(No Model.)

N. B. HIGBIE.

GRAIN CLEANER OR OAT SIFTING MACHINE.

No. 493,429. Patented Mar. 14, 1893.

Fig. 1.

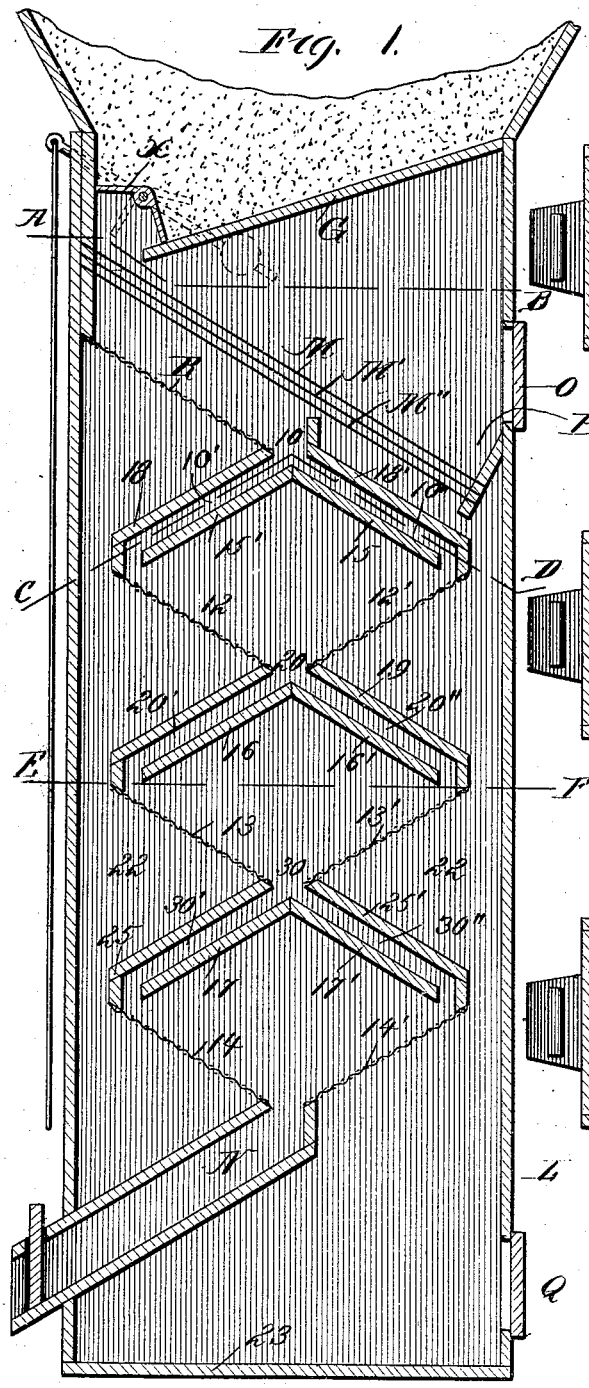


Fig. 2.

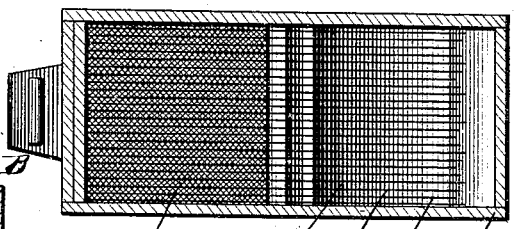


Fig. 3.

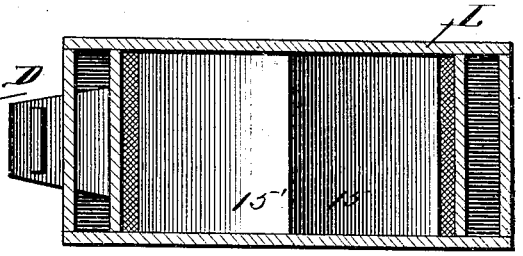
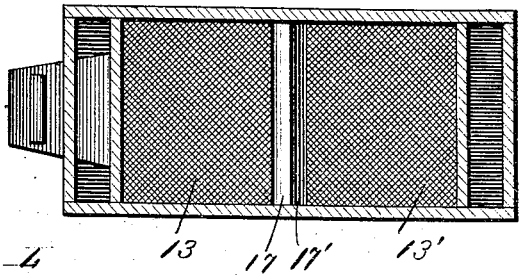


Fig. 4



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GRAIN-CLEANER OR OAT-SIFTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 493,429, dated March 14, 1893.

Application filed May 23, 1892. Serial No. 434,034. (No model.)

To all whom it may concern:

Be it known that I, NATHAN BRADLEY HIGBIE, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Grain-Cleaners, of which the following is a full, clear, and exact description.

My invention relates to an improvement in the class of grain-cleaners which employ a series of perforated surfaces, the openings in which forbid the passage of the grain while they permit the passage of the dust and other impurities; and my invention has for its object to produce a grain-cleaner of this general class which shall be more perfect and more rapid in operation, and which besides causing the separation from the grain of finer impurities shall serve also to separate therefrom the coarser impurities such as hay, lumps of clay, &c., and in producing such a device contribute materially to the economy of construction and rapidity and perfectness of operation.

To these ends, my invention consists in a grain-cleaner comprising a vertically arranged case, which constitutes the dust-receiver, the upper end of which is partly closed by an inclined lid, having at its lower end the controllable valve common in such devices for the admission of the grain. Below the point of admitting the grain are provided downward extending wires arranged in series side by side and such a distance apart as to permit the passage of the grain and material of less dimension while preventing the passage of lumps of clay, or straws, or other things of greater dimension. Below the inclined separator, afforded by the wires arranged as described, is located a series of alternate tables and sieves arranged in pairs oppositely diverging and converging, respectively, each table comprising an upper and lower plate, the space between which affords a passage for the downwardly moving grain. These parts are arranged substantially as hereinafter described, whereby perfect freedom of downward movement is assured in the grain, the sifted particles are caused to be delivered into the dust-collector and the cleansed grain to the chute for removal from the device.

My invention also consists in the details of construction and arrangement of parts, all as hereinafter more fully set forth.

In the drawings—Figure 1 is a vertical central section taken through a grain-cleaner involving my improved construction. Fig. 2 is a horizontal section taken on the irregular line A B, Fig. 1. Fig. 3 is a horizontal sectional view taken on the irregular line C. D., Fig. 1; and Fig. 4 is a horizontal sectional view taken on the line E F, Fig. 1.

L represents the case terminating in its upper end in the flaring receptacle shown, and having its upper end partly closed by a permanent lid G, which extends from one side nearly to the other of the case. The opening thus left is closed in the usual manner by a door or valve x' comprising a pivoted angle plate adapted to be turned on its pivot with an arm and cord, as illustrated in Fig. 1.

Extending in a downwardly inclined direction across the case from a point contiguous to the door x' at the upper end to a suitable support in the form of a board at the lower end of the incline are parallel wires, M M′ and M″, so arranged with relation to each other that the space between any wire and its nearest neighbor is greater than the dimension of the grains intended to be cleaned, and less than that of the coarser impurities usually found associated with the grain. The introduced grain, upon opening the door x', falls upon the separator produced by the wires M, M′, M″ the grain falling through while the coarser impurities collect at the lower end in the pocket P so that they may be removed through the door O. Substantially parallel with the wires M and arranged below the same is a wire screen R, the upper end and lateral edges of which are joined to the case while the lower end is joined to the oppositely inclined plate 18 extending from side to side of the case. The lower end of the plate 18 continues in the form of a vertical downward extension, the purpose of which will be presently described. Also parallel to the inclined wires M, M′ and M″, and arranged to extend in the opposite direction to the plate 18 is a plate 18′, which at its upper end is provided with the vertical extension shown in Fig. 1, and at its lower end with the downward extension there shown, and the upper ends of the plate 18 and 18′ are separated to afford a passage 10 for the grain which passes through the same from the sieve R and is prevented from passing beyond the opening by the vertical extension of the plate 18′. Immediately below the plates 18 and 18′ are similar plates

15 and 15′ which diverge downwardly from a common point at about the middle of the opening 10, and terminate at their lower extremity at a point away from the downward extension of the plates 18 and 18′, thus affording at the lower end a passage for the egress of the grain passing through the chute afforded by the plates 18, 18′ and 15, 15′. These plates constitute what I have hereinbefore termed the tables, and their purpose is to receive respectively the finer particles sifted through the sieve R, and the grains passing downward along said sieve together with such impurities as were not sifted out. Below the tables 18, 18′ and 15, 15′ and similarly supported in the case is another pair of tables similarly arranged to those described and in all essential respects identical in construction, except that the upward extension of the plate 18 is not repeated. These plates numbered, respectively, 19, and 19′, 16 and 16′ produce the opening 20 and chutes 20′ and 20″, which correspond with the opening 10 and chutes 10′ and 10″. Below these last mentioned tables and in all respects identical in construction are the tables 25, 25′, 17, 17′ providing the opening 30 and chutes 30′, 30″.

Below each pair of tables and leading from the lower edge of each to the inner upper edge of the next below are oppositely inclined sieves 12, 12′, 13, 13′ and 14, 14′, the last named pair of which are connected at their lower ends to the opposite walls of a chute N leading outward from the case. The case is provided toward its lower end above the bottom 23 with a door Q, through which access may be had to the interior for removing the deposited dust and finer impurities.

In operation on opening the door x' the admitted grain falls upon the wire screens made up of the parallel wires M, M′ and M″, which retain the coarser particles which are collected in the pocket P and permit the falling of the grain and finer impurities upon the sieve R. From this sieve the grain passes to the tables 15, 15′ which offer no obstruction to its onward movement, but, by reason of their inclination, give to the grain an accelerated impetus, so that when the latter is directed upon the sieves 12, 12′ the finer particles are more readily separated to pass through the meshes of the sieve upon the fixed ledge or plate 19. The grain partly cleansed thus enters the chute 20′, 20″ to fall thence at accelerated speed, which is greater than the movement along the sieve 12, 12′, because of the absence of obstruction, upon the sieve 13, 13′. The finer particles as before pass through this sieve and through the space 22 upon the ledges or plates 25, 25′, while the grain continues through the chutes 30′, 30″ to the sieves 14, 14′ and thence to the chute N. The deposited finer particles which pass through the sieves respectively fall into the chamber and are collected at the bottom 23 thereof.

The number of sieves and tables may be varied according to the requirements and conditions involved.

The apparatus constructed is found to be substantially perfect in its results for cleaning oats and removing therefrom both the coarser and finer impurities.

The characteristic advantage of the cleaner constructed as herein described is largely due to the rapidity with which the grain is permitted to pass through the same. Ample screening surface is provided with the proper inclination to cause the grains to descend and at the same time to cause the finer particles to escape; while the movement of the grain through the intermediate space where no material benefit from the use of screens is obtained, is permitted to take place with the utmost desirable rapidity, the effect of which besides increasing the speed of the operation, is to produce such a rapid discharge upon the next lower screen as materially to assist the act of separation. The duplication of screening surfaces produces, of course, a mere duplication of the capacity of the apparatus, and as such, only, is not claimed; but in connection with the use of the wires M, M′ and M″ and the pocket P which receives the larger particles deposited thereon, a decided economy results from such duplication. It will be at once apparent that to collect the coarse particles falling along the wires M, M′ and M″, without interfering with the freedom of the movement of the grain, necessitates an elongation of this part of the apparatus and hence of the case; and as such increased dimension is provided, it is quite obvious that compactness will not forbid the provision of a double set of screens and tables.

So far as I am aware, the device here produced is the first which successfully provides for the rapid and slightly interrupted movement of the grain to the full capacity of the admitting chute with substantially perfect cleansing and without clogging.

What I claim as new, and desire to secure by Letters Patent, is—

A grain cleaner comprising, in combination, the case L having the doors O, Q, and provided with the lid G and door x', downwardly-inclined screen wires M, M′, M″ producing the pocket at the lower end thereof, screens R, 12, 12′, 13, 13′, and 14, 14′ converging in a downward direction toward the center of the case arranged in series, chutes 10′, 10″, 20′, 20″, 30′, 30″, and the upper and lower downwardly-diverging plates or tables producing the same, and the chute N, substantially as set forth.

In testimony whereof I have affixed my signature in presence of two witnesses.

NATHAN BRADLEY HIGBIE.

Witnesses:

PHILIP LARMON,

AXEL JOHNSON.