

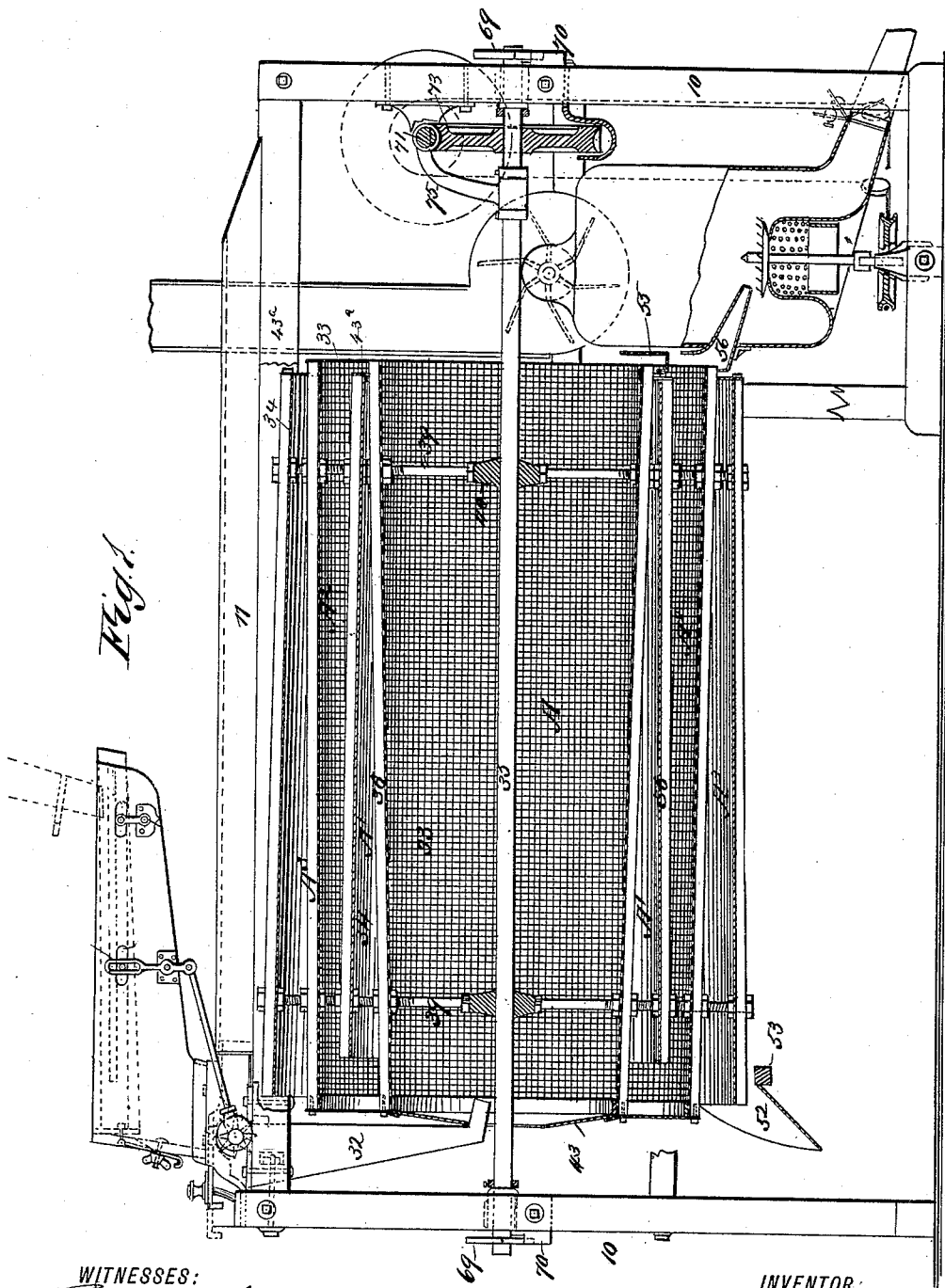
(No Model.)

3 Sheets—Sheet 1.

A. J. ETZOLD.
GRAIN SEPARATOR.

No. 415,709.

Patented Nov. 26, 1889.



WITNESSES:
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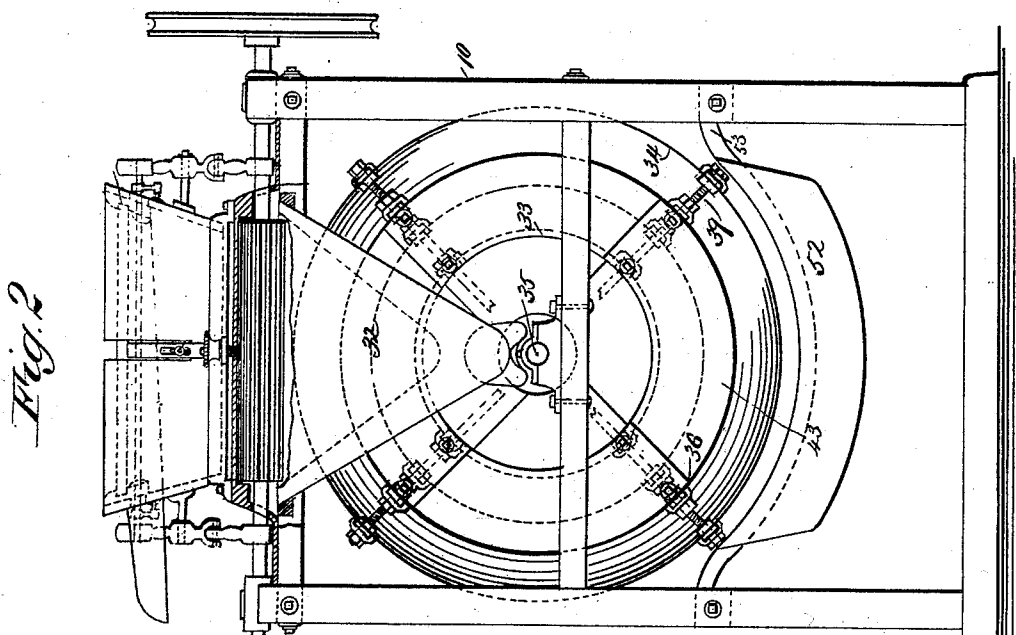
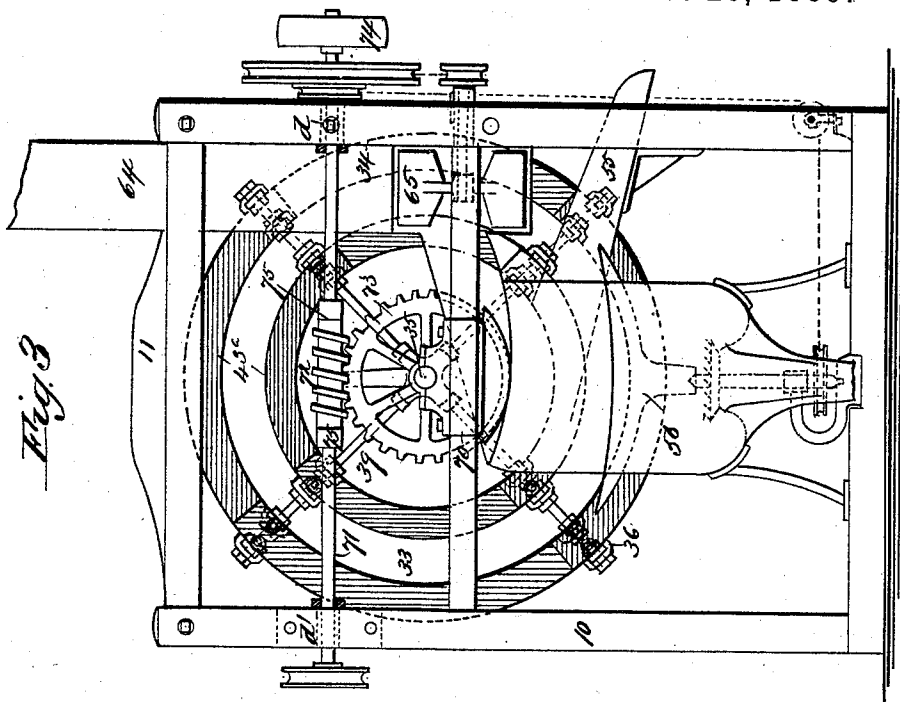
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No. 415,709.

Patented Nov. 26, 1889.



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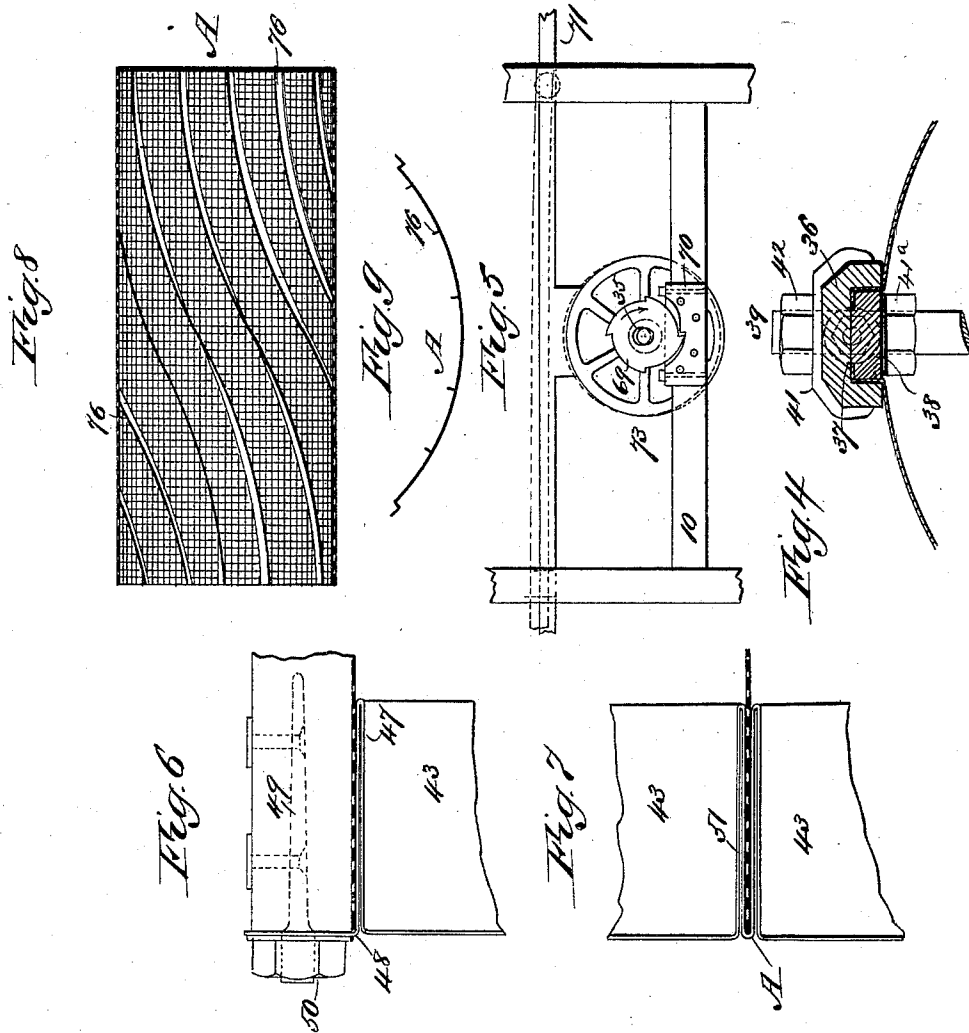
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UNITED STATES PATENT OFFICE.

ALBERT J. ETZOLD, OF DETROIT, MICHIGAN.

GRAIN-SEPARATOR.

SPECIFICATION forming part of Letters Patent No. 415,709, dated November 26, 1889.

Application filed November 6, 1888. Serial No. 290,093. (No model.)

To all whom it may concern:

Be it known that I, ALBERT J. ETZOLD, of Detroit, in the county of Wayne and State of Michigan, have invented a new and Improved Grain-Separator, of which the following is a full, clear, and exact description.

The object of the invention is to provide a grain-separator with the greatest possible area of screens, sieves, or separators, and so construct said screens or sieves that they may be readily cleaned and the chances of the mesh or perforations becoming clogged up reduced to a minimum; and the object of the invention is also to provide a means whereby the screens or sieves and the imperforate drums employed may be quickly and conveniently adjusted, removed, and replaced.

The invention consists in the devices employed and in the novel construction and combination of the several parts, as will be hereinafter fully set forth, and pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar figures and letters of reference indicate corresponding parts in all the views.

Figure 1 is a side elevation, mainly in longitudinal central vertical section. Fig. 2 is a front elevation, parts being broken away. Fig. 3 is a rear elevation, parts being broken away. Fig. 4 is a detail section through a portion of a separating-drum, illustrating the method of securing the same to the rib. Fig. 5 is an enlarged end view of the drum-shaft and its rocking mechanism. Figs. 6 and 7 are detail views illustrating the construction of the separating or screen drum. Fig. 8 is an elevation of one section of a modified form of separating or screen drum, and Fig. 9 is an end view of the same.

In carrying out the invention a suitable frame 10 is provided for the machine, covered at the top by a hood 11, at the forward end of which is located a feed mechanism. (Not claimed herein, and which need not be further described.) Below the feed mechanism a chute 32 is secured for delivering the grain or seed into the inner one of a series of alternately arranged and attached separating and delivery drums 33 and 34. The

separating-drums 33 are composed of perforated sheet-metal or woven wire, and the delivery-drums 34 are constructed of solid sheet metal.

The several separating or screen and the delivery drums are attached one to the other and are readily detachable from the machine.

The separating or screen and the delivery drums are secured to and carried by a horizontal shaft 35, journaled in the frame of the machine, and the combination of the drums and their attachment to the shaft is effected in the following manner: Each separating and delivery drum is made up of a series of longitudinal sections, usually four, united by a corresponding number of ribs 36, provided with a longitudinal groove 37 in the under face and a binding-block 38, loosely fitting in said groove from end to end thereof, as best shown in Fig. 4. Threaded radial arms 39 are passed through the clamping-ribs, one arm near each end, the inner ends of which arms are screwed into tapped sockets in hubs 40, rigidly attached to the drum-shaft, as best illustrated in Figs. 1 and 3. The spaces between the blocks 38 and the sides and bases of the grooves in the ribs form angular ways to receive the correspondingly-shaped flanges on the longitudinal edges of the segmental screen-sections. The ribs are therefore each provided with parallel ways opening on their inner faces. The blocks or bars 38 are supported against inward movement on the rods by the lower nuts 41^a. The inner faces of the blocks or bars are flush with the inner sides of the screen or separator drums, so that unbroken working-surfaces will be presented. A clip 41 is made to embrace the top of the several ribs, the said clip being located upon the radial arm and held in firm contact with the rib by an upper lock-nut 42. Thus the radial arms and clamping-ribs are at all times fixedly secured to the drum-shaft, and any one or all of the drum-sections may be removed and other drum-sections substituted to suit the various requirements of the work. This is accomplished by removing one or more of the nuts 50, to permit the removal of one or more of the flanged drum-cap sections on the front or larger end, and removing as many of said

cap-sections as it is desired to remove drum-sections.

The drums, which are essentially conical, may be arranged in any approved manner, but are preferably grouped as shown, in which the inner drum A is perforated or reticulated and is given a pitch in direction of the rear. The second drum A', surrounding the first or inner drum, is made of solid sheet metal, having a pitch in direction of the forward end of the frame, and the said sheet-metal drum is of shorter length than the reticulated drum and spaced a distance therefrom. A third drum A², similar to the inner drum A, of equal length therewith, and also inclined in direction of the rear, is made to encircle the intermediate sheet-metal drum A', as best shown in Fig. 1. A fourth and outer metal drum A³ is also employed, having an inclination in direction of the front, the said outer drum A³ being slightly shorter than the next drum A².

I desire it to be understood that the form of the drums may be varied, likewise the arrangement, or more or less drums may be employed than is illustrated, without departing from the spirit of the invention.

In the front end of the drums detachable cap-flanges 43 are introduced, closing the end of the inner drum, excepting a circular space around the shaft large enough to admit the end of the chute 32, and also a space between the outer and third drum. In like manner are the spaces on the rear or back end of the drums closed with sectional cap-flanges 43^a between the inner and second and between the third and outside drums. The flanges of the cap-sections are folded upon themselves to produce one inward fold 47, which is brought in contact with the cylinder and an outwardly-extending member 48. This is the construction where the section is to be secured to the clamping drum-ribs, as shown in Fig. 6. A bolt 49 is riveted in the rib, the outer end whereof is threaded, and the flange member 48 is brought in contact with the end of the rib and held by a nut 50, screwed upon the bolt.

The flange-section shown in Fig. 7 illustrates the construction employed when used between the ribs, the said flange being bent upon itself to form a spaced overlapping seamed groove 51, adapted to receive the end of the drum.

At the forward end of the machine a chute 52 is secured to a suitable cross-beam 53 in such manner that it will receive the material discharged from the outer drum, and a second chute 55 is provided at the rear, extending out from the side, so located as to receive the material discharged from the inner drum. Another chute 56 is located at the rear, adapted to receive the material passing out from the third drum. The chute 56 conducts the grain or seed from the drum, and the remaining chutes the impurities. The chute 56 discharges into a cleaning appa-

ratus. (Not claimed herein, and hence not necessary to describe.)

By reference to Figs. 1 and 5 it will be observed that a ratchet-wheel 69 is secured to each outer end of the drum-shaft, which wheels, when revolving, engage with the irregular face of a block 70, secured rigidly to the frame, and cause a jarring motion to be imparted to the drums for the purpose of cleaning them, or when such motion is desirable in the cleaning process. The drum-shaft is driven from a transverse shaft 71, journaled in the frame at the rear and provided with a worm 72, meshing with a worm-gear 73, secured upon the drum-shaft. The worm or drive-shaft is provided with a driving-pulley 74 and other pulleys suitably located for communicating motion to the other shafts, as best illustrated in Fig. 3. An arm 75 is sleeved upon the drum-shaft, and likewise upon the worm-shaft, and serves to hold the worm and worm-wheel in proper position to each other when the ratchet-wheels are in use and the drum-shaft rises and falls. For this reason the bearing *d* of the work-shaft is pivoted and the opposite bearing *d'* is elongated, so that there is a corresponding swing of the shaft upon the pivoted bearing. The ratchet-wheels may be readily detached and removed.

In Figs. 8 and 9 a modified form of the separating-drums is illustrated, in which slight projections or ridges 76 are formed on the length of the sections to accelerate or retard the motion of the grain or seed in its passage through the drums. Accelerating-cylinders may be employed, for instance, where the grain or seed is not very unclean, and yet needs further cleaning. Suppose a standard-size machine of perhaps four or four and a half feet drum length were in use. To effect an economical use of the machine, the grain should be hurried through, and to that end drum-sections are inserted with ridges so formed as to accelerate the movement. On the other hand, if the grain or seed contains an unusual amount of impurities, drum-sections are inserted with the ridges so formed as to retard the progress of the grain or seed through the drums.

The drum illustrated in Fig. 8 is provided with spiral ribs arranged to accelerate the motion of the grain; but when the direction of said ribs is reversed a retarding motion is obtained.

From the foregoing description, read in connection with the drawings, the operation will be readily understood.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a grain-separator, a drum consisting in a series of segmental sections, a circular series of ribs having ways receiving the longitudinal edges of said sections, and removable caps embracing the ends of the drum, substantially as set forth.

2. In a grain-separator, a conical drum

formed of a series of segmental sections, a circular series of ribs having ways receiving the longitudinal edges of said sections, and removable end caps embracing the ends of the drum, the cap at the larger end of the drum being in removable sections corresponding in number and position with the drum-sections, substantially as set forth.

3. In a grain-separator, a drum consisting in a series of segmental sections, a circular series of ribs having longitudinal ways receiving the longitudinal edges of said sections, bolts projecting from the ends of said ribs, removable sectional end caps having apertures through which said bolts pass, and nuts on the bolts retaining said cap-sections in place, substantially as set forth.

4. In a grain-separator, a screen or separator-drum provided with removable screen-sections having ridges on their inner sides and ribs having ways receiving the edges of said sections, substantially as set forth.

5. The combination, with the drum having removable sections and the ribs having ways therefor, of the detachable cap-sections secured to the front end of the drum and having an inward fold contacting with the drum, substantially as set forth.

6. The combination, with the drum having removable sections and the ribs having ways for the edges of said sections, of the detachable cap-sections inclosing the drum ends,

each section being folded twice upon itself to receive one end of the drum-sections, substantially as set forth.

7. A grain-separator comprising the shaft 35, the hubs 40, the rods or arms 39, radiating therefrom, a series of alternating perforated and imperforate drums secured to said arms and each composed of series of circularly-arranged ribs grooved longitudinally on their inner faces and provided with spaced blocks or bars apertured for the said radial arms, nuts on the bars holding said ribs and blocks properly spaced, the removable drum-sections having angular flanges along their edges fitting in the ways formed between said blocks and ribs, the detachable sectional end caps for said drums, and the inlet and outlet chutes, the inner drum being perforated and the outer one imperforate, substantially as set forth.

8. The combination, with the shaft of a separating-drum having ratchets on its ends engaging irregular-faced blocks and a worm-wheel on said shaft, of a worm-shaft having one end held in a pivoted bearing and its other end vertically movable and a spacing-arm sleeved upon the reel-shaft and worm-shaft, substantially as shown and described.

ALBERT J. ETZOLD.

Witnesses:

HERMANN KAUFMANN,
THEODORE W. ETZOLD.