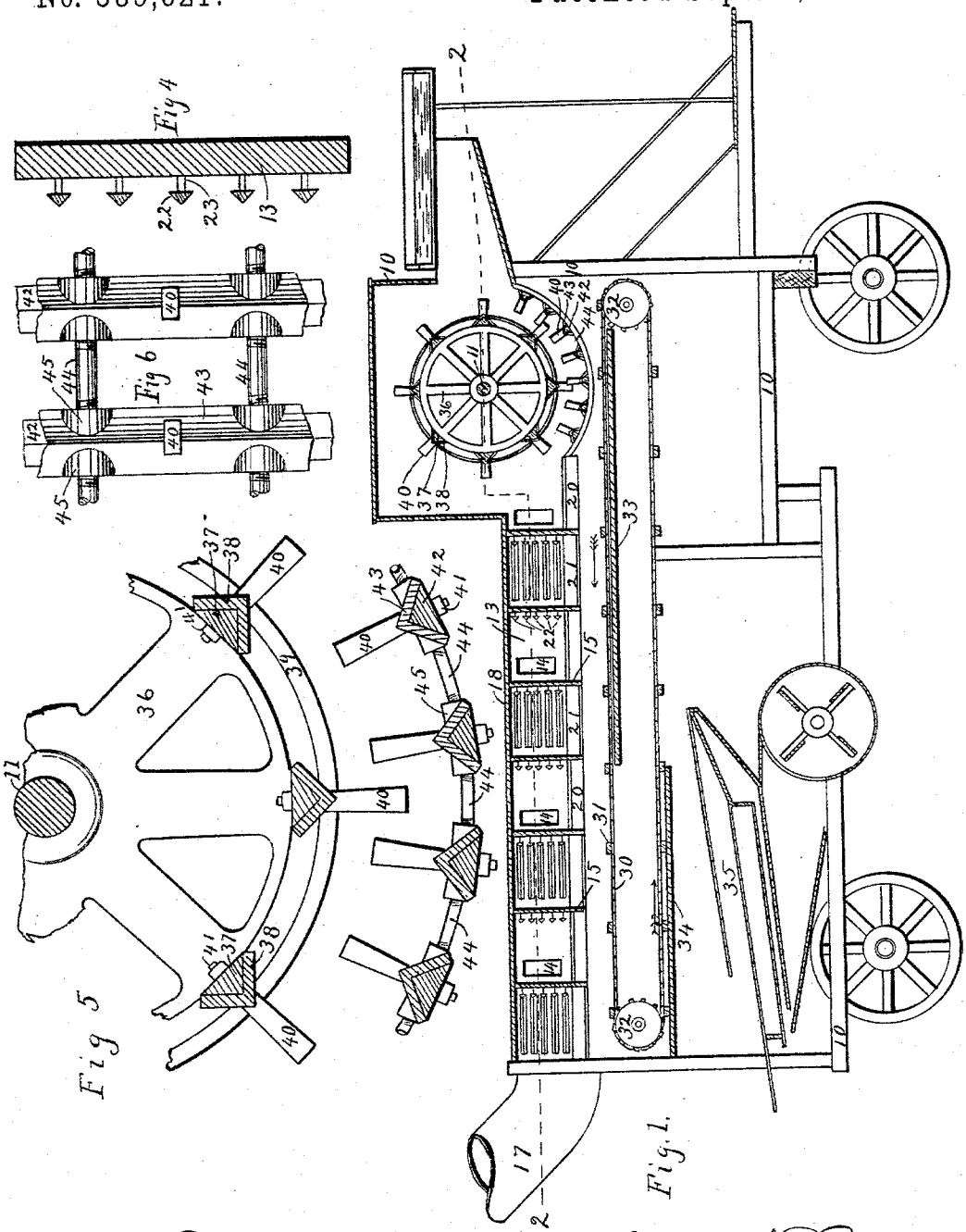
(No Model.) 2 Sheets—Sheet 1.

J. W. RUSSELL.

GRAIN SEPARATOR.

No. 589,621. Patented Sept. 7, 1897.



Witnesses:
John A Brainhall
Jas. Barels.

Inventor: James W. Russell,
By Thomas G. and J. Ralph Orwig,
Attorneys.

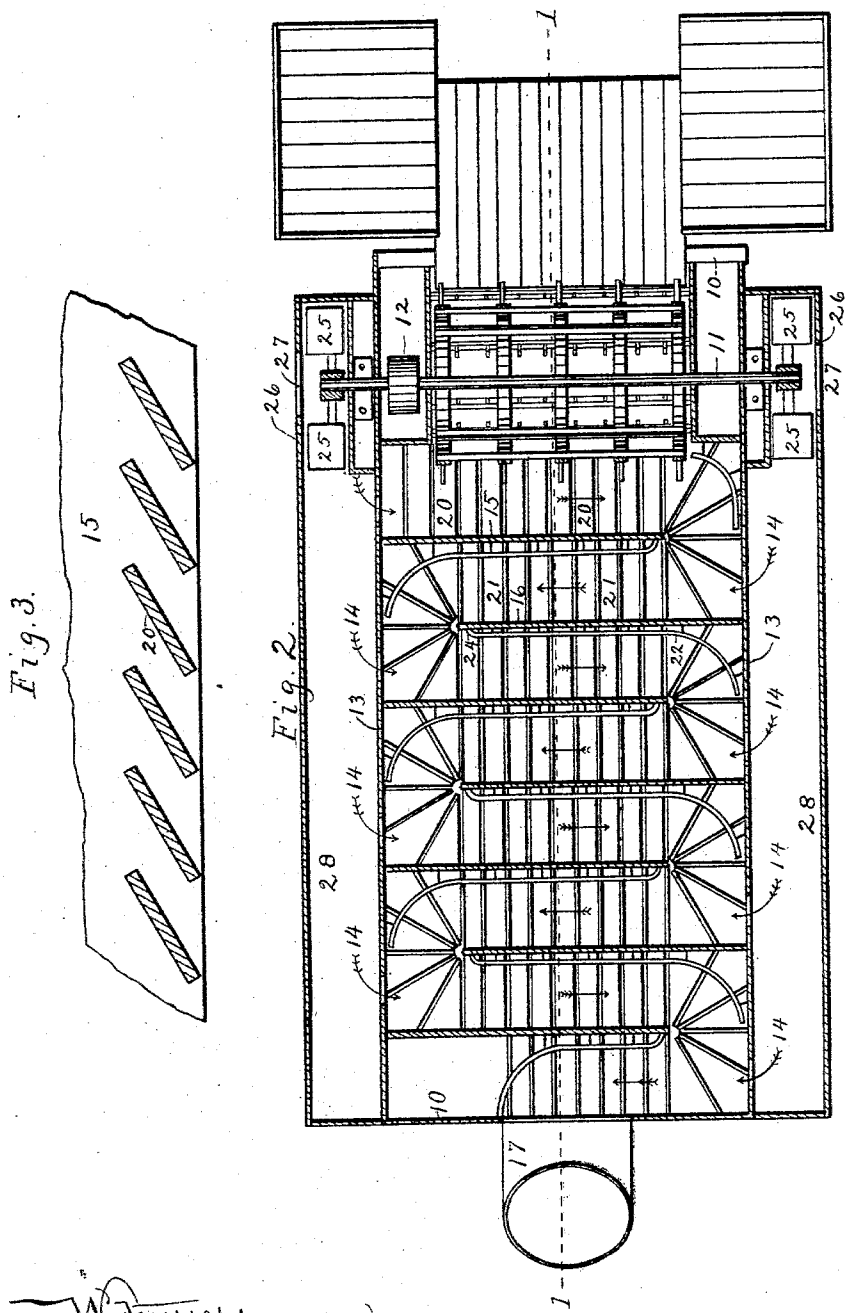
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(No Model.) 2 Sheets—Sheet 2.

J. W. RUSSELL.

GRAIN SEPARATOR.

No. 589,621. Patented Sept. 7, 1897.



Witnesses:
J. A. Bramhall.
Jas. Barels.

Inventor: James W. Russell,
By Thomas G. and J. Ralph Orwig,
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THE NORRIS PETERS CO., PHOTO-LITH., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

JAMES W. RUSSELL, OF NEWTON, IOWA.

GRAIN-SEPARATOR.

SPECIFICATION forming part of Letters Patent No. 589,621, dated September 7, 1897.

Application filed February 19, 1897. Serial No. 624,137. (No model.)

To all whom it may concern:

Be it known that I, JAMES W. RUSSELL, a citizen of the United States, residing at Newton, in the county of Jasper and State of Iowa, have invented a new and useful Grain-Separator, of which the following is a specification.

My object in this invention is primarily to provide means of simple, cheap, and durable construction, whereby chaff and grain may be conveyed from the threshing-cylinder to the rear end of the machine and during its passage to be violently agitated and shaken up, so that all the grain and heavy substances may fall through the bottom of the device in which the grain is carried and the chaff be discharged at the rear end of the machine, and, further, to produce this result without the use of reciprocating or oscillating carrying devices, such as are employed in similar machines, and which violently shake the machine-frame and are usually very noisy.

My object is, further, to provide means to act in conjunction with said separating means and designed to convey the separated grain to the sieves.

A further object is to provide an improved cylinder and concave in which the teeth are detachably connected and are all alike, so that only one kind or style of teeth need be kept on hand, and when a tooth in either the cylinder or concave is broken the same tooth can be put in either of said places.

My invention consists, primarily, in the construction, arrangement, and combination of parts, whereby the grain and chaff from the threshing-cylinder may be conveyed to the rear end of the machine and at the same time violently agitated by means of a series of blasts of air.

My invention consists, further, in the arrangement and combination of the various parts of the machine, whereby this idea is carried into effect and a complete operative machine is provided.

My invention consists, further, in the construction of the cylinder and concave and in the construction of the teeth and in their arrangement and combination with the cylinder and concave, as hereinafter set forth, pointed out in my claims, and illustrated in the accompanying drawings, in which—

Figure 1 shows a vertical longitudinal sectional view of a complete threshing-machine, taken through the line 1 1 of Fig. 2. Fig. 2 shows a horizontal sectional view taken through the line 2 2 of Fig. 1. Fig. 3 shows an enlarged detail sectional view of a portion of the bottom of one of the passage-ways through which the grain and chaff is forced to the rear end of the machine. Fig. 4 shows an enlarged detail sectional view illustrating one of the transverse partitions in the threshing-machine to form a passage-way for the grain and chaff and also showing the arrangement thereon of the guide-bars. Fig. 5 shows a detail perspective view of a portion of the cylinder and concave to show the construction thereof and the method of attaching the teeth thereto.

In the accompanying drawings, the reference-numeral 10 is used to indicate the machine-frame.

The shaft of the cylinder is indicated by the numeral 11 and has a belt-wheel 12 thereon, whereby it may be rotated by a belt connected with the source of power.

The numeral 13 indicates solid side pieces extending from the cylinder to the rear end of the machine and having a number of openings 14 therein, for purposes hereinafter set forth.

The numeral 15 indicates a partition extending from one of the side pieces 13 to a point some distance from the side pieces 13 on the opposite side, and the numeral 16 indicates a similar partition leading from the side pieces 13 to a point near the opposite side piece 13 in a reverse manner from the partition 15. By this arrangement a continuous passage is provided around the end of the partition 15 and then transversely of the machine-frame around the opposite end of the partition 16. This arrangement of partitions is continued throughout the entire length of the machine to a pipe 17, through which the chaff is discharged. The sinuous passage thus formed has a solid top 18, and its bottom is slatted so that the grain may pass through it, and is constructed as follows.

The reference-numeral 20 indicates slats fixed to the lower end portion of the partition 15 and extended at an angle of approximately forty-five degrees. The slats 21, which

are fixed to the opposite side of the partition, are of the same construction but are slanted in an opposite direction, so that in each of the passage-ways, or rather in the entire passage-way, the slat bottom will incline in the direction of the travel of the chaff and grain over it. It will be obvious that this arrangement will prevent any considerable amount of the wind-pressure from escaping downwardly, and at the same time any grain that passes to the bottom of the straw or chaff may freely pass through the slat bottom; and it is obvious, further, that the incline of the slats on the bottom will give to the air-blasts an outward direction and thereby the straw and chaff will be held elevated from the bottom or at least will be forced upwardly from the bottom and violently agitated during its entire passage.

I have provided guide-bars on the sides of the partitions and extended around the ends or turns of the passage-way to prevent the straw or chaff from accumulating in the corners and at the same time to permit the grain to pass through the bars and to descend through the slat bottom. These guide-bars 22 are preferably triangular in cross-section and supported some distance from the partition by means of the rods 23. At one end these bars are curved at 24 and fixed to the end portion of the partition, and at the other end they are curved to protect the corner of the passage-way.

By this arrangement and combination of parts it is obvious that a continuous and sinuous passage is provided from the cylinder through the entire length of the machine to a discharge-pipe at the rear end of the machine and that this passage-way is inclosed on all sides except the bottom which is arranged to prevent the escape of wind and yet permit the grain to pass in the manner hereinbefore described. Each of the corners in this sinuous passage-way is protected by means of guide-bars, so that no straw or chaff may accumulate therein and at one end of each portion of this sinuous passage-way there is an opening 14, through which a blast of air is discharged to force the contents of the passage-way to the other end of the particular section.

In practice it will be noted that there will be two forces at work upon the straw or chaff in any particular section of the passage-way, the one being the direct pushing power of the blast of wind at one end and the other being a force of suction caused by the rapid flow of a current of air through the adjoining section of the passage-way. This will obviously prevent the accumulation of the straw or chaff in one point in the passage-way. I produce the air-blast for moving the straw or chaff in this passage-way as follows: The numeral 25 is used to indicate a rotary fan fixed to the end of the shaft 11. 26 indicates a casing in which the said fan is inclosed and provided with an opening 27, through which air is admitted to the interior of the fan-casing. The numeral 28 indicates a pipe or conduit leading from the fan-casing horizontally along the side of the threshing-frame adjacent to the said sinuous passage. The aforesaid openings 14 are provided so that the air-blast produced by said fan may enter the sinuous passage at the proper points. These openings 14 are so arranged and proportioned relative to the size of the fan and of the pipe or conduit that each one of said openings will supply a current of wind of approximately the same strength or force. A similar fan and conduit is located on the opposite side of the machine.

I have provided an endless conveyer, composed of the chains 30 and the cross-pieces 31, to move in a horizontal plane over the sprockets 32, which are placed at opposite ends of the machine-frame, and which are driven by power derived from the cylinder-shaft.

33 indicates a flat platform supported in a horizontal plane directly under the upper portion of the endless conveyer and extended from a point beneath the concave to a point near the rear end portion of the machine-frame.

34 indicates a like platform extending from the rear end of the machine-frame forwardly a short distance and directly beneath the endless conveyer.

When the conveyer travels in the direction indicated by the arrows indicated in Fig 1, any grain that has dropped to the platforms 33 and 34 will be conveyed to the ends of said platforms and dropped downwardly at the forward end of the platform 34.

35 indicates a series of sieves, which may be of any ordinary construction and which are located directly beneath the end of the platform 34 to receive the grain therefrom.

I shall next describe the construction of the concave and cylinder. These may be seen best in Fig. 5.

The reference-numeral 36 indicates a spider fixed to the shaft 11. 37 indicates a wooden bar triangular in cross-section and 38 an angle-iron fixed to the wooden part 37. These parts extend longitudinally of the cylinder and parallel with the shaft. They are held to the spiders by means of the inclosing bands 39 in the ordinary way.

The numeral 40 is used to indicate a tooth screw-threaded at its one end and designed to pass through the angle-iron 38 and the angular bar 37 and be held in place by a nut 41 on its inner end.

The concave is formed by means of a series of triangular wooden bars 42, extended parallel with the axle of the cylinder, and each having an angle-iron 43, placed on its upper face. The teeth constructed exactly like the one just described are extended through these parts 42 and 43, and a series of screw-threaded rods 44 are provided to enter the screw-threaded lugs 45, formed on the edges of the

angle-irons. By this arrangement a simple, cheap, strong, and durable cylinder and concave is provided, and the same kind of teeth may be used to replace any of the teeth in the cylinder or concave that have become broken.

What I claim as new, and desire to secure by Letters Patent of the United States therefor, is—

1. In a grain-separator, the combination with a threshing device, of a tortuous passage-way extending transversely of the machine and leading to a point of discharge, means for producing an air-blast, and discharging said air-blast into the passage-way at each turn or bend thereof, and a bottom in said passage-way through which grain may pass.

2. In a grain-separator, the combination of a threshing device, a passage-way leading therefrom to a point of discharge, and having a number of bends or turns therein, a slatted bottom in said passage-way, arranged as shown and described, a means for producing an air-blast, and for discharging said air-blast into the passage-way at each turn or bend thereof, for the purposes stated.

3. In a grain-separator, the combination of a threshing device, a passage-way extending therefrom backwardly and forwardly transversely of the machine, a bottom in said passage-way, composed of slats arranged as shown and described, guide-bars arranged in said passage-way as shown and described, a fan at each side of the machine, means for operating said fans, and conduits leading from said fans, and opening into the said passage-ways at each of the bends or turns therein, substantially as and for the purposes stated.

4. In a grain-separator, the combination of a threshing device, a passage-way extending therefrom backwardly and forwardly transversely of the machine, a bottom in said passage-way, composed of slats arranged as shown and described, guide-bars arranged in said passage-way as shown and described, a fan at each side of the machine, means for operating said fans, and conduits leading from said fans, and opening into the said passage-ways at each of the bends or turns therein, an endless conveyer arranged to travel in an approximately horizontal plane beneath the said passage-way, a platform under the upper part of said endless conveyer, to extend from a point beneath the threshing device to a point near the rear end portion of the machine, another platform beneath the rear end of the under part of the endless conveyer, to extend from the rear end of the machine forwardly, means for operating said conveyer, and a sieve located beneath the forward end of the latter platform.

5. In a threshing-machine, a grain-separator, having a tortuous passage-way through which the straw and chaff must pass, and a device for forcing air into said passage-way at each of its turns, the combination of guide-rods fixed to the side walls of the passage-way, and supported at some distance therefrom, and curved around the corners of said passage-way, substantially as and for the purposes stated.

JAMES W. RUSSELL.

Witnesses:
H. W. GOODWIN,
C. RUSSELL.