

T. F. MORSE.
GRAIN SEPARATOR.
APPLICATION FILED MAR. 26, 1908.

1,109,299.

Patented Sept. 1, 1914.

2 SHEETS—SHEET 1.

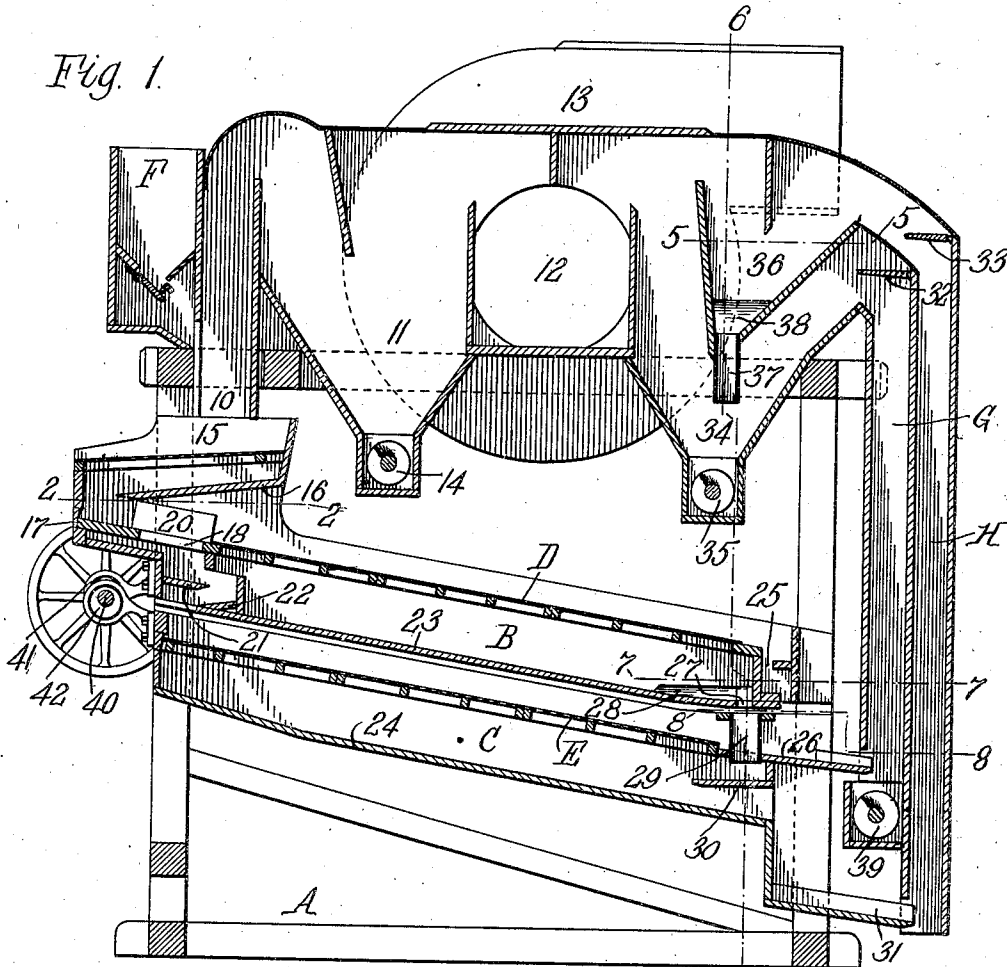


Fig. 2.

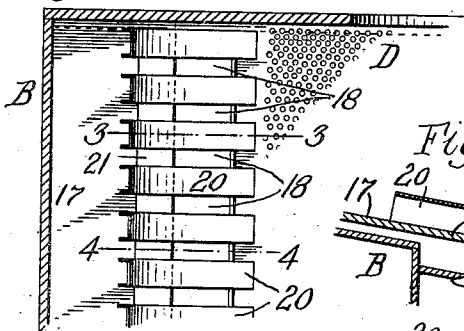


Fig. 3.

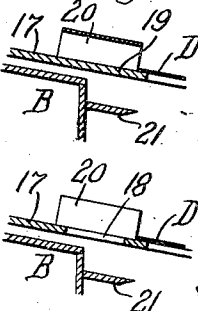


Fig. 4.

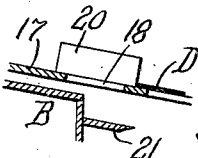
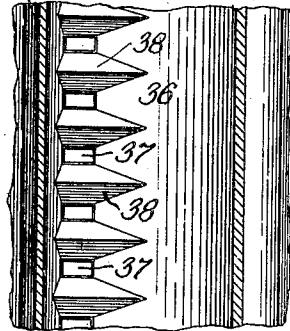


Fig. 5.



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Fig. 6.

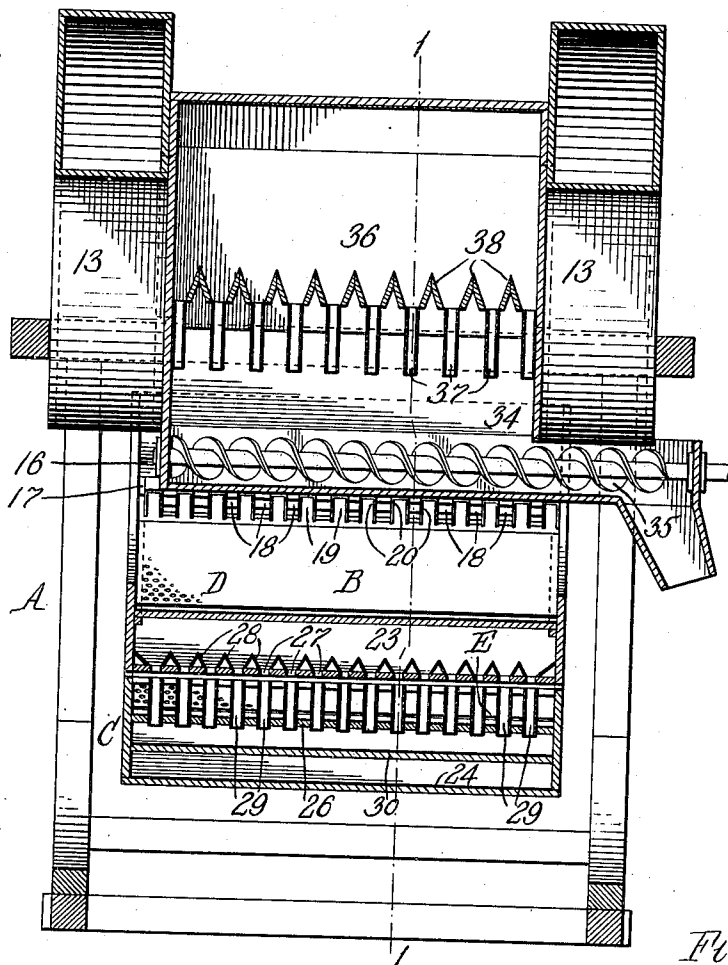


Fig. 7.

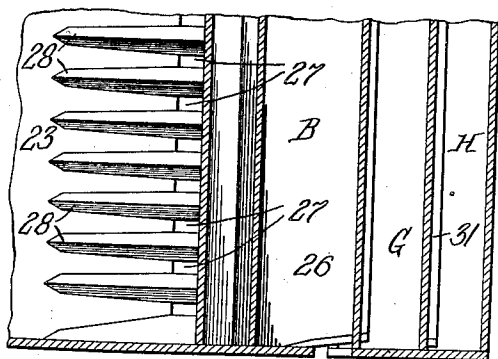
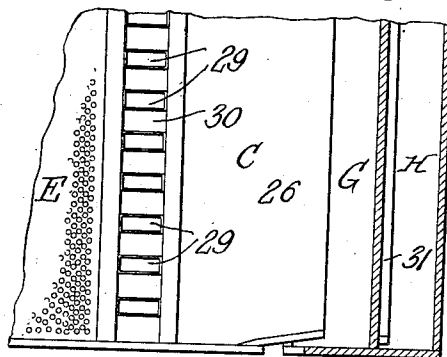


Fig. 8.



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UNITED STATES PATENT OFFICE.

THEODORE F. MORSE, OF SILVER CREEK, NEW YORK, ASSIGNOR TO HUNTLEY MANUFACTURING COMPANY, OF SILVER CREEK, NEW YORK.

GRAIN-SEPARATOR.

1,109,299.

Specification of Letters Patent.

Patented Sept. 1, 1914.

Application filed March 26, 1908. Serial No. 423,354.

To all whom it may concern:

Be it known that I, THEODORE F. MORSE, a citizen of the United States, residing at Silver Creek, in the county of Chautauqua and State of New York, have invented a new and useful Improvement in Grain-Separators, of which the following is a specification.

This invention relates to that class of grain separating or grading machines which comprise shaking screens for separating the grain into several grades according to size, and air trunks for removing the light matter, such as dust, shucks, hulls, chaff, &c., from the grain.

The object of this invention is to increase the separating capacity and the efficiency of this class of machines without materially increasing their size or the floor space which they occupy.

In the accompanying drawings: Figure 1 is a vertical longitudinal section of the machine, in line 1—1, Fig. 6. Fig. 2 is a fragmentary horizontal section in line 2—2, Fig. 1, on an enlarged scale. Figs. 3 and 4 are vertical sections in lines 3—3 and 4—4, Fig. 2, respectively. Fig. 5 is a fragmentary horizontal section in line 5—5, Fig. 1, on an enlarged scale. Fig. 6 is a vertical transverse section in line 6—6, Fig. 1. Figs. 7 and 8 are fragmentary horizontal sections in lines 7—7 and 8—8, Fig. 1, respectively, on an enlarged scale.

Like reference characters refer to like parts in the several figures.

A represents the stationary frame which may be of any suitable construction and B C represent two shaking shoes, each containing an inclined screen, of perforated sheet metal, or other suitable material, the upper shoe containing the screen D and the lower shoe the screen E. These screens are alike in the size of their perforations or mesh, so that each screen effects the same separation of the stream of grain supplied to it into two grades, of which the smaller grade passes through the perforations while the larger grade escapes over the tail end of each screen.

The machine is so organized that the stream of grain fed to the machine is divided into as many equal batches or streams as separating screens are contained in the machine. The machine represented in the

drawings contains two such screens and the stream of grain is therefore divided into two, approximately equal streams, one flowing to the upper screen and the other to the lower screen. Each screen delivers two streams of grain, one formed by the large and the other by the small grade. The two streams of large grain coming from the two screens are united and conducted to an air trunk suitable for separating the light impurities from this grade of grain, while the two streams of small grain also coming from the two screens are united into another stream which is conducted to another air trunk suitable for separating the light impurities from this small grade of grain.

F represents a feed hopper which receives the grain to be separated and from which the grain passes into an ascending preliminary air trunk 10 which is connected at its upper end with a separating hopper 11 from which the air current passes to the eyes 12 of fans 13 arranged on both sides of the machine. 14 represents a conveyer in the hopper 11 for removing the material deposited in the same.

The upper shoe B is provided with the usual preliminary screen 15 for separating coarse, foreign matter, such as sticks, straws, &c., from the grain, the latter passing through the screen, while the large foreign matter escapes over the tail thereof. 16 is an inclined bottom board upon which the grain falls from the screen 15 and by which the grain is conducted to the head board 17 of the upper screen D. This head board is provided with a transverse row of openings 18 which are separated by imperforate or solid portions 19 of the head board of about the same width as the openings. Each of the imperforate portions is covered by a housing, cover or guard 20 which extends lengthwise over this imperforate or solid portion and which is open at the front and rear so that portions of the grain will flow over the solid portions 19 of the head board, on which the grain is confined by the housings or guards, to the upper end of the screen D, while other portions of the grain which pass between the housings or guards 20 will pass downwardly through the feed openings 18 between the same and descend to the lower screen E. The upper shoe B is preferably provided below the feed openings 18 with

transverse baffle boards 21 22 which break the flow of the grain and conduct the grain to the head portion of the lower screen E. The stream of grain supplied to the machine, after passing through the preliminary air trunk 10 and the straw screen 15, is in this manner divided into two batches or streams, one which flows to the upper screen D over conductors formed by the solid portions 19 of the head board 17 and the housings or guards 20, and another which flows from the head board 17 through the feed openings 18 between the conductors to the lower screen E.

The upper shoe B is provided with an inclined bottom 23 which collects the small grade of grain passing through the upper screen, and the lower shoe C is provided with an inclined bottom 24 which collects the small grade of grain passing through the lower screen E. The large grade of grain which escapes over the tail end of the upper screen D passes through a passage 25 and drops upon a tail board 26 which also receives the large grade of grain tailing off from the lower screen E. The small grade of grain which falls upon the bottom board 23 of the upper shoe escapes from said board through openings 27, Figs. 1, 6 and 7, and is conducted to the bottom board 24 of the lower shoe, where the small grade of grain coming from the upper screen unites with that coming from the lower screen. The discharge openings 27 are preferably separated by inverted V-shaped saddles 28 which conduct the grain to these openings. The grain passes from these openings through four-sided or elongated tubes 29 which are secured to the lower shoe and extend through the tail board 26. The grain passes from these tubes upon a baffle board 30 which is also secured to the lower shoe and from which the grain passes to the bottom board 24.

The tubes 29 extend downwardly in rear of the lower screen E, Fig. 1, and through the tail board 26 thereof, and are separated by spaces through which the large grade of grain from the lower screen flows over the tail board 26. The small grade of grain coming from the upper screen is thereby kept separate from the large grade of grain coming from the lower screen E. By these means the two streams of large grain tailing off from the screens D and E are collected upon the tail board 26 of the lower screen, while the two streams of small grain from the two screens are united upon the bottom board 24 of the lower shoe from which the small grade of grain passes upon the tail board 31.

G represents an ascending air trunk which receives the large grade of grain from the tail board 26, and H represents an ascending air trunk which is arranged in rear of

the air trunk G and receives the small grade of grain from the tail board 31. The air currents flowing through these air trunks are regulated by any suitable means, for instance, by valves 32 and 33 arranged, respectively, in the trunks G and H. The upper end of the front air trunk G for the heavy grade of grain communicates with a separating hopper 34 which in turn communicates with the eyes of the fans and from which the collected material is removed by a conveyer 35. The upper end of the rear air trunk H for the light grade of grain communicates with a separating hopper 36 which in turn communicates with the eyes of the fans. The hopper 36 is arranged above the hopper 34 and is provided at its lower end with a transverse series of depending discharge tubes 37 through which the material deposited in the upper hopper 36 is conducted downwardly into the lower hopper 34 and protected against the air current which flows through the upper portion of the lower hopper 34 between the tubes 37. The material deposited in the hopper 36 is by this means united with the material deposited in the lower hopper 34. The lower portion of the upper hopper 36 is preferably provided with saddles 38 of inverted V-shape between the tubes 37 for the purpose of insuring a complete discharge of the deposited material. The grain which passes from the tail board 26 into the trunk G may be removed by a conveyer 39 or other suitable means. The shaking shoes may be actuated by eccentrics 40 and 41 on a shaft 42 or other suitable means.

The arrangement of two like screens, one below the other and both effecting the same separation produces a separating capacity approximately equal to that of a screen having twice the width of these screens, without increasing the floor space occupied by the machine and without materially increasing the height of the machine or the power required for running the machine. As like grades of grain coming from both screens are united before being subjected to the air separation each air trunk can be proportioned with reference to the particular grade of grain which is supplied to such trunk and the air current in each trunk can be properly regulated. This separating or grading machine is particularly desirable for grading rice preparatory to hulling, but may also be employed for grading other grains or substances.

I claim as my invention:

1. In a separating machine, the combination of a plurality of shaking screens of like mesh arranged one beneath the other, means for directing the material to the head ends of the several screens, the upper screen having a bottom board provided with discharge conduits for the material which passes

through said screen, a tail board at the tail end of the lower screen which is arranged to receive the material tailing off of said screens for uniting said material, and a
5 bottom board for the lower screen, said conduits extending from the bottom board of said upper screen past said lower screen to the bottom board of the lower screen for uniting the material passing through said
10 screens.

2. In a separating machine, the combination of a plurality of shaking screens of like mesh inclining in the same direction and arranged one beneath the other, means for
15 directing the material to the head ends of the several screens, the upper screen having a bottom board provided with discharge conduits for the material which passes through said screen, a tail board at the tail
20 end of the lower screen which is arranged to receive the material tailing off of said screens for uniting said material, and a bottom board for the lower screen, said tail
25 board having openings through which said conduits pass to the bottom board of the lower screen for uniting the material passing through said screens.

3. In a separating machine, the combination of a plurality of screens of like mesh extending in the same direction and arranged one below the other, the upper
30 screen having an extension forming a head board provided with a transverse row of spaced feed openings for the lower screen, open-ended longitudinal feed conductors arranged between said openings leading to the
35 upper screen, a bottom board for the upper screen provided with discharge conduits for the material passing through said screen, a tail board on the lower screen for collecting the material tailing off both screens, said
40 tail board having openings through which said conduits pass to the bottom board of the next lower screen for uniting the material passing through said screens.
45

Witness my hand in the presence of two subscribing witnesses.

THEODORE F. MORSE.

Witnesses:

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W. P. CHRISTY.