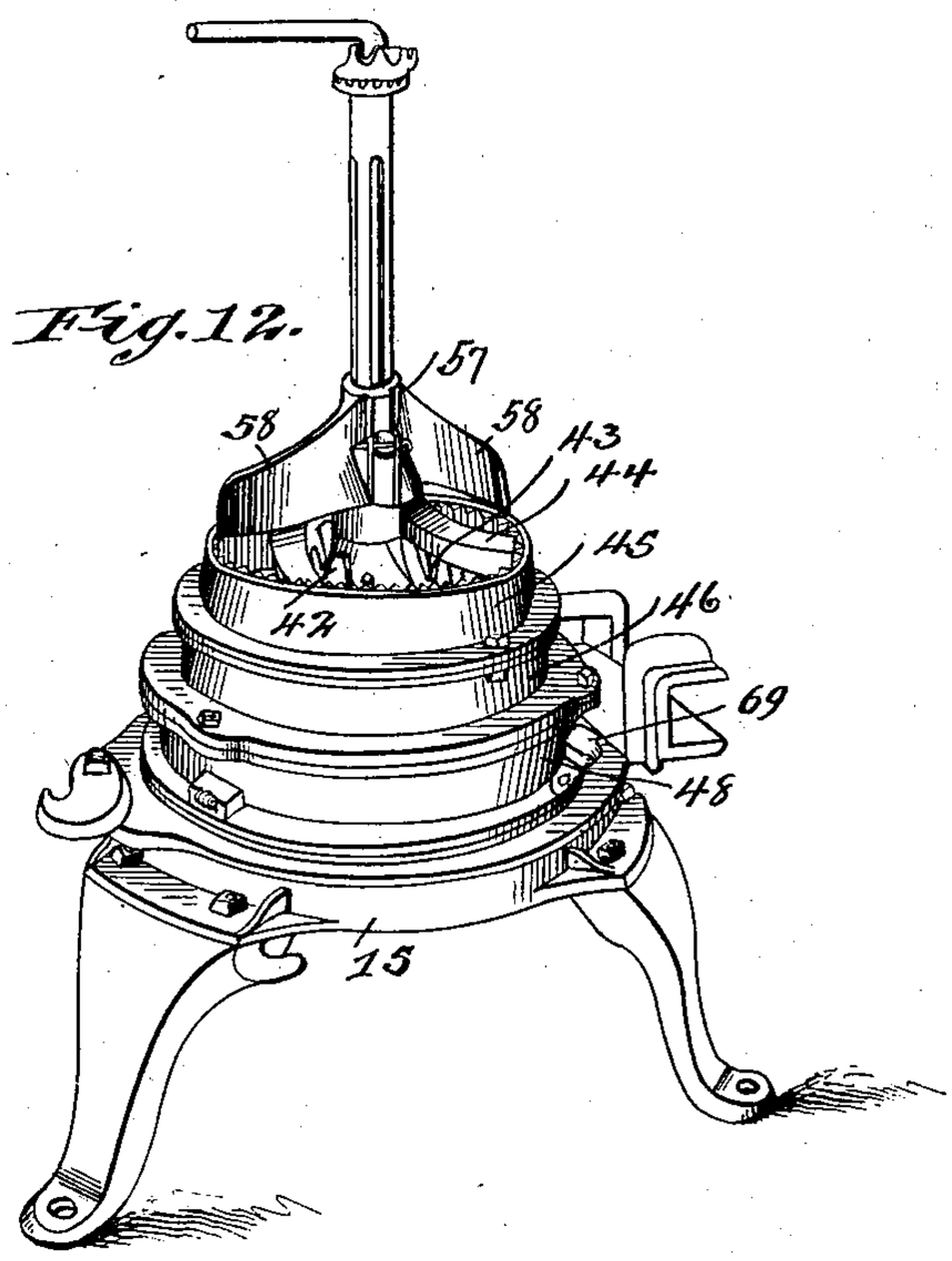

Fig. 14.

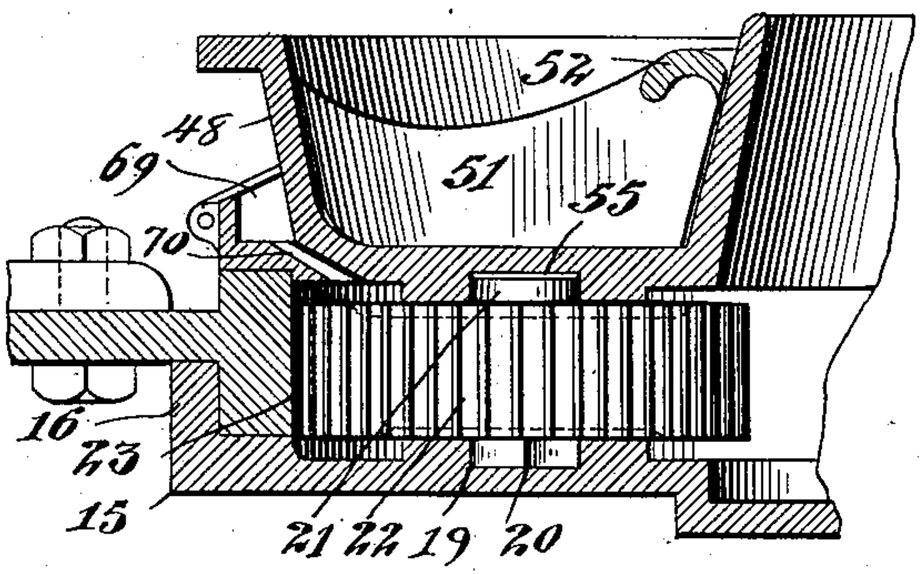

Fig. 13.

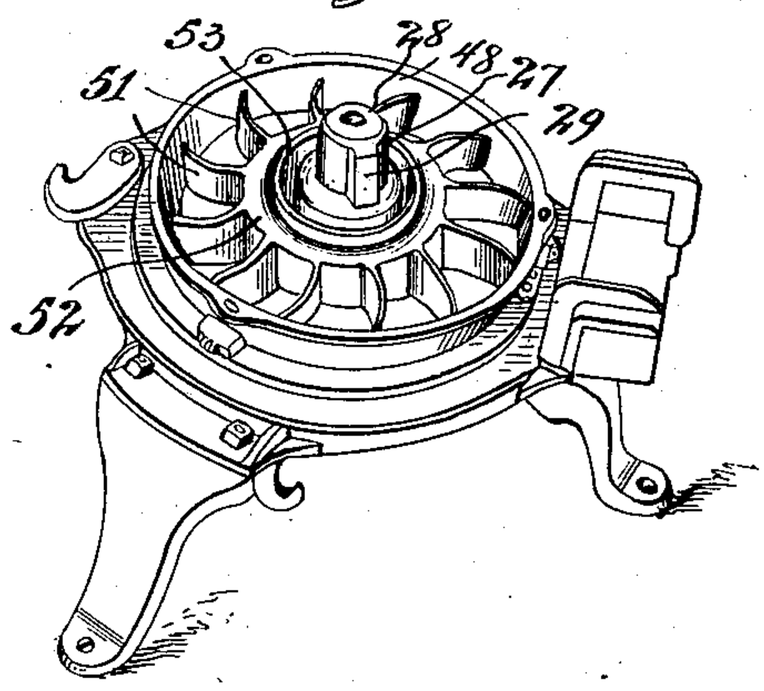

Fig. 14a

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No. 747,610. Patented December 22, 1903.

UNITED STATES PATENT OFFICE.

PEYTON R. JANNEY, OF OTTUMWA, IOWA, ASSIGNOR TO THE JANNEY MANUFACTURING COMPANY, OF OTTUMWA, IOWA, A CORPORATION OF IOWA.

GRINDING-MILL.

SPECIFICATION forming part of Letters Patent No. 747,610, dated December 22, 1903.

Application filed November 9, 1900. Serial No. 35,902. (No model.)

To all whom it may concern:

Be it known that I, PEYTON R. JANNEY, of Ottumwa, county of Wapello, and State of Iowa, have invented certain new and useful Improvements in Grinding-Mills, of which the following is a specification.

This invention relates to that class of grinding-mills commonly known as "feed-mills;" and the object of the invention is to improve the structural features with a view to the attainment of greater efficiency, durability, and ultimate economy.

The particular features of improvement will be pointed out in connection with the detailed description and will be summarized in the claims.

In the accompanying drawings, Figure 1 is a perspective view of the mill complete. Fig. 2 is an elevation, partly in central section, with the parts assembled. Fig. 3 is a perspective view of the base, which is provided with a discharge-opening for the ground material and flanged to provide a gear-case and lubricating-chamber or oil-pan. Fig. 4 is a similar view with the gearing in place. Fig. 5 is a bottom view of the feed-pan with a discharge-opening therein. Fig. 6 is a perspective view of the lower grinding-ring. Figs. 7 to 10, inclusive, are perspective views of the different parts of the mechanism for adjusting the lower grinding-ring, and Fig. 11 shows a stud or trunnion for the driving-pinions. Fig. 12 is a perspective view showing the hopper removed. Fig. 13 is a similar view with the grinding-rings, hopper, and casing removed, but showing the meal-pan and scraper in place. Fig. 14 is an enlarged sectional detail taken through the base of the machine and feed-pan and showing an oil-duct leading to the upper end of a pin or trunnion of the intermediate gear. Fig. 14^a is a perspective view of the cob-breaker, and Fig. 15 is a central vertical section through the central driving-gear and the superposed clutches and inner grinding-ring.

The base 15 is a casting of circular form having an upstanding marginal flange 16 and interior continuous flanges 17, surrounding discharge-openings 18. The bottom of the base is provided with pin or trunnion sockets 19 to receive the squared portions or tenons 20 of the pins or trunnions 21. The latter are preferably made slightly conical or tapering to fit a corresponding aperture in the pinions 22. These pins or trunnions may be constructed in various ways, but my improvement consists in making them removable or separable from both the base and the pinions, as by this construction they may be accurately turned, so as to secure a better fit upon the pinions and also facilitate repair in the case of breakage of either the bed, the trunnion, or the pinion itself. By making them conical and providing the pinion with the tapering bore a better fit is secured and wear is taken up and the placing of the pinion right side up is compelled. Concentrically disposed within the base is an internal gear-ring 23, intermeshed with the pinions 22, and said pinions mesh with a central driving-pinion 24. This pinion carries one member 25 of a clutch, and the other member 26 of the clutch has rigid and preferably integral therewith a boss 27, provided with a threaded socket or aperture 28 and with wings or lugs 29. An adjusting-rod 30, Fig. 7, is threaded into this boss and extends upwardly in the vertical axis of the machine through a sleeve 31, Fig. 10, said sleeve being provided with a flange 32, having locking-notches 33, which flange is surmounted by the cap 34, Fig. 9, provided with a latch 35, adapted to take into the locking-notches. The upper end of the rod 30 is bent over, as shown at 30^a, Fig. 7, and a seat 36 is provided therefor in the cap 34. The lower end of the sleeve has a bearing on the cob-breaker and is interlocked therewith by the projections 37 to prevent its rotation relatively thereto. By lifting the latch 35 out of engagement with the locking-notches the adjusting-rod may be rotated to raise or lower the clutch and the lower grinding-ring carried thereon so as to vary the fineness of the product.

The lower grinding-ring is shown detached in Fig. 6 and in section in Fig. 2. It has a central body 38, preferably made massive and of cast iron, and it has bolted to its edge and depending therefrom the grinding-ring

39. The under surface of the grinding-ring body 38 is hollowed out to provide a conical seat 40, which is adapted to rest upon the rounded upper end of the boss 27 of the upper clutch member, and the side walls of this hollow conical portion have recesses 41 to engage the side lugs 29 of said boss. The upper surface of the body 38 is provided with the breakers 42, which intermesh corresponding breakers 43 of the spider 44, which is formed integrally with the stationary grinding-ring 45, which in turn is bolted to the ring 46, having fine grinding-teeth or burs 47. The ring 46 is bolted to the meal-pan 48, this pan being provided with a discharge-opening, as shown at 49. The contour of this opening 49 is shown in Fig. 5, and one of the edges thereof (marked 50) is radial or slightly tangent to the radius of the pan. Within the pan is mounted the scraper or feed-ring, which is composed of a series of paddles or flights 51, united at their inner ends to an annular ring or flange 52, which surrounds the hollow hub 53 of the meal-pan. These paddles are preferably curved transversely, or they may be of spiral or other form with their lower edges sweeping in close contact with the bottom of the pan. The lower contacting edge of this paddle or flight will extend in a plane intersecting the vertical radial plane of the edge 50 of the discharge-opening 49, thus providing for a shearing or cutting effect upon the silks, particles of husk, or other foreign matter carried by the grain, and this shearing action will operate to prevent the clogging of the scraper and aid in the more effective discharge of the material.

While I have shown the scraper or feed-ring as composed of a series of blades rigidly secured together by a common annular web or ring, they may be separately attached thereto, or they may be divided longitudinally and their lower edges or scraping portions made removable for renewal. The same effect might be produced by making the flange 50 of the discharge-opening removable and constructing it from hardened steel. The scraper or feed-ring is driven by depending lugs 54 on the bur 39.

The bottom of the meal-pan 48 is provided with sockets 55 to receive the upper ends of the trunnions 21, and the meal-pan is bolted to the base or oil-pan by bolts passing through the apertures 56. The sockets of the meal-pan and the upper ends of the pins or trunnions might be constructed to prevent the rotation of the latter by making them non-cylindric.

The cob-breaker has the central conical hub or body 57 and two or more inclined transversely-curved blades or paddles 58. It is interlocked with the upwardly-extending sleeve 59 of the lower grinding-ring body 38, so as to be driven thereby. It is also recessed, as shown at 60, to receive the tenons 37 of the sleeve 31. The central body 57 of the cob-breaker has a track-surface upon its lower edge adapted to a similar surface of the breaker 44 and is lubricated through an oil-channel 61, in which is placed a suitable packing, (shown at 62,) confined by a spring 63, which is held in place by a screw-cap or cotter-pin.

The sweep 64 is fitted at its end into a socket-casting 65, formed as a part of the gear-ring 23, and has a bearing on said ring through the hook-shaped casting 66. At the opposite side of the gear-ring is bolted a hook-shaped catch 67, over which the looped end of the guy-rod 68 can be sprung, the opposite end of the guy-rod being bolted to the tongue. By simply springing the sweep the loop can be detached from the hook and the sweep removed, and when it is in place it is held level and steady by means of the casting and guy-rod.

Oil-cups 69, provided with oil-channels 70, leading to the upper ends of the pinions 22, are provided upon the flange of the meal-pan 48 and furnish a lubricant for the upper ends of the studs 21.

The several structural improvements above described add greatly to the efficiency of the mill. The mounting of the pinions upon separate studs removable from the base not only facilitates renewal or repair, but it enables the use of standard gears and of pins or trunnions which can be accurately turned and held in such manner as to provide for a better alinement than can be obtained with gears having cast pins or trunnions. Another important gain connected with the pins or trunnions and the described manner of mounting the same resides in the fact that said pins or trunnions do not injure or interfere with the character of the base, as an oil holder or reservoir. I am aware that pinions occupying similar relations in devices of this character have heretofore been made in the form of sleeves, seated at their lower ends in the base and secured by means of bolts passing through the same axially and also through the base and the bottom of the superimposed meal-pan, thus securing the base and meal-pan together. This construction, however, is highly objectionable for the reason that the perforate bottoms of the sockets receiving the lower ends of the sleeves easily permit leakage of the lubricant therethrough. My invention is designed to entirely obviate this objection by dispensing entirely with the locking-bolts of the older art and rendering the bottoms of the sockets imperforate, whereby leakage of the lubricant is made impossible. The improved means for adjusting the lower grinding-ring are also important. In this mill the entire adjusting mechanism is connected with the central adjusting-rod, and the parts are virtually suspended from the hub of the cob-breaker, resting upon the track or table of the upper breaker. While facility of adjustment is thus provided, it is essential to secure such a construction of the parts, and particularly of the contact-surfaces, as will en-

able the grinding-rings to be kept in proper relative position to each other and to reduce friction to a minimum. For these reasons the contacting surfaces of the boss of the lower clutch member and the under side of the body of the lower grinding-ring are of conical formation and have a tendency to wear true, thus preserving the proper alinement of the parts. For this reason also the contacting surfaces of the cob-breaker from which the weight of the lower grinding-ring is suspended and the upper grinding-ring are lubricated and preferably provided with the antifriction devices indicated in the drawings. The means for locking the adjusting-rod while efficient for the accomplishment of their purpose and easily operated may of course be be varied as to precise detail of construction, but in the form shown are simple and easily operated. The scraper is also a great improvement over previous devices of this kind, because it enables the machine to clear itself from all foreign substances carried by the material being operated upon and prevents the clogging of the machine, which not only interferes with its continuous operation, but is liable to cause accidents by the breaking of the scraper-blades or the stripping of the teeth in the pinions.

While I have described my improvements in connection with a mill in which the outer grinding-ring is stationary and the inner one revolves, yet it is obvious that my improvements might be applied in a mill where the outer grinding-ring and the shell containing the same are also made to revolve, and therefore it will be understood that the words "stationary" and "movable" are used for the purpose of identifying the particular grinding-rings referred to. In all mills of this character there must be a relative movement of one of the grinding-rings with reference to the other; but if both rings were driven in opposite directions or in the same direction at different rates of speed the function of grinding would still be performed.

I claim—

1. In a grinding-mill, the combination with a stationary base having non-cylindrical sockets, provided with imperforate bases, of an internal gear mounted to turn thereon, a central driving-pinion, and intermediate pinions driven by the internal gear and enmeshed with said driving-pinion, said intermediate pinions having removable pins or trunnions seating in the non-cylindrical sockets of the base, substantially as described.

2. In the driving-gearing of a feed-mill, the combination with a base having non-cylindrical sockets provided with imperforate bases, of removable pins or trunnions having shanks adapted to seat in said sockets and bodies of frusto-conical formation and pinions having bores of similar conformation, substantially as described.

3. In a grinding-mill, the combination with a base having a series of non-cylindrical sockets having solid bases formed therein and having also a raised peripheral flange affording a gear-casing, an oil-pan and a track, of an internal gear adapted to travel upon said track, a central driving-pinion having a bearing upon said base, intermediate pinions enmeshed with the internal gear and with said central pinion and having removable pins or trunnions seating in said sockets of the base, and a meal-pan mounted above said pinions and having seats or sockets formed in its base to receive the upper ends of said pins or trunnions, substantially as described.

4. In a grinding-mill, the combination with a base and an internal gear mounted to rotate thereon, a central driving-pinion having a clutch member, intermediate pinions for transmitting motion from the internal gear to the driving pinion, a movable clutch member having sliding engagement with the clutch member of the central driving-pinion, said clutch member having a boss or bearing end of convex form, an inner grinding-ring having a concave self-centering seat upon and a clutch engagement with the upper end of said boss, an adjusting-rod having threaded engagement therewith, and an outer grinding-ring on which the adjusting-rod has a bearing and whereby the inner grinding-ring may be adjusted vertically, substantially as described.

5. In a grinding-mill, the combination, with a driving-gearing, having a clutch member, a second clutch member having sliding engagement therewith, an inner grinding-ring suspended upon and driven by said sliding clutch member, an outer grinding-ring having a track, a cob-breaker turning upon said track, a sleeve or hollow post mounted upon said cob-breaker and non-rotatable relatively thereto, an adjusting-rod extending through said sleeve or hollow post and engaging the sliding clutch member and means for rotating said rod and for locking it, substantially as described.

6. In a grinding-mill, the combination with a driving-gear having a clutch member, of a second clutch member in sliding engagement therewith, an inner grinding-ring suspended upon and driven by said sliding clutch member, an outer grinding-ring having a track, a cob-breaker mounted to rotate upon said track, a sleeve or hollow post interlocked with the cob-breaker and terminating at its upper end in a notched flange, a cap having a pivoted latch and a radial seat surmounting said flange, and an operating-rod extending through said sleeve or hollow post and having threaded engagement with the clutch, said operating-rod having a crank or handle lying in the radial seat of the cap, substantially as described.

7. In a grinding-mill, the combination with a base-plate having a marginal flange forming an oil-receptacle, of a master-wheel located in said receptacle, resting and traveling on the base-plate, and provided with in-

ternal teeth, a central gear-wheel also resting and traveling on the base-plate within the receptacle, said base-plate being provided with seats or recesses between the central gear and master-wheel, a grist-receiving pan provided with corresponding seats or recesses and detachably bolted to the base, and pinions provided with stud-bearings fitting the recesses of the pan and base, said pinions meshing with and centering the master-wheel and central gear, substantially as described.

8. In a grinding-mill, the combination with a base-plate having a marginal flange forming an oil-receptacle, of a master-wheel located in said receptacle and having a flange extending over the edge of the flange of the base-plate, and also provided with an upwardly-extending flange or fillet, gearing located within said oil-receptacle, and a grist-receiving pan provided with a flange extending over the top of the master-wheel, substantially as described.

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