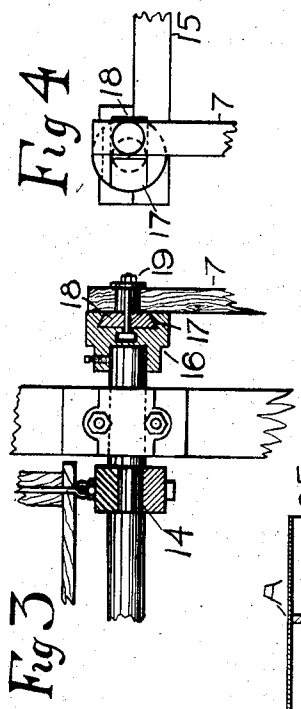
No. 760,832. PATENTED MAY 24, 1904.

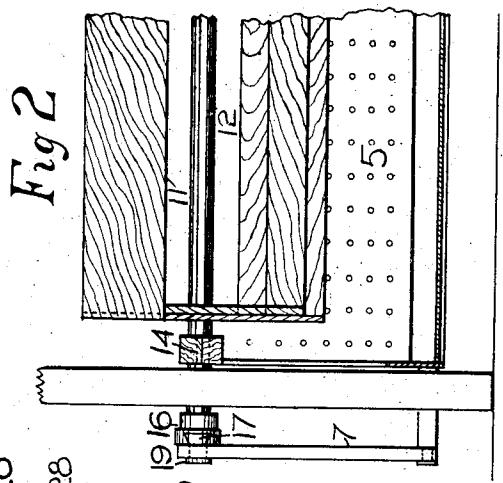
W. WILLIAMSON.

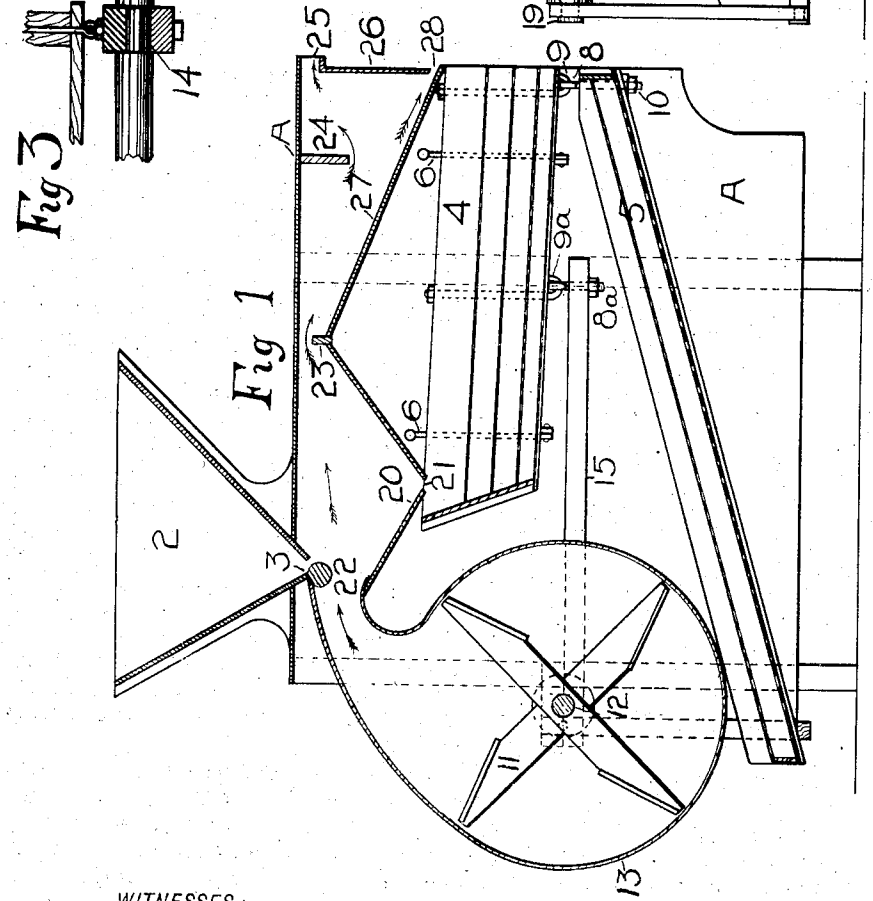
GRAIN CLEANER.

APPLICATION FILED DEC. 31, 1903.

NO MODEL.







WITNESSES:

C. B. McAulay.

J. L. Morse

INVENTOR

William Williamson

BY

Geo. H. Strong ATTORNEY

No. 760,832. Patented May 24, 1904.

UNITED STATES PATENT OFFICE.

WILLIAM WILLIAMSON, OF SAN FRANCISCO, CALIFORNIA, ASSIGNOR OF ONE-HALF TO C. J. WILLIAMSON AND H. E. WILLIAMSON, OF SAN FRANCISCO, CALIFORNIA.

GRAIN-CLEANER.

SPECIFICATION forming part of Letters Patent No. 760,832, dated May 24, 1904.

Application filed December 31, 1903. Serial No. 187,247. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM WILLIAMSON, a citizen of the United States, residing in the city and county of San Francisco and State of California, have invented new and useful Improvements in Grain-Cleaners, of which the following is a specification.

My invention relates to an apparatus which is designed for cleaning grain and separating it from straw, chaff, and other impurities.

It consists in the combination, with loosely suspended, superposed, and connected shoes containing suitable screens, of a fan by which a blast of air may be discharged, two pairs of eccentrics upon said fan-shaft, one pair being connected with the upper and the other with the lower shoe, substantially at right angles with each other, and a means for adjusting the second pair of eccentrics to increase, diminish, or reverse the stroke and to make a reciprocation with any desired relation to the first pair of eccentrics. In conjunction with this device is a superposed hopper and a means for directing a blast through the space between the hoppers, and thus separating out the larger chaff and straw before the grain reaches the screen-carrying shoe.

My invention also comprises details of construction, which will be more fully explained by reference to the accompanying drawings, in which—

Figure 1 is a longitudinal and vertical section. Fig. 2 is a partial transverse section through the fan-case. Fig. 3 is a detail section of the eccentric-drivers. Fig. 4 is a detail end view of the outer driver.

It is the object of my invention to provide a mechanism for the more complete separation of grain from its impurities, and to this end the mechanism is so constructed as to impart a peculiar and different movement to each of the screen-carrying shoes.

As shown in the drawings, A represents a case or frame of any suitable or desired construction. If the apparatus is to be used as a stationary and ordinary grain-cleaner only, this casing will be provided with legs or supports and carry only the grain-cleaning mechanism. Upon the top of this casing, or at the point where the grain is delivered to it, is a hopper 2, having a feed-roller 3 extending across at the lower end of the convergency of the hopper sides. This roller may be driven by any suitable connection, as belt and pulley, from the fan-shaft. The fan-shaft may be either driven by hand, or, if forming a part of a power-machine, by belt, chain, or other desired connection.

4 and 5 are two shoes, suspended one above the other. The shoe 4 is suspended by rods 6, and the shoe 5 has its rear end suspended by a rod 7, connecting with a crank or eccentric, as will be hereinafter described. The rear end of the shoe 5 is connected by links 8 with corresponding hooks 9, formed upon a rod depending from the proper shoe, as shown. The lower end of the link or eyebolt 8 is screw-threaded and has upon it a nut 10, which enables me to take up the connection between the eyebolt and hook to prevent any undue slackness of motion between the two.

11 is a fan mounted upon a shaft 12 and revoluble within an exterior casing 13, as shown. This fan-shaft 12 has two cranks or eccentrics 14 formed in it, and these are connected by rods 15 with opposite sides of the shoe 4. This connection is made by a hook 9^a and an eyebolt 8^a at a point sufficiently distant from the hook 9 and eyebolt 8, and a snug joint may be maintained in a similar manner to that described for the former connections. As the shoe is suspended, as previously stated, by the hangers 6, it will be seen that the revolution of the fan will impart motion through the cranks or eccentrics and the rods 15 and the shoe will be moved in a substantially horizontal direction. This movement is communicated through the links 9 and eyebolts 8 to give the lower shoe 5 a similar movement in unison with that of the shoe 4.

Upon the outer ends of the fan-shaft 12 are fixed disks or equivalent heads 16, which I have here shown formed with transverse dovetailed slots or channels 17, and within these channels slides 18 are movable. These slides carry pins or bolts 19, to which the upper

ends of the connecting-rods and hangers 7 of the lower shoe are attached. It will be seen from this construction that while the cranks or eccentrics 14 will through the connecting-rods 15 impart a substantially horizontal reciprocating motion to both the shoes 4 and 5 the eccentricity of the pins 19 will cause a vertical movement of the lower end of the shoe 5, and this movement combined with the horizontal movement gives a tossing motion to the grain which is moving down the screens to the shoe 5. If the revolution of the fan-shaft be made from right to left from above, the action would be to cause the grain to move rapidly down the shoe; but for the purpose of retarding it and allowing the screens of the shoe 5 to act thoroughly upon the grain and separate from it the smaller worthless grain, such as mustard, I prefer to make the tossing movement such that the upward movement of the lower end of the screen 5 will take place in unison with the movement toward the rear end of the machine, the rear end being in this case the right, and thus the tossing motion will act to throw the grain up the incline and retard its escape from the lower end.

By reason of the movable and adjustable slide 18 it will be readily seen that either of the above-described motions may be imparted to the screen 5, since the pin 18 may be moved along the channel 17, so as to stand upon either side of the center of the shaft and at any desired distance therefrom. In addition to this the head or disk 16 is keyed or secured by set-screw or other suitable means so that it can be turned and the slots or channels 17 made to stand in any desired relation with the other eccentrics 14 of the shaft 12. Thus the horizontal and tossing movement of the screens may be made to bear any relation to each other which will be most effective when doing the work required.

In order to utilize the blast of the fan, which is revolving from left to right, as shown by the arrows, the upper portion of the box or case A is closed, and beneath the hopper 2 is a second hopper 20, with downwardly-convergent sides and a channel 21 at the bottom, through which the grain from the hopper 2 is delivered upon the upper end of the upper shoe 4. The grain passing from the hopper 2 is mixed with a great deal of light straw, chaff, and other impurities, and a blast of air from the fan 11 passes through a throat 22 at the upper part of the fan-case and is by this throat directed below the bottom of the hopper 2 and above the hopper 20, thus crossing the falling grain and separating the chaff and light stuff from it, carrying it over the deflector 23, which extends upwardly from the rear edge of the hopper 20, and thence beneath the deflector 24, which extends downwardly from the top of the casing A, and thence the chaff may pass out, as shown by the arrow, through an escape-passage 25, located above the back 26 of the case and between the top of this back and the top of the case A. It will be seen by the line of arrows that this passage is tortuous, and any grain which might be thrown backward by the intensity of the air-blast the heaviest would first fall within the rear portion of the hopper 20 and slide down to the point of delivery. Any that might be carried over the deflector 23 would in like manner slide down the incline 27, which forms a junction with the top of the hopper 20 and the deflector 23, and its lower end forms, with the back 26, a channel 28, through which any grain or material heavier than the chaff may be discharged with the discharge from the rear of the shoe 4. The chaff and like material following the tortuous passage before described will be discharged through the opening 25, and the larger portion of the grain, falling from the hopper 2 through the hopper 20 upon the screens of the shoe 4, will be separated, first, from oats, barley, and coarser material, then in the final shoe 5, into which the grain falls, the mustard and fine seeds will be separated, while the best grain passes over the lower end of the shoe 5.

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

1. The combination in a grain-cleaner and the exterior casing thereof, of superposed shoes, the upper suspended to swing substantially horizontally and lengthwise of the frame, the lower having its rear end suspended from the rear end of the upper shoe, a fan-shaft having cranks, connecting-rods between said cranks and the upper shoe whereby a substantially horizontal movement is imparted, other adjustable cranks and rods connecting them with the lower end of the lower shoe, whereby a variable compound motion is imparted to the shoes.

2. The combination in a grain-cleaner and the casing thereof, of superposed shoes suspended within the casing, a crank-shaft, rods connecting with the upper shoe to produce a longitudinal substantially horizontal movement thereof, other adjustable crank or eccentric pins attached to the same shaft, rods by which the lower end of the lower shoe is connected with said adjustable cranks and an eye-bolt-and-link connection between the rear contiguous ends of the two shoes.

3. The combination in a grain-cleaner and the casing thereof of superposed suspended shoes, a casing therefor, two pairs of cranks formed upon said fan-shaft, one pair being connected with the upper shoe and the other pair connected with the lower end of the lower shoe, primary and secondary hoppers located one above the other having discharge-passages at the bottom of each, directing means where-

by the air-blast from the fan is delivered across the line of the grain falling from one hopper to the other.

4. The combination with a grain-cleaner and the casing thereof of superposed suspended connected shoes, cranks and connecting-rods by which a horizontally-reciprocating motion of the upper shoe and the rear end of the lower shoe is effected, other cranks whereby a vertical tossing motion of the lower end of the lower shoe is simultaneously effected and means for adjusting said second cranks to reverse or regulate their throw.

5. The combination in a grain-cleaner and the casing thereof of superposed suspended screen-carrying shoes having the rear ends connected and the lower shoe diverging downwardly from the point of connection, means by which a substantially horizontal oscillation of the upper shoe and the rear end of the lower shoe is effected, means for producing a simultaneous vertical movement of the lower end of the lower shoe, a fan and guide-openings whereby the blast is delivered horizontally through the upper part of the casing, a hopper through which grain is delivered into the upper shoe, a feed-hopper located above and between which hoppers the air-blast is discharged.

6. The combination in a grain-cleaning apparatus, of superposed suspended screen-carrying shoes having their rear ends contiguous and connected and the lower shoe diverging downwardly from the point of connection, means by which a substantially horizontal oscillation of the shoes is produced, and a second crank or eccentric connection with the lower end of the lower shoe, said crank being reversible and adjustable with relation to the first-named crank to change the motion of the lower shoe relative to that of the upper one.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

WILLIAM WILLIAMSON.

Witnesses:
S. H. NOURSE,
JESSIE C. BRODIE.