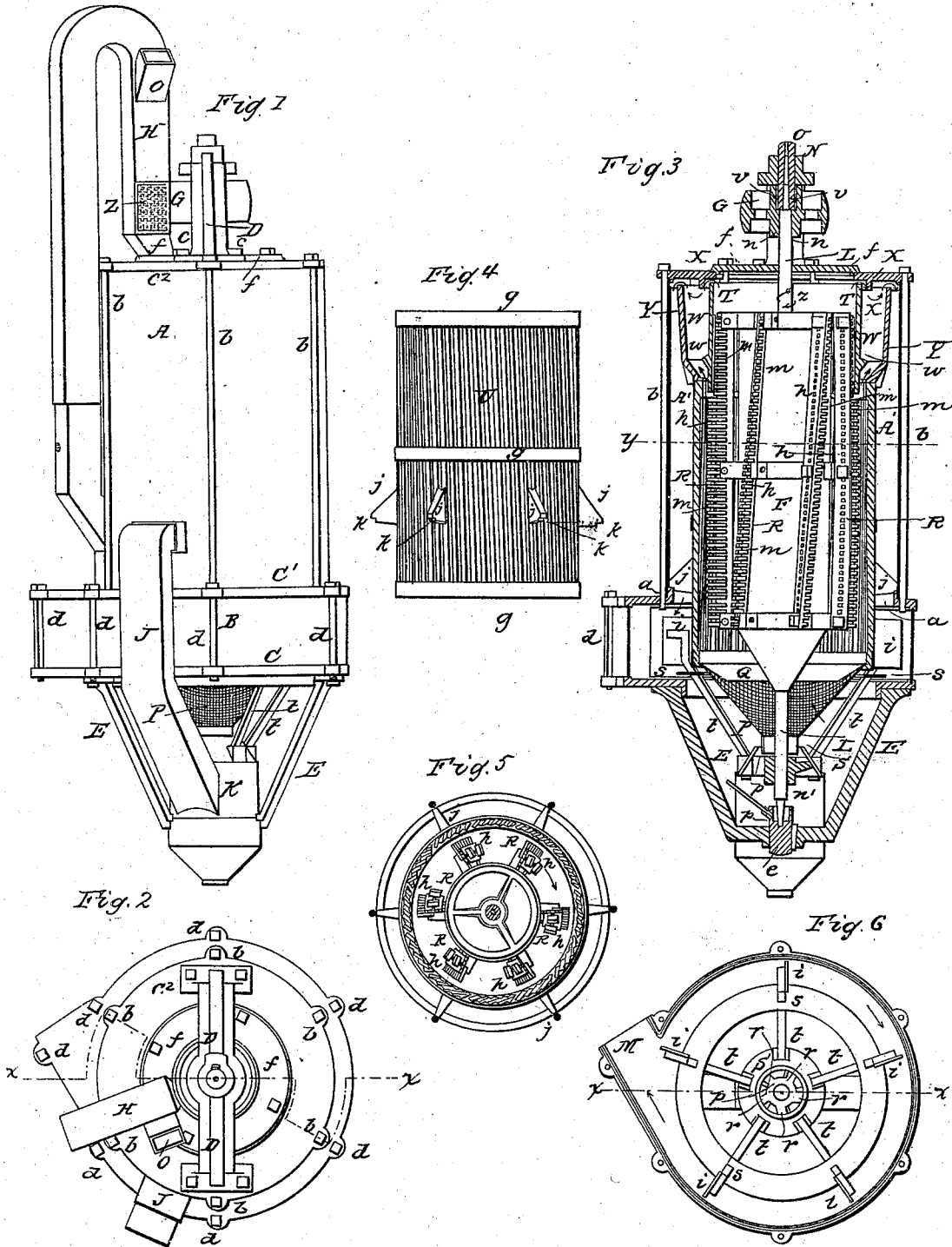


N. PLATT.
Smut Mill.

No. 8,097.

Patented May 20, 1851.



UNITED STATES PATENT OFFICE.

NELSON PLATT, OF OTTAWA, ILLINOIS.

SMUT-MACHINE.

Specification of Letters Patent No. 8,097, dated May 20, 1851.

To all whom it may concern:

Be it known that I, NELSON PLATT, of Ottawa, in the county of La Salle and State of Illinois, have invented certain new and useful Improvements in Smut-Machines; 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, which form part of this specification, and in which—

Figure 1 represents an elevation of the machine complete; Fig. 2, represents a plan of the same; Fig. 3, represents a vertical section of the machine at the red lines $x x$ of Figs. 2 and 6, with the exception of the cylinder with its beaters, which is shown in elevation; Fig. 4, represents an elevation of the spiral fluted cylinder or shell, which surrounds the beaters; Fig. 5, represents a horizontal section of the machine at the red line y, y , in Fig. 3; and Fig. 6 represents a plan of the fan and case surrounding it.

The same letters in the several figures indicate the same parts.

My smut machine consists of a series of mechanical devices constructed, arranged, and combined in a manner not heretofore known for the purpose of cleansing wheat and other grain from dirt, dust, and smut; and which, while acting upon the most approved principles, performs the work more effectually and with less breakage of the grain than any machine heretofore in use, while at the same time its operation is such that the impurities separated from the grain do not tend to escape into the room where the machine is set up, but are conducted out of the building or into some suitable receptacle provided for the purpose.

The machine consists of a case into which the unclean grain is fed, within which it is acted upon by a series of moving and stationary beaters contained therein, and to the action of a current of air produced within the case, and from which the clean grain and the impurities separated therefrom are discharged through separate orifices.

In the accompanying drawing C is the base plate of the machine, it is of annular form and constitutes the lower head of the case in which the fan wings act. The upper head C² of this fan case is similar in form to the lower and is separated therefrom by a scroll of sheet metal B, which forms the outside of the fan case. These heads are of such form and the sheet iron is so adapted

thereto that an orifice M is formed at one side of the case through which the currents of air generated by the fan and the impurities drawn off therewith are discharged from the machine into a trunk or pipe which conducts them to the outside of the mill or other building in which the machine is set up, or into some suitable receptacle provided for the purpose thus preventing the spreading of the dust within the building, the oil by which the pivot of the shaft is lubricated. The upper pivot of the shaft is lubricated by introducing oil through the tubular brass, and the oil thus introduced is prevented from escaping by means of an oil cistern v which is secured to the shaft and is formed in this example in the hub of the driving pulley G to which the power is applied. The sides of this cistern extend upward as high as the upper extremity of the pivot of shaft, and its diameter is such that the tubular brass N enters easily in it so that the upper pivot of the shaft runs in oil throughout its whole extent.

The upright shaft carries the beating cylinder and the fans by means of which the current of air is generated. The beating cylinder F consists of a drum, which, commencing at a short distance beneath the top plate C², extends downward to about the middle of the fan case. This drum is closed at its lower extremity by a conical head, and at its upper extremity by a dishing head. A series of comb formed beaters R are secured to lugs projected through the barrel of the beating cylinder from the heads or arms to which the barrel is secured; these beaters are formed by securing teeth m of nail-rod or other suitable material to flat bars or strips h , which are set in oblique positions, and which not only support the teeth but act as wings to facilitate the ascent of the currents of air in the machine an object which it is believed has not hitherto been as effectually accomplished as it is with my machine. The edges of the sheet iron scroll B are received in corresponding grooves cast in the inner faces of the heads, and the heads are secured to each other by bolts d which pass through ears projecting from their edges.

The fan-case is surmounted by a cylindrical sheet iron casing A whose lower edge rests upon the upper head C' of the fan case, while its upper extremity is closed by the top plate C², or upper head of the

machine. This sheet iron cylinder or casing is maintained in place by ring flanges, one of which *a* is cast fast to the upper face of the upper head, *C'*, of the fan-case, and the other flange is cast fast to the lower face of the top-plate *C*². The latter has a large circular opening therein which is closed by lids *f*, and this plate and the cylinder are secured to the upper head (*C'*) of the fan case by tie rods or bolts *b*. An upright shaft *L* extends through the case thus described; its lower extremity is stepped in a box *e* which is supported by a bridge tree *E* secured to the base plate (*C*) of the machine; the upper extremity of the shaft is supported by a tubular brass *N* which is inserted through and secured in a bridge tree *D* attached to the top plate (*C*²). The lower box or step (*e*) of this shaft has a cistern *p* formed in its upper face to contain and to discharge portions thereof outward. The teeth of each comb are divided into two sections, those of the upper section, which constitutes about a quarter of the whole length, being shorter than those of the lower.

The longer teeth of the beating combs act in combination with a fluted hollow cylinder *U*, which extends upward from a short distance above the base plate *C* of the machine to a short distance above the highest of the longer comb teeth. This fluted cylinder is composed of a series of oblique or spiral staves, which are fluted in a direction parallel with their sides, and are bound together by hoops *g*. Those portions of the oblique staves which are encircled by the hoops touch each other, the remaining portions of the staves are separated by narrow spaces or slots, as shown in Fig. 5, through which the dust and other impurities separated from the grain can pass at once into the space between the fluted cylinder *U* and the surrounding casing *A*. The fluted cylinder thus formed is supported upon the upper flange *a* of the upper head *C'* of the fan case by lugs *j* cast fast to the fluted staves. The upper shorter toothed sections of the comb beaters are also surrounded by a hollow cylinder *T*, which is suspended by bolts or otherwise from the top plate (*C*²) of the machine; the interior of this cylinder is fluted vertically and its ribs extend within a short distance of the comb beaters; its upper edge is separated by a narrow space from the under face of the top plate, and its lower edge enters the upper extremity of the lower fluted cylinder *U* but does not touch it, the two being separated by an annular space through which a current of air can pass. The upper extremity of the lower fluted cylinder *U* is surmounted by a cylindrical head *Y* which widens as it rises, as shown in section at Fig. 3, and extends upward within a short distance of

the under face of the top plate *C*². The latter has a ring flange *X* which hangs down in the annular space between the upper fluted cylinder *T* and the surrounding head *Y*. The exterior of the upper fluted cylinder has also a flaring band *w* near its lower edge which deflects the upward current of air entering the annular space against the sides of the head *Y*.

The lower extremity of the lower fluted cylinder *U*, is fitted with an annular dishing rim *Q* extending downward into a cone formed screen *P* which closes the lower extremity of this fluted cylinder. This rim breaks the fall of the grain and thus prevents it from striking with its full force the meshes of the screen beneath, which without such protection would be rapidly worn away by the falling grain. As the inclination of the rim is less than that of the screen, a space is formed between the two through which the air can freely pass into the machine. The lower extremity of this conical screen terminates in a spout which conducts the grain to a cylindrical receptacle *K* beneath, which is supported by the lower bridge tree *E*. The head of this grain receptacle is formed by a conical wheel *S* to which flaring arms *t* are secured; these extend upward and outward into the fan-case where they are each fitted with a wing *i*. Those portions of the arms of the fan which enter the fan case are passed through and secured to an annular plate *s* which extends over and covers the annular space through which the arms enter the fan-case.

The grain receptacle *K* is connected by a pipe *J* with the space between the outer casing *A* and the fluted cylinder *U*. A second pipe *H* is also connected with this space and is extended upward above the top plate of the machine, it is thence returned downward and enters an opening made in one of the lids *f*, which close the opening in the top plate of the machine. The shorter descending portion of this pipe is fitted with a spout *O* into which the grain to be cleaned is introduced; apertures are also made in the lower part of this portion of the pipe and fitted with gauze screens *Z* which permit air to enter the pipe but prevent the escape of the grain.

When the grain is to be cleaned with this machine the shaft is caused to revolve rapidly in the direction indicated by the arrow *z* in the drawing by power imparted to the driving pulley *G*. As the shaft revolves the wings *i* of the fan discharge the air through the orifice *M* in the periphery of the fan case, while air rushes into the machine to supply the place of that discharged. The air enters the machine at several points, that entering at the screens *Z* in the pipe *H* passes upward to the bend of the pipe, whence it is car-

ried downward through the longer descending portion of the pipe into the cylinder A, whence it passes directly to the wings of the fan. The air enters also at the orifice of the grain receptacle K and is conveyed thence by the pipe J to the cylinder A. But the great body of air enters through the meshes of the conical screen P and passes upward between the beating cylinder F and its fluted cylinders U T. The ascent of this body of air is quickened by oblique position of the comb beaters R, which while quickening the upward movement of the air also discharge portions of it through the slots in the lower fluted cylinder U. The air on reaching the upper extremity of the lower fluted cylinder divides into two portions or currents; one current passing within the upper fluted cylinder T to the top plate, while the other current passes through the annular space or chamber W between the exterior of the upper fluted cylinder T and the surrounding head Y to the top plate. The current within the fluted cylinder passes over the upper edge thereof and is deflected downward by the ring flange X, it is then reunited with the current passing upward through the space W. The united currents pass over the upper edge of the head Y into the space surrounding the head and the lower fluted cylinder, and thence passing to the fan case are discharged at the orifice M. The grain to be cleaned is fed into the machine at the spout O; as it passes downward it meets the ascending currents of air which enter the screens Z. These carry off at once the lighter impurities and convey them to the fan case. As the grain enters the lid of the top plate it falls upon the dishing head of the beating cylinder F which distributes it by its centrifugal action to the comb beaters; these acting in connection with the fluted cylinder break the smutty grains and scour the sound ones. As the currents of air at this part of the machine are very strong the lighter portions of the sound grain are sometimes carried upward with them. As the current passing over the upper edge of the upper fluted barrel is deflected downward by the ring flange X these lighter grains are thrown out of their course and fall into the space W where they mingle with those lighter grains which have been carried upward by the current of air passing into the head or have been thrown up by the beaters, and which being deflected by the band *w* toward the sides of the head, pass down again close to the sides where the current of air is weaker. As the grain passes down the spiral fluted cylinder the smut separated from it is in part driven by the lateral currents of air, produced by the revolution of the comb beaters R, through the slots in the fluted cylinder into the space A' within the outer casing A while the rest is

carried with the upward currents over the upper edge of the head Y into the space A' whence the whole is drawn into and discharged by the fan beneath. As the grain leaves the beaters it falls upon the dishing rim Q which breaks the force of its fall and shields the screen beneath. The grain passes from the rim to the conical screen P by which it is conducted to the spout and thence to the receptacle K beneath. As the grain passes down the screen the currents of air passing upward through the meshes carry off any adhering smut and dust, and as the grain falls in the receptacle beneath, the current of air drawn through the orifice thereof and into the pipe J carries off any portion of smut or dust which may have escaped the action of the currents of air above. The cleaned grain is discharged through the lower orifice of the grain receptacle while the air carrying with it the whole of the impurities is discharged through the orifice M by the fan and conveyed, by an air tight trunk adapted thereto, to the outside of the building in which the machine is set up.

By arranging the fan at the lower part of my machine the heavier impurities which are driven through the slots in the spiral fluted cylinder fall naturally into the fan case, whereas if the fan was situated at the head of the machine the currents of air might not be sufficiently strong to carry these heavier impurities upward. As the currents of air are produced by drawing air through the machine in contradistinction to forcing it along the tendency of the external air is to enter the machine at every part with the exception of the periphery of the fan-case where the air is discharged; hence no dust can escape into the room in which the machine is set up but the whole is discharged at the orifice M and is thence conveyed to the outside of the building.

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

1. In connection with a close case surrounding the machine, the arrangement of the fan as herein described in the annular space surrounding the beaters between the outer case and the fluted cylinder, and at the entrance of the pipe M through which the dust is discharged, so that currents of air will set into the machine through any cracks or openings in the same from the room in which it is placed, by which means the escape of pulverized dust or smut into the room is effectually prevented.

2. I claim the arrangement of the air chamber W, having currents of air passing through and across it, between the upper part of the beater and the space through which the descending current of air passes to the fan, for the purpose of collecting any portion of the grain accidentally thrown out of the scouring cylinder by the blast or

beaters and returning the same, so that it may pass through the machine with the rest of the grain in the proper direction.

3. I claim the conical rim or shield for the purpose of protecting the conical screen below it from abrasion by the descending grain, and at the same time keeping the pores of the screen open for a free passage of air through it into the fluted cylinder.

4. I claim the tube or passage (K) for discharging the cleaned grain as set forth and also for receiving and transmitting air to and through the tube J, as described.

NELSON PLATT.

Witnesses:

A. B. STOUGHTON,
HENRY KILBY.