No. 629,407. Patented July 25, 1899.

G. WELLINGTON.

GRAIN CLEANER.

(Application filed May 14, 1898.)

(No Model.)

Fig. 1.

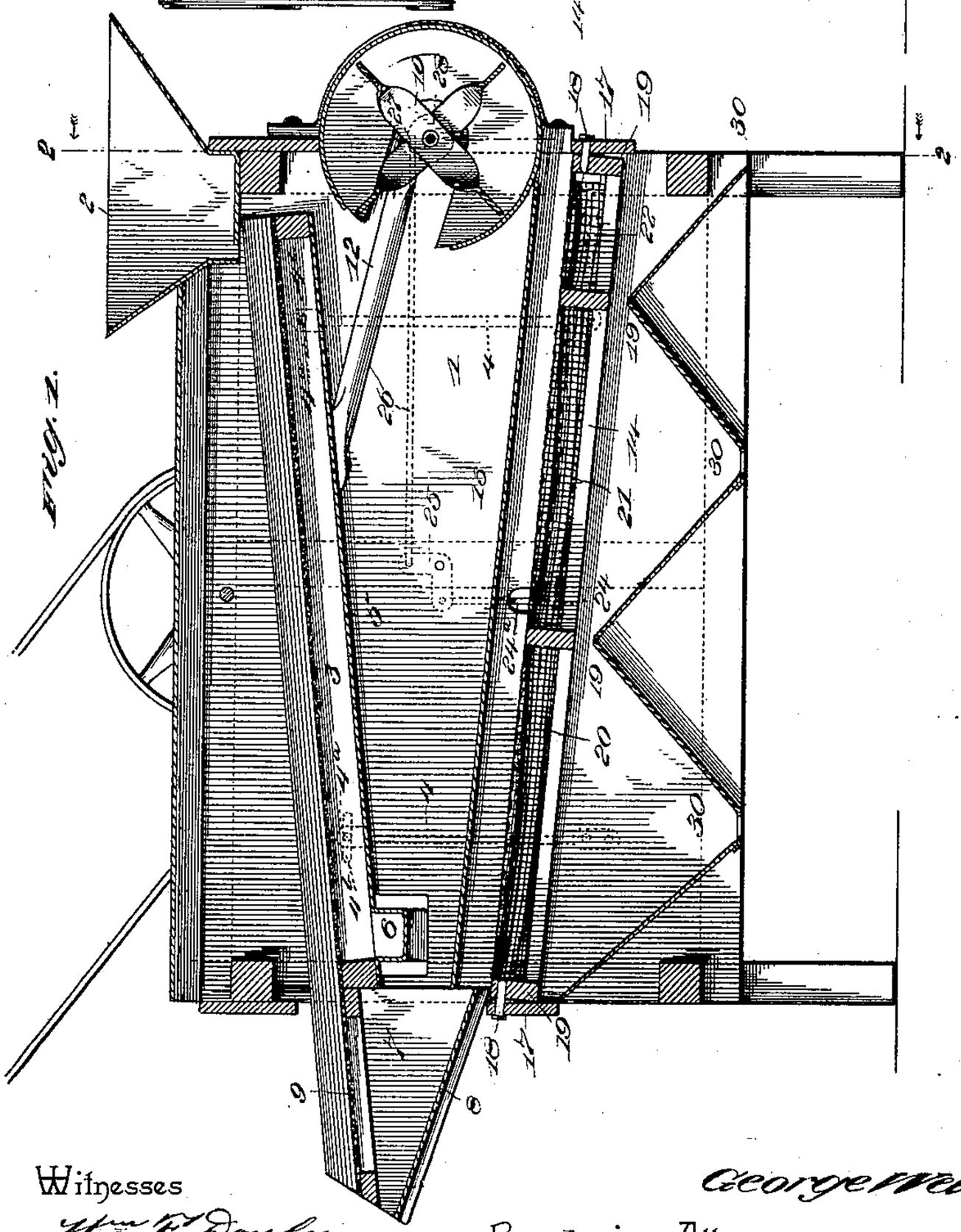


Fig. 2.

Fig. 4.

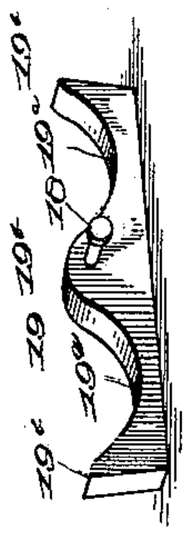
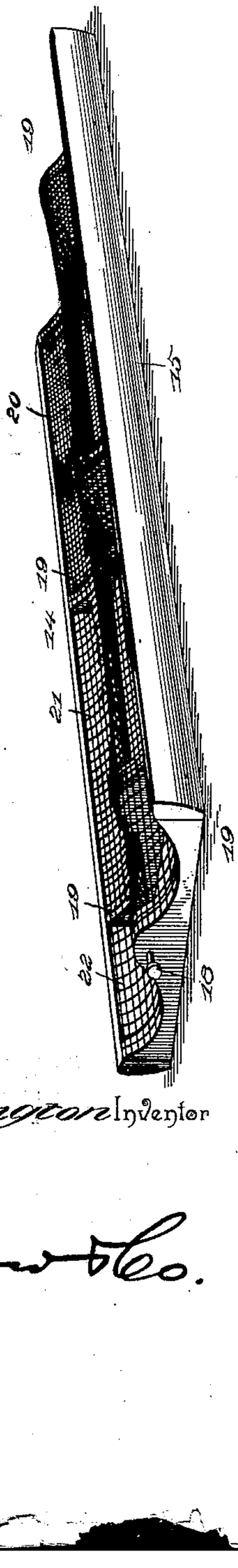


Fig. 3.



Witnesses

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UNITED STATES PATENT OFFICE.

GEORGE WELLINGTON, OF EMERSON, NEBRASKA.

GRAIN-CLEANER.

SPECIFICATION forming part of Letters Patent No. 629,407, dated July 25, 1899.

Application filed May 14, 1898. Serial No. 680,721. (No model.)

To all whom it may concern:

Be it known that I, GEORGE WELLINGTON, a citizen of the United States, residing at Emerson, in the county of Dixon and State of Nebraska, have invented a new and useful Grain-Cleaner, of which the following is a specification.

My invention relates to improvements in grain separators and cleaners; and the object that I have in view is to provide an improved separator of simple and efficient construction which requires a moderate blast from the cleaning-fan to carry off the impurities as the substance under treatment passes from the primary cleaning-sieve to the second screen or sieve.

A further object that I have in view is to provide an improved structure in which the grain will be graded and delivered according to its size into isolated receivers or hoppers.

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

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

Figure 1 is a vertical longitudinal section through my improved grain-separator looking in a direction to show the sieve-operating mechanism by dotted lines. Fig. 2 is a vertical transverse section on the plane indicated by the dotted line 2 2 of Fig. 1 looking in the direction indicated by the arrow. Fig. 3 is a detail perspective view of the secondary or grading sieve detached from the machine, and Fig. 4 is a detail detached view of one of the valley-bars of the secondary or grading screen.

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

1 designates a casing of the machine, which casing is closed on the sides and open at its ends. On top of the casing is erected a suitable hopper 2, into which the grain to be cleaned is deposited, and below this hopper is hung a primary screen 3. This primary screen is composed of a suitable frame, over which is secured a screen fabric of suitable mesh, or a finely-perforated plate may be used in lieu of the screen, and said primary screen is suspended within the main frame or casing to have a downward inclination toward its discharge end. I prefer to arrange the primary screen within the casing to provide sufficient clearance-space between the casing and screen for the latter to have a longitudinal shaking motion imparted thereto, and this primary screen is suspended or hung within the machine-casing by means of spring links or hangers 4, which are arranged on the outside of the casing 1. These hangers are fastened at their lower ends to the casing, and to the upper ends of the hangers are attached the bolts 4^a, which play in the slots 4^b of the casing and are attached to the screen-frame. To the bottom side of the screen-frame of said primary screen is fastened an imperforate collecting-plate 5, of sheet metal or other suitable material, and upon which the small grain is deposited after passing through the screen fabric or plate of the primary shaking-screen 3, and at one end of said primary screen is arranged a discharge-spout 6, which extends through a suitable opening or slot in the casing of the machine, so as to discharge the small grain which accumulates on the bottom 5 of said primary screen into a suitable receptacle provided for the reception of said grain. To one end of the frame of said shaking-screen is rigidly secured a delivery-chute 7, which lies externally to the casing, and in this chute are supported the imperforate delivery-board 8 and the screen 9. This screen 9 is a coarse screen as compared with the screen 3, and it is arranged in the horizontal plane of said screen 4 to receive the tailings therefrom. The delivery board or plate 8 is arranged in an inclined position below the screen 9, and it is arranged to deliver the coarse grain received from the screens 3 9 upon the grading-screen in the lower part of the machine.

To the end of the machine-casing is rigidly secured a casing for the blast-fan 10, which is arranged in a horizontal plane below the primary screen 3. The fan and its casing may be of any suitable construction approved in the art, and said fan is arranged to direct its blast in a direction lengthwise of the machine upon and against the delivery-board 8

and beneath the coarse-tailings screen at the tail or discharge end of the primary screen. In my improved machine I have arranged the fan in a position to direct a blast of moderate energy against the tailings-screen for the purpose of removing from the grain at practically its initial stage of treatment a part of the refuse matter, thus obviating the necessity in prior machines of a strong blast from a fan to separate the chaff from the grain. This fan is operated from a suitable form of driving mechanism, (indicated by Fig. 2 of the drawings,) and the fan-shaft is provided with eccentrics or cranks 11, to which are fitted the straps or yokes 11ª, attached to the pitmen 12, which are connected to the screen-frame.

Between the primary screen 4 and the lower grading-screen is arranged a partition or baffle 13, which isolates the two screens in longitudinal compartments of the casing, and thus the blast from the fan is directed almost entirely against the tailings-screen. This grading-screen 14 is arranged in an inclined position below the baffle-plate and the primary screen and within the machine-casing, and said secondary screen 14 is hung or mounted within the casing to have a rocking motion imparted thereto. This grading-screen consists of a suitable frame 15, which is pivotally connected at its ends to cross-rails 17, fastened to the machine-casing, such pivotal attachment of the screen-frame 15 to the fixed cross-rails being effected by means of suitable pivotal pins or bolts 18, which pass centrally through the end rails of the screen-frame and are supported in the fixed cross-rails, whereby the screen-frame is pivotally connected centrally and in the line of its longitudinal axis to the machine-casing, so as to rock transversely therein. Within this rocking screen-frame 14 are mounted the valley-bars 19, and on these valley-bars are secured the screen fabrics 20 21 22, of different meshes. I prefer to provide a series of four valley-bars 19, which are secured at suitable intervals between the side rails, and to form therewith the frame of the rocking grading-screen 14, and each valley-bar 19 is shown as provided with the grooves or channels 19ª, on opposite sides of which are the elevations 19ᵇ. The screens 20 21 22 are attached to the irregular edges of the valley-bars in any suitable way, and by the described construction of the grading-screen it is given a dip longitudinally between the valley-bars and an undulatory surface is imparted to the screen fabrics in directions both longitudinally and transversely throughout the area thereof, said valley-bars also forming gutters or valleys, which extend longitudinally of the screen between the side rails and the elevations 19ᵇ of said bars 19. The meshes in the screens 20 21 22 extend in the direction of the length of the screen-frame, and by the peculiar formation of the working surface of the screen and by imparting the transverse rocking motion thereto the grading-screen is adapted to separate the different-sized grains from each other and from the chaff, said chaff and refuse being retained on the screen and discharged over the tail or discharge end thereof.

The rocking grading-screen 14 is provided with an arm 24, which extends through a suitable opening in one side of the casing 1, and to this arm is connected the lower end of a long pitman 24ª, which extends to the bell-crank 25, fulcrumed on the casing, said bell-crank being connected by a link 26 to a wrist-pin 27 on the crank-disk 28, rigidly secured to one end of the fan-shaft, whereby the shaft of said blast-fan is adapted to operate both the primary and secondary screens of the machine.

Below the screens 20 21 22 of the secondary or grading screen 14 is arranged a series of delivery-spouts 30, one spout for each section of said grading-screen. These delivery-spouts are adapted to receive grain of different sizes as the grain is assorted and graded by the different sections of the screen 14, and each spout is arranged to discharge to a suitable receptacle. The spouts are all arranged within the machine-casing 1, and they are attached to the lower part thereof in any suitable manner.

The operation of my grain-cleaning machine may be described, briefly, as follows: The grain is deposited in the hopper and the driving mechanism for the blast-fan is operated to rotate the fan and to drive the connections by which the two screens of the machine are set in motion. The grain flows by gravity upon the primary screen, and the small seeds pass through said primary screen, are deposited on the collecting-plate, and thence discharged through the spout leading from said screen 3. The larger grains, with the refuse, are subjected to a moderate blast of air from the fan and a portion of the refuse is blown over the tail of the screen 3, while the larger grains and remainder of the refuse are deposited upon the tailings-screen, from whence they pass to the secondary grading-screen. The grains travel over the surface of this secondary screen until the grains find meshes which permit their descent through to the delivery-spouts, and thus the larger grains are assorted, while the chaff and other refuse are carried along the surface of the screen to the discharge end thereof.

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 the 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 grain cleaning and grading machine, a separating and grading screen comprising a frame having its side rails united by the

valley-bars, 19, each bar provided with a raised surface, 19^b, which is situated between the series of depressions, 19^a, and a series of screen fabrics of different-sized meshes and secured to the frame and its valley-bars to form a continuous working surface on said frame, the raised surfaces, 19^b, of the valley-bars giving an undulatory surface to the fabrics transversely and longitudinally of the screen-frame and also forming gutters or channels which extend longitudinally of the screen between the elevations, 19^b, of said valley-bars and the side rails of said frame, substantially as described.

2. A grain cleaning and grading machine comprising a suitable frame, a longitudinally-reciprocating and inclined shoe hung in said frame and having an imperforate grain-plate below its screen and a laterally-extending spout 6, a rocking grading-screen hung in the line of its longitudinal axis to the frame, directly below and within the limits of the reciprocating shoe, inclined in an opposite direction to said shoe and having a series of different-sized fabrics forming an undulatory working surface, a baffle-plate, 13, supported between the grading-screen and the reciprocating shoe and forming a blast-passage below the imperforate grain-plate of the shoe, a screen, 9, in the inclined plane of the screen on said shoe and beyond the vertical plane of the shoe and the rocking screen, the inclined return-plate, 8, below the screen, 9, and discharging below the baffle-plate to the rocking screen, a fan, and means for reciprocating the shoe and rocking the grading-screen, 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.

GEORGE WELLINGTON.

Witnesses:

GEO. H. HAASE,

W. L. SHONING.