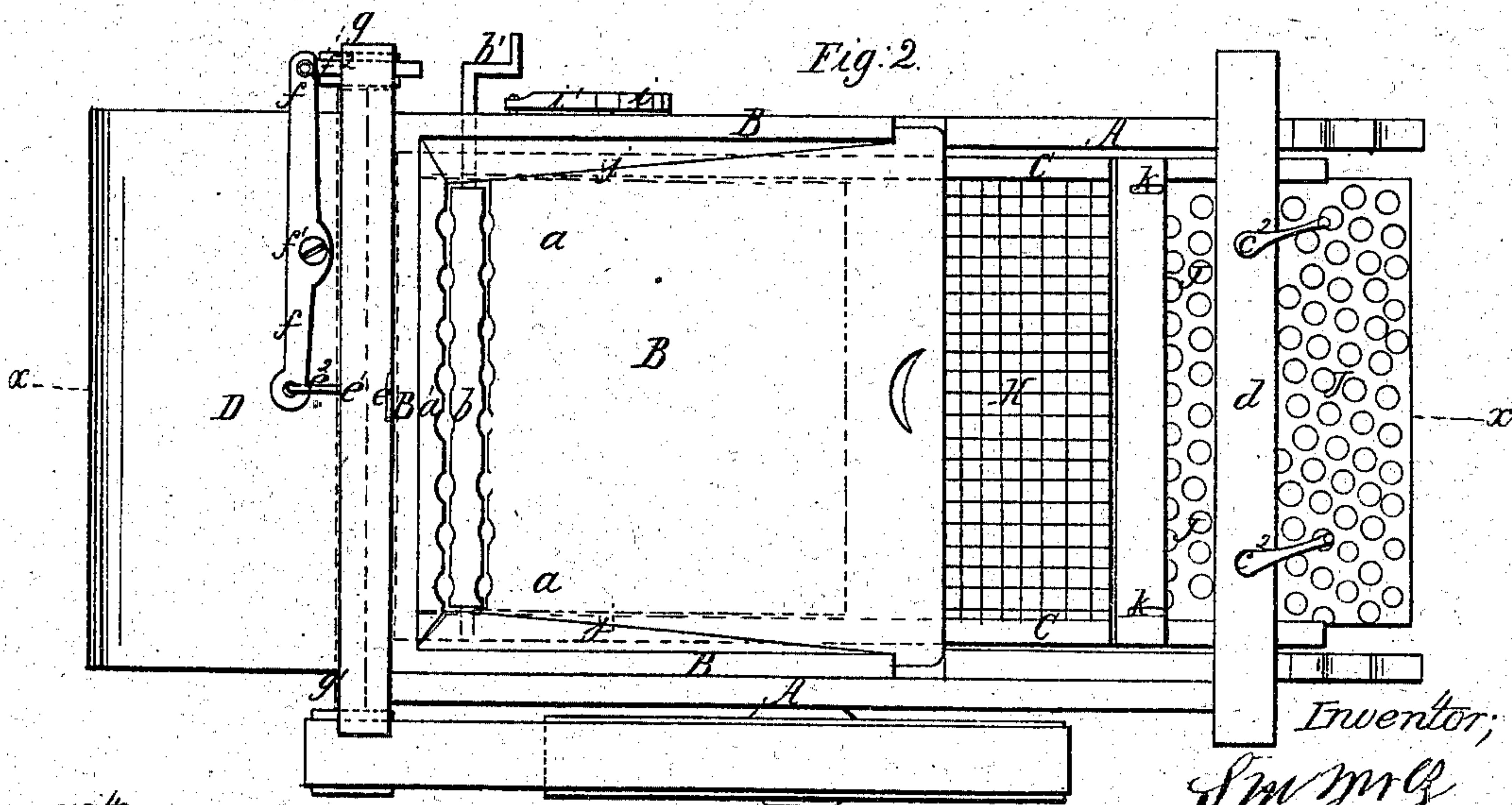
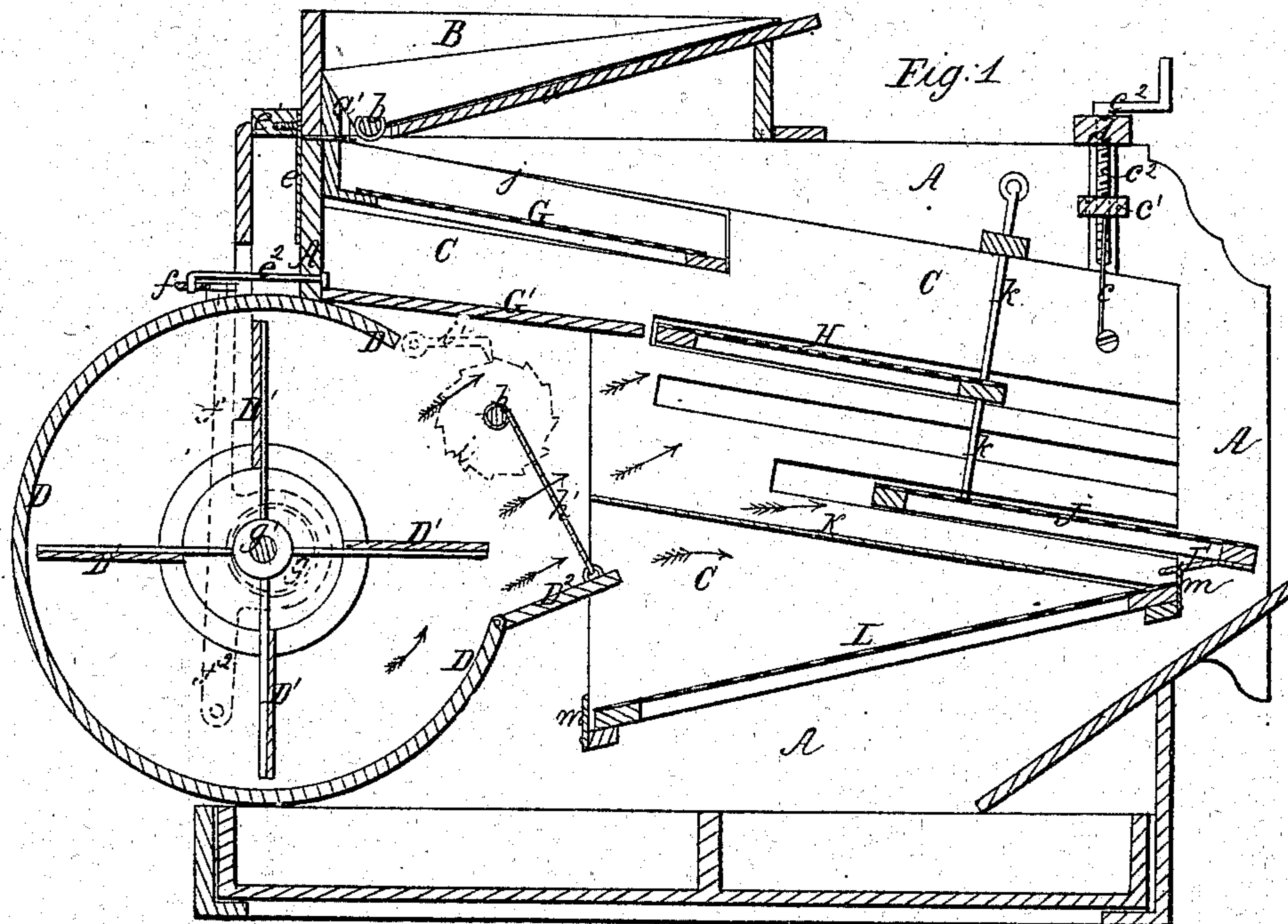


S. M. WIRTZ & F. SWIFT.
GRAIN SEPARATOR.

No. 32,099.

Patented Apr. 16, 1861.



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UNITED STATES PATENT OFFICE.

S. M. WIRTZ AND F. SWIFT, OF HUDSON, MICHIGAN.

GRAIN-SEPARATOR.

Specification of Letters Patent No. 32,099, dated April 16, 1861.

To all whom it may concern:

Be it known that we, S. M. WIRTZ and F. SWIFT, of Hudson, in the county of Lenawee and State of Michigan, have invented certain new and useful Improvements in Grain-Separators; and we do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1, is a longitudinal section through the improved grain separator, taken in the vertical plane indicated by the red line x, x , in Fig. 2. Fig. 2, is a top view of the improved grain separator.

Similar letters of reference indicate corresponding parts in both figures.

This invention relates to a novel arrangement of screens and inclined boards in a vibrating shoe, for the more perfect separation of grain from foreign substances, as will be hereinafter fully explained.

To enable those skilled in the art to make and use our invention, we will proceed to describe its construction and operation.

A, represents the frame of the machine; B, the hopper box with an inclined sliding bottom a , and a short inclined ledge a' . The lower edge of the board a , is scalloped and the lower edge of ledge a' , is also scalloped as shown in Fig. 2. Between these two scalloped edges of board a , and ledge a' , a transverse feed bar b , is introduced which has both its edges scalloped. This bar b , has its end bearings in each side of the hopper B, and the crank b' , is used to rotate this feed bar. Hopper box B, is stationary and rests on top of the frame of the machine.

Below hopper B, is arranged the shoe C, which is a movable frame hung at its rear end by straps c, c , which are connected to a horizontal transverse bar c' , which works between vertical guides in frame A, and which is moved up and down by means of screws c^2, c^2 , which pass through a transverse stationary bar d . By means of screws c^2, c^2 , the bar c' , and consequently the rear end of shoe C, may be adjusted up or down at pleasure. The front end of shoe C, is hung by a spring strap e , which is secured at its upper end to the middle of a cross bar e' , of frame C, as shown in Fig. 1 of the drawings. At the lower end of spring strap

e , where this strap is secured to the shoe C, a connecting rod e^2 , is secured, which passes out through a vertical slot in the end of frame C, as shown in Fig. 1, and connects with a horizontal lever f , which is pivoted at f' , and attached at its extreme outer end to a vibrating arm f^2 , which is vibrated by an eccentric g , on one end of fan shaft g' . The shoe C, is thus supported and shaken within the frame A.

D, is the circular fan box; D', are the fans which are constructed in the most approved manner, and rotated in the direction indicated by the arrows in Fig. 1, producing a blast which is directed toward the rear end of the machine through the shoe and controlled and properly directed by the hinged blast board D², which is hinged to the lower edge of fan box D, and connected with a transverse shaft h , by a cord h' . The shaft h , has its end bearings in the sides of frame A, and one end of this shaft h is passed through the side of frame A, and carries a ratchet wheel i , which is caught and held by a pawl i' . By turning shaft h , the board D², may be given any degree of inclination desired and the currents of air from the fan box D, will be more or less directed upward by thus adjusting the board D².

Immediately below the throat of hopper box B, is arranged a screen G, on which the grain, mixed with oats, etc., first falls after leaving the hopper. The box or frame of this screen is pivoted at j, j , to the top edge of shoe C, over the board G', and these pivots allow the screen G, to receive a rocking motion when the machine is in operation. The pivots j, j , are a little toward the forward end of the screen G, so that its front end will have a slight preponderance as the grain, etc., passes off from it on a screen H. The screen G, is also in an inclined plane, inclining toward the tail end of the machine; and the carrier board G', is also inclined in the same, or in about the same plane as screen G, shown in Fig. 1 of the drawings. The screen H, which is arranged in inclined grooves in the sides of frame A, under the lower end of screen G, is coarser than this screen G, and does not extend out to the rear end of shoe C, but discharges its impurities (mixed with some good grain) on an inclined and perforated zinc screen

J, arranged below the lower end of screen H, and inclined to the rear end of shoe C. The pins k , k , pass down through the side edges of the screens H, and J, and keep them in their proper positions, as shown in Fig. 1 of the drawings. A carrier board K, inclining from a point under the front of board G', toward the rear end of shoe C, to a point under the middle of screen J, receives the pure grain from screens G, H, and J, and discharges this grain on a long inclined screen L, which inclines from the extreme rear end of shoe C, to the front end thereof at a point under the blast board D², as shown in Fig. 1. This latter screen L, is made up of long meshes which effectually separate oats, barley, etc., from the pure grain allowing such foreign substances to pass through it while the pure grain is discharged from its forward end into a drawer or other proper receptacle placed under the front edge of this screen L. The rear, or discharging end of screen J, is carried out a suitable distance from the rear end of shoe C, in order that chaff, etc., may not fall on the lowermost screen L; and in order to save all the grain which passes through this screen J, a short inclined board or metal plate J', is secured along the lower edge of this screen J, which board projects over the upper end of the screen L, and discharges any grain falling on it, on the screen L. Thus we have an arrangement of four screens G, H, J, and L, three in the form of steps, one being slightly above the other and in rear of the other, while the fourth screen L, is arranged under the two screens H, and J, and also receives the pure grain from the uppermost screen G. The screen G, is designed to discharge cockle and chess and is furnished with a spout to carry the foul stuff out of the mill in the full sized machine. The grain which passes over screen G, drops through screen H, on the board K, thence to the screen L, and the grain which escapes the screen H, falls on screen J, passes through this latter screen and falls directly on the lowermost screen L. Thus this screen L, will ultimately receive the grain from all the screens, and this latter screen being made up of long wire meshes allows the oats, barley, short straw, etc., which may have escaped from either of the preceding screens, to fall through and leave the pure grain to pass over this screen L, into the drawer or box for receiving it as before described. Screen L, is allowed to have a free longitudinal play in the bottom of shoe C, and the two short springs m , m , which project up from the ends of shoe C, give to the screen L, a quick rebound at each movement of the shoe C, which has the effect of keeping the meshes of the screen open, by preventing the oats and light grain from clogging up these meshes. It is found in practice that a slight

upward or downward knock will keep the meshes of the screen open, and that the action of springs m , m , upon the screen will give the required blow to effect this object.

The operation of the entire machine is as follows: Motion is communicated to the fan shaft g' , through the belt N, from any convenient prime mover and the fans D' revolve in the direction indicated by arrows in Fig. 1, and the currents of air are conducted from fan box D, toward the lower screws H, J, L, as also indicated by the arrows in Fig. 1. The direction of the currents of air from the fan box are controlled by adjusting the board D², to a more or less inclined position as before described. The fan shaft g' , gives a vibrating motion to lever f , through eccentric g , and the arm f^2 , and this vibrating motion of lever f , is transmitted to the shoe C, through connecting rod c^2 . The shoe C, being suspended from frame A, by the spring straps c , c , and e , is allowed to receive a free shaking motion which is found best suited to the desired purpose. The machine being thus set in motion the grain, mixed with the usual impurities, is put into hopper B, and fed from this hopper on the screen G, which is hung on pivots j , j . On this screen G, the grain, etc., is agitated not only by the motion of the shoe C, but by the rocking or tossing motion of the screen itself in the shoe C. This double concussive motion of the screen G, prevents its meshes from clogging, and keeps the lighter and coarser particles, straws, etc., on top of the grain, and the former are then rapidly pitched toward the rear end of screen G, and on the coarser screen H. The grain which passes over the screen G, (mixed with fine particles of foreign substances) falls on the inclined board G', which rapidly discharges it on the inclined board K, and thence it falls on the screen L, where it is again submitted to a cleaning operation and finally discharged. The grain, etc., which falls on the coarser screen H, is here subjected to the blast from fan box D, and the pure grain falls through this blast on the board K, while the impurities which are further mixed with grain, after leaving screen H, fall on the zinc screen J, which is also under the influence of the blast from fan box D. This latter screen discharges the grain partially on the board K, and partially on the screen L, and during these several operations, while all the foreign substances are blown and shaken out of the machine the pure grain is conducted back, over screen L, and collected at the bottom of this screen.

To fully understand the advantages of this improved arrangement of screens with the carrier boards, it must be known that a machine with coarse screens sufficient to discharge the grain fast enough for practical purposes, will let through a large portion of

the oats, etc., mixed with the grain, and if a blast is applied sufficient to drive out the oats a great portion of the wheat is unavoidably carried away with the lighter grain. On the
5 other hand, if perforated zinc, or any of the more perfect screens are employed such an extent of screening surface is necessary that the machine is rendered expensive and unwieldy, besides it will be a very slow cleaner.
10 We obtain in our arrangement of screens the advantage of both kinds of screens and a perfect separation of the grain within the frame of the machine, the blast forcing the impure grain on a finer set of screens after
15 passing through a coarser set, while the pure grain passes under the finer set of screens thus dividing the labor of the screens.

Having thus described our invention, what

we claim as new, and desire to secure by Letters Patent, is;

1. Hanging the screen G, on pivots *j, j*, in shoe C, operating as and for the purposes herein set forth. 20

2. Arranging the inclined screen L, within shoe C, so that said screen will have an end 25 play and strike against pieces *m, m*, as, and for the purposes herein set forth.

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