

W. PECK.  
Grinding-Mill.

No. 212,049.

Patented Feb. 4, 1879

Fig. 1.

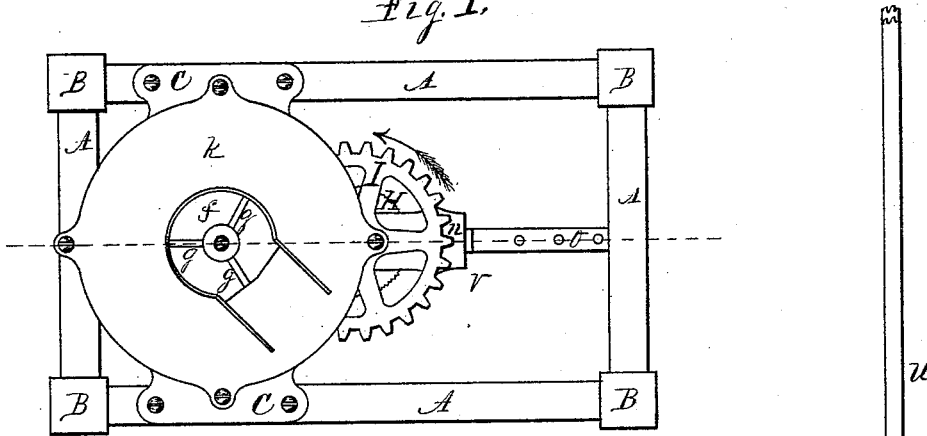
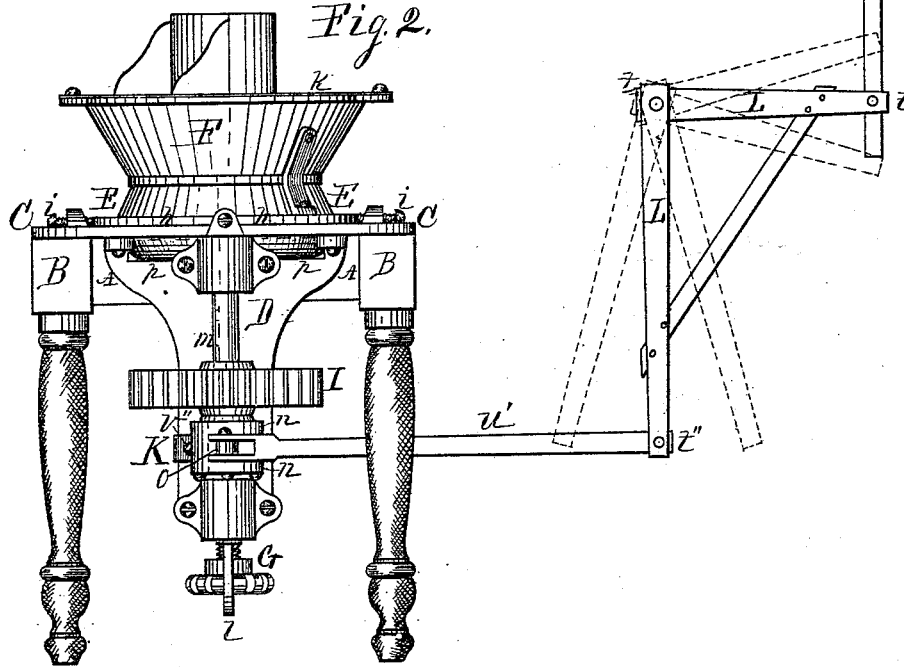


Fig. 2.



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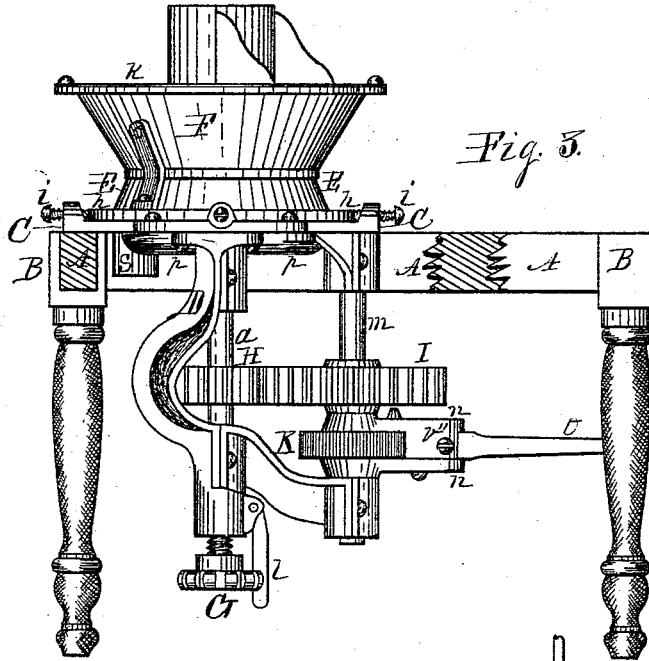


Fig. 3.

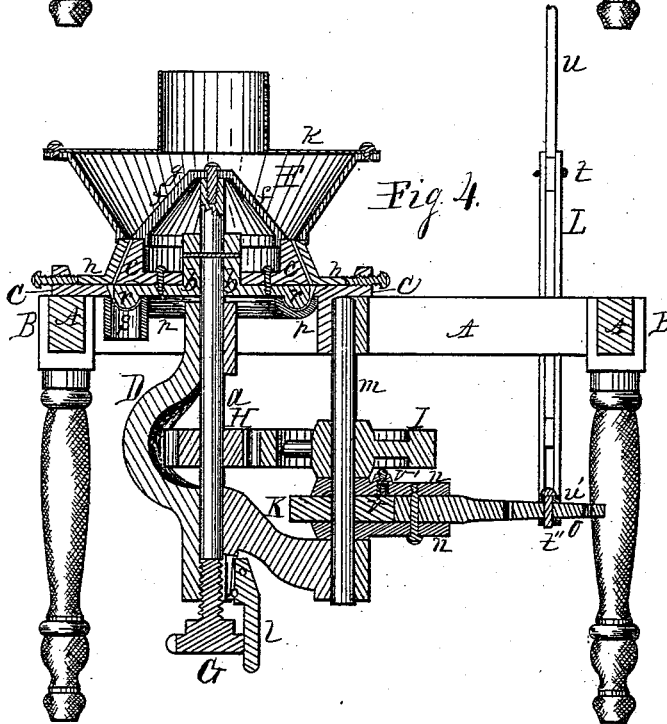


Fig. 4.

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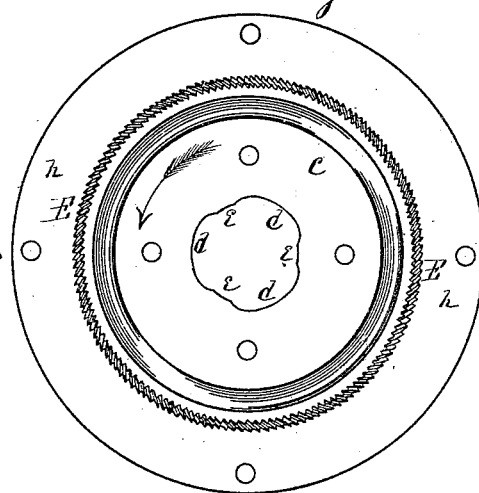
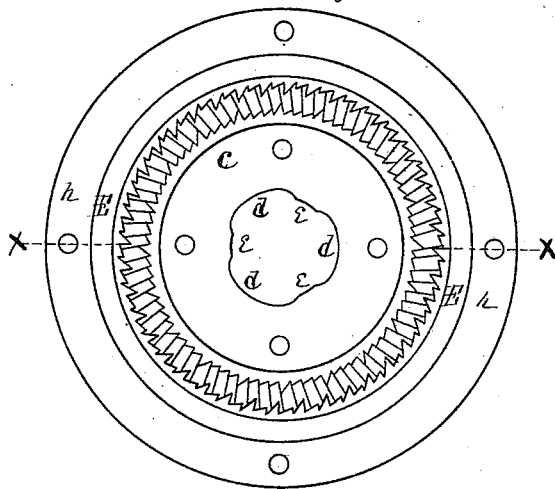
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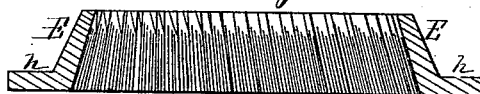
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*Fig. 5.*

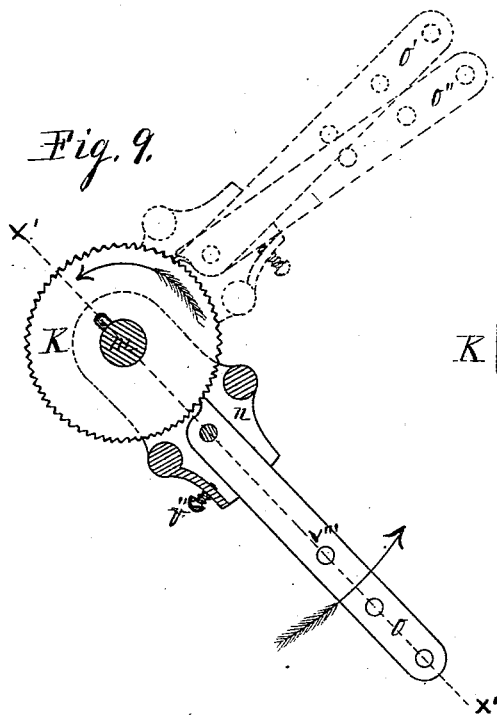
*Fig. 6.*



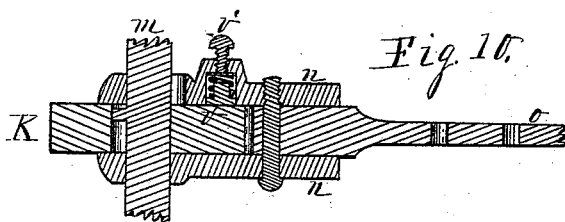
*Fig. 7.*



*Fig. 9.*



*Fig. 10.*



*Fig. 8.*



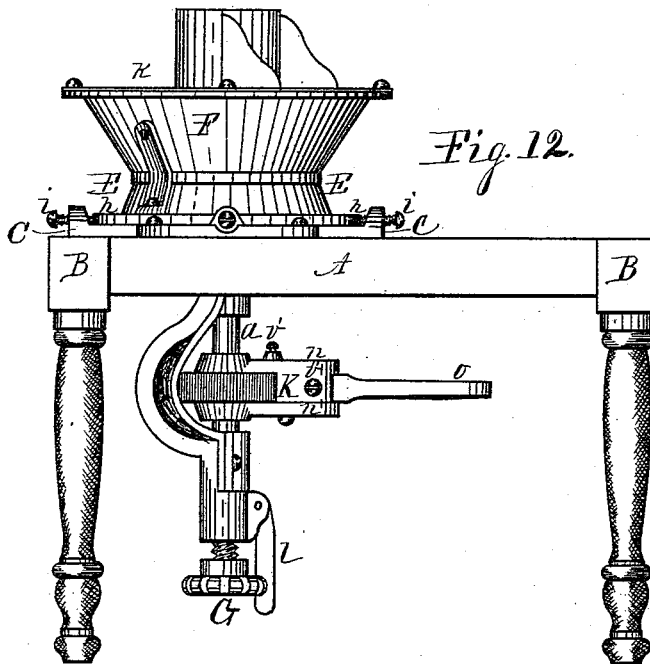
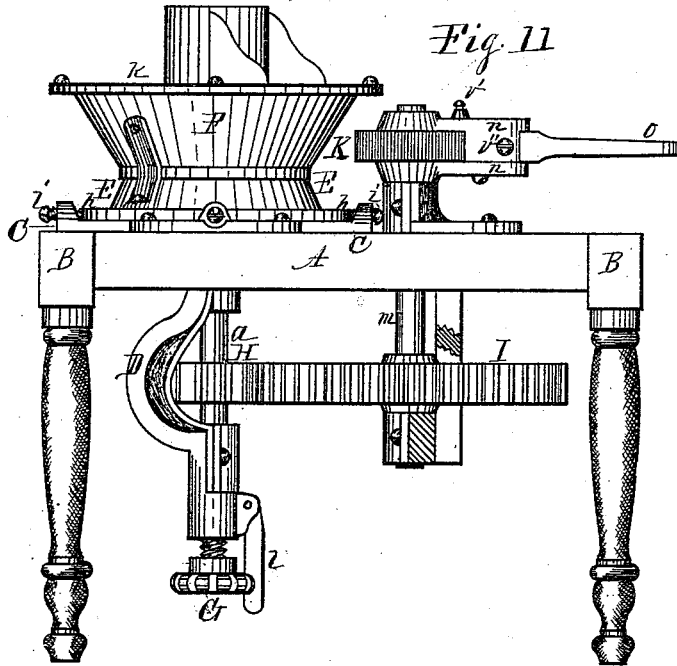
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# UNITED STATES PATENT OFFICE.

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## IMPROVEMENT IN GRINDING-MILLS.

Specification forming part of Letters Patent No. 212,049, dated February 4, 1879; application filed August 14, 1878.

*To all whom it may concern:*

Be it known that I, WALTER PECK, of the city of Rockford, in the county of Winnebago and State of Illinois, have invented a new and useful Improvement in Grinding-Mills, of which the following is a specification:

My invention relates to that class of grinding-mills in which metallic grinding-plates are employed, and are mainly used in domestic practice as feed-grinding mills. The use of this class of grinding-mills as heretofore constructed has, to a large extent, been limited to those having horse-power machines as a means by which to impart a rotary motion to the grinders. This fact has operated to prevent their general introduction and usefulness.

The object of this invention is to improve this class of grinding-mills, to produce a mill of greater capacity at a less cost, and to adapt it to use in connection with the farm-wind-mill now in general use.

To this end I have designed and constructed the machine represented in the accompanying drawings, in which Figure 1 is a plan view of my improved grinding-mill, of which Fig. 2 is an end elevation; Fig. 3, a side elevation, in which portions of the frame are broken away, and Fig. 4 a lengthwise central vertical section. Fig. 5 is a plan view of the grinding-plate rings, of which Fig. 6 is a bottom view; Fig. 7, a central vertical section of the fixed plate-ring on dotted line *x*, and Fig. 8 is an edge view of the runner or inner plate-ring. Fig. 9 is a plan view of the ratchet-wheel and lever-pawl, in which the cap over the pawl is omitted, and Fig. 10 is a central vertical section on dotted line *x'*. Figs. 11 and 12 are side elevations, showing modifications of the gearing and application of the ratchet device.

In the figures, A represents the beams of a rectangular frame, supported on posts B. C represents a bed-plate, securely fixed to the upper surface of the frame. D is a depending curved arm, secured to the bed-plate, and furnishes the bearings in which the spindle *a* is fitted to revolve. *b* is the bed-plate of the runner or live grinding-ring, which is provided with an upwardly-projecting hub, by means of which it is fixed to the upper portion of the spindle by a pin which is passed through the hub

and spindle. This bed-plate and spindle are turned up, and the hub of the bed-plate reduced to a proper size to receive the runner as cast. *c* represents the runner or live grinding-ring, which is cast of hard metal, made in the form represented in the drawings, consisting of an outwardly-inclined ring, having its outer inclined surface grooved, preferably in spiral or inclined form, the grooves being deepest and largest at the upper edge of the ring, and as they approach the lower edge of the ring the grooves, and consequently the teeth, are made smaller, less deep, and increased in number, in such a manner as to produce a complete grinding-surface.

It being impracticable to fit or true up these rings, in the usual manner, by turning, boring, or filing, I construct my patterns with a rim of uniform cross-section throughout its length, joined by a web of uniform thickness provided with a center opening of considerable size. Portions of the walls of this opening, as represented at *d*, are enlarged, leaving bearing portions at proper intervals, as represented at *e*, which are concentric with the outer grinding-surface, and receive the hub of the bed-plate *b*, turned to proper size, which serves to center the grinding-ring on the bed-plate properly, to which it is securely fixed by sufficient bolts. The enlarged portions of the center opening in the grinding-ring at *d* receive the gatings, through which the metal to form the ring is poured at a point nearest the center possible not to interfere with the bearing-points *e*, which centers it on the bed-plate, and the stubs of the gatings on the castings will not interfere with its complete centering. By this method the shrinkage in cooling will be so nearly uniform as to enable me to produce hard iron grinding-rings to any extent in exact duplicates.

*f* is a hollow conic cap, fitted to rest on the upper edge of the runner or live grinding-ring, and is held in place by a screw, which fixes it to the upper end of the spindle. The outer inclined face of this cap is provided with outwardly-projecting ribs *g*, extending from its base to its apex, which serve to agitate the grain in the hopper to prevent clogging. The spindle, with the runner and conic cap mounted

thereon, as above described, is fitted to revolve in suitable bearings in the depending curved supporting-arm D.

E is the fixed outer grinding-ring, constructed to properly receive the runner. Its inner inclined surface is provided with grooves, preferably of spiral or inclined form, inclining in the opposite direction to the grooves in the runner. These grooves are deepest and largest at the upper edge of the ring, and as they approach the lower edge of the ring the grooves and the teeth are made smaller, less deep, and increased in number, in such a manner as to produce a complete grinding-surface. This ring is also cast of hard iron, and for the purpose of preserving its perfect form in cooling, I have constructed it with a base-ring, *h*, projecting horizontally from its lower edge. This dead or fixed outer grinding-ring is fixed in position on the bed-plate C, and is made adjustable by means of the adjusting-screws *i*, for the purpose of properly centering it relatively with the runner.

F represents a hopper, supported on the fixed grinding-ring, to which it is fixed. This hopper is provided with a cover, *k*, having a central opening, from which rises an induction-tube, open on one side to admit the delivery end of a conducting-spout, which connects it with the supply-bin, from which the grain is conducted through the spout to the hopper of the grinders.

G represents an adjusting-screw, fitted into the lower end of the curved depending support D. Its upper end furnishes the support on which the spindle rests, and, by means of its screw-connection with the depending curved supports, provides for the vertical adjustment of the grinding-ring secured to the upper end of the spindle, which is accomplished by turning the screw in or out, to lessen or enlarge the opening between the inclined grinding-surfaces of the grinding-rings, to cause them to grind coarse or fine. This adjusting-screw is provided with a hand-wheel, by which it can be turned. Its periphery is notched to receive a spring-lever detent, *l*, to hold it in position when adjusted.

To the spindle *a* is fixed a gear-wheel, H, the teeth of which engage the teeth of a counter-wheel, I, which is larger than the toothed wheel H, and is fixed on the counter-shaft *m*, fitted to revolve in suitable bearings in connection with the mill. K is a suitable wheel, having its periphery finely corrugated, and is fixed to the counter-shaft *m* between lever-arms *n*, which are fitted to swing on the shaft.

*o* is a lever-pawl, pivoted between the outer ends of the swinging arms in such a manner that when in the position as represented in solid lines at *o*, Fig. 9, its inner end will engage the corrugated surface of the wheel, and when moved in the direction indicated by the arrow will cause the wheel to revolve, which motion will be imparted to the grinders through its connection therewith, by means of

the toothed gear-wheels. When moved backward from the position in dotted lines *o'* to *o''*, the point will be removed from contact with the wheel, at which point, when its movement is reversed, it will again engage the wheel to carry it with its forward movement. This action imparts an intermittent rotary motion to the grinding-ring mounted on the spindle, and will cause the grain to be ground between its grooved outer surface and the grooved inner surface of the fixed grinding-ring.

*p* is a ring, being a semicircle in cross-section, secured to or formed in the bed-plate immediately under the opening between the grinding-rings, adapted to receive the ground grain as it falls from the grinders. *r* are scrapers depending from the lower outer edge of the bed-plate *b*, and are adapted to traverse the circular groove *p*, to carry the ground grain to the delivery-spout *s*, through which it is discharged.

L represents a bell-crank lever, adapted to be pivoted at its angular point *t* to the tower of the windmill, and one of its arms pivoted to the windmill-pitman *u* at *t'*, and its other arm pivoted at *t''* to the pitman *u'*, which connects it with the lever-pawl *o*.

From this arrangement it will be seen that if a reciprocating motion be imparted from the windmill to the pitman *u*, an intermittent rotary motion will be imparted to the runner or live grinding-ring through its connection with the windmill; and if the hopper be supplied with grain, it will be ground and discharged through the spout *s*.

*v* represents a friction block or plate, provided with a spiral spring, and is fitted to enter a suitable recess made in the under side of the upper arm, *n*, in such a manner that the spring action will force the friction-block against the side of the wheel K, and is employed for the purpose of holding the lever-arms *n* with sufficient force to permit the lever-pawl to swing free from the wheel K in its backward movements, and in its forward movements to swing in contact with the wheel before moving the lever-arms.

*v'* is a set-screw, provided to operate on the spiral spring of the friction device, by which its friction force can be regulated to work properly. *v''* is an adjusting-screw, by means of which the movement of the lever-pawl on its pivotal point may be regulated to give the least practical lost motion.

By this construction I dispense with the usual spring-pawls and ratchets, or levers with pawls attached, and instead thereof I employ the lever and pawl combined in a single piece.

In this instance I have represented the wheel K, on which the lever-pawl operates to impart motion to the grinding-rings, as having a corrugated surface; but this is not absolutely essential, as it may have a smooth surface, and the lever-pawl to operate by frictional contact.

The outer arm of the lever-pawl is provided with a series of holes, as at *v'''*, by means of which the pitman connecting it with the wind-

mill may be connected closer to or farther from the fulcrum of the lever-pawl, to increase or lessen the movement of the grinders with each stroke of the pitman.

In Fig. 11 I have represented a different method of increasing the movement of the runner or live grinding-ring, which is accomplished by simply increasing the diameter of the counter gear-wheel. This change might necessitate some slight changes, such as extending the bearings in which the counter-shaft *m* revolves. The same and opposite results may, however, be attained by varying the relative size of the gear-wheels.

At Fig. 12 I have shown a modification, in which I have dispensed with the gear-wheels, and have mounted the wheel K and the lever-pawl directly on the spindle of the grinding-rings. By this arrangement I produce a cheap and efficient mill of sufficient capacity for most purposes.

I have represented my mill as designed to be operated by pitman-connection with the primemover; but it may be employed by means of gearing, or belt-connection with the mover, as is common in such or similar machines, in which instance the movement of the grinders may be continuous rotary, instead of the intermittent movement described.

I claim as my invention—

1. A hard-iron grinding-ring constructed with an outer grinding-rim, the periphery of which is outwardly inclined and provided with oblique or inclined grooves, while the web of the ring is formed with three or more bearing-surfaces concentric with the hub of the bed-

plate, to which it is secured, substantially as set forth.

2. In a grinding-mill, the combination, with the spindle and a bed-plate provided with an upwardly-projecting hub, which is secured to the spindle, of a grinding-ring constructed with a flat web, which is seated on the upper horizontal face of the bed-plate, and the central portion of the web fitted to the hub portion of the plate, said grinding-ring formed with a grinding-rim which is outwardly-inclined, and provided with oblique or inclined grooves, substantially as set forth.

3. The combination, with the spindle, grinding-ring *e*, grinding-ring bed-plate *b*, hollow conic cap *f*, the latter attached to the top of the spindle and arranged within the hopper, of the fixed supporting bed-plate C, provided with a depending curved arm for supporting the spindle, and fixed grinding-ring, adjustably secured to bed-plate C by set-screws *i*, substantially as set forth.

4. The combination, with the grinding-ring, and the hollow conic cap secured to the upper end of the spindle, of the bed-plate C, the spindle, and the curved spindle-support attached to said bed-plate C, substantially as set forth.

5. The combination, with the fixed and rotary grinding-rings, of the spindle, toothed adjusting-screw G, and lever-detent *l*, for securing the screw in any desired position, substantially as set forth.

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