

No. 673,875.

Patented May 14, 1901.

J. S. JORDAN.

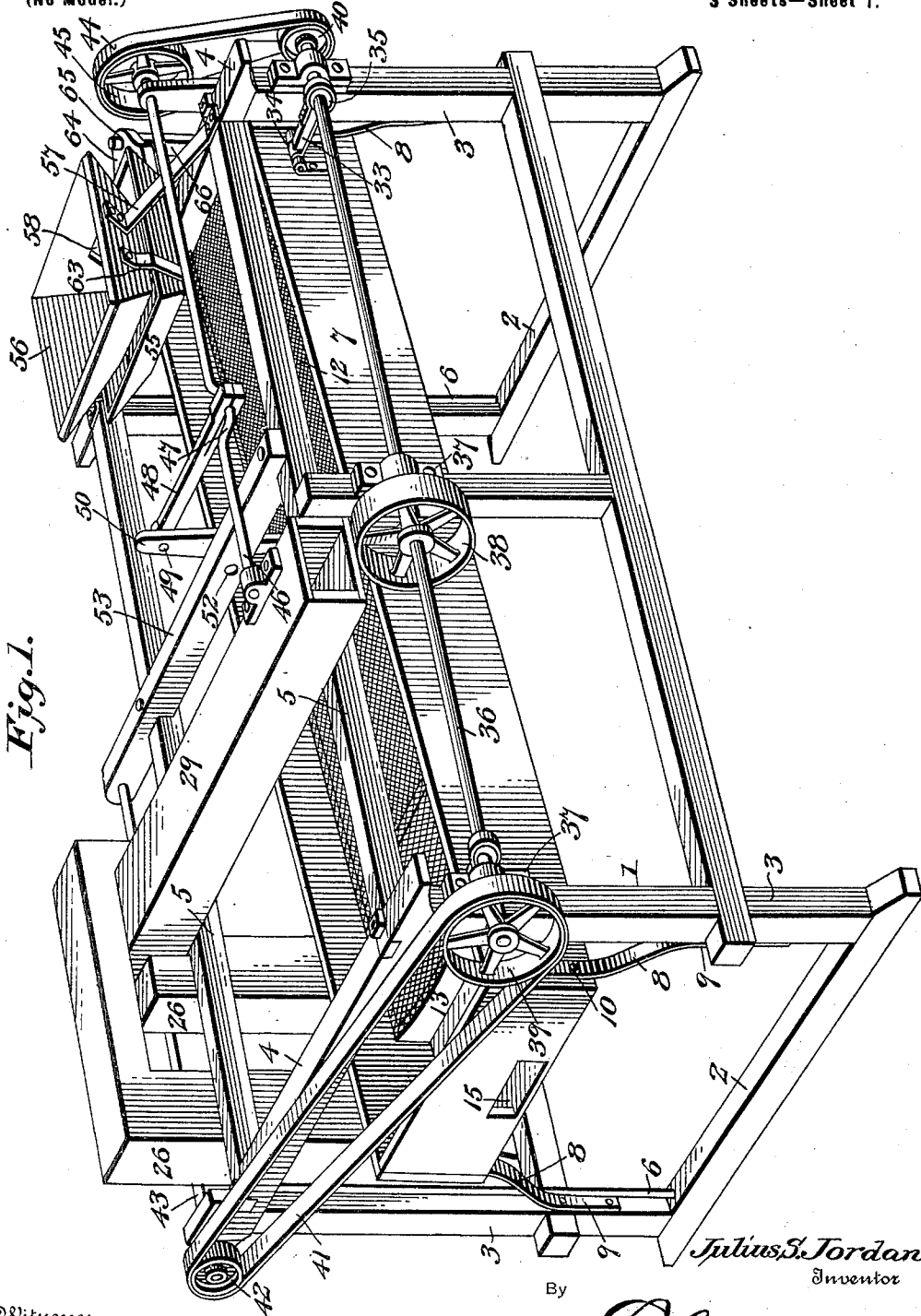
GRAIN SEPARATING AND CLEANING MACHINE.

(Application filed June 18, 1900.)

(No Model.)

3 Sheets—Sheet 1.

Fig. 1.



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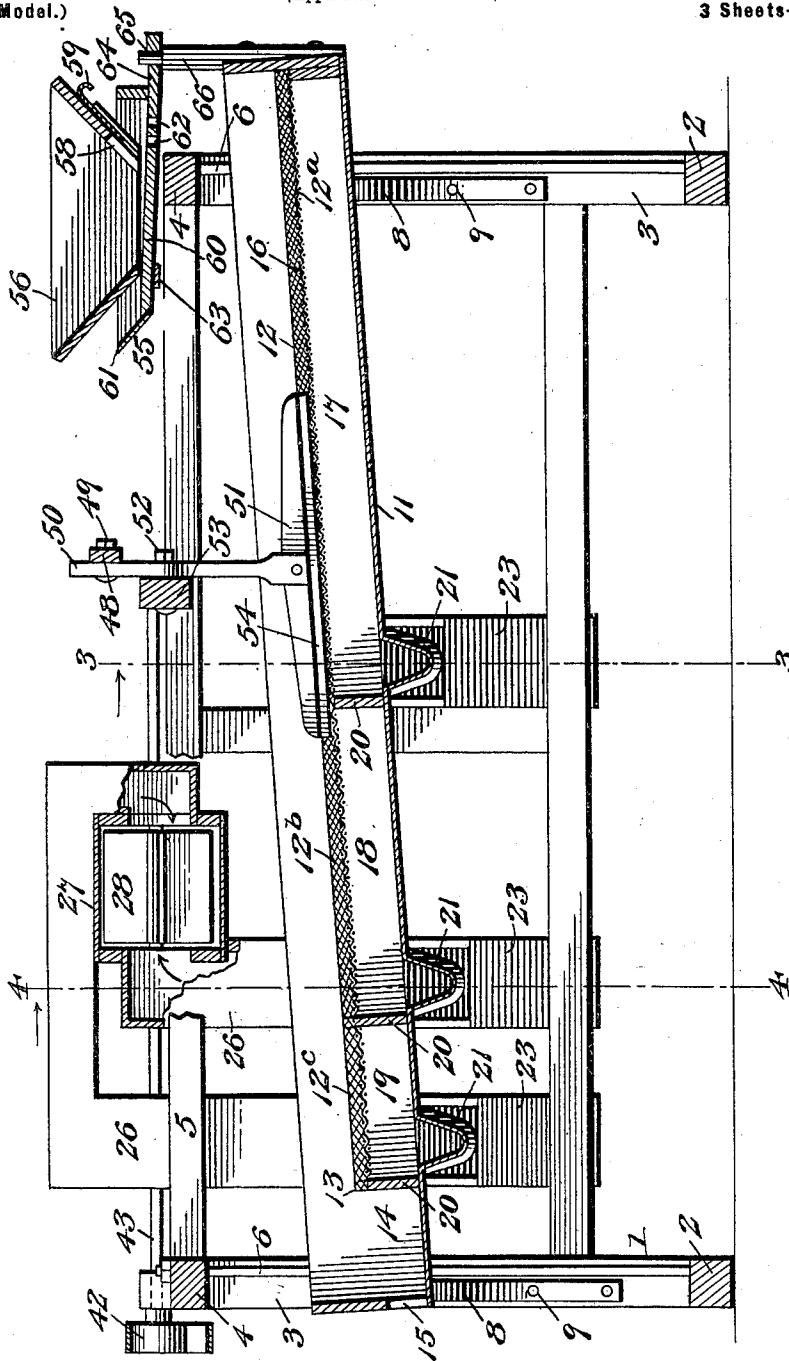
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(No Model.)

3 Sheets—Sheet 2.

Fig. 2.



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3 Sheets—Sheet 3.

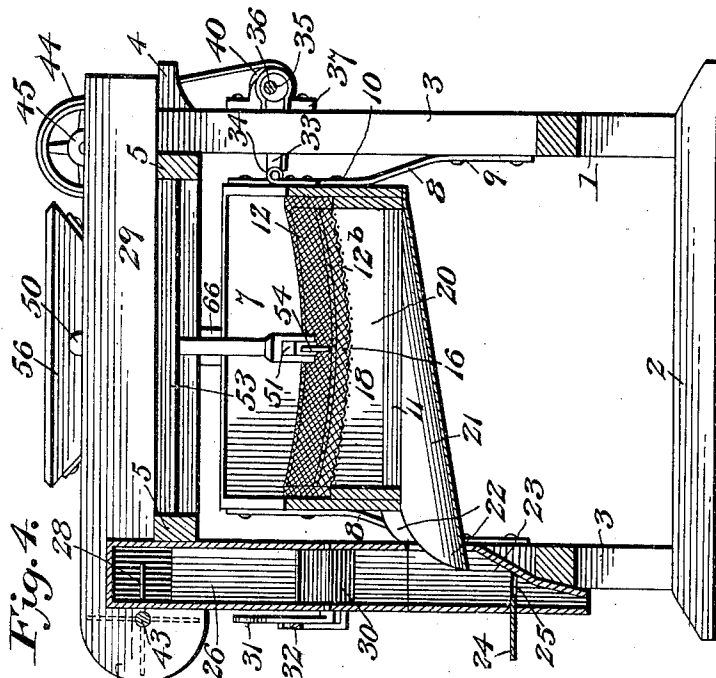


Fig. 4.

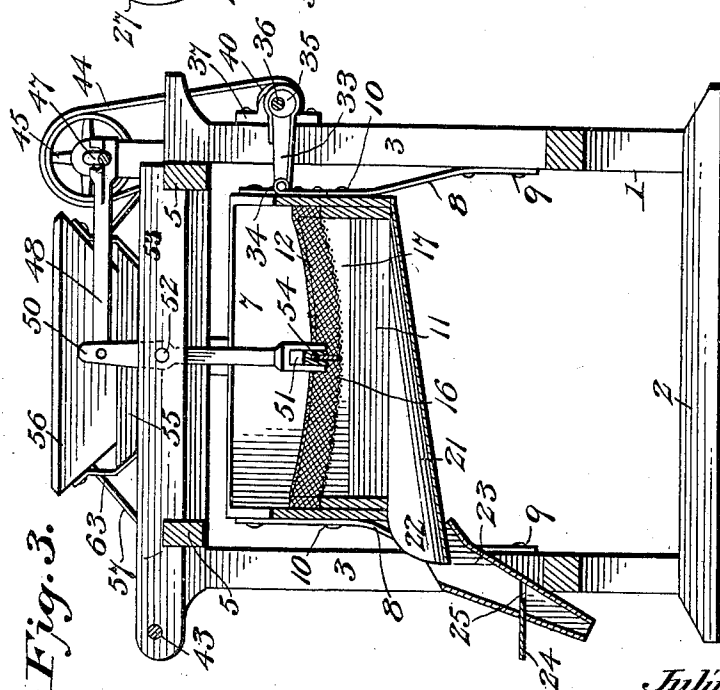


Fig. 3.

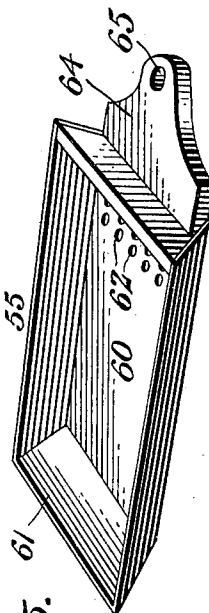


Fig. 5.

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UNITED STATES PATENT OFFICE.

JULIUS SIDNEY JORDAN, OF MAPLE, SOUTH CAROLINA.

GRAIN SEPARATING AND CLEANING MACHINE.

SPECIFICATION forming part of Letters Patent No. 673,875, dated May 14, 1901.

Application filed June 13, 1900. Serial No. 20,748. (No model.)

To all whom it may concern:

Be it known that I, JULIUS SIDNEY JORDAN, a citizen of the United States, residing at Maple, in the county of Colleton and State of South Carolina, have invented a new and useful Grain Separating and Cleaning Machine, of which the following is a specification.

This invention relates to grain separating and cleaning machines, and has special reference to an improved machine of this character which may be properly termed a "shaking-bolt" and which possesses special utility in the separation and cleaning of grist and meal.

To this end the invention contemplates a simple and practical form of separating-machine having means for effectively separating good stock from foreign matter, while at the same time providing for a thorough cleaning thereof and its separation into the desired number of grades.

A further object of the invention is to equip the machine with improved means for causing the stock to travel evenly in a uniform path throughout the length of the separating-shoe, while at the same time causing the same to be evenly spread or distributed over the screen-floor of the shoe in order to insure not only a thorough separating action, but also causing the screen-floor to be kept clean and free from clogs.

Another object of the invention is to associate with the machine an improved feeding device for evenly and automatically feeding the stock to be treated into the extreme upper end portion of the separating-shoe.

With these and many other objects in view, which will more readily appear as the nature of the invention is better understood, the same consists in the novel construction, combination, and arrangement of parts herein-after more fully described, illustrated, and claimed.

The essential or fundamental features of the invention are necessarily susceptible to modification without departing from the spirit or scope thereof; but the preferred embodiment of the improvements is shown in the accompanying drawings, in which—

Figure 1 is a perspective view of a separating and grading machine constructed in ac-

cordance with the present invention. Fig. 2 is a vertical longitudinal sectional view thereof. Fig. 3 is a vertical transverse sectional view on the line 33 of Fig. 2. Fig. 4 is a similar view on the line 44 of Fig. 2. Fig. 5 is a detail in perspective of the vibratory feed-pan for distributing the stock from the hopper.

Like numerals of reference designate corresponding parts in the several figures of the drawings.

In carrying out the invention the working parts of the machine are supported by a suitable frame 1, which is preferably of a skeleton formation and essentially consists of the oppositely-located base-sills 2, corner-posts 3, arising from the base-sills, top cross-bars 4, connecting the upper ends of the oppositely-located pairs of corner-posts, and longitudinal top stringers 5, connecting the oppositely-located top cross-bars 4, preferably inside of the plane of the corner-posts 3, to provide an exceptionally strong and thoroughly-braced frame structure. To secure the parts of the frame more firmly together, there may be employed a series of tie-rods 6, arranged at the inner sides of the corner-posts 3 and bolted, respectively, through the base-sills 2 and the top cross-bars 4 thereabove, and the upper bolted ends of the said tie-rods 6 may be arranged to pass through the ends of the top stringers 5, connected to the top cross-bars 4. In addition to the elements specified suitable braces may be associated with the frame at such points as may be found necessary to strengthen the same; but it will of course be understood that the manner of assembling the frame members and the precise construction of the frame itself may be varied without affecting the working parts of the machine, although it is desirable that a frame of suitable strength and rigidity be employed to support the different parts.

The skeleton frame 1 is of a general rectangular shape, being of a considerably greater length than width, and is designed to accommodate within the same the separating-shoe 7. The separating-shoe 7 extends longitudinally within the supporting-frame 1 from end to end of the latter and is yieldingly sustained in operative position therein by means of yielding supports 8, preferably in the form of spring-straps, secured fast at their lower ends, as at

9, to the inner sides of the frame and at their upper ends, as at 10, to the outer sides of the shoe 7. The said spring supporting-strips 8 are preferably located at or near the corners 5 of the shoe 7, so as to evenly support the same and permit of the free lateral vibration or shaking motion thereof, it being observed that the shoe 7 is of a less width than the frame, within which it is arranged, and that the 10 spring supporting-strips 8 stand off from the inner sides of the frame 1 to provide for the necessary play of the shoe.

The laterally vibrating or shaking separating-shoe 7 is preferably in the form of an open 15 rectangular pan which is longitudinally inclined and is provided above its main imperforate bottom or bottom plate 11 with a false screen-floor 12. The false screen-floor 12 extends longitudinally of the shoe-body nearly 20 the entire length thereof and terminates at the point 13 short of the extreme lower end of the pan-body to leave within said lower end a discharge-pocket 14 for the tailings or un-separated matter, which finds escape from the 25 said pocket through the tailings-opening 15 in the lower end wall of the shoe.

An important feature of the present invention resides in having the screen-floor cross-sectionally concaved throughout its entire 30 length from side to side of the shoe-body, thereby providing what may be properly termed a "longitudinally-depressed gutter" 16, running centrally of the floor 12 in a longitudinal direction, so that the stock will 35 maintain a general running direction longitudinally of the shoe by reason of tending to follow the gutter. This formation of the screen-floor also facilitates the spreading of the stock in a manner to be presently explained; but at this point it is to be noted that 40 the said screen-floor 12 is made up of a series of separate sieve-sections 12^a, 12^b, and 12^c, which are respectively of different mesh and are longitudinally alined to constitute substantially flush portions of the complete separating-floor. The division of the screen-floor into a plurality of sieve-sections is for the purpose of separating the stock into as many 45 grades of meal and grist as desired, or, in fact, to separate any grain treated in the machine into the proper number of grades, and in order to maintain a complete separation of the different grades of stock from each other there is inclosed between the screen-floor and the main bottom 11 of the shoe a series of partitioned receiving-compartments 50 17, 18, and 19, respectively, which are separated by transverse partition-pieces 20, interposed between the screen-floor and the main bottom of the shoe, and said receiving-compartments are arranged, respectively, between 55 the sieve-sections 12^a, 12^b, and 12^c to individually receive the portions of the stock passing therethrough. At the lowermost end 60 of each of the receiving-compartments 17, 18, and 19 the main bottom or bottom plate 11 has formed therein a transverse discharge-

trough 21, each of said discharge-troughs being longitudinally inclined and provided at the open end thereof, at one side of the shoe 70 7, with a spout extension 22, which loosely overhangs the upper receiving end of the fixed delivery-chute 23, suitably mounted on the exterior of the frame 1, at one side thereof, and adapted to deliver the grade of stock 75 received therein into the bag, barrel, or other receptacle which may be placed therebeneath. Each of the said fixed delivery-chutes 23 may be conveniently fitted with a cut-off slide 24, 80 working through a suitable slide-opening 25 in the outer side of the shoe and adapted to cut off the flow of material therethrough during the removal and replacing of the bag or other receptacle to be filled.

As already explained, there is a discharge- 85 trough 21 for each of the compartments 17, 18, and 19, and there is also a fixed exterior delivery-chute 23 associated with each of the said troughs 21, and in order to provide for the proper cleaning of the grades of stock 90 which pass over the first sieve-section 12^a and are separated out respectively into the compartments 18 and 19 the delivery-chutes 23 for such compartments are preferably fitted directly to draft-flues 26. In the embodiment 95 of the invention shown in the drawings a pair of the draft-flues 26 are employed, and although it is immaterial in which direction these draft-flues run the convenient arrangement thereof is the one shown in the drawings, 100 which consists in disposing the pair of flues 26 in an upright position upon the frame 1, at one side thereof, so as to extend above the chutes 23 for the compartments 18 and 19 to cause an upward draft of air through 105 said chutes as the grain or stock falls there-through, thus providing for thoroughly cleaning the grain and stock passing through said chutes and carrying all light foreign matter upward into the casing 27 of a common cleaning-fan 28. The separate draft-flues 26 are 110 connected, respectively, with the opposite inlet-eyes of the fan-casing 27, and the said casing is further provided with a discharge-trunk 29, which may be conveniently supported 115 transversely on top of the machine-frame 1 and which may extend to any desired point within or outside of the building, according to the point of deposit for the matter separated from the grain or stock by the air-currents. To provide for controlling the draft 120 of air through the chutes 23, with which the draft-flues 26 are associated, each of the said draft-flues has mounted therein a controlling-valve 30, having an exterior operating-handle 125 31 working over a segment 32 upon the exterior of the draft-flues to provide convenient means whereby the valve may be opened or closed or set at any desired position, as the requirements of the work may demand. Any 130 equivalent device, of course, may be substituted for the form of controlling-valve illustrated to effect the desired result.

The necessary lateral vibration or shaking

motion is imparted to the shoe 7 through
 the medium of a pair of pitmen 33, pivotally
 connected at one end, as at 34, to one side of
 the shoe-body, respectively near the opposite
 5 ends thereof, and connected at their outer
 ends with the crank portions 35 of the main
 drive-shaft 36, arranged longitudinally of
 the machine-frame, at one side thereof, and
 journaled in suitable bearings 37, fitted to
 10 the frame. The said main drive-shaft 36
 is provided with a belt-pulley 38 to receive
 the driving-belt and also has fitted on the
 opposite ends thereof additional belt pulleys
 or wheels 39 and 40, respectively, the pulley
 15 39 receiving thereover a belt 41, which also
 passes over a pulley 42 on one end of the fan-
 shaft 43, which is arranged at the top of the
 machine-frame, opposite the main drive-
 shaft 36, and connects with the cleaning-fan
 20 28, so that motion may be transmitted to said
 fan from the drive-shaft. The said other pul-
 ley 40 at one end of the main drive-shaft 36
 imparts motion to a belt 44, also passing over
 a pulley 45 on one end of the counter-shaft
 25 46. This counter-shaft 46 is journaled in
 suitable bearings at the top of the machine-
 frame and is provided at an intermediate
 point with a crank 47, to which is connected
 one end of a pitman 48, the other end of
 30 which pitman is pivotally connected at the
 point 49 to the upper end of the oscillatory
 standard 50 of the transversely-oscillating
 spreader 51. The said standard 50 is pivot-
 ally supported intermediate its ends, as at
 35 52, upon a stationary cross-bar 53 at the top
 of the machine-frame, and at its lower end,
 beneath the pivotal support thereof, the said
 standard 50 has fitted thereto the spreader 51,
 which is in the form of a flat blade disposed
 40 longitudinally of the screen-floor of the shoe
 and arranged to play over the first sieve-sec-
 tion 12^a thereof, which section of the screen-
 floor is of the finest mesh, the other succeed-
 ing sections being progressively of a larger
 45 mesh, as will be well understood by those fa-
 miliar with the art. The transversely-oscil-
 lating spreader-blade 51 works in close prox-
 imity to the first sieve-section 12^a of the shoe
 and has attached to the lower edge thereof a
 50 flexible scraper-strip 54, of leather or equiva-
 lent material, which contacts with and rubs
 over the surface of the screen-floor, and there-
 by serves to maintain the meshes thereof clean
 and free from clogs, while at the same time
 55 the lateral oscillation of the spreader-blade
 serves to spread out or distribute the stock
 over the floor to insure an effective separa-
 tion thereof. By reason of the operating or
 counter shaft for the spreader being belted
 60 directly to the main drive-shaft 36 the cranks
 of the drive and counter shafts may be ar-
 ranged so that the separating-shoe and the
 spreader will simultaneously move in oppo-
 site directions, and this relative movement
 65 is maintained during the operation of the ma-
 chine to secure the action referred to.

The stock to be separated and cleaned is
 evenly distributed into the upper or higher
 end of the separating-shoe 7 by means of the
 laterally-vibrating feed-pan 55, which feed- 70
 pan is arranged to work beneath the lower
 open side of a flaring hopper 56, sustained in
 a stationary and elevated position above the
 top of the machine, at one end thereof, by
 means of suitable supports or brackets 57, at- 75
 tached to the sides thereof and also to the
 contiguous top portions of the machine-frame.
 The stationary elevated hopper 56 is provided
 at one bottom edge thereof with a feed-open-
 ing 58, which is covered and uncovered by 80
 means of the regulating-slide 59, adjustably
 mounted upon the exterior of the hopper 56,
 to provide means for regulating the flow of
 the stock from the hopper through the open-
 ing 58. The said laterally-vibrating feed-pan 85
 practically forms a movable bottom for the
 hopper 56 and essentially consists of a flat
 floor 60, provided with an upwardly-flaring
 peripheral flange 61, which prevents the ma-
 terial from working off at the edges of the 90
 floor, while at the same time serving to hold
 within the feed-pan a sufficiently large amount
 of stock for maintaining the proper feed to
 the separating-shoe. At one side of the plane
 of the feed-opening of the hopper the said 95
 pan 55 is provided in the floor thereof with
 one or a plurality of discharge-openings 62,
 through which the stock works and is deliv-
 ered directly into the upper end of the shoe
 7 upon the first or finest sieve-section 12^a 100
 thereof. In order to impart the necessary
 lateral vibration to the pan 55 to secure an
 even distribution of the material or stock, the
 said pan is loosely hung at one end within a
 pendent hanger-loop 63, attached to and sus- 105
 pended from the hopper 56, and at its oppo-
 site end the pan-body is provided with a
 shaker-arm 64, having an opening 65 there-
 in, which loosely receives the upper end of
 the actuating-stem 66, rigid with and extend- 110
 ing from the upper end of the laterally vibrat-
 ing or shaking shoe 7, so that the movement
 of this shoe will be imparted to the pan 55.
 The latter has a sufficient inclination toward
 its connection with the actuating-stem 66 to 115
 insure the working of the stock toward and
 out from the discharge-opening 62.

While a specific relation of the different
 parts of the machine has already been de-
 scribed, it will be understood that any proper 120
 working relation thereof may be utilized in car-
 rying out the invention. For instance, the fan-
 casing and the draft-flue connections there-
 with may be arranged beneath the separating-
 shoe or otherwise suitably associated with the 125
 delivery-chutes 23 to secure the operation al-
 ready described. Furthermore, there may be
 utilized in connection with the chutes 23 a
 suitable elevator to take up the material as
 high as desired from the machine, and also, 130
 if found desirable, an ordinary type of ele-
 vator or conveyor may be utilized in connec-

tion with the last delivery-chute 23 to convey the cracked corn back to the corn-mill to be reground.

From the foregoing it is thought that the construction, operation, and many advantages of the herein-described grain cleaning and separating machine will be readily apparent to those familiar with the art without further description, and it will be understood that various changes in the form, proportion, and minor details of construction may be resorted to without departing from the principle or sacrificing any of the advantages of this invention.

Having thus described the invention, what is claimed as new, and desired to be secured by Letters Patent, is—

1. In a machine of the class described, a longitudinally-inclined shaking separating-shoe having at the top a cross-sectionally-concaved screen-floor extending longitudinally thereof, an oscillatory spreader supported independently of the shoe in a plane above the same and having a sweep over the top screen-floor, and means on the machine for automatically oscillating the shoe.

2. In a machine of the class described, a longitudinally-inclined vibratory separating-shoe provided with a cross-sectionally-concaved screen-floor, an oscillatory spreading device supported independently of and centrally above the shoe and means on the machine for driving the spreading device back and forth transversely over said floor, and equidistantly from the center thereof in opposite directions, substantially as set forth.

3. In a machine of the class described, a vibratory separating-shoe provided with a transversely-concaved screen-floor, an oscillatory spreading device supported entirely independent of the shoe in a plane above the same and sweeping transversely across the floor thereof, and mechanism for simultaneously actuating the shoe and spreading device in opposite directions.

4. In a machine of the class described, a separating-shoe having a transversely-concaved screen-floor, a spreading device supported entirely independent of the shoe in a plane above the same and comprising an os-

cillatory standard, and a spreader-blade carried by said standard and disposed longitudinally of said floor, said blade having a sweep transversely of the floor and carrying a flexible scraper-strip, and means for simultaneously and automatically vibrating the shoe and oscillating the scraper in opposite directions.

5. In a machine of the class described, the combination with the laterally-vibrating separating-shoe, of a stationary hopper having at one side a slide-controlled feed-opening, a laterally-vibrating oscillatory feed-pan loosely suspended at one end beneath the hopper and provided with a continuous surrounding up-standing flange and with bottom discharge-openings contiguous to the feed-opening of the hopper, said pan being provided at one end with a vibratory shaker-arm, and an actuating-stem rigid with the shoe and having an operative connection with said shaker-arm, substantially as set forth.

6. In a machine of the class described, the combination with a separating-shoe having a screen-floor, of a stationary hopper having an open bottom and a vibratory feeding-pan having inclosing side portions and arranged to constitute a shaking-bottom for the hopper, said pan having discharge-openings for delivering the stock into the receiving end of the shoe.

7. In a machine of the class described, the combination with a laterally-vibrating separating-shoe, of a stationary hopper supported above the receiving end of the shoe and having a pendent hanger, and a laterally-vibrating feed-pan having inclosing side portions arranged to constitute a shaking-bottom for the hopper, said feed-pan having one end loosely mounted in said hanger and its other end connected with the shoe to receive motion therefrom.

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

JULIUS SIDNEY JORDAN.

Witnesses:

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F. F. HERNDON.