

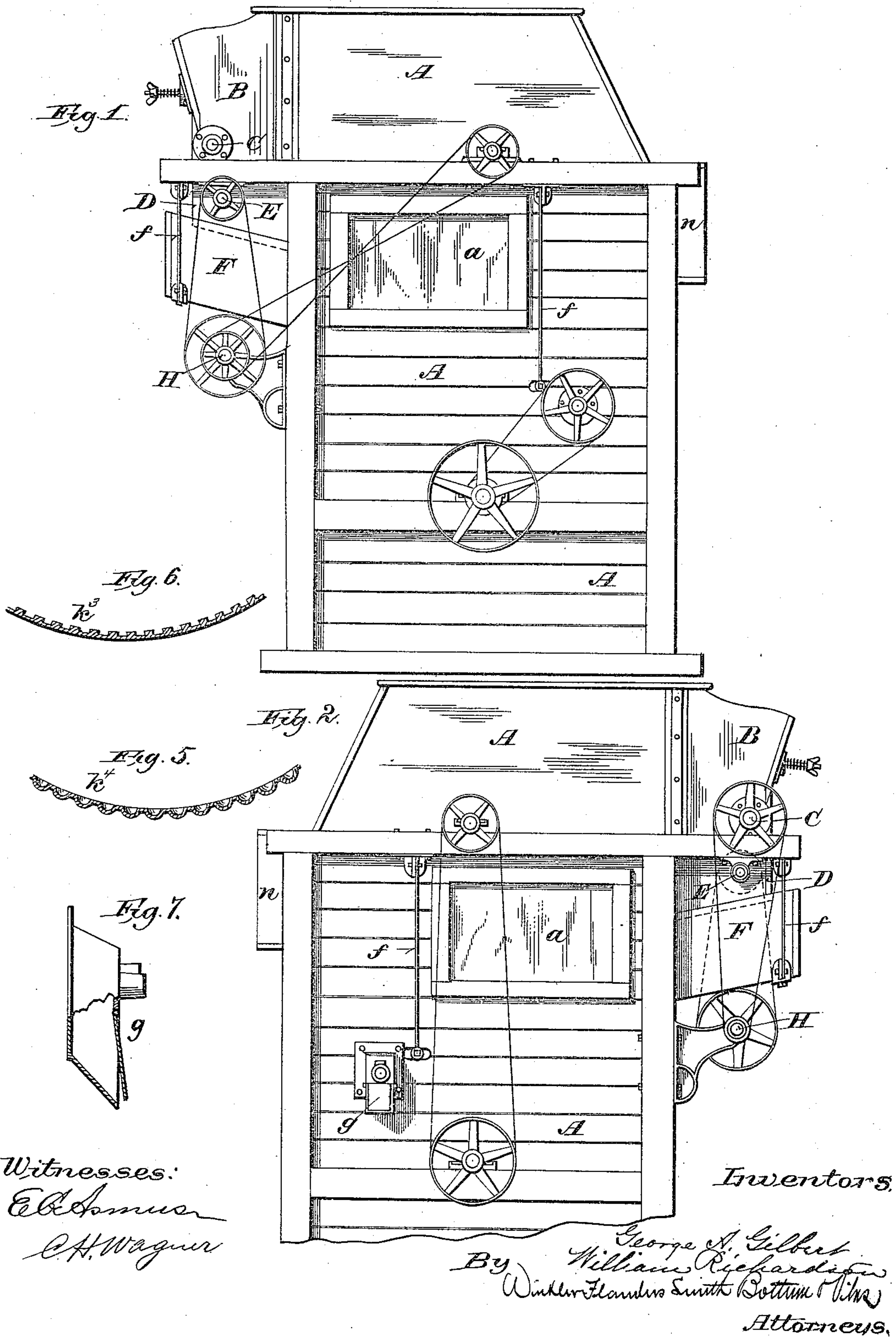
(No Model.)

3 Sheets—Sheet 1.

G. A. GILBERT & W. RICHARDSON.
GRAIN CLEANING MACHINE.

No. 442,805.

Patented Dec. 16. 1890.



Witnesses:
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C. H. Wagner

Inventors,
George A. Gilbert
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Attorneys.

(No Model.)

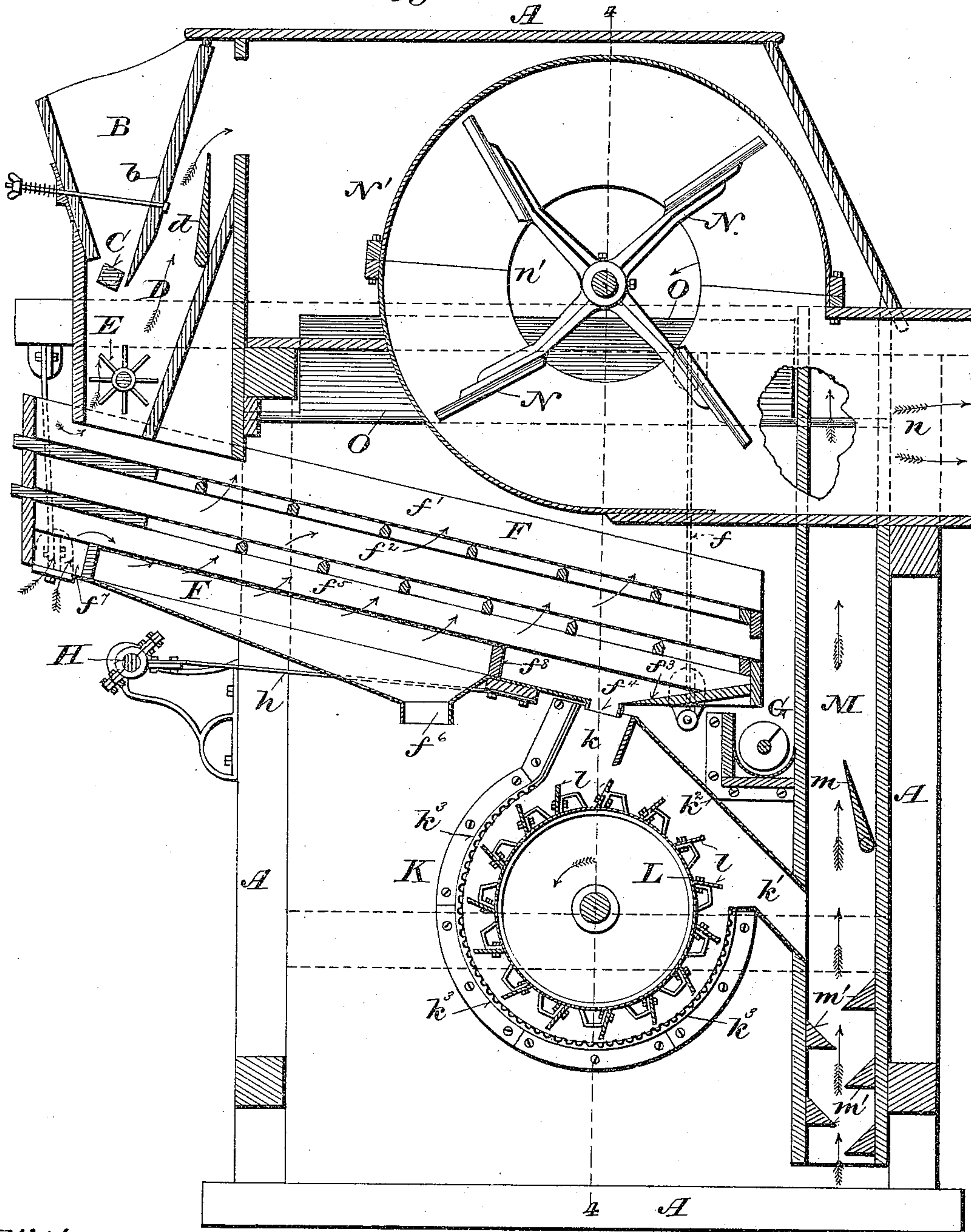
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Fig. 3.



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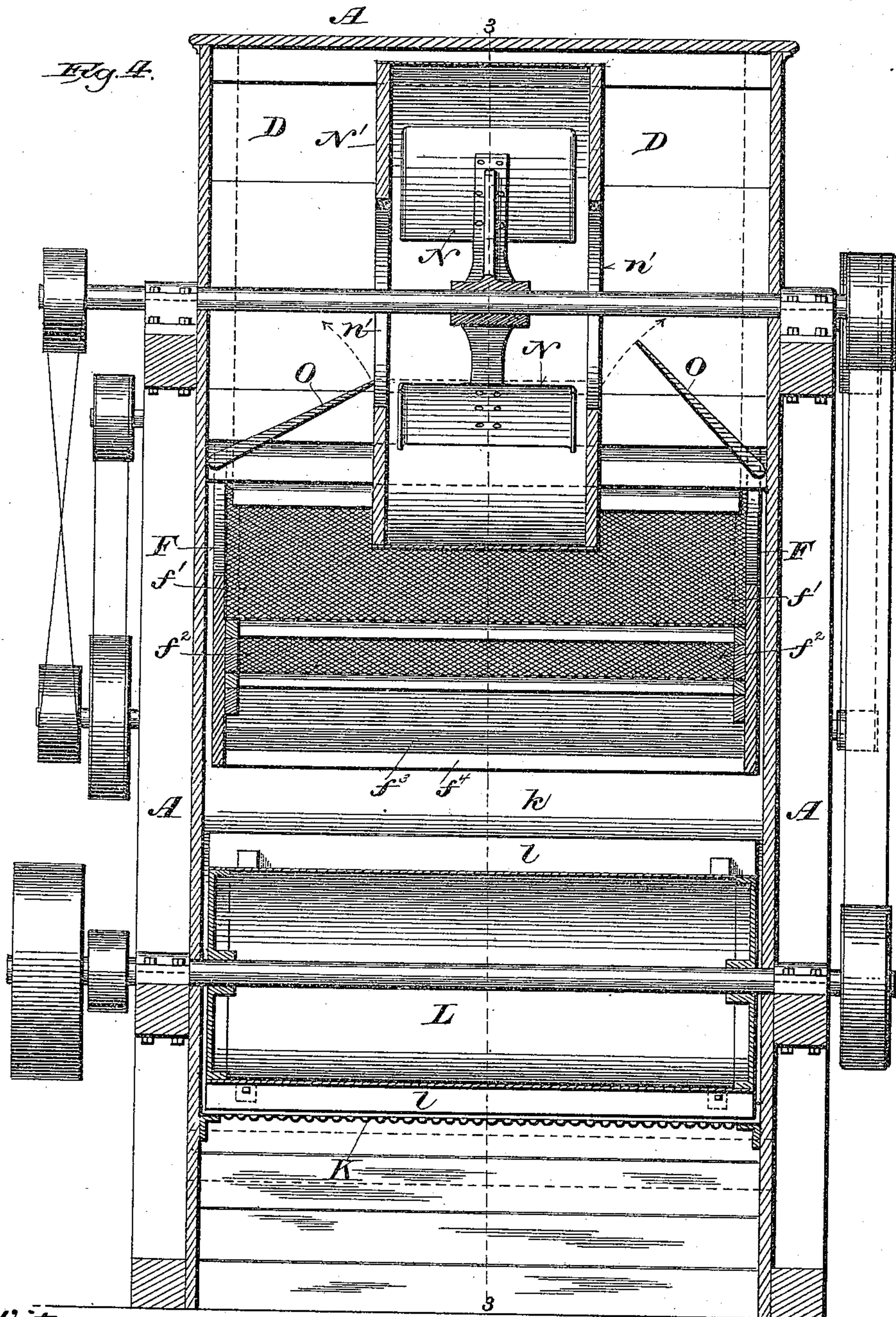
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G. A. GILBERT & W. RICHARDSON.
GRAIN CLEANING MACHINE.

No. 442,805.

Patented Dec. 16. 1890.



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UNITED STATES PATENT OFFICE.

GEORGE A. GILBERT AND WILLIAM RICHARDSON, OF MILWAUKEE, WISCONSIN; SAID RICHARDSON ASSIGNOR TO SAID GILBERT.

GRAIN-CLEANING MACHINE.

SPECIFICATION forming part of Letters Patent No. 442,805, dated December 16, 1890.

Application filed November 25, 1889. Serial No. 331,439. (No model.)

To all whom it may concern:

Be it known that we, GEORGE A. GILBERT and WILLIAM RICHARDSON, of Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented certain new and useful Improvements in Grain-Cleaning Machines; and we do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

The main objects of our invention are to separate loose and adhering impurities from various kinds of grain and to gently scour and polish the grain without breaking the same or abrading the bran, to clip and remove the beard from such grain as oats and barley, to remove the dust and dirt adhering to the grain immediately upon its separation therefrom, so as to prevent its being again attached thereto by the further action of the machine, and in the attainment of the foregoing objects to thoroughly separate the grain and to subject the same in a separated and agitated state to an air-current.

It consists of certain peculiarities of construction and arrangement hereinafter particularly described, and pointed out in the claims.

In the accompanying drawings like letters designate the same parts in the several figures. Figure 1 is an elevation of one side of my improved machine. Fig. 2 is a like elevation of the other side thereof. Fig. 3 is an enlarged vertical cross-section of the machine on the line 3 3, Fig. 4. Fig. 4 is a vertical longitudinal section of the same on the line 4 4, Fig. 3. Figs. 5 and 6 are sectional details of two kinds of staves employed in the scouring-case, and Fig. 7 is a detail view in side elevation of the valve through which the "tailings" are discharged from the machine.

The machine herein shown and described is particularly adapted to clipping and cleaning oats, barley, and malt, for which thorough separation and ventilation, together with light scouring and polishing, are desirable;

but it may be used advantageously in cleaning other kinds of grain.

Referring to the drawings, A represents the frame and casing, of any suitable form, material, and construction, provided with bearings for the necessary mechanism and adapted to support the same and to inclose such parts as it is desirable to inclose.

a a are doors or movable sections in the casing, by means of which access is had to the interior of the machine when desired.

B is a hopper or feeding-pocket, of the usual or any suitable construction, having a yielding adjustable feed-board *b*, by which the size of the aperture at the bottom of the hopper is adjusted and the feed is controlled as desired. In this aperture, which extends approximately the width of the machine, is placed lengthwise thereof an ordinary or any suitable form of feeding-roller C.

D is a feeding-spout, into which the aperture at the bottom of hopper B opens, as shown in Fig. 3. It communicates at the upper end through an opening with the interior of the upper portion of casing A and opens at the bottom just above the receiving end of the upper sieve. A wing-valve *d*, extending through said spout from side to side above the aperture in the bottom of hopper B, serves to regulate and control the air current or suction through said spout. Below the aperture in the bottom of said hopper a rotary picker E, consisting of a shaft with radial pins or fingers secured therein at intervals, extends horizontally through said spout D from side to side, so that the grain will fall thereon from the hopper and be thoroughly separated, any lumps or adhering masses of grain and smut-balls being broken up and the beards on barley and sprouts on grown malt being broken off by said picker E before falling upon the sieve.

F is a reciprocating frame having closed sides and a bottom and suspended by suitable hangers *ff* from the frame of the machine in an inclined position, its upper receiving end protruding through an opening in casing A and projecting underneath and a little outside of the lower end of the feed-spout D.

f' f^2 are removable sieves held one above the other in the frame F and extending to the inner lower end of said frame, which is open upward from the lower sieve f^2 , so as to allow the coarse impurities or tailings to pass over the lower ends of said sieves outside of the frame F into a conveyer G, (shown in Fig. 3,) which conducts them to one side of the machine and discharges the same through a self-closing gravitating valve g . (Shown in Figs. 2 and 7.) This valve automatically closes the discharge-opening of said conveyer, and thus avoids a draft through the same, which would be detrimental to the operation of the machine. The upper and coarser sieve f' separates the coarser impurities—such as straws, sticks, &c.—and the finer sieve f^2 below it separates finer impurities. The grain passing through the lower ends of said sieves f' and f^2 falls directly on a reversely-inclined leaf f^3 , by which it is conducted backward to an opening f^4 , extending transversely through the bottom of the sieve-frame F. Below the sieve f^2 is a finer screen or sieve f^5 , which may be permanently attached to the under side of the cleats upon which said sieve f^2 is supported and terminates at its lower end above the opening f^4 . The finer impurities—such as sand—sift through this screen, while the grain freed of all loose impurities passes over its lower end into the lower portion of the bottom of the sieve-frame, which is separated from that portion underneath said sieve f^5 by a cross-piece f^8 . Underneath said sieve f^5 the bottom of the frame F is made slightly funnel-shaped, with an opening f^6 to catch and discharge the screenings into a suitable receptacle or conduit, by which they are carried off. An intake-opening f^7 is provided in the bottom of the sieve-frame F for supplying a current of air through the sieves.

A short longitudinal reciprocating movement is imparted to the sieve-frame F by a crank or eccentric shaft H, connected with said frame by a rod h and driven by any suitable connections, such as are shown in Figs. 1, 2, and 4.

K represents the scouring-case extending transversely across the machine underneath the lower end of the sieve-frame and having longitudinal receiving and discharging apertures k and k' of approximately its entire length and in the upper portion thereof. The intervening space between these apertures, where no work is done, may be closed by a plane board or section k^2 . The remaining or working portion of the case, which is preferably a segment of a cylinder in form, is composed of staves, such as k^3 k^3 , (shown in detail in Fig. 5,) having rounded indentations on their inner surfaces for lightly scouring and polishing barley, malt, and the like, or, in place of the staves k^3 k^3 , staves, such as k^4 , (shown in detail in Fig. 6,) having abrupt longitudinal grooves or corrugations for harsher grades of work—such as clipping, scouring, and polishing oats—may be em-

ployed. The scouring-case K may be formed of sections or staves, as shown, cast with the desired indentations, grooves, or corrugations, or it may be made of any suitable sheet metal, either integrally or in sections, with corrugations or indentations impressed therein.

Within the case K is placed a revoluble scouring-cylinder L, having at suitable intervals on its periphery blades or beaters l , extending lengthwise from end to end thereof.

The opening f^4 in the bottom of the sieve-frame F communicates with the receiving-aperture k of the scouring-case K, and the discharging aperture k' of said scouring-case opens into the side of an upright suction-leg M, extending laterally from side to side and from a point near the bottom to the upper part of the machine. This suction-leg is provided above the opening from the scouring-case with a wing-valve m , by which the strength of the air-current is regulated, and is also provided below said opening in the usual manner on opposite sides with inwardly-projecting alternating wings m' m' , by which a zigzag movement is imparted to the grain as it falls, thereby affording freer access thereto of the upward air-current and facilitating the removal therefrom of any remaining impurities detached from the grain in the scouring-case.

N is an ordinary fan-blower, the case N' of which is inclosed in the upper part of the machine, its eduction-pipe n passing outwardly through the casing A and its intake-openings n' n' communicating with the interior of said casing.

Two wing-valves O O—one on each side of the fan-case N'—serve to regulate the strength of the air-current through the sieve by opening more or less communication between that portion of the casing inclosing said sieves and that portion inclosing the fan. The suction-leg M extends upwardly on each side of the eduction-pipe n , opening above the same into the upper part of casing A in communication with the intake-openings n' n' of the fan.

The feed-roller C, picker E, conveyer G, eccentric-shaft H, scouring-cylinder L, and fan N may be driven by any suitable connections, a convenient arrangement for the purpose being shown in Figs. 1, 2, and 4 of the drawings.

It will be observed that the several bearings of the machine are all outside of the casing, where they are accessible for the purpose of oiling or of making repairs.

Our improved machine operates as follows: The grain is fed from the hopper B in a thin wide stream into the spout D upon the picker E, which separates the kernels, breaking up any adhering masses or lumps, detaching some of the impurities sticking to the grain, and breaking off the beards on barley and the sprouts on malt, and affording a free passage through the grain thus separated to the upward air-current, which takes up the

lighter of the loose impurities and carries them off through the upper part of casing A and the fan-case N', as indicated by arrows, Fig. 3. The grain falls in a separated condition from the spout D upon the upper end of the upper sieve f' , which takes out the coarser impurities and discharges them at its lower edge into the conveyer G. The smaller of the coarse impurities falling with the grain through the upper sieve f' upon the next sieve f^2 are separated thereby and pass over its lower edge into the conveyer G with the tailings from the upper sieve. The grain passing through the upper portions of the two sieves f' and f^2 falls upon the fine screen f^3 , which separates the fine and heavier impurities—such as sand—the grain passing down over the lower edge of said screen into the bottom of the frame F, from which it is discharged through an opening f^4 into the scouring-case K. The grain passing through the lower portions of said sieves f' and f^2 falls directly upon the bottom of the sieve-frame below the lower end of screen f^3 . The finer screenings sifted through the screen f^3 are caught by the funnel-shaped bottom of frame F underneath said screen and are discharged through an aperture f^6 into a suitable receptacle or conduit. A current of air taken in through the opening f^7 at the outer end of the sieve-frame is produced by the fan N upwardly through the sieves, as indicated by arrows, Fig. 3, and carries with it such light impurities as may pass with the grain to the sieves or be detached by the agitation of the grain in passing over the sieves. The grain traverses the sieves and is discharged through the opening f^4 into the scouring-case K in a broad thin stream, affording the upward air-current ready access thereto and enabling it to carry off any light dirt or impurities as soon as they are detached. Upon entering the scouring-case the grain is caught by the beaters $l l$ and thrown rapidly back and forth against the opposing surfaces of said scouring-case and of the cylinder L, thereby dislodging dust and dirt still adhering to the grain and lightly polishing the latter. As it is brought opposite to the aperture k' it is carried by the centrifugal force of the beater into the suction-leg M, in which it is deflected by the wings $m' m'$ into a zig-zag course as it falls, and, thus separated and agitated, is subjected to an upward air-current, whereby any impurities loosened in the scouring-case are caught up and carried off through the fan.

Sieves of different mesh and staves having different kinds of scouring-surface may be employed for operation on different kinds of grain, and the several air-currents may be regulated by the wing-valves previously described for various grades and kinds of work.

It will be observed that, unlike the scouring-cases usually employed in this class of machines, the scouring-case K of our machine

is not perforated or ventilated by forcing an air-current through the same.

We claim—

1. In a grain-cleaning machine, the combination of a hopper, a suction-spout into which said hopper opens, a yielding feed-board forming a division between the hopper and spout, a picker placed in said spout below the opening from the hopper, and a fan arranged to produce an upward air-current through said spout past the picker, substantially as and for the purposes set forth. 70

2. In a grain-cleaning machine, the combination, with the feeding hopper or pocket, of a suction-spout into which it discharges, a picker in said spout between its discharging end and the opening into said hopper, and a fan arranged to produce a current of air through said spout, substantially as and for the purposes set forth. 80

3. In a grain-cleaning machine, the combination, with the feed-hopper, of a suction-spout into which said hopper opens, a rotary fingered picker placed in said spout underneath the opening into the hopper, a fan arranged to produce an upward air-current through said spout, and a valve for regulating the strength of the current, substantially as and for the purposes set forth. 90

4. In a grain-cleaning machine, the combination of a hopper, a suction-spout into which it opens, an adjustable feed-board forming a partition between said hopper and spout, a feed-roller in the discharge-opening of the hopper, a picker in said spout below said discharge-opening, and a fan arranged to produce an upward air-current past the picker, substantially as and for the purposes set forth. 95

5. In a grain-cleaning machine, the combination of a hopper, a suction-spout into which it opens, a picker placed in said spout below the discharge-opening from the hopper, an inclosed sieve having its receiving end underneath the discharging end of said spout, and a fan arranged to produce an upward air-current through said sieve and through the spout past the picker therein, substantially as and for the purposes set forth. 100

6. In a grain-cleaning machine, the combination, with a suitable frame and casing, of an inclined reciprocating sieve-frame partially inclosed therein and provided with a bottom having an air-intake opening at its upper exposed end, an opening at or near its lower end for discharging the grain, and an intermediate opening for the discharge of screenings, a feeding-spout over the upper end of said sieve-frame, and a fan arranged to produce an upward air-current through the sieves in said frame, substantially as and for the purposes set forth. 110

7. In a grain-cleaning machine, the combination, with a suitable frame and casing, of a reciprocating sieve-frame partially inclosed in said casing and provided with a closed bot- 115

tom having an air-intake opening at its upper outer end, a grain-discharging opening at or near its lower end, and an intermediate opening separated below the sieves from said other openings by cross-partitions, a screen impervious to the grain to be cleaned placed between the air-intake opening and the grain-discharging opening next above the bottom of said sieve-frame, one or more sieves above said screen, and a fan arranged to produce an air-current upwardly through said sieves, substantially as and for the purposes set forth.

8. In a grain-cleaning machine, the combination, with a suitable frame and casing having an opening in one side, of an inclined reciprocating sieve-frame partially inclosed in said casing, with its upper end protruding through the opening therein, and provided with a bottom having an air-intake opening at its outer end, a fan inclosed in the upper part of said casing, its suction-openings communicating with the sieve-chamber on each side of the fan-case, and valves for regulating the size of the openings on each side of the fan-case into said sieve-chamber, substantially as and for the purposes set forth.

9. In a grain-cleaning machine, the combination of a scouring-case having closed ends and receiving and discharging apertures extending approximately its entire length, a suction-leg of approximately the same width as the length of said scouring-case, with which it communicates through said discharging-aperture, a rotary beater within the scouring-case, an inclosed sieve-frame opening approximately its full width into said scouring-case, and a fan arranged to produce an upward air-current through the sieves and through said suction-leg, substantially as and for the purposes set forth.

10. In a grain-cleaning machine, the combination of a scouring-case having closed ends and longitudinal receiving and discharging apertures extending approximately its full length, a rotary beater within said case, a sieve-frame set transversely to the axis of said scouring-case and having a transverse discharging-opening of approximately the same length of the receiving-opening of said scouring-case and communicating therewith, a feeding-spout of approximately the same width as and placed over the upper end of said sieve-frame, a picker within said spout, a suction-leg into which the discharging-aperture of the scouring-case opens approximately its full length, and a fan arranged to produce upward air-currents through the feeding-spout, sieve-frame, and suction-leg, substantially as and for the purposes set forth.

11. In a grain-cleaning machine, the combination of a scouring-case having closed ends and longitudinal receiving and discharging apertures extending approximately its entire length, the sides of said case being imperforate, excepting said apertures, a sieve-frame provided with sieves and having an air-intake opening, an aperture in the bottom for the discharge of screenings, and an aperture through which the grain is conducted into the scouring-case, a conveyer arranged to catch and conduct off the tailings from the sieve, a casing inclosing a space over the sieve, a fan the intake-opening of which communicates with said inclosed space, and a suction-leg into which the grain is discharged from said scouring-case and communicating at its upper end with the intake-opening of the fan, substantially as and for the purposes set forth.

12. In a grain-cleaning machine, the combination, with a suitable casing having an opening in one side, of a sieve-frame partially inclosed in said casing, with its upper end exposed through said opening, and provided with a bottom having an air-intake opening at its upper exposed end, a conveyer located below the discharging end of said sieve-frame in position to receive the tailings therefrom and opening through said casing, a self-closing valve controlling the discharge-opening of the conveyer, and a fan arranged to produce an upward air-current through the sieve-frame, substantially as and for the purposes set forth.

13. In a grain-cleaning machine, the combination of an imperforate, indented, or grooved scouring-case having closed ends and longitudinal receiving and discharging apertures and a rotary beater within said case, substantially as and for the purposes set forth.

14. In a grain-cleaning machine, the combination of interchangeable imperforate scouring-cases, one having on the inside longitudinal sharp square-cornered ribs and one having rounded indentations, and a rotary beater adapted to work within said scouring-cases, substantially as and for the purposes set forth.

In testimony that we claim the foregoing as our own we affix our signatures in presence of two witnesses.

GEORGE A. GILBERT,
WILLIAM RICHARDSON.

Witnesses:

FRANK A. KREHLA,
CHAS. L. GOSS.