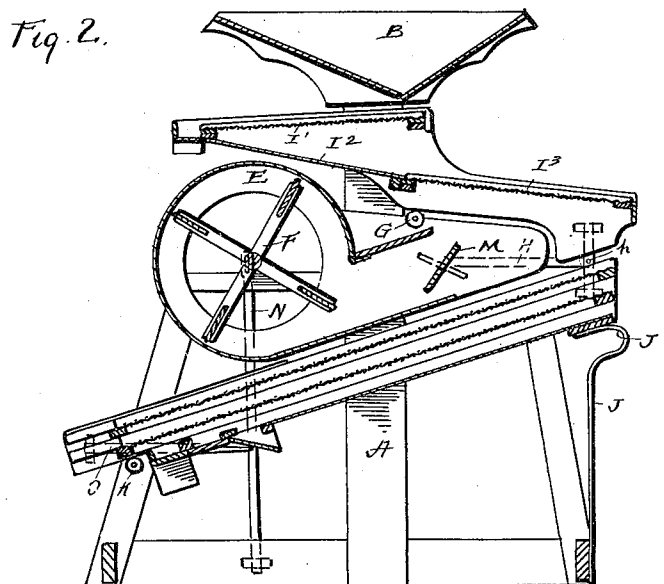
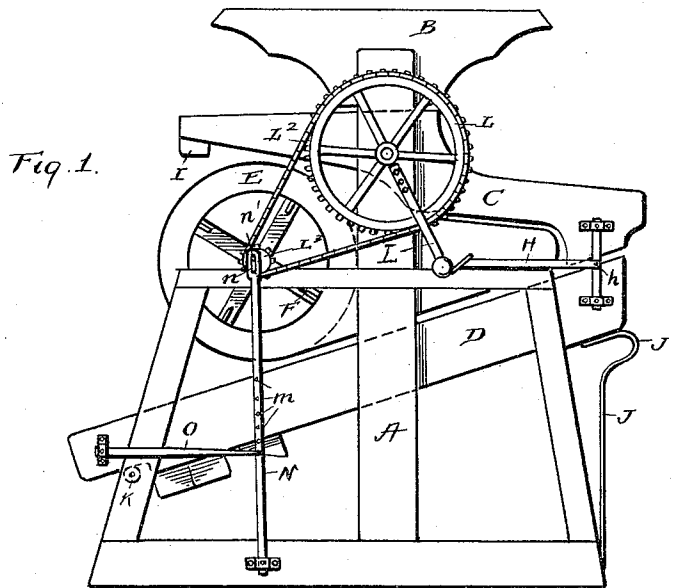


(No Model.)

J. F. HATFIELD.
GRAIN SEPARATOR AND CLEANER.

No. 582,916.

Patented May 18, 1897.



WITNESSES
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UNITED STATES PATENT OFFICE.

JAMES F. HATFIELD, OF FOUNTAIN CITY, INDIANA.

GRAIN SEPARATOR AND CLEANER.

SPECIFICATION forming part of Letters Patent No. 582,916, dated May 18, 1897.

Application filed April 4, 1896. Serial No. 586,238. (No model.)

To all whom it may concern:

Be it known that I, JAMES F. HATFIELD, a citizen of the United States, and a resident of Fountain City, in the county of Wayne and State of Indiana, have invented certain new and useful Improvements in Grain Cleaners and Separators; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

Figure 1 of the drawings is a representation of a side elevation of separator. Fig. 2 is a central longitudinal section of same.

This invention relates to grain cleaning and separating machines, and has for its object the provision of certain improvements whereby the capacity of the machine is largely increased and its operation is rendered more efficient; and the invention consists in the novel construction and combination of parts, all as hereinafter described, and pointed out in the appended claim.

Referring to the accompanying drawings, the letter A designates the frame of the machine.

B is the hopper, which is supported between the uprights of said frame.

C is the upper or chaff shoe; D, the lower or separating shoe; E, the cylindrical blast-wheel casing, and F the blast wheel or fan.

The upper or chaff shoe is inclined forwardly and downwardly, its middle portion being supported upon the bearing-rollers G, one at each side, while its downwardly-offset lower end is supported by means of two short arms or links G', one at each side. Said arms or links have a pivotal connection at their lower end portions with the lower shoe and at their upper end portions with the upper shoe, while at its central portion each arm or link has a loose engagement with a stud *h* of a strap H, rigidly secured to the frame or casing. The shoe extends to both sides of the hopper, its upper end being over the blast-wheel casing, while its lower end projects slightly beyond the upper or front end of the lower shoe. At the rear end of said upper shoe is a laterally-inclined transverse trough

I, into which is arranged to discharge a rearwardly-inclined screen I', whose upper end portion extends underneath the discharge of the hopper.

I² is a forwardly-inclined grain-board, which is placed underneath the screen I', and I³ is the chaff-screen, whose upper edge is seated slightly underneath the lower edge portion of the said board.

The lower shoe D is inclined oppositely to the upper shoe and is a long shoe, its lower end being extended some distance beyond the blast-wheel casing, under which it extends. Said shoe is provided with the usual separating-screens and grain-discharges. Its upper or forward end is supported upon two flat spring-arms J, whose lower end portions are rigidly secured to a base board or bar of the frame and whose upper ends are firmly secured to the under side of the shoe. The upper end portions of these springs have the rearwardly-extending semielliptical bends J'. Near its lower end the shoe is supported on the rollers K, one at each side.

L designates a sprocket driving-wheel, which is fitted with a crank L' and which is connected by a sprocket-chain L² with a small sprocket-wheel L³ on the shaft of the blast-wheel.

M is a pivoted damper or wind board, which is arranged to control the blast.

N is a lever whose lower end is pivotally secured to the base of the frame and whose upper end portion has an oblong slot *n*, which engages a wrist *n'* of the blast-wheel shaft. Formed in the intermediate portion of the said lever are a vertical series of holes *m*, any one of which is designed to be engaged by the hooked end of an arm O, whose rear end is connected to the rear lateral portion of the lower shoe. The lowest hole *m* is on substantially the same horizontal line as the point of connection between the arm O and the shoe. This connection, lever N and arm O, exists in duplicate, there being a similar arrangement upon each side of the machine. The purpose of these connections and of the manner in which the shoes are supported is to do away with the transversely-swinging or the endwise up-and-down vibratory motion which has heretofore been used in this class of machines and to cause the shoes to have what

may be termed "a rapid, continuous, quivering motion," both shoes having a short quick movement in the direct plane of their inclinations. When the arms O are engaged with the lowest holes of the levers N, a very short and quick motion is produced. As the connection is changed to a higher point the movement is longer and also stronger. By changing the points of these connections, therefore, the motion can be suited to the particular kind of grain to be cleaned. The motion imparted to the shoes is such that the grain at both ends of the screens is equally agitated, and the lodgment of grain at the lower end thereof is prevented. I have found by a practical use of the machine that this movement increases the capacity to a very great extent, there being much less friction, while the machine cleans itself thoroughly and does not become choked.

In operation the hopper discharges the grain upon the upper portion of the screen I', the berries falling through the meshes thereof onto the grain board or blank I², while the sticks or caps, to a large degree, slide over the screen and fall into the trough I, from which they are discharged. Some of the sticks or caps, however, together with such pointed seeds as oats, which are often present in wheat and rye, will work through the screen I' by reason of their endwise position thereon and will fall onto the board I². The purpose of this board is to cause such sticks, caps, &c., to assume positions on their sides before they reach the screen I², so that when they do reach said screen they will slide over it instead of working through the meshes, and will be discharged from the end of the screen onto the floor or ground. In this manner nothing but the finest chaff and dirt passes through the screen I² with the grain, and for this reason I am able to employ a much lighter blast than is usually required. Consequently in cleaning light seeds and grain they are all separated from the chaff and saved, instead of a considerable percentage thereof being blown away with the chaff by reason of the strength of blast necessary to blow out the heavy chaff and sticks. The screens are all interchangeable, and by using screens I' I² of the proper fineness of mesh the machine is admirably adapted for cleaning clover-seed and separating the plantain and buckhorn therefrom. Heretofore such separation has been largely sought by means of a blast of sufficient strength to blow out these foreign seeds. This cannot, however, be done successfully for the reason that such seeds are of about the same weight as the clover-seeds. In the present machine the coarser clover-seed is at once separated out and removed by the screen I' and is discharged into the trough

I, while the finer seeds with the buckhorn falls through said screen and onto the grain-board I². Inasmuch as the buckhorn-seeds have one flat side they are caused to take position on this side on the said board, so that they slide over the screen I² without falling through it, while the clover, being a round seed, falls through. The blast has therefore only to blow out the lighter foreign matter.

It will be seen from the foregoing that the upper shoe is not only a chaffing-shoe, but that it is also a separating-shoe to a large extent.

The manner in which motion is applied to the shoes, as before described, is of considerable importance, especially in the feature of connecting the arms O to the extreme lower end of the lower shoe, whereby the movement of the latter is such as to prevent any lodgment of the grain at the point of its discharge, thereby preventing clogging. This motion is assisted by the manner in which the shoes are supported. The adjustability of the points of connection between the said arms O and the levers N, whereby the motion may be varied, is also a feature of importance.

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

The herein-described grain cleaner and separator comprising a frame having central uprights at opposite lateral portions thereof, a hopper supported between the upper portions of said uprights, an upper or chaff shoe inclined forwardly and downwardly, and supported at its central portion, below the discharge of the hopper, upon bearing-rollers, a pair of oppositely-inclined screens in said shoe and extending in opposite directions with respect to the hopper, a laterally-inclined trough at the rear end of the uppermost screen, a grain-board extending underneath said screen to the upper end of the other screen, a long lower shoe underneath the upper one and inclined oppositely thereto, springs which support the upper end of the lower shoe, rollers which support its lower end, a fan-chamber and fan located between the said shoes, a loose connection between the adjacent ends of said shoes, a blast-passage leading upwardly and forwardly from the fan-chamber, means for varying the direction or angle of the blast through said passage, and a connection between the shaft of the fan and the lower shoe whereby it, and thereby the upper one also are vibrated, substantially as specified.

In testimony whereof I affix my signature in presence of two witnesses.

JAMES F. HATFIELD.

Witnesses:

J. REYNOLDS,

B. F. HATFIELD.