B. D. Sanders.

Grain Separator,

No. 42,409. Patented Apr. 19, 1864

Fig. 1.

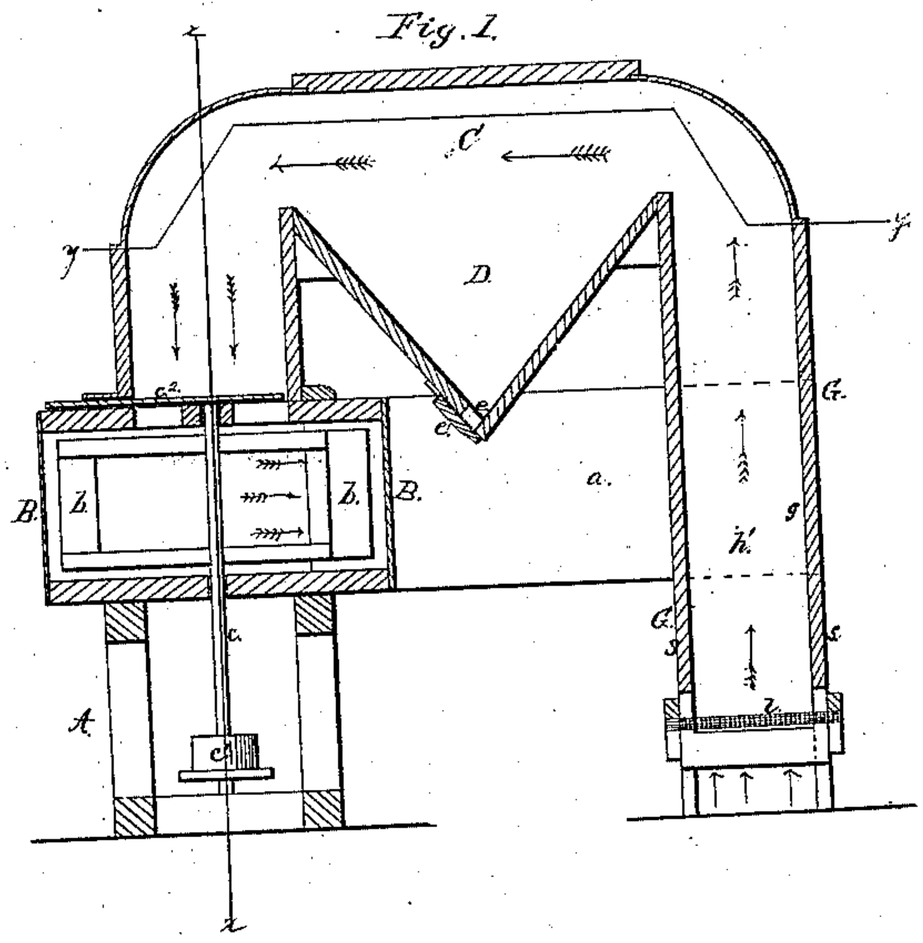


Fig. 3.

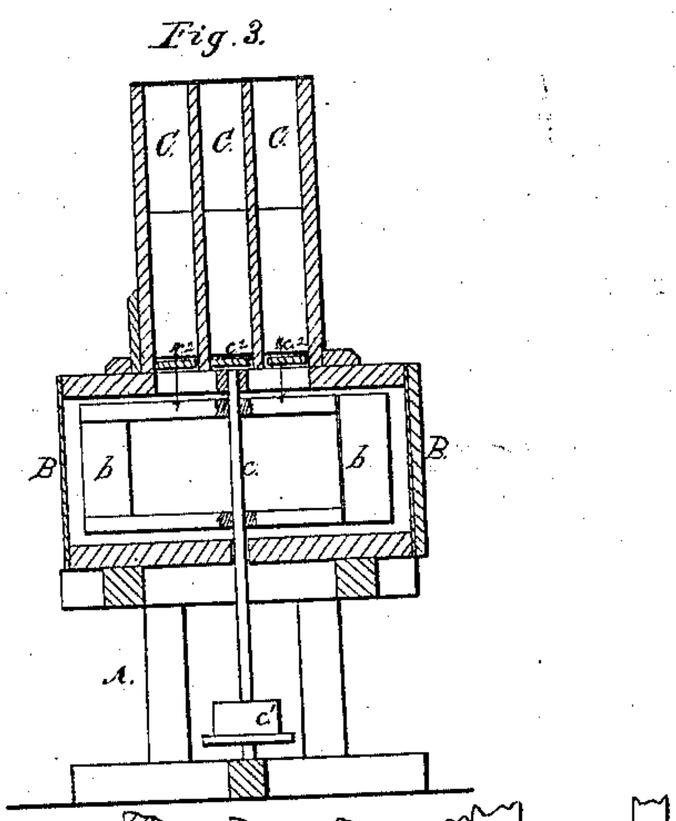


Fig. 4.

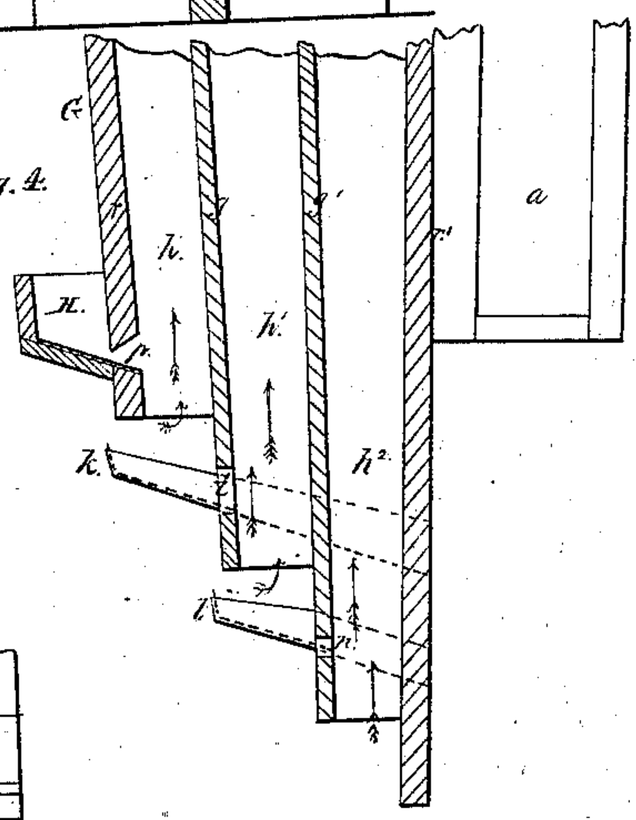


Fig. 2.

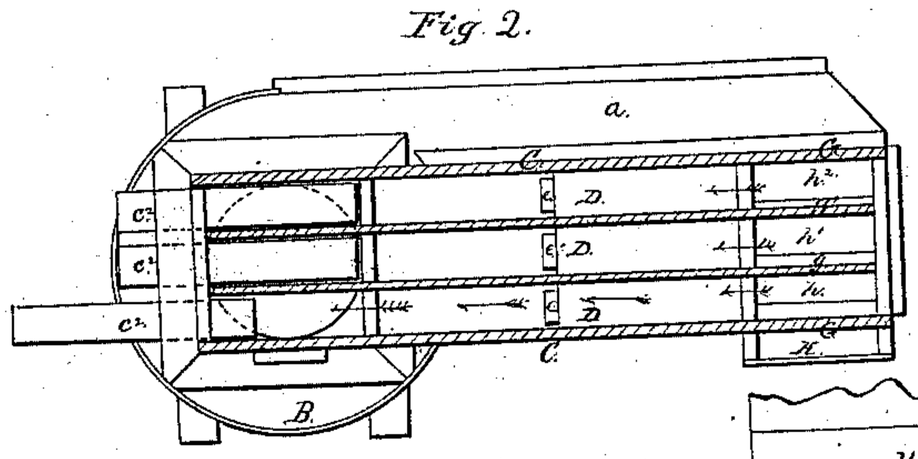
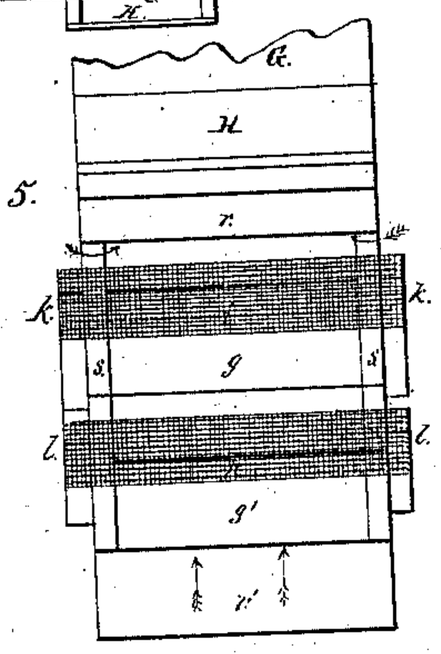


Fig. 5.



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UNITED STATES PATENT OFFICE.

BENJAMIN D. SANDERS, OF WELLSBURG, WEST VIRGINIA.

GRAIN-SEPARATOR.

Specification forming part of Letters Patent No. **42,409**, dated April 19, 1864.

To all whom it may concern:

Be it known that I, BENJAMIN D. SANDERS, of Wellsburgh, county of Brooke, State of West Virginia, have invented a new and useful Improvement in Grain-Separators; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 is a vertical longitudinal section through my improved separator. Fig. 2 is a horizontal section through the machine, taken as indicated by the course of red line *y y*, Fig. 1. Fig. 3 is a section taken in the vertical plane indicated by the red line *x x*, Fig. 1. Fig. 4 is a longitudinal section taken in a vertical plane through the lowermost part of the subdivided suction-spout. Fig. 5 is a front view of the lower end of the suction-spout.

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

This invention relates to an improvement in winnowing grain, and has for its object the more perfect subjection of the grain to currents of air passing through it, as it falls from one receptacle to another in its passage through the machine, as will be hereinafter described.

To enable others skilled in the art to make and use my invention, I will proceed to describe its construction and operation.

In the accompanying drawings, A represents the frame which supports the fan-case and one end of the trunk. B is the cylindrical fan-case, opening externally at one side through the exhaust-spout *a*. (Shown in Figs. 1 and 2.) The rotary suction-fans *b* are secured to the vertical driving-shaft *c* within the fan-case, and this shaft may be driven by a belt passing around pulley *c'* or by any other convenient means.

The fan-case B has a large opening through its upper end, which communicates with the several compartments in the partitioned trunk C, as shown in Figs. 2 and 3. The opening through the top of the fan-case is provided with sliding-valves c^2 c^2 c^2, which are used for partially closing one or more of the compartments in the trunk for the purpose of regulating the force of the currents through the same, as will be hereinafter described.

The bottom of the horizontal portion of the trunk C is inclined so as to form a spout, D, for the reception of the heaviest substances drawn up from the grain, which it is desired to collect according to their different qualities. The angle or lowest point of this spout D has perforations *e* through it corresponding to each division of the trunk, which perforations prevent substances from collecting in the spout. The flap-valves e^1, which are used to close this spout, open outward and prevent the influx of air into it, at the same time allow foreign substances to escape at proper times.

These parts may all be constructed and arranged as described by me in my former patents, or in any other suitable manner whereby my invention may be carried into effect.

The end of the subdivided trunk C which is opposite the fan-case communicates with a vertical spout, G, which is also divided into compartments corresponding in number to and communicating with the trunk-compartments, as shown in Figs. 1 and 2.

One side of the spout G is carried down so as to rest upon the floor and form a support for this end of the machine; but the opposite side of this spout does not extend down so far by a considerable distance. The partitions *g g'*, as well as the two sides *r r'*, just referred to, are arranged and put together so that the compartments or passages *h h' h²* will be contracted at their lower ends and enlarged at their upper ends in conformity with the trunk-passages, for the purpose of obtaining the greatest force of the currents of air at the lowest end of each compartment, where the winnowing of the grain takes place.

A perforated bottom hopper, *k*, is arranged beneath the shortest passage, *h*, and inclined so as to empty its contents through the opening *i* in partition *g*, into or on the perforated hopper *l*, which is arranged beneath the next passage, *h'*, and inclined in such manner as to discharge its contents through an opening, *n*, into the passage *h²*, which is the long **s** of the three passages, as shown in Fig. 4. The first hopper, *k*, receives the grain as it pours from the primary hopper H through an opening, *p*; and thus it will be seen that the grain, leaving the hopper H, will be carried successively through the sides of all the ascending passages of the spout G, and finally discharged

from the bottom of the longest passage, h^2, thereby subjecting the grain to successive independent blasts of air in its passage through the machine. The two sides *s s* of the spout G do not project down farther than the respective passages which these sides close; and the hoppers *k l* being arranged a short distance below their respective passages, it will be seen that the body of air entering these passages will flow over the hoppers, as indicated by the arrows in Figs. 4 and 5, and thus the currents of air will not be obstructed in any manner by the hoppers which are used as conductors of the grain from one suction-passage to another across the spout G.

In using a screen extending across the bottom of the spout G, where the entire body of air entering the spout must pass through its perforations or meshes, I have found that the chaff and other foreign substances are blown, or rather drawn up against the bottom of this screen in such quantities as to obstruct the free passage of air into the compartments; but in the present arrangement I am enabled to subject the grain to the action of one or more unobstructed suction-passages, and to conduct the air over the hoppers and directly through the grain as it flows from one passage to another without first passing it through a screen.

I have described the hoppers which receive the falling grain and conduct it into a series of suction-passages, as being made of woven wire or perforated plates; but instead of using perforated hoppers I am enabled by my invention to employ imperforated hoppers and to effect the winnowing of grain equally as well, by making the spaces between these hoppers and the ends of their respective suction-passages somewhat greater than is required in the use of perforated hoppers. This will allow all the air which is drawn into the lower ends of the several suction-passages to rush over the hoppers and directly through the falling grain; but where perforated hoppers are employed they can be arranged closer to the mouths of their respective suction-passages, and thus obtain good results in a comparatively small vertical space, the force of the air passing through them not being sufficient to draw up or retain any foreign substances in contact with their bottoms.

I have used the term "hopper" in referring to the inclined planes *k* and *l*, which receive the grain from the first hopper H, and submit it to the currents of air flowing through the several suction passages, because each one of these hoppers forms a distinct receiver and feeder for conducting the grain in its different stages of purity to its respective suction-passage.

The grain is first introduced into the primary hopper H, from which it flows into the first suction-passage, *h*, and falls through the ascending blast into the first secondary hopper, *k*, thence into the second passage, *h'*, and down into hopper *l*, from which it is discharged into the passage h^2. Thus it will be seen that the several suction-passages of the spout G are each provided with a distinct hopper, forming, as it were, several distinct and independent machines united together in such manner that the grain is conducted successively through all of them. The spout G being divided by its partitions into compartments, each one of which communicates with the fan-case, the force of the suction-blast through each compartment can be regulated by means of the slides c^2, according to the different grades submitted to each compartment, and thus the different qualities of the foreign substances extracted from the grain can be obtained from the corresponding compartments in the spout D of the trunk.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. Constructing the spout G with two or more passages varying in length, whether said passages be enlarged upward or are of equal dimensions throughout, substantially as and for the purposes described.

2. So constructing and arranging a spout with two or more passages that independent currents of air have a free access into their lower ends at different elevations, substantially as and for the purposes described.

3. So constructing one or all of the passages of a spout, G, and furnishing a hopper to one or all of the passages, that the grain shall enter the spout at a point above the lower end of each respective passage, substantially in the manner and for the purpose described.

4. So applying independent hoppers to two or more passages of a spout, G, that the grain from the highest hopper falls upon a lower hopper, and in its passage from the different hoppers is acted upon by separate blasts of air in the different passages of the spout, substantially as and for the purpose set forth.

5. So arranging perforated or imperforated hoppers with respect to one another and the termini of the passages of the spout that an unobstructed passage above the hoppers for the flow of air into the ends of the passages of spout G is obtained, substantially as and for the purposes set forth.

6. A separating-machine having a spout and hoppers constructed and operating so as to control the grain and air, substantially in the manner set forth.

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