2 Sheets—Sheet 1.

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Grain Winnower.

No. 3,258. Patented Sept. 9, 1843.

Fig: 3.

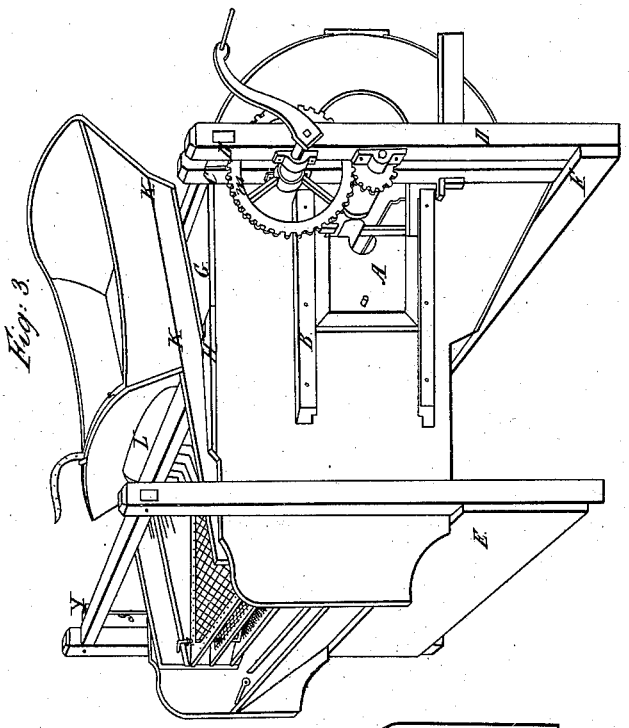
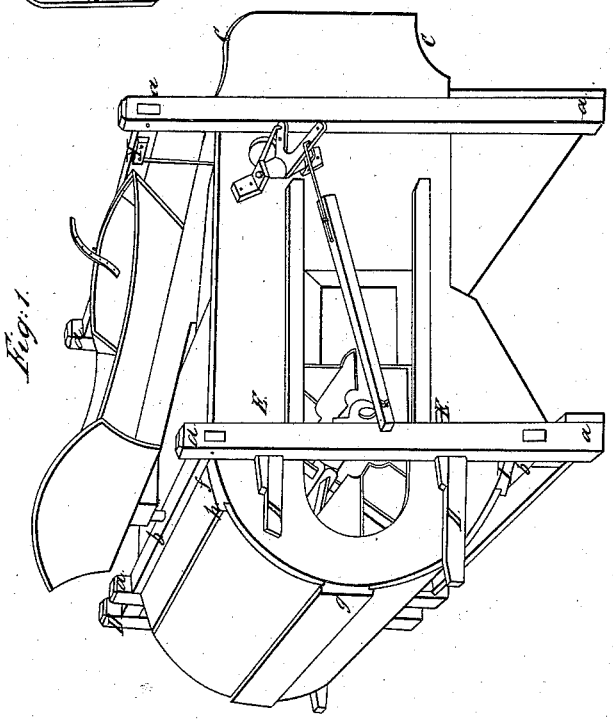


Fig: 1.



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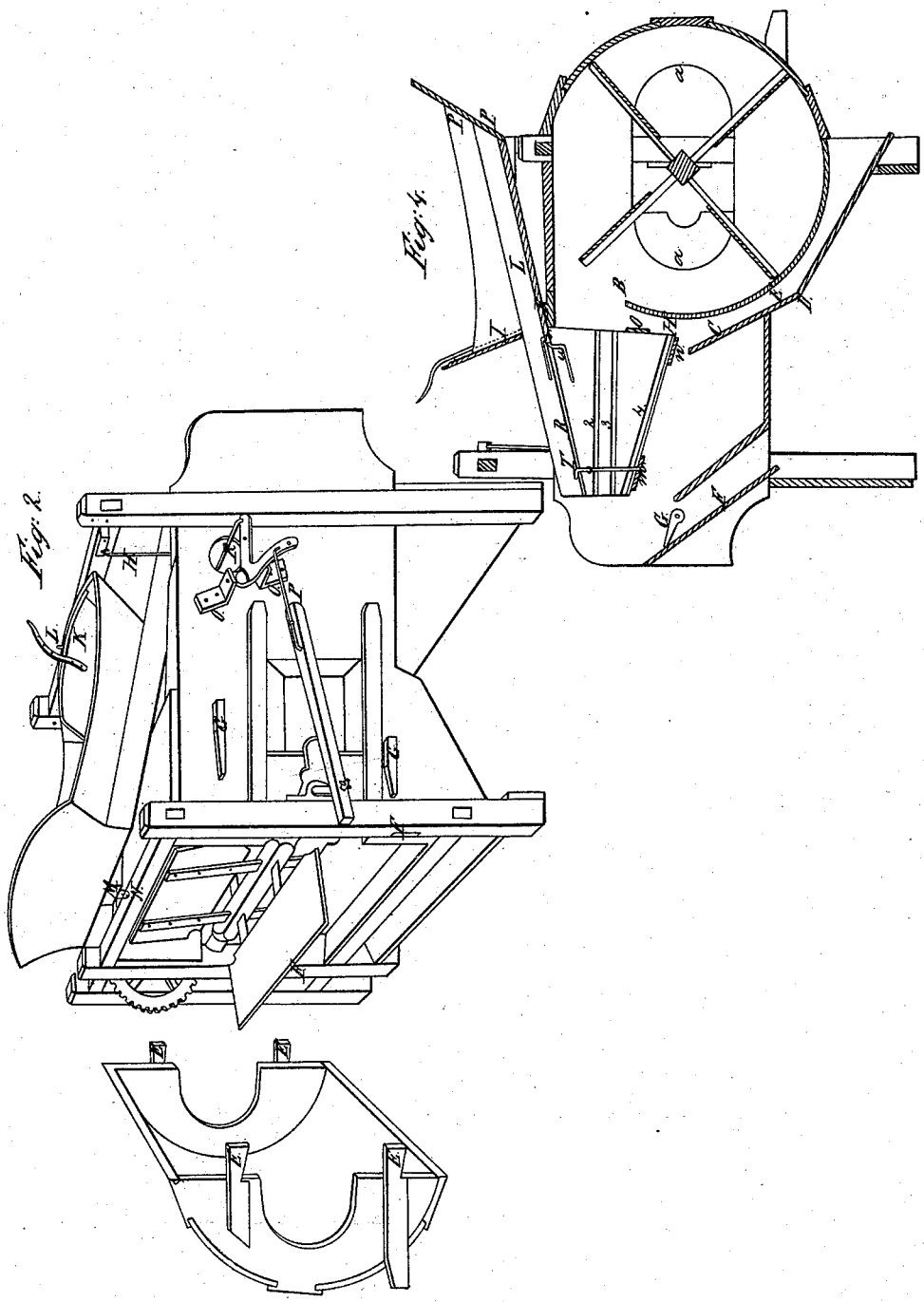

UNITED STATES PATENT OFFICE.

JAMES STARR, OF NEW LISBON, OHIO.

WINNOWING-MACHINE.

Specification of Letters Patent No. 3,258, dated September 9, 1843.

To all whom it may concern:

Be it known that I, JAMES STARR, of the town of New Lisbon, in the county of Columbiana and State of Ohio, have invented a new and useful Improvement in the Construction of Overblast Fanning-Mills for Cleaning Various Kinds of Grain; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawings, making a part of this specification, in which—

Figure 1, is a perspective view of the front and one side, and Fig. 2, is a perspective view of the same front and side, in a disconnected condition. Fig. 3, is a perspective view of the other side, and of the rear, or, back end. Fig. 4 is a longitudinal section.

It is constructed with a frame of five posts, as represented at *a*, *a*, *a*, *a*, in Fig. 1, the timbers of which are two inches and five eighths of an inch in breadth and two inches in thickness. The three posts near the front end, are three feet and eight inches and a quarter high; and are connected by two cross-ties, B, B, Fig. 1, of the same width and thickness as the posts. The upper cross-tie is mortised into each of the two posts near the front end, to which the sides are nailed, with its upper side two inches from the tops of the posts. The lower cross-tie is mortised into the same posts with its upper side nine inches and five eighths from the lower end of the posts. The tenons at the one end of the upper and lower cross-ties, extend through the post C, in Fig. 3, and enter the fifth post D, as shown in Fig. 3, which they connect firmly with the frame, leaving however a space of about two inches between the posts, to afford sufficient room for the wheel and pinion to work. These three posts are also connected by a board one inch thick and about five inches wide, which is nailed against the posts on the rear side, at their lower ends, as shown at F, in Fig. 3. The two posts near the rear or, back end, are four feet and four inches high, and are also connected by a cross-tie, of the same width and thickness as the one described above, which is mortised into them, with its upper side two inches from the tops of the posts, and by a board one inch thick and fifteen inches wide, which is nailed against the posts on the rear side, with its upper edge placed against the lower edge of the two sides of the mill, and extending to the outside of each of the two posts, as represented at E, in Fig. 3.

The frame thus made, is two feet and three inches wide in the clear, and the front and rear, or, back posts are two feet and six inches and a quarter apart. The two sides are straight and their upper edges are also straight, and are placed against the underside of the cross-tie connecting the two front posts, they are nailed to the inner side of the posts, with their upper edges in a horizontal position. They are made of inch boards, and are four feet, nine and a half inches in their entire length, including the semi-circular front when attached to the mill as represented in Fig. 1, exclusive of the thickness of the hoop, which is nailed on the outer edge of the semi-circular part of the sides. At the front posts, or, widest place, the sides are three feet broad, exclusive of the thickness of the inclined plane at the bottom, and the board at the top, both of which are nailed on the outer edge of the two sides. At the posts near the rear end, the sides are two feet wide, the corners at this end of the sides, may either be left square, or rounded off at the upper corner, and cut out with a curve at the lower, as represented at *c*, *c*, in Fig. 1, or in any other manner that the fancy of the constructor may dictate.

The semi-circular part is not quite the half of a circle, but so far as it extends, it corresponds with the circumference of a circle with a radius of fifteen inches and one eighth; its center is the axis of the shaft to which the fans are attached. There are two strips, about two inches and a half wide, and one inch thick, fastened to it on each side, as represented at *d*, *d*, in Fig. 1, all of which project over its straight edge about three inches, the lower sides of the projection of these strips, are cut in a dove-tail, as represented at E, E, E, E, in Fig. 2, and fitted to enter the mortices *f f f f*, as represented at Fig. 2, with sufficient room to receive the wedges, *g g*, as shown in Fig. 2, on the upper side, by which means it is firmly attached to the other part, as represented in Fig. 1. The other ends of the two lower strips are left long enough to project about six inches beyond the semi-circular

side, and are made to answer the purpose of handles to lift the mill by; as represented in all the figures. By removing the wedges *e*, *e*, in Fig. 1, and the corresponding ones on the other side, it may at any time be disconnected as represented in Fig. 2.

Both sides of the mill have also oval, or, elliptical holes cut through them; which have the same point, for their center, that the semi-circular front has, to admit air, which are about eighteen inches and three quarters long, and about eleven inches wide, as represented at *a*, *a*, in Fig. 4. Each side is provided with a slide, or, damper, which is placed between the front and rear posts of the frame, as represented at *a*, in Fig. 3, and is made to slide in the grooves of two strips, that are nailed on the sides of the mill, one of which is placed near the upper edge of the oval, or, elliptical hole, and the other at the lower edge, as represented at B, B, Fig. 3.

The lower edges of the sides of the mill, from the rear, or, back end, continue straight, or, horizontal for a distance of twenty-seven inches and a quarter, the point where the upper part of the inclined plane is intersected there they make an angle of about seventy degrees, below the horizon, and continue in that direction for about two inches and three quarters, where the inclined plane makes an angle. There the lower edges make another angle of about twenty nine degrees, depressed below the horizon, and continue for the distance of about nineteen inches and a half, which brings them within one half inch of the front side of the front posts; where the straight, or perpendicular ends of the sides proper, will be met by the straight edges of the semicircular part, which should be made to enter in between the front posts, about one half inch, which will give it greater firmness.

Close against the rear side of the upper cross-tie that connects the three front posts, is placed a board G, in Fig. 3, fourteen inches broad and one half inch thick, and forms the top of the mill, under the hopper, it is nailed on the upper edge of the sides: close against this top board is fitted the end of a strip of board, one half inch thick, and about fourteen inches and three quarters long, and two inches and one eighth broad, at the end next the above described top board, and one inch and a half at the other end, it is nailed on the edge of the side, its outer edge, is even with the side of the mill and runs lengthwise, its width extends inward and closes up the space not required for the motion of the shoe and hopper. There is one on each side of the hopper. It is represented at H, in Fig. III.

The hoop is made by fitting a strip of board, about four inches and a half wide and one inch thick, on the outside of the upper part of the semi-circle, close against the cross-tie with one edge, as shown at *f*, in Fig. 1. The other edge is made to lap on the upper side of another piece of the hoop which is one half of an inch thick, which is shown at, *h*, in Fig. 1. This second piece of the hoop, extends down nearly to the middle of the semi-circle, where there is another strip of seven inches in width, fitted at the upper edge to lap on the piece of hoop above mentioned, and the lower edge is fitted in the same way, on the other piece of hoop extending from thence downward, near to the lower side of the semi-circle, as represented at G, in Fig. 1, at the lower cross-tie is another strip of the same dimensions, as the one at the top, fitted against it with one edge, and the other edge is made to fit on the last mentioned piece of hoop, similar to the piece on the top, as represented at I, in Fig. 1. The remainder of the hoop is fitted to slide in a circular groove, half an inch wide, that is cut in the inside of each of the side boards, and corresponding with the circumference of the circular front, until it approaches the top edge of the side boards, within about nine inches as represented at, B in Fig. 4.

The inclined plane C, Fig. 4, designed to receive the grain as it passes from the screen is formed by nailing a board from one half to three quarters of an inch thick, on the lower edges of the two sides, commencing at the broadest part of the sides, and extending it down until it is even with the front side of the front posts, and on the upper side of the board nailed against the front posts at their lower end. The board is about nineteen inches and a half long, and must project sufficiently at the angle at, D, in Fig. 4, to lap on, or cover the thickness of the other board, which is from three eights to one half of an inch thick, and forms the other part of the inclined plane, from the angle upward, it is also nailed on the edges of the sides from the angle to the straight or horizontal part of the lower edge of the sides at, E, in Fig. 4, where the board is diminished in width, so as to enter a groove cut in the inside of each of the side boards, and is continued in a straight line with the direction of the plane from the angle, for the distance of twelve inches and a half from the point of said angle at D in Fig. 4. This part of the inclined plane, also joins one end of the screen box, the other end is formed by nailing a board, from three quarters of an inch, to an inch in thickness, and about one foot in width or height, in a slanting position between the sides of the mill, from the outside, the upper edge of this end should be placed perpendicularly under the rear end of the shoe, or edges of the sieves; and the lower edge of it, should be placed about fourteen inches

and three quarters, in, from the rear end of the sides, and about one foot from the inclined plane: The bottom board should be one inch in thickness and also nailed in between the sides at their lower edge, from the outside, as shown at Fig. 4. The tail-board is about three quarters of an inch thick and about nineteen inches broad it is placed with its upper edge even, with the rear or back end of the mill, and about nine inches and five eighths, below the upper edges of the sides, it extends downward in a slanting position, and rests on the upper edge of the board that is nailed against the lower end of the upright posts near the rear end of the mill: see Fig. 4, the tail board is represented at, F, it is made to slide in a groove cut in the insides of the side boards, and held by the click G, in Fig. 4.

The rear ends of the sides of the shoe, in which the sieves are placed, are perpendicular, and are seven inches and seven eighths of an inch broad, the upper edges of the sides form an angle, elevated above the horizon of about eleven degrees, and are three feet and five and a quarter inches long: the lower edges form an angle depressed below the horizon of about twenty degrees, and are eighteen inches and five eighths long, as represented at H, in Fig. 4. At this point another angle is made, and forms what may be considered, as the front edge of the sides of the shoe by continuing in a straight line toward a point at I, in Fig. 4 on the upper edge of the sides, which is twenty inches and a half from the rear or perpendicular ends of the sides, until the point is approached within two inches and five eighths at, K, in Fig. 4, from thence the line continues parallel to the upper edges of the sides already described; leaving a strip of two inches and a half broad, as shown at L, in Fig. 4 which strip forms the lower part of the sides of the hopper.

On the inside of the sides of the shoe four grooves are cut, the first, or, uppermost one, at R, in Fig. 4, is five sixteenths of an inch wide, its upper edge is two inches and three quarters from the upper edges of the sides at the rear end, at the other end it is close under the bottom of the hopper which should have the lower corner a little beveled, to fit it properly, it will be about three inches and one eighth below the top edge of the sides it is designed to receive the rake, S, at Fig. 4. The second groove from the top is five eighths of an inch wide its upper edge is only one half inch from the lower edge of the first groove, at the rear end and three inches and a half at the other end; it is made to receive the coarse sieve; the third groove is also five eighths of an inch inside, and is two inches and one eighth from the groove above with its upper edge; at the rear end and one inch and seven eighths at the other end, and is designed for the wheat sieve. The fourth groove is only one half inch wide and is one inch and one eighth from the one above it at the rear end, and seven inches and one quarter at the other end. It is intended for the screen. The second, third and fourth grooves, are respectively marked, 2,-3 and 4, in Fig. 4.

The sieves and screen are held to their places by an iron pin, that passes through a staple, driven in the inside of the side of the shoe, a little above the upper groove, and extends down through all the sieves and screen and a strip M, in Fig. 4. The iron pin is bent in an angle at the upper end, to prevent the pin from slipping down and for taking it out, and putting in by. There is one pin on each side of the shoe. The pin is shown at T, in Fig. 4.

The shoe is twenty one inches wide, from out side to outside; the sides are held together; exclusive of the support derived from its connection with the hopper: by means of three strips of boards, at M, N, and O, in Fig. 4, which are nailed to each side of the shoe. M, is three inches broad and three eighths of an inch thick, and is nailed on the lower edge of the sides, within one inch and a half from the rear end, N, is of the same thickness, and is placed at the lower edge at the front corner and is one inch and three quarters wide, and O, is two inches and one quarter wide, of the same thickness and is nailed on what may be termed front edge of the sides, three inches up from the lower corner.

The shoe is suspended by iron rods, as represented at H, in Fig. 2, and at I, in Fig. 3. They are hooked at one end into staples, that are driven in the sides of the shoe on the outer side. The other ends, are hooked over iron pins passing below small blocks or buttoms Y, in Fig. 1 and *y*, in Fig. 3, into the cross-tie that connects the rear posts, to which the small blocks are also screwed. The blocks have a notch cut out at one end on the side next to the cross-tie, so as to afford sufficient room for the rods to play. The length of the rods, should be so adjusted as to have the upper edge of the shoe, at the rear end, about one half of an inch below the upper edge of the sides of the mill.

The hopper is constructed by nailing its sides on the upper edges of the sides of the shoe as represented at *k*, *k*, in Fig. 3. It is twenty and a half inches long at the bottom and twenty-one inches wide. The sides are made of boards seven eighths of an inch in thickness. They are about four inches and a quarter wide at the front end, and about six inches and three quarters at the rear end. On the upper edge they are slightly curved out, in the middle which gradually diminishes toward the ends, the

lower edges should be beveled so as to incline the upper edges outward, about three or four inches the ends of the sides must be fitted to make a finish with the ends of the hopper where they meet.

The front end piece is nailed on the ends of the sides of the shoe, and also on the ends of the sides of the hopper as represented at P, P, in Fig. 4, and makes an angle of one hundred and thirty five degrees, with the upper surface at the sides of the shoe; it is one foot high in the middle, the corners are rounded down to suit the height of the sides and make a finish.

The rear end of the hopper is fitted on the upper edge of the sides of the shoe, and against the ends of the sides of the hopper, in such manner as to incline the top of the end toward the rear of the mill so as to form an angle of one hundred degrees with the upper surface of the sides of the shoe. It is five eighths of an inch in thickness and nine inches high in the middle, the corners rounded down to suit the sides. The lower edge is curved out as represented at L, in Fig. 3. The curve commences about one inch and a half from the outer edge of each side, and corresponds with the arc of a circle of about two inches and one eighth radius. The upper edge of the curve is nearly straight. On the inside of this end, at each corner a triangular block is fastened. The point of the triangle is placed at the upper edge of the shoe, from thence one side of the triangle rises perpendicularly, the other side is fitted to the side of the hopper both sides extend to the top of the end of the hopper. The straight or perpendicular edge of the triangle has a square notch taken out, on the side next the end piece, as represented at I, in Fig. 2, which extends the whole length of the block so as to form a groove for the gate K, at Fig. 2 to slide in; the ends of the gate should be made to slide in the grooves of the triangle, and toward the lower edge they should be diminished so as to fit in between the sides of the shoe, which form the lower part of the hopper.

A leather strap is nailed on the inside of the gate with holes punched through it, by which it is raised and lowered, and made stationary by hooking over a pin driven in the upper edge of the rear end of the hopper as represented at L, in Fig. 2.

The bottom of the hopper is nailed on the lower edges of the sides of the shoe, and should extend in between the sides, by having the groove in which the rake slides, a little enlarged at that place, so as to admit it about one half inch. A block M, at Fig. 2, about two inches square at one end, and tapering to an edge at the other is nailed on the bottom of the hopper, at the front end. There is a hole bored in the block by which it is hung on a wooden pin fastened in the middle of the cross-tie between the front posts as represented at N, in Fig. 2. The length of the pin and the depth of the hole in the block should be so adjusted as to have the bottom of the hopper about three inches above the top of the front cross-tie, and the front edge of the hopper perpendicularly over the front edge of the cross-tie.

The handle is attached to the arbor of the wheel M, at Fig. 3, which is supported by and works in two bearings fastened against the two posts C and D, as shown in Fig. 3. The diameter of the wheel is thirteen inches and three quarters; it has one hundred and four teeth; it works in a pinion that is three inches and one quarter in diameter and has twenty three teeth. The pinion is attached to the shaft of the fan, which is two inches and one half square. It is also supported by and works in two bearings that are fastened to two of the front posts, D, in Fig. 3, and *a* in Fig. 1. The end of the shaft opposite the pinion has a double crank driven into it, one end of which serves as pivot, the other end extends through the shaft that communicates motion to shaker, as represented in Fig. 1. The end driven into the shaft of the fan is fastened by a key, driven through the shaft and the arm of the crank. The crank is one inch and an eighth from the center of one arm to the center of the other.

There are four arms running through the shaft, to which the fans are nailed. The fans are about nine inches wide and from one fourth to three eighths of an inch thick. The rake is a strip of board one inch and three quarters broad and three quarters of an inch thick with tenons on the ends to slide it in the upper grooves of the sides of the shoe, in the rear edge of which are placed nine teeth, made of wire. They are alternately of the lengths of six inches and a half, and five inches from the edge in which they are driven. They are set down perpendicularly about one inch and a half, thence making an angle. They run parallel with the groove in which the rake is placed, as represented at *u*, in Fig. 4. The rake may be taken out, and its place supplied by a thin board about six inches wide, usually called a "chess board," which is used in cleaning wheat the second time. A conducting board may also be substituted in the place of the screen, when it is not desired to screen the grain to be cleaned. The shaker is a piece of cast iron with two prongs that extend out at an angle of about sixty degrees. It is also supplied with a short shaft on which there is a pivot at each end. It is attached to the side of the mill by means of two pieces of cast iron of a rectangular shape, which are screwed against the side of the mill with one side. The other sides project at right angles, and have holes in them

into which the pivots of the shaker are fitted so as to work freely, as represented at *o*, *o*, Fig. 2.

The prong of the shaker next the front end of the mill has two holes through it; the one is three inches from the center and the other is three inches and seven eighths. They are designed to receive the hook on the end of the shaft that communicates motion. The other prong has also a hole through it two inches and seven eighths from the center and another three inches and five eighths from the center. The shaft that communicates motion from the crank on the shaft of the fan has an iron rod attached to it, as represented at P, in Fig. II. The end of the iron rod is bent in a right angle, so as to enter the holes in the prong of the shaker first above described.

R, in Fig. 2, is an iron rod with one end bent so as to form a hook, which is hooked into one of the holes in the prong nearest the rear end of the mill. It then extends through a hole cut in the side of the mill and is fastened to the side of the shoe at the other end, by being hooked into a staple that is driven into it.

The above dimensions may to some extent be varied to suit the opinion of the constructor.

The operation of the above described "over blast fanning mill" is similar to other over blast fanning mills. The fan is put in motion by means of the wheel with the handle working in a pinion on the shaft of the fan, which creates a strong current of wind that passes through the space between the rake, sieves and screen. The strength of the current may be regulated by shifting the slides or dampers, which are much more effectual in consequence of being placed between the posts at the sides of the mill, which affords the opportunity of using oval or elliptical holes and admitting the air to that point, instead of having the holes so as to require the slides or dampers on the front sides of the front posts. The shoe and hopper are put in motion in the ordinary manner as represented in drawings. The strips represented at H, in Fig. 3, on the top edges of the sides on each side of the hopper, prevent the escape of the wind and confine its course through the spaces of the shoe with the rake, sieves and screen. The additional sieve afforded by the enlarged size of the shoe aids greatly in rendering the grain more clean than it can possibly be made without it. The downward set of teeth in the rake is important in the over blast mill; it has the tendency to throw the grain immediately into the current of the wind at the front edge of the sieves and being thereby exposed for a longer time to its action than it would be if it were deposited nearer the rear end of the sieves, and consequently the grain is better cleaned.

The advantage derived from the improved construction of the inclined plane consists in having the grain discharged more freely through the mill and not permitting it to rest at any point on the inclined plane, as is usually the case, where the lower part of the plane corresponds with the circumference of a circle, which must of necessity have a radius so great as to prevent the possibility of having the plane of the requisite inclination.

What I claim as my invention, and desire to secure to Letters Patent is—

The construction and use of the rake with the vibrating screens and hopper in the manner herein described.

JAMES STARR.

Witnesses:
CHAS. D. HOSTETTER,
E. CONNELL,
LAZARUS B. MCLAIN.