(No Model.)

# R. WILCOX & S. L. PHILLIPS.

## MACHINE FOR REDUCING WHEAT AND ANALOGOUS GRAIN.

No. 359,586. Patented Mar. 15, 1887.

Fig. 1.

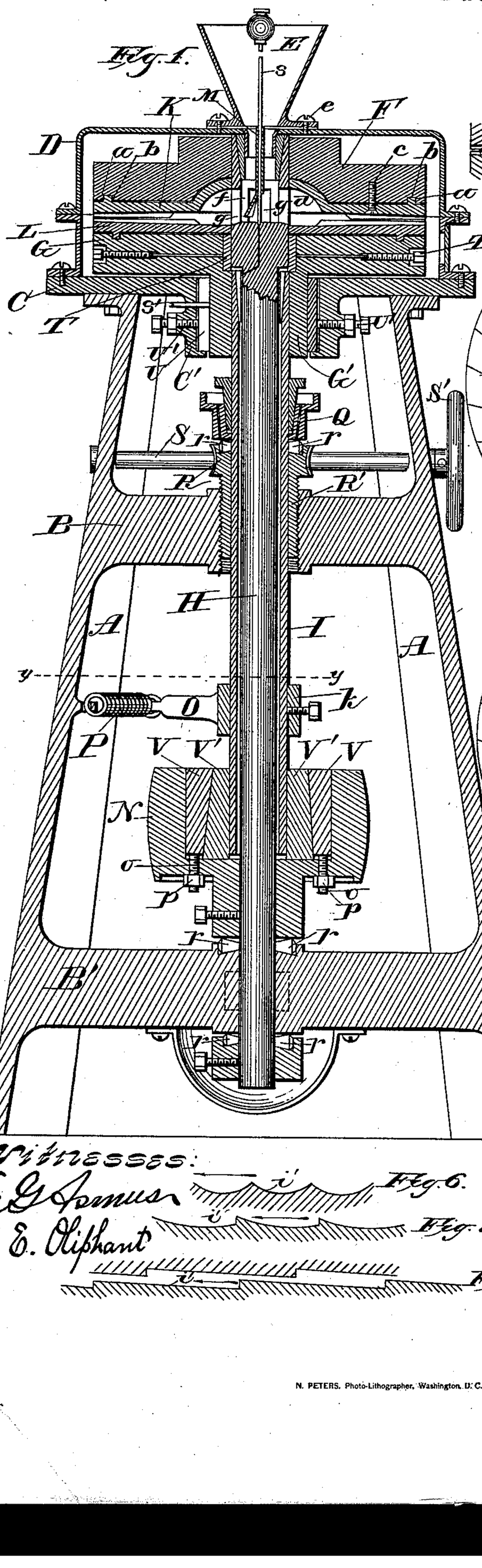



Fig. 2.

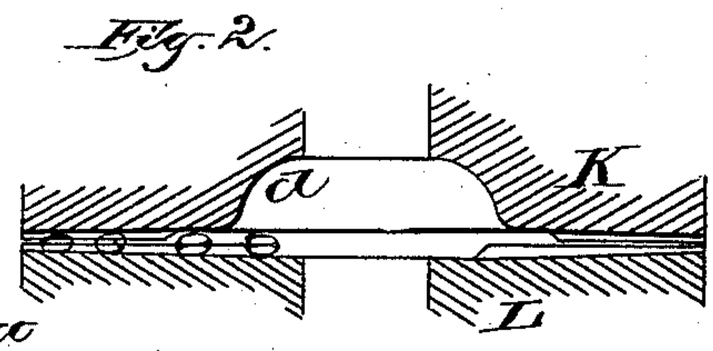



Fig. 3.

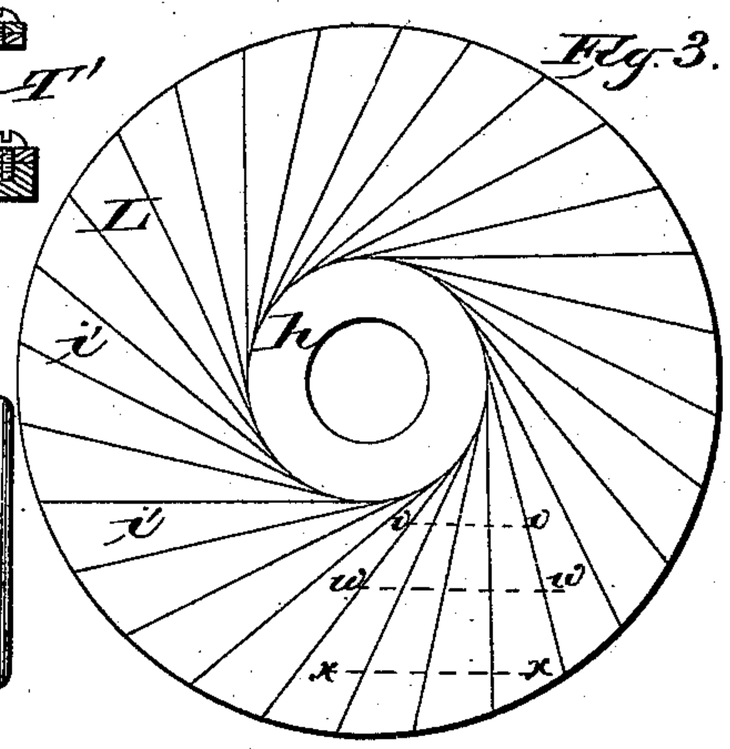



Fig. 4.

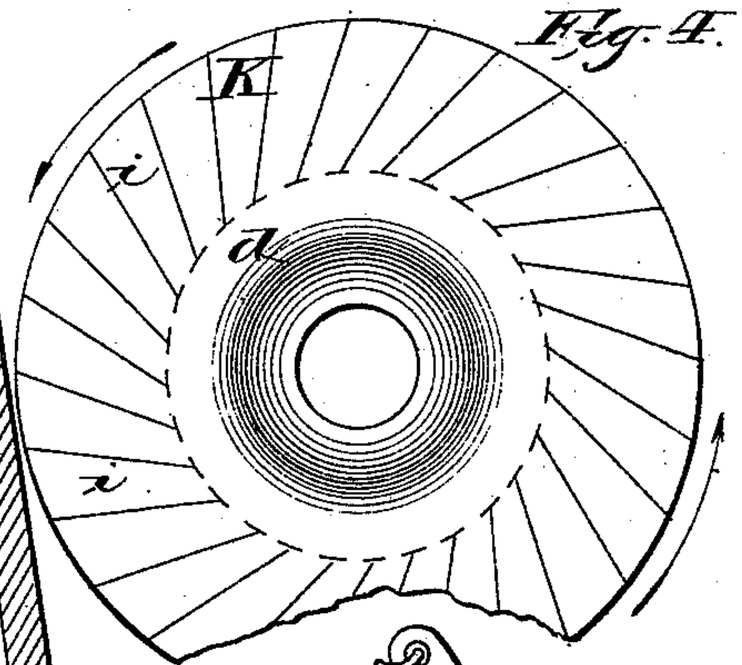
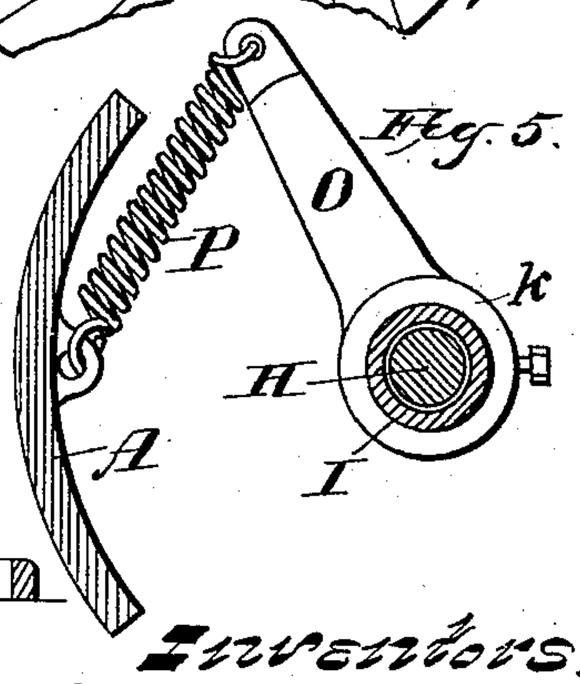



Fig. 5.




Witnesses:
E. G. Spencer
N. E. Oliphant

Fig. 6.




Fig. 7.




Fig. 8.

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# UNITED STATES PATENT OFFICE.

RANSFORD WILCOX AND SAMUEL L. PHILLIPS, OF MILWAUKEE, WISCONSIN.

## MACHINE FOR REDUCING WHEAT AND ANALOGOUS GRAIN.

SPECIFICATION forming part of Letters Patent No. 359,586, dated March 15, 1887.

Application filed April 10, 1886. Serial No. 198,447. (No model.)

*To all whom it may concern:*

Be it known that we, RANSFORD WILCOX and SAMUEL L. PHILLIPS, of Milwaukee, in the county of Milwaukee, and in the State of Wisconsin, have invented certain new and useful Improvements in Machines for Reducing Wheat and Analogous Grain; and we do hereby declare that the following is a full, clear, and exact description thereof.

Our invention relates to machines for the reduction of wheat and analogous grain prior to grinding, and has for its objects to rapidly disintegrate the kernels without making flour, thus aiding to secure a purer grade of the ground product than is usually the case.

This we obtain by the construction to be hereinafter described with reference to the accompanying drawings, making part of this specification, in which—

Figure 1 represents a vertical transverse section of our machine; Fig. 2, a diagram in cross-section of the disk-faces; Fig. 3, a plan view of the lower disk-face; Fig. 4, a similar view of the upper disk-face; Fig. 5, a detail sectional view on line *y y*, Fig. 1; Figs. 6, 7, and 8 diagram sections respectively taken on lines *v v*, *w w*, and *x x*, Fig. 3.

Referring by letter to the drawings, A represents the standards, and B B′ the bridge-pieces, that form the supporting-frame of our machine. Bolted or otherwise suitably secured to the upper flanged ends of the standards A is a horizontal table, C, that has a depending hub, C′. Detachably connected to the table C is a sectional casing, D, and to the top of this casing is suitably secured a hopper, E. The casing D incloses two parallel disks, F G, that are, respectively, keyed to vertical spindles H I. The spindle I for the lower disk is entirely hollow, while the spindle H of the upper disk is solid throughout the greater portion of its length and partially inclosed by the one I.

The disks F G are preferably provided with detachable chill-cast faces K L, that are secured in position by any suitable means, those shown consisting of annular ribs *a*, that fit corresponding grooves *b* in the main portions of the respective disks, and countersunk screws *c*, that serve to bind the parts firmly together. By the construction just described the disk-faces are readily replaced at a comparatively small cost when worn or fractured. The upper disk-face has its bosom *d* hollowed out to allow for the feed of the grain from the hopper E, the latter being usually provided with a downward extension, *e*, designed to fit within the bored-out enlarged upper portion, *f*, of the spindle H, said enlarged portion of this spindle having passages *g*, through which the grain finds its way to the bosom *h* of the lower disk-face.

To prevent the grain from clogging in its descent from the hopper and at the same time insure an equal distribution through the spindle-passages *g*, we may employ a suitable regulator, M, the one shown consisting of a hollow central stem having angular wings that extend down into the bored-out portion of the spindle H.

A series of tangential furrows, *i i′*, form the respective skirts of the disk-faces K L, said furrows being narrow and concave at the peripheries of the bosoms *d h* and gradually increase in width, while at the same time they decrease in concavity until, as the circumferences of the disks are approached, each furrow assumes the form of an inclined plane, this construction being best illustrated by the diagram views, Figs. 6, 7, and 8.

The disk-furrows just described are preferably smooth and highly polished, the greater the degree to which this finish is attained the better the result desired to be accomplished by our machine. This peculiar construction of the disk-faces facilitates the feed of the grain from the bosoms toward the circumferences of the skirts and prevents the kernels from being split prior to reaching the inclined planes, the latter being most clearly shown by Fig. 8. Keyed to the solid or inner spindle, H, is a pulley, N, designed to be rotated at a comparatively high speed by belt-connection with another pulley on a drive-shaft, (not shown,) thus imparting a similar rotation to the upper disk, F, in a direction from right to left.

Thus far our present machine corresponds to the one described and illustrated in our application, No. 198,448, for a patent for a similar machine, filed this same date.

Keyed to the hollow or outer spindle, I, is the collar *k* of an arm, O, and the outer end,

*m*, of this arm is made fast to one extremity of a spring, P, the other extremity of the latter being made fast to one of the standards A of the machine or similar stationary fixture. The upper disk being rotated, as above described, causes the grain that feeds down from the hopper to travel in the furrows of the disk-faces K L toward their circumferences, and is rolled from one to the other of the smooth polished surfaces, thereby preventing the making of flour, there being no perceptible attrition. As the grain approaches the circumferences of the furrowed disk-faces the kernels are severally caught between the opposing inclined planes at the outer termini of the furrows and continue to be rolled as before described. By the rotation of the upper disk, F, the lowest points of the inclined planes on its face K, at the outer termini of the furrows *i*, will successively approach and pass the highest points of the similarly-located planes of the furrows *i'* on the disk-face L, thereby gradually contracting the intermediate spaces between these opposing inclined planes. This approach of the opposing inclined planes toward each other acts to exert a gradual pressure on the kernels and cause them to split apart at their seams without being crushed.

Should the grain at any time accumulate between the opposing disk-faces in such quantity as would tend to clog and prevent the rolling movement of the kernels from furrow to furrow, the lower disk will be actuated and yield in a direction with the line of travel of said upper disk, to thereby cushion the stroke of the latter and render such clogging impossible, thus preventing grinding and the consequent making of flour, as would be otherwise the case. After this operation has been accomplished and the pressure of the upper disk has been compensated for the contracting force of the spring P brings the disk back to its normal position. The split kernels fall upon the table C between the peripheries of the disks F G and casing D, and from this point may be carried off by any convenient means to suitable receptacles.

The spindle I has keyed thereto a collar, Q, that bears against a worm-wheel, R, the latter having a screw-threaded hub, R', operative in a corresponding socket in the bridge-piece B. The worm-wheel R meshes with a worm-shaft, S, having its bearings in the standards A, and provided with a hand-wheel, S'. By operating this worm-gear the lower spindle, G, may be vertically adjusted to vary the space between it and the upper one, F, according to the grade of grain to be reduced.

If desired, the grain after having been split, as above described, may be again passed through the machine one or more times, and thus further disintegrated, the proper vertical adjustment of the lower disk being effected to accomplish such operation.

The eye of the disk G is downwardly extended, and forms the bore of a hub, G', said extension of the eye being somewhat reduced in diameter. In the eye of the lower disk, G, are inserted truing-blocks T, that bear against the spindle H, and are adjusted by screw-rods T', that extend through said disk. The lower end of the spindle is trued by a similar mechanism operative in the bridge-piece B'.

The outer spindle, I, is trued at its upper end by means of blocks U and adjusting-screws U', said blocks being located between the hub G' of the disk G and the hub C' of the table C, the adjusting screws being passed through the latter. The lower end of the spindle I is trued by wedge-blocks V V', located in the pulley N, the outermost of these blocks having screw-threaded extensions *o*, that receive suitable nuts, *p*, the latter serving to secure the necessary adjustment. To overcome friction, we insert cones *r* between the parts that would otherwise come in direct contact, and through the medium of suitably-arranged tubes *s s'* lubricant is conducted from oil-cups to the parts necessary to be lubricated.

Having thus fully described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. In a machine for reducing wheat and analogous grain, the combination of two parallel disks having their opposing faces provided with a suitable dress, means for imparting a continuous rotary motion to one of the disks, and means for holding the other of said disks normally stationary while permitting a movement thereof in a direction with the travel of the former, as and for the purpose set forth.

2. In a machine for reducing wheat and analogous grain, the combination of two parallel disks having their opposing faces provided with tangential furrows that assume the form of inclined planes at their outer termini, means for imparting a continuous rotary motion to one of the disks, and means for holding the other of said disks normally stationary while permitting a movement thereof in a direction with the travel of the former, as and for the purpose set forth.

3. In a machine for reducing wheat and analogous grain, the combination of two parallel disks having their opposing faces provided with a series of tangential furrows that are narrow and concave at their inner extremities, and gradually increase in width while decreasing in concavity until their outer termini assume the form of inclined planes, means for imparting a continuous rotation to one of the disks, and means for holding the other of said disks normally stationary while permitting a movement thereof in a direction with the travel of the former, as and for the purpose set forth.

4. In a machine for reducing wheat and analogous grain, the combination of two parallel disks having their opposing faces provided with a suitable dress, a worm-wheel and shaft arranged to vertically adjust the lower disk, means for imparting a continuous rotation to one of the disks, and means for holding the

other one thereof stationary while permitting it to yield in a direction with the travel of the former, as and for the purpose set forth.

5. In a machine for reducing wheat and analogous grain, the combination of two parallel disks having their opposing faces provided with a suitable dress, a pulley keyed to the spindle of one disk for operative connection with a driving-pulley, an arm extended from the spindle of the other disk, and a suitable spring connecting said arm and a stationary fixture, as and for the purpose set forth.

6. In a machine for reducing wheat and analogous grain, two parallel disks having their opposing faces provided with a suitable dress, the upper disk having a solid spindle and the lower disk having a hollow spindle that surrounds the solid one, in combination with a pulley keyed to the solid spindle for operative connection with a driving-pulley, an arm having a collar that is keyed to the hollow spindle, and a suitable spring connecting said arm with the machine-frame, as and for the purpose set forth.

In testimony that we claim the foregoing we have hereunto set our hands, at Milwaukee, in the county of Milwaukee and State of Wisconsin, in the presence of two witnesses.

RANSFORD WILCOX.
SAMUEL L. PHILLIPS.

Witnesses:
H. G. UNDERWOOD,
N. E. OLIPHANT.