(No Model.)

3 Sheets—Sheet 1.

# F. F. LANDIS.

## CENTRIFUGAL GRAIN SEPARATOR.

No. 551,495. Patented Dec. 17, 1895.

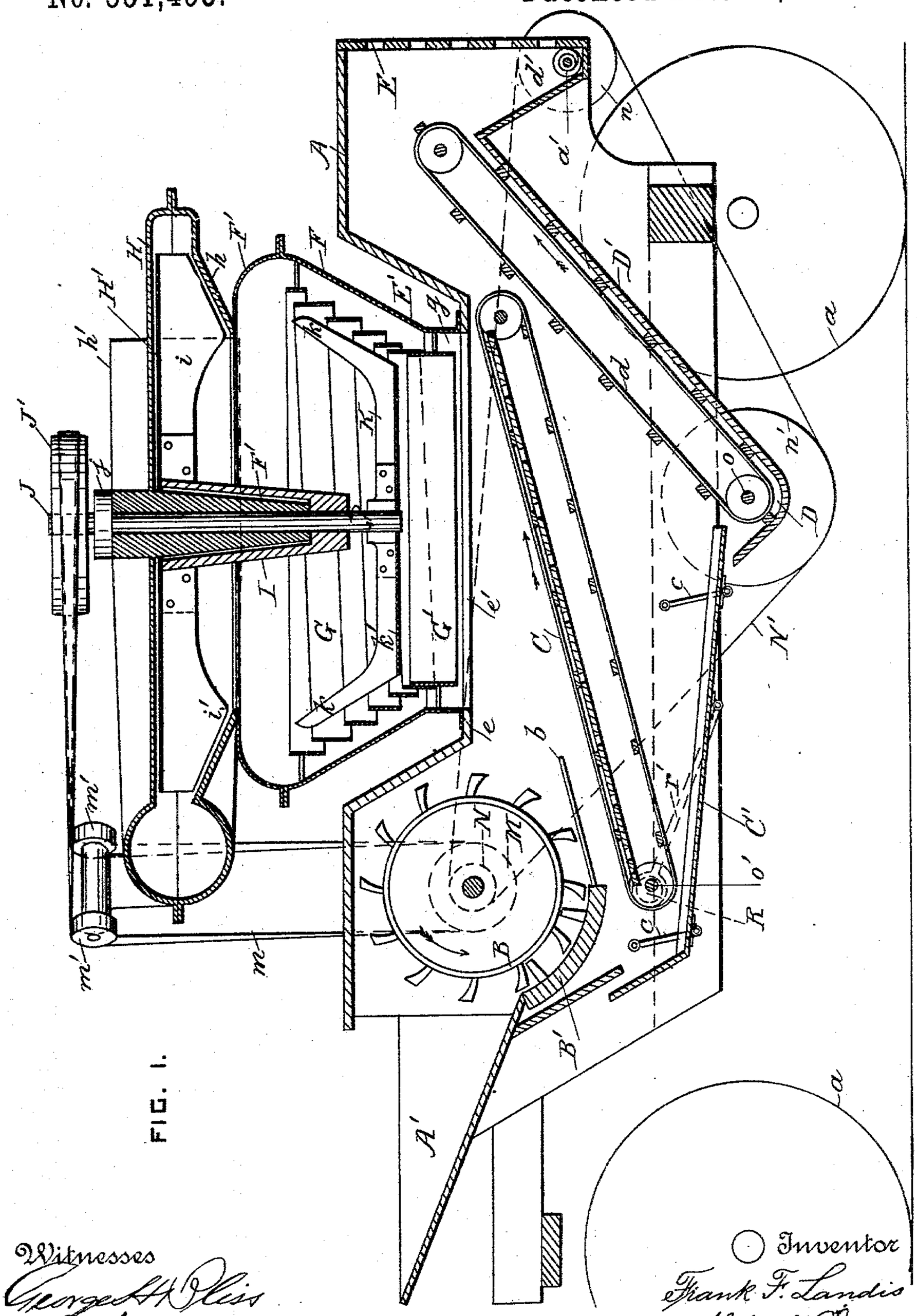

FIG. 1.

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(No Model.) 3 Sheets—Sheet 2.

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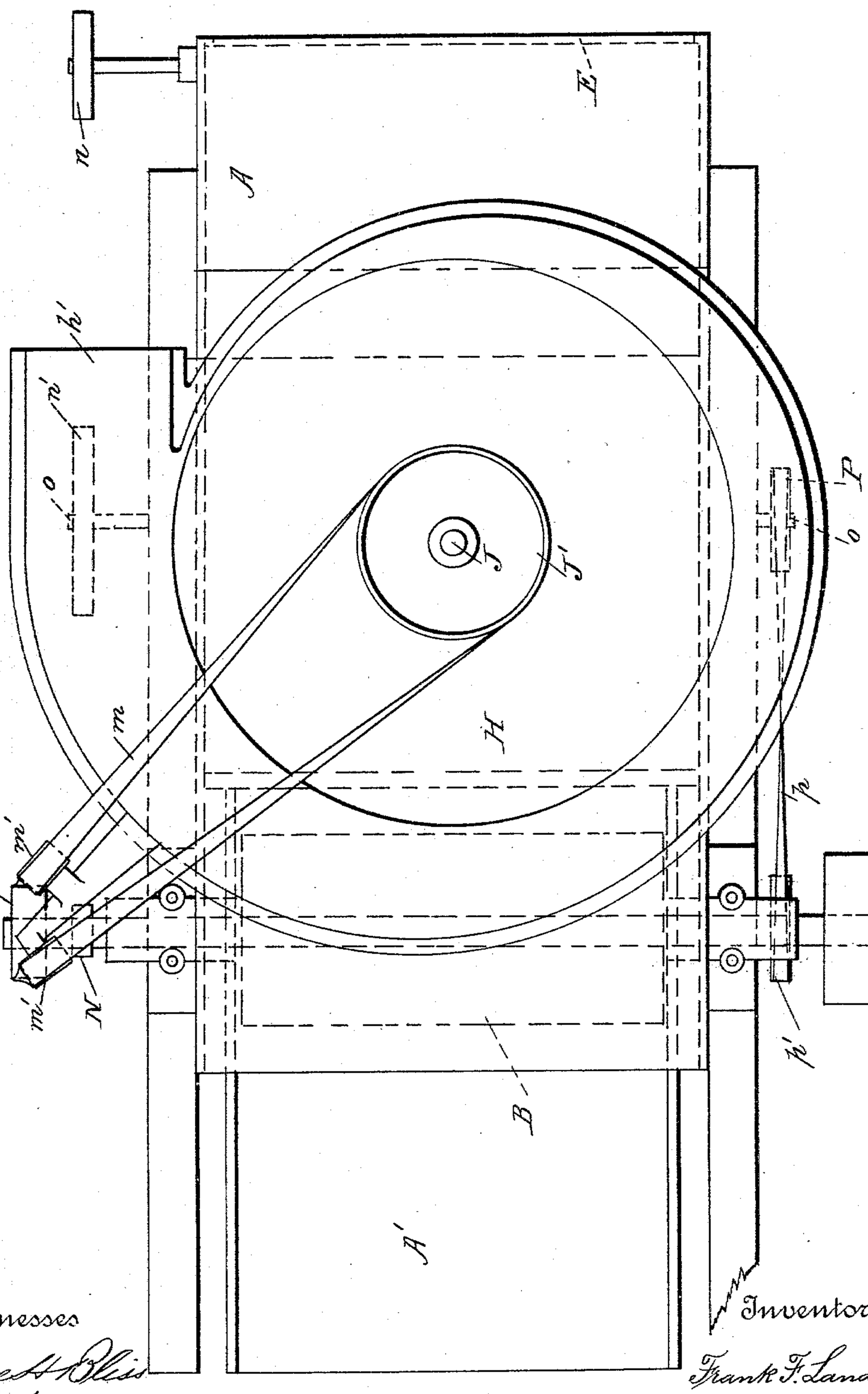


FIG. 2.

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(No Model.)

3 Sheets—Sheet 3.

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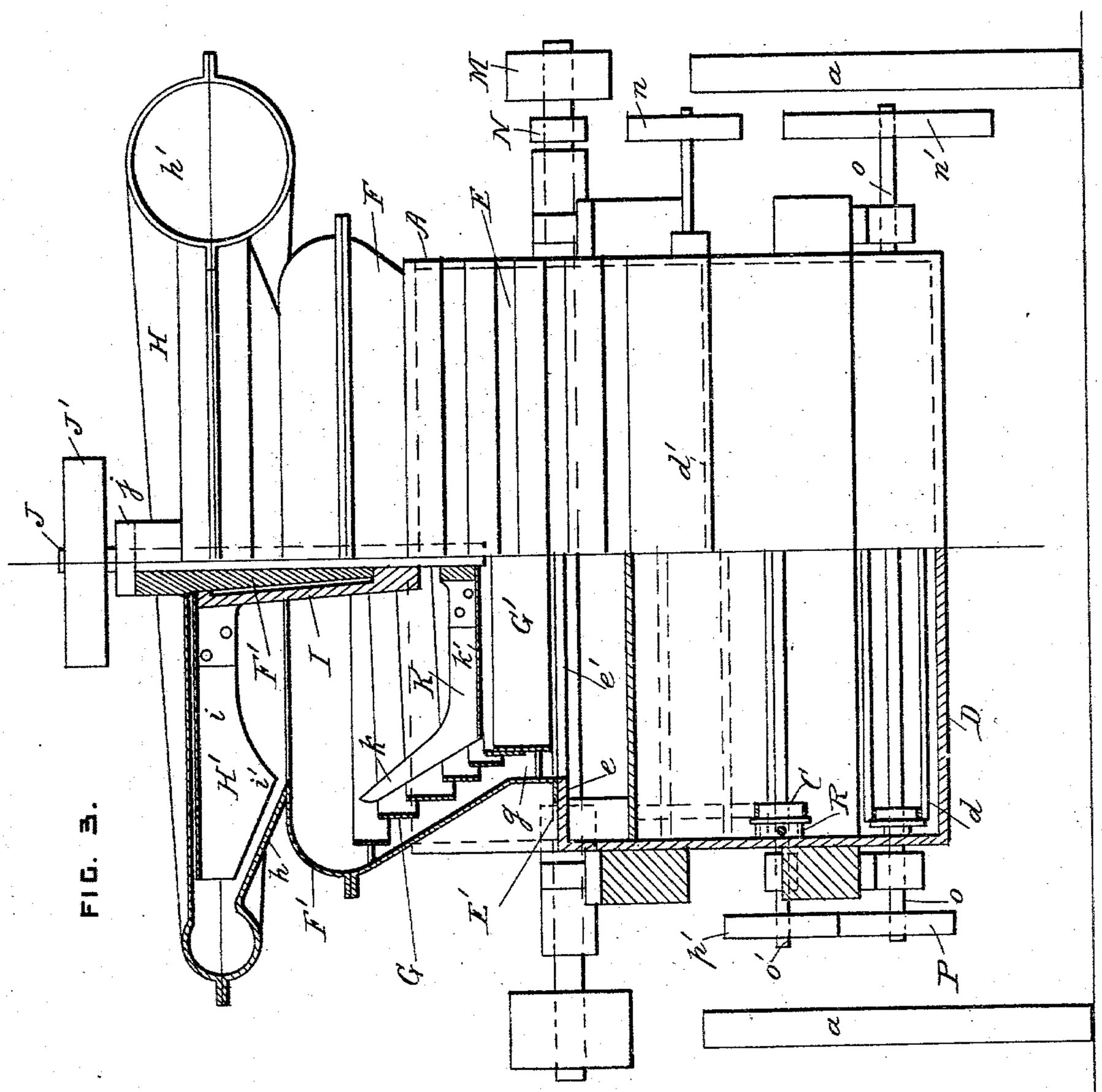

FIG. 3.

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# UNITED STATES PATENT OFFICE.

FRANK F. LANDIS, OF WAYNESBOROUGH, PENNSYLVANIA.

## CENTRIFUGAL GRAIN-SEPARATOR.

SPECIFICATION forming part of Letters Patent No. 551,495, dated December 17, 1895.

Application filed August 15, 1895. Serial No. 559,332. (No model.)

*To all whom it may concern:*

Be it known that I, FRANK F. LANDIS, a citizen of the United States, residing at Waynesborough, in the county of Franklin and State of Pennsylvania, have invented certain new and useful Improvements in Centrifugal Grain-Separators; and I do hereby 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.

This invention relates to centrifugal grain-separators; and it consists in the novel construction and combination of the parts hereinafter fully described and claimed.

In the drawings, Figure 1 is a longitudinal section through a thrashing-machine constructed according to this invention. Fig. 2 is a plan view of the same. Fig. 3 is an end view, partly in section, through the center of the separating-chamber.

A is the casing of the thrashing-machine, which is preferably mounted on wheels *a*.

A′ is the hopper for the unthrashed grain.

B is the thrashing-cylinder, and B′ is the concave provided with a straw-guide *b* at its rear.

C is a straw-conveyer arranged in an inclined position behind the cylinder and concave.

C′ is a gather-board provided with means for oscillating it, and suspended under the front part of the straw-conveyer by the links *c*.

D is the grain-hopper under the lower end of the gather-board C′, and D′ is a grain-board extending upwardly behind the hopper D. A grain-elevator *d* is arranged over the grain-board D′, and operates to elevate the grains which accumulate in the hopper D and discharge them into the grain-trough *d*′.

The grain-trough is provided with means for discharging the grains, such as a spiral conveyer *a*′ of approved construction.

The rear end of the casing A is provided with an air-inlet opening E, and its top portion is provided with a recess E′ for the accommodation of the separating devices.

The bottom *e* of the recess E′ is provided with a large opening *e*′ over the upper end part of the grain-conveyer.

F is a grain-separating chamber secured to the bottom *e*. This chamber is conical in form, and is provided with an inwardly-curved upper portion F′.

G is a conical and spiral screen supported in the chamber F in any approved manner. This screen consists of a long plate or a series of sections coiled spirally into a conical form, the convolutions being preferably vertical and partially overlapping each other.

G′ is a short cylinder secured to the lowest convolution of the screen G, leaving an annular space *g* between it and the bottom edge of the chamber F and the opening *e*′.

H is the casing of the straw-discharger, preferably provided with a conical throat-piece *h*, which is secured to the top of the chamber F. The casing H is provided with a long bearing F′ arranged vertically over the center of the chamber F.

H′ is the centrifugal discharger which is provided with a long hub I encircling the bearing F′ and radial arms *i*, which are preferably provided with projections *i*′ running in the throat-piece *h*. The periphery of the discharger-casing is preferably formed on a volute curve, and the cross-section of the casing increases gradually in area, being largest where it joins onto the delivery-pipe *h*′.

J is a shaft journaled in the bearing F′ and provided with a collar *j* resting on its upper end.

J′ is a belt-pulley secured on the upper end portion of the shaft J and affording a means for revolving it.

K are radial arms secured on the lower end portion of the shaft J, and provided with a disk *k*′ and with upwardly-inclined ends *k* corresponding substantially in inclination with the conical form of the screen G.

Rotary motion is imparted to the shaft J from a belt-pulley M on the cylinder-shaft by a belt *m*, which passes over guide-pulleys *m*′ and around the pulley J′.

The grain-elevator *d* and the spiral grain-conveyer *a*′ are driven from a pulley N on the cylinder-shaft by means of a belt N′, which passes around a pulley *n* on the shaft of the conveyer *a*′ and around a pulley *n*′ of the shaft *o* at the lower end of the grain-elevator.

The straw-conveyer C is driven from a pulley P on the shaft *o* by means of a crossed belt

$p$, which passes around a pulley $p'$ secured on the shaft $o'$ at the lower end of the straw-conveyer.

The gather-board C′ is oscillated by means of an eccentric R on the shaft $o'$ and an eccentric-rod $r'$ pivoted to the said gather-board.

The operation of the machine is as follows: The grain is thrashed out in its passage between the cylinder and concave in the ordinary manner, and the straw is delivered to the separating devices by the straw-conveyer. Most of the grain flies out at the concave and is conducted to the grain-trough by the gather-board and grain-elevator. The centrifugal straw-discharger draws a current of air through the machine, most of the air entering the machine at its rear end through the opening E. The straw, together with the chaff, passes upward through the opening $e'$ and short cylinder G′. The straw is whirled around on the screen G in the chamber F by the arms K, and the grains remaining in the straw are driven out of it by centrifugal force. The straw is whirled into a very loose condition in the chamber F and is assisted in rising therein by the spiral convolutions of the screen. The grains fall through the convolutions of the screen and pass down the annular space $g$ into the lower part of the machine. The straw is turned over at the top of the separating-chamber by the curved portion F′, so that all the grains may drop out of it, and is then drawn through the throat-piece by the straw-discharger and is forced through the delivery-pipe $h'$.

I do not limit myself to the driving mechanism shown, as any approved driving mechanism can be used to impart motion to the various parts of the machine; nor do I limit myself to the use of the thrashing mechanism and the conveyer and the elevator shown, as these parts may be of other approved constructions.

What I claim is—

1. The combination, with a thrashing cylinder, of an upwardly inclined straw conveyer behind the said cylinder, a gatherboard below the said cylinder and conveyer, a grain elevator receiving the grain from the said gatherboard, and centrifugal grain separating devices arranged over the upper part of the said straw conveyer between the cylinder and the upper end of the grain elevator, substantially as set forth.

2. The combination, with the casing of a thrashing machine provided with a recessed portion at its top having an opening in it, of centrifugal grain separating devices secured over the said opening and within the said recessed portion, thrashing devices arranged in one end of the said casing partly above the said opening, and a conveyer operating to receive the straw from the said thrashing devices and to deliver it to the said separating devices, substantially as set forth.

3. The combination, with the casing provided with air inlet openings at its rear end, and a thrashing cylinder and a concave at the front part of the casing; of centrifugal grain separating devices arranged on top of the said casing between the said air inlet openings and the cylinder, substantially as set forth.

4. The combination, with a conical grain separating chamber having an inlet opening at its bottom, of a conical screen formed of spiral convolutions and supported in the said chamber, and revoluble arms for whirling around the straw on the said screen, substantially as set forth.

5. The combination, with a grain separating chamber having an inlet opening at its bottom and an inwardly curved portion at its top, of a conical screen formed of spiral convolutions and supported in the said chamber, and revoluble arms for whirling around the straw on the said screen, substantially as set forth.

6. The combination, with a grain separating chamber having an inlet opening at its bottom, of a conical screen formed of spiral convolutions supported in the said chamber, and revoluble arms provided with inclined end portions corresponding substantially in form with the conical form of the screen, substantially as set forth.

7. The combination, with a grain separating chamber having an inlet opening at its bottom and an outlet opening at its top, of a discharger casing secured to the top of the said chamber and provided with a long bearing depending within the said chamber, a vertical shaft journaled in the said bearing, radial arms secured on the said shaft in the said chamber, and a centrifugal discharger provided with radial arms and a hub secured to the said shaft and encircling the said bearing, substantially as set forth.

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

FRANK F. LANDIS.

Witnesses:
ALF. N. RUSSELL,
GEO. H. RUSSELL.