No. 647,511. Patented Apr. 17, 1900.

A. G. NEWMAN.

FEED GRINDER.

(Application filed Feb. 16, 1899.)

(No Model.) 3 Sheets—Sheet 1.

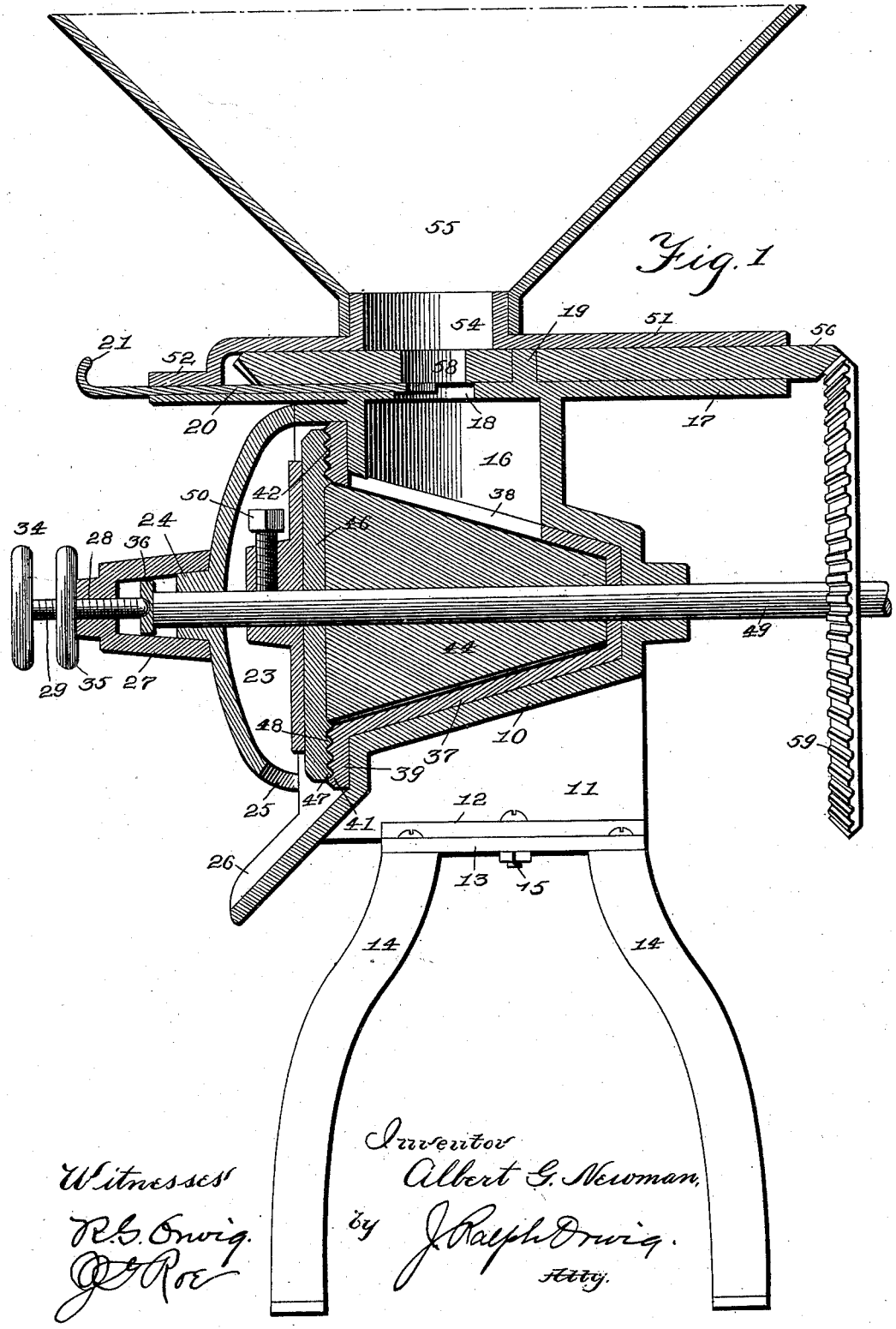

Fig. 1

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Fig. 2.

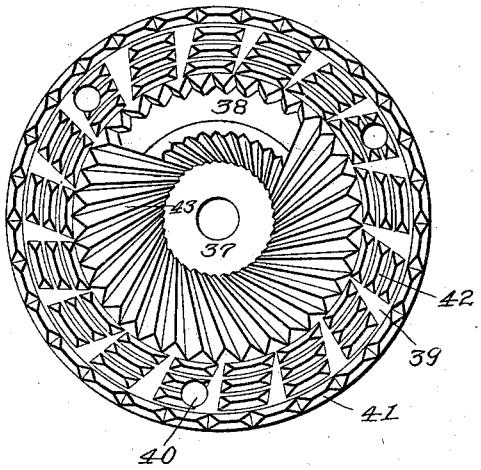


Fig. 3.

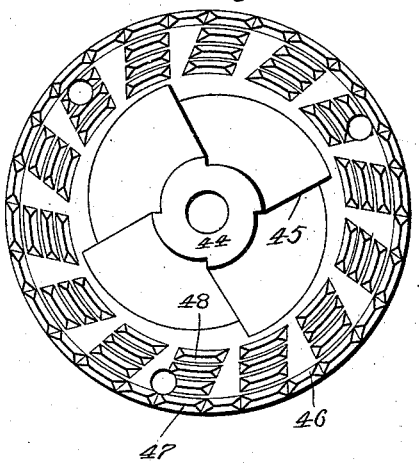


Fig. 4

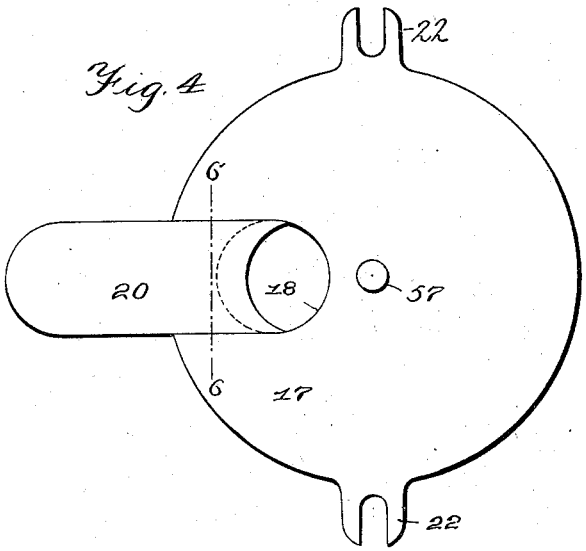


Fig. 5.

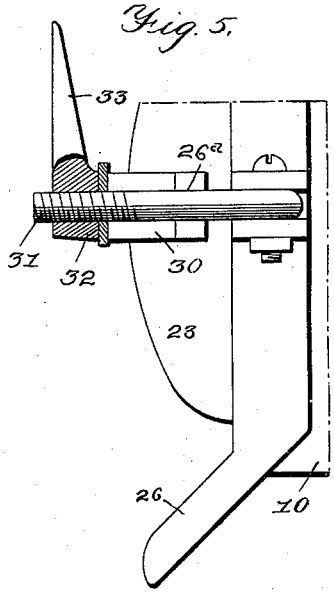
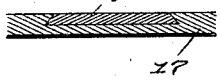


Fig. 6.



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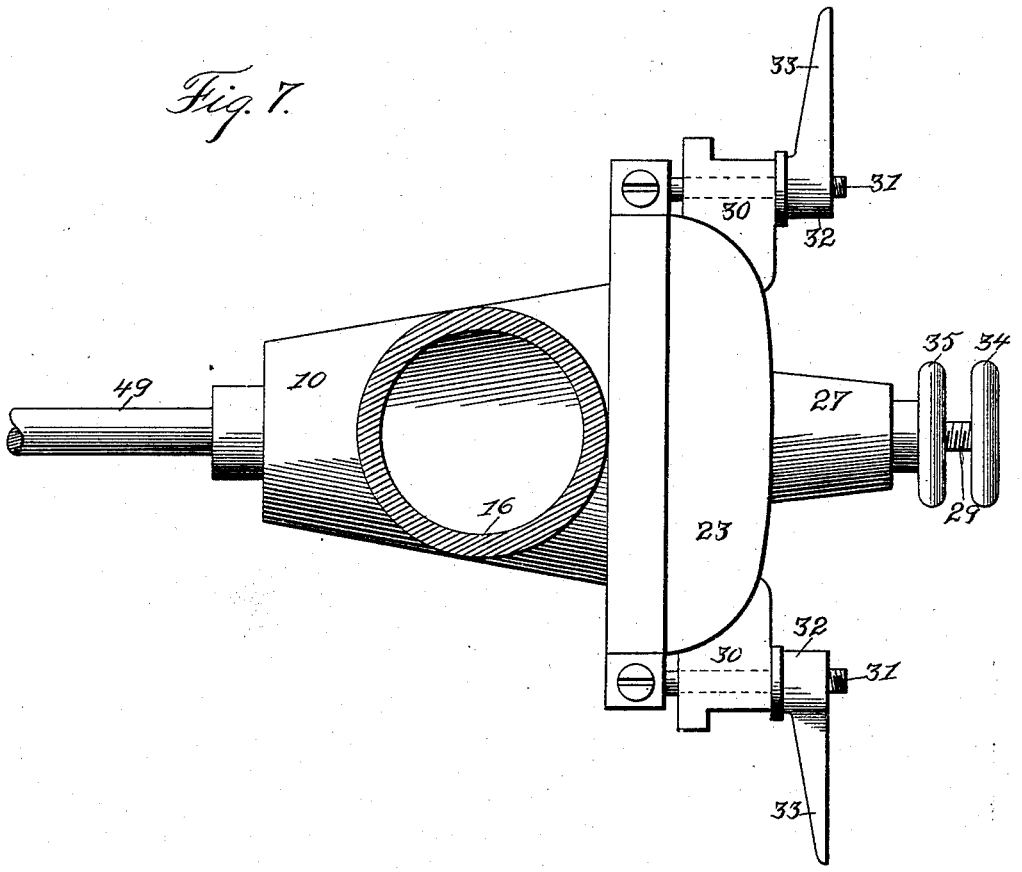
(No Model.) 3 Sheets—Sheet 3.

Fig. 7.



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UNITED STATES PATENT OFFICE.

ALBERT G. NEWMAN, OF MARSHALLTOWN, IOWA.

FEED-GRINDER.

SPECIFICATION forming part of Letters Patent No. 647,511, dated April 17, 1900.

Application filed February 16, 1899. Serial No. 705,657. (No model.)

To all whom it may concern:

Be it known that I, ALBERT G. NEWMAN, a citizen of the United States, residing at Marshalltown, in the county of Marshall, State of Iowa, have invented certain new and useful Improvements in Feed-Grinders, of which the following is a specification.

The object of this invention is to provide improved means whereby the inner or male bur of a feed-grinder is detachably held in position in a feed-grinder, and at the same time convenient means are provided for suspending a sack from said clamping means, so that the ground feed passing from the machine may enter the sack.

My invention consists in certain details in the construction, arrangement, and combination of the various parts of the device whereby the objects contemplated are attained, as hereinafter more fully set forth, pointed out in my claim, and illustrated in the accompanying drawings, in which—

Figure 1 shows a vertical sectional view of the complete machine. Fig. 2 shows a front elevation of the female bur. Fig. 3 shows a rear elevation of the male bur. Fig. 4 shows a top or plan view of the plate at the top of the machine in which the feed-regulating slide is placed. Fig. 5 shows an enlarged detail side view of a portion of the front of the machine and the case for inclosing the burs to illustrate one of the sack-holding devices. Fig. 6 shows a detail sectional view on the line 6 6 of Fig. 4 to show the construction of the feed-regulating slide; and Fig. 7 shows a horizontal section of the machine, taken at a point directly beneath the top plate of the machine-casing.

Referring to the accompanying drawings, I have used the reference-numeral 10 to indicate that portion of the machine-frame in which the female bur is inclosed. At its lower end this portion is projected downwardly at 11 and flattened out to form an integral horizontal base-plate 12, designed for attachment to the top of a post by means of screws. I have provided a second flat plate 13, to which the four legs 14 are bolted. This plate is provided with two or more holes for the reception of bolts 15, whereby it may be quickly and easily attached to the said base-plate 12 to thereby avoid the necessity of attaching the four legs thereto separately and to strengthen the machine. The body portion 10 is substantially truncated cone-shaped, with its base toward the front end and open to receive the male bur. There is also a small central opening in the rear end of this part to receive the shaft. The upper portion of this part 10 is formed into a collar 16, with a flat integral plate 17 on the upper end thereof. An opening 18 is formed in the plate, and an upwardly-projecting central journal 19 is formed on the top of the plate. A feed-regulating slide 20 is dovetailed into the top surface of this plate, so that its top is flush with the top of the plate. The inner end of this slide is concave in shape, so constructed as to form an oval opening no matter where the slide may be placed, and on the outer end of the slide a small handle 21 is provided. Three bifurcated lugs 22 project horizontally outward from the edge of this plate for the purposes hereinafter made clear.

The numeral 23 is used to indicate the cover for the head of the male bur. It is substantially dome-shaped and its base fits against the open front of the part 10. At the central portion is a bearing 24, through which the shaft is passed, and at its lower edge is an opening 25, leading to a short spout 26 on the body portion 10, through which the ground feed discharges, and at its sides the slotted projections 30 are formed. This cover 23 is held in place by means of the following device: 27 indicates a cup-shaped part shaped to fit over the bearing 24 and having a screw-threaded bearing 28, through which a screw-threaded rod 29 is passed. Pivoted between the lugs 30^a on each side of the body portion 10 are the screw-threaded rods 31 of a length sufficient to pass through the slotted projections. A nut 32 is provided for each rod 31, having a curved and pointed arm 33 for the purpose of engaging and supporting the opposite sides of a sack to hold it in position to receive the ground feed. Thus the nuts are made to serve the double function of supporting the sack and clamping the part 23 to the part 10.

A hand-wheel 34 is fixed to the outer end of the rod 29, and a locking-nut 35 is placed on the rod to impinge the end of the cup-shaped device 27. The inner end of said rod

is rounded to enter an opening in the front face of a follower 36 in the cup-shaped device for the purposes hereinafter set forth.

The body portion 37 of the female bur is made of a truncated cone shaped to fit the interior of the part 10. It has an opening 38 at its top and an opening at its rear end through which the shaft passes. At its front face is an outwardly-projecting flange 39, extending to the inner edge of the cover 23. A number of openings 40 for screws, whereby the bur is held to the casing, are made in this flange, and upon the face of the flange I have provided an outer circle of teeth 41, each having its sides tapered to a thin edge and its ends inclined inwardly and arranged as close together as may be possible. Within this circle I have arranged a number of other teeth 42, all arranged in concentric rows, but separated by considerable spaces to permit the passage of ground feed from one row to the next. These teeth are also of the same shape and have sharp-edged corners. On the inner surface of the body of this bur I have provided a series of grooves 43, which diverge from a line for the purposes hereinafter set forth.

The numeral 44 indicates the body of the male bur, its general contour being the same as the interior of the female bur. On the surface of its body portion are several large ribs 45, divergent from a line for the purpose of coacting with the grooves of the female bur in advancing or feeding the grain toward the large ends of the burs and also for breaking up the grains, so that they may more readily enter between the grinding-surfaces of the burs. The head 46 of this bur is disk-shaped, and on the inner face thereof are, first, an outer circle of teeth 47, each wedge-shaped, like the teeth 41, and placed close together. Within this circle are a number of other circles of wedge-shaped teeth 48, concentrically arranged and so disposed with relation to the circles of teeth of the female bur that the teeth of one bur will enter the interdental spaces of the other and permit of a free rotation of the male bur, while maintaining this relative position. The male bur is clamped to a shaft 49 by means of a set-screw 50. This shaft passes through the rear of the casing, and power is applied to its rear end by means of a belt-wheel. (Not shown.) The male bur may be adjusted with relation to the female bur by means of the threaded rod, which tends to force the follower 36 against the end of the shaft 49. Obviously when the burs are close together the grain will be ground fine, and when separated the grain will be reduced proportionately fine. In practical operation this portion of the device will work as follows: By means of the sharp corners on the teeth, which are arranged so that their edges will be substantially parallel and close together, the grain will be reduced by means of a cutting action in contradistinction to the grinding or mashing action of simply roughened burs, which action will obviously reduce a greater amount of grain per hour than is possible with merely roughened surfaces that mash the grain. Furthermore, less power is required in cutting than in mashing, and hence the friction is not nearly so great, thus permitting of a high speed without danger of heating the burs. In addition to this, one of the chief merits of the construction shown is found in the fact that the teeth are self-sharpening. This is so for the reason that the teeth are arranged in concentric circles, and the teeth on one bur enter the spaces between the teeth of its mate. Hence the wear comes upon the flat sides of the teeth as well as upon the edges. Hence wearing off the sides sharpens the edges. This action is especially effective when the machine is run without grain and when the burs are held tightly together, such action seeming to wear away only the sides of the teeth; but even when running full the sharp edges will not be dulled until so much of the teeth are worn away by long usage that this action cannot be had. As the grain is reduced it passes from one circle of teeth to the other by reason of the pressure of the incoming grain until it is finally forced out between the teeth of the outer circle, whence it passes out through the spout.

I have provided means for feeding grain to the burs, as follows:

The numeral 51 is used to indicate a cover arched at its central portion and having a horizontal flange 52 to lie flat against the edges of the plate 17 beyond the wheel-valve, hereinafter described, whereby it may be bolted to the bifurcated arms 22 of the plate 17. Near the central portion of this cover is an opening 53, surrounded by an upwardly-projecting collar 54, which is designed to receive a hopper 55. This cover is cut off at its rear end for the purposes hereinafter shown.

The numeral 56 indicates a bevel gear-wheel or a wheel-valve of a size to enter between the plate 17 and the cover 51 and to closely engage the adjacent surfaces of these parts. A central opening 57 is provided to admit the upwardly-projecting journal of the plate 17, and one or more vertical holes 58 are formed therein in position to be brought into coincidence with the hole in the plate 17 when the wheel-valve is turned. This wheel-valve is covered by the cover 51 and plate 17, except at the rear, where said cover and plate are cut away.

In practical use it is obvious that the grain in the hopper will rest upon the surface of the valve-wheel. Then when one of the openings in the valve-wheel passes under the openings in the cover the said opening in the valve-wheel will fill with grain, and when it passes over the opening in the plate 17 the contents of the said opening in the valve-wheel will drop into the grinder. If the slide in said opening in the plate 17 is only partially open,

obviously only part of the contents of this opening in the valve-wheel will pass into the grinder. It is obvious that the amount of grain fed to the grinder may thus be regulated to a nicety, and hence the burs can never become clogged, but will be at their maximum efficiency at all times. This valve-wheel is operated as follows: 59 indicates a small bevel-gear on the machine-shaft and meshed with the gear-teeth on the valve-wheel, the plate 17 and the cover 51 being cut away for this purpose. By this means the feed is always automatically regulated by the speed of rotation of the burs. Hence when they are running at a high speed and have a large grinding capacity the feed will be rapid, and when the movement of the grinders is slow the feed will be proportionately smaller.

Having thus described my invention, what I claim, and desire to secure by Letters Patent of the United States therefor, is—

In a feed-grinder, the combination with a casing for the reception of the female bur of the feed-grinder, of two rods pivoted to the sides of the said casing to project forwardly in a horizontal plane, a cap or cover, 23 to rest against the face of the said casing and slotted projections on said cap 23 to receive the said rods and nuts designed to be screwed to the ends of said rods, each nut being provided with a projecting pointed arm, to serve the double function of a handle by which the nut may be turned and a hook upon which a sack may be held, substantially as set forth.

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