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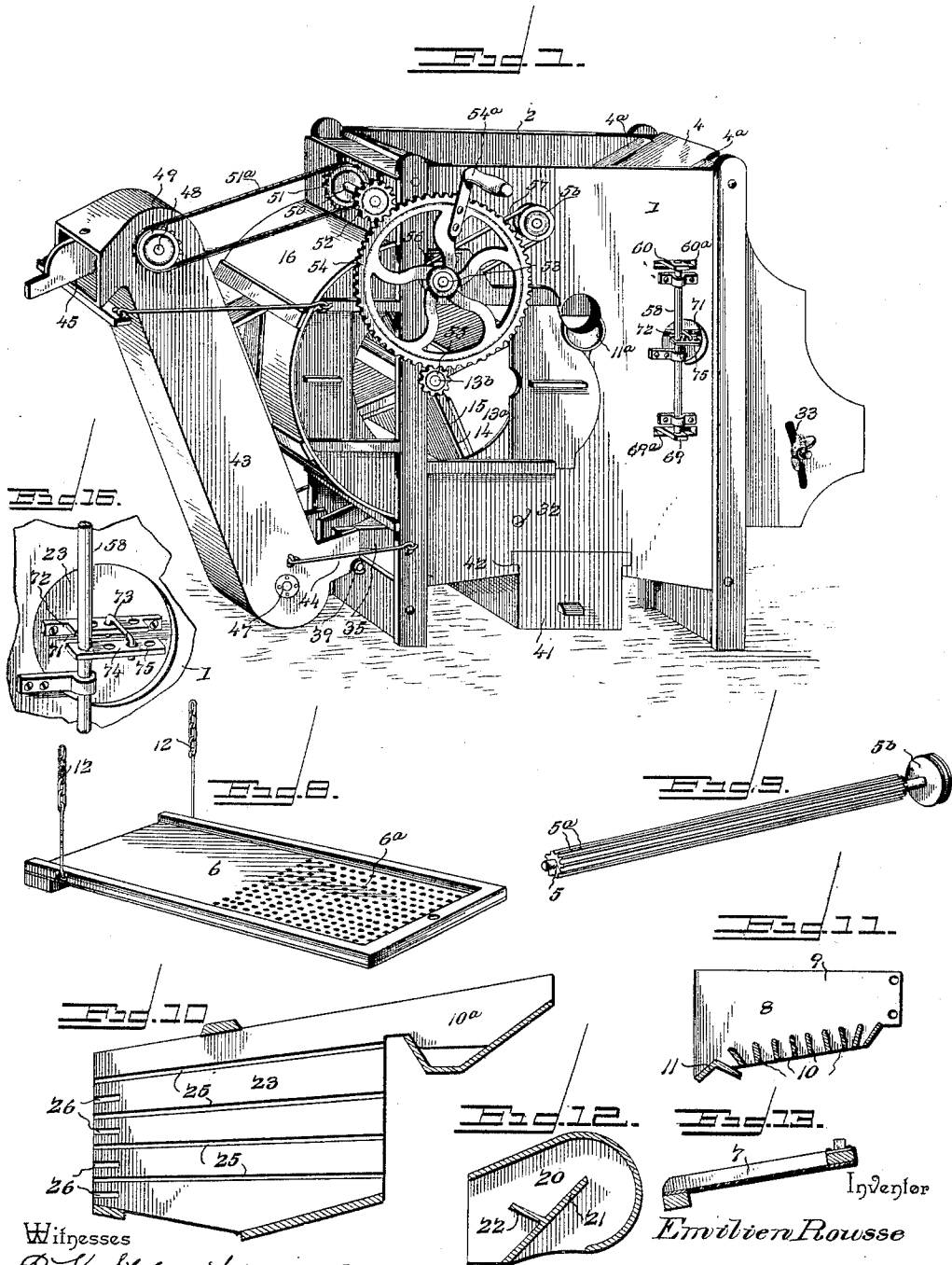
Patented Jan. 23, 1900.

E. ROUSSE.
FANNING MILL.

(Application filed Jan. 31, 1898.)

(No Model.)

3 Sheets—Sheet 1.



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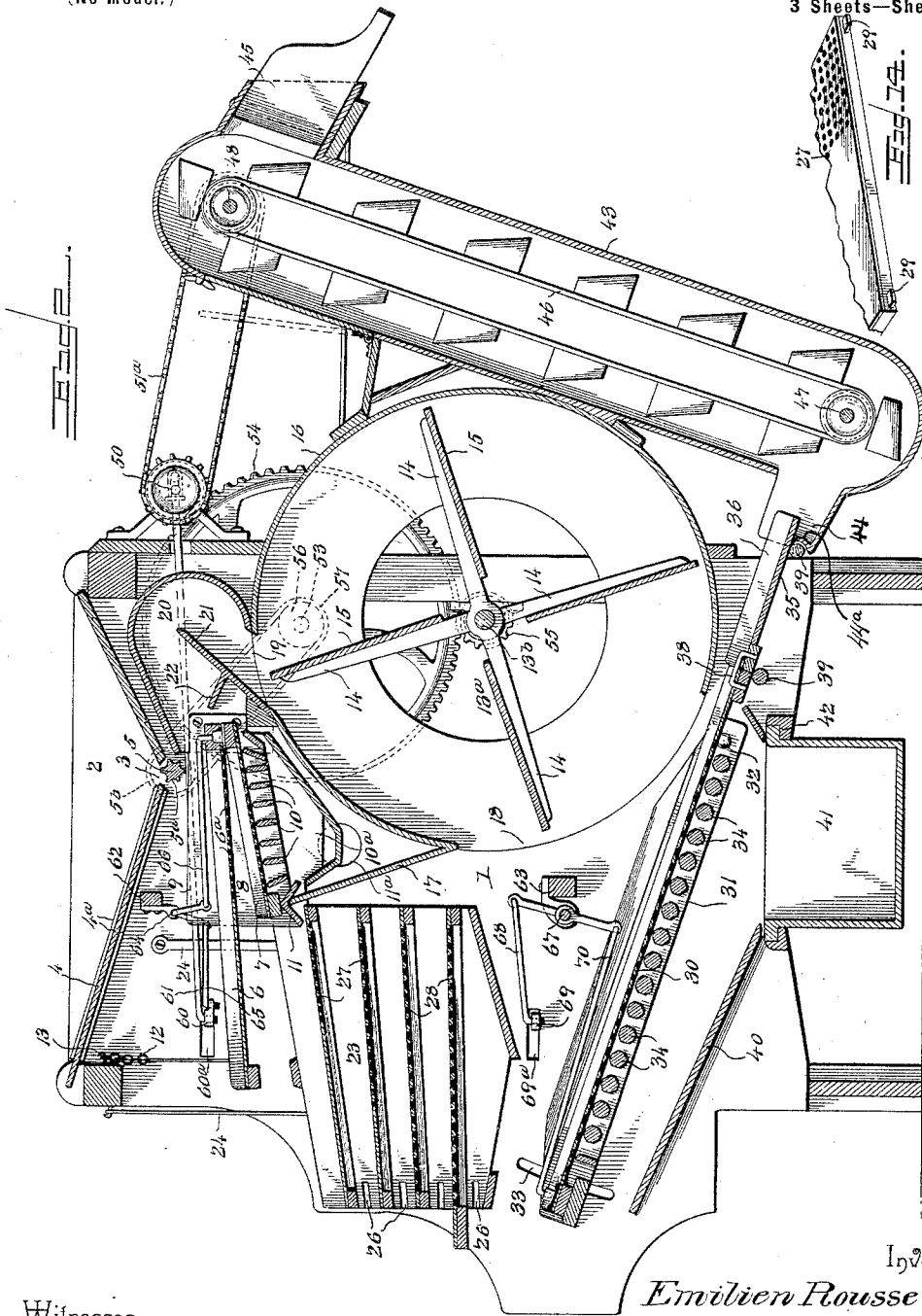
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3 Sheets—Sheet 2.



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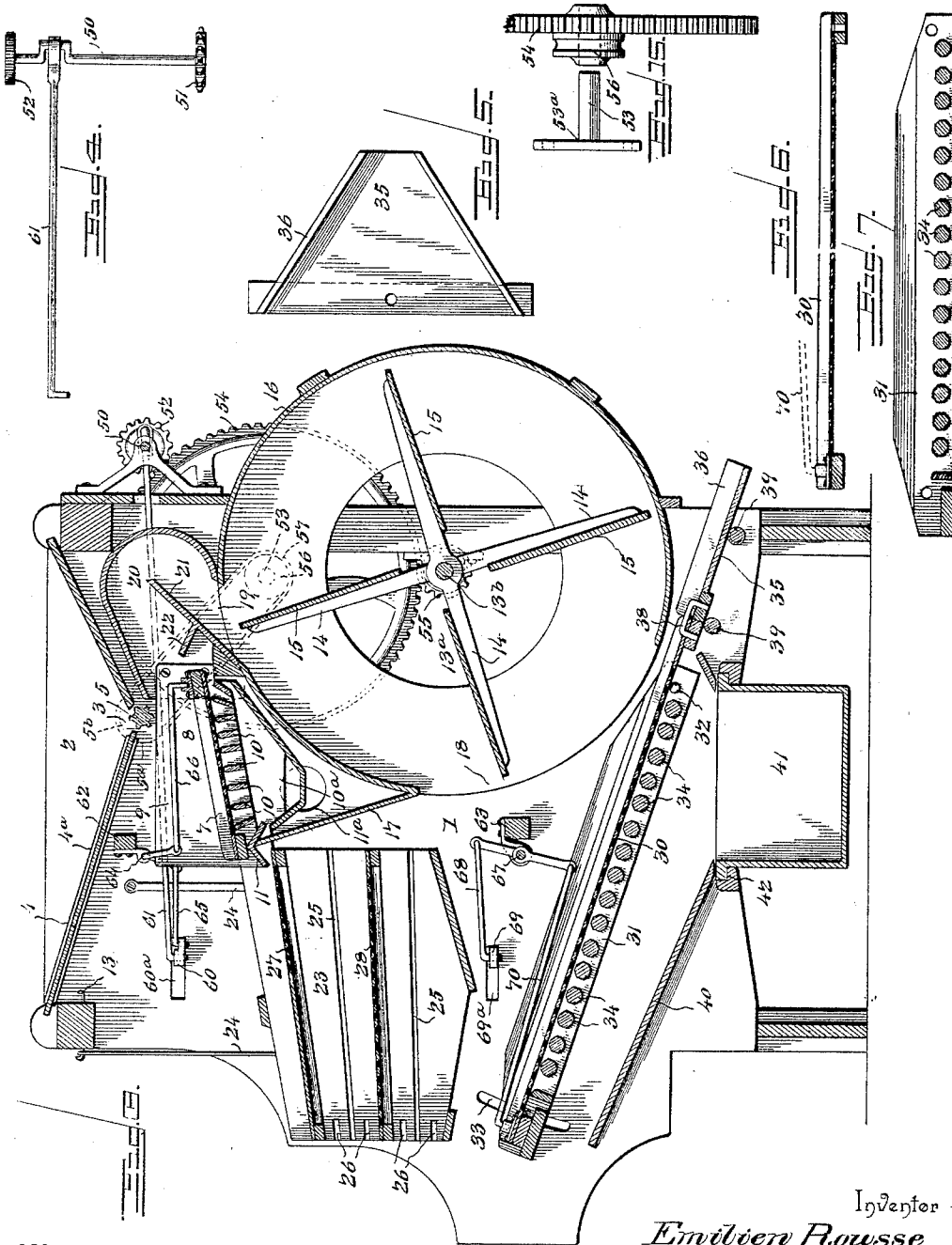
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3 Sheets—Sheet 3.



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UNITED STATES PATENT OFFICE.

EMILIEN ROUSSE, OF WESTON, OREGON.

FANNING-MILL.

SPECIFICATION forming part of Letters Patent No. 642,006, dated January 23, 1900.

Application filed January 31, 1898. Serial No. 668,656. (No model.)

To all whom it may concern:

Be it known that I, EMILIEN ROUSSE, a citizen of the United States, residing at Weston, in the county of Umatilla and State of Oregon, have invented a new and useful Fanning-Mill, of which the following is a specification.

This invention relates to improvements in fanning-mills of that class which employ a series of shaking screens in connection with a rotary blower or fan; and the primary object that I have in view is to provide an improved mill in which the elements are disposed to increase the capacity of the machine, so as to avoid clogging of the working parts and effect the thorough separation of the chaff and refuse from the grain.

A further object that I have in view is to provide means for separating the refuse and the fine or small grain from the large grain at an early stage of the treatment of the grain.

A further object that I have in view is to provide mechanism by which the shaking screens are kept in a clean condition, free from accumulations of refuse, which have a tendency to adhere to the screens and clog the same to interfere with the proper working thereof.

A further object that I have in view is to provide means for imparting motion to the several screens independently of each other and to enable the screens to be adjusted to the pitch or inclination which will attain the best results in treating different kinds of grain.

A further object is to provide means by which the cleaned grain may be delivered to a sacking or bagging mechanism, thus saving the handling of the grain necessary to pack it into bags or sacks.

With these ends in view my 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 my 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 fanning-mill, illustrating the same in connection with a bagging or sacking mechanism. Fig. 2 is an enlarged vertical sectional elevation taken

centrally through the fanning-mill shown by Fig. 1 and illustrating the bagging or sacking mechanism. Fig. 3 is a vertical sectional elevation somewhat similar to the structure shown by Fig. 2, but showing my improvements without the bagging mechanism. Figs. 4 to 16, inclusive, are detail views of parts of the improvements embodied in the machines illustrated by Figs. 1 to 3, inclusive.

Like numerals of reference denote like and corresponding parts in each of the several figures of the drawings.

1 designates the casing of my improved fanning-mill, which casing is similar in its general outline to other fanning-mills familiar to those skilled in the art. The casing or frame 1 is constructed with a feed-hopper 2, which is provided with a transverse throat or opening 3, through which the grain may pass to the screens of the machine. To regulate the quantity of grain which may pass from the hopper to the screens or riddles, I provide an adjustable gate 4, which is mounted to slide endwise upon suitable guides or ways 4^a, provided in the side walls of the hopper 2. A horizontal feed-roller 5 is journaled in the hopper immediately below and opposite to the throat or opening 3 therein, and this feed-roller is provided with a series of longitudinal grooves or channels 5^a, (see Fig. 9,) which impart to said roller a corrugated or fluted appearance and cause it to deliver the grain from the hopper to the screens or riddles without liability of the grain choking in the throat or opening 3 of the hopper. This feed-roller is designed to be positively driven by connections with one of the shafts of the machine, and to this end I provide a feed-roll shaft at one end with a pulley 5^b. (See Figs. 1 and 9.) 6 designates the chaffing-screen, and 7 is the upper shaking screen or riddle of the machine. These screens or riddles 6 7 are designed to be operatively and loosely connected together to insure simultaneous movement or play to the upper screens 6 7; but under certain conditions of service I may omit the upper chaffing-screen 6, which is suspended or hung in the frame or casing independently of the screen 7.

The chaffing-screen 6 consists, preferably, of a suitable frame and a plate, which is perforated for a part of its length, as at 6^a, while

the remainder of said plate is imperforate, so as to discharge the refuse and chaff thereon directly upon the primary shoe of the machine. The front end or head of the chaffing-screen 6 rests upon and is operatively connected with the head of the upper screen 7; but the rear end of this chaffing-screen is suspended adjustably within the machine-casing 1 by means of the link-chains 12, certain of the links of which are attached removably to the hooks 13, fixed in the machine-casing 1. This upper chaffing-screen 6 is thus suspended at one end independently of the screen 7, and the chains 12 thereon may be lengthened or shortened by connecting different links to the hooks 13 for the purpose of varying the pitch of inclination of said chaffing-screen 6.

The chaffing-screen 6 is arranged within the machine-casing to have its perforated or head end directly below the throat and feed-roll of the hopper, and immediately beneath this perforated head of the chaffing-screen is arranged the screen or riddle 7. This screen or riddle is slidably supported within the sides of a clearer 8, and said clearer is fixed within the machine-casing above the primary shoe and in close relation to a wind-trunk, which is supplied with an air-blast from the rotary fan or blower from the fanning-mill. This clearer consists of suitable side boards forming a casing 9 and a series of transverse slats 10, which are fixed within the lower part of the casing 9 to occupy different upright positions therein. The shaking screen or riddle 7 is arranged to have its foraminous material or perforated plate rest directly upon the clearer-slats 10 of the clearer 8, and as said screen or riddle 7 is arranged to vibrate or play in a substantially horizontal direction over said slats 10 the latter are adapted to sweep the lower face of the riddle or screen 7, and thereby remove any refuse which may have a tendency to adhere to said screen or riddle. The clearer-casing carrying the fine screen or riddle 7 is adapted to discharge directly into a chute 10^a, which is fixed within a peculiarly-formed part of the fan-casing, and this chute 10^a discharges the fine grain and refuse swept from the riddle or screen 7 through a spout 11^a, which projects from one side of the machine-casing, as shown by Figs. 1 and 2. The casing 9 of the clearer for the screen or riddle 7 is provided at its lower rear end with a seat 11, adapted to rest upon a part of the fan-casing, and the screen or riddle 7, which is sustained by such clearer-casing, is adapted to discharge directly into the primary shaking-shoe of the fanning-mill.

13^a designates the rotary fan or blower of my improved fanning-mill. The shaft 13^b of this fan is journaled in suitable bearings provided on the casing or frame 1, and to said shaft is secured a series of radial tapering arms 14, which carry the inclined blades or wings 15. This rotary fan operates within a

casing 16, suitably secured within the main frame or casing 1, and said fan-casing has an upwardly-inclined wall 17, a discharge-mouth 18, and a blast-opening 19. The upwardly-inclined wall 17 of the fan-casing forms a support for the seat 11 of the clearer-casing 9, and the mouth 18 of the fan-casing is arranged to discharge the blast of air directly to the primary shoe of the fanning-mill. The blast-opening 19 from the fan-casing is arranged in the upper part of said fan-casing and at a suitable distance from the mouth 18 thereof, and said blast-opening 19 discharges directly to the wind-trunk 20, which is arranged within the machine frame or casing 1 to discharge a part of the blast from the said fan directly to the upper screens or riddles 6 7. This wind-trunk is clearly represented by Figs. 2, 3, and 12 of the drawings, and within said wind-trunk is provided an inclined deflector 21, that extends upwardly and forwardly from the fan-casing at one side of the blast-opening 19 therein. This inclined deflector 21 serves to conduct a part of the air-blast from the fan-casing into the wind-trunk, and from this deflector extends the baffle 22, which serves to reduce the force of the blast of air on the screen or riddle 7. It will thus be observed that I have provided an improved construction by which the air-blast from a single fan is directed to the primary shifting shoe and the upper screens or riddles of the fanning-mill, and thus the blast is utilized to blow the refuse and chaff from the upper screens or riddles as well as from the screens forming a part of the primary shoe.

23 designates the primary shoe of my fanning-mill, and 24 are the links by which this shoe is suspended loosely within the main frame or casing 1 to vibrate therein. This primary shoe is similar in substantial respects to the shoes of ordinary fanning-mills; but I have modified the construction of said shoe 23 with a view to enabling the screens or riddles therein to be adjusted to different inclinations or pitches, according to the character of the grain to be treated. The casing of the primary shoe is provided with a series of long grooves or channels 25 and with another series of short grooves or channels 26, the latter lying intermediate of the long grooves 25, as clearly shown by Figs. 2, 3, and 10. The screens or riddles 27 28 of the primary shoe are provided with short lugs or arms 29, adapted to fit in the grooves of the shoe-casing. The upper screen or riddle of the primary shoe is perforated for a part of its length. The second screen is also perforated for a part of its length; but the perforations extend over a greater space of said second screen than do the perforations of the first or upper screen, while the third and fourth screens 28 are perforated throughout their length. It will be evident that the arms or lugs of each screen may be fitted in the long grooves 25 to give the screen a certain pitch

or inclination; but when it is desired to increase this pitch of the screen it may be partially withdrawn from the long grooves and adjusted to have the lugs or arms at one end of the screen fit in the short grooves 26, while the lugs or arms at the other end of the screen may fit in the long grooves 25.

Beneath the primary shoe 23 is arranged a long lower screen 30, which has its frame seated upon the frame of a clearer 31, that serves to support said screen in operative relation to the mouth of the fan-casing and the primary shoe. The clearer-frame is hung or pivoted at its lower end on suitable bolts or studs 32, and the upper end of said clearer-frame is adjustably supported within the main frame or casing 1 by means of bolts and nuts which work in the segmental slots 33, provided in said main frame or case. It will thus be seen that the clearer-frame is adjustably supported within the main frame or casing with relation to the shaking shoe 23, and as the lower screen or riddle 30 rests directly upon this clearer-frame it will partake of the adjustment thereof. The clearer-frame occupies the fixed position within the main frame or casing; but the lower screen or riddle 30 is slidably supported on said clearer-frame to vibrate or move endwise thereon, and said clearer-frame is provided with a series of hexagonal or polygonal rollers 34, which are journaled loosely in the clearer-frame to rotate freely therein. These rollers are arranged to have contact directly with the lower face or side of the reciprocating lower screen or riddle 30, and they thus serve to positively remove any refuse which may have a tendency to adhere to the screen.

The lower end of the inclined lower screen 30 projects beneath the fan-casing, as shown by Figs. 2 and 3, and said end of the lower inclined screen delivers directly to a delivery-spout 35. (Shown by Fig. 5 of the drawings.) This delivery-spout is provided with the inclined vertical flanges 36, arranged to converge toward each other and contract the exit-opening from the spout into the elevator or a suitable receptacle. The delivery-spout is arranged in an inclined position substantially coincident with the inclination with the lower screen or riddle, with its clearer, and said delivery-spout is operatively connected with said lower screen or riddle to partake of the vibrating motion thereof by means of the coupling or clamp 38, (see Figs. 2 and 3,) said coupling or clamp being of any suitable type that will prevent the separation of the connected parts in any direction. The lower end of the inclined screen or riddle 30 extends beyond the clearer-frame and its pivot, and said screen or riddle and its delivery-spout are properly sustained in position by means of the rollers 39.

The inclined grain-board 40 is arranged beneath the lower screen or riddle to deliver the grain which may fall thereon into a grain box or receptacle 41, which is slidably fitted to

the transverse ways 42, provided at the lower part of the main frame or casing 1.

In Figs. 1 and 2 of the drawings I have illustrated my improved fanning-mill in connection with an elevator designed to receive the grain from the delivery-spout 35 and convey it to a spout, to which a bag or sack may be attached for the purpose of automatically sacking the grain as it passes from the mill; but I would have it understood that I do not strictly confine myself to the employment of this elevator in connection with my improved fanning-mill, because such elevator may be omitted, as represented by Fig. 3. I may also dispense with the chaffing screen or riddle 6, as shown by Fig. 3.

The grain-elevator has an inclined casing 43, arranged in an upright position alongside of the main frame and the fan-casing, and said elevator-casing is provided with a laterally-offset foot 44, into which projects the delivery-spout 35 from the lower screen or riddle. To insure the proper delivery of the material from the spout 35 into the foot 44 of the elevator-casing and to prevent the material "backing" out of the latter beneath the delivery-spout, said offset foot 44 is provided with an upstanding ledge 44^a at the outer receiving end thereof, and the lower end of the spout 35 overhangs this ledge. Directly adjacent to and at one side of the upstanding ledge 44^a is arranged one of the supporting-rollers 39, while the other of said rollers is arranged directly beneath and in the plane of movement of the coupling connection between the spout and the screen to provide for strengthening and sustaining the coupled parts at their joint. The upper end of this elevator-casing is equipped with a reversible or adjustable spout 45 of any suitable construction, and within said casing is arranged the endless bucket elevator 46, which passes around the idler-shaft 47 and engages operatively with the driving-shaft 48. One end of this driving-shaft is extended beyond the elevator-casing 43 to receive a sprocket-pinion 49, around which passes a sprocket-chain 51^a, that extends to and around a sprocket-wheel 51 on the crank-shaft 50. This crank-shaft 50 is journaled in suitable bearings on the machine frame or casing above the fan-casing and substantially in the horizontal plane of the wind-trunk 20, and at one end this crank-shaft has a spur gear-pinion 52, which meshes with a master-gear 54, mounted loosely on a stub axle or shaft 53, which is carried by a plate 53^a, fixed to the machine, (see Fig. 15,) and this master-gear is provided with a suitable hand-crank 54^a. This master-gear 54 also meshes with the gear-pinion 55 on the fan-shaft 13^b, and the master-gear has attached to one side thereof the pulley 56, that drives a belt 57, which leads to the pulley 5^b on the feed-roller shaft. While I prefer to employ the crank-gear, as shown by the drawings, I do not limit myself strictly to this construction, because I am aware that equivalent

devices may be used in lieu of the hand-operated master-gear for driving the mill by power.

As a means for driving the several screens or riddles and the primary shoe of the fanning-mill I employ a vertical rock-shaft 58, journaled in suitable bearings on the main frame or casing near the rear end thereof, and said vertical shaft 58 is provided with a series of horizontal arms, one of which is indicated at 60 in Figs. 1, 2, and 3 of the drawings. This arm 60 extends through a slot 60^a in the main frame or casing 1, and to the arm is attached a link 61, which extends within said frame or casing 1 between a side wall thereof and the wind-trunk 20 to the crank on the shaft 50. (See Fig. 4.)

Within the machine-casing 1, above and adjacent to the upper and lower screens or riddles 6 and 30, are arranged the fixed rails 62 63. On the upper rail 62 is journaled a rock-shaft 64, which is connected by a link 65 to the arm 60 on the vertical shaft 58, and said rock-shaft 64 is further provided with the link 66, which extends to the screens or riddles 6 7 and is operatively connected thereto for the purpose of imparting the vibrating or shaking motion to said upper screens or riddles. The lower rail 63 sustains a rock-shaft 67, which is connected by a link 68 with an arm 69 on the lower part of the vertical shaft 58, said arm 69 playing in a slot 69^a of the main frame or casing. This lower rock-shaft 67 is connected by a link 70 with the head of the lower screen 30, and thus the lower rock-shaft is adapted to be vibrated by connections with the vertical shaft 58 and transmit the motion to the lower screen 30 for the purpose of reciprocating the latter over the rollers of the clearer-frame. The vibrating shoe 23 of the fanning-mill is designed to be operatively connected with the vertical rock-shaft 58 by an adjustable connection 71, and this adjustable connection, as shown by Fig. 16, consists of a perforated plate 72, attached to the shoe, and a link 73, having its prongs fitted, respectively, in the holes of the plate 72 and in holes 75 of an arm 74 on the rock-shaft 58. The vertical rock-shaft is operatively connected with the upper screens or riddles. The lower screens and the primary shoe are thus operatively connected to the rock-shaft 58 for the purpose of imparting the shaking motion to all the parts by connections which are independent the one from the other.

This being the construction of my improved fanning-mill, the operation may be described as follows: The grain, mingled with chaff and refuse, is deposited in the hopper, and the master-gear is set in motion to actuate the various working parts of the machine. The corrugated roller is positively driven by connection with the driving-shaft, and it delivers the grain to the upper screen or screens 6 7. The grain passes through the screen 6 upon the screen 7, by which operation the small grain is separated from the larger desirable grains. The small grain passing through

the screen 7 is discharged into the chute and spout from one side of the machine-casing, while the large grains and part of the chaff pass over the screens 6 7 upon the shaking-shoe. The grain is cleaned in its passage over the screens 6 7 and the shaking-shoe by the blast from the fan, and the cleaned grain is deposited upon the lower screen or riddle 30, from whence it passes to the delivery-chute 35, and thus to the elevator. The grain is carried from the foot of the elevator-casing to the delivery-spout, and thus supplied directly into the bag or sack, which may be suspended directly from said elevator-casing.

It is evident that the upper screen 7 and the lower screen 30 are kept clear from accumulations of refuse by the action of the clearers which sweep the lower faces of the screens or riddles, and it will also be evident that the inclination or pitch of the upper screen 6, the screens of the primary shoe, and the lower screen 30 may be changed as desired by the described means for effecting the adjustment of said parts.

I am aware that changes in the form and proportion of parts and in the details of construction may be made by a skilled mechanic without departing from the spirit or sacrificing the advantages of my invention, and I therefore reserve the right to make such modifications as clearly fall within the scope of the invention.

Having thus described the invention, what I claim is—

1. In a fanning-mill, the combination with a hopper, a fan-casing, and a primary cleaning-shoe, of a stationary clearer-frame 10, situated above the shoe, a reciprocating screen or riddle 7 fitted to said clearer-frame to travel thereon, a discharge-chute arranged between the fan-casing and the shoe, below the clearer-frame, to receive the seed from the screen or riddle, and inclined to discharge through one side of the machine-casing, a chaffing-screen, 6, imperforate for a part of its length and having its perforated section arranged between the hopper and the riddle 7, said chaffing-screen being suspended at one end within the machine-casing independently of the riddle 7 and overhanging the primary shoe, and means connected with the riddle 7 and the chaffing-screen 6 to simultaneously reciprocate the same, substantially as described.

2. In a fanning-mill, the combination with a hopper, a fan-casing, and a primary shoe, of the screen or riddle, 7, supported above the clearer-shoe to deliver its tailings thereto, a removable chaffing-screen, 6, imperforate for a part of its length and arranged with its perforated section between the hopper and the screen or riddle, the imperforate part of said chaffing-screen being suspended adjustably over the primary shoe to deliver its tailings to the latter, a pitman connected detachably to the riddle, 7, and the chaffing-screen to reciprocate the same simultaneously, and a wind-trunk connected to the fan-casing and

having an inclined deflector arranged to divert a part of the blast upon the riddle and the chaffing-screen, substantially as described.

3. In a fanning-mill, the combination with
5 a primary shoe and a blast-fan, of a transverse delivery-chute adjacent to said shoe, a clearer fixed above the delivery-chute and provided with a series of bars, a vibrating screen mounted on said clearer to contact
10 with the bars or slats thereof, a chaffing-screen above the first-named screen and delivering to said primary shoe, and a wind-trunk connected with the fan to deliver a part of the blast therefrom over the screen and the chaffing-screen, substantially as described.

4. In a fanning-mill, the combination with a primary shoe, of a blast-fan having its casing provided with an inclined partition, 17, a clearer-frame fixed in the space between said
20 inclined partition and a wind-trunk, the double inclined seat, 11, on the upper edge of said partition and in the horizontal plane of the clearer-frame, a transversely-inclined chute below the clearer-frame and between the fan-casing and its inclined partition, a reciprocating screen or riddle fitted upon the clearer-frame and the inclined seat, 11, and a wind-trunk connected with the fan-casing and discharging over the screen or riddle, substantially as described.

5. In a fanning-mill, the combination with a primary shoe and a blast-fan, of a hopper provided with a positively-driven feed-roller, a fixed transverse chute adjacent to the shoe
35 and below said hopper, a clearer above the chute, a vibrating screen mounted upon said clearer, a chaffing-screen connected at one end to the vibrating screen and independently suspended at its other end over the primary shoe, and a wind-trunk connected with the fan to deliver a part of the blast therefrom over the screen and chaffing-screen, substantially as described.

6. In a fanning-mill, the combination with
45 a fan, and a cleaning-shoe, of the riddle arranged to deliver its tailings to the shoe, a chaffing-screen provided with the perforated section and with the imperforate section and arranged over said riddle for its perforated
50 section to lie in the vertical plane of said riddle, the imperforate section of the chaffing-screen being arranged to deliver tailings to the shoe, and a wind-trunk connected to the fan-casing and arranged to discharge a part
55 of the blast over the chaffing-screen, substantially as described.

7. In a fanning-mill, the combination with a fan, and a cleaning-shoe, of the riddle arranged to deliver tailings to said shoe, a chaffing-screen provided with the perforated section and with the imperforate section ar-

ranged respectively over the riddle and the shoe, the space between the heads of said riddle and the chaffing-screen being closed, and a wind-trunk connected to the fan-casing
65 and arranged to discharge a part of the blast over the chaffing-screen, substantially as described.

8. In a fanning-mill, the combination with a fan-casing, and a cleaning-shoe, of the riddle arranged to deliver tailings to said shoe, a chaffing-screen provided with the perforated section and the imperforate section arranged respectively over the riddle and the shoe, the head end of said chaffing-screen being seated
75 upon the corresponding end of said riddle, means for suspending the delivery imperforate end of the chaffing-screen over the shoe, means for vibrating the riddle and the chaffing-screen, and the wind-trunk arranged to
80 discharge a blast of air over the chaffing-screen, substantially as described.

9. In a fanning-mill, the combination with a shoe, and an inclined reciprocatory screen, of an elevator-casing provided with a laterally-extended foot offset therefrom contiguous to its lower end, said foot having an upstanding ledge at its receiving end, a separate delivery-spout arranged in flush relation to the screen for movement therewith and having
90 its lower end projecting into and overhanging the ledge of said offset foot, a supporting-roller arranged beneath and in the plane of movement of the joint between the screen and the spout, and a similar roller arranged alongside of said upstanding ledge and bearing under the discharging end of the spout, substantially as set forth.

10. In a fanning-mill, the combination of an upper screen or riddle, a chaffing-screen
100 over the upper riddle, a primary shoe receiving from the upper riddle and the chaffing-screen, a lower riddle below the shoe, a vertical rock-shaft disposed at one side of the riddles, the shoe and its chaffing-screen, horizontal rock-shafts adjacent to the upper and
105 lower riddles, link connections between each horizontal shaft and one of the riddles, an independent connection from the vertical rock-shaft to the primary shoe, other link connections between the horizontal rock-shaft and the vertical rock-shaft, and a link connecting the chaffing-screen with the vertical rock-shaft, substantially as described.

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

EMILIE ROUSSE.

Witnesses:

WM. BLAIR,
J. R. KILLGORE.