

(No Model.)

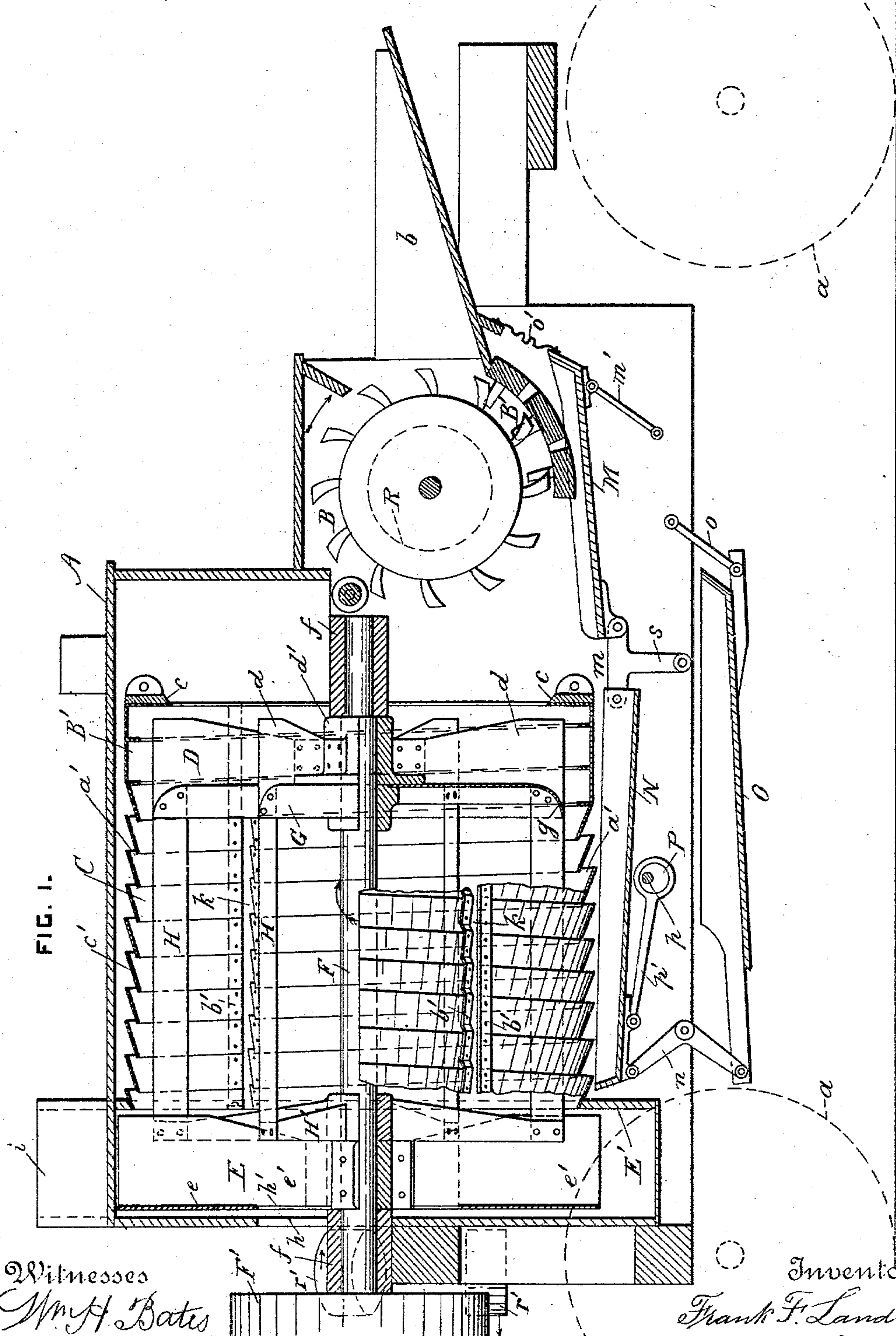
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F. F. LANDIS.
CENTRIFUGAL GRAIN SEPARATOR.

No. 551,492.

Patented Dec. 17, 1895.

FIG. 1.



Witnesses
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(No Model.)

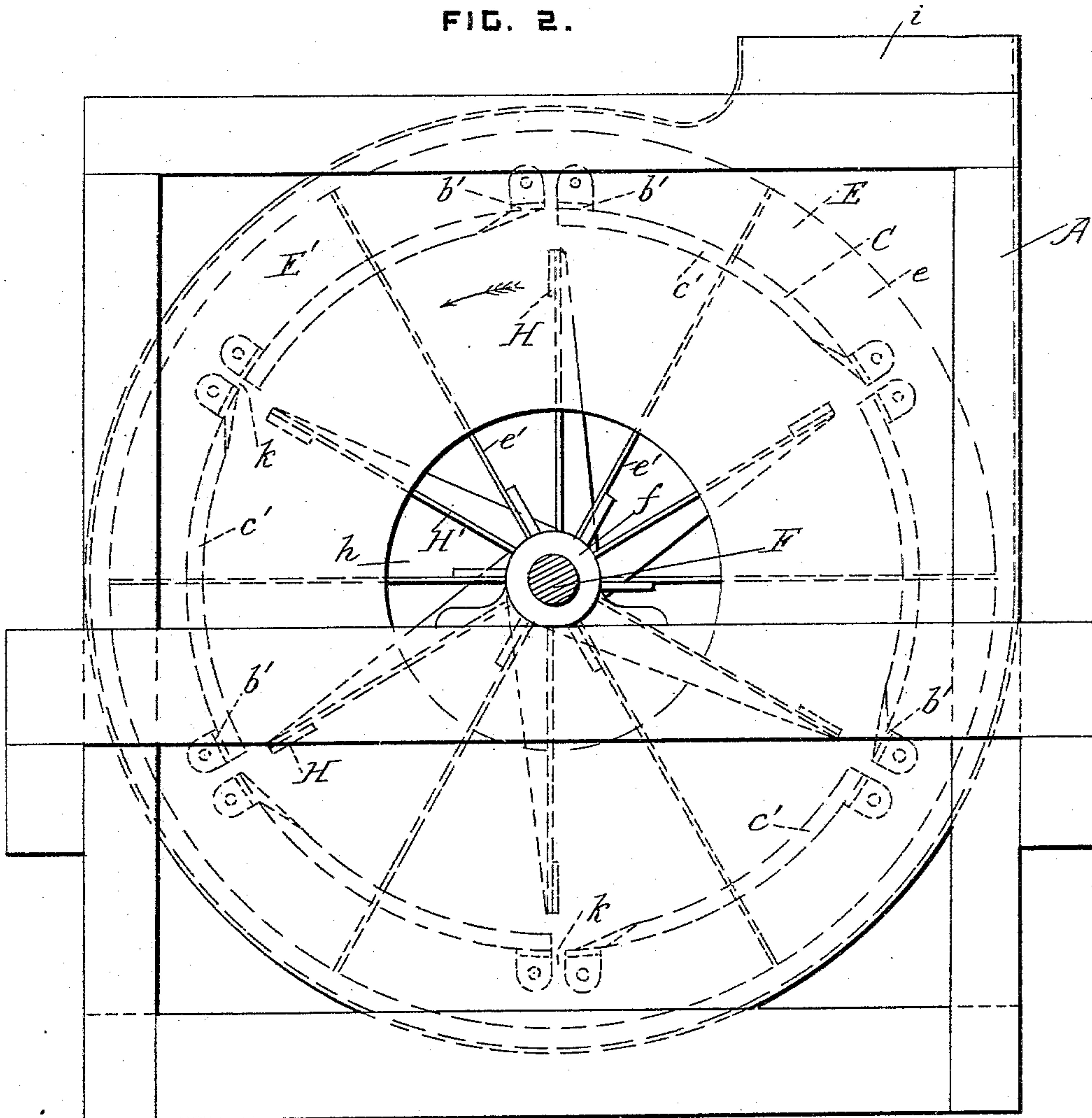
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FIG. 2.



Witnesses

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(No Model.)

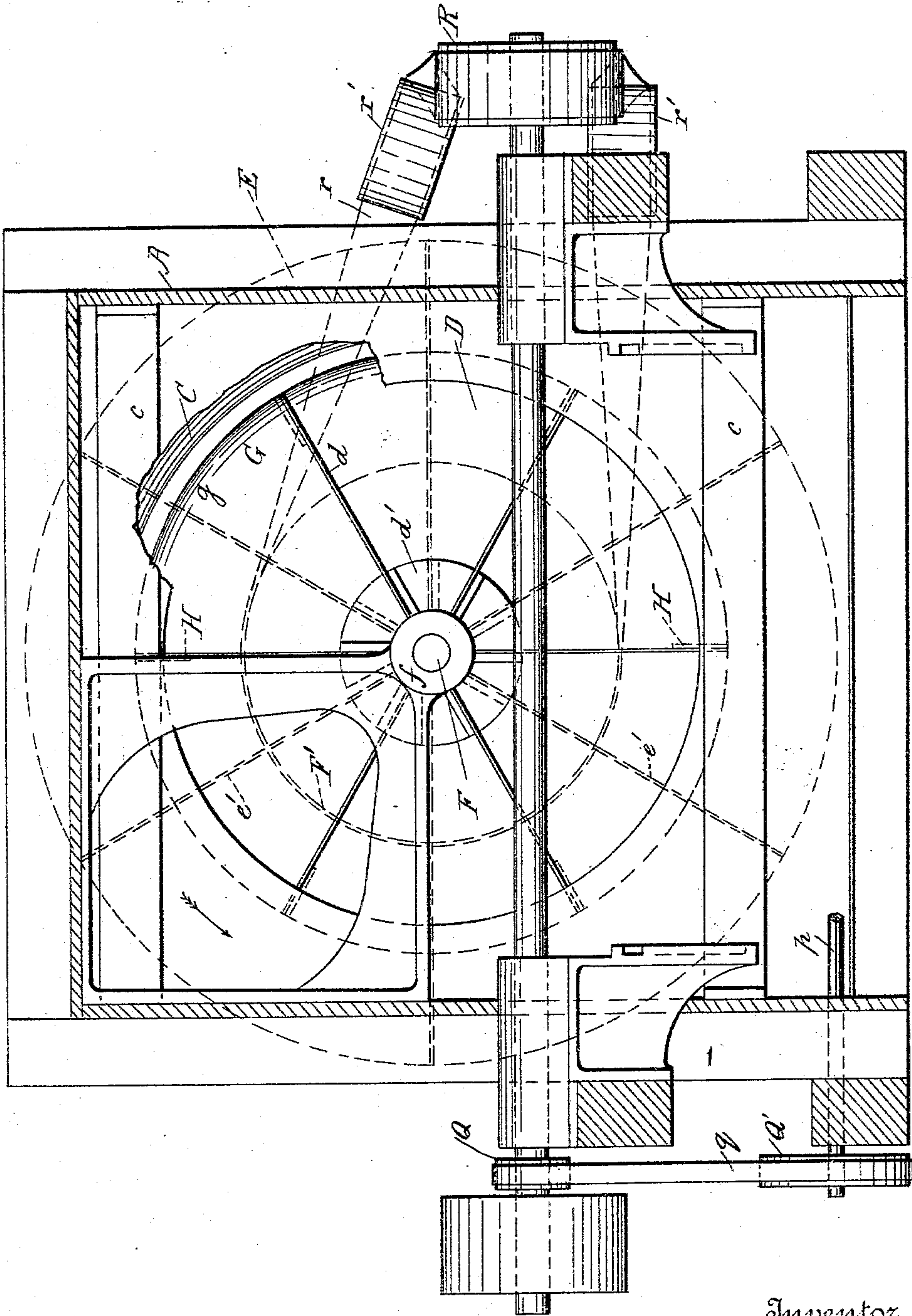
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FIG. 3.



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UNITED STATES PATENT OFFICE.

FRANK F. LANDIS, OF WAYNESBOROUGH, PENNSYLVANIA.

CENTRIFUGAL GRAIN-SEPARATOR.

SPECIFICATION forming part of Letters Patent No. 551,492, dated December 17, 1895.

Application filed July 31, 1895. Serial No. 557,766. (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 grain-separator constructed according to this invention. Fig. 2 is a rear end view. Fig. 3 is a front end view, partly in section.

A is the inclosing case of the machine, which is preferably mounted on wheels *a* of any approved construction. B is the thrashing-cylinder, B' is the concave, and *b* is the hopper for receiving the unthrashed grain. All these parts are of any approved construction, and the grain is thrashed out as it passes between the cylinder and concave.

C is a horizontally-arranged cylindrical chamber supported in the casing A behind the cylinder and concave. The front end of the chamber C is supported by the cross-bars *c*, which are secured to the casing A, and its rear end is secured to the casing E' of the straw-discharger, which will be more fully described hereinafter.

The chamber C is formed of a series of conical rings or convolutions *c'*, which are preferably formed in sections arranged in the form of spirals, narrow longitudinal passages *k* being left between the sections, but if desired the said chamber may be formed of a single continuous plate bent to the form of spiral rings or convolutions. The conical rings *c'* incline inwardly toward the rear of the machine, and preferably overlap each other to a slight extent, leaving narrow circumferential passages *a'* between them. The rings or convolutions *c'* are supported in position by longitudinal bars *b'* secured to the discharger-casing and to the front end portion B' of the chamber C. The edges of the

plates at one end of the sections are preferably bent cylindrical, so that one half of the bars *b'* are straight and the other half bent to fit against the conical portions of the sections, leaving the longitudinal passages *k* between the adjacent ends of the sections. The front end portion B' of the chamber C is cylindrical and is secured to the cross-bars *c*, forming a chamber for the fan D. The fan D is provided with radial arms *d* and a hub *d'*.

F is a central shaft on which the fan D is secured. This shaft is journaled in bearings *f*, which are supported by the framing of the machine in any approved manner. F' is a pulley secured on the shaft F at the rear end of the machine for the purpose of revolving the shaft F and the parts carried by it.

G is a spreading-disk secured on the shaft F, close behind the fan D, and provided with a rearwardly-curved edge *g*.

E is the discharger, consisting of an end disk *e* and radial arms *e'*, secured on the shaft F inside the casing E'.

H are longitudinal bars connecting the arms of the said fan with the arms H' secured on the shaft F between the arms *e'* of the discharger. These bars H revolve in close proximity to the periphery of the chamber C.

The discharger-casing is provided with an air-inlet opening *h* near the shaft F, and the discharger-disk has a corresponding opening *h'*. The discharger-casing is also provided with a delivery-passage *i* at its periphery leading into the discharge-pipe of the stacker, which is not shown in the drawings. The opening *h* in the discharger-casing can be regulated by any approved form of door or shutter.

M and N are two reciprocatory gather-boards. The adjacent ends of these two gather-boards are pivoted to the upper part of a T-shaped link *s*, leaving an open space *m* between the ends of the gather-boards. The gather-board M is arranged in an inclined position under the cylinder and concave, and its front end is pivoted to the casing by two similar links *m'*. The gather-board N is arranged under the chamber C in an inclined position, and its rear end is supported by two similar arms *n* pivoted to the casing. The two gather-boards are inclined toward each other.

A conveyer-board O is pivoted in an inclined position under the open space *m*. The front end of the board O is carried by two similar links *o* which are pivoted to the casing. The rear end of the board O is carried by prolongations of the arms *n* below their pivots.

P is an eccentric secured on a shaft *p* which is journaled in the casing under the gather-board N, and P' is an eccentric-rod operatively connecting the said eccentric with the gather-board N. The shaft *p* is revolved by means of the belt-pulley Q on the cylinder-shaft. A belt *q* passes over the pulley Q and over a pulley Q' secured on the shaft *p*.

The space between the front end of the gather-board M and the under side of the grain-hopper is filled in with a piece of flexible material *o'*, such as canvas. The discharger and fan are driven by a pulley R on the cylinder-shaft, and a belt *r* which passes around the pulley R, over the guide-pulleys *r'*, and around the pulley F' on the shaft F.

The operation of the separator is as follows: Most of the grains fly out from the heads at the concave and pass through the open space *m* between the two gather-boards. A strong current of air is drawn by the fan D through the open space *m*, and all the straw and chaff are drawn into the chamber C by the said fan. The straw is whirled around in the front part of the chamber C by the fan, and passes off in a loose uniform stream around the periphery of the spreading-disk G. The straw is whirled around in the chamber C by the longitudinal bars H, is kept in a loose condition, and is brought in contact with the spiral and conical convolutions *c'*. The spiral form of these rings or convolutions causes the straw to move to the rear, and the grains, which are driven out of the straw by centrifugal force, are deflected by the conical sides of the convolutions, and pass through the passages between the convolutions and between their sections. The discharger also assists in drawing the straw through the chamber C, and draws in air through the passages between the convolutions, so that no chaff is discharged through the said passages. The discharger receives all the straw and chaff from the chamber C and forces it up the delivery-passage to the straw-stacker discharge-pipe.

I do not confine myself to the devices shown for imparting motion to the various parts of the machine, nor to the detailed construction of its component parts, nor to the arrangement of the gather-boards, as these features may be modified in many ways in carrying out the invention.

What I claim is—

1. The combination, with a thrashing cylinder and its concave, of a suction fan arranged behind the said parts, the axis of the said fan being substantially horizontal and opposite to the upper side of the middle portion of the cylinder, and a gatherboard ar-

ranged under the said cylinder and concave, leaving an open air-inlet space between its rear edge and the fan, whereby the grains are permitted to pass down the said space and the straw and chaff are drawn into the lower half of the eye of the said fan, substantially as set forth.

2. The combination, with a thrashing cylinder and its concave, and a suction fan and a grain separating chamber arranged behind the said parts, the axis of the said fan and chamber being substantially horizontal and opposite the upper side of the middle portion of the said cylinder, whereby the straw and chaff are drawn into the lower half of the eye of the fan; of the two gatherboards inclined toward each other and having an open air-inlet space between them under the entrance to the suction fan, and means for supporting and oscillating the said gatherboards, substantially as set forth.

3. The combination, with a cylindrical grain separating chamber having rearwardly and inwardly inclined passages at its periphery for the escape of grains and the inlet of air, of a suction fan arranged at one end of the said chamber, means for whirling around the straw in the said chamber, and a discharger at its opposite end, substantially as set forth.

4. The combination, with a cylindrical grain separating chamber formed of spirally-arranged overlapping plates and having rearwardly and inwardly inclined passages in its periphery, of a suction fan arranged at one end of the said chamber, and a spreading disk secured to the said fan inside the chamber, whereby the straw is drawn in and whirled around in contact with the periphery of the chamber, substantially as set forth.

5. The combination, with a cylindrical grain separating chamber having passages in its periphery, of a suction fan at one end of the chamber, a discharger at its opposite end, a spreading disk inside the chamber, and bars arranged longitudinally in the chamber between the said fan and discharger, substantially as set forth.

6. The combination, with a cylindrical grain separating chamber having passages in its periphery, of a discharger provided with arms and arranged at the rear end of the said chamber, radial supporting arms secured to the discharger and arranged intermediate of its arms, a suction fan provided with arms and arranged at the front end of the said chamber, and longitudinal bars secured to the arms of the suction fan and to the said supporting arms, substantially as set forth.

7. The combination, with a cylindrical grain separating chamber provided with rearwardly and inwardly inclined passages at its periphery for the escape of grains and the inlet of air, and a discharger casing arranged at the rear of the said chamber and provided with an air inlet opening at its rear side; of a shaft passing through the said chamber and casing, means for whirling around the straw, secured

on the said shaft inside the said chamber, and a discharger provided with arms and having a disk at its rear side provided with an air inlet-opening around its center, substantially as set forth.

5 8. The combination, with a cylindrical grain separating chamber formed of conical overlapping rings having passages between them, of a central shaft, a suction fan secured on the front end of the shaft, a discharger secured on its rear end, and bars supported intermediate of the said fan and discharger, for whirling around the straw in the said chamber, substantially as set forth.

15 9. The combination, with a cylindrical grain separating chamber formed of conical spirally-arranged convolutions overlapping each other and having rearwardly and inwardly

inclined passages between them, of means for whirling around the straw in the said chamber, substantially as set forth.

10. The combination, with a cylindrical grain separating chamber formed of sections arranged in the form of conical and spiral convolutions having passages between the 25 convolutions and between the adjacent ends of the sections, of supports for holding the said sections in position, and means for whirling around the straw in the said chamber, substantially as set forth.

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

FRANK F. LANDIS.

Witnesses:

T. S. CUNNINGHAM,

HERBERT W. T. JENNER.