

No. 801,141.

PATENTED OCT. 3, 1905.

A. W. ERICKSON.
GRAIN SEPARATOR.

APPLICATION FILED APR. 13, 1905.

2 SHEETS—SHEET 1.

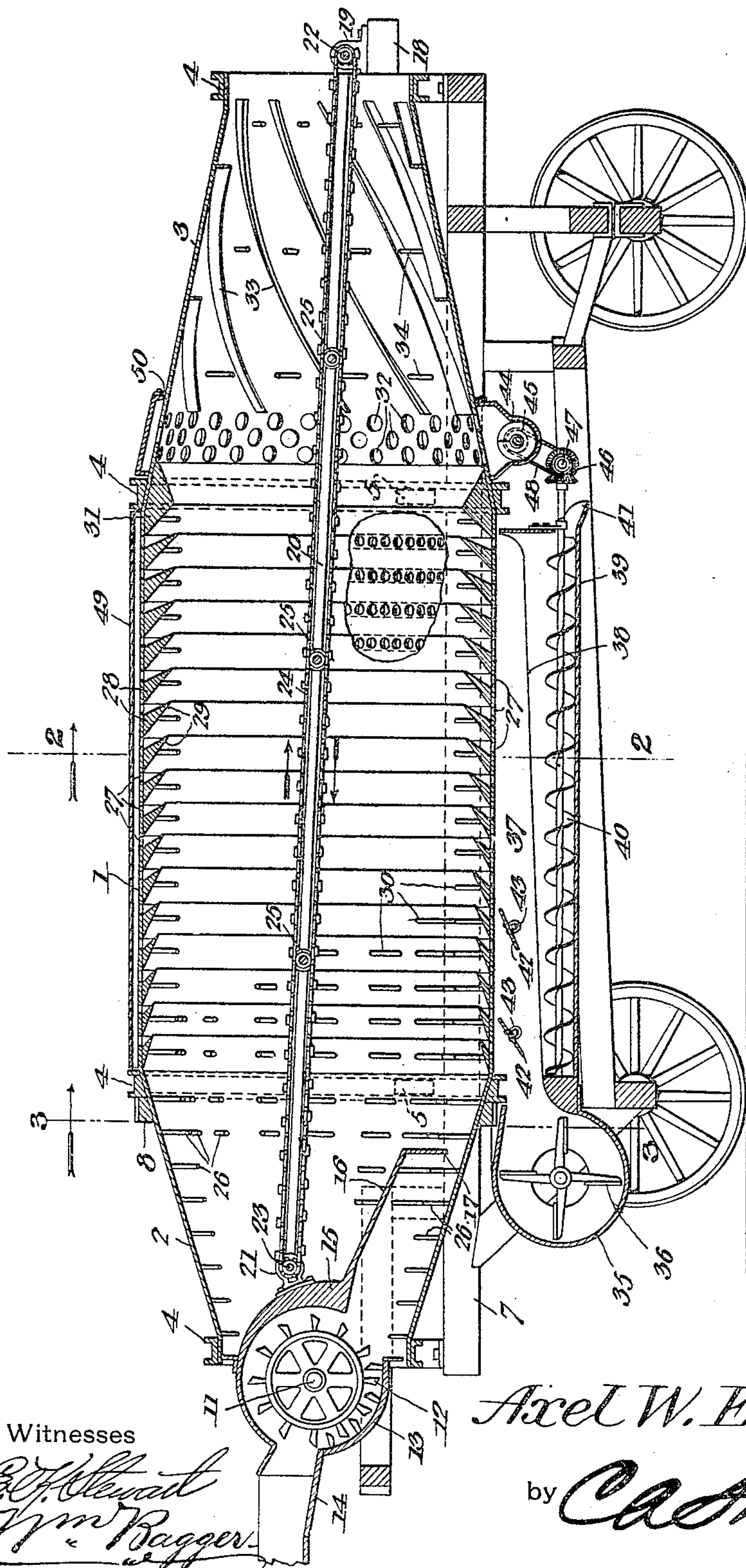


Fig. 1.

Witnesses

E. J. Stewart
J. M. Baggett

Axel W. Erickson,
Inventor,

by *C. A. Snow & Co.,*
Attorneys

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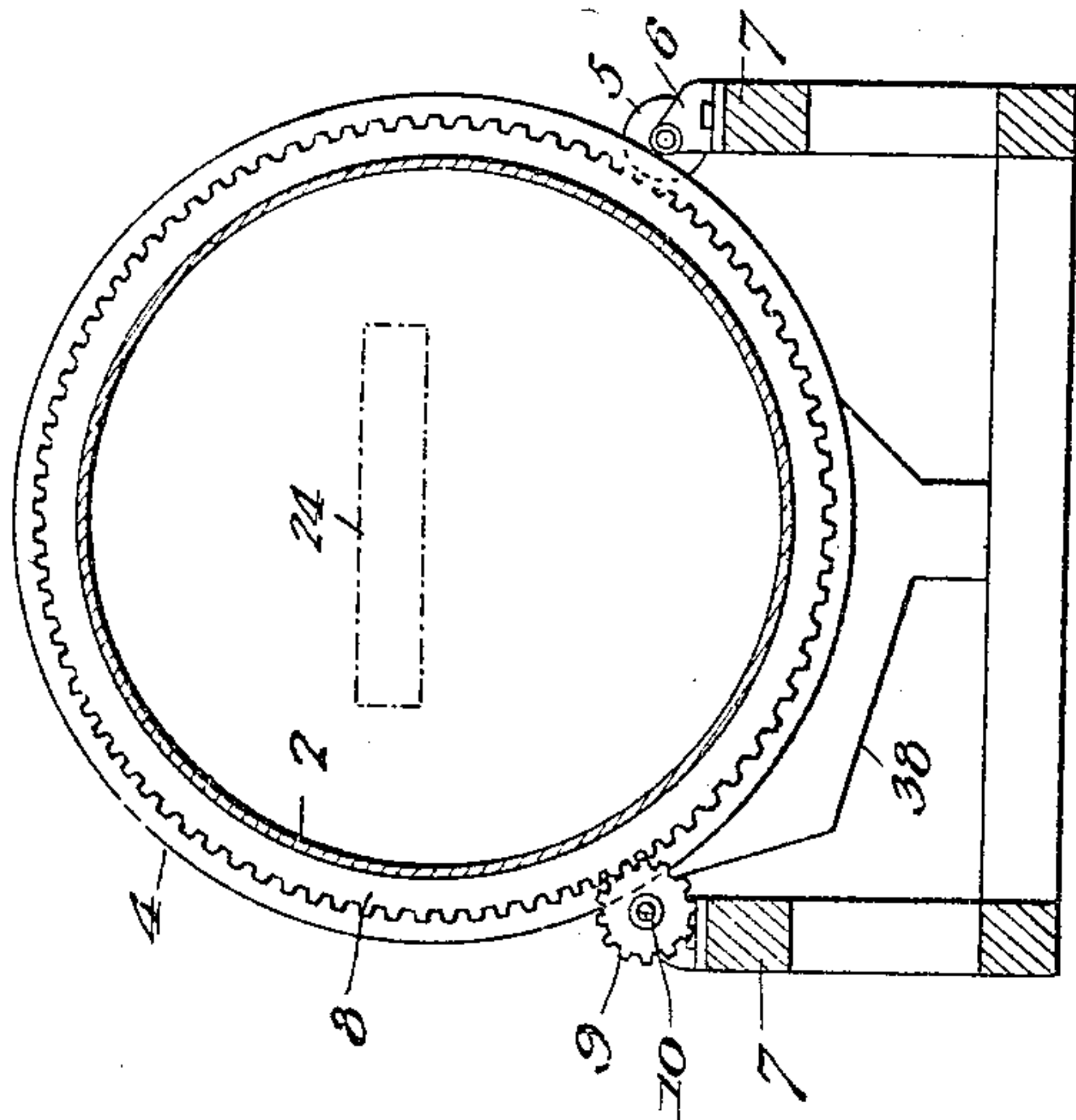


Fig. 3.

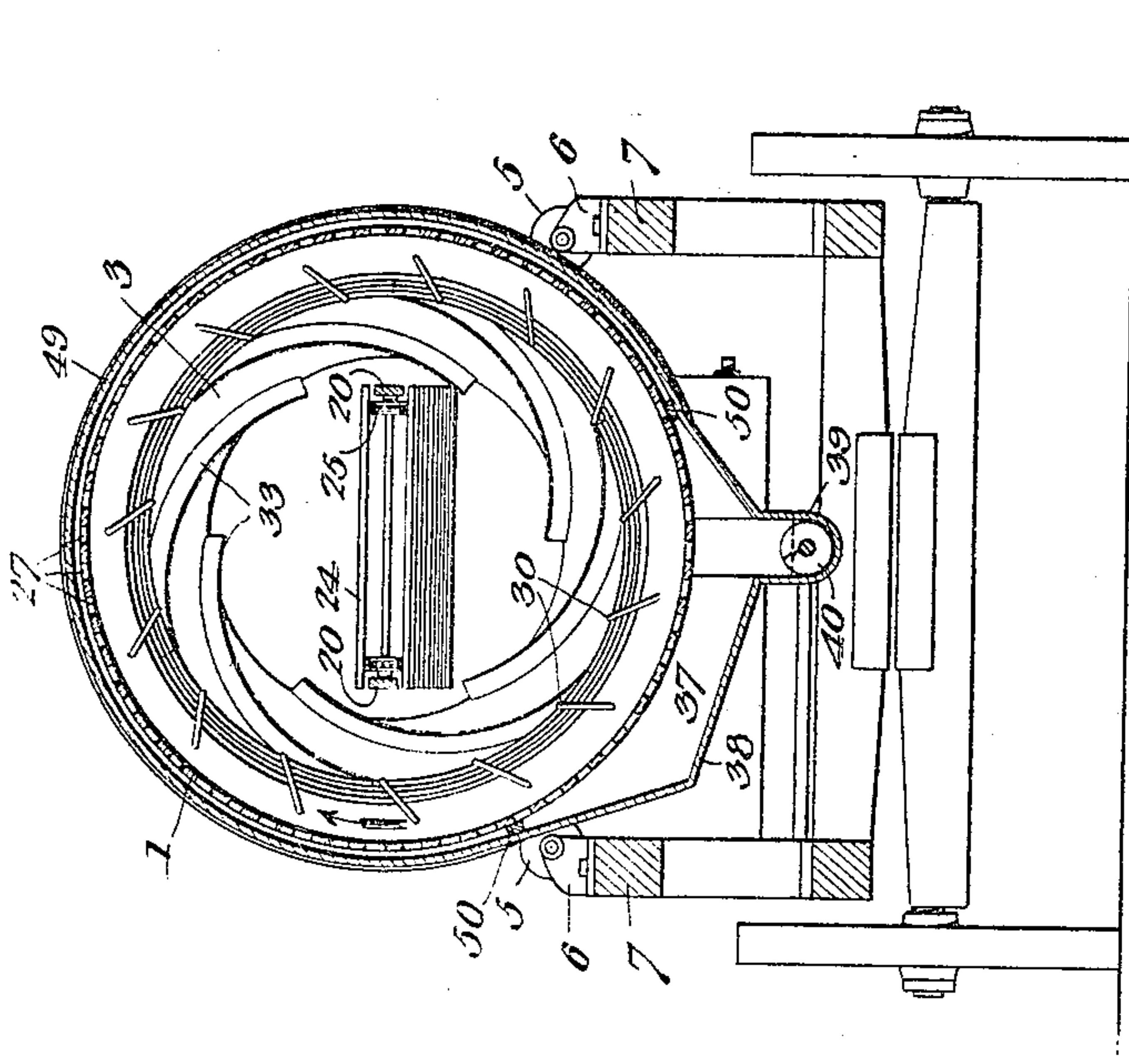


Fig. 2.

Witnesses
E. J. Stewart
Wm. Bagger

Axel W. Erickson,
Inventor,
by *Chas. H. Snow*,
Attorneys

UNITED STATES PATENT OFFICE.

AXEL W. ERICKSON, OF OBERLIN, KANSAS.

GRAIN-SEPARATOR.

No. 801,141.

Specification of Letters Patent.

Patented Oct. 3, 1905.

Application filed April 13, 1905. Serial No. 255,391.

To all whom it may concern:

Be it known that I, AXEL W. ERICKSON, a citizen of the United States, residing at Oberlin, in the county of Decatur and State of Kansas, have invented a new and useful Grain-Separator, of which the following is a specification.

This invention relates to grain-separators; and a principal object of the invention is to increase the life and wearing capacity of this class of machines by the avoidance of reciprocatory or vibratory elements, such as shaking-screens.

Other objects of the invention are to simplify and to generally improve the construction and operation of this class of machines.

With these and other ends in view, which will readily appear as the nature of the invention is better understood, the same consists, primarily, in a rotary body or drum having a screen portion, said drum being adapted to receive material from the threshing mechanism which is located at one end thereof and to effect separation of the grain from the straw and chaff.

The invention further consists in an improved interior construction of the drum, whereby the rearward passage of material shall be facilitated, an endless carrier being supported longitudinally within the drum for the purpose of disposing of the straw, &c.

The invention further consists in the improved construction and novel arrangement and combination of parts, which will be hereinafter fully described, and particularly pointed out in the claims.

In the accompanying drawings has been illustrated a simple and preferred form of embodiment of the invention, it being, however, understood that no limitation is necessarily made to the precise structural details therein exhibited, but that the right is reserved to any changes, alterations, and modifications to which recourse may be had within the scope of the invention and without departing from the spirit or sacrificing the efficiency of the same.

In said drawings, Figure 1 is a longitudinal sectional view of a machine constructed in accordance with the principles of the invention. Fig. 2 is a transverse sectional view taken on the plane indicated by the line 2 2 in Fig. 1. Fig. 3 is a diagrammatic sectional detail view taken on the line 3 3 in Fig. 1.

Corresponding parts in the several figures

are indicated throughout by similar characters of reference.

The drum which constitutes the body of the improved machine is composed of a cylindrical central or intermediate section 1, having tapering front and rear extensions 2 3. This drum is provided with conveniently-disposed grooved annular bands or hoops 4 4, whereby it is supported for rotation upon rollers 5, journaled in bearings or brackets 6 upon a framework 7. Said framework, which has been conventionally shown in the drawings, may be of any suitable construction, and it is to be understood that the supporting means for the rotary drum may be disposed in whichever manner and location that shall be deemed most convenient and suitable for the purpose. The drum has been shown as provided near its front end with an annular spur-gear 8, and this spur-gear has in Fig. 3 been shown in mesh with a pinion 9 upon a shaft 10, which is to be driven from any suitable source of power; but other suitable means may within the scope of the invention be employed for the purpose of imparting rotary motion to the drum, and it is not considered necessary to illustrate particular means for driving the shaft 10.

In or adjacent to the open front end of the drum is supported a shaft 11, carrying the threshing-cylinder 12, which coöperates with the concave 13 to thresh material fed thereto over the feed-table 14. The threshing-cylinder and its related parts, including the hood 15, are obviously to be supported by the frame of the machine independently of the rotary drum. The hood 15, which is located within the section or compartment 2 of the drum, is provided at its lower edge with a rearwardly and downwardly inclined deflector 16, terminating in a depending flange 17. All of these parts, it will be understood, are firmly supported by the main frame of the machine.

The frame 7 is provided at its rear end with rearwardly-extending brackets 18, supporting boxes 19, which are connected, by means of longitudinal bars 20, with boxes 21, supported upon the rear side of the hood 15. The boxes 19 and 21 afford bearings for shafts 22 23, supporting an endless carrier 24, which extends longitudinally through and within the drum, the upper lead of said carrier being preferably supported upon idlers 25. This endless carrier is preferably constructed in the

usual manner of chains spaced and connected by means of slats; but no limitation is made to this particular construction, although an open-work construction, which will admit of the separation of grain from the straw traveling upon the carrier, is to be preferred. No particular means have been shown for driving this carrier, inasmuch as any one of a great variety of means might be employed for this purpose; but it is obvious that the upper lead of said carrier is to travel in a rearward direction, as indicated by an arrow.

Within the compartment 2 of the drum are mounted a plurality of fingers or straw-lifters 26, which are tilted in the direction of the rotation of the drum for the obvious purpose of carrying the material as it passes from the threshing mechanism from under the deflector 16 and placing it upon the upper lead of the endless carrier 24, the drum being rotated at sufficient speed to dispose of the material as fast as it comes from the threshing mechanism. A considerable quantity of the material will drop from the carrier and onto the upper side of the deflector 16 to be guided into the middle compartment of the drum, the object being to toss the material about and separate the particles, so as to permit separation of the grain to be readily effected. The cylindrical middle compartment of the drum is provided throughout the length thereof with perforations 27, disposed in annular series at suitable distances apart, and between said series of perforations are interiorly-disposed annular ridges 28, forming a longitudinal series of obstructions. These ridges are provided with inclined front sides 29, the slope of which gradually increases from the front to the rear end of the compartment, where the said slopes more nearly approximate the perpendicular, while at the front end said slopes more nearly approximate the horizontal. The height of these ridges or obstructions also gradually increases from the front in the direction of the rear end of the machine. These ridges occupy the spaces between the annular series of perforations 27, so that material will be guided over the inclined front sides of said ridges in the direction of said perforations. The ridges are, moreover, of such cross-section that each ridge will overlap the perforations in rear thereof, the rear walls of said ridges being inclined, as will be clearly seen by reference to Fig. 1 of the drawings. It will, however, be understood that the rearward overlap of said ridges may be greater or less than that illustrated in the drawings without departing from the scope of the invention. The interior of the cylindrical compartment 1 is also provided with a plurality of straw engaging and lifting fingers 30, which are tilted in the direction of the rotation of the drum.

At the intersection of the cylindrical com-

partment 1 and the rear tapering compartment 3 of the drum has been shown an interiorly-disposed annular spacing member 31 of triangular cross-section, over which material may pass from the compartment 1 into the compartment 3. The latter is provided with several annular series of perforations 32, forming chaff-openings, and it has interiorly-disposed spiral flanges 33, disposed to feed material in a forward direction—that is to say, in the direction of the chaff-openings. The compartment 3 also has several longitudinal rows of straw-engaging fingers 34, which are tilted in the direction of the rotation of the drum.

The frame of the machine supports beneath the front compartment 2 of the drum a casing 35, containing a fan 36, suitably driven from any convenient source of power and discharging into a compartment 37 beneath the central compartment 1 of the drum and formed by a casing 38, likewise suitably supported by the frame of the machine. The bottom of the compartment 37 constitutes the grain-trough 39, in which a spiral conveyer 40 is suitably supported for rotation. Within the compartment 37, the rear end of which is closed except that it has the discharge-spout 41, are supported a plurality of wind boards or deflectors 42, adjustable by their supporting-shafts 43, so that the direction of the blast may be thereby governed. Beneath that portion of the rear compartment 3 of the drum which is provided with the chaff-openings 32 is supported a transversely-disposed chaff-trough or tailings-trough 44, in which a screw conveyer 45 is supported for rotation. The shaft of the conveyer 40 has been shown as connected by bevel-gearing 46 with a shaft 47, from which motion is transmitted by a chain or belt 48 to the tailings-screw 45; but it is to be understood that any suitable means may be employed for driving these conveyers, as well as any other live parts of the machine.

The entire screen portion of the drum, including the entire cylindrical compartment 1 and the perforated portion of the compartment 3, is covered by a casing 49, which suitably joins the casings 38 and 44. It will be noticed by reference to Fig. 2 that the casing 38 extends much farther on the upgoing side of the drum than on the downgoing side of the latter, for the reason that separation of grain from the straw takes place principally on the upgoing side, as will be readily understood. While it is intended that the hood or casing 49 shall fit so closely against the perforated portion of the drum as to prevent much leakage of air, it is preferred to interpose packing-strips not only between the ends of the casing 49 and the drum, but also between the edges of said casing or hood where they join the edges of the casing 48 and the drum, as shown at 50, said packing to be com-

posed of bands or strips of leather, rubber, felt, or any other suitable material or combination of materials.

The operation of this device will be readily understood from the foregoing description, taken in connection with the accompanying drawings. Material passing from the threshing mechanism will be carried by the fingers 26 in the compartment 2 of the drum from under the deflector 16 and will be thoroughly shaken and agitated, so that the grain will be readily separated from the straw and chaff. As the material passes into the compartment 1 it will be constantly agitated, as will be readily understood, and the straw will be deposited upon the carrier 24 to be thereby conveyed to the tail end of the machine. Within the compartment 1 there is a constant air-current in an upward and rearward direction from the blast set up by the fan, which is directed by the wind-boards 42 through the perforations 27 in that part of the compartment 1 which is in communication with the compartment 37, and it will be specially noted that the air-current is directed not only by the wind-boards 22, but equally or even to a larger extent by the annular ridges 28 within the compartment 1, the rear walls of which overlap or overhang the perforations 27, and it will also be seen that owing to the construction of the ridges, as herein described, the blast at the front end of the compartment 1 will be directed more nearly in a rearward direction than at the rear end, where said blast is directed more nearly in an upward or inward direction toward the axis and upper portion of the cylindrical compartment 1. The heavy particles—that is to say, the grain—will obviously gravitate through the air-current, the force of the latter being properly regulated, and pass through the openings 27 into the compartment 37 to be disposed off by the grain-auger. It is also obvious that the principal separation will take place at the front end of the machine. At the rear end of the compartment 1, where the blast is directed more nearly in an upward direction, the chaff which has not already been carried by the air-current into the compartment 3 will be readily separated from the remaining grain and blown over the separating member 31 into said compartment 3. The straw is disposed of by the carrier 24. Of the material which passes into the compartment 3, which latter, as will be observed, is beyond the influence of the direct blast from the fan, the heavier particles will gravitate through the openings 32 into the tailings-spout, while the lighter particles will be blown out at the tail end of the machine by the air-current passing from the fan through the compartment 37, openings 27, and cylindrical compartment 1. The spirally-disposed flanges 33 will operate to avoid waste by forcing any material that settles upon the inner walls of the compartment 3 in the direc-

tion of the chaff-openings, and these flanges, as well as the fingers 34, will operate to prevent the compartment 3 from being choked by elevating the lighter material and depositing the same upon the straw-carrier.

It will be readily understood that the size, proportion, and exact manner of assemblage of the parts of this improved machine may be greatly varied within the scope of the invention, provided, of course, that the general characteristics are retained.

Having thus described the invention, what is claimed is—

1. A separating-drum supported for rotation, threshing mechanism at one end of said drum, a hood supported within the drum adjacent to the threshing mechanism, an endless carrier extending longitudinally through the drum, supporting means upon the hood for the front end of said carrier, and supporting means independent of the drum for the rear end of said carrier.

2. The combination with threshing mechanism, of a separating-drum supported for rotation, said drum having a cylindrical screen-body and tapering ends; an endless carrier extending longitudinally through the drum; and lifting means within the latter.

3. A separating-drum supported for rotation and having a screen-body provided with annular series of perforations, and rearwardly-inclined ridges connected with the body of the drum and disposed between and completely overlapping said perforations.

4. A separating-drum supported for rotation and having a screen-body and interiorly-disposed rearwardly-inclined annular ridges connected with said screen for rotation.

5. A separating-drum supported for rotation and having a screen-body and interiorly-disposed rearwardly-inclined annular ridges of gradually-increasing height toward the rear end of the drum.

6. A separating-drum supported for rotation and having a screen-body and interiorly-disposed annular ridges with sloping front sides of gradually-increasing slope in the direction of the rear end of the machine.

7. A separating-drum supported for rotation and having a screen-body provided with annular series of perforations and annular ridges disposed between the series of perforations; said ridges being connected with the screen for rotation, and rearwardly inclined to overlap said perforations.

8. A separating-drum supported for rotation and having a screen-body, interiorly-disposed annular ridges, and lifting-fingers tilted in the direction of the rotation of the drum.

9. A separating-drum supported for rotation and having a screen-body provided with interiorly-disposed rearwardly-inclined annular ridges, and means for directing an upward blast through the lower portion of said screen-body.

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10. A separating-drum supported for rotation and having a screen-body provided with interiorly-disposed rearwardly-inclined annular ridges, means for directing an air-current 5 through a portion of said screen-body, and a suitably-supported stationary hood for that portion of the screen-body through which the air-current is not to be directed.

11. A separating-drum supported for rotation and having a screen-body, a grain-compartment communicating with a portion of said screen-body and supported independently of the latter, a hood or casing for that portion of the screen-body which does not 15 communicate with the grain-compartment, packing means between the edges and ends of the hood and the drum, and means for directing an air-blast through the grain-compartment and the screen portion of the drum into 20 the latter.

12. A separating-drum supported for rotation, a hood or casing extending partly around a perforated portion of said drum, a grain-compartment communicating with the perforated portion of the drum unprotected by 25 the hood or casing and isolated from the latter, and rearwardly-inclined interiorly-disposed annular ridges within the drum; and

means for directing a blast of air through the grain-compartment and the perforated portion of the drum. 30

13. A separating-drum supported for rotation and having a screen-body and tapering ends, threshing mechanism supported adjacent to the front end, straw-lifting means 35 throughout the body of the drum, an endless carrier extending longitudinally through the latter, interiorly-disposed spiral flanges in the tapering rear compartment of the drum the latter being provided with chaff-openings, a 40 tailings-spout beneath the latter compartment, a grain-compartment supported beneath the screen-body of the drum, means for setting up an air-blast through the grain-compartment and the screen-compartment, a hood 45 or casing for the latter isolated from the grain-compartment, and air-deflectors within the latter.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in 50 the presence of two witnesses.

AXEL W. ERICKSON.

Witnesses:

F. G. HITCHCOCK,
GEORGE PATTON.