No. 684,856. Patented Oct. 22, 1901.

J. L. OWENS.

COMBINED GRAIN WINNOWER AND COCKLE SEPARATOR.

(Application filed Jan. 22, 1900.)

(No Model.) 2 Sheets—Sheet 1.

FIG. 2

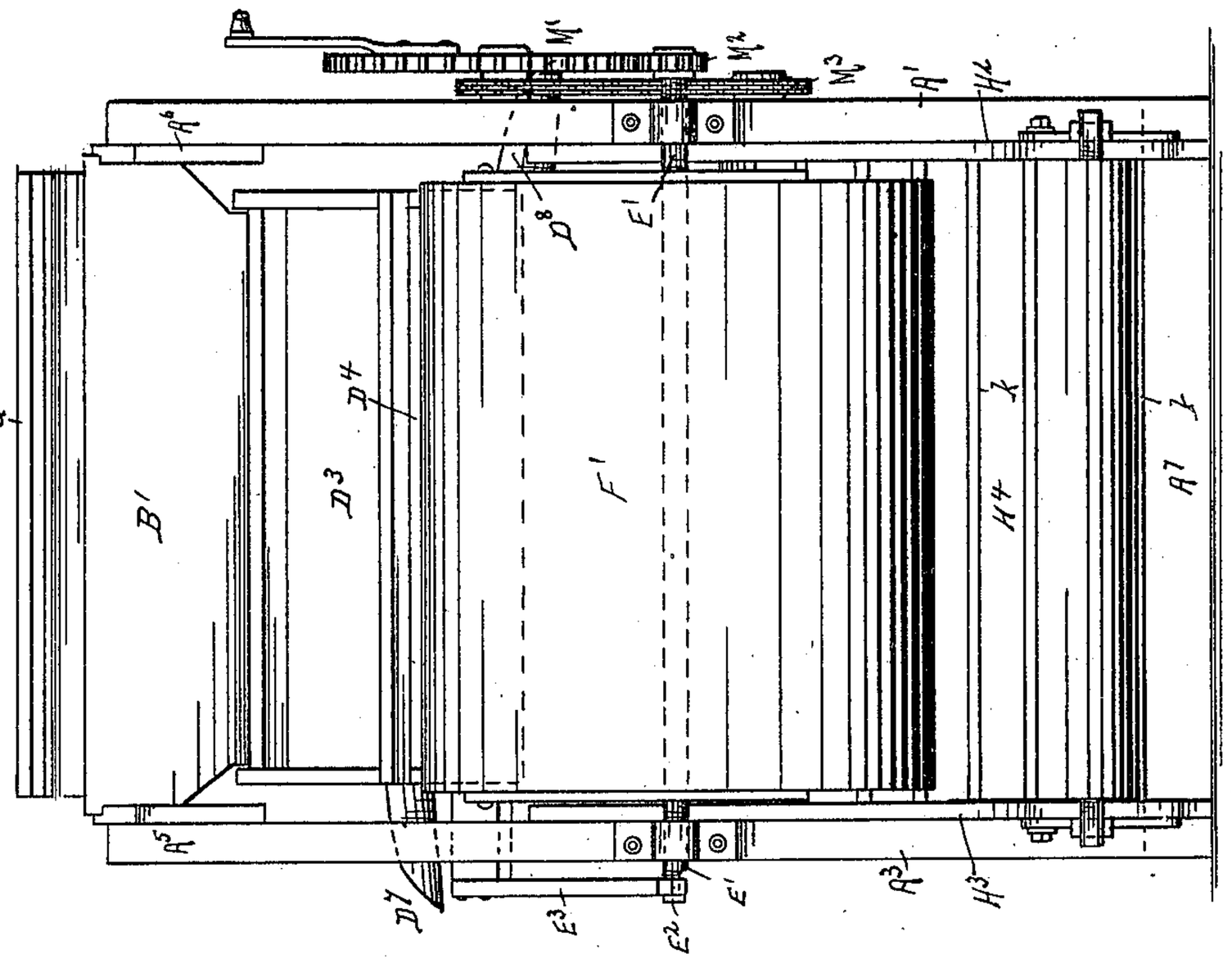
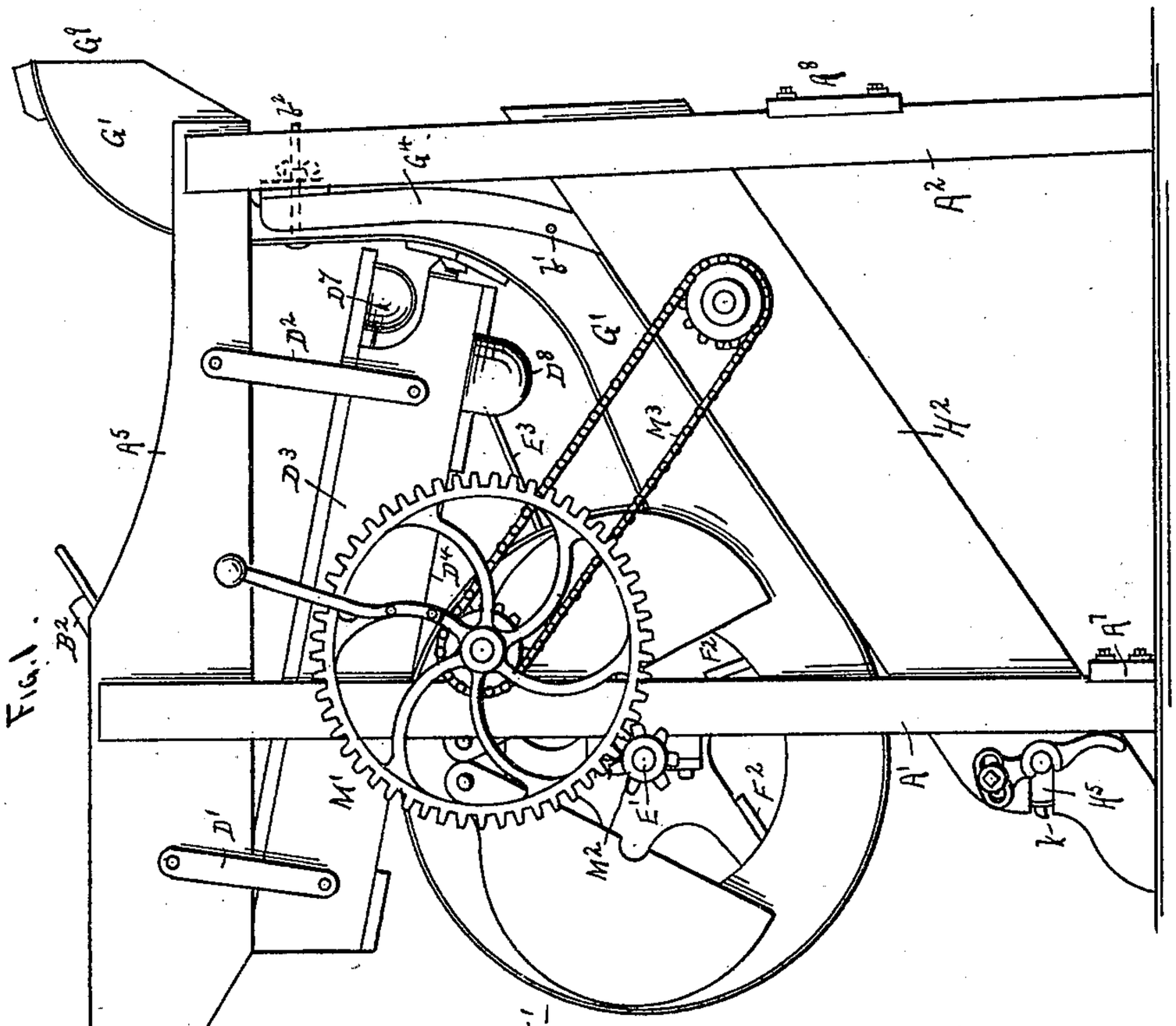


FIG. 1.



WITNESSES.
F. Womack.
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John L. Owens, INVENTOR.
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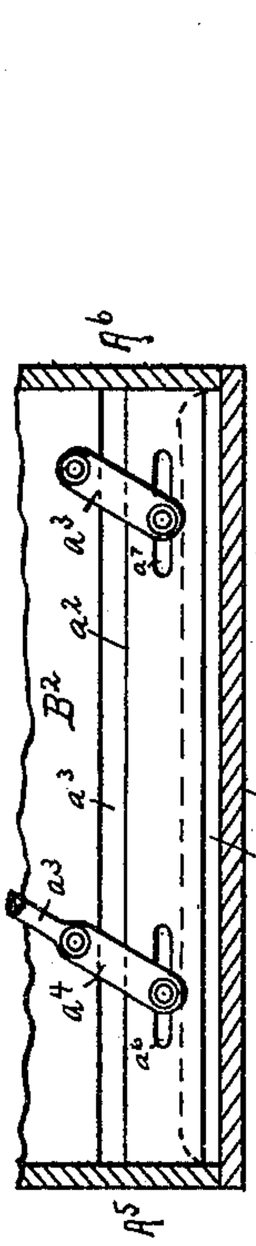

FIG. 4

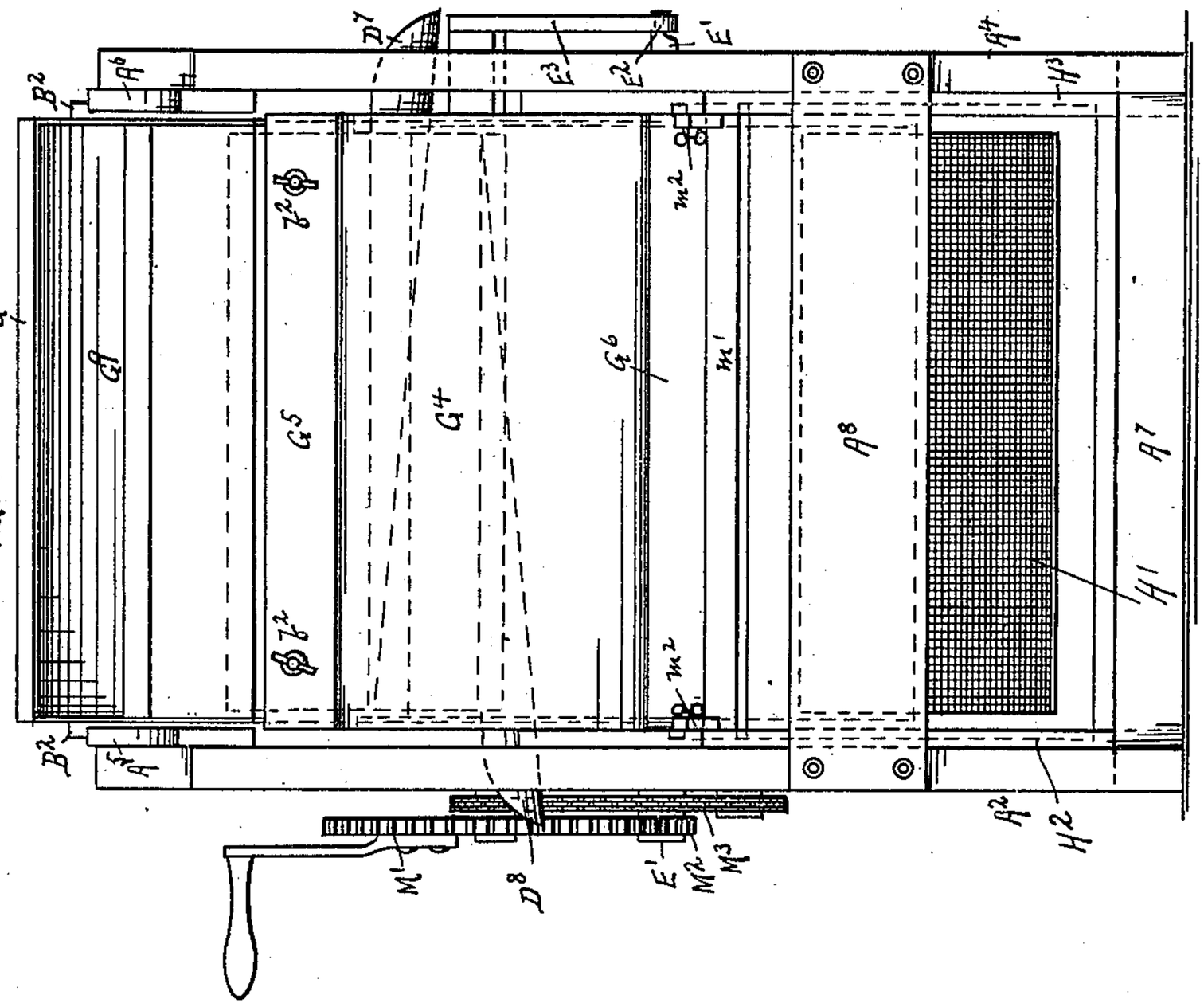

FIG. 5

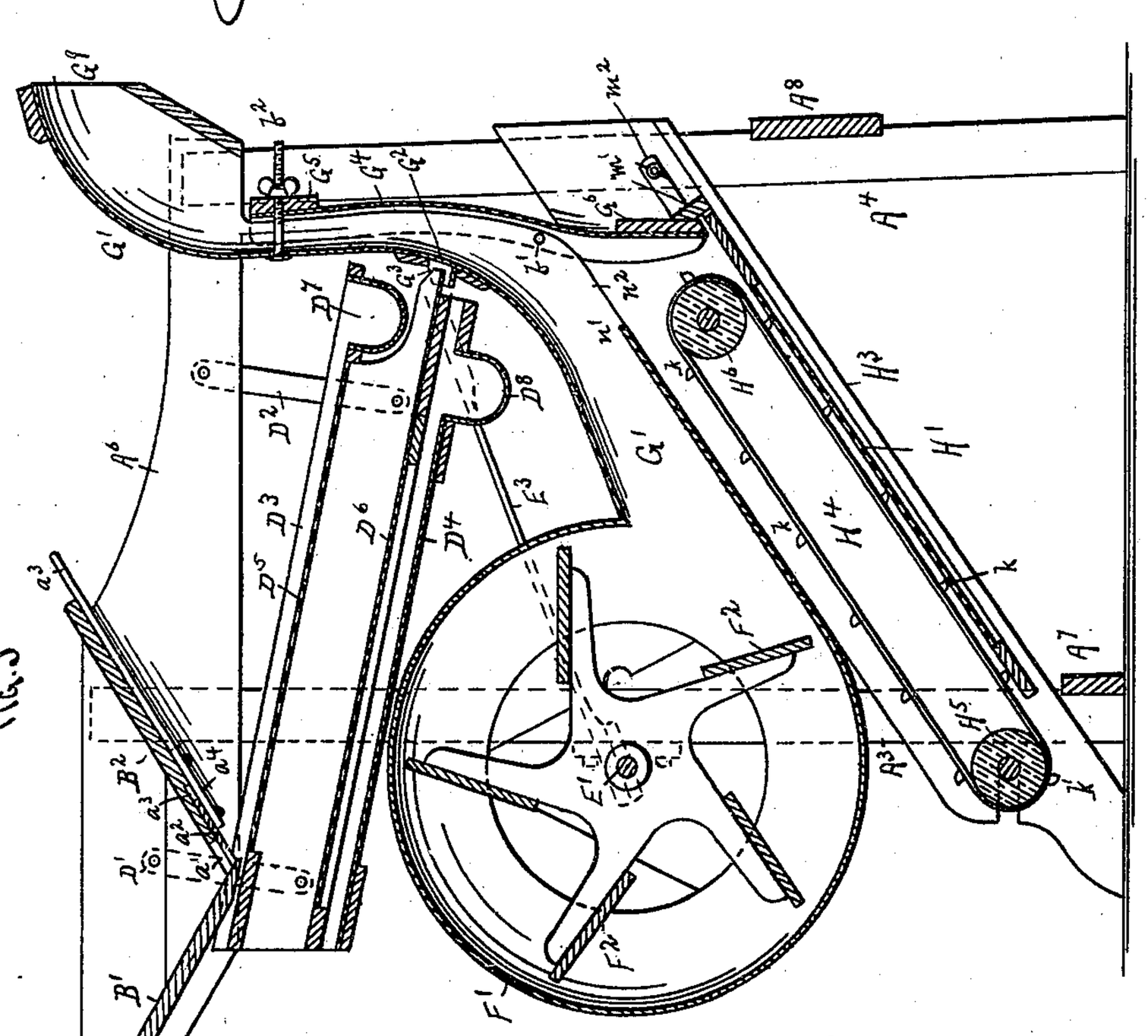

FIG. 3

WITNESSES.
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UNITED STATES PATENT OFFICE.

JOHN L. OWENS, OF MINNEAPOLIS, MINNESOTA.

COMBINED GRAIN-WINNOWER AND COCKLE-SEPARATOR.

SPECIFICATION forming part of Letters Patent No. 684,856, dated October 22, 1901.

Application filed January 22, 1900. Serial No. 2,284. (No model.)

To all whom it may concern:

Be it known that I, JOHN L. OWENS, a citizen of the United States, residing at Minneapolis, in the county of Hennepin and State of Minnesota, have invented certain new and useful Improvements in a Combined Grain-Winnower and Cockle-Separator, of which the following is a specification.

This invention relates to machines for separating and winnowing grain; and it consists in the construction, combination, and arrangement of parts, as hereinafter shown and described, and specially pointed out in the claims.

In the drawings, Figure 1 is a side elevation, and Fig. 2 is an end elevation, from the feed end of the machine complete. Fig. 3 is a sectional side elevation. Fig. 4 is an end elevation from the "tail" end of the machine. Fig. 5 is a detached detail of a portion of the feed-hopper, illustrating the construction of the feed-slide and its operating mechanism.

The framework consists of four posts A' A^2 and A^3 A^4, arranged in pairs and each pair connected longitudinally at their upper ends by side plates A^5 and A^6 and transverse plates A^7 A^8, as shown.

The feed-hopper is formed by transverse plates B' B^2, projecting transversely between the plates A^5 A^6 and with one of the hopper-plates B^2 provided with a feed-aperture a'.

a^2 is a feed-slide fitting in a recess a^3 in the lower surface of the cross-plate B^2 and adapted to be adjusted to close or open the aperture a' to regulate the flow of the material from the hopper.

a^4 a^5 are two bars each pivoted by one end to the cross-plate B^2 and by the other end to the slide a^2, the pivots in the slide fitting into slots a^6 a^7 in the slide. The bar a^4 is extended into a handle a^8, as shown in Figs. 1, 3, and 5. By this arrangement it will be readily understood that the feed-slide may be adjusted to open or close the aperture a' to any desired extent by simply moving the handle a^8 to the right or left.

Suspended within the main framework, as by bars D' D^2, is a screen-frame consisting of a shoe D^3, having an imperforate bottom D^4, and screens D^5 D^6, the screen D^5 arranged to discharge its tailings into a transverse spout D^7, by which they may be conducted to one side of the machine, and the imperforate bottom provided with a reversely transverse spout D^8 to receive the material flowing through the screen D^6 and discharge it off to the opposite side of the machine.

E' is the fan-shaft, journaled across the machine and provided with a small crank E^2 on one end, connected by a rod E^3 to the screen-shoe to impart the necessary vibratory motion to the shoe.

F' is the fan-casing, and F^2 the fan-blades connected to the fan-shaft E'.

G' is the fan-discharge, which is in the form of an upwardly-curved trunk passing in its course past the discharge end of the screen D^6, and into which trunk the tailings of the screen D^6 are adapted to be discharged by an opening G^2, as shown. The opening G^2 is protected by a small chute G^3, so that the material discharged over the tail of the screen D^6 will be properly fed into the fan-trunk G' by the vibratory motion of the shoe. The sides and rear of the fan-trunk G' are integral with the trunk; but the front G^4 is distinct therefrom and connected adjustably thereto by a pivot b' near the lower end and by one or more adjustable rods b^2 at the upper end, as shown. The upper end of the adjustable front G^4 of the fan-trunk is strengthened by a transverse plate G^5, while the lower end projects some distance below the body of the "trunk" and is supported by a transverse plate G^6. By this arrangement the upper part of the "throat" of the fan-trunk may be increased or decreased in size, as hereinafter explained. Beneath the fan-trunk G' an inclined screen H' is supported between side plates H^2 H^3, the latter secured to the posts A' A^2 A^3 A^4, as shown.

H^4 is an endless belt running over transverse rollers H^5 H^6, journaled in the side plates H^2 H^3 near their ends, the belt H^4 having slats or strips k at intervals and running in close relation to the screen H' as the belt is revolved.

The transverse plate G^6 reaches close to the upper end of the screen H', and the small space between them is still further closed by a stop m', held in place removably, as by buttons M^2.

The lower side of the trunk G' stops short at n', so as to leave a space n^2 for the passage

of the tailings from the screen D^6 to the upper end of the screen H′ between the plate G^6 and the upper end of the endless belt H^4.

The incline of the screen H′ will be sufficient to permit the grain to flow freely and rapidly over its surface; but the endless belt H^4 will be caused to travel with its lower surface downward over the screen and at a slower speed than the natural flow of the material over the screen, so that the material will be retarded and form in banks behind the slowly-moving slats and be thereby rolled over and over and cause the cockleberries and similar-shaped seeds to be precipitated to the surface of the screen and pass through its meshes and leave the larger perfect kernels only to be discharged over the tail of the screen.

The motion will be imparted to the fan-shaft E′ and the belt H^4, as by gearing M′, M^2, and chain M^3, as shown.

Being thus constructed, the operation is as follows: The material flows from the feed-hopper upon the rapidly-vibrating screen D^5, and the lighter and larger particles will flow over the tail of the screen and be discharged off to one side by the transverse spout D^7, while the material passing through the screen D^5 will fall upon the screen D^6, which is of finer mesh, and where another separation takes place, the material passing through the screen being received by the imperforate bottom of the shoe and discharged by the transverse spout D^8, and the tailings from the screen D^6 passing into the fan-trunk G′. Up to this point the material has not been subjected to the action of artificial air-currents; but the separations have been accomplished entirely by the vibratory action. The tailings from the screen D^6 in entering the fan-trunk G′ come in contact with the upwardly-moving air-currents from the fan, which picks off the lighter particles and blows them out through the outlet G^9, leaving the heavier particles only to pass down to the endless belt H^4, where it is acted on as before described. The force of the air-currents passing through the trunk G′ may be perfectly controlled by increasing or decreasing the size of the throat of the trunk, as before described, by means of the adjusting-bolts b^2, and thus adapt the machine to the quality or condition of the material being acted upon.

Having thus described my invention, what I claim as new is—

1. The combination of the main frame, a shoe supported in the upper part of said frame, and arranged to be vibrated, and with an imperforate bottom, an upper screen in said shoe, a lower screen in said shoe, a fan below said shoe, a wind-trunk leading from said fan and consisting of an upwardly-inclined section merging into a vertical section adjacent to the discharge end of said lower screen, a transverse aperture through which the tailings from said lower screen are discharged into said vertical wind-trunk section, an opening in the bottom of said wind-trunk at the juncture of the inclined and vertical sections, whereby material too heavy to be affected by the air-currents is discharged, a stationary inclined screen below said opening and adapted to receive the material passing therethrough and an endless slatted belt traveling over said stationary inclined screen with its slats in close relation thereto and moving at a slower speed than the natural flow of the material over said screen, substantially as set forth.

2. In a combined grain-winnower and cockle-separator, a vibrating shoe containing a series of screens, a blast-fan, an inclosed casing for said fan having an upwardly-inclined blast-spout, an upwardly-curving wind-trunk connected to the discharge from said blast-fan and into which wind-trunk the tailings from the lowermost of said screens are discharged, a stationary inclined screen supported below said wind-trunk, an endless slatted belt traveling over said stationary inclined screen in close relation to said screen, but at a slower speed than the natural flow of the material thereover, a front to said wind-trunk separate from and partially encompassing the body of the wind-trunk and pivoted near its lower end to said body portion and adjustable at its upper end nearer to and farther away from said body portion, the lower end of said adjustable front extended below the line of the lower wall of the blast-spout of the fan-casing to close the gap between said wind-trunk and said stationary inclined screen, substantially as and for the purpose set forth.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

JOHN L. OWENS.

In presence of—
C. N. WOODWARD,
A. LINDAHL.