

No. 646,955.

Patented Apr. 10, 1900.

F. W. CRAIG.
GRAIN SEPARATOR.

(Application filed Apr. 15, 1899.)

(No Model.)

2 Sheets—Sheet 1.

Fig. 1.

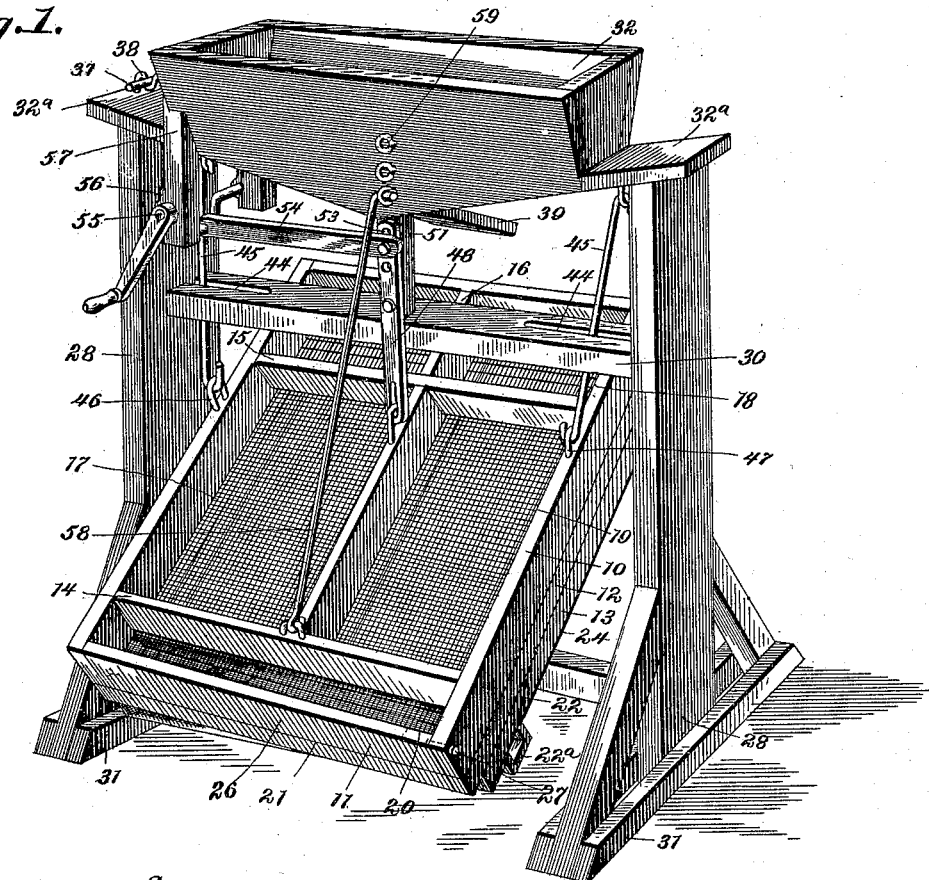
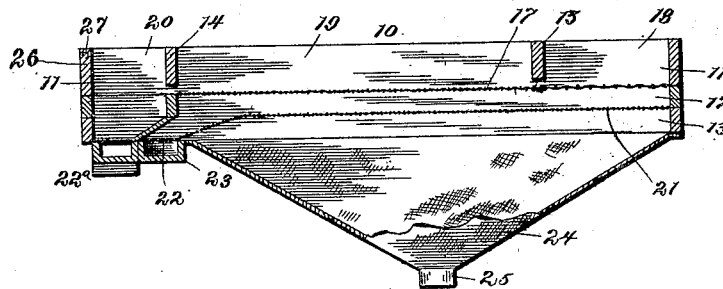


Fig. 6.



Witnesses.
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F. W. Craig, Inventor,

By his Attorneys,

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No. 646,955.

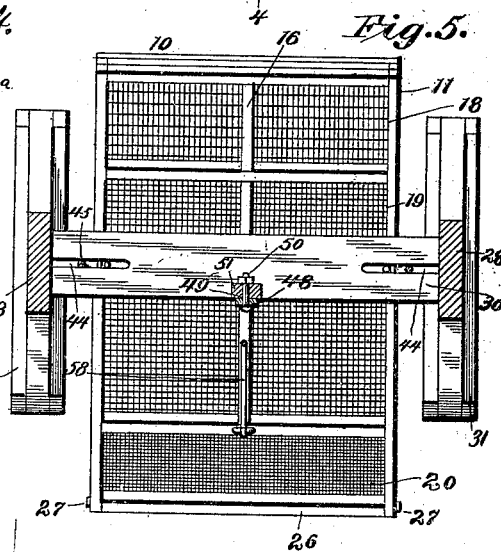
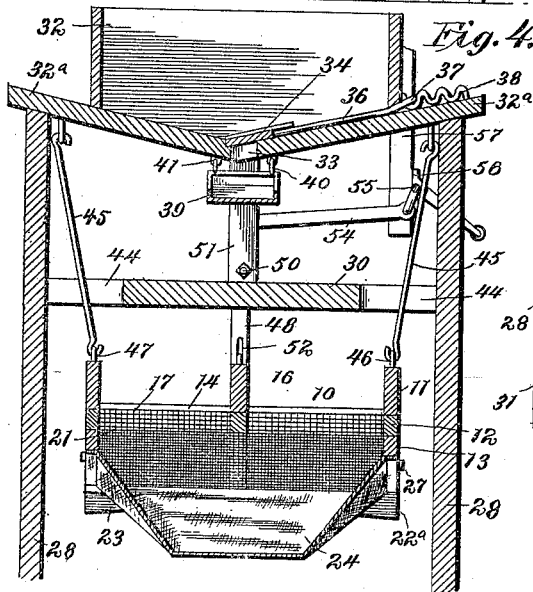
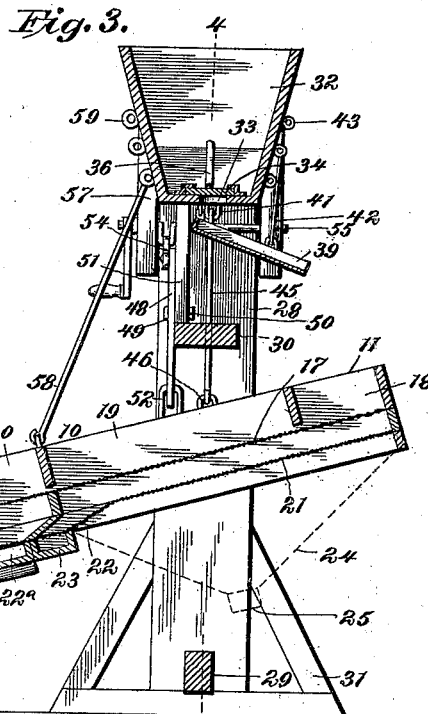
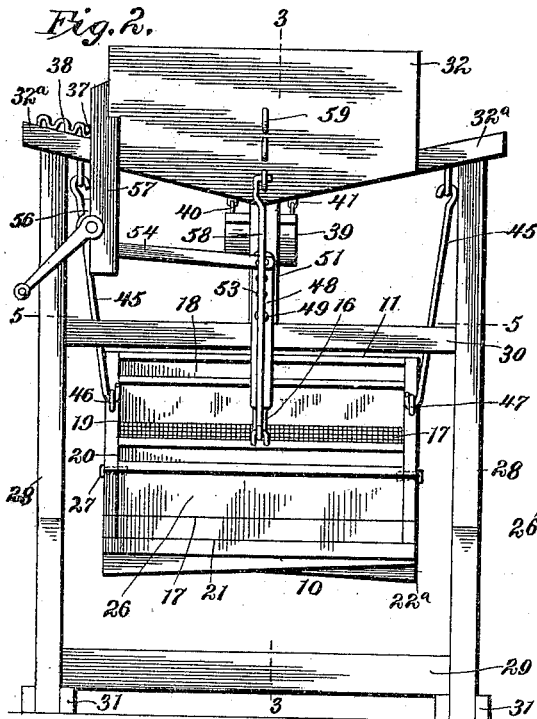
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2 Sheets—Sheet 2.



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UNITED STATES PATENT OFFICE.

FRANKLIN W. CRAIG, OF MARION, VIRGINIA, ASSIGNOR OF THREE-FOURTHS
TO JOHN B. NEAL, JR., WILLIAM S. ROBINSON, AND SAMUEL R. BONHAM,
OF SAME PLACE.

GRAIN-SEPARATOR.

SPECIFICATION forming part of Letters Patent No. 646,955, dated April 10, 1900.

Application filed April 15, 1899. Serial No. 713,139. (No model.)

To all whom it may concern:

Be it known that I, FRANKLIN W. CRAIG, a citizen of the United States, residing at Marion, in the county of Smyth and State of Virginia, have invented a new and useful Grain-Separator, of which the following is a specification.

My invention relates to improvements in grain-separators; and one object in view is to provide a simple construction which may be easily operated to effect the separation of the desirable first-grade wheat from the cheat, cockle, rye, and faulty grain.

A further object in view is to provide means by which the inclination and shaking movement of the separator-shoe may be regulated to vary the rate of feed of the grain through said shoe and to secure a thorough separation or grading of the wheat from the tailings.

With these ends in view the invention consists in the novel combination of elements and in the construction and arrangement of parts, which will be hereinafter fully described and claimed.

To enable others to understand the invention, I have illustrated the same in the accompanying drawings, forming a part of this specification, and in which—

Figure 1 is a perspective view of a grain-separator constructed in accordance with my invention. Fig. 2 is an elevation looking at the delivery end of the shaking-shoe. Fig. 3 is a longitudinal sectional view on the plane indicated by the dotted line 3 3 of Fig. 2. Fig. 4 is a vertical cross-sectional elevation on the plane indicated by the dotted line 4 4 of Fig. 3. Fig. 5 is a horizontal sectional plan view on a plane above the cross-bar of the supporting-frame, the section being taken on the line 5 5 of Fig. 2. Fig. 6 is an enlarged vertical longitudinal sectional view of the shaking-shoe, showing the canvas receptacle.

The same numerals of reference are used to indicate like and corresponding parts in each of the several figures of the drawings.

The shaking-shoe 10 of my improved grain-separator is constructed with a plurality of screens arranged to effect the thorough separation of the wheat from the cheat, cockle, rye, and faulty grain and also to effectually

grade the wheat into desirable first and second qualities of grain. This shaking-shoe is peculiar to my separator in that it is arranged in an inclined position and is mounted or suspended for a rectilinear lateral movement, as will hereinafter appear. This shoe has a substantial frame 11 of suitable dimensions and preferably rectangular in form, and said frame is equipped with battens 12 13 on the lower side thereof, said battens arranged to securely fasten the wheat and cockle screens to the frame. The interior of the frame proper, 11, is divided into compartments by the employment of transverse partitions 14 15 and the longitudinal partition 16. The partitions 14 15 are secured to the sides of the frame at proper distances from the ends thereof and from each other, and these transverse partitions are arranged slightly above the plane of the upper wheat-screen, so that the grain will pass beneath the partitions in order to travel lengthwise of the shoe. The longitudinal partition 16 is between and parallel to the sides of the frame, and at its ends said partition 16 is fastened to the transverse partition 15 and the head-rail of the frame 11. The upper wheat-screen 17 consists of a series of sections 18 19 20, the meshes of which are of different sizes. These screen-sections 18 to 20, inclusive, are fitted to the lower edge of the frame 11 and are clamped firmly in place by the battens 12, which are fastened to said frame 11, whereby the battens and the partitions serve to stretch the sectional wheat-screen 17, and thereby maintain said screen in a taut condition to insure efficiency in the separation of the tailings from the desirable first grade of wheat.

The grain from an elevated hopper is directed by suitable delivery devices upon the screen-section 18 at the head of the shoe, and said screen-section 18 is made of wire fabric the meshes of which are approximately three by ten to the square inch. The next section 19 of the upper wheat-screen has smaller meshes, which are approximately seven by seven to the square inch, and the lower section 20 of the upper wheat-screen is made of meshed fabric, the meshes of the screen 20 being four by four to the square inch. The

lower screen 21 of the shaking-shoe is a single piece of wire fabric arranged at a proper distance below and parallel to the upper wheat-screen 17. This lower screen 21 is the cockle-screen, and its meshes are approximately three by twelve to the square inch. The final screen 22 is a short screen below the screen 21 at the lower delivery end of the shaking-shoe, and the meshes of said screen 22 are sixteen by sixteen to the square inch. The upper screen 17 of the shoe is arranged to deliver the first grade of wheat to a transverse chute 22^a, which is arranged at the lower end of the shoe, so as to have the open delivery end of said chute discharge into a receptacle placed at one side of the machine. The chute 23 is adjacent to the wheat-chute 22^a, and it receives the second grade of wheat or tailings from the screens 21 and 22. On the under side of the shaking-shoe is a canvas receptacle 24, which covers the lower screen 21 in order to receive the tailings which pass therethrough. The lower screen 21 is fastened to the shoe-frame by means of the battens 13, which are fastened to the battens 12 in order to clamp said screen 21 between the two sets of battens, and the canvas receptacle 24 is fastened to the lower set of battens 13 in any suitable way, said receptacle having a central discharge-spout 25.

The wheat passes over the sectional upper screen 17 of the shaking-shoe, while the faulty grain, cheat, rye, and cockle pass through this upper screen and lodge upon the second screen 21. The second grade of wheat passes over this lower screen 21, while the tailings pass through said lower screen and accumulate in the canvas receptacle. At the delivery end of the shaking-shoe I employ a gate 26, which is pivotally supported, as at 27, in the side rails of the frame 11. Said gate is hung to the shoe-frame above the upper screen 17, and any large grain, beans, or peas are free to pass this gate, while the wheat passes through the screen-section 20 and is deposited in the transverse chute 22^a.

The shaking-shoe of my separator is suspended in an inclined position within an upright frame. This frame has a pair of posts 28, which are united firmly together by the transverse braces 29 30, and said posts are also provided with feet or bases 31, which serve to sustain the separator firmly in place on the floor without fastening the supporting-frame in position. The hopper 32 of the separator is supported on the posts of said frame by the cap-rails 32^a, and in the bottom of this hopper is a discharge-opening 33. A slide or regulating valve 34 is adapted to traverse the delivery-opening of the hopper, and said valve is adjusted by means of a rod 36. Said rod has its inner end fastened firmly to the slide-valve, and it passes loosely through an opening in one wall of the hopper. A protruding end of the valve-rod is formed with a handle 37, which may be adjusted to en-

gage with either of a series of notches provided in the corrugated keeper 38, which is fastened to one of the cap-rails 32 at a point outside of the hopper and within convenient reach of the operator. To adjust the valve, the rod 36 is turned to free its handle 37 from the keeper, and said rod may then be moved endwise through the aperture of the hopper to adjust the valve 34 to the desired position across the delivery-opening 33, thus regulating the flow of grain from the hopper to the feed-chute 39. The handle of the valve-rod is adapted to engage with the keeper in order to prevent the valve from moving accidentally out of position.

The feed-chute 39 is arranged in an inclined position below the hopper 32, and said chute extends beyond the frame and hopper to a position contiguous to the head of the inclined shoe 10 in order to deliver the grain upon the upper section 18 of the wheat-screen 17. The feed-chute is suspended by means of hangers 40, which are attached to eyebolts 41 on the hopper or the cap-rails 32^a of the frame, and the inclination of this feed-chute may readily be varied by means of an adjusting link or links 42, connected with the chute 39 and adapted to engage with one or the other of a series of adjacent eyes 43, supported on the front wall of the hopper. The transverse brace 30 of the supporting-frame, which lies below the hopper 32, is provided with longitudinal slots 44, which lie transversely or at right angles to the axis of the inclined shoe 10, and through these slots 44 pass the hangers 45, that serve to suspend the shaking-shoe 10. The upper ends of the hangers 45 are pivotally connected to the cap-rails 32^a of the frame, and the lower ends of said hangers are connected detachably to the sides of the shoe-frame 11. The hangers are free to move or play in the slots 44 of the frame-brace 30 in a direction at right angles to the axis of the shaking-shoe 10, and said hangers serve to permit the shoe to move or reciprocate laterally, whereby the slotted brace-rail 30 prevents the hangers and the shoe-frame from partaking of an endwise-reciprocating movement. As shown by the drawings, the side rails of the frame 11 are provided with eyebolts 46 47 at points intermediate their length for the detachable connection of the hangers 45 to the shoe-frame, and this connection of the hangers to the frame permits the latter to be easily removed from the machine.

As one means for driving the inclined shoe in a lateral rectilinear path I employ the driving-lever 48, which is erected in an upright position on the brace 30 of the supporting-frame. This driving-lever is fulcrumed at a point intermediate its length, as at 49, to a bolt 50, which is supported by the stirrup 51. The lower end of the driving-lever has a loose connection 52 with the shoe-frame, and the vibration of the lever on this fulcrum

serves to move the shoe-frame in a lateral rectilinear path, the hangers 45 swaying with the shoe-frame in order to play in the slots 44, which confine the hangers and the shoe against endwise movement. The upper end of the driving-lever 48 has a series of apertures 53, into either of which may be fitted one end of a pitman 54, whereby the pitman may be shifted on the driving-lever to vary the stroke or movement thereof and correspondingly regulate the lateral shaking travel given to the inclined shoe. This pitman 54 is connected operatively with a crank of the crank-shaft 55, which is journaled in the proper bearings 56 of the hopper-arms 57, which are fastened to the hopper at one end thereof or to the cap-rails of the supporting-frame. It is to be observed that the lever is fulcrumed above the shoe and that its lower end is pivoted to the shoe nearly in line with the hangers. The link connection between the upper end of the lever and the crank-shaft imparts vibration to the lever for the purpose of making the lever impart a like vibration to the shoe.

It will be observed that the inclined shoe is suspended at points intermediate its length by the hangers 45, and in order to prevent the shoe from tilting on the hangers and to provide for the adjustment of the shoe to variable inclinations I employ the adjustable link 58. One end of this link is connected loosely to an eye or staple on the shoe-frame near the lower end thereof, and the other end of said link has shiftable connection into engagement with either of a vertical series of eyes 59, which are attached to the rear wall of the elevated hopper 32. It will be noted that the upper end of the link 58 may be connected to the lower eye of the series of eyes 59 to give a certain inclination to the shoe-frame. To vary the angle of said shoe, the link 58 may be connected to the upper or intermediate eye of the series 59.

The grain passes from the hopper through the opening 33 into the feed-chute 39, which in turn deposits the grain upon the section 18 of the upper screen. The operator rotates the crank of the shaft 55 to drive the lever 48, which imparts the lateral shaking motion to the suspended shoe, and in the movement or travel of this shoe the link 58 turns freely on its connections with the hopper and the lower part of the shoe-frame. As the shoe is shaken transversely the grain is distributed over the screen-section 17 on opposite sides of the longitudinal partition 16, and the grain is caused by gravity to travel along the sections 18 19 20 of the upper screen. The desirable first grade of wheat is retained by the upper screen until it reaches the section 20 at the lower end of the shoe, and this first-grade wheat is free to pass through the screen-section 20, while the peas and beans are discharged from the shoe past the gate 26. The second grade of wheat passes through the upper

screen 17 and lodges upon the screen 21 and is discharged from this screen 21 into the chute 23, while the rye, &c., pass into the canvas receptacle 24 to be discharged from the spout 25 thereof. The inclination of the feed-chute 39 may be varied by adjusting the link 42, and in like manner the inclination of the shoe 10 may be varied by adjusting the link 58, whereby the capacity of the shoe to clean the grain may be regulated, and the wheat is graded to suit commercial demands. The travel of the inclined shoe will be regulated by adjusting the pitman 54 toward or from the fulcrum of the driving-lever 48, thus changing the capacity of the shoe.

Changes in the form, proportion, size, and the minor details of construction within the scope of the appended claims may be resorted to without departing from the spirit or sacrificing any of the advantages of this invention.

What I claim is—

1. In a grain-separator, the combination with an open frame, and a hopper, of the inclined shoe within said frame, the single pair of hangers connected pivotally to the frame and to the shoe near the middle of its length, the adjusting-link connecting the lower end of the shoe to the frame, and said link coacting with the hangers to thereby suspend the shoe within the open frame, means for adjusting the link endwise and changing the angle of inclination of the shoe, means for driving the inclined suspended shoe in a lateral path and connected to the shoe independently of the hangers or the adjusting-link, and guiding devices arranged transversely to the longitudinal axis of the shoe and slidably receiving the hangers to allow the lateral swing thereof and the consequent lateral movement of the shoe, but restraining the latter against longitudinal movement, substantially as described.

2. The combination of the open frame, the hopper, the shaking screen-shoe, the transverse brace, 30, above the shoe and formed with the longitudinal guide-slots, 44, the hangers pivoted to the frame above said brace, passing through said guide-slots, and connected at their lower ends to the shoe near the middle of its length, the lever fulcrumed above the shoe and pivoted at its lower end to the shoe nearly in line with the hangers, means connected with the upper end of said lever for imparting vibration thereto, and the adjusting-link supporting the lower end of said shoe, substantially as described.

3. In a grain-separator, the combination of a frame having one of the braces thereof provided with longitudinal slots, said slots arranged at right angles to the longitudinal axis of a separator-shoe, hangers connected to said frame and passing freely through said slots, an inclined shoe connected about the middle of its length to said hangers, a hopper, means for conveying grain from said hopper to the shoe, an endwise-movable adjusting-link con-

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§ nected to the shoe and having shiftable connection with the hopper for varying the inclination of the shoe, said link and hangers cooperating to wholly suspend the shoe within the frame, and means for imparting a lateral positive shaking motion to the shoe, substantially as described.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

FRANKLIN W. CRAIG.

Witnesses:

J. H. GOLLEHON,
JNO. R. SEXTON.