No. 649,543. Patented May 15, 1900.

W. E. LARMON.

DEVICE FOR CLEANING GRAIN.

(Application filed Dec. 22, 1899.)

(No Model.) 2 Sheets—Sheet 1.

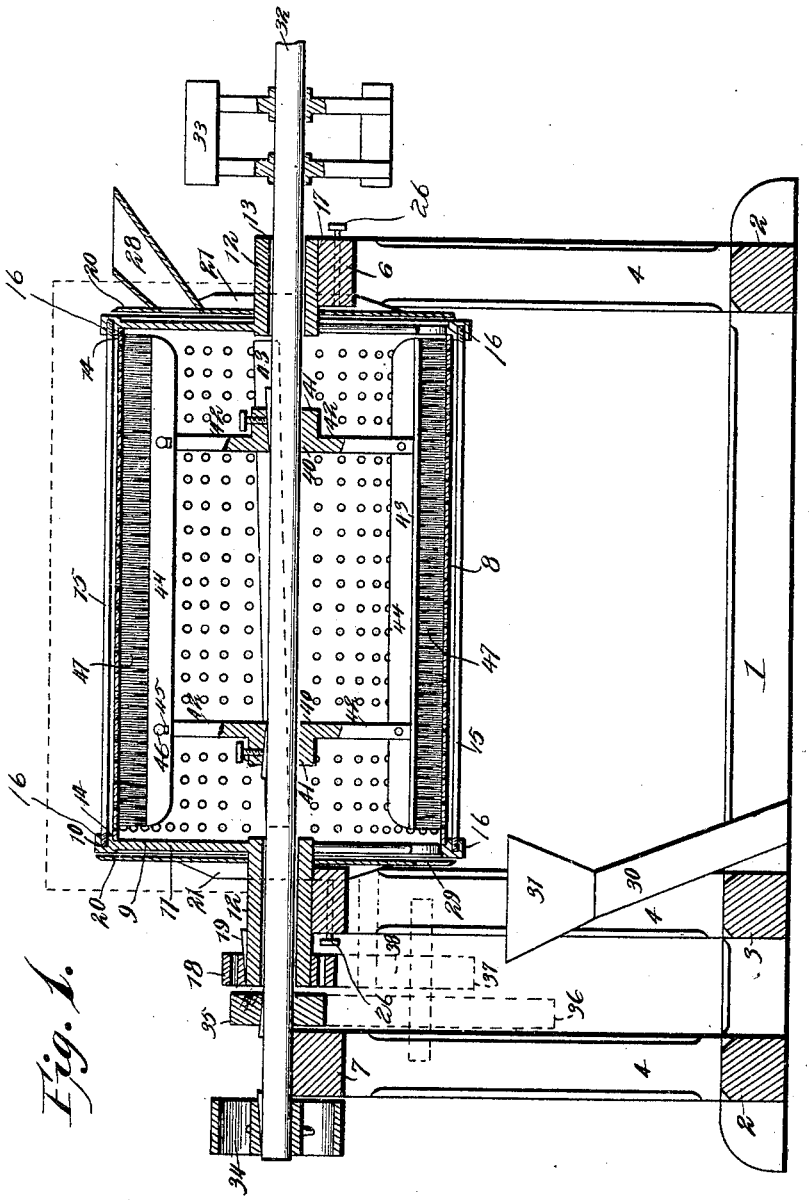

Fig. 1.

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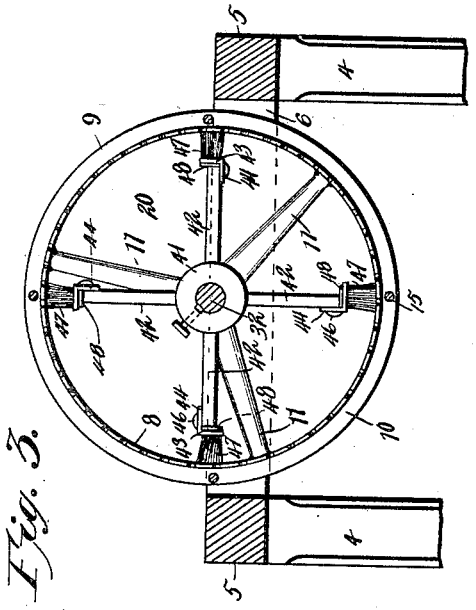

Fig. 3.

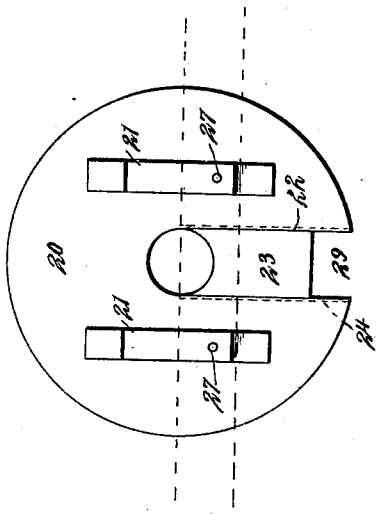

Fig. 4.

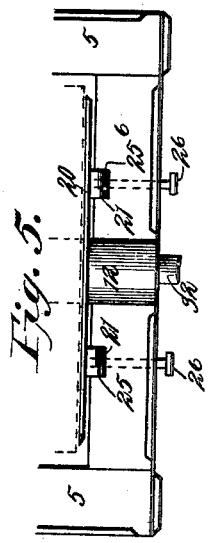

Fig. 5.

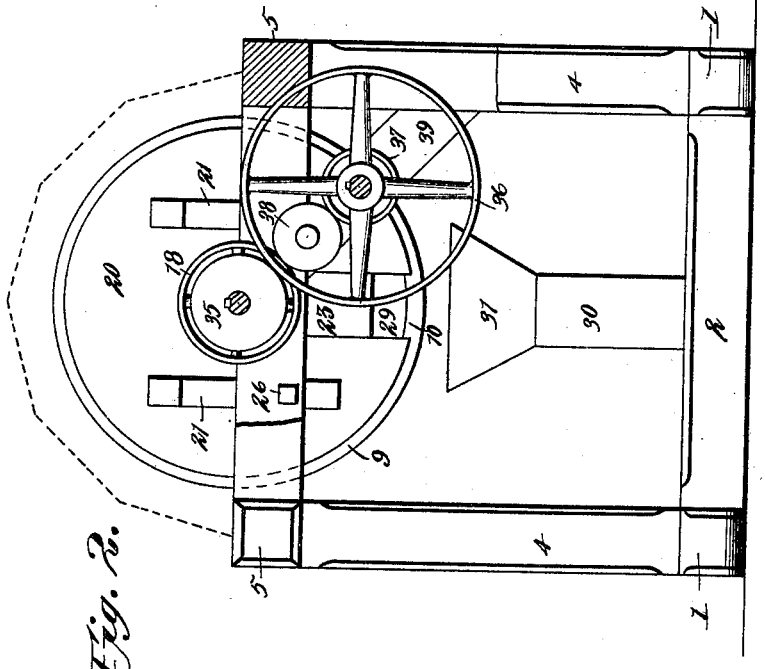

Fig. 2.

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UNITED STATES PATENT OFFICE.

WILLIAM EUGENE LARMON, OF ALVATON, KENTUCKY, ASSIGNOR OF ONE-HALF TO HUGH LARMON, OF BOWLING GREEN, KENTUCKY.

DEVICE FOR CLEANING GRAIN.

SPECIFICATION forming part of Letters Patent No. 649,543, dated May 15, 1900.

Application filed December 22, 1899. Serial No. 741,299. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM EUGENE LARMON, a citizen of the United States, residing at Alvaton, in the county of Warren and State of Kentucky, have invented a new and useful Device for Cleaning Grain, of which the following is a specification.

My invention is an improved grain separator and cleaner, one object of my invention being to provide a cheap, simple, and efficient grain separator and cleaning machine which is adapted to remove smut, cheat, chaff, dirt, and the fuzz which grows on the end of the grain.

A further object of my invention is to provide a grain-cleaning machine which may be operated independently or in milling in conjunction with the common type of grain-scouring machine.

To these ends my invention consists in the peculiar construction and combination of devices hereinafter fully set forth, and particularly pointed out in the claims.

In the accompanying drawings, Figure 1 is a vertical longitudinal central sectional view of a grain cleaning and separating machine embodying my improvements. Fig. 2 is an end elevation of the same, partly in section. Fig. 3 is a vertical transverse sectional view taken through the cylinder. Fig. 4 is a detail elevation of one of the closer-heads for the cylinder. Fig. 5 is a detail top plan view of the same, showing the means for securing the closer-head to the machine-frame.

A pair of sills 1 are connected together at their ends by cross-bars 2 and near the discharge end of the machine by a cross-bar 3. Vertical standards 4 rise from the said sills at the points where they are joined to the cross-bars, the said standards serving to support a pair of plate-bars 5, which are connected together by the cross-bars 6 and a cross-bar 7, which is located at the extreme discharge end of the machine-frame.

A separating-cylinder 8, which is made of suitable sheet metal, is provided throughout its extent with openings which are not sufficiently large to permit the passage of grain through them, but which are sufficiently large to admit of the discharge of the chaff, cheat, smut, fuzz, dirt, and other foreign substances. The cylinder is provided at its ends with heads 9, each of which constitutes a rim 10, a series of radial spokes 11, and a central hub portion which is elongated on its outer side to form a trunnion or bearing 12 for one end of the cylinder. The said trunnion or bearing is bored throughout its length, as at 13. On the inner opposing sides of the rims 9 of said cylinder-heads are formed annular shoulders 14, against which the ends of the barrel of the cylinder are seated, and said cylinder-heads are connected together and secured on the ends of the barrel of the cylinder by longitudinal tie-rods 15, which are provided at their ends with right and left hand screw-threads 16, which engage similarly-threaded openings in the rims of the cylinder-heads. The trunnions 12 are seated in bearings 17 on the cross-bars 6, and thereby the cylinder is adapted to rotate, and the trunnion 12 at the discharge end of the cylinder is lengthened sufficiently to receive a friction-wheel 18, which is keyed thereto, as at 19.

The open ends of the cylinder are closed by closer-heads 20, which are circular in form and are preferably made of sheet or plate metal of suitable thickness. On the outer side of each closer-head is secured a pair of vertical parallel stiffening-ribs 21, which are rectangular in cross-section, and each of the said closer-heads is bored centrally to receive the trunnions 12 and is provided with a vertical opening 22 of sufficient width to clear the trunnion and allow the said closer-heads to be placed opposite the ends of the cylinder and removed therefrom without having to displace the cylinder from its bearings. The openings 22 receive gates 23, each of which comprises a plate of metal of the same thickness as the closer-heads and has its sides angled and adapted to enter grooves 24 in the sides of the openings 22. The said plates or gates 23 are permanently secured to the inner sides of the cross-bars 6 at the center thereof, and the ribs 21 of the closer-heads 20 when said closer-heads are located at the ends of the cylinder are received and supported in vertical grooves 25, made in the inner sides of said cross-bars, said ribs and grooves serving to maintain the closer-heads firmly in place at the ends of and out of con-

tact with the cylinder and to prevent said closer-heads from rotating. As an additional means for securing the closer-heads in place I employ bolts 26, which extend through the openings in the cross-bars 6 and enter threaded openings 27 in the ribs 21. A feed-hopper 28 is provided for one of the closer-heads at one end of the machine, and the gate-plate 23 of the closer-head at the opposite end of the machine is somewhat shorter than the opening 22 in which it is placed, and thereby provides a discharge-opening 29 for the grain, which passes therefrom into a suitable grain chute or flue 30, having a hopper 31 to catch the grain as it falls from said discharge-opening 29.

Extending through the center of the cylinder and through the bores of the trunnions of the cylinder-heads is a speed-shaft 32, which is of less diameter than the said bores and is out of contact therewith, and as here shown one end of the said speed-shaft has its bearing on the center of the cross-bar 7, said speed-shaft being extended in length at the feed end of my improved grain cleaning and scouring machine and adapted to be coupled or otherwise connected in milling to a grain-scouring machine of the usual form. (Not shown.) A fan 33 is keyed to the speed-shaft at a suitable distance from the feed end of the machine, and to the opposite end of the said shaft is keyed a suitable driving-pulley 34. The speed-shaft is connected to the revoluble cylinder by a train of friction-wheels 35, 36, 37, and 38, the wheel 38 contacting with the periphery of the wheel 18 on one of the cylinder-trunnions, and, as shown in Fig. 2, the said train of friction-wheels are of various sizes and are adapted to communicate motion from the speed-shaft to the cylinder and drive the latter in the reverse direction to the motion of the speed-shaft and at about one-third the rate of speed thereof. I do not, however, limit myself in this particular, as the proportional rates of speed of the speed-shaft and cylinder may be varied and the same may under certain conditions be so geared and connected as to be caused to rotate simultaneously in the same direction, but not at the same rate of speed. Bearings for the train of friction-wheels are formed in inclined bars 39, which connect the cross-bar 7 and the proximate cross-bar 6 with two of the standards 4, and said friction-wheels should have adjustable bearings to compensate for wear.

Keyed on the speed-shaft within the cylinder, at suitable distances from the ends thereof, are a pair of spider-frames 40, which are preferably made of metal, each comprising a hub 41 and radial arms 42, preferably four in number. The spiders are so set on the speed-shaft that their arms are out of line with each other. Longitudinal brush-heads 43 connect the radial arms of the pair of spiders and are located within the cylinder, and owing to the fact that the arms of the spiders are not in line with each other said brush-heads are arranged at an angle to the axis of the cylinder, as shown in Fig. 1. The brush-heads are made of plate metal and are rectangular in cross-section and are thereby each provided with an inwardly-extending flange 44, said flanges bearing against the sides of the radial arms of the spiders in the direction of the rotation thereof, and said flanges are provided with adjusting-slots 45 to receive clamping and adjusting bolts 46, which enter threaded openings in the arms of the spider and serve to secure the brush-heads thereto and to admit of radial adjustment of the brushes 47, which are made of steel and rotate in contact with the interior of the perforated cylinder-barrel. As the brushes wear and are adjusted radially compensating strips 48 are interposed and clamped between the brush-heads and the ends of the radial arms of the spiders.

The operation of my invention is as follows: The grain which is fed to the interior of the revolving cylinder is caused by centrifugal force and by the rotary motion of the brushes to be evenly distributed throughout the interior surface of the cylinder and subjected to the efficient scouring action of the brushes, which serve to remove the dust, dirt, smut, cheat, chaff, and fuzz from the grain, the said impurities being driven through the perforations in the cylinder-barrel and the grain being worked toward the discharge end of the cylinder by reason of the angular arrangement of the brushes hereinbefore described.

A suitable casing is indicated in dotted lines in Figs. 1 and 2, which incloses the cylinder.

The closer-heads, which are adapted to be removed at will without unshipping the cylinder from its bearings, permit of ready access to the interior of the cylinder, and inasmuch as the said closer-heads are supported at a slight distance beyond the ends of the cylinder and out of contact therewith there is no friction between them and the cylinder. The speed-shaft being of less diameter than the bores of the cylinder-trunnions through which it passes and being out of contact therewith, there is no friction between said speed-shaft and said cylinder, and hence there is a corresponding reduction of the power necessary to operate my improved grain cleaning and separating machine.

Having thus described my invention, I claim—

1. In a grain-cleaner, the combination with the revoluble screen-cylinder, of the removable closer-heads provided with radial openings adapted to clear the cylinder-bearings, the gate-plates for said openings and the supports for said closer-heads and gate-plates, substantially as described.

2. In a grain-cleaner the combination with the revoluble screen-cylinder, of the removable closer-heads having the parallel stay-

ribs on one side, and the supports having the grooves to receive said stay-ribs and thereby secure said closer-heads against rotation with the cylinder and permit the removal of said closer-heads, substantially as described.

3. In a grain-cleaner, the combination with the revoluble cylinder having the open heads carried by or provided with the trunnions or journals, of the closer-head (one or more) having the radial opening to clear the cylinder-journal, the fixed support and the gate-plate secured to said support and fitted to said opening, substantially as described.

4. In a grain-cleaning machine, the combination of the perforate screen-cylinder, having the open heads provided with hollow trunnions, one of which has a driving-wheel, bearings for said trunnions, closer-heads, in fixed supports, and disposed at the ends of the screen-cylinder, the speed-shaft in independent bearings, and extending through the screen-cylinder trunnions, said speed-shaft being geared to one of the said screen-cylinder trunnions, for the purpose set forth, the spiders on said speed-shaft and the brushes connecting the arms of said spiders, all constructed and adapted to operate, substantially as described.

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

WILLIAM EUGENE LARMON.

Witnesses:
T. T. GARDNER,
J. M. JAMISON.