(No Model.) 2 Sheets—Sheet 1.

C. STONE.

GRAIN SCOURER.

No. 603,294. Patented May 3, 1898.

Fig. 1.

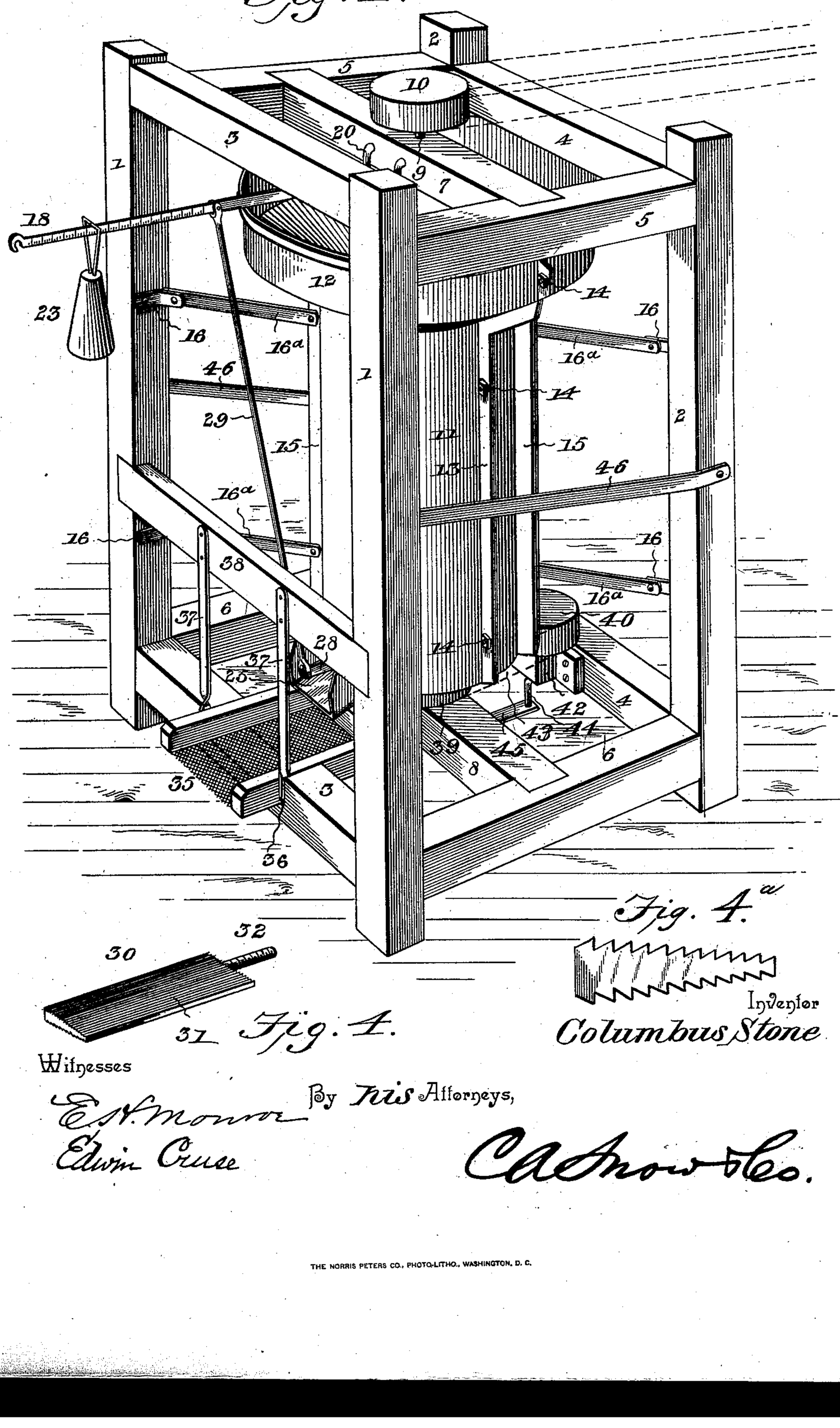

Fig. 4.

Fig. 4a.

Inventor
Columbus Stone

Witnesses
E. F. Monroe
Edwin Cruse

By His Attorneys,
C. A. Snow & Co.

(No Model.)

2 Sheets—Sheet 2.

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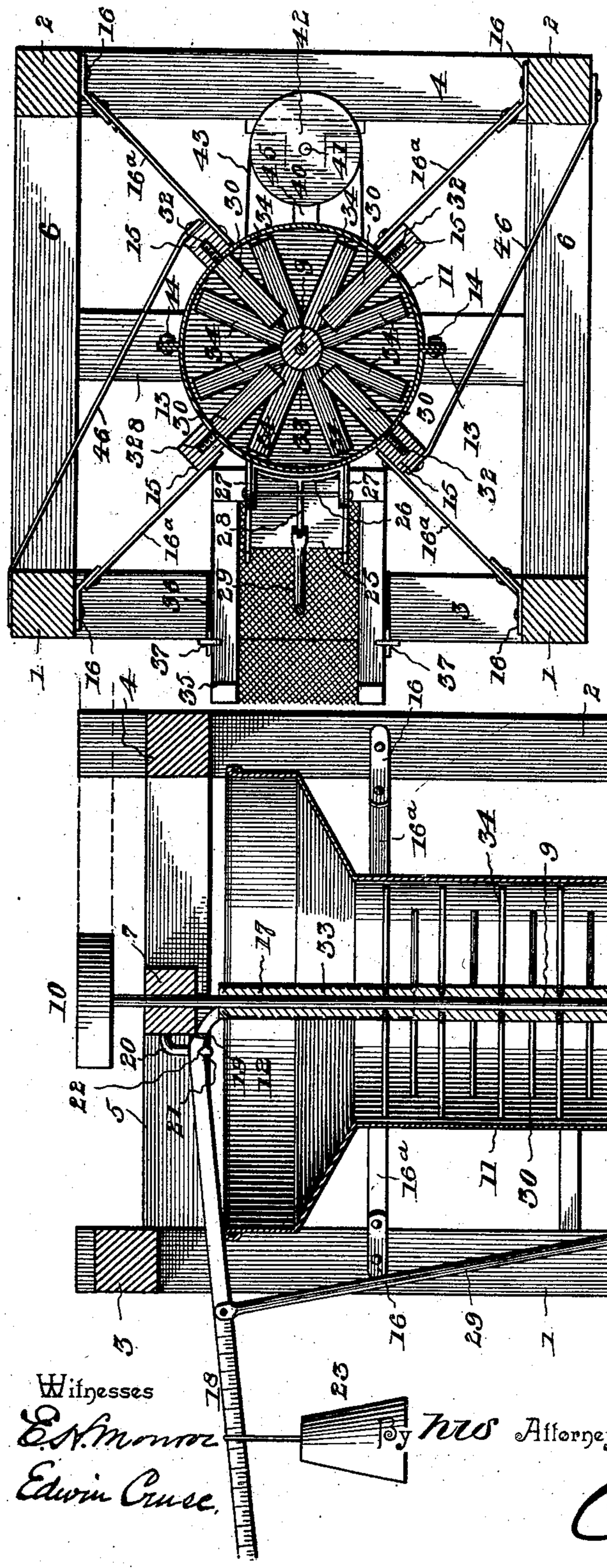

Fig. 3.

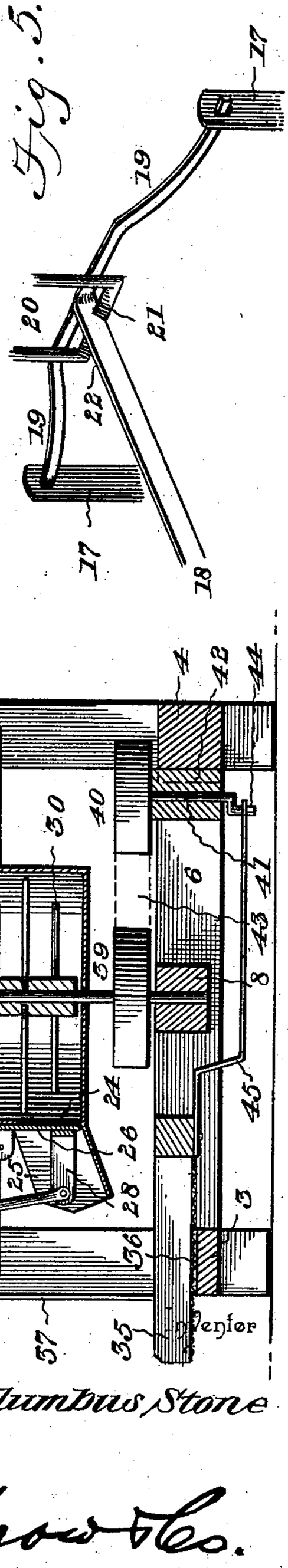

Fig. 5.

Witnesses
E. F. Mower
Edwin Cruse.

Inventor
Columbus Stone
By his Attorneys,
C. A. Snow & Co.

UNITED STATES PATENT OFFICE.

COLUMBUS STONE, OF HOME, TENNESSEE, ASSIGNOR OF ONE-SIXTH TO JAMES ARMITAGE, OF GREENVILLE, TENNESSEE.

GRAIN-SCOURER.

SPECIFICATION forming part of Letters Patent No. 603,294, dated May 3, 1898.

Application filed August 12, 1897. Serial No. 647,992. (No model.)

To all whom it may concern:

Be it known that I, COLUMBUS STONE, a citizen of the United States, residing at Home, in the county of Greene and State of Tennessee, have invented a new and useful Grain-Scourer, of which the following is a specification.

This invention relates to grain-scourers, its objects being to provide a machine which will effectually remove the fuzz and smut from grain before it is ground and in which the cylinder inclosing the scouring devices will operate automatically by the weight of the grain therein to open and close the door of the discharge-opening for the treated grain, whereby the degree of scouring to which the grain is to be subjected may be regulated according as circumstances require.

With these and other objects in view the invention consists of the several details of construction and combination of parts, as will be hereinafter fully described, and particularly pointed out in the claims.

In the drawings, Figure 1 is a perspective view of a grain-scourer made in accordance with my invention. Fig. 2 is a vertical section. Fig. 3 is a horizontal section. Fig. 4 is a detail view of one of the scouring-blades detached. Fig. 4ª is a transverse section of the scouring-blade on an enlarged scale. Fig. 5 is a detached detail of the scale-beam support.

Similar reference-numerals indicate similar parts in the several figures.

The frame consists of the front standards 1 and the rear standards 2, the upper and lower horizontal tie-bars 3 for the front standards and the upper and lower horizontal tie-bars 4 for the rear standards, and the upper and lower horizontal side bars 5 and 6, which connect the front and rear standards together.

7 indicates an upper horizontal transverse bar supported by the side bars 5, and 8 indicates a lower horizontal transverse bar supported by the side bar 6. These transverse bars are provided with suitable bearings in which the vertical shaft 9 is supported to rotate, and this shaft is provided at its upper end with a driving-pulley 10, which will be connected to any suitable source of power. (Not shown.)

11 indicates a cylinder provided with a hopper 12 at its upper end. The cylinder and hopper are made of two similar sections separable on a vertical line, and each section is provided with flanges 13, which are secured together by bolts 14 or other suitable fastening devices.

15 indicates stiffening-bars, preferably four in number, arranged radially on the outer face of the cylinder and equidistant from each other.

16 indicates brackets which are secured to the standards 1 and 2, and 16ª indicates links which are pivoted at one end to the brackets and at their other ends to the stiffening-bars 15. The links connecting each stiffening-bar to its post are parallel, and the cylinder is thus enabled to have a limited vertical movement without moving out of its vertical plane.

17 indicates rods or bars, which are secured at their lower ends to the inner face of the upper end of the cylinder at diametrically opposite points, and 18 indicates a scale-beam which is provided with diverging arms 19, which arms are pivotally connected to the upper ends of the rods 17.

20 indicates a strap which is secured to the bar 7 and forms a fulcrum on which the scale-beam can rock. Preferably the fulcrum will have a knife-edge, as indicated at 21, and the scale-beam will have a recess 22 to fit over the knife-edge. The scale-beam projects outwardly beyond the front of the frame, and a weight 23 is adjustably supported on the outer end. The cylinder and the hopper are therefore suspended from one end of the scale-beam, and it is obvious that by adjusting the weight 23 on the beam the vertical position of the cylinder can be adjusted and regulated.

24 indicates a discharge-opening at the lower end of the cylinder, and 25 a spout leading therefrom. A door 26 is hinged at its upper end to brackets 27, secured to the cylinder, and is adapted to close the discharge-opening. The door is provided at its lower end with an outwardly-projecting arm 28, to which is pivoted the lower end of a rod 29, the upper end of said rod being pivotally connected to the scale-beam.

Within the cylinder are arranged a plurality of vertical series of radiating horizontal

scouring-blades 30. The blades in each series are parallel, spaced apart equidistantly, and firmly secured in the cylinder, and preferably also in the stiffening-bars 15, in order that they may have a firm support. The opposite faces of these blades must be roughened in order to form abrading-surfaces with which the grain will contact. As shown in the drawings, these scouring-blades are wedge-shaped in cross-section and are preferably provided on each side with a file-surface having a series of longitudinal ribs 31, each rib having a vertical face and an inclined face and extending the full length of the blade, parallel with the longitudinal edges thereof, and presenting a cutting edge toward the advancing or thin edge of the blade. These ribs must be very fine in order to form an abrading-surface on each side of the blade, by which the fuzz or smut may be removed from the grain without breaking or injuring the latter. Instead of having the fine ribs 31 formed thereon the scouring-blades may have a coating of sand on each face, secured thereon in any suitable manner, and in such case the blades may be of either wood or metal. When ribs are formed in the blades, the latter will preferably be made of metal. As a convenient means of securing the blades in position I provide each with a threaded stem 32, which will screw into the cylinder and stiffening-ribs 15.

33 indicates a tube which is firmly secured to the shaft 9 to rotate therewith, and to this tube are secured a plurality of series of radial horizontal scouring-blades 34, similar in construction to the scouring-blades 30, and so arranged as to be rotated in a horizontal plane between the fixed blades on the cylinder. In the drawings I have illustrated four vertical series of blades on the cylinder and eight vertical series on the tube 33; but I do not intend to restrict my invention to these numbers, as the series may be increased or diminished in number and still work very effectively. In practice, however, I have attained good results from the machine as illustrated.

In order to separate the smut, fuzz, &c., from the grain when discharged from the cylinder, I arrange a sieve 35 immediately below the discharge-spout 25, and preferably in a recess 36, formed in the lower horizontal tie-bar 3, to permit it to have longitudinal movement and prevent lateral movement thereof. 37 indicates spring-rods connected at their lower ends to the sides of the sieve and at their upper ends to a supporting-beam 38, secured to the front standards 1.

In order to reciprocate the sieve, I provide a pulley 39 on the shaft 9 below the cylinder and mount another pulley 40 on a vertical shaft 41, journaled in suitable bearings 42 on the lower horizontal tie-bar 4. A belt 43 connects the pulleys 39 and 40 to transmit movement from the former to the latter. A crank 44 is formed on the lower end of the shaft 41, and this crank is connected to the sieve 35 by means of a connecting-rod 45. As the shaft 9 is rotated it will be seen that the sieve will be given a reciprocating movement, which will separate the smut, fuzz, &c., from the grain. In order to prevent the cylinder from rotating, I provide tie-rods 46, which extend in opposite directions from diagonally opposite stiffening-bars 15 to diagonally opposite standards 1 and 2.

In operation the thin edges of the scouring-blades on the tube 33 will oppose the thin edges of the fixed scouring-blades on the cylinder, and the shaft will be rotated at all times in the direction toward which the thin edges on the tube 33 project. When the grain is very smutty or fuzzy the weight 23 will be so adjusted that the weight of the cylinder and the grain contained therein will not overcome it until the cylinder is nearly full of grain, and in this manner the grain will be subjected to the scouring action of the blades for an extended period of time, and be thus thoroughly cleaned before discharged from the cylinder. As soon as the predetermined quantity of grain has been admitted to the cylinder it will overcome the weight 23 and lift the outer end of the scale-beam, and thereby open the door 26 to permit the grain to be discharged therefrom. The machine can therefore be made to operate automatically and adjust itself to the condition of the grain being scoured. In some cases when the grain is not very dirty it can be run through the scouring-machine very rapidly, and in such case the weight would be adjusted to allow the cylinder to fall with very little grain, so that the grain would pass very quickly through the cylinder and be discharged therefrom.

As the scouring-blades work with both faces, the weight of the grain in the cylinder will keep it in close contact with both abrading-faces, and as the blades carried by the shaft move through the grain they will work on it and also cause it to move over the fixed scouring-blades, and thereby subject every grain to the action of the abrading-surfaces under pressure and effectually remove all smut, fuzz, &c., from the grain.

It will be understood that changes in the form, proportion, and the minor details of construction may be resorted to without departing from the spirit or sacrificing any of the advantages of this invention.

Having thus described the invention, what I claim is—

1. In a grain-scourer, the combination with a frame, of a cylinder supported within the frame to have limited vertical but no rotary movement, a vertical shaft supported to rotate in said cylinder, a plurality of scouring-blades secured to the cylinder within it, a plurality of scouring-blades radiating from the shaft to work between the blades on the cylinder, and means to automatically control the vertical movement of the cylinder, substantially as described.

2. In a grain-scourer, the combination of the frame, a cylinder supported to have a limited vertical movement within the frame, and having a plurality of vertical series of horizontal scouring-blades firmly secured therein, a vertical shaft journaled to rotate in said cylinder, a plurality of vertical series of horizontal scouring-blades carried by said shaft to work between said fixed blades, each blade being wedge-shaped in cross-section and provided with an abrading-surface on opposite faces, and the thin edges of the rotating blades opposing the thin edges of the fixed blades, and tie-bars connected to the cylinder and frame to prevent rotary movement of the cylinder, substantially as described.

3. In a grain-scourer, the combination with the frame, a cylinder supported to have limited vertical movement within the frame, said cylinder being provided with a series of fixed scouring-blades and with a discharge-opening at its lower end, and a shaft provided with a series of scouring-blades, journaled to rotate within said cylinder, of a scale-beam fulcrumed on the frame and connected at one end to the cylinder, a weight adjustable on the other end of the beam, a door to close the discharge-opening, and connections between the weighted end of the beam and said door, substantially as described.

4. In a grain-scourer, the combination with the frame, and a scouring-cylinder provided with a discharge-opening at its lower end, of parallel series of radiating links pivotally connected at their ends to the cylinder and frame, respectively, to permit a limited vertical movement of the cylinder within the frame, a scale-beam fulcrumed on the frame and connected at one end to the cylinder, a weight adjustable on the other end of the beam, a door to close the discharge-opening, and connections between the weighted end of the beam and said door, substantially as described.

5. In a grain-scourer, the combination of a cylinder supported to have limited vertical movement but no rotary movement and having a plurality of vertical series of scouring-blades projecting inwardly toward its center, of a vertical shaft supported to rotate in the axial center of the cylinder, a plurality of vertical series of scouring-blades radiating from said shaft to work between the blades of the cylinder parallel thereto, each blade being wedge-shaped in cross-section and provided with an abrading-surface on its upper and lower sides, and the thin edges of the fixed blades opposing the thin edges of the moving blades, and means to automatically control the vertical movement of the cylinder, substantially as described.

6. In a grain-scourer, the combination with a frame, of a cylinder supported within the frame to have limited vertical but no rotary movement, and having a discharge-opening at its lower end, a movable door to close said opening, a vertical shaft supported to rotate in said cylinder, a plurality of series of scouring-blades secured to the cylinder within it, a plurality of series of scouring-blades radiating from the shaft to work between the blades on the cylinder parallel thereto, means to automatically control the vertical movement of the cylinder and also to operate the door of the discharge-opening, and a sifting device on which the grain is discharged, substantially as described.

7. In a grain-scourer, the frame, a weighted beam fulcrumed at the top of the frame, a self-adjusting vertically-movable scouring-cylinder suspended from one end of the weighted beam and having a discharge-opening, a movable closure for said opening, a connection between said closure and the weighted beam, and scouring devices arranged within the cylinder, substantially as set forth.

8. In a grain-scourer, the frame, an oscillatory weighted beam fulcrumed at the top of the frame, a scouring-cylinder suspended from one end of the beam and having a movable discharge-door and a plurality of pivotal link connections with the frame, a connection between said door and the weighted beam, and scouring devices arranged within the cylinder, substantially as set forth.

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

C. STONE.

Witnesses:
JOHN H. SIGGERS,
C. E. DOYLE.