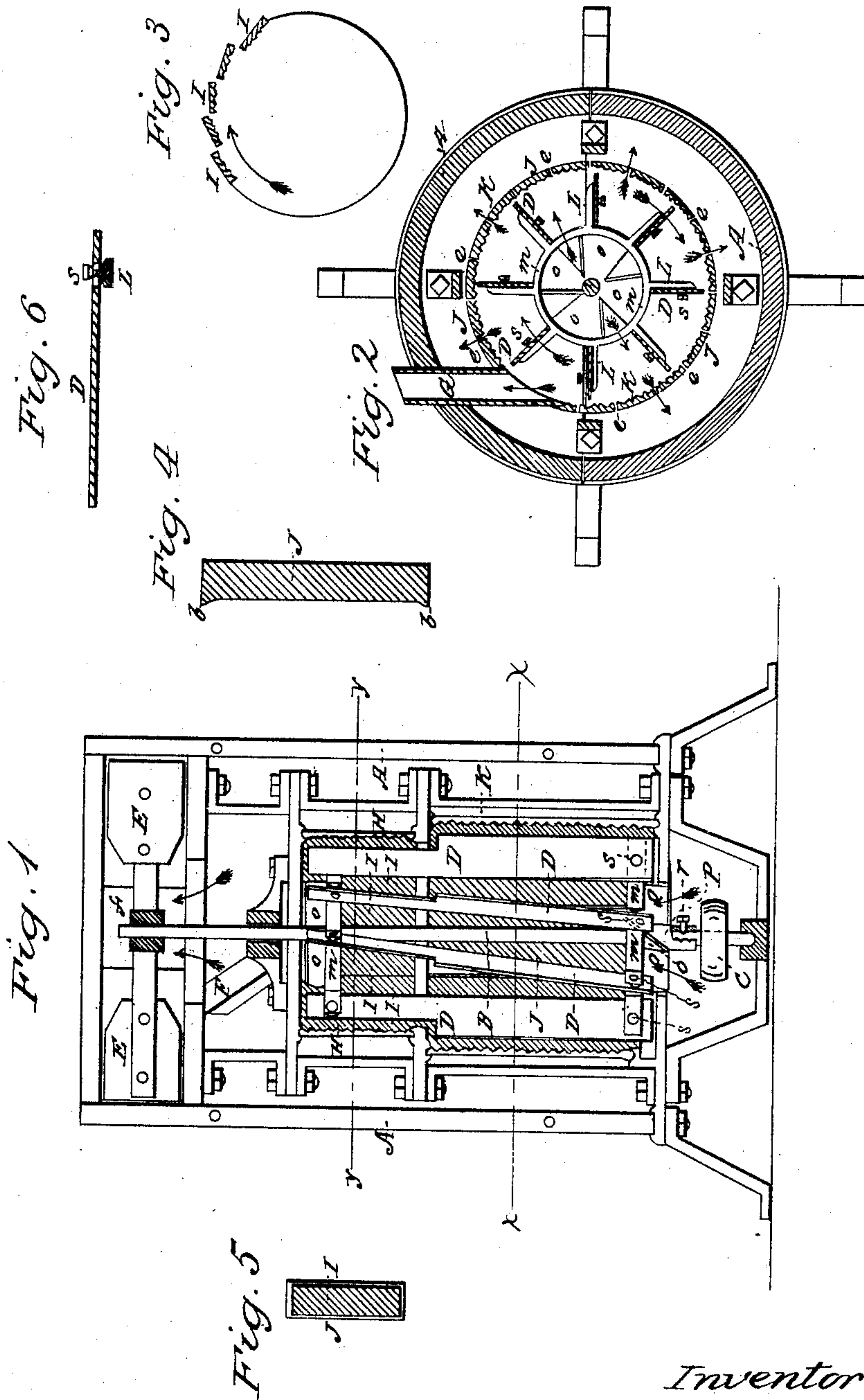


ALLEN & MARSHALL.

Smut Mill.

No. 63,355.

Patented April 2, 1867.



Witnesses:

Jay Kipatt.
Albert Haight.

Inventors:

Isaac L. Allen
Geo. W. Marshall
by J. Maser & Co., Attys

United States Patent Office.

ZADOCK G. ALLEN AND GEORGE W. MARSHALL, OF BUFFALO, NEW YORK.

Letters Patent No. 63,355, dated April 2, 1867; antedated March 18, 1867.

IMPROVEMENT IN SMUT MACHINES.

The Schedule referred to in these Letters Patent and making part of the same.

TO ALL WHOM IT MAY CONCERN:

Be it known that we, ZADOCK G. ALLEN and GEORGE W. MARSHALL, both of Buffalo, in the county of Erie, and State of New York, have invented certain new and useful Improvements in Smut Machines; and we do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1 is a vertical section of our machine.

Figure 2 is a horizontal section on the line $x x$ of fig. 1.

Figure 3 is a diagram showing the manner of setting the corrugated plates of the upper section of the concave, being a section on the line $y y$, fig. 1.

Figure 4 is an elevation of one of the corrugated plates which compose the lower concave K, detached.

Figure 5 is a like elevation of one of the plates of the upper concave H.

Figure 6 is a section lengthwise of one of the adjustable beaters, and across the arm, showing their adaptation to the required adjustment.

Like letters of reference designate corresponding parts in all of the figures.

Our machine consists essentially of a tight cylindrical case, A A, preferably made of wood, divided into two equal vertical sections, which are connected by dowels and hoops, clamps, or other equivalent device, said case enclosing a suction fan, a beater frame, and two iron scouring cylinders or concaves, of different size and construction, as will be more fully described hereafter. A central vertical shaft or spindle, B, provided with the driving pulley C, carries the beaters D and the fan E. The fan revolves in a close chamber at the top of the case, provided with a discharge or dust pipe, f . The air is received through a central opening at the bottom surrounding the shaft B, as indicated by arrows, and is drawn upward through the two concaves and the fan case to the dust pipe. The grain is admitted through the induction pipe F, at the top of the upper concave, and delivered through the eduction pipe G, placed tangentially at the bottom and periphery of the lower concave. The concaves are constructed of a series of iron plates or sections, having their interior faces corrugated obliquely, as shown most clearly in figs. 4 and 5. The angle of inclination is upward, in relation to the direction in which the beater shaft revolves, so that the grain which is thrown against them glances upward, and is kept longer exposed to the action of the machine. The plates of the upper concave H are placed eccentrically, as shown in fig. 3, so as to present their edges to the grain as it is thrown from the revolving beaters, and a slight space is left between each, through which the dust passes tangentially, the interstices not being large enough to admit the kernels. The edges of these plates or sections are not serrated, but present a uniform line at their inner surface, as seen at j , fig. 5, the object of which is to present abrupt barriers, against which smut balls and other pulverulent foreign matter will be broken, by being thrown violently against them by the beaters. The lower concave K is formed of iron plates, corrugated in like manner, set concentrically, and far enough apart to allow a small space for the escape of the dust, as shown by the spaces $e e$. Each plate is formed with a projection from one edge at the top and bottom $b b$, fig. 4, to insure the leaving of this space. The grooves of the plates J J run obliquely, and in the same direction, relative to the rotation of the beaters, as in the upper concave; but these grooves extend from edge to edge of the plates, dispensing with the barrier j , which is not required in this concave, the function of which is to subject the grain to long-continued scouring and abrasion, which is most completely effected by the continuity of the upwardly inclined grooves of the plates, which guide or carry upward the grain thrown in contact with them so long as the force which it receives from the motion of the beaters keeps it from falling. The beaters consist of broad, flat plates or slats D, preferably eight in number, connected with radial arms L, which project outwardly from rings $m m$, which are attached to the central shaft B by scroll-shaped wings $o o$, starting from a hub thereon, the further purpose of which will be presently explained. The office of the beaters being to throw the grain against the plates which form the concaves H K, it is obvious that some means are essential for regulating this action so that different qualities of grain may be subjected to the abrasion for longer or shorter periods, as their condition may require. Thus smutty grain which is damp may require a long process of scouring, while that which is dry is quickly cleaned; and to place it within the power of the attendant to regulate the period which the grain remains in the machine, we make the beater slats adjustable from a perpendicular position to one inclined either forward, with reference to their

direction of rotation, or backward, as shown in fig. 1. This is accomplished by making the lower hub P adjustable on the shaft B, so that, by loosening the set-screw *r*, it may be turned in either direction, to give the required inclination to the slats. In order to adapt the fastening to this purpose the face of the arms L L may be bevelled, as shown in fig. 6, and the heads of the bolts *s* may be conical, when, with a slight elongation of the holes through the slat for said bolts, a free adjustability is obtained. It is obvious that a forward inclination of the beater slats will tend to carry the grain upward as it is thrown off centrifugally, and the upward inclination of the grooves in the concave serves to continue this direction so long as the grain does not fall, as previously explained; while, if the slats are set to a backward inclination, the grain is thrown downward, striking across the corrugations, by which it sooner falls to the bottom and is swept out through the discharge spout. The spiral wings *o o*, filling the opening in the bottom around the shaft B, serve the double purpose of forcing air into the concave, or aiding the current produced by the suction fan E, and of preventing any of the grain from falling through this opening. Such kernels as fall in this direction strike the wings and are thrown back on to the floor of the concave, when they are swept out of the spout by the slats D D. There is no partition between the upper and lower concaves, the same beater extending through both, being adapted to the greater diameter of the lower by increasing the width of the slats in a corresponding degree. The diameter of the upper concave is necessarily less, in consequence of its different office—that of breaking the smut balls and other refuse—as a speed like that required in the larger concave for scouring would be sufficient to pulverize a portion of the wheat, if employed in the upper concave.

What we claim as our invention, and desire to secure by Letters Patent, is—

1. We claim the combination of the upper and lower concaves H K, the former of lesser diameter, with the beaters D D, or their equivalent, when arranged and operating in the manner specified.
2. We also claim the adjustable beater slats D D, in combination with the concave formed of the obliquely corrugated iron plates or sections I I and J J, substantially as described.
3. We also claim, in combination with the fan E and beater shaft B, the spiral wings *o o*, operating substantially for the purposes described.

In witness whereof we have hereunto signed our names in the presence of two subscribing witnesses.

Z. G. ALLEN,
GEORGE W. MARSHALL.

Witnesses:

J. FRASER,
JAY HYATT.