2 Sheets--Sheet 1.

J. W. JOHNSON.

Grain-Separator.

No. 165,931. Patented July 27, 1875.

Fig. 1.

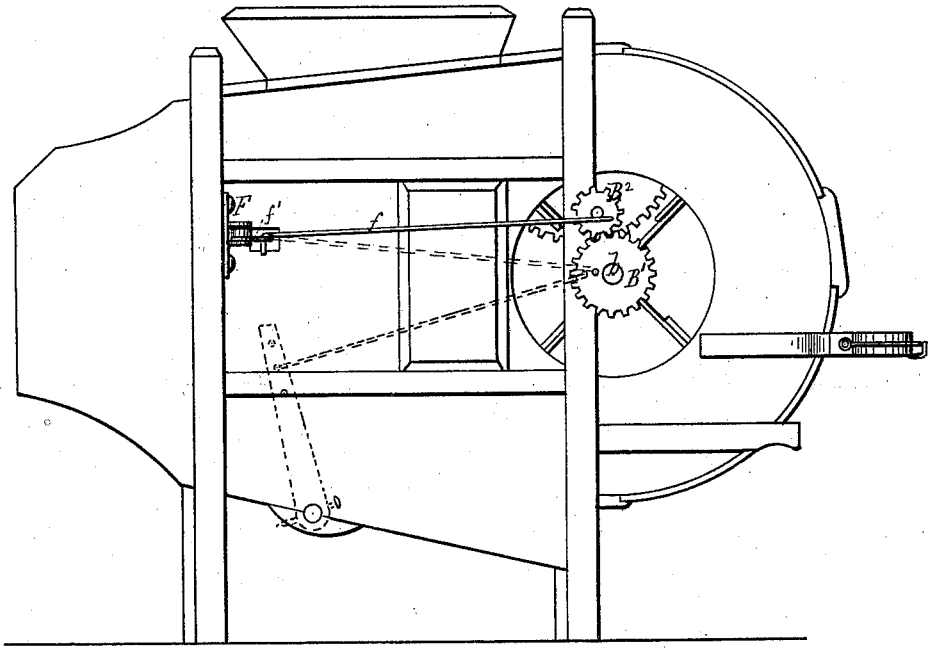
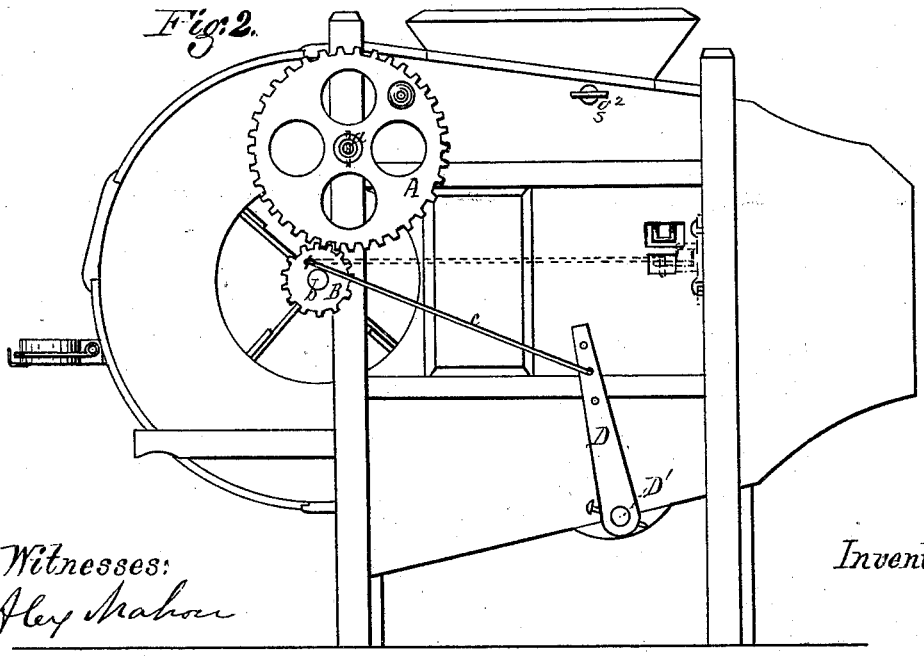


Fig. 2.



Witnesses:
Alex Mahon
John G. Center.

Inventor:
John W. Johnson
by A. M. Smith
Attorney

2 Sheets--Sheet 2.

J. W. JOHNSON.

Grain-Separator.

No. 165,931. Patented July 27, 1875.

Fig. 3.

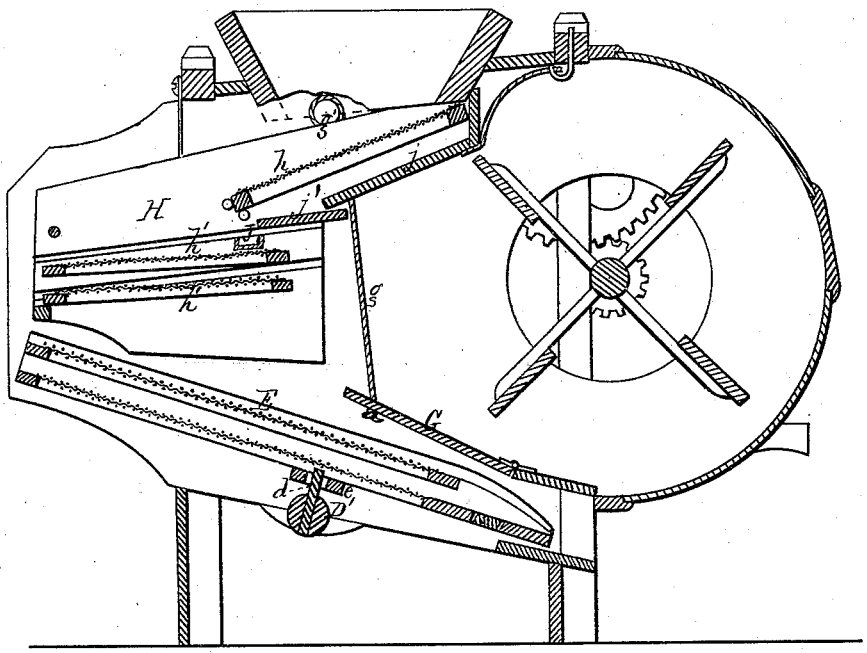


Fig. 4.

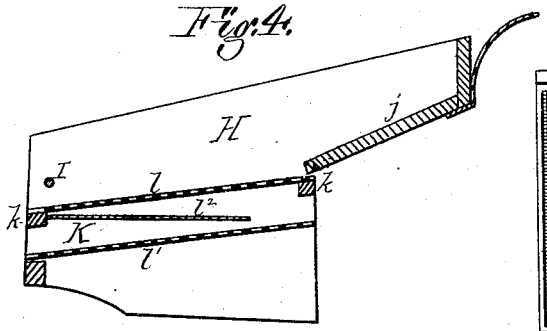
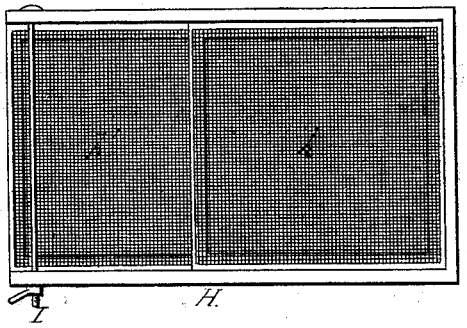


Fig. 5.



Witnesses:
Alex Mahon
John G. Center

Inventor:
John W. Johnson
by A. M. Smith
Attorney.

UNITED STATES PATENT OFFICE.

JOHN W. JOHNSON, OF TOWANDA, PENNSYLVANIA, ASSIGNOR OF TWO-THIRDS HIS RIGHT TO C. M. MANVILLE AND E. E. BUFFINGTON, OF SAME PLACE.

IMPROVEMENT IN GRAIN-SEPARATORS.

Specification forming part of Letters Patent No. **165,931**, dated July 27, 1875; application filed April 23, 1875.

To all whom it may concern:

Be it known that I, JOHN W. JOHNSON, of Towanda, county of Bradford and State of Pennsylvania, have invented certain new and useful Improvements in Fanning-Mills or Machines for Separating and Cleaning Grain, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings making a part of this specification, in which—

Figure 1 is a side elevation of my improved mill. Fig. 2 is a similar view taken from the opposite side. Fig. 3 is a vertical longitudinal section through the same. Fig. 4 is a similar section through the shoe only, showing a different arrangement of the screens to that shown in Fig. 3; and Fig. 5 is a plan view of the shoe.

Similar letters of reference denote corresponding parts in all the figures.

My invention relates to that class of fanning-mills employing a shoe having a lateral vibration and a lower long screen having a longitudinal vibration; and consists in the combination, with said shoe and screen, of means for changing their relative speed of vibration, whereby they may be readily adapted to the different kinds of work required of them, as hereinafter explained.

The frame of the machine, inclosing the shoe-screens and the fan, may be of the usual or any preferred construction. Upon one side of this frame, at *a*, is secured a stub-axle or shaft, upon which is mounted a spurred crank-wheel, A; or, where the machine is to be operated by other than hand-power, a band-pulley, in addition to the spur-wheel, may be mounted on said shaft, rigidly connected to and turning with said spur-wheel. The wheel A engages with and drives a pinion, B, on the main or fan-wheel shaft *b*, imparting motion to said shaft or fan-wheel. The wheel B is provided with a crank-wrist, or is perforated eccentrically, and has one end of a connecting-rod, *c*, attached to it, the opposite end of said rod being connected adjustably with a crank-arm, D, on a transverse rock-shaft, D′, mounted in bearings underneath the frame, and provided midway of its length with an arm or spur, *d*, which passes through a slot in a transverse bar, *e*, attached to the bottom of the frame of the long double screen E, for imparting a longitudinal reciprocation thereto.

Perforations in the arm D, at different distances from the shaft D′, permit the adjustment of the rod *c*, for varying the throw of the arm D and screen A. The opposite end of shaft *b* is armed with a spur-wheel, B^1, which engages with and drives a pinion, B^2, mounted and turning on a pin or stud secured to the main frame, said pinion being provided with a crank-wrist, or perforated for the attachment of one end of a connecting-rod, *f*, which, at its opposite end, is connected with one arm of a horizontal bell-crank lever, *f′*, pivoted in a removable bracket, F, attached to the main frame. The other arm of this elbow-lever *f′* is connected, by a link passing through a perforation in the casing with the shoe, for imparting a lateral vibration thereto. The speeding-up through the gear B^1 and pinion B^2 gives a much higher speed of vibration to the shoe than is imparted to the screen E, adapting them to the ordinary work of cleaning grain; but when the machine is employed for separating different kinds of seeds or grains it is desirable to change the relative velocities of the shoe and screen. To provide for this the elbow-lever *f′*, with its supporting-bracket F, is made removable, and can be transferred to the opposite side of the machine, where its connecting-rod will be driven from the crank-wheel B, giving the shoe the slower vibration required. When this is done the crank-arm D will be transferred to the opposite end of the shaft *d*, and operated either from the wheel B^1 or B^2, as desired, and according to the speed required to be given to the screen, this arrangement being shown in dotted lines, Figs. 1 and 2; or, instead of transferring the levers D and *f*, as described, a slower motion of the shoe, corresponding to that of the screen, may be obtained by driving it direct from the crank-wheel B^1. The lower forward part G of the fan case or chamber is hinged, as shown in Fig. 3, and the outer swinging end of this hinged part G is upheld by a cord, *g*, which passes up to and around a roller, g^1,

which can be rotated by a handle or thumb-wheel at g^2, Fig. 2, for winding up or unwinding the cord g, and thereby raising or lowering the swinging end of valve G, for giving the desired direction to the blast from the fan, according to the character of the work to be done. The frame of the shoe (indicated at H) may be of any usual construction, except that I prefer in practice to dispense with the usual grooves for the screens or bolts placed therein, and to clamp said bolts or screens between the yielding sides of the shoe by a long through-bolt, I, and clamping thumb-nut, as shown in Figs. 4 and 5. By this arrangement any desired angle of adjustment can be given to the shoe-screens for adapting them to the work to be done. For separating clover or grass seed or cockle from other seed I place one of the screens h, of the required degree of fineness of mesh, directly under the hopper, as shown in Fig. 3, and by the vibration of the shoe the finer clover or grass seeds pass through this screen, falling upon the inclined chute or flooring $j\,j'$, and thence into an inclined transverse trough, J, by which it is carried out of machine through an aperture in one side of the casing, while the coarser grain or seed is carried by the screen h over and past the trough J, and is deposited upon a lower screen, h', where the usual operation of cleaning is performed. In the ordinary operation of cleaning grain, screen h and the trough J are removed, and the grain descends directly over the chute $j\,j'$ to the screens h', which are of the same dimensions as the screen h, and can, therefore, be readily applied in either position, as the character of the work may require. K, Fig. 4, represents a double screen, applied to the shoe for effecting a separation of oats, beans, &c., from wheat or rye, and consists of two longitudinal bars united by transverse strips $k\,k$, forming an open rectangular frame, with a coarse screen, l, secured to its upper face or side, and a similar one, l^1, to its lower side, as shown in Fig. 4. To the outer transverse bar k the upper end of an inclined board or return-chute, l^2, is attached, by means of which the wheat and any oats that may accidentally pass through the upper screen l are returned to the forward end of screen l^1, and are again subjected to the screening action before the wheat passes to the lower long screen or bolt E. By this construction and arrangement the wheat is effectually separated from larger grains or seed, while at the same time the action of the screens and blast in freeing the grain from the chaff and other impurities is in no way impaired. By the employment of double bolts, K, of different grades or degrees of fineness, the machine may be readily adapted to the separation of different kinds of grain. When the double bolt K is used in addition to the trough or spout J, the lower section j' of the inclined floor or chute is removed, and the grain is delivered directly to said bolt from the chute j. The shoe H is supported from the main frame by any usual arrangement of suspending-links. Its construction, as explained, permits the ready adjustment of its screens, $h\,h'$, and K to adapt them to the different kinds of grain or seed acted upon, and to the varying conditions of such grain, as required.

Having now described my invention, what I claim as new, and desire to secure by Letters Patent, is—

The fan-shaft b, provided at both ends with crank-pinions B B^1, the latter driving a smaller crank-pinion, B^2, in combination with the transferable connecting-rods $c\,f$, elbow-lever f' on the removable bracket F, and removable crank-arm D on the rocking shaft D′, as and for the purpose set forth.

JOHN W. JOHNSON.

Witnesses:

E. E. BUFFINGTON,

O. F. DUNLOP.