

A. J. VANDEGRIFT.

Grain Separator.

No. 51,495.

Patented Dec. 12, 1865.

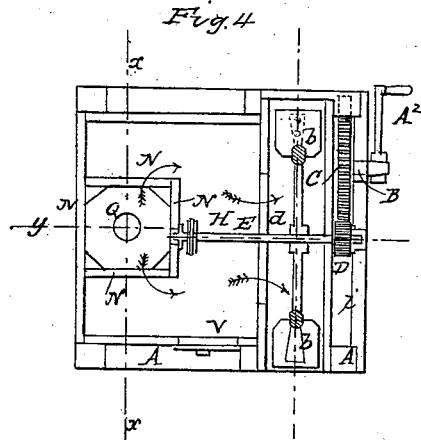


Fig. 3

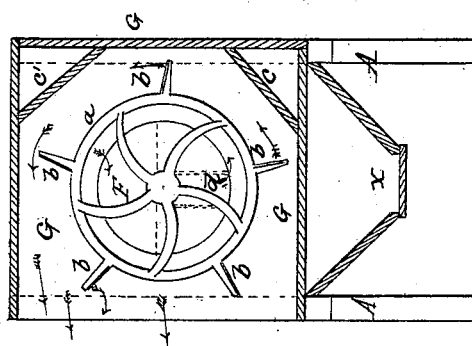


Fig. 5

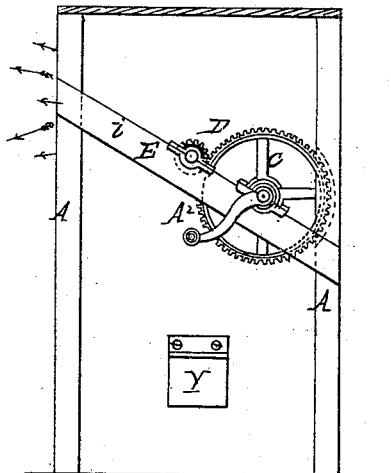


Fig. 2

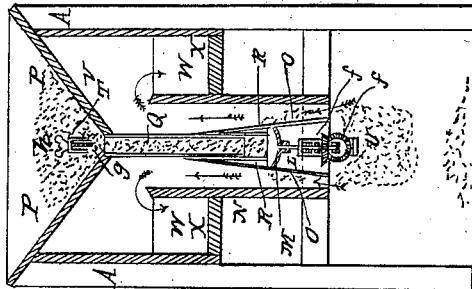
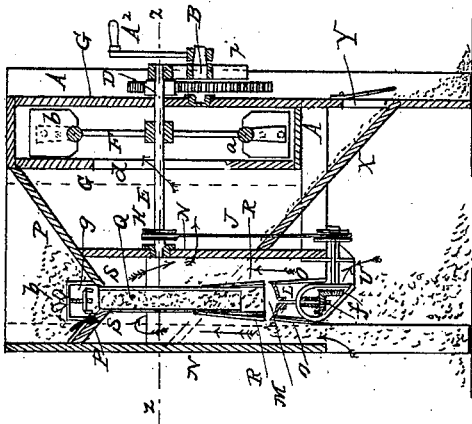


Fig. 1



Witnesses

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## IMPROVEMENT IN GRAIN-SEPARATORS.

Specification forming part of Letters Patent No. 51,495, dated December 12, 1865.

*To all whom it may concern:*

Be it known that I, ANDREW J. VANDEGRIFT, of the city of Cincinnati, county of Hamilton, and State of Ohio, have invented new and useful Improvements in Centrifugal Feeding Suction Grain-Separators, for the purpose of separating smut and other impurities from grain; 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 accompanying drawings, making a part of this specification, in which—

Figure 1 is a vertical section taken in lines *yy*, Fig. 4. Fig. 2 is a vertical section taken in lines *xx*, Fig. 4. Fig. 3 is a vertical section taken in lines *qq*, Fig. 4. Fig. 4 is a transverse section taken in lines *zz*, Fig. 1. Fig. 5 is a side elevation.

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

This invention relates to that class of machines used for the purpose of separating impurities from grain by means of a current of air being drawn or sucked by an exhaust-fan through the same in such a manner as to extract all foreign substances from the grain by taking advantage of the difference in the relative specific gravity of said foreign substances and that of the grain. This class of machines, as heretofore constructed, have operated well as power machines when driven by steam or other mechanical power; but, owing to defects in their construction, they have never been made very effective when used by agriculturists and operated by hand, the objectionable features most notable having been, first, they have always required too much power to be operated by a single hand; secondly, having had no balance-wheel, they have always been ineffective on account of irregularity of motion; thirdly, not being so constructed as to enable the operator to examine the offal while operating the machine, in order to judge of the work being performed and at the same time having the feed-regulating device within his reach, so that he may be enabled to change and regulate the feeding in of the grain according as his judgment may dictate; fourthly, in not having the working parts properly inclosed and protected in a substantial and compact frame

in such a manner as to preclude the danger of breakage in handling, shipping, &c.; fifthly, where centrifugal feeding apparatus has been used there has always been a shaft made to extend up through the tube through which the grain was fed in, (this being objectionable, first, from the fact that the upper journal of said shaft, being supported by a piece of timber passing over and above the hopper for that purpose, has always been more or less in the way, and is very apt to become deranged by the usual rough handling in shipping, &c.); sixthly, the device for regulating the feed to the machine has always been so arranged as to be more or less cumbersome and inconvenient to adjust.

The object of this invention is to obviate all of these defects and to produce a simple, substantial, compact, and efficient air-suction grain-separator to operate by hand, without the use of screens or riddles, and being well adapted for the use of agriculturists.

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

A, Figs. 1, 2, 3, 4, and 5, is a substantial frame, inside of which the working parts are properly arranged and fitted. A<sup>2</sup>, Figs. 1, 4, and 5, is a crank.

B, Figs. 1, 4, and 5, is a short shaft, upon the projecting end of which crank A<sup>2</sup> is fitted.

C, Figs. 1, 4, and 5, is a cog-wheel, cast or otherwise firmly fitted on shaft B.

D, Figs. 1, 4, and 5, is a pinion-wheel into which cog-wheel C is made to mesh.

E, Figs. 1, 3, and 4, is a shaft, upon one end of which pinion D is secured, while the other end extends to the interior of the machine, being provided with suitable bearings.

F, Figs. 1, 3, and 4, is a fan and fly-wheel combined, being provided with a heavy rim, *a*, for the purpose of acting as a fly-wheel, and wings, *b b*, to constitute a fan, said wings being secured on heavy rim *a*, shown plainly in Figs. 1, 3, and 4.

G, Figs. 1, 3, 4, and 5, is a case or box suitably constructed to inclose combined fan and fly-wheel F. Said box or case G communicates with the interior of the machine by a suitable air passage or opening, *d*, Figs. 1, 3, and 4, and is also provided with a discharge-opening,

e, Figs. 3 and 4. There is a peculiarity in the construction of case G, it being unlike fan-cases constructed in the usual manner, it being simply constructed like a box having the interior corners filled or cut off by corner-pieces *c c*, (shown plainly in Fig. 3,) and being so constructed and arranged as to form a gradually-increasing space between the ends of fan-wings *b b* and the case from the bottom around to the point of discharge, thereby forming in effect a spiral or scroll case, which renders the discharge of air more regular in its flow than would otherwise be the case.

H, Figs. 1 and 4, is a grooved pulley.

I, Fig. 1, is a corresponding grooved pulley.

J, Fig. 1, is a suitable band spanning pulleys H and I for the purpose of transmitting motion from shaft E to shaft K, Fig. 1.

Shaft K, Fig. 1, is arranged in a horizontal position in a line parallel to that of shaft E.

Shaft L, Figs. 1 and 2, is a small upright shaft standing at a right angle with that of shaft K.

M, Figs. 1 and 2, is a dish or disk which, when put in rotary motion, forms a centrifugal feed apparatus, motion being transmitted from shaft K, Fig. 1, to shaft L, Figs. 1 and 2, by means of a pair of gear-wheels, *f f*, Figs. 1 and 2, and dish or disk M, being properly secured on the upper end of shaft L, is put in motion thereby.

U, Figs. 1 and 2, is a peculiarly-constructed device for the purpose of forming the proper bearings and support for shafts K and L, as shown plainly in Fig. 1, it being necessary to transmit motion from shaft E, Figs. 1 and 4, to dish or disk M, Figs. 1 and 2, without causing an obstruction to the uprushing current of air being drawn or sucked by fan F through the apparatus. I have devised and adopted this peculiar metal bearing for that purpose, and to prevent the necessity of running a shaft up through the tube which conducts the grain from the hopper to revolving dish or disk M.

N, Figs. 1, 2, and 4, is an air-flue, built substantially in with the other parts of the machine, and being open at its lower end, thereby communicating with the external atmosphere. The mouth or lower end of flue N is partially filled with a conical hollow curb, O, Figs. 1 and 2, which is secured to the verge of dish or disk M, Figs. 1 and 2, and forms a covering to that part of bearer U which supports shaft L, (shown plainly in Figs. 1 and 2,) and at the same time preventing an eddy which would otherwise occur under dish or disk M, by confining the uprushing current of air to the space between curb O and the inside of flue N. Flue N, having its corners filled, is octagon on the inside, as shown plainly in Fig. 4, and is so arranged in its construction as to communicate with the interior of the machine, by openings or air-passages V V, Fig. 2, and W W, Fig. 2, and thence with the fan-case by opening or air-passage *d*, Figs. 1, 3, and 4.

P is a hopper firmly built in and forming the top of that part of the apparatus in front of the fan-case. (Shown plainly in Figs. 1 and 2.)

Q, Figs. 1 and 2, is a hollow tube, being firmly attached in and extending down from the bottom of hopper P to within a short distance of dish or disk M, Figs. 1 and 2.

R, Figs. 1 and 2, is a slip-joint, arranged so as to be adjustable and to form the lower end of tube Q.

S S, Fig. 1, are two small wires, being properly attached to the upper end of slip-joint R, and extending up through the bottom of the hopper on either side of tube Q, and being hooked into suitable lugs on cross-head *g*, Figs. 1 and 2, in such a manner as to render slip-joint R adjustable, being raised or lowered by a thumb-screw, *h*, at pleasure.

T, Figs. 1 and 2, is a case for the purpose of inclosing cross-head *g* and forming a bearer to thumb-screw *h*. This case is provided with suitable flanges, by which it is firmly secured to hopper P in such a manner as to form no obstruction to the passage of the grain from said hopper into tube Q, as shown plainly in Figs. 1 and 2.

X, Figs. 1 and 2, is an inclined floor or gathering-board, upon which the offal is deposited when the machine is in operation.

Y, Figs. 1 and 5, is a valve or exit-passage, through which the offal is discharged from the machine.

Shafts B, E, K, and L, are provided with suitable bearings, with proper conveniences for supplying oil to them for lubrication. The outer ends of shafts E and B are supported by a cross-timber, *i*, Fig. 5, the interior ends being properly supported.

Z, Fig. 4, is a sliding door for the purpose of giving access to the interior of the machine, for the purpose of supplying oil to the interior journal of shaft E, &c.

The apparatus being thus constructed is operated as follows: The grain to be operated upon is placed, as is appropriately represented, in hopper P, Figs. 1 and 2, passing down through tube Q, Figs. 1 and 2, onto revolving dish or disk M, Figs. 1 and 2, the machine being put in motion by means of the operator applying power to crank A<sup>2</sup>, imparting rapid motion to combined fan and fly-wheel F, Figs. 1, 3, and 4, which, acting as an exhaust-fan, draws a strong current of air through the apparatus, said current of air passing in at the lower mouth of air-flue N, Figs. 1, 2, and 4, and passing upward in said flue, as represented by arrows, and, being deflected by the bottom of hopper P, Figs. 1 and 2, said current of air is divided, each division passing respectively through openings or passages left between the top of sides of air-flue N and the bottom of hopper P, (marked V V, and shown plainly in Fig. 2,) the air-currents at this point making a turn, as represented by the arrows, downward and through openings W W, Fig. 2, and turn-

ing thence, as shown by the arrows plainly in Fig. 4, passes back and enters fan-case G through opening or eye *d*, Figs. 1, 3, and 4, is blown off or discharged from said fan-case through discharge-opening *e*, Figs. 3 and 4, into the external atmosphere. Motion being transmitted from shaft E to shaft K, and thence to shaft L, as hereinbefore described, by the arrangement of devices shown plainly in Fig. 1, and dish or disk M being secured on the upper end of shaft L, is made to rotate rapidly, and the grain to be operated upon, passing down from hopper P through tube Q to revolving dish or disk M, is thrown, by centrifugal force, horizontally in a thin sheet across the current of air rushing up through air-flue N, Figs. 1 and 2, by which all foreign matter, being lighter than the grain, is floated out and carried by the air in its passage up through flue N and through side openings, V V and W W, Fig. 2, to the interior of the body of the machine, and is deposited on inclined floor X, Figs. 1 and 2, and passing thence back is discharged from the body of the machine through exit-opening valve Y, Figs. 1 and 5, while the air passes into fan-case G through opening or eye *d*, and is blown off by fan F through discharge-opening E, (shown plainly in Figs. 3 and 4.) The regulation of the feeding of the grain is effected by raising or lowering slip-joint R of feed-tube Q, Figs. 1 and 2, by means of thumb-screw *h* passing through cross-head *g*, as shown plainly in Fig. 1, which is attached to said slip-joint by means of wire rods S S, Fig. 1. Thumb-screw *h* is arranged in the hopper that the operator has it within his reach while operating the machine, and can examine the offal being discharged from the machine through exit-valve Y, Figs. 1 and 5, at his feet, thereby being enabled to judge as to the character of the work being performed, and can reach over in the hopper to thumb-screw *h*, Figs. 1 and 2, and by turning which, either back or forth, he can raise or lower slip-joint R, thereby regulating the feeding of the grain, increasing or diminishing the quantity as the case may require, and while the lighter pro-

ducts are being floated out and carried up through air-flue N, as aforesaid, the grain, having been thus cleansed and its specific gravity being greater than that of those lighter products, passes down and is discharged from the mouth of flue N.

Having thus fully described the construction and operation of my invention, what I claim therein as new, and desire to secure by Letters Patent, is—

1. The attachment of wings to a fly-wheel in such a manner as to form a fan and fly-wheel in combination, having the same set of arms and hub in common, thus constituting, in combination, a device to perform the double office, acting as a regulator of motion or distributor of power, and at the same time constituting an efficient exhaust-fan, constructed in the manner and used for the purpose substantially as set forth.
2. Peculiarly-constructed bearer U, shaft K, wheels *ff*, shaft L, or their equivalents, when located at the mouth or lower end of flue N in such a manner as not to form a material obstruction to the air rushing into said flue and to transmit motion to dish or disk M, or its equivalent, without the necessity of extending a shaft up through tube Q, when arranged in the manner and for the purpose substantially as set forth.
3. Case T, thumb-screw *h*, cross-head *g*, connecting-rods S S, when arranged in hopper P in the manner and for the purpose substantially as set forth.
4. Crank A<sup>2</sup>, shaft B, wheel C, pinion D, shaft E, combined fan and fly-wheel F, pulley H, pulley I, bearing U, shaft K, gear-wheels *ff*, shaft L, plate or disk M, curb O, feed-tube Q, slip-joint R, with connection-rods S S, cross-head *g*, thumb-screw *h*, and case T, all arranged relatively with each other, combined and operated in the manner and for the purpose set forth.

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Witnesses:

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