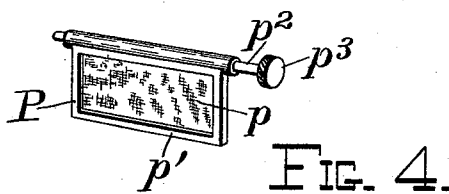
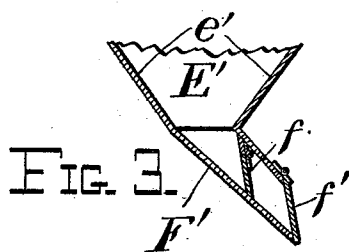
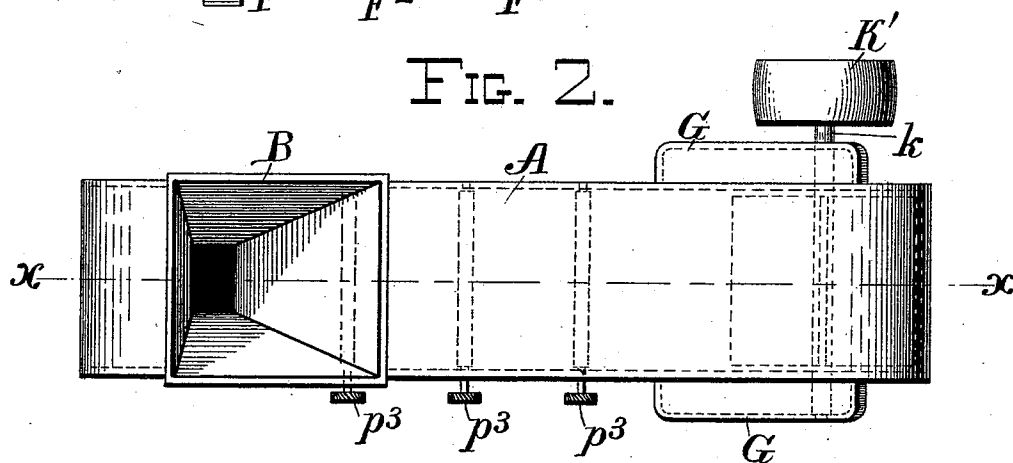
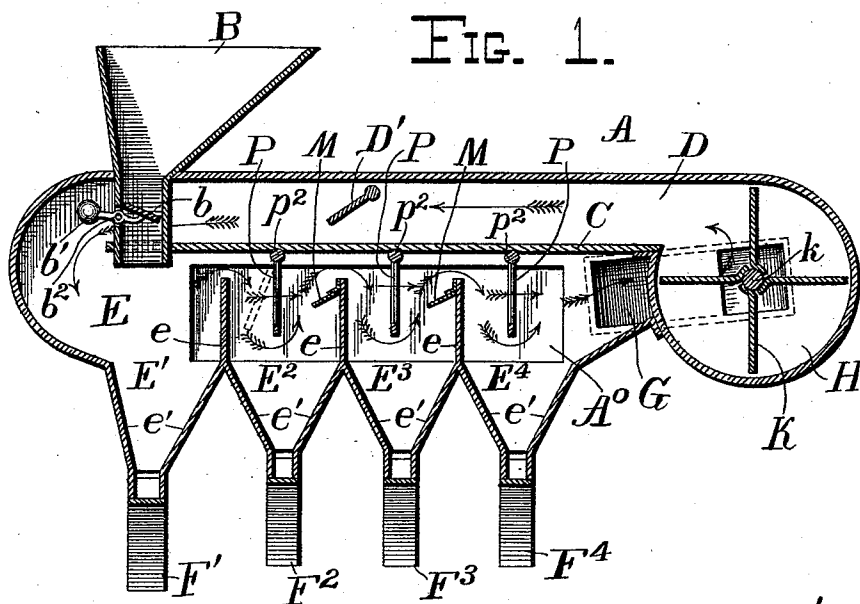


(No Model.)

D. J. DAVIDSON.
PURIFIER, SEPARATOR, AND GRADER.

No. 527,835.

Patented Oct. 23, 1894.



Witnesses
Rey C. Bowen.
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UNITED STATES PATENT OFFICE.

DAVID J. DAVIDSON, OF PORT HURON, MICHIGAN, ASSIGNOR OF TWO-THIRDS
TO ABRAHAM S. MARTIN AND STEPHEN G. MARTIN, OF SAME PLACE.

PURIFIER, SEPARATOR, AND GRADER.

SPECIFICATION forming part of Letters Patent No. 527,835, dated October 23, 1894.

Application filed November 20, 1893. Serial No. 491,378. (No model.) Patented in Canada December 18, 1893, No. 44,901.

To all whom it may concern:

Be it known that I, DAVID J. DAVIDSON, a citizen of the United States, residing at Port Huron, county of St. Clair, State of Michigan, have invented a certain new and useful Improvement in a Purifier, Separator, and Grader; and I declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

My present invention relates to improvements in separators and graders for purifying, separating and grading various kinds of grain, seed, middlings, flour, and analogous substances; and it especially relates to certain modifications of the device described in my application, Serial No. 489,617, filed October 31, 1893.

Reference is had to the accompanying drawings in which the same parts are indicated by the same letters throughout the several views.

Figure 1 represents a central longitudinal section through the apparatus. Fig. 2 represents a plan view of the apparatus. Fig. 3 represents a transverse section through one of the delivery chutes; and Fig. 4 represents a perspective view of one of the adjustable foraminous diaphragms as detached from the apparatus.

A represents a casing into which the grain is fed through a hopper B the bottom of which hopper is closed by a valve *b* which is normally kept closed by the weighted arm *b'* pivoted as at *b*².

The chamber on the interior of the casing A, is divided by a partition C into upper and lower air passages D and E, the lower one of which is connected by the side passages G to the fan chamber H, in which the fan K is journaled by means of the shaft *k*, which shaft is driven by means of the pulley K', or in any other convenient way.

The air passage E is partly interrupted by a plurality of vertical partitions *e* extending nearly to the top of the said passage. To the upper part of some of the said partitions inclined deflectors M are attached, and projecting downward between the said partitions ad-

justable foraminous diaphragms P are provided. These diaphragms may be made of impervious material, but are preferably made of flannel or like substance *p* secured in a frame *p'* and attached to the shaft *p*² journaled in the sides of the casing and set at any desired position, such as is shown in dotted lines to the left in Fig. 1, by means of the thumb screw or equivalent device *p*³. In the base of this air passage E cant boards *e'* are provided which form a plurality of dead air chambers E', E², E³, and E⁴, at the base of which chutes F', F², F³, F⁴ are provided. These chutes are preferably closed by double valves which close automatically, such for instance as *f* and *f'* shown in Fig. 3, which valves are hung somewhat out of the perpendicular and fall by their own weight, opening only when the pressure of the grain or other solid matter in the interior is sufficient to overcome the tendency of the valve to keep closed; or valves similar to that shown in the mouth of the hopper B may be used for closing the chutes.

When the machine is in operation the suction of the air drawn into the fan chamber will be sufficient to cause these chutes to remain closed except when there is a considerable amount of grain or solid matter in the bottom of the settling chambers E' to E⁴.

The flow of air through the device is regulated not only by the velocity of the fan K, but also by the damper D' mounted in the upper air passage D.

A glass plate A⁰, or glass plates, are provided to allow inspection of the interior of the casing.

The operation of the device is as follows:—The stock is fed into the hopper B and falls vertically downward past the valve *b*. The air current from the fan flowing in the direction of the arrows, cuts across the path of the falling stock, and carries the lighter portion thereof, and the various impurities in the stock of lighter specific gravity than the grain, over the first partition *e*, the purified stock falling in the first settling chamber E' and being drawn off through the chute F'. The air carrying the impurities, passes partly through and partly beneath the first foraminous diaphragm, and the heavier solid par-

ticles carried thereby fall into the second settling chamber E^2 and are drawn off by means of the chute F^2 . Further separations are made in the settling chambers E^3 and E^4 .

5 By adjusting the foraminous diaphragms P the velocity of the flow of the air in any part of the apparatus, may be varied at will. The deflectors M tend to check the air in its motion and assist in causing it to drop its burden
10 of solid matter.

The operation of the various parts above the settling chambers is inspected by means of the glass plates A^0 , and the adjustments can be readily regulated to suit varying conditions.
15

It will be evident that in the herein-described apparatus a continuous current of air is forced through the machine, and that there is no escape of dust-laden air into the surrounding atmosphere. Moreover, it will be evident that by adjusting the diaphragms P and the damper D' the force of the air in the machine or in any part thereof, may be varied at will, and thus the machine is eminently
25 adapted to treat stock of various kinds, and of varying degrees of lightness.

These and the various other advantages of the herein-described apparatus, will readily suggest themselves to any one skilled in the art.
30

Having thus described my invention, what I claim, and desire to secure by Letters Patent of the United States, is—

1. In a separator and grader, the combination with a casing of a fan situated in one end of said casing and a hopper near the opposite
35 end, a partition in said casing extending from said fan to said hopper separating the interior of said casing into an upper air passage receiving air from the fan and a lower
40 air passage delivering air to the fan, settling chambers provided at the base of said lower air passage, and adjustable diaphragms projecting downward toward said settling chambers, with air passages opening from said
45 lower air passage into the fan casing, substantially as and for the purposes described.

2. In a separator and grader, the combination with a casing of a fan situated in one end of said casing and a hopper near the opposite
50 end, a partition in said casing extending from said fan to said hopper separating the interior of said casing into an upper air passage receiving air from the fan and a lower
55 air passage delivering air to the Y-shaped fan, settling chambers provided at the base of said lower air passage, and foraminous diaphragms pivoted beneath said partition, and projecting downward toward said settling
60 chambers, with air passages opening from said lower air passage into the fan casing, substantially as and for the purposes described.

3. In a separator and grader, the combina-

tion with a casing of a fan situated in one end 65 of said casing and a hopper near the opposite end, a partition in said casing extending from said fan to said hopper separating the interior of said casing into an upper air passage receiving air from the fan and a lower 70 air passage delivering air to the fan; Y-shaped settling chambers provided at the base of said lower air passage, and foraminous diaphragms pivoted beneath said partition, and projecting downward toward said settling 75 chambers, with air passages opening from said lower air passage into the fan casing, chutes at the base of said settling chambers, and double valves closing automatically and controlling said chutes, substantially as and 80 for the purposes described.

4. In a separator and grader, the combination with a casing of a fan situated in one end of said casing and a hopper near the opposite end, a horizontal partition in said casing extending from said fan to said hopper separating the interior of said casing into an upper air passage receiving air from the fan and a lower air passage delivering air to the fan, a damper provided in said upper passage, Y-shaped settling chambers provided at the base of said lower air passage, with vertical partitions between said settling chambers, and deflectors near the tops of said vertical partitions, and foraminous diaphragms pivoted beneath said horizontal partition, and projecting downward toward said settling chambers, with air passages opening from said lower air passage into the fan casing, substantially as and for the purposes described. 100

5. In a separator and grader, the combination with a casing of a fan situated in one end of said casing and a hopper near the opposite end, a horizontal partition in said casing extending from said fan to said hopper separating the interior of said casing into an upper air passage receiving air from the fan and a lower air passage delivering air to the fan; a damper provided in said upper air passage; Y-shaped settling chambers provided at the 110 base of said lower air passage, with vertical partitions between said settling chambers and deflectors near the tops of said vertical partitions; foraminous diaphragms pivoted beneath said partition, and projecting downward toward said settling chambers, with air passages opening from said lower air passage into the fan casing, chutes at the base of said settling chambers, and double valves closing automatically and controlling said 120 chutes, substantially as and for the purposes described.

In testimony whereof I sign this specification in the presence of two witnesses.

DAVID J. DAVIDSON.

Witnesses:

N. S. WRIGHT,

H. R. WHEELER.