

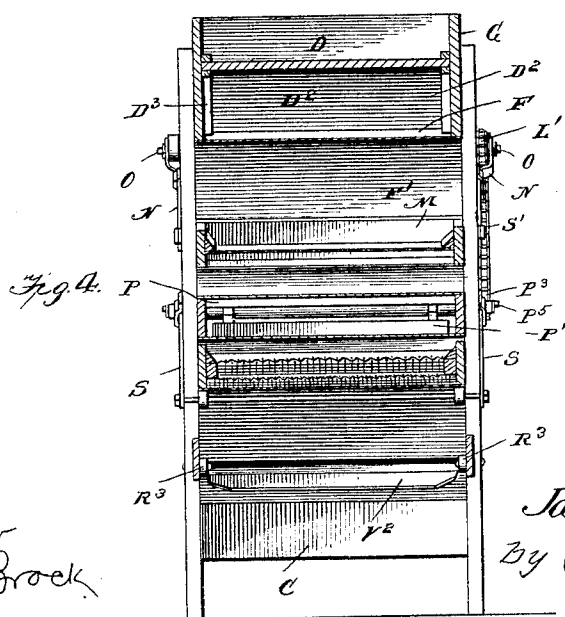
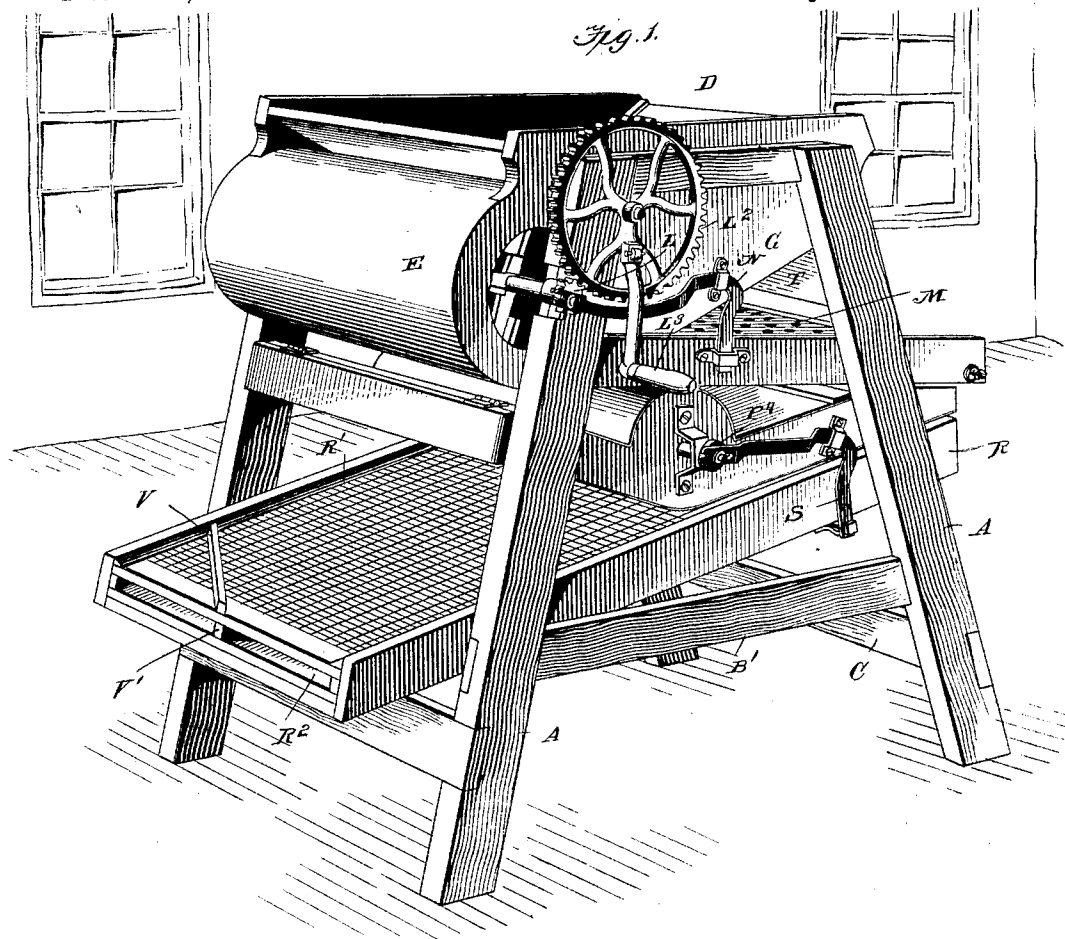
(No Model.)

2 Sheets—Sheet 1.

J. C. BENSON.
GRAIN CLEANER AND SEPARATOR.

No. 586,756.

Patented July 20, 1897.



Witnesses

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Chas. E. Brock

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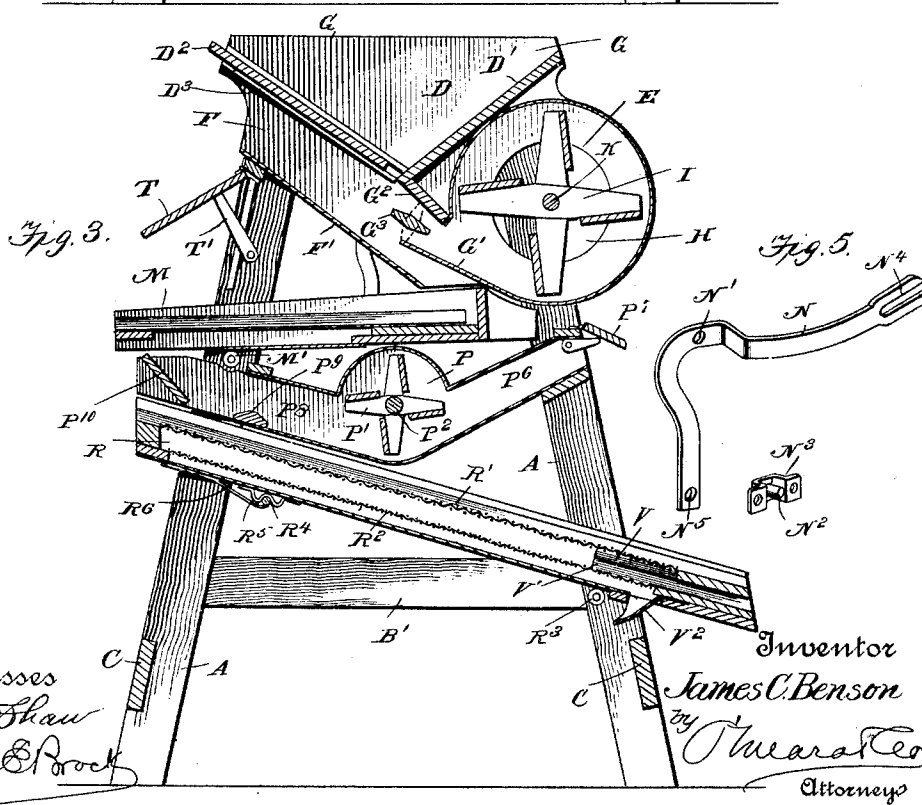
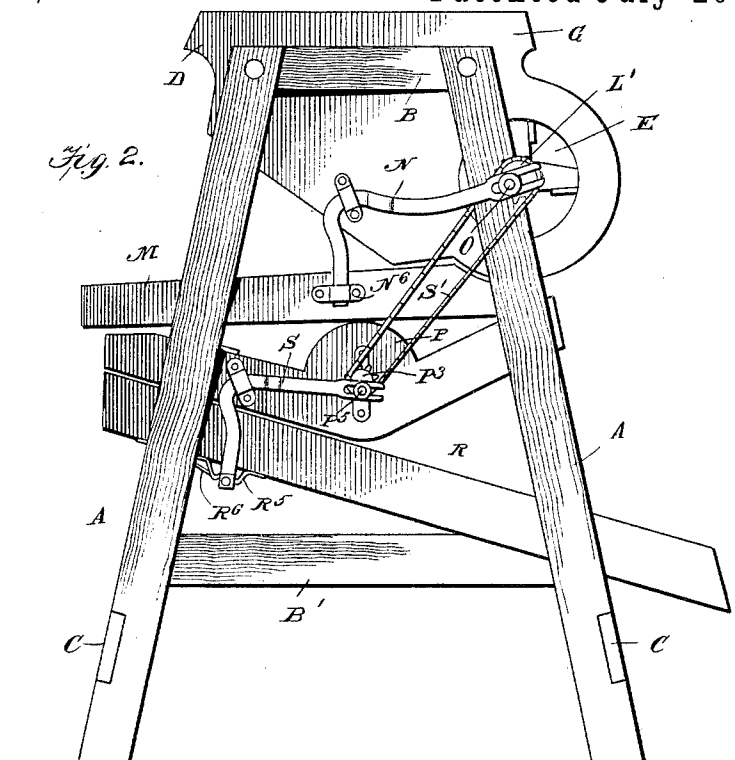
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UNITED STATES PATENT OFFICE.

JAMES C. BENSON, OF ALCONY, OHIO.

GRAIN CLEANER AND SEPARATOR.

SPECIFICATION forming part of Letters Patent No. 586,756, dated July 20, 1897.

Application filed February 16, 1897. Serial No. 623,630. (No model.)

To all whom it may concern:

Be it known that I, JAMES C. BENSON, residing at Alcony, in the county of Miami and State of Ohio, have invented a new and Improved Grain Cleaner and Separator, of which the following is a specification.

This invention is an improved construction of grain cleaner and separator, the object being to provide an exceedingly cheap and simple machine which will thoroughly separate all the chaff from the grain and simultaneously separate the grain itself.

Another object of the invention is to provide an exceedingly simple and compact arrangement of the hopper and air-chamber, said parts being practically constructed as a single part.

Another object is to provide improved means for operating the grain-separating shoes and simultaneously revolving the rotary fans.

Another object is to provide an improved arrangement for supporting the reciprocating shoes within the main frame.

With these various objects in view my invention consists in the peculiar construction of the various parts and in their novel combination or arrangement, all of which will be fully described hereinafter and pointed out in the claim.

In the drawings forming a part of this specification, Figure 1 is a perspective view of my grain cleaner and separator. Fig. 2 is a side elevation, the opposite side being shown. Fig. 3 is a vertical longitudinal section. Fig. 4 is a transverse section. Fig. 5 is a detail view of elbow-lever and pivot-guide.

In constructing a grain cleaner and separator in accordance with my invention I employ a main frame consisting of the standards A, the upper side pieces B and lower side pieces B', connecting said standards, and the cross-pieces C, connecting the opposite standards near their lower ends.

Within the main frame thus constructed and near the top thereof is arranged the hopper D, the fan-chamber E, and air-chamber F, all of said parts having common side boards G, which are securely fixed upon the inner sides of the main frame, as most clearly shown.

The hopper D has a V-shaped bottom, one portion D² of which is in the nature of an ad-

justable gate, which works in slides D³ in order to regulate the passage of the grain to the cleaning-shoes.

The fan-chamber E is essentially cylindrical in shape and has its sides covered with sheet metal, as shown at G', said chamber having an opening H at each end for the ingress of air, and journaled within said chamber is the rotary fan I, the shaft K thereof being journaled upon one of the standards A and carries a pinion L upon one end and a sprocket-wheel L' upon the opposite end.

The metal side of the fan-chamber continues a considerable distance into the interior of the machine, as shown at G', and in conjunction with the board G² forms a throat for the fan, through which the air emerges, said throat having a valve G³ arranged therein and capable of being adjusted as desired to regulate the passage of air therethrough.

The bottom F' of the air-chamber F is in the nature of a fall-board or guide-board and serves to direct the grain passing from the hopper to the upper end of the grain-shoe M.

As thus far described it will be understood that the grain is placed in the hopper, the gate D² of which has been previously regulated, and as the grain passes through the opening and falls upon the bottom F' it is subject to an air-blast from the fan-chamber E, the fan being revolved by means of a gear L², which meshes with the pinion L and is operated through the medium of a crank L³, said crank being readily detachable from the gear L², as most clearly shown in Fig. 1.

The grain-shoe M is constructed in the usual manner—that is, it has imperforate sides, carries a screen, and has a guide-board arranged beneath the screen nearly to the end thereof. The outer end of the shoe M rests upon the rollers M', journaled upon the interior sides of the standards A.

Elbow-levers N are pivotally mounted upon the sides of the side boards G, said levers having a pivotal opening N', through which a pivot-pin N² passes, said pivot-pin being carried by a guide-clip N³, adapted to be secured to the sides of the side boards G, the pivot N² passing through the pivot-opening N' and securely connecting the elbow-levers to the side boards G.

The upper ends of the levers are slotted, as

shown at N⁴, while the lower ends are perforated, as shown at N⁵, said perforated ends engaging pivot-clips N⁶, secured to the sides of the shoe M, whereby the elbow-levers are pivotally connected with the said shoe.

An operating-stud O projects laterally from the pinion L and the sprocket L' and is adapted to pass through the slots N⁴ in the upper ends of the elbow-levers N, so that when the fan-shaft is revolved the elbow-levers will be rapidly reciprocated. Inasmuch as the studs O are arranged eccentrically, and as they engage the slots N⁴, it is clear that the elbow-levers will be rapidly reciprocated, such action causing the shoe M to reciprocate rapidly upon the guide-rollers N'.

A fan-chamber P is arranged directly beneath the shoe M and has the rotary fan P' arranged therein, the shaft P² projecting through the closed ends of the fan-chamber, and at one end carries a sprocket P³ and at the opposite end a disk P⁴, and the said sprocket and disk each carry an eccentric stud P⁵, the purpose of which will appear farther on.

The fan-chamber has an inlet-throat P⁶, provided with a regulating-door P⁷, and leading from the fan-chamber is an outlet-throat P⁸, having a stop-board P⁹ to prevent the grain which falls through the shoe M entering the fan-chamber, said grain striking upon the fall-board P¹⁰ and dropping upon the screen R, arranged directly beneath the fan-chamber P.

The screen R is double—that is, it has an upper screen R' and a lower screen R², the lower screen being of course finer than the upper screen R'. The screen-shoe is of course constructed with imperforate sides and bottom, and the shoe at its lower end is supported upon a roller R³, while its upper end rests upon a shaft R⁴, which is held in place in a pendent hanger R⁵ by means of a leaf-spring R⁶.

A second set of elbow-levers S are pivoted to the sides of the fan-chamber P, their upper ends being slotted and adapted to engage the eccentric studs P⁵, while their lower ends are connected to the opposite ends of the shaft R⁴ and connecting the sprocket P³ and the sprocket L' with a sprocket-chain S', by means of which the fan P' is revolved simultaneously with the fan I, and also by means of which the lower elbow-levers S are reciprocated, which operation causes the screen-shoe to be rapidly reciprocated.

The space between the fall-board F' and the upper shoe is normally closed by means of a hinged door T, which can be held open at any time by means of a suitable prop T'.

A guide-strip V is arranged upon the top of the upper screen R' at the lower end in order to direct the grain to one side, and a similar strip V' is arranged upon the top of the second screen R² in order to direct the grain in the opposite direction, and in order to direct the grain which passes through both the upper and lower screens and falls upon the imperforate bottom I provide a chute V²

at the end of the imperforate bottom, so that the three varieties of the separated grain will be conducted to their proper places.

It will thus be seen that I provide a grain cleaning and separating machine comprising a feed-hopper and primary blower, the reciprocating cleaning-shoe, the secondary blower, and the final cleaning and separating screen, all of said parts being exceedingly simple and compact in construction and efficient in operation.

Now in cleaning grain with my improved device it is of course first placed into the hopper and the machine placed in operation by revolving the crank which drives the main gear which sets the fan-shaft in operation. This of course causes a blast of air to pass upward through the fan-chamber and blows the greater portion of the chaff from the grain out of the end of the fan-chamber. The grain falls upon the bottom of the air-chamber or fall-board and is conducted to the reciprocating shoe M, which receives its motion from the fan-shaft through the medium of the reciprocating elbow-levers N. Here the grain is again separated from the chaff, the grain passing through the screen of the shoe and dropping upon the fall-board P', while the chaff is blown from the machine by the secondary blower or fan P', and the grain falls upon the first or upper screen of the cleaning and separating shoe. By this time the chaff has been entirely separated and blown from the grain, and the thinnest grain passes down through both sieves or screens and is conducted from the machine by the chute V². The next finer grain passes through the first screen or sieve to the second one and is directed from the machine by the guide-strip V', while the coarsest grain remains upon the top of the screen and is directed from the machine in the opposite direction of the next coarsest grain by means of the guide-strip V, so that it will be impossible for the various grades of grain to become mixed after being separated by my machine.

The manner of separating and reciprocating the upper and lower shoes M and R is exceedingly simple and thoroughly efficient, and by employing the pendent bracket R⁵ and the supporting-spring R⁶ a jarring or quivering motion is imparted to the lower shoe or screen through its reciprocation.

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

In a grain cleaner and separator, the combination with the main frame, of the lever, fan-chamber, and air-chamber all having common side boards, the fan and fan-shaft, said shaft having the pinion at one end and a sprocket at the opposite end, a drive-gear meshing with the pinion, the eccentric studs carried by the pinion and sprocket, the elbow-levers pivoted to the side boards slotted at their upper ends to engage the eccentric studs, the upper reciprocating shoe supported upon

guide-rollers of the main frame and pivotally connected to the lower ends of the elbow-levers, the secondary fan-chamber, the fan and fan-shaft, the sprocket arranged upon one end of said shaft, and a disk arranged upon the opposite end, the sprocket-chain connecting the two sprocket-wheels, the elbow-levers pivoted upon the sides of the secondary fan-chamber and slotted at their upper ends, the eccentric studs carried by the sprocket and disk, the lower reciprocating shoe, the supporting rod or shaft, the pendent guide-hanger and the spring for holding the supporting rod or shaft in the said hanger all arranged and adapted to operate substantially as shown and described. 15

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