2 Sheets—Sheet 1.

H. HELM.

Smut Machine.

No. 3,078.

Patented May 8, 1843.

Fig. 1

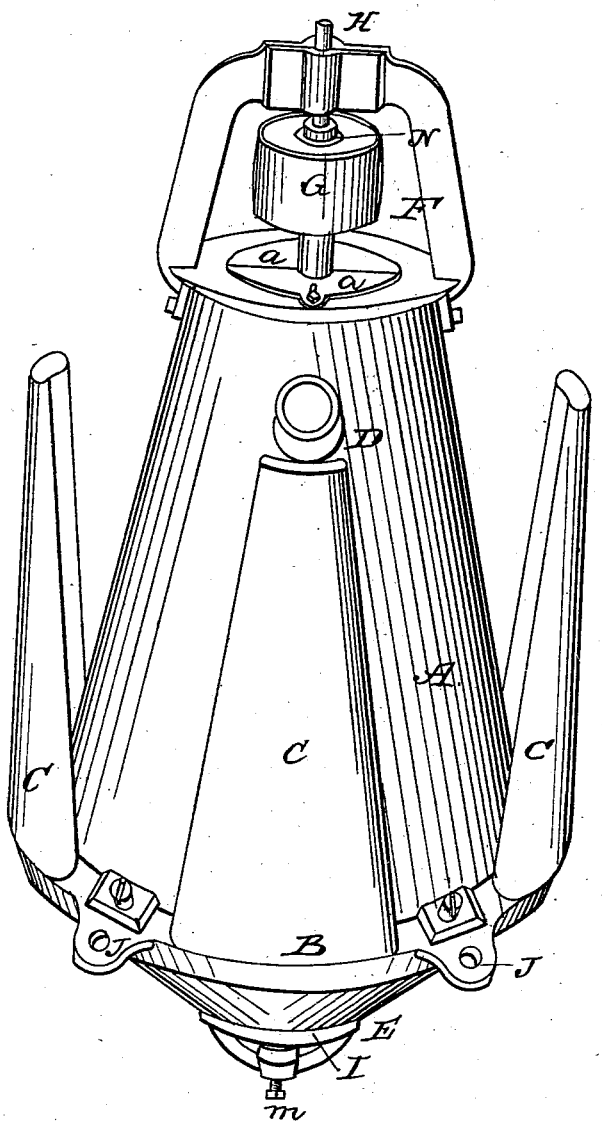
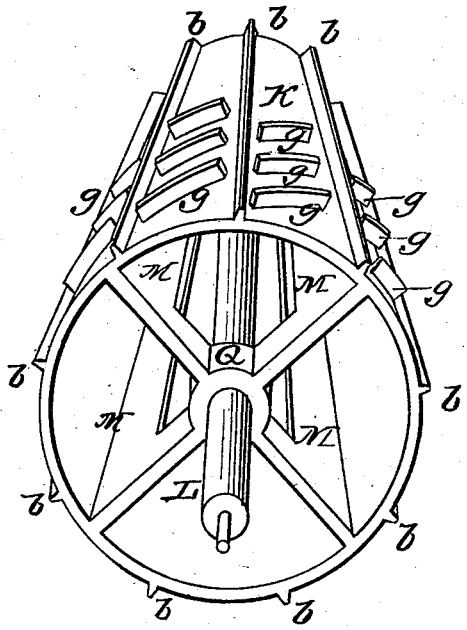


Fig. 2



2 Sheets—Sheet 2.

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Fig. 4

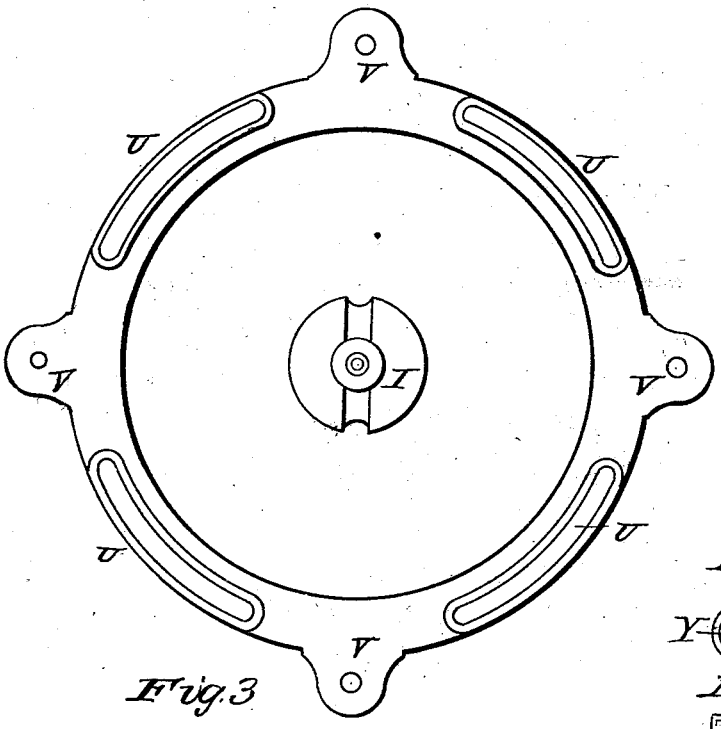
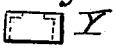
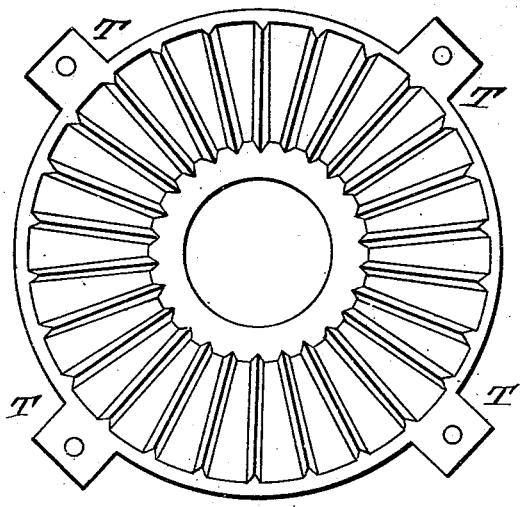


Fig. 3

Fig. 6.

Fig. 5





UNITED STATES PATENT OFFICE.

HENRY HELM, OF WHEELING, VIRGINIA.

SMUT-MACHINE.

Specification of Letters Patent No. 3,078, dated May 8, 1843; Antedated November 8, 1842.

To all whom it may concern:

Be it known that I, HENRY HELM, of the city of Wheeling, in the county of Ohio and State of Virginia, have invented a new and useful Machine for the Purpose of Cleaning Wheat and other Small Grain, called "Helms Smut Machine;" and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawings, making a part of this specification, in which—

Figure 1,—is a perspective view, Fig. 2, a perspective view of the inside cone, Fig. 3, is a transverse view of the bottom of the outer cone A, showing the interior, Fig. 4, is a transverse view of the bottom B. Fig. 5 is a transverse vertical view of ferrule. Fig. 6, a horizontal transverse view of ferrule.

Fig. 1 A, is the outside cone which is made of cast-iron; on the inside of this cone, there are projections cast called fillets running from the base to the top, the form of which are triangular and about 2 inches apart at base, and projecting $\frac{3}{8}$ of an inch as represented in Fig. 3. On the bottom of the outside of cone A there are four lugs T, T, T, T, for the purpose of bolting it to the bottom B, with four screw bolts. At the top of cone A, there is an opening the diameter corresponding with the opening in the top of the cone K Fig. 2; over which there are two slides or dampers *a*, *a*, in which there are two slats to permit them to slide in or out from the center for the purpose of regulating the current of air created by the fan M, M, M, M, in Fig. 2.—The cone, lugs and fillets, all cast in one piece.

B, is the bottom, on the inside of which at the top part there is a projection or flange about $\frac{3}{8}$ of an inch thick projecting in towards the center sufficient to receive or leave a bearing for the base of cone A, Fig. 1. Through this flange are oblong apertures U, U, U, U, as shown in Fig. 4; these are $1\frac{1}{2}$ inches wide and extending from lug to lug V, V, V, V, having a projection around each aperture of $1\frac{1}{2}$ inches high and $\frac{1}{4}$ of an inch thick to receive pipes C, C, C, C.

At the lower part of B at I there is an opening of about 9 inches diameter for the purpose of letting the wheat pass through and for the machine to receive a current of air sufficient to prevent any dirt or white-caps from passing through with the wheat. Across the opening I, there is a stirrup E, cast on B, which is drilled out $1\frac{1}{4}$ inches diameter and two inches deep for the purpose of receiving a step made of cast-steel which is $1\frac{1}{2}$ inches long and turned to fit the hole in the stirrup. The step has a hole drilled in each end $\frac{3}{8}$ of an inch deep and $\frac{5}{8}$ diameter and flat on the bottom; when one end has worn too large it can be turned upside down; also the cast-steel foot P, Fig. 2, drove out by means of a hole drilled in shaft L, and reversed; thereby renewing the foot and step. In the side of the step there is a groove cut to receive the point of a screw to prevent it from turning. In the bottom of the stirrup there is a screw M, for the purpose of raising or lowering the cone K, Fig. 2, setting it coarse or fine as may be necessary to break rat dirt, or other dirt that may be longer or larger than a grain of wheat.

G Fig. 1, is a pulley made of cast iron bored out to fit on shaft L, at N, and turned perfectly true and fastened with a key.

F is an arch for the purpose of supporting the center H, by having a recess made in it and a cap fastened with two screws and reamed out true, with the inside of cone A, and with the step in stirrup E. Center H, Fig. 1, may be made of cast-steel, or wrought iron, case hardened, and turned 4 inches long tapering at the lower end to enable it to be drawn out of the composition that is cast around it in the end of shaft L, at N, Figs. 1 and 2.

Fig. 1, J, J, are lugs or projections cast on B, as represented in Fig. 4 at V, V, V, V, for the purpose of bolting the machine down to a frame or to the floor.

C, C, C, C, Fig. 1 are four sheet-iron or tin-pipes, made oblong at the lower end to fit on flanges or projections U U, U, U, Fig. 4, being smaller at the top than the bottom varying in proportion to the size of the machine so as not to choke the draft of air created by the fans M, M, M, M, Fig. 2.

Fig. 2, K is the inner cone that revolves inside of cone A, and is about three inches smaller in diameter at the base than the cone A, and three and a half inches in diameter at the top than the top of cone A. On the inside of cone K, Fig. 2, there are four fans extending from the top to the base, of an equal distance apart, $3\frac{1}{2}$ inches wide at base, and $1\frac{1}{2}$ inches at the top; the edge next to the cone is $\frac{1}{4}$ of an inch thick and $\frac{1}{8}$ of an inch thick at the inner edge. This fan may be made straight or spiral. Extending from

the inner edge of the fans to the eyes Q Q, into which the shaft L, is fastened to, there are four arms at top and four at bottom the eyes or centers are bored out and the shaft L, turned to fit and fastened by means of a key at Q, and at the upper end by a screw the end of which is inserted in shaft L, through the eye at the upper end. The fans and arms are all cast to the cone K. On the outside of cone K, there are extending in a perpendicular direction from the base to the top of cone, strips or beaters *b*, *b*, *b*, *b*, *b*, *b*, *b*, *b*, *b*, ¼ of an inch thick and 1 inch wide at the base of cone K, and 1¼ inches wide at the top of cone, of an equal distance apart and projecting edgewise. In between each of these strips or beaters *b*, *b*, there are three or more pieces *g*, *g*, *g*, *g*, the width of strips *b*, *b*, cast on the outside of cone K, at an angle of about 40 degrees with a line drawn parallel to the base.

The diagonal pieces *g*, *g*, *g*, are ¼ of an inch thick extending within an inch of the strips *b*, *b*,; they are intended to prevent the wheat from passing through too rapidly and to cause it to rebound against the outside cone A, Fig. 1.

L, Fig. 2,—is a cast iron shaft; in the upper end at N, there is a hole cast in it 4 inches deep and 1½ inches diameter, leaving a space of ¼ inch around the upper center H, in Fig. 1, around which I cast a composition of lead, zinc and block tin ⅓ of each by means of a ferrule of which Figs. 5, and 6, are sections. This composition when it wears out can be replaced by the miller without getting a new shaft.

Figs. 5 and 6, are sections of a ferrule 2 inches deep and 3½ inches diameter having on the top at Y, Fig. 5, a groove forming a cup with a hole *h*, in it to run the composition in at. The inside of the ferrule is bored out 1½ inches deep to fit the end of shaft L, at N, with a small hole the diameter of center H, drilled perfectly true with the inside that fits on the shaft at N. The shaft L, Fig. 2, is placed in its proper place in Fig. 1. The ferrule Fig. 5, and 6, is placed on the shaft L, at N, and the centers H, placed in arch F, Fig. 1, and inserted into the shaft through the ferrule to the bottom of the hole in shaft L, at N; after the cap of the center has been screwed to arch F, the composition is run into the shaft L, at N, through the hole in the ferrule; then after the composition has become chilled center H is drawn out, the ferrule taken off and the center and pulley replaced.

Operation of the machine.—The machine is to be inclosed in a box made of boards or plank and made so tight that the dirt can not fly through into the mill. It is inclosed from the base of the cone to the top and about 4 feet square at the bottom. At the upper edge of the box there is a spout leading out from it about 10 inches square for the purpose of conducting off the white caps and dust; directly below this spout there is another in the bottom of the box on the same side of it for the purpose of conveying the heavy particles that may collect in the bottom of the box; the lower spout to be placed at an angle sufficient to prevent it from choking. The machine is propelled by means of a leathern strap or band running on the pulley as shown in Fig. 1. The inner cone revolves from 500 to 700 revolutions per minute varying in proportion to the size of the machine. The wheat passes in at the spout D, Fig. 1, through a tin funnel or small hopper; as soon as the wheat enters between the inner and outer cones it is distributed around the inner cone, and the beaters cause it to rebound back and forth in its downward passage through the machine, the diagonal pieces on the inner cone retaining it long enough to work off the white caps, the fuzz or fibrous covering on the end of the wheat, and the dust or duskiness off of the wheat also breaking the smut; this is effected by the concussion it receives in passing through the space between the cones; the wheat falling down through the hole in the bottom perfectly cleaned from dust dirt or smut. The smut dust and white caps are blown from the wheat by means of the fan in the inside of the inner cone and carried out at the sheet-iron pipes. The fan creating a vacuum around the axis of the shaft, causes a strong current of air to pass up through the hole in the bottom, sufficient to prevent any dust or white caps from passing through with the wheat and likewise creating a strong draft through the opening in the top of the center and inner cone. If the wheat is very dirty, the dampers at the top of the outer cone should be closed to change the current of air between the two cones upwards aided by the diagonal pieces on the inner cone and by means of a vacuum formed at the top of the cone by the fan. When the wheat is very dirty and I want to run a greater quantity through I leave the damper open and let the air in at the top which produces a current downwards between the inner and outward cones aiding the wheat to pass through more rapidly.

When the machine is in motion, the air produced by the fan is confined on the inside of the cone until it passes out at the base the pressure of the air operating in a perpendicular direction on the inside cone and buoying it up; the fan having to meet with no more resistance in putting the air in motion than what is sufficient to blow out the dust, not operating like ordinary fan having a great body of air to put in motion to produce the same effects. The air created by my fan operates more on the principle

of a whirlwind or tornado when set in motion, it meets with little resistance and consequently takes about ½ the power to run it that the ordinary machine requires and producing a stronger draft.

What I claim as my invention and which I desire to secure by Letters Patent are—

1. The fans M, M, M, M, on the inside of the inner cone K, constructed as set forth.

2. I also claim the diagonal pieces *g*, *g*, *g*, *g*, on the outside of the inner cone K, in combination with the said inner cone.

3. I also claim the mode of carrying the dust, dirt and smut and white caps from the machine through apertures in the bottom B, through the pipes *c*, *c*, *c*, *c*, in combination with the inner and outer cones.

4. I claim the dampers *a*, *a*, likewise, which are for the purpose of changing the current of air at the top of the machine or cone A, Fig. 1, in combination with inner and outer cones constructed and operated as set forth.

HENRY HELM.

In presence of—
JAMES S. WHEAT,
THOS. RIDGWAY, Jr.