A. DUNCAN.

Smut Machine.

No. 36,285. Patented Aug. 26, 1862.

Fig. 1.

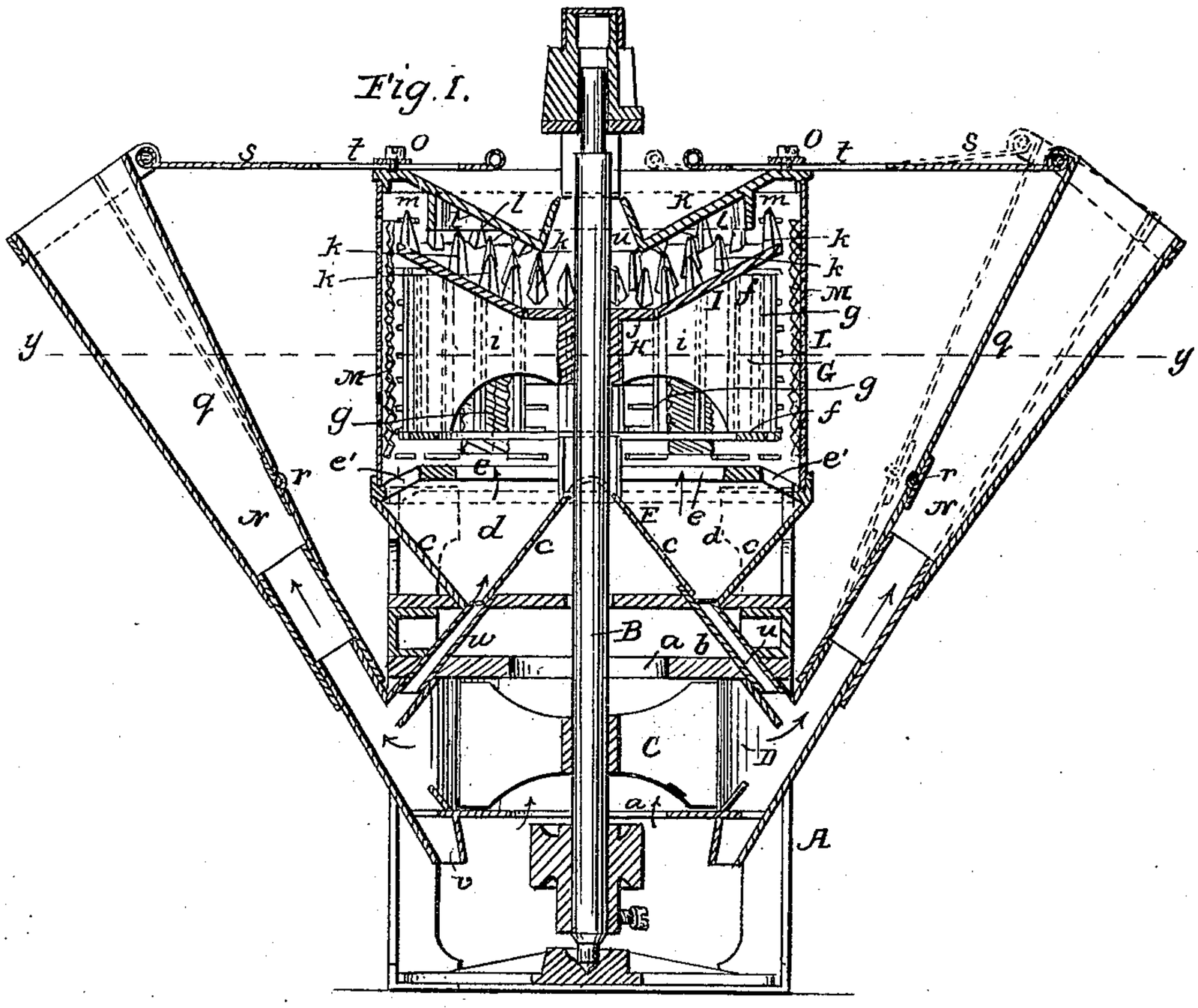


Fig. 2.

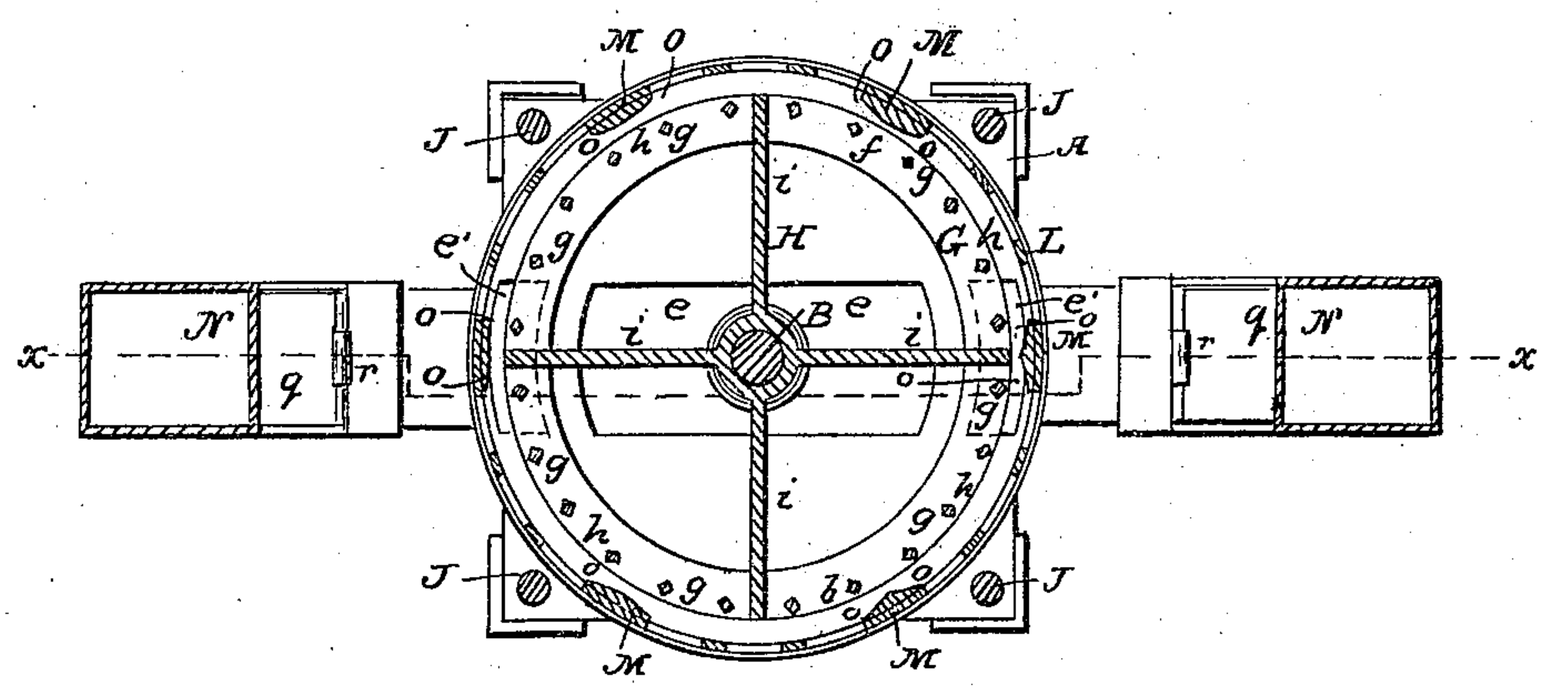
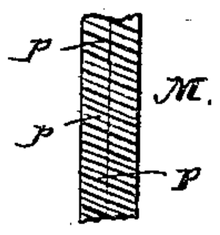


Fig. 3.



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UNITED STATES PATENT OFFICE.

ALEXANDER DUNCAN, OF YORK, PENNSYLVANIA.

IMPROVEMENT IN SMUT-MACHINES.

Specification forming part of Letters Patent No. **36,285,** dated August 26, 1862.

To all whom it may concern:

Be it known that I, ALEXANDER DUNCAN, of York, in the county of York and State of Pennsylvania, have invented a new and Improved Smut-Machine; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 is a vertical central section of my invention, taken in the line *x x*, Fig. 2; Fig. 2, a horizontal section of the same, taken in the line *y y*, Fig. 1; Fig. 3, a detached view of a portion pertaining to the same.

Similar letters of reference indicate corresponding parts in the several figures.

This invention consists in the employment or use of a rotating concave spike-beater, stationary convex toothed plate, vertical beaters, fans, and expanding blast-spouts, arranged in such a manner that the grain will be subjected to a thorough scouring and perfectly cleansed and separated from smut and other impurities.

To enable those skilled in the art to fully understand and construct my invention, I will proceed to describe it.

A represents the frame of the machine, which may be constructed in any proper way to support the working parts, and B is a vertical shaft, which is fitted centrally in the frame A, and has a blast-fan, C, on its lower part, said fan being inclosed within a cylindrical case, D, into which air is admitted through apertures *a a*, one at its upper and the other at its lower end, as shown in Fig. 1. The upper aperture *a* is made in a horizontal plate, *b*, in the frame A, against which plate the upper edge of the case D abuts, and on the upper part of frame A there is placed a horizontal plate, E, which is connected with a box, F, that forms, by means of four inclined bottoms, *c*, two air-chambers, *d d*, each of which has two orifices, *e e'*. (See Fig. 1.)

On the vertical shaft B, above the plate E, there is secured a cylinder, G, which is formed of two annular plates or rims, *f f*, having vertical rods *g* attached to them, the latter forming the periphery of the cylinder G, and placed at such a distance apart as to admit of spaces *h* between them, as shown in Fig. 2. The rims *f f* of the cylinder are connected to the shaft A by radial arms *i*, which are sufficiently broad or deep to serve as a fan (designated by H.) The inner orifices, *e*, of the air-chambers *d d* are within the lower rim, *f*, and the orifices *e'* at its outer side.

On the shaft B and just above the top rim *f* of the cylinder G there is permanently secured a plate, I, the upper surface of which is of concave form, it being a frustum of a hollow cone, the bottom *j* being a circular plane surface, and the inclined sides provided with vertical spikes *k*, of taper quadrangular form, (pyramidal,) as shown in Fig. 1. These spikes are placed in concentric circles extending from the circular plane surface *j* to the upper edge of plate I, the spikes being disposed in quincunx form.

At each angle of the plate E there is secured a vertical rod, J. These rods have screw-threads cut on their upper parts, below which there are shoulders to form bearings for a plate, K, which has a convex under surface or face side corresponding to the upper or face side of the plate I. (See Fig. 1.) The under surface of the plate K is toothed, as shown at *l*, and the teeth being in concentric circles and directly over the centers of the spaces between the spikes *k* of the plate I. The plate K is also provided with a circular pendent rim, *m*, at its under or face side, which projects down between the two outermost circles of spikes *k*. This pendent rim *m* is corrugated or toothed at its inner surface. The plate K is secured or held in proper position on the rods J.

L represents a curb or hollow cylinder of sheet metal, which is perforated, as shown at *m*, and has vertical bars M attached to its inner surface at suitable distances apart. The bars M are beveled at their inner surfaces or face sides, as shown at *o o* in Fig. 2, and these beveled surfaces have teeth *p* formed on them in an inclined position, but parallel with each other, as shown in Fig. 3.

N N are two blast-spouts which are placed at opposite sides of the frame A and communicate at their lower ends with the fan-case D. The spouts N have an inclined position, and the upper parts, *q*, of their inner sides work on joints or hinges *r*, the parts *q* being allowed to work into the spouts, so as to increase or diminish their capacity. The upper parts of the spouts N have bars *s* attached to them, which project over the plate K and are secured thereto

by set-screws O, said set-screws passing through oblong slots *t* in the bars *s*, which admit of the latter being adjusted farther in or out from the frame A, and consequently admit of the spouts N being adjusted more or less inward, so as to regulate the discharge of foreign substances therefrom as circumstances may require, as will be fully understood by referring to Fig. 1. The lower parts of the air-chambers *d d* communicate by means of spouts *u u* with the lower parts of the spouts N N, and the lower ends of the latter project down below the fan-case D and communicate with the external air, as shown at *v v* in Fig. 1.

The operation is as follows: The grain to be cleaned passes down through a circular opening, *w*, at the center of the plate K and falls upon the circular horizontal bottom *j* of said plate. The shaft B is rotated by any convenient power, and the grain is, owing to the centrifugal force generated by the rotation of the plate I, forced up between the spikes *k*, which, in connection with the teeth *l* of the plate K, scour the grain, breaking up or pulverizing the smut. The pendent rim *m* prevents the grain passing over the tops of the spikes *k*. The grain passes off the edge of the plate I and is thrown into the cylinder G by the teeth *p* on the beveled surfaces *o o* of the bars M, the rods *g* serving as beaters and acting upon the grain as the latter passes between them. The dust, pulverized smut, &c., are driven out through the perforated curb or hollow cylinder L by the fan H, and the grain passes down into the air-chamber *d d*, being subjected to a blast therein, which is induced upward therein by the rotation of fan H. The grain passes down through the spouts *u u* into the spouts N N, and is there subjected to a second blast, produced by the rotation of the fan C, the remaining impurities being driven out through the upper ends of the spouts N N, and the cleansed grain discharged at the lower ends, *v v*, of said spouts. By altering the capacity of the latter, through the medium of the adjustable parts *q* of the inner or back parts of the spouts N N, the draft therein may be regulated as desired, and the discharge of the foreign substances also regulated as desired by adjusting the spouts N in a more or less oblique position.

By having the plates I K made, respectively, of concave and convex form, as set forth, the passage of the grain between them is considerably retarded and the scouring operation rendered far more efficient than it otherwise would be, and in consequence of having the fan H arranged and combined with the beater-cylinder H, as described, the dirt is expelled simultaneously with the beating operation and a very compact arrangement of means obtained for the purpose.

I do not claim, separately, a toothed scouring-plate; nor do I claim the fans and spouts irrespective of the construction and arrangement herein shown and described; but

I do claim as new and desire to secure by Letters Patent—

1. The rotating concave plate I, provided with a circular horizontal bottom, *j*, and vertical spikes *k*, in connection with the stationary plate K, provided with the teeth *l* and a pendent rim, *m*, arranged as and for the purpose specified.

2. The cylinder G, formed of the annular rims *f f*, connected by the vertical rods or beaters *g*, and provided internally with the fan H, in connection with the perforated curb or hollow cylinder L and bars M, having beveled toothed surfaces *o o*, arranged as herein set forth.

3. The combination of the air-chambers *d d*, blast-spouts N N, and fans H C, arranged with the cylinder G, to operate in conjunction therewith, as and for the purpose specified.

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