# W. PUTNAM & W. H. SCOTT.

## Apparatus for Reducing Grain by Cutting-Action.

**No. 218,194.** **Patented Aug. 5, 1879.**

FIG. 1.

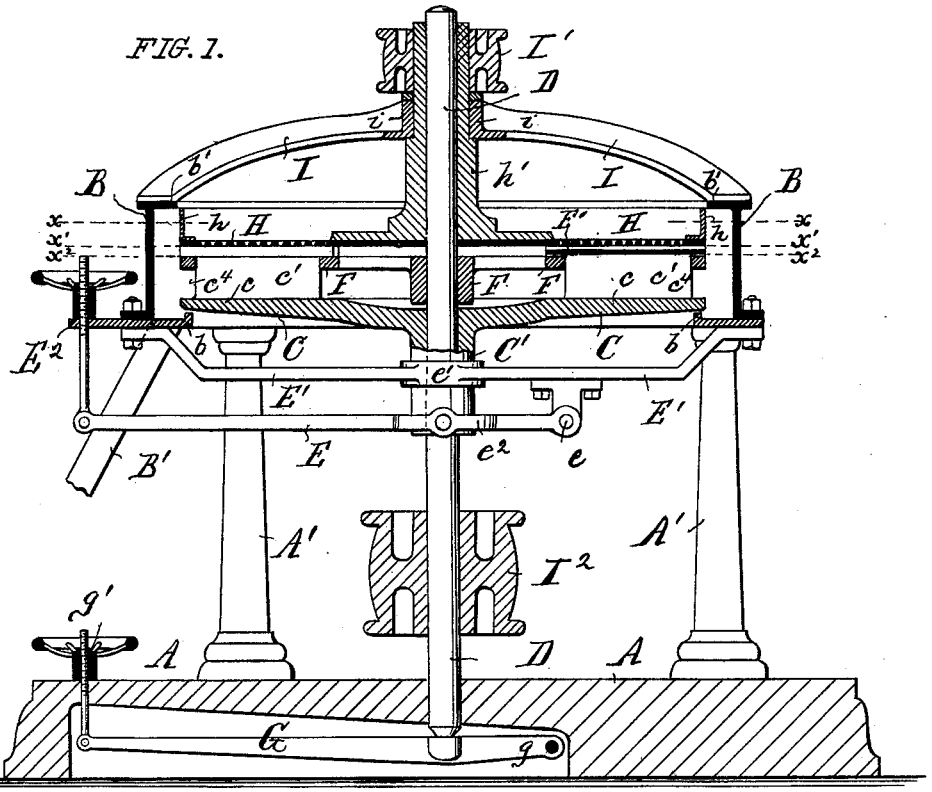



FIG. 4.

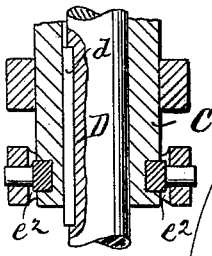
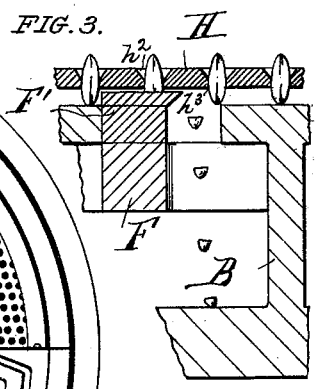



FIG. 2.




FIG. 3.

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## IMPROVEMENT IN APPARATUS FOR REDUCING GRAIN BY CUTTING ACTION.

Specification forming part of Letters Patent No. **218,194**, dated August 5, 1879; application filed May 15, 1879.

*To all whom it may concern:*

Be it known that we, WILLIAM PUTNAM and WILLIAM H. SCOTT, both of St. Louis, Missouri, have invented an Improved Machine for Cutting Wheat or Grain, of which the following is a specification.

The object of our invention is to subject wheat or grain to a cutting action (in contradistinction to the ordinary grinding mode effected by millstones) in order to convert each kernel into transverse cut sections, and produce a product of said cut particles preparatory to further subjecting said product to the ordinary rolling, separation, and purification processes.

We will first fully describe the construction and operation of our improvements, also the advantages derived from using the same, and hereinafter point out the novel features thereof in the claims.

Of the drawings, Figure 1 is a sectional elevation taken on a line through one of the knives, and in a diagonal direction through the gage-head. Fig. 2 is a horizontal section, the half of the perforated plate being taken on line *x x*, Fig. 1, the quarter-plan views of the knife-head and gage-head parts being taken, respectively, on lines $x^1$ $x^1$, $x^2$ $x^2$, Fig. 1. Fig. 3 is an enlarged detail section to illustrate the position of the kernel with relation to the cutters or knives to produce the cross-cut action. Fig. 4 is an enlarged detail, showing the engagement of the sleeve of the gage-head with the spindle.

A represents a suitable foundation to support the operating parts. A′ represents the columns, to the top of which the casing B is secured stationary. The casing B incloses the chief operating parts, which we shall term, respectively, the "gage-head," the "knife-head," and "grain-head." Also, said casing forms a housing for the cut wheat, which is discharged through the chute at B′. The casing B is therefore cylindrical, open at top and bottom, and has the flanges at *b b′*, as shown.

C represents the gage-head, employed as a means to gage, graduate, and determine the cutting action of the knife-head. The gage-head, in its entirety, consists of a circular metallic disk, *c*, having the hollow sleeve C′. Further, the disk *c* has cast upon its face the seats $c^1$, to which the follower-plates $c^2$ are secured. The seats $c^1$ are vertical bearings, preferably made to have the constructive shape shown in Figs. 1 and 2. The plates $c^2$ are correspondingly shaped to close the top of the seats $c^1$, and it will be noted that between each of the seats and plates there exists an open space, $c^3$, to receive and permit the operation of the knife-head and gage-head to be independent of each other when said parts are adjusted, as will hereinafter appear; also, through said open spaces the dropping of the cut sections takes place. At $c^4$ (see Fig. 1) the disk *c* above it has its side open for the cut wheat (which falls on said disk) to effect its discharge from the machine. Thus constructed, the gage-head C is fitted by its sleeve C′ on the spindle D, the latter having a key, *d*, to fit in the keyway existing in the sleeve. (See Fig. 4.) The gage-head can therefore have two distinct actions—that of revolving with the spindle, and also be vertically adjustable along the same.

The adjustment of the gage-head is done by operating the lever E, which is pivoted at *e* to a hanger, $E^1$, the collar $e^1$ of which loosely encircles the sleeve. (See Fig. 1.) The lever E likewise can have a collar at $e^2$ fitted to engage an annular groove made in the sleeve C′; or, by means of pins engaging said annular groove, the required joint of the lever with the said sleeve is made to permit the gage-head to revolve, also be vertically adjustable by simply raising or lowering the lever. To secure the lever E in adjusted position, its forward end has a hand-screw engaging a proper bearing, (see $E^2$, Figs. 1 and 2.)

F represents in its entirety the knife-head, and is employed for the purpose of cutting the wheat or grain crosswise. The knife-head simply consists of a wheel-shaped casting, F, and to the top of its tangentially-arranged arms the cutters or knives F′ are secured. The arms of the casting F (with the knives when placed in the spaces $c^3$, that, as previ-

ously stated, exist in the gage-head) still leave sufficient clearance or open space in front of the knives for the dropping of the cut grain. (See Figs. 2, 3.)

The knives are steel, with a keen or sharp cutting-edge, in manner shown in Fig. 3. This cutting-edge exists the entire length of the knife. Each knife has also the same inclination as the tangent of the arms of the casting. (See Fig. 2.)

The draft here given to each knife is such that it can best impart a decisive draw-cut, and at all times present the cutting edge to the grain when operating.

The knife-head thus constructed is fitted by its hub stationary on the spindle D, so as to revolve with same, also be capable of vertical adjustment.

The adjustment of the knife-head (raising and lowering it) is done by the means which support the upright shaft or spindle D.

By referring to Fig. 1, the lower end of the spindle is shown as resting in the bearing of a lever, G, which is pivoted at *g*, and adjustably secured by the stem *g* and wheel-screw *g'*.

As apparent, the lever G is raised to raise the spindle, and consequently raise the knife-head, and said parts are lowered in lowering the lever. This adjustment of the knife-head is independent of the gage-head.

The purpose of the vertical adjustment of the knife-head just described is to bring it close up to the perforated plate of the grain-head and obtain a perfect working fit of said parts, consistent with the revolving action.

H (see Figs. 1, 2, 3) represents the grain-head, and is employed specially for the purposes of causing each kernel to assume a vertical position and retain it in said position preparatory and until it has been completely cut crosswise into horizontal layers or sections or particles by the action of the revolving knife-head.

The grain-head, in its entirety, consists of a perforated circular plate having the rim *h*, and to said plate is secured a sleeve, $h^1$. (See Figs. 1, 2, 3.) By the addition of the rim *h* the grain-head forms a receptacle to receive and contain the grain.

The perforations consist of a twofold construction—first, the countersunk face at $h^2$, and the farther straight or vertical face at $h^3$, as indicated in Fig. 3.

The purpose of the countersunk part is to freely permit the kernel (or grain) to tumble into or enter the opening, and, further, in seeking a passage through the straight part of the perforation, assume a perpendicular position.

The straight face of the perforation positions the kernel perpendicularly, holds it so, and permits its lowest part always to project below the opening, or until said projection has been properly cut. (See Fig. 3.) We therefore lay stress upon the described construction of the perforations, as it facilitates and better enables us to accomplish the object of our invention—viz., to cause each grain to fall lengthwise at right angles to the cutting-edge, in order to be divided into two or more equal slices or sections without any of its particles being reduced to flour.

I is a hanger to suspend the grain-head and permit the same to be revolved. The collar *i* of the hanger engages an annular groove (or collar) of the sleeve of the grain-head. This latter, by its pulley $I^1$, is independently revolved. The knife-head and gage-head are revolved by power applied to the pulley $I^2$, near lower end of the spindle.

All the parts being thus constructed and arranged, the operation is as follows: The wheat or grain is first sampled as to size, and different-sized perforated plates can be provided to suit the grain to be cut. The grain is fed upon the perforated plate or grain-head. The power is started that operates the pulleys. The pulleys can be made to revolve in opposite directions—that is, the grain-head made to revolve in opposite direction from that of the gage-head and knife-head, both said latter revolving together in the same direction; or all the revolving parts of the machine can revolve in the same direction, but with different speed, producing the like results, the revolution of the grain-head being to take the renewed feed of grain all the time, while that of the gage and knife heads being to produce the required cutting action. The knife-head should be adjusted to revolve as close to the perforated plate as possible, in order to avoid breaking or grinding the grain. The adjustment of the gage-head should be such as to expose the grain or kernel properly below the cutting-edge of the knives, and determine their cutting action and the size of the product to be produced. The cut sections of the kernels immediately drop down upon the disk of the gage-head, to be from thence by centrifugal action discharged from the machine. Stationary partitions can be provided in the grain-head to prevent an obstruction to the grain and keep the same agitated, and the better to drop into the perforations.

Our machine in operation does not grind or flour the grain, but simply cuts it, and the cut product produces a greater quantity and better quality of pure middlings. This result is due to the fact that each cut particle has the ends of the shell or hide broken, and hence when said cut particles are subjected to rolls a better grade of pure middlings is obtained. After rolling, the further processes of separation and purification are resorted to in the customary manner.

What we claim is—

1. The gage-head C, consisting of a disk, *c*, carrying elevated plates $c^2$, the sleeve C', the knife-head, consisting of the casting F and cutters F', the spindle D, and the adjusting-lever E, all said parts being combined to operate in the manner and for the purposes set forth.

2. In a machine for cutting grain, the combination of a grain-head, consisting of a perforated disk or plate, the knife-head, consisting of a casting carrying cutters, the gage-head, consisting of a disk having the raised plates with spaces between, together with a revolving spindle and adjusting mechanism, substantially as herein shown and described.

In testimony of said invention we have hereunto set our hands.

WM. PUTNAM.
WM. H. SCOTT.

Witnesses:
WILLIAM W. HERTHEL,
JOHN W. HERTHEL.