2 Sheets—Sheet 1.

J. W. MORRISON.
Grain-Separators.

No. 220,639. Patented Oct. 14, 1879.

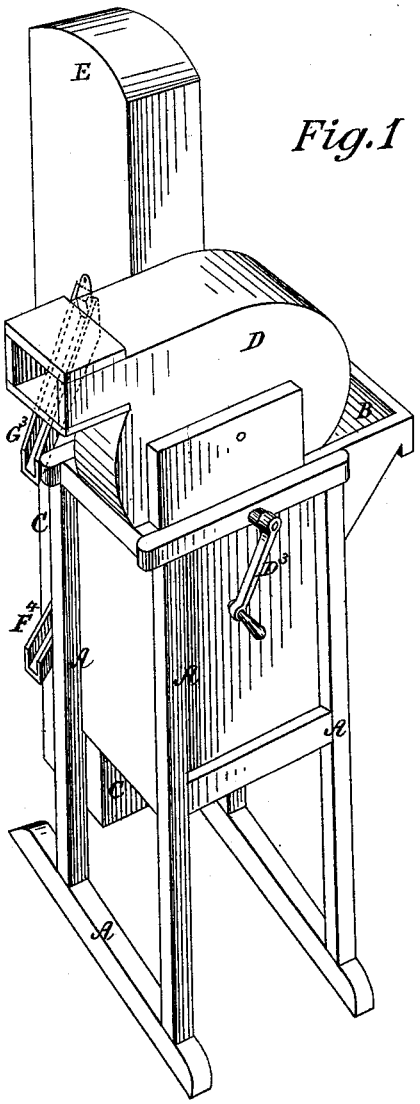

Fig. 1

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D. P. Coe

Inventor:
James W. Morrison,
by his Atty.
Wm. F. Rowe

2 Sheets—Sheet 2.

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Fig. 2

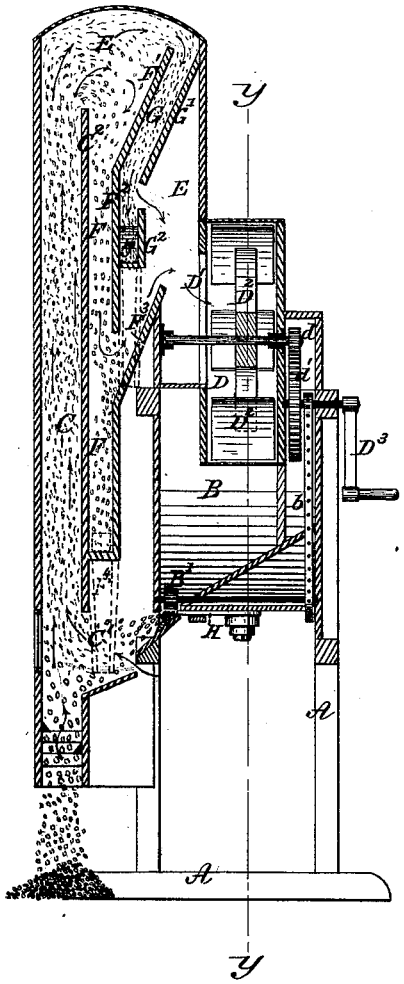
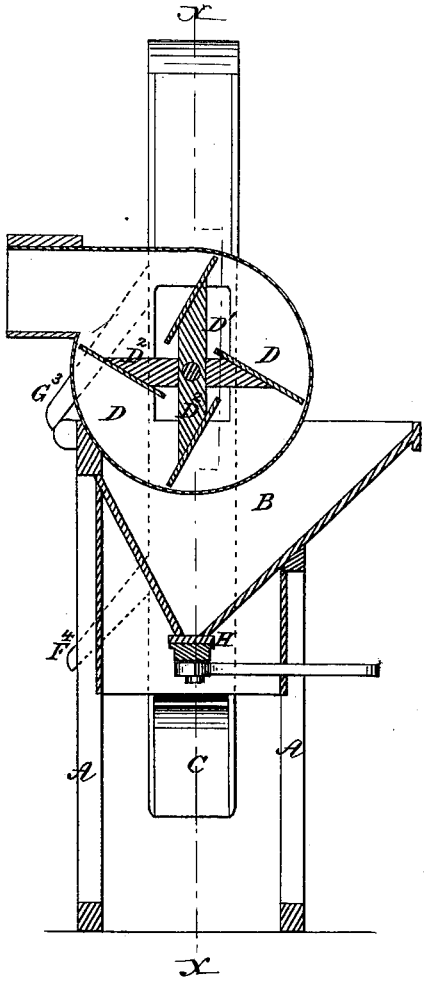


Fig. 3



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UNITED STATES PATENT OFFICE.

JAMES W. MORRISON, OF CLINTON, ILLINOIS, ASSIGNOR TO GEORGE W. GIST AND BARNEY J. ROLLIN, OF LETART, WEST VIRGINIA.

IMPROVEMENT IN GRAIN-SEPARATORS.

Specification forming part of Letters Patent No. **220,639**, dated October 14, 1879; application filed September 8, 1879.

To all whom it may concern:

Be it known that I, JAMES W. MORRISON, of Clinton, in the county of De Witt and State of Illinois, have invented certain new and useful Improvements in Gravity Grain-Separators, of which the following is a specification.

My invention relates to that class of machines for separating and cleaning grain which employ a draft of air to act upon the material and weigh it in such manner that the light particles and refuse will pass away with the draft, and allow the heavier material and good grain to drop through the draft and be separated therefrom because of their greater weight.

The object of my invention is to form a simple, cheap, and light machine that may be easily operated and carried from place to place in the granary by a single operator, and which will admit of a fine gradation and complete separation of the light wheat from the heavy wheat, and also the different grades of wheat from the cheat, chaff, and straw, which may be used for feed, while the still lighter particles of fuzz, smut, and worthless material unsuited for food may be driven off with the ultimate exhaust away from the machine.

In the accompanying drawings, Figure 1 is a perspective view of a machine embodying my invention; Fig. 2, a vertical section in the line *x x* of Fig. 3, and Fig. 3 a vertical section in the line *y y* of Fig. 2.

A rectangular frame, A A, supports a hopper, B, the mouth of which projects beyond the frame. A vertical draft-tube, C, is secured at its lower end against one side of the frame, and projects above it a suitable distance to form an air-trunk, E, and a series of gravity-chambers, F G. The upper portion of the draft-tube is widened, and overlaps the upper cross-bar of the frame, by which means the draft-tube and gravity-chambers are given additional support, and may be more readily secured to the frame. The material is fed to the lower portion of the draft-tube through an expanding throat, C^1, having an opening in its side, through which a lateral draft passes to aid in distributing the material across the draft-tube.

A fan-chamber, D, communicates by an opening, D^1, with the air-trunk E and gravity-chambers of the draft-tube, and is provided with an exhaust-fan, D^2, of any well-known construction. A pinion, *d*, and spur gear, *d'* connects the fan-shaft with the crank-shaft of the crank D^3, through which motion is imparted to the fan.

The upper portion of the draft-tube is enlarged to form an air-trunk, and the inner wall, C^2, of the draft-tube C terminates at a point sufficiently below the top of the air-trunk to allow the material raised by the draft to be carried over into the air-trunk, to be deposited in the gravity-chambers. The first gravity-chamber, F, is arranged alongside of and parallel with the draft-tube, and extends nearly down to the throat C^1 of the draft-tube. An inclined deflector-board, F^1, forms the upper part of the partition F^2, between the gravity-chamber F and a second gravity-chamber, G, arranged alongside of and parallel with the first gravity-chamber. Sufficient space is left between the top of the deflector-board F^1 and the cover of the air-trunk to allow the light material to pass over into the second gravity-chamber. A deflector-board, F^3, is arranged below and to underlap the partition F^2, so that a sufficient space is left between them for the air to pass from the draft-tube to the exhaust-fan. The lower end of the deflector F^3 is connected with the partition of the gravity-chamber F, that continues the said chamber down nearly to the throat of the draft-tube, whence the material is conveyed to a suitable receptacle by an open spout, F^4, at the rear of the machine. The opening communicating with the spout is covered by a weighted valve in a well-known manner, to prevent the air from entering through it into the draft-tube connections.

The gravity-chamber G has a partition or deflector-board, G^1, arranged parallel with the deflector-board F^1, and terminates at a point a sufficient distance above the wall of the trough G^2 of the gravity-chamber G to allow the draft to pass on to the fan-chamber. The lower part or trough of the gravity-chamber G is provided with an opening and weighted valve, *g*, similar to that of chamber F, to communicate with the spout G^3, and allow the

material from the chamber G to be delivered at the rear of the machine at a point above and to one side of the material delivered from the chamber F. The material is evenly distributed and fed through an opening in the hopper B to the throat C^1 of the draft-tube by a fluted feed-roller, B′, driven by a shaft and endless belt, *b*, communicating with a pulley on the shaft of the crank D^3.

A sliding valve, H, arranged beneath the discharge-opening of the hopper, permits the feed to be entirely shut off from the exhaust-tube when the machine is stopped; but it will be found that the feed-roller B′ will greatly lessen its utility, as the grain can only pass from the hopper while the fan is in motion; and should the fan be suddenly stopped and the operator fail to close the valve, the uncleaned wheat will not be allowed to pass uninterruptedly through the opening in the hopper and mix with the cleaned wheat below the draft-spout.

In operation the heaviest wheat will fall down the draft-tube, after it has been thoroughly weighed therein by the upward current of air, and all impurities and lighter grades of wheat separated therefrom. The impurities and light wheat are carried up into the air-trunk E, where the draft is turned from a vertical to a horizontal direction, and the lower stratum thereof is attracted by a downward air-current passing through the chamber F, and is also intercepted by the deflector-board F^1, which creates a whirl or eddy in the current, which will cause the lighter grade of wheat to be suspended in the air-trunk until it has been separated from the chaff and falls below the main current of air downward through the gravity-chamber F. The draft through the chamber F passes through the opening over the deflector-board F^3, and carries with it any fine impurities that may have been carried down with the light wheat in the chamber F; but the light wheat is intercepted by the deflector-board and returned to the chamber F. The chaff and other impurities lighter than the second grade of wheat follow the main draft, and are carried over into the chamber G, and discharged through the spout leading therefrom, while the air passes on to the fan-chamber, and carries with it the lightest impurities, such as smut-balls, fiber, and other refuse, unsuited for animal food.

It will thus be seen that the machine above described will separate the heavy wheat for choice grades and seed-wheat from the lighter wheat, while it also separates the chaff from both grades of wheat and frees the chaff from smut-balls, fiber, and dust, so that its quality is superior for cattle food.

A single gravity-chamber may be employed, without departing from the spirit of my invention, by leaving out the deflector-board G^1 and gravity-chamber G, so that the main draft will pass over the deflector-board F^1 immediately to the fan-chamber.

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

1. In a gravity-separator, the combination of the vertical draft-tube, the vertical gravity-chamber, and a secondary gravity-chamber, having a partition between them that extends above the partition between the first chamber and the draft-tube, the partitions being provided with openings which allow each of the gravity-chambers to communicate with the fan-chamber, substantially as described, for the purpose specified.

2. The combination of the vertical draft-tube C, the gravity-tube F, the partition F^2, situated between said tubes and the fan-chamber, and having openings above and below, and deflector-boards F^1 F^3, substantially as and for the purpose set forth.

3. The combination of the fan-chamber, the vertical draft-tube, the partition C^2, partition F^2, having draft-openings above and below, deflectors F^1 G^1, and trough G^2, of the second gravity-chamber, all arranged substantially as and for the purpose described.

In testimony that I claim the foregoing as my invention I hereby subscribe myself.

JAMES W. MORRISON.

Witnesses:
WM. H. ROWE,
JAMES NICHS. CALLAN.