

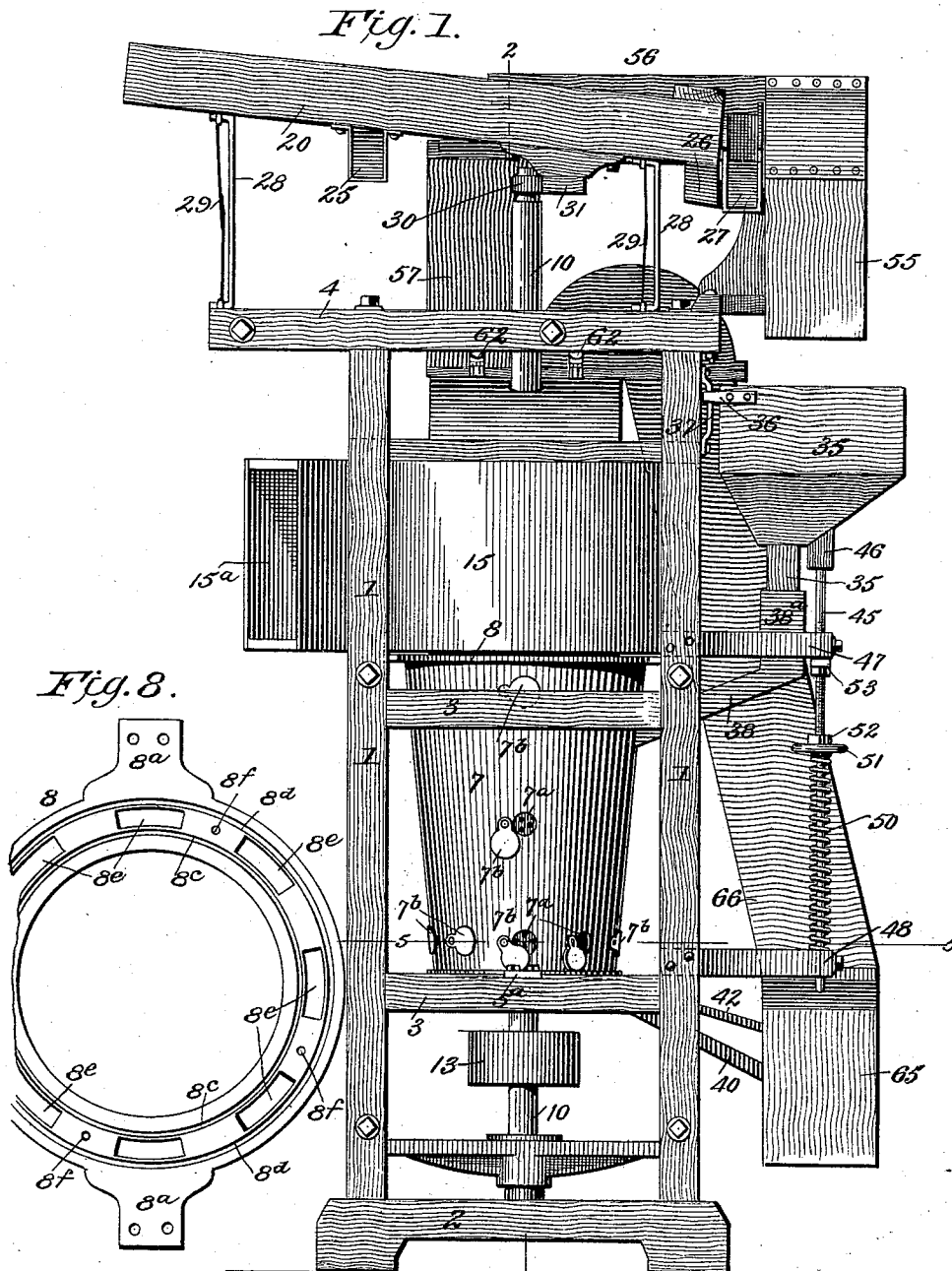
(No Model.)

4 Sheets—Sheet 1.

H. C. F. HORSTMANN, Jr.
GRAIN SCOURER.

No. 539,739.

Patented May 21, 1895.



WITNESSES:

W. D. Blonde,
Jas. W. White.

INVENTOR

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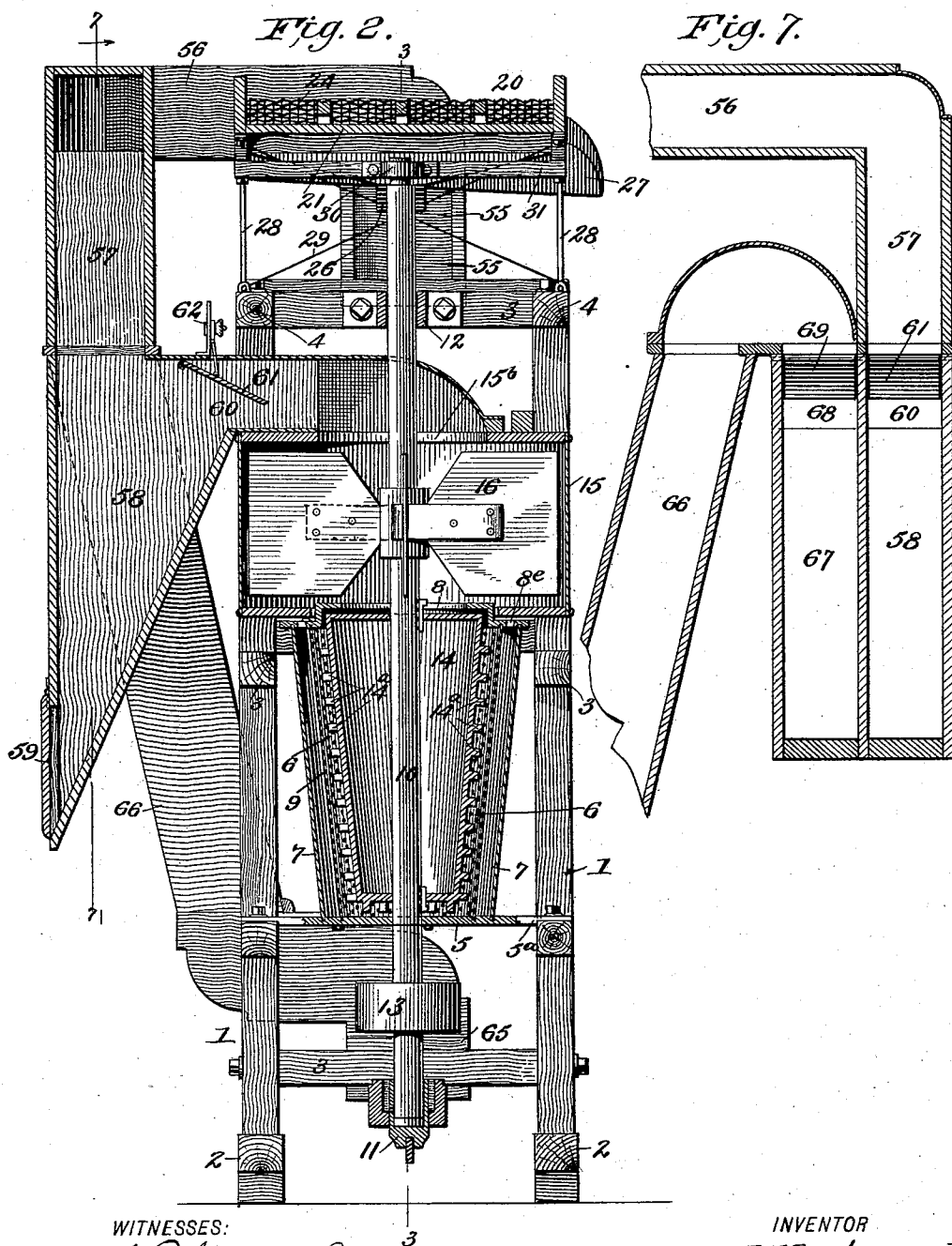
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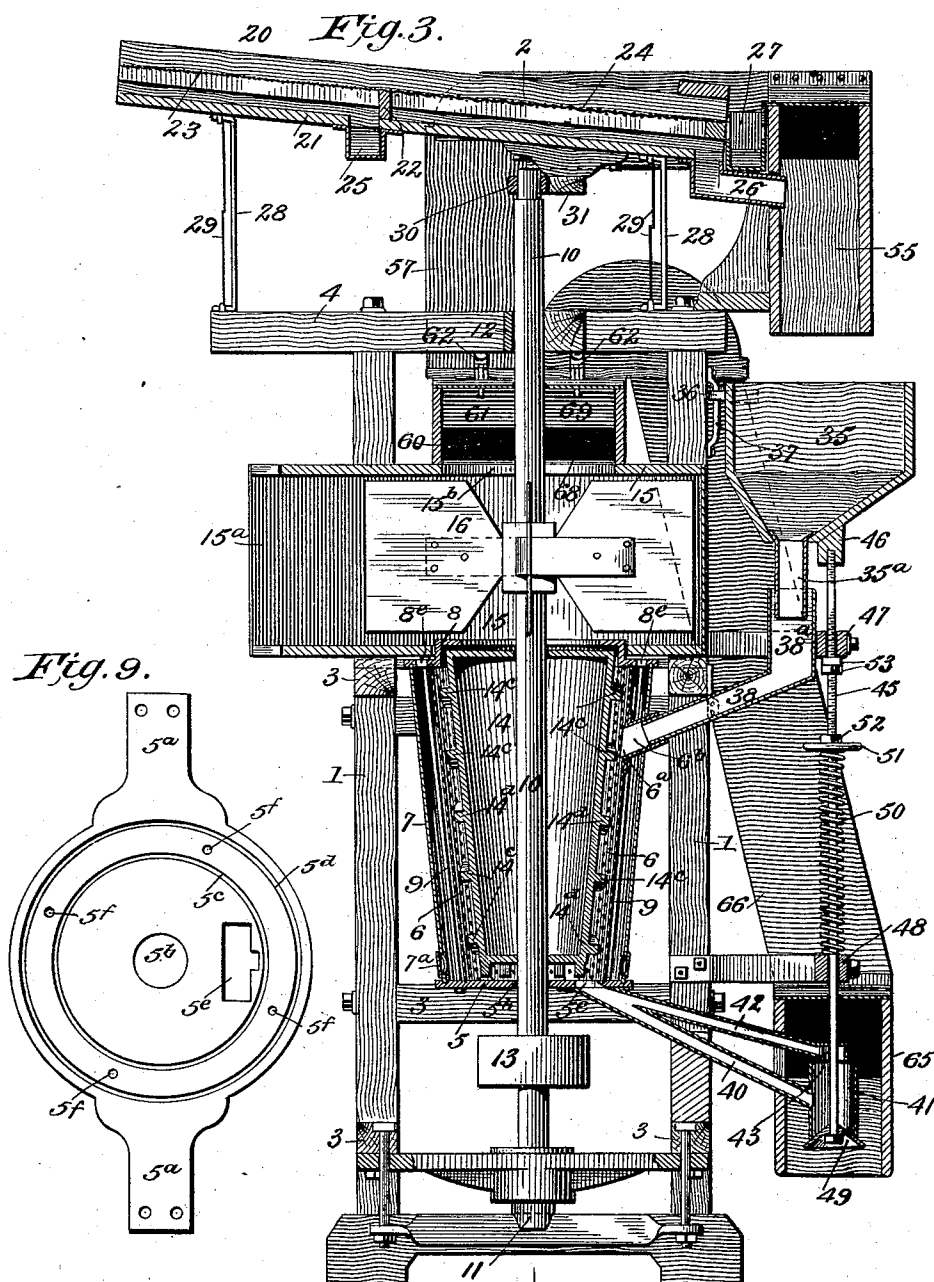
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4 Sheets—Sheet 4.

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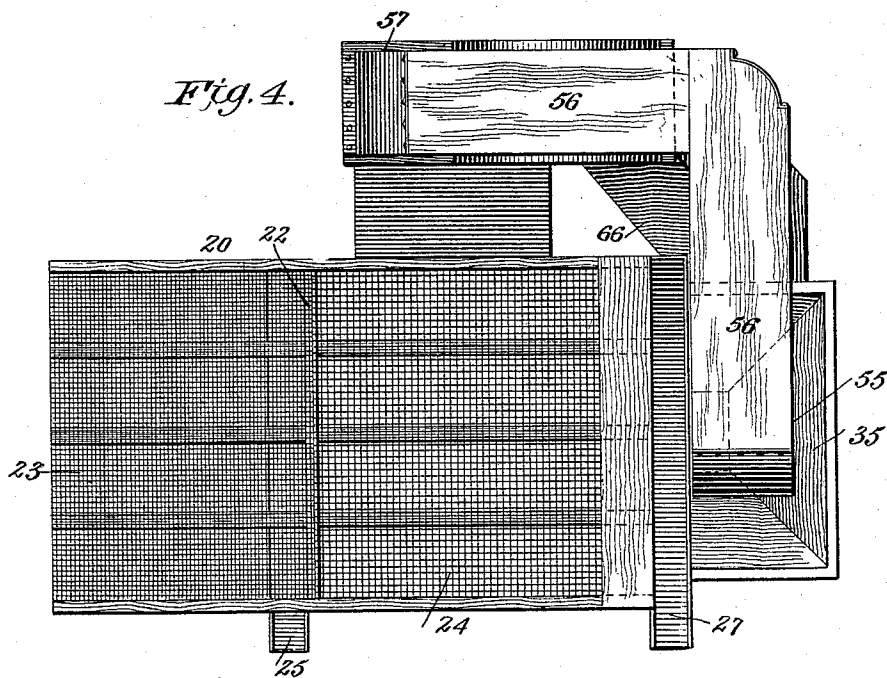


Fig. 6.

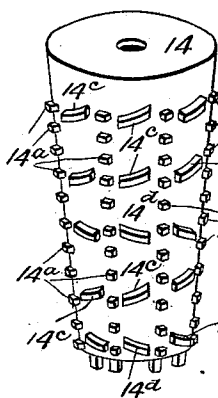
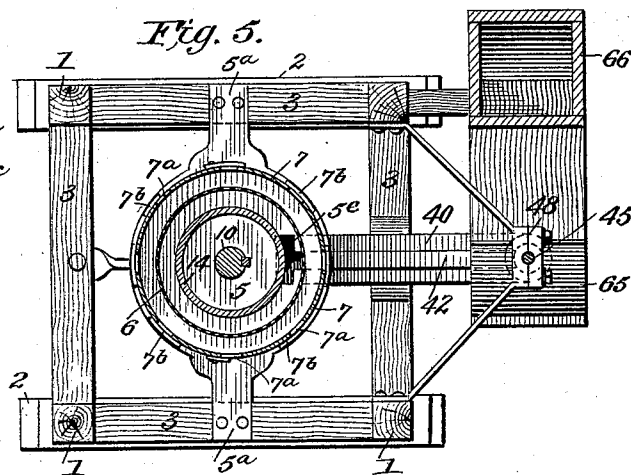


Fig. 5.



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UNITED STATES PATENT OFFICE.

HENRY C. F. HORSTMANN, JR., OF ASHLAND, KENTUCKY.

GRAIN-SCOURER.

SPECIFICATION forming part of Letters Patent No. 532,739, dated May 21, 1895.

Application filed October 8, 1894. Serial No. 525,279. (No model.)

To all whom it may concern:

Be it known that I, HENRY C. F. HORSTMANN, Jr., a citizen of the United States, residing at Ashland, in the county of Boyd and State of Kentucky, have invented certain new and useful Improvements in Grain-Scourers; and I do hereby declare that the following specification, taken in connection with the accompanying drawings, is a full, clear, and exact description of my invention, such as will enable those skilled in the art to make and use the same.

My improved grain scourer consists principally of a scouring cylinder or chamber having a beater or agitator working therein, a free inlet for the supply of the grain to be treated, and a valved or obstructed outlet for the delivery of the scoured grain, the valve of the obstructed outlet being controlled by the grain supply, whereby the grain will be passed slowly through the scouring chamber and be scoured by its contact with the walls of the chamber and the agitator, and also by being rubbed together. The obstructed outlet from the scouring chamber serves to keep the chamber normally full of grain so that it will be constantly crowded and rubbed together as it passes through. For supplying the grain to the free inlet of the scouring chamber I employ a vertically movable hopper which is connected by means of a suitable rod with the controlling valve of the grain outlet, and by means of a suitable adjustable spring, the valve is held closed except when there is a sufficient quantity of grain in the hopper to open it against the action of the spring. I also provide a separating screen for removing the main impurities from the grain, and for the purpose of removing all the fine impurities I provide a suction fan which constantly draws a current of air through suitable air trunks and through the scouring chamber.

In order that my invention may be fully understood I will now proceed to describe the same with reference to the accompanying drawings, and will afterward particularly point out the novelty in the annexed claims.

In said drawings, Figure 1 is a side elevation of my improved grain-scouring machine.

Fig. 2 is a vertical sectional view taken on line 2 2 of Figs. 1 and 3. Fig. 3 is a vertical sectional view taken on line 3 3, Fig. 2, or at right angles to the section of Fig. 2. Fig. 4 is a top plan view. Fig. 5 is a transverse sectional view taken on line 5 5 of Fig. 1. Fig. 6 is a perspective view of the rotary beater or agitator. Fig. 7 is a detailed sectional view taken on line 7 7 of Fig. 2 and looking in the direction indicated by the arrows. Fig. 8 is an elevation of the top plate of the scouring-chamber. Fig. 9 is a similar elevation of the bottom plate of the scouring-chamber.

Similar figures of reference indicate the same parts throughout the several views.

I construct my improved machine upon a suitable frame work comprising four uprights or standards 1 mounted upon the base piece 2 and braced together by the cross bars 3 and top bars 4. This frame work is preferably secured together by means of suitable bolts.

5 is the bottom plate of the scouring chamber formed with the diametrically opposite arms 5^a which rest upon and are securely bolted to two of the cross bars 3. This bottom plate 5 is also provided with a central opening 5^b for the passage of the operating shaft, the annular depressions or grooves 5^c and 5^d for the reception of the lower edges of the inner and outer casing of the scouring chamber, the outlet opening 5^e for the passage of the scoured grain, and the bolt holes 5^f for the passage of the bolts which hold the parts of the scouring chamber together. These parts of the bottom plate of the scouring chamber will be more particularly referred to as the description proceeds.

6 is the inner conoidal casing of the scouring chamber formed preferably of finely perforated sheet metal. The casing 6 rests in the annular groove 5^c of the bottom plate and is provided adjacent to its upper end with an inlet opening 6^a from which extends the upwardly inclined box 6^b.

7 is the outer conoidal casing of the scouring chamber formed of imperforate sheet metal and provided at different elevations and points in its periphery with air inlet openings 7^a which may be closed with the pivoted flaps or covers 7^b. A suitable opening is provided

near the upper end of this casing 7 for the passage of the box 6^b leading into the scouring-chamber.

8 is the top plate of the scouring chamber 5 formed with diametrically opposite arms 8^a which rest upon and are bolted to two of the cross beams 3 of the supporting frame. The top plate 8 is provided the central opening, the concentric annular depressions or grooves 10 8^c and 8^d, the air blast openings 8^e leading from the space between the inner and outer casings 6 and 7 to the fan, the bolt holes 8^f and the large central annular depression for the reception of the upper end of the rotary 15 beater or agitator.

The annular grooves or depressions 5^e and 5^d fit over the lower ends of the inner and outer casings 6 and 7 respectively and the parts are held securely together by means of the long bolts 9 which pass through the bolt 20 openings 8^f and 5^f of the top and bottom of the scouring chamber.

10 is a large vertical shaft supported at its lower end upon the adjustable step 11 and 25 having bearing at 12 near its upper end in a suitable cross beam.

13 is a band pulley keyed to the shaft 10 near its lower end for imparting rotary motion to it.

14 is a rotary beater or agitator supported 30 in the scouring chamber upon the shaft 10. This beater comprises preferably a conoidal body of cast metal provided with the alternated vertical series of agitator fingers 14^a 35 and inclined agitator blades 14^c and 14^d. The agitator blades 14^c are inclined so as to impart a downward motion to the grain which is passing through the machine, whereas the blades 14^d are inclined so as to impart an up- 40 ward or lifting motion to the grain in order to prevent its packing too tight, but it will be observed that there are three agitator blades 14^c for giving the grain a downward tendency whereas there are only two blades 14^d so that 45 the general tendency of the whole mass of grain will be downward through the scouring chamber. The agitator fingers 14^a simply serve to assist in keeping the grain constantly agitated and rubbing together.

15 is a fan casing supported directly above the scouring chamber, and 16 a rotary fan operating in said casing and keyed to the shaft 10. The openings 8^e lead into said fan casing from the space between the inner casing 55 6 and outer casing 7 so that the particles of impurities rubbed off of the grain are drawn out through the perforations of the casing 6 up into the fan and discharged through the exit 15^a.

20 is an inclined shaking screen formed 60 with a bottom 21 and central transverse partition 22, an upper fine sieve 23, and a lower coarse sieve 24. 25 is a chute leading from the upper portion of the screen for discharging the fine impurities which pass through 65 the fine sieve 23. 26 is a chute leading from

the lower part of the screen for passing off the separated grain which falls through the meshes of the large screen 24. The large impurities are tailed off into the chute 27 which 70 discharges them out of the machine.

The screen 20 is supported upon the spring arms 28 which are securely bolted to the underneath beams of the screen and to the upper face of the cross beams 4, said cross beams 75 being extended to one side to make them sufficiently long. 29 are crossed wire braces extending from the opposite ends of the spring supports 28 for preventing the screen shaking sidewise. 80

30 is a cam keyed to the extreme upper end of the shaft 10, and 31 is a bearing block secured to the under side of the screen 20, whereby the rotation of the shaft 10 will impart reciprocal movement to the screen, the 85 supporting spring arm 28 serving to hold the screen in normal position against the action of the cam.

35 is a supply hopper adapted to receive the separated grain as it falls from the spout 90 26. The hopper 35 is provided with bearings 36 which embrace the vertical guide rods 37 secured to the frame work of the machine in order to allow for the vertical reciprocation of the hopper. The hopper is provided with 95 inclined bottom walls and a contracted extension 35^a which telescopes with the vertical portion 38^a of the chute 38 which leads into the box 6^b of the scouring chamber.

Projecting from underneath the bottom 100 plate 5 of the scouring chamber and leading from the outlet 5^e is a main outlet chute or passage which leads to and terminates in valve box 41. 42 is a similar auxiliary outlet chute leading from the main chute 40 and 105 terminating in the open enlargement 43.

45 is a rod secured at its upper end to the movable hopper 35 by means of the block 46, and extending down through the bearings 47 110 and 48 and the outlet boxes 43, 41 and having secured to its lower end a conical valve 49 serving to close the outlet box 41 for obstructing or regulating the exit of the grain from the scouring chamber. 50 is a spiral spring mounted on the rod and resting at its lower 115 end upon the bearing 48. 51 is an adjustable collar or nut working on a threaded portion of the rod and confining the upper end of the spiral spring 50 and 52 is a jam nut for holding the adjustable collar or nut 51 in the de- 120 sired adjusted position. 53 are the nuts confining the upward movement of the rod 45 under the action of the spiral spring 50.

It will be observed that by adjusting the collar or nut 51 to the proper position the 125 movable hopper 35 and valve 49 can be supported in their extreme upper positions and held there until a predetermined weight of grain is fed into the movable hopper when the weight of the grain will overcome the strength 130 of the spring and force the hopper down and open the valve 49. By this means the scour-

ing chamber can be constantly kept crowded full of grain which passes slowly through and is thoroughly scoured by the agitation and rubbing together. The small auxiliary free outlet is provided in case it is desired to run the machine empty, which can be slowly accomplished by reason of this auxiliary outlet.

To further assist and perfect the cleansing of the grain I provide a system of air trunks through which I keep up a constant circulation of air currents at different points of the operation presenting the grain to the action of these currents for removing all light impure particles. This system of air trunks will now be explained.

55 is a leg of the air trunk supported directly over the movable hopper 35 and embracing the exit end of the grain spout 26. From this leg the trunk extends around to the side of the machine through the portion 56 where it extends downwardly through the portion 57 to a trap 58 having an outlet valve 59. From this trap the air current passes through an opening 60 into the eye 15^b of the fan. The opening 60 is controlled by valve 61 the position of which is regulated by the adjusting device 62 which can be of any approved construction. Another section of the air trunk leads from the grain exit. The leg 65 embraces the grain outlet boxes 41, 43 and extends around to the side of the machine where it passes up on an incline through the portion 66 and thence into the trap 69 which corresponds with and is alongside of the similar trap 58. From this trap the current of air passes through the opening 68 into the eye of the fan, the opening being regulated by valve 69 of the same construction as the valve 61.

By this system of air trunks every particle of dust and impurity is removed from the grain and it is discharged from the machine in perfect condition.

Having thus fully described my invention, the following is what I claim as new therein and desire to secure by Letters Patent:

1. In a grain scourer, the combination of a scouring cylinder or chamber, a beater or agitator working in said chamber, an open inlet for freely supplying the grain to be scoured, a valved or obstructed outlet for the escape of the scoured grain which is adapted to retain the grain in a crowded condition in the scouring chamber while it passes slowly there-through, and suitable mechanism exterior to the scouring chamber operated by the weight of grain at the point of supply for opening and closing the valve of the grain outlet, substantially as and for the purpose set forth.

2. In a grain scourer, the combination of a scouring cylinder or chamber, a beater or agitator working in said chamber, a free inlet for supplying the grain to be scoured, a movable hopper for feeding grain to said inlet, an outlet for the scoured grain, a valve controlling said outlet, and a suitable connection between the movable hopper and the valve, substantially as and for the purpose set forth.

3. In a grain scourer, the combination of a scouring cylinder or chamber, a beater or agitator working in said chamber, a free inlet for supplying the grain to be scoured, a vertically movable feed hopper for feeding grain to said inlet, an outlet for the scoured grain, a valve controlling said outlet, a rod connecting the movable hopper with the valve, and a spring for holding the hopper and valve in normally elevated position, substantially as and for the purpose set forth.

4. In a grain scourer, the combination of a scouring cylinder or chamber, a beater or agitator working in said chamber, a free inlet for supplying the grain to be scoured, a vertically movable feed hopper for feeding grain to said inlet, an outlet for the scoured grain, a valve controlling said outlet, a rod connecting the movable hopper with the valve, a spiral spring surrounding the rod, a support for the lower end of the spiral spring, and an adjustable collar or nut carried by the rod and bearing on the upper end of the spring, substantially as and for the purpose set forth.

5. In a grain scourer, the combination of a scouring cylinder or chamber, a beater or agitator working in said chamber, a free inlet for supplying the grain to be scoured, a chute leading to said free inlet, a vertically movable feed hopper having a contracted extension which telescopes with said chute, an outlet for the scoured grain, a valve controlling said outlet, and a suitable connection between the movable hopper and the valve, substantially as and for the purposes set forth.

6. In a grain scourer, the combination of a scouring cylinder or chamber, a beater or agitator working in said cylinder or chamber, a free inlet for supplying the grain to be scoured, a vertically movable hopper feeding grain to said inlet, guide rods mounted upon a suitable support, bearings carried by the hopper and engaging the guide rods for guiding the hopper in its vertical movement, an outlet for the scoured grain, a valve controlling the outlet, and a suitable connection between the movable hopper and the valve, substantially as and for the purposes set forth.

7. In a grain scourer, the combination of a scouring cylinder or chamber, a beater or agitator working in said chamber, a free inlet for supplying grain to said scouring chamber, a main valved outlet for the scoured grain, a smaller free outlet for the scoured grain, and means for controlling the valve of the main outlet, substantially as and for the purpose set forth.

8. In a grain scourer, the combination of the scouring cylinder or chamber, a beater or agitator working in said chamber, a free inlet for supplying grain to said chamber, a main outlet passage leading from the scouring chamber to a valved chamber, an automatic valve controlling the outlet of said valve chamber, and a smaller auxiliary outlet passage leading from the main passage, substantially as and for the purpose set forth.

9. In a grain scourer, the combination of a
scouring cylinder or chamber having suitable
inlet and outlet openings for the passage of
the grain, with a beater or agitator compris-
5 ing a suitable body having alternate vertical
series of agitator fingers and short blades
projecting from its periphery, some of the
blades being inclined in the direction for feed-

ing the grain downwardly and others being
inclined to lift the grain upwardly, substan- 10
tially as and for the purpose set forth.

HENRY C. F. HORSTMANN, JR.

Witnesses:

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