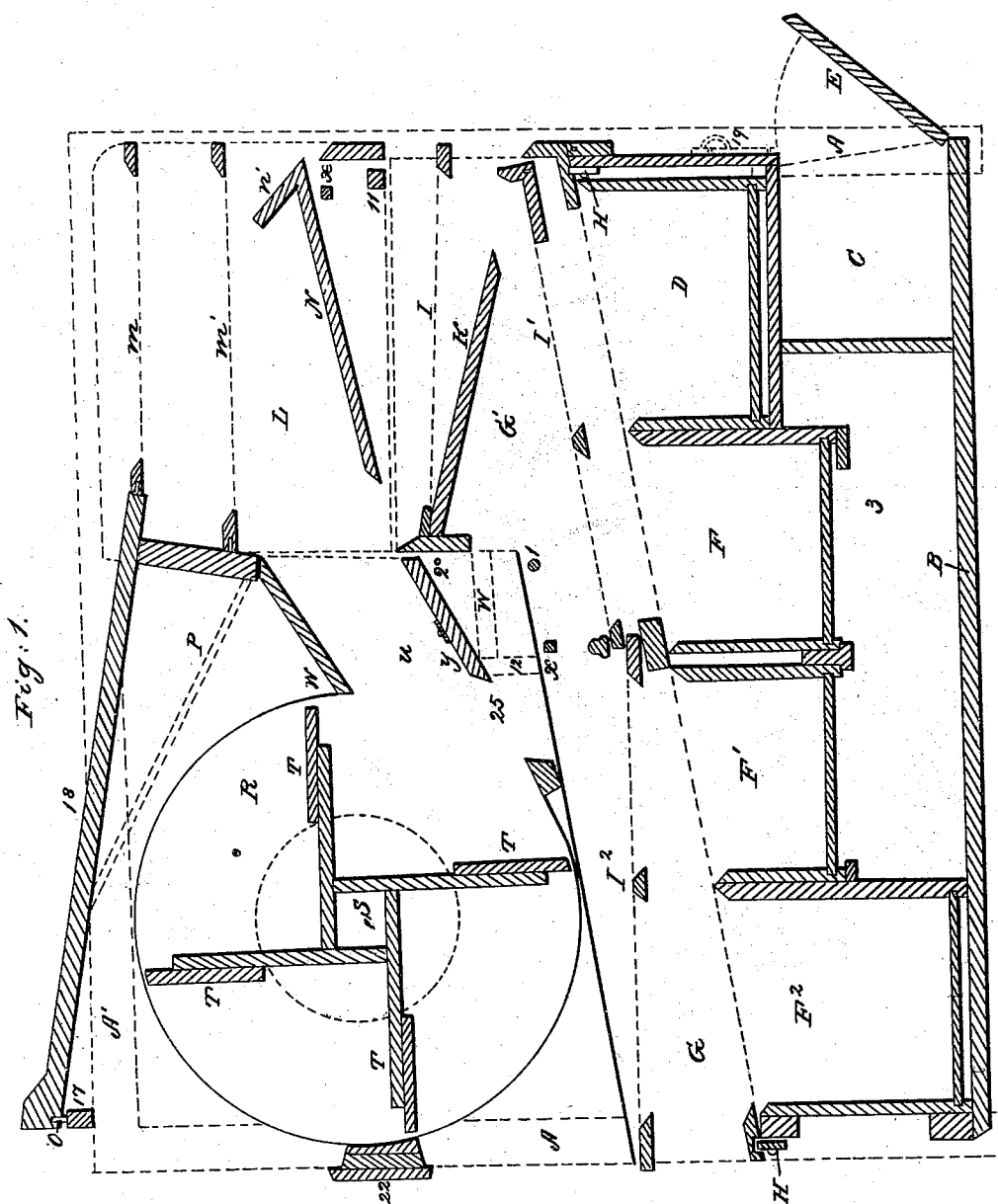


R. NUTTING.
Grain Winnowers.

3 Sheets—Sheet 1.

No. 21,144.

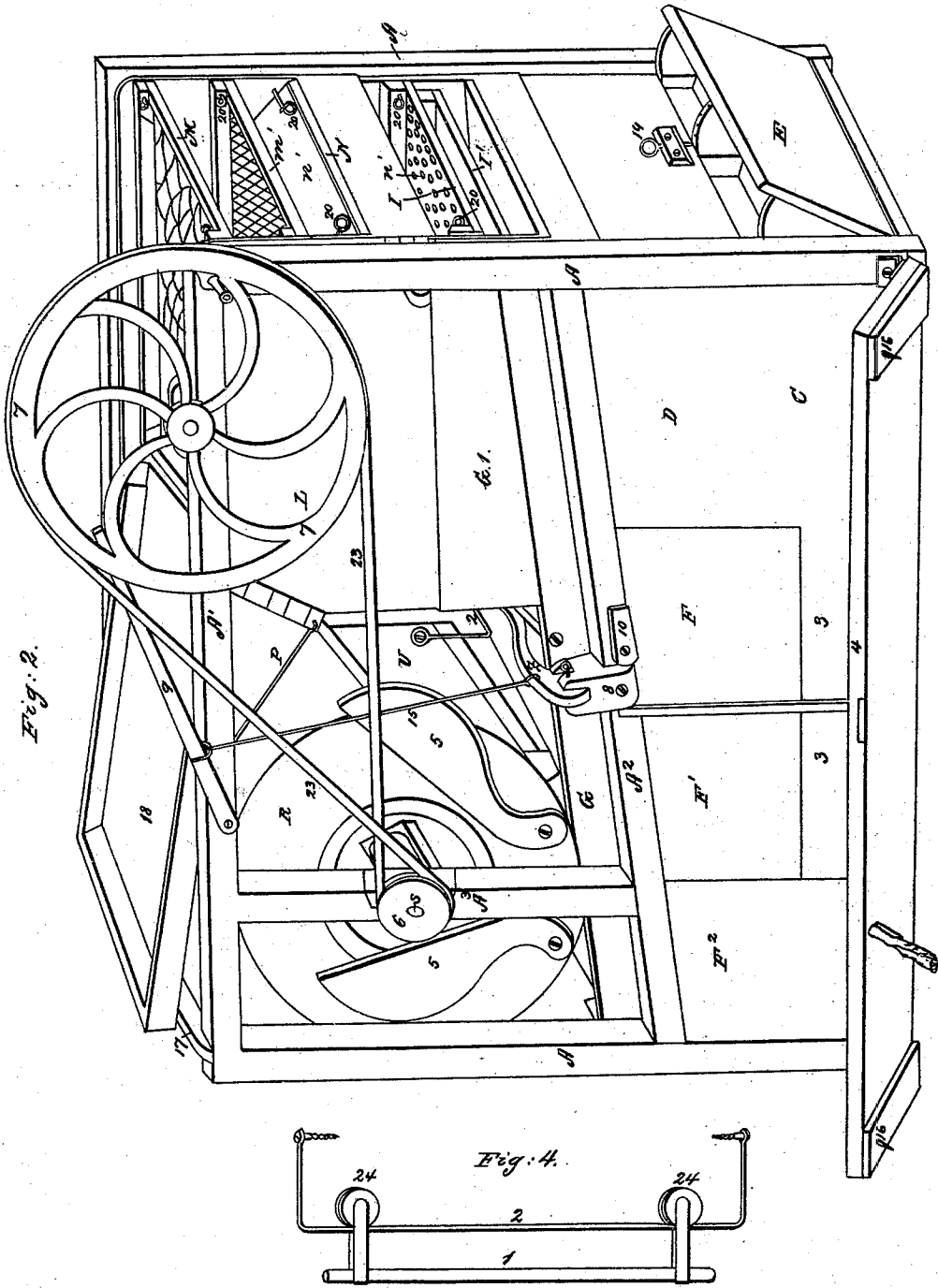
Patented Aug. 10, 1858.



R. NUTTING.
Grain Winnow.

No. 21,144.

Patented Aug. 10, 1858.

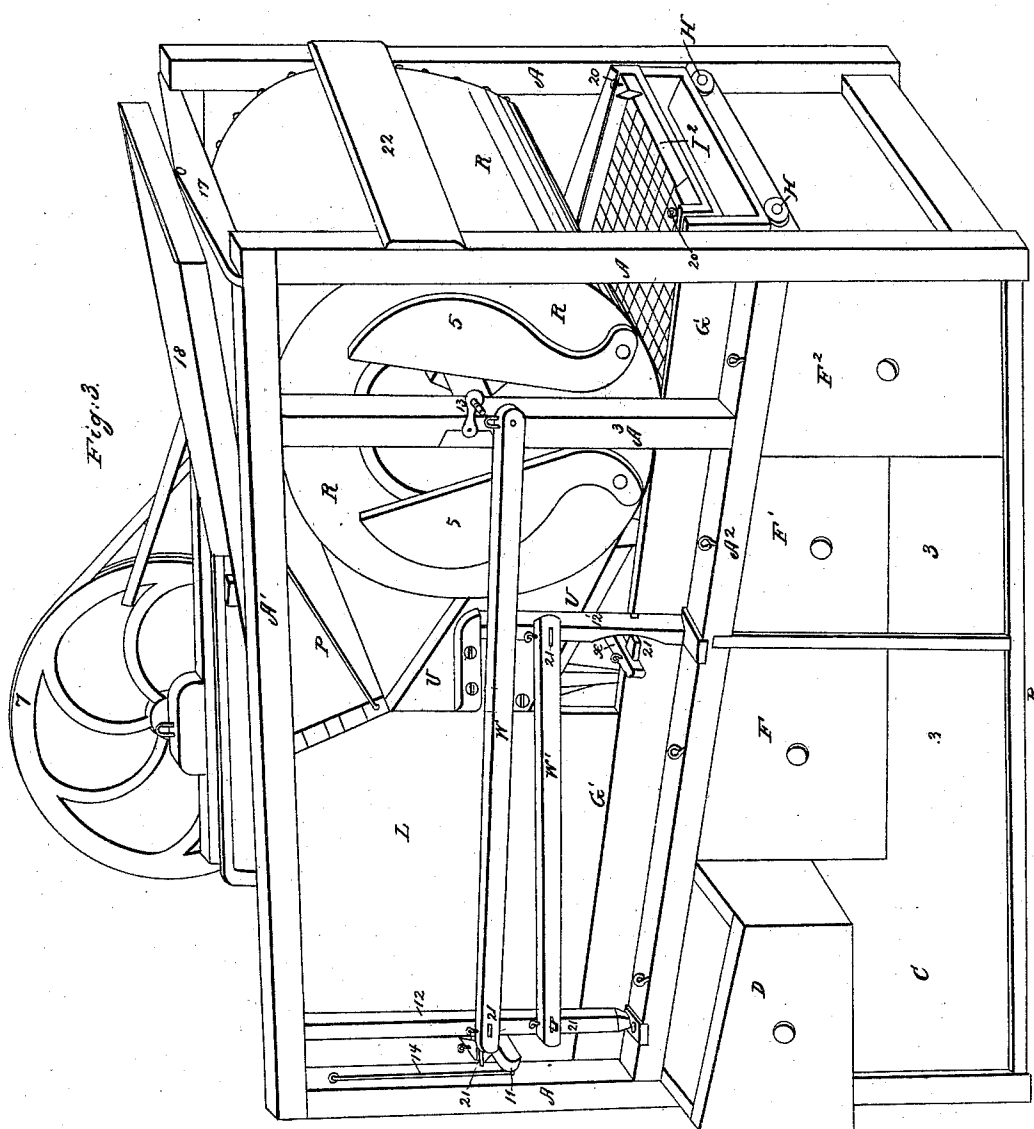


R. NUTTING.
Grain Winnower.

3 Sheets—Sheet 3.

No. 21,144.

Patented Aug. 10, 1858.



UNITED STATES PATENT OFFICE.

R. NUTTING, OF RANDOLPH, VERMONT.

MACHINE FOR FANNING AND ASSORTING GRAIN.

Specification of Letters Patent No. 21,144, dated August 10, 1858.

To all whom it may concern:

Be it known that I, RUFUS NUTTING, of Randolph, in the county of Orange, in the State of Vermont, have invented a new and useful machine for fanning and cleaning all kinds of grain, corn, beans, peas, garden, flower, grass, and all other kinds of seed, and separating them according to size, form, and weight and assorting each into grades and depositing each variety and grade in an apartment by itself; and I do declare that the following is a full and exact description thereof, reference being had to the annexed drawings, making a part of this specification, in which—

Figure 1 is a vertical sectional drawing of the said machine taken in the direction of its greatest length; Fig. 2 is a perspective view of the machine showing the front side and the front end and the top, with the "hold fast" partially turned up, and without the hopper; Fig. 3 is a perspective view of the machine showing the back side and end end and the top; Fig. 4 represents the "percussion bar" and the parts connected with it.

In each of the said drawings and figures, the same letters and figures refer to the same parts of the said machine.

Letters A, A¹, A², A³ represent the frame of the machine; B, the floor or bottom; C, an apartment or tailings box under the drawer D, which, in Fig. 3 is represented as partially open; E, is a leaf for closing said tailings box; F, F¹, F² are drawers similar to D, which drawer D, in Fig. 3 is partially open; G, is the lower shoe, and G¹, the angular part of the side; H, H, are small wheels or rollers on which the said lower shoe G, rests and moves; I, I¹, I² are the screens in the lower shoe G; K, is a conductor which carries the grain that has passed through the first screen I, to the top of the second screen I¹ in the lower shoe; L, is the upper shoe; M, M¹ are the two sieves and N, a conductor for carrying the grain that has passed through the lower sieve M¹ in the upper shoe, to the upper screen in the lower shoe; N¹ is the part of said conductor for passing out the tailings into the tailings box C; O is the point or pivot on which the upper shoe L and hopper plays; and 14 are the straps, wires or rods by which the bar 11, on which the front end of the upper shoe

rests, is suspended; P, P, are the rods or braces connecting the bottom of the hopper 18 and the back end of the upper shoe L; R, is the drum containing the fan or blower; S, is the shaft of the blower and T, T, T, T, are the wings of the fan; U, is the wind conductor from the blower to the upper shoe L; 5, 5, are the dampers; 6 is the pulley on the shaft S, 7 the driving wheel and 23 the belt or cord; 8 is the block containing the joint in which the hammer plays; Z is the hammer; 15 is the wire which connects the hammer with the lever 9, which gives motion to the hammer; 4 is the hold fast, which in Fig. 2 is raised a little to show the points or spikes on the under side and 16, 16 are the spikes or iron points for holding it to the floor; 3 is the extra sieve box; X, X, are the shake bars connecting the shoes with the rocking shafts 12, 12¹; W, W¹, are the connecting rods between the crank 13 and the rocking shafts 12, 12¹ (the longest of the connecting rods W, is exhibited in Fig. 3 as thrown off from the crank, to show the groove in the crank, and the manner of connecting the bar with it;) 10 is a button for holding the "hold fast" up to the machine when not in use; 17 is the bar holding the pivot O, on which the back end of the bottom of the hopper 18 rests; 19 is the bolt for holding the leaf E, in its place; 20, 20, 20 are the bolts for holding the screens and sieves in their proper places; 21, 21, 21 are the arms of the rocking shafts, by means of which they receive and transmit motion; 22 is the board covering the opening into the drum in the rear; 2 is the track on which the percussion bar is suspended; 1 is the percussion bar and 24 are the wheels or rollers on which the bar runs; Y is the director for dividing the current of air so that a part may be thrown on the screens in the lower shoe when desired; and 25 is the aperture in the bottom of the conductor U, for letting grain and seed fall through which otherwise might pass into the drum.

The machine may be of any desirable size; but one, the frame of which is about three feet and a half in length; two feet two inches in width, and three feet one inch in height is found to be of suitable dimensions, and proper proportions.

The outer frame may be of any suitable material; but wood is the most proper; and

it may be of stuff of about two inches square or more. An upright is placed at each corner A, A, A. The pair of uprights for each side of the frame, are connected by a rail A¹ at the top; also by another rail A² lower down and extending from upright to upright in a direction; one end of which is placed about one half way down the front end upright; and the other end is placed about two thirds of the distance down the other upright, in the manner seen in Figs. 2 and 3. Extending from this rail A² to the upper rail A¹, is another upright A³, placed distant about one-fifth the length of the machine from the back end upright, or the one into which the rail A² is mortised the lowest.

Each side of the frame is precisely similar; and the two sides are connected at each end by rails at or near the bottom of the uprights A, A, and by two others just under where the rails A² are mortised into the uprights A, A.

All the uprights, rails and bars, are suitably mortised or halved into one another.

At the rear end of the machine a board, 22, of about the width of four inches or more, extends from upright to upright and is secured to them by screws or otherwise so that it may be removed at pleasure; and it serves as well to protect the drum and give strength and stability to the frame as to furnish an opening into the drum to put in the fan or blower and to repair the same.

The bottom of the machine is closely covered with boards B. Extending across the top of the machine near the rear end, is the bar 17, which gives stability to the frame, and holds the pivot O.

The hopper (of which only the bottom part, 18, is represented in the drawings,) for receiving the grain and conducting it into the upper shoe L, may be constructed in any approved form, and be attached to the machine over the shoe in the usual manner.

The upper shoe L, is formed of two side pieces of boards. In depth it is about one third the depth of the machine; and in length a little more than one third the length of the machine; and the side boards are placed so far apart as to allow the proper horizontal vibratory motion between the frame, necessary to pass the grain or seed through the sieves in the shoe. These sides are connected together on the front end by a board of the width of about one fourth the depth of the shoe, which board is placed even with the lower edge of the sides of the shoe, and is properly dovetailed into the ends of the side pieces or otherwise properly fastened to them. At the rear end of the upper shoe, a similar board connects the sides in a similar manner, but it is placed even with the under side of the bottom of the hopper, which bottom is two inches below the top of the shoe, and extends down-

ward, about one half the depth of the shoe. The top and the bottom of the shoe and the upper three fourths part of the front end, and the lower one half of the rear end, are left open.

To the upper outer corner of the rear end of the shoe, just at the top of the cross board mentioned, is connected the bottom of the hopper 18, and the same extends upward and backward at about an angle of ten degrees with the top line of the shoe, to near the rear end of the machine where it rests on the pivot O, as seen in Figs. 1, 2, and 3.

Support is given to the connection of the shoe and the bottom of the hopper as above mentioned by the braces or rods P, P; one of which is placed on each side.

The front end of the shoe L, is suspended by straps or wires 14, fastened at a point near the top, on the back side of the front uprights and the other end of which is attached to the outer ends of a horizontal bar 11, which passes through the sides of the shoe, at the front end and near the bottom of the shoe. These straps or rods when so suspended and attached to said bar, hang when at rest, perfectly vertical.

Under the upper shoe L, and the drum R, is the lower shoe G. It extends the length of the machine, between the two rails A², and has the same direction and inclination. The sides are of boards, and the width or depth from the rear end of the machine, to the rear end of the upper shoe is about five inches, and the remainder of the side is of sufficient width or depth to fill the angular space between the bottom of the upper shoe, and the lower shoe, as seen in Figs. 2 and 3, G¹. The sides are united together, at about the same distance apart as the upper shoe, by a narrow board fastened to the bottom at each end, and a similar one in the center, all on the under side of the shoe: the rear end of the angular part of the lower shoe G¹, is closed by a similar board extending across from one side to the other. This last board is about one half the width of the rear end of such angular part; and while the like board on the upper shoe corresponds with the top of the wind conductor U; this cross piece on the lower shoe corresponds in height with the under side of such conductor, as seen in Fig. 1. The lower shoe G, is supported at each end on two small wheels, or rollers H, H, which may be of wood, or any other suitable material; and which are attached to the two cross bars or rails under the ends of the rails A², by screws or otherwise. Corresponding with these wheels are grooves on the under side of the cross pieces of the lower shoe, already described, in which the said wheels or rollers play; by means of which arrangement a perfectly horizontal motion is given to the shoe G, in its whole

length, and thus avoids all sudden jerks or shaking, and prevents the one side of the screens from being raised or depressed more than the other, and consequently allows the grain or seed to be evenly spread over the surface of the screens, and each grain or seed to touch the screen, and to slide or roll over on the smooth surfaces of the screens, which is essential to the perfect assorting of the grain and seed.

The sieves M , M^1 in the upper shoe, may be of the usual kind, in form and material.

The screens I , I^1 I^2 may be made of perforated zinc, or other sheet metal or material; or of wire cloth reduced to an even and smooth surface, and having the wires where they meet and cross, halved into one another, thereby rendering the form and size of the meshes permanent and rendering the cloth stiffer and more elastic than ordinary; and presenting no impediment to the sliding or rolling of the grain or seed over the surface of the screens. The different sides of each aperture in either kind of material used, must be of equal height with the main surface of the sheet or other material used. The size of the holes or apertures in the screens vary according to the size and character of the grain or seed to be cleaned and assorted; and they increase in size from the front end of I^1 to the rear end of the machine.

The sieves and screens being attached to frames in the usual manner, are held in their places by means of two pins each, of iron or other proper material, placed in a horizontal line at the several heights it may be desired to place the rear ends, of the sieves or screens; which pins are made to enter corresponding holes in the back part of the frames of the sieves and screens.

The pins are short and the holes do not fit too close, but allow some play if desired to the front of the sieve or screen, and it may be made to rise or fall as desired. When the desired inclination is determined the front ends of the sieves and screens are fastened in their proper places by means of pins or bolts of metal passed through the sides of the frames, and into the sides of the shoes. The first sieve M , of the upper shoe, which is the coarsest, is placed at the rear end of the shoe, in a line with the top of the bottom of the hopper, and the front end may, by the means above described, be made to assume any desired inclination.

The next lower sieve M^1 is placed on a line near the lower edge of the cross piece mentioned as being at the rear end of the upper shoe; or it may be raised higher by having pins placed at proper distances above, and the front may be made to assume any desired inclination, in the same manner and by the same means as the upper sieve M . Under the last sieve M^1 , is placed the conductor

N , N^1 . It is formed of two parts. The main part N , is formed of a board extending from the front to near the rear end of the shoe, and inclined at an angle of about ten degrees, as seen at N , Fig. 1; but this inclination may be varied. The use of this conductor N , is to receive upon its inclined smooth surface the grain or seed as it passes through the sieves M , M^1 of the upper shoe and convey them gradually down to the elevated end of the upper screen I , in the lower shoe G . The part N^1 of this conductor is a board of about 3 inches in width, united to the main part at the front end, and forming with it an angle of about 45 degrees, as seen in Fig. 1. This latter part N^1 is for the purpose of passing down into the tailings box C , such light grains of wheat, oats, and chaff as have not been blown entirely out of the machine by the blast, but have been caught by the frame of the sieve M^1 , and then fall through it. The first, or upper screen I , of the lower shoe L , is fastened at the rear end, to the cross board, already mentioned, as uniting the ends of the angular parts of the side of the shoe G , by pins in such board and corresponding holes in the frame, in the manner already described as to the sieves; and it is fastened in its place in front, in the manner already described, and its degree of inclination may be varied as already described in the case of the sieves. This screen is formed in the manner already described, and it is of about the length of the sieves M , M^1 , and the holes or meshes are of such size, as to freely pass through the largest sized grain or seed to be cleaned; while objects of larger size that may have passed through the lower sieve M^1 , are carried down its inclined surface and gradually pass into the tailings box C . Directly underneath this screen I is the conductor K , which receives upon its upper surface all the grain and seed, that have passed through the screen I , and conveys them gradually down to the elevated end of the screen I^1 . This latter screen I^1 is of about half the length of the machine, and is made like the screen I . Screen I^2 is also about one half the length of the machine, and is placed in the rear end of the machine, and to end with the screen I^1 but at a little less angle with the shoe G , than screen I^1 . Both of these screens are made of different degrees of fineness. The elevated end of I^1 , having the finest holes or meshes, which increase in size to the opposite end of I^2 . The increase in the size of the holes or meshes is not gradual from hole to hole, but the upper end of I^1 should have a transverse strip of a given width, having holes or meshes of such size as will pass through only the finest seed that has passed through the sieves and screens above; next should follow a like transverse strip with

holes or meshes of sufficient size to pass the next largest sized seed; and thus on, to the end of screen I².

There may be as many changes in the size of the holes or meshes, as the number of grades it is intended or desired to separate the grain or seed into, including chess, cockle seed, pigeon-weed seed and other foul stuff; and the number of apartments or drawers for receiving the grain and foul seed may correspond with the changes in the size of the holes or meshes of the screens; or all the foul stuff may be collected into one apartment.

Underneath the whole length of the screens I¹ and I² are the said drawers, marked D, F, F¹, F², as seen in Figs. 1 and 3. In Fig. 3, D, is shown as partially open. These drawers may be divided in the direction of their length, so as to increase the number of apartments for receiving the grain and seed in its cleaned state and after it is assorted.

The general arrangement of the screens I, I¹, I² and of the conductors N, and K, are such that the grain and seed to be assorted, necessarily fall gently on a plane, smooth surface, and then made to slide or roll over the screens until they meet a hole or mesh of sufficient size to pass them through, instead of being allowed to fall endwise or to be thrown up and about by the jerking and shaking motion of the machine which prevents a perfect separation.

The drum may be of wood or metal, or both. The best method is to make the ends of wood and cover them with sheet metal. The diameter of the drum should be about eighteen inches. The ends made of boards having in the center a circular opening of about one-third the diameter of the drum. The ends of the drum are also extended on one side, in such form as to form the sides of the wind conductor U, as seen in Figs. 1, 2, and 3. The ends of the drum are placed on the inside of the uprights at the rear end; and the centers correspond with the centers of the short uprights *a'* as seen in Figs. 2 and 3; and the projecting sides are placed so as to be on about an angle of 38 degrees, with the horizon.

The top of the drum from the top of the wind conductor U, to the cross board 22 on the back end of the machine is covered with sheet metal; as is also the bottom, from the point where the projection commences to form the sides of the wind conductor U, to the under side of said board 22. The top of the conductor is covered with wood or metal, and the under side is covered next the shoes for about one-third its length, in the same manner. Connected with this part of the under side, is a leaf Y, of about the same width, and connected to it with hinges, and so arranged as to be turned upward, and

fastened in any desired position by a pin or bolt passing through the side of the conductor, and passing into the end of the leaf. The use of this director is to divide the current of wind and cause a part of it to pass in to the lower shoe, instead of as in the ordinary case, allowing it all to pass through the sieves of the upper shoe. The remainder of the lower side of the conductor, near the drum, is left open, in order that the grain or seed that fly off, or bound from the sieves, may not descend into the drum and obstruct the fans; but will by means of this opening, fall upon the lower screens, and be assorted with the rest.

The dampers 5, 5, Figs. 2 and 3, are for regulating the ingress of air into the drum, and thence the amount of wind directed against the falling grain in the upper shoe, independently of the velocity of the wings or motion of the shoe; different grain and seed requiring different amounts of wind. They are formed of two buttons on each side, and each in the form of a segment of a circle, and which, together with the upright A², completely cover when closed the circular opening in the side of the drum. Each button has a horn curved outward at the lower end through which horn is passed the pin or screw which holds them to the drum and allows them to play. The point where the said pin or screw is inserted is so far out and beyond the center of gravity, that when the button is closed, it will remain so by its own gravity; while their weight when thrown open beyond the center of gravity, will keep them open when desired.

Through the center of the drum, passes the shaft S. The gudgeons of this shaft work in boxes in the uprights A²; these boxes are formed by cutting into the said uprights for about one-half their thickness, for about four to five inches in length, and fitting into the places so cut out, blocks of wood of the same size, and fastening the same in their places by screws; and the boxes or bearings for the pinions of the shaft are made, one half in the upright, and one half in the inserted block. When by use and wear, these boxes become too large, the blocks may be taken out and a shaving taken off the back side, by which means the holes are made smaller and the blocks may be restored to their places. On the front end of the shaft S, is a small pulley 6, over which the cord or band 23, passing to the driving wheel 7, is placed; which band is crossed, as seen in Fig. 2, to allow the driving wheel to be turned in the most convenient manner. On the opposite end of the shaft S, is a small crank 13, of about an inch in length. The shaft S, is square in the center and has an arm screwed into each of its sides, and on the ends of such arms are screwed boards or wings of the fan, at right

angles to the arms. Such boards or wings are about six inches in width and are of the length of the drum.

The crank 13, gives motion to the connecting rod W (which is represented in Fig. 3 as thrown off the crank 13, to show the groove in the crank.) Such connecting rod W, may be of wood or metal, and is connected with the crank by a box in the connecting rod, and is held in its place by a staple which passes through the connecting rod and within the groove in the crank. This connecting rod reaches to the longer rocking shaft 12, from which an arm projects, and which passes through the connecting rod and is fastened in its place by a pin passing through the rod and a hole in the said arm. The joint is so made as to allow free horizontal motion to the rod W, and the arm of the rocking shaft. At right angles to the above described arm of the rocking shaft, is a similar arm to which one end of the shaking bar X is attached in the same manner as the connecting rod W, and the arm already described, and so as to allow the same motion. This shake bar X passes through the one side of the upper shoe in a horizontal manner at right angles to the shoe, and is attached to the opposite side of the shoe by a screw or otherwise. On said rocking shaft 12, is another arm 21 standing in the same direction as the arm to which the connecting rod W, is attached; near the rear end of the lower shoe on the same side is a shorter rocking shaft, 12', made similar to the other and with a similar arm extending in the same direction as the corresponding arm on the longer rocking shaft 12; its lower bearing is in the diagonal rail A², and its upper bearing in an arm extending from the wind conductor as seen in Fig. 3. From these two arms extends the second connecting rod, which gives the rocking or reciprocating motion to the second or short rocking shaft. At right angles to the arm on this rocking shaft is another similar arm, to which is attached a shake bar X similar in all respects to the shake bar which gives motion to the upper shoe. This last shake bar passes through about the center of the lower shoe, and is attached in a like manner with the other shake bar to the opposite side of said shoe. The crank being put in motion, causes the longer connecting rod, W, to play backward and forward and consequently this gives to the large rocking shaft and the arms, a rocking or reciprocating motion; while the shake rod which moves the upper shoe, has a horizontal reciprocating motion, and consequently the upper shoe at the front end, where such shake rod is situated, is made to move in a similar manner, while the other end turns upon the pivot O, through its connection with the bottom of the hopper. The larger

rocking shaft being set in motion as described, it transmits the same motion to the shorter rocking shaft, by means of the short connecting rod, and the arms in the said rocking shafts, and a perfectly horizontal reciprocating motion is given to the lower shoe.

The extent of the horizontal motion to be given to the shoes, may be varied by means of different sets of holes being provided in the arms connecting with the shake rods. The greatest length of the arms is about one inch, and by means of such holes they may be diminished to any other length.

The rocking shafts may play in boxes or bearings at either end, or in any other approved manner.

The purpose of the hammer Z, Figs. 1 and 2, is to free the under screens I' and I² when they may happen to become clogged. It may be of any suitable form, with a handle and a head of proper weight. The end of the handle is connected with the rail A², on the front side, forming a joint in a block, attached to such rail, while the handle reaches in to about the center of the machine. Upon the front side of the upper rail A', over the point where the handle is jointed to the diagonal rail, is a lever 9, from which extends a rod or wire, to the handle of the hammer, a little inside of the joint. The end of this lever is raised by means of pins, projecting from the back side of the driving wheel. When it is not desired to use the hammer, the lever is raised up, beyond the line of the pins on the wheel, and fastened in its place by a button or otherwise. The hammer is made to strike upon the top of the lower end of the frame of the screen I'; or a block may be placed thereon for it to strike upon.

The object of the percussion bar is the same as the hammer; but its mode of operation is different as it strikes alternately on each inner side of the lower shoe as it vibrates from side to side. Fig. 4 represents this bar, and the connecting parts. The bar is of metal, and in length, nearly the width of the lower shoe, and of sufficient weight to oppose considerable resistance to the movement of the shoe, but not so much as to cause it to stop. The bar is suspended by means of two straps of iron, each of which is doubled and attached to the axles of two small grooved rollers or wheels, which play upon a round bar, running horizontally across the machine, under the upper end of the wind conductor U; the ends of which round bar are turned up and attached to the outer sides of said wind conductor. The bar being properly suspended, and the shoe being put in motion, the bar strikes upon one or the other of the inner sides of the shoe. This causes the bar to move in the opposite direction a little and

is soon met by the reversed motion of the shoe which sends it back to the point from which it started; while the shock the shoe receives from striking the bar, causes any grain or seed that has lodged in the meshes to pass through the screen. When not in use the bar is turned toward the said wind conductor and is fastened up to its side, if desired in any approved manner.

10 The tailings box C, opens toward the front end. The leaf E, is fastened at the bottom by pins or otherwise, so that it may be opened to a certain extent, when the machine is in use, and be entirely removed 15 when the box is to be cleared.

When the machine is in use the tailings box is partially open as seen in Figs. 1 and 2, and is fastened in place by a bolt or pin, passed through the block in the end of the machine into the circular block placed on the inner side of the leaf E, as seen in Fig. 2.

The "hold fast" is a small platform, the length of the machine, and of about half 25 of its width, made of boards and battened together and the whole connected with the front side of the machine at the bottom, by hinges, in such manner that when in use it may be turned down flat upon the floor, and when not in use may be turned up and fastened to the side of the machine. At each of the upper and outer corners of the hold fast, is a sharp pointed spike, which, when the "hold fast" is laid down for use, is 35 pressed into the floor; and the operator standing upon it, keeps the spikes in their places, and consequently the machine is held fast in its place on the floor, and does not move about like machines for cleaning grain in ordinary cases.

The driving wheel 7 has a short shaft or axle which passes into a proper box, attached to the upper side of the front rail, near the front end of the machine, such 45 shaft or axle has a groove therein, such as is seen in the crank 13, and the shaft and wheel are held in their place, in the same manner as the long connecting rod is attached to the crank.

50 The extra screen box is the apartment between the floor and the bottom of the drawers D, F F' and the tailings box on one side and the drawer F² on the other and is opened and closed by the drawer F².

55 The operator, standing upon the "hold fast" holds the machine firmly to its place by his weight pressing the spikes of the hold fast into the floor; and he operates the machine with his right hand, while with his 60 left he regulates the quantity of grain or seed to run from the hopper.

The quantity of wind necessary, is regulated by the dampers, without reference to

the speed of the fan or blower; and the form and position of the wind conductor U, is 65 such as to direct the wind, through the opening in the under side of the upper shoe, upon the falling grain at an angle of about 45 degrees; that being found to be the most practicable and advantageous direction to apply 70 the wind in such cases. When desired the current of wind, may be changed by means of the director Y, and a part directed upon the lower shoe. The blast thus directed clears away the chaff and lighter foul stuff, 75 from the grain or seed, while the tailings are passed by the sieves into the tailings box; or if any is caught by the frame of the sieves and passes through them, it falls upon the front end of the conductor N', and is thus 80 passed into the tailings box; and so if any coarser grains fall on the screen I, they are likewise passed into the tailings box. The grain or seed to be assorted being thus cleaned of all chaff and dust, and tailings 85 and coarse seed or grain, passes through the screen I, and is conducted to the elevated end if the screen I', which is the finest; and through the meshes of which only the finest seed will pass, and is deposited in the proper 90 drawer or apartment below: and thus as the grain or seed, passes over the different sections of the screens, the grain or seed corresponding in size with the meshes in such sections, is passed through to its proper 95 drawer; while the seeds that are too large for any of the meshes, are passed over the rear end of the last screen I²; and if any of the grain clogs the screens they are instantly relieved by causing the hammer or the percussion bar to strike a few blows on the 100 screen or shoe.

What I claim as my invention and desire to secure by Letters Patent is as follows:

1. The arrangement of the screens for separating and assorting substantially as described when so combined with shoes, frames and motive arrangement that the grain, seeds, beans, &c. are required to pass over them in a sliding or rolling manner and not 110 caused or allowed to drop on their surface or fall thereupon vertically, or so as to strike an aperture endwise first constructed and operating substantially as set forth.

2. The hold-fast substantially as described 115 and for the purposes set forth.

3. The extra-screen box, substantially as described and for the purposes set forth in combination with the drawers.

4. The percussion bar, substantially as described and for the purposes mentioned. 120

RUFUS NUTTING.

Witnesses:

S. H. NUTTING,
H. CALAGHAN.