A. WOLF.

GRAIN CLEANING MACHINE.

APPLICATION FILED SEPT. 27, 1910.

1,040,086.

Patented Oct. 1, 1912.

3 SHEETS—SHEET 1.

Fig. 1.

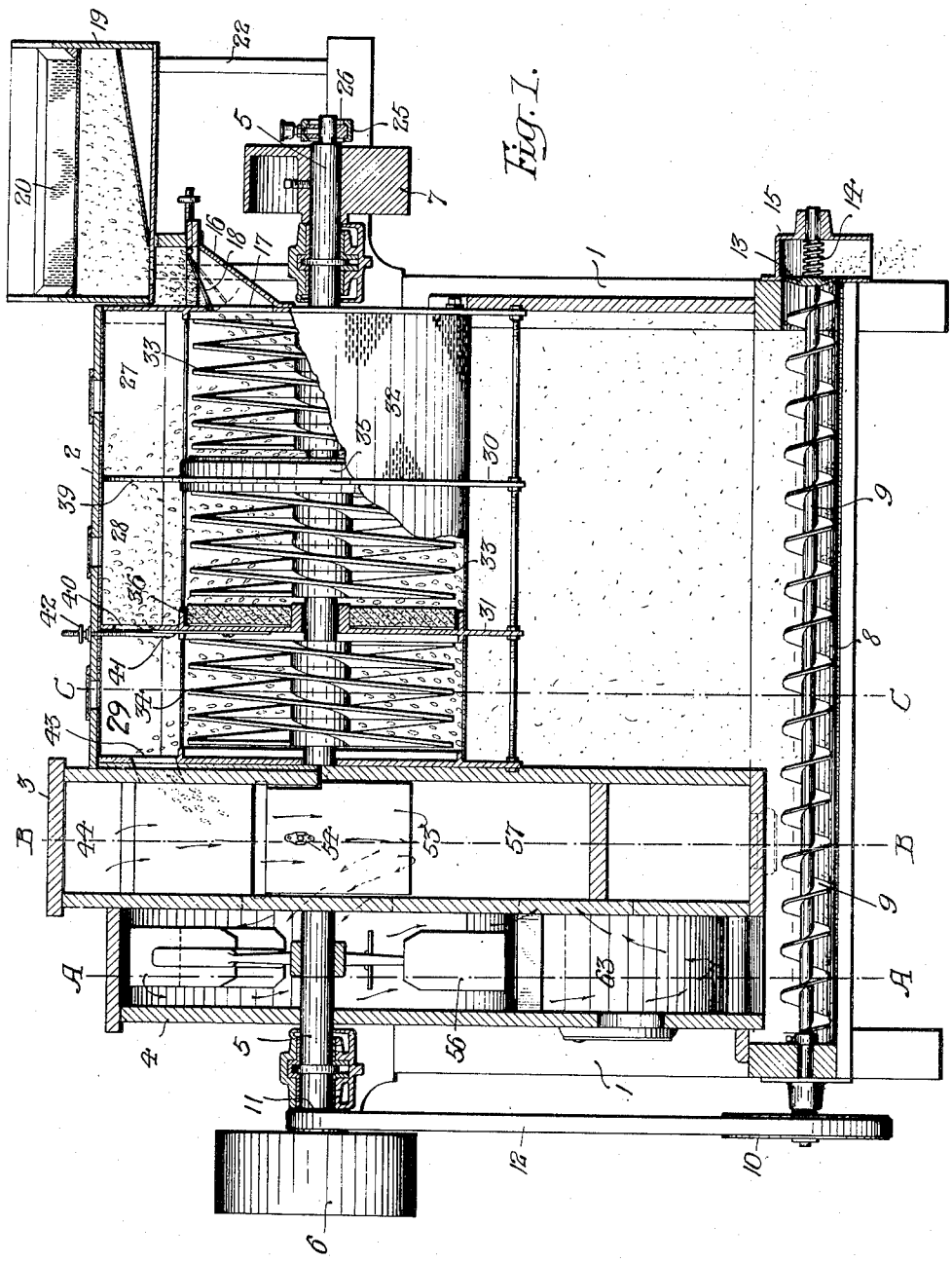

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Fig. 3.

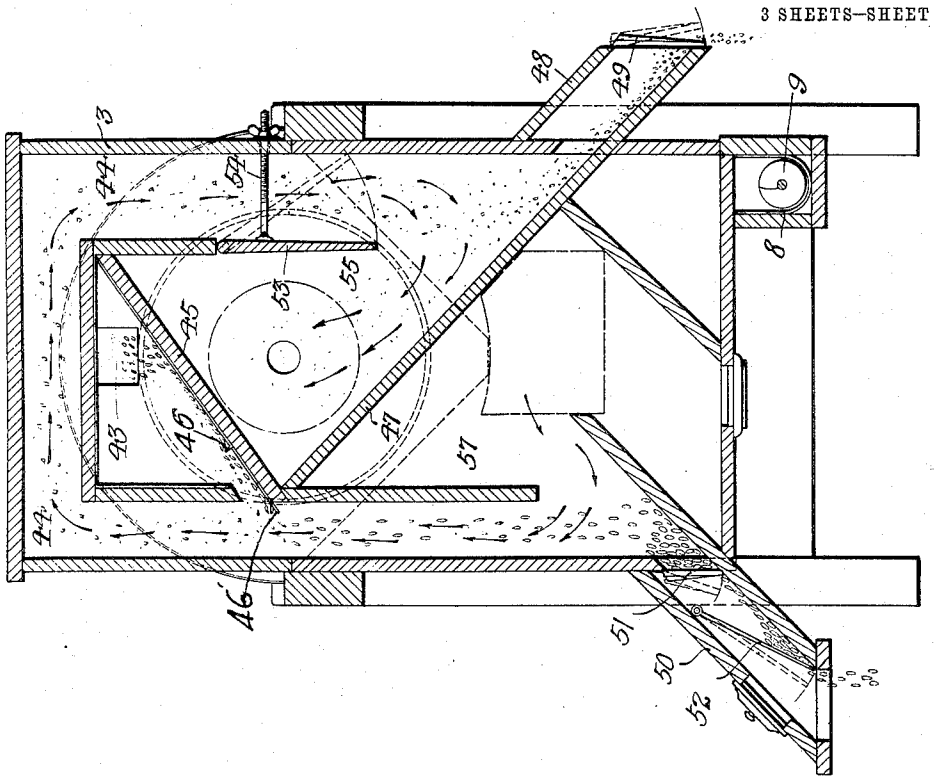
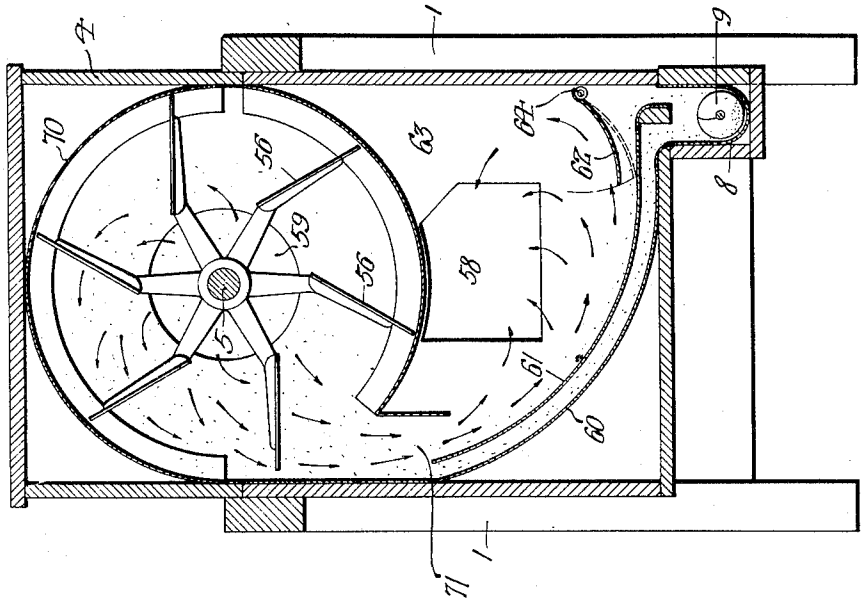


Fig. 2.



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3 SHEETS—SHEET 3.

Fig. 4.

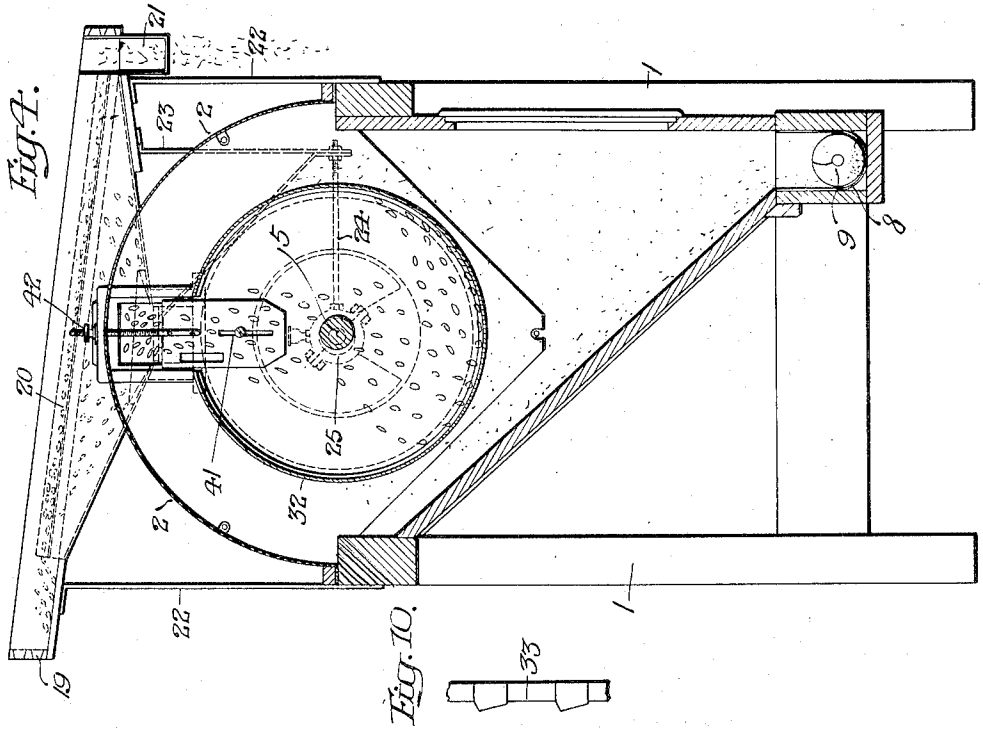


Fig. 10.

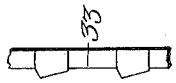


Fig. 9.

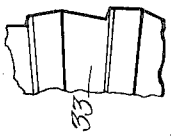


Fig. 6

Fig. 8.

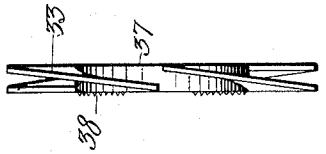


Fig. 5.

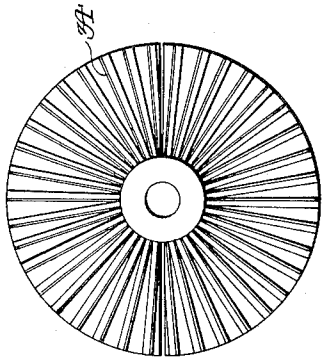
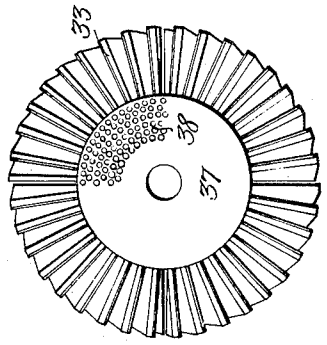


Fig. 7.



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UNITED STATES PATENT OFFICE.

AUGUSTUS WOLF, OF CHAMBERSBURG, PENNSYLVANIA.

GRAIN-CLEANING MACHINE.

1,040,086. Specification of Letters Patent. Patented Oct. 1, 1912.

Application filed September 27, 1910. Serial No. 584,054.

To all whom it may concern:

Be it known that I, AUGUSTUS WOLF, a citizen of the United States, and a resident of Chambersburg, Franklin county, Pennsylvania, have invented certain Improvements in Grain-Cleaning Machines, of which the following is a specification.

One object of my invention is to provide a machine for completely and rapidly removing dirt or foreign material from grain so as to thoroughly clean and polish the latter, it being especially desired that the machine shall be simple and substantial in construction.

I further desire to provide a novel form of feeding device for use as part of the cleaning machine, preferably in combination with a device for preventing the escape or entrance of air.

These objects and other advantageous ends I secure as hereinafter set forth, reference being had to the accompanying drawings, in which—

Figure 1, is a longitudinal vertical section illustrating the arrangement and in part the detail construction of a machine constructed according to my invention. Figs. 2, 3 and 4, are transverse vertical sections respectively taken on the lines A—A, B—B, and C—C, Fig. 1; Figs. 5 and 6, are respectively a side and an edge elevation of one of the polishing members employed as part of my invention; Figs. 7 and 8, are respectively a side and edge elevation of the cleaning elements of the machine, and Figs. 9 and 10 are respectively side and edge elevations of portions of one of the cleaning elements showing the construction thereof.

In the above drawings, 1 represents a suitable supporting frame on which are mounted a series of communicating casings 2, 3 and 4, through all of which extends a shaft 5 having on one end a driving pulley 6 and on the other end a balancing fly wheel 7. The lower portions of the casings 2 and 4 communicate with a longitudinally extending trough 8 in which is mounted a screw conveyer 9 driven from a pulley 10; power being communicated through a belt 12 to said pulley from a pulley 11 on the shaft 5. At that end of the conveyer 9 opposite the pulley 10 there is provided a valve 13 normally held closed so as to prevent the entrance of air into the casing, by means of a spring 14 operative within a discharge bowl 15.

At the receiving end of the casing 2 is placed a hopper, communicating therewith through an opening 19; the opening being controlled by an adjustably weighted valve 18 arranged to prevent entrance of air. Mounted above the hopper and in such position as to discharge thereinto, is an open topped box 19 constituting a shaking shoe and having mounted within it an inclined screen 20 on which is placed the grain to be cleaned. Said shoe is provided with a tailing spout 21 at its lower edge for the reception of chaff and large pieces of foreign material incapable of passing through the screen, and the bottom under said screen is suitably inclined to cause the grain to be delivered into the hopper 16. The shoe is flexibly mounted on a number of spring straps 22 and has fixed to it a bracket 23 connected through a rod 24 with a strap 25 mounted on an eccentric fixed to the shaft 5.

The casing 2 is divided into a number of compartments 27, 28 and 29 by means of vertical partitions 30 and 31, and extending longitudinally through these compartments is a cylindrical screen 32 concentric with the shaft 5. This latter has fixed to it in the compartments 27 and 28 two series of cleaning elements 33 of the construction shown in Figs. 7 and 8, and there are polishing elements 34 mounted on the shaft in the compartment 29, there being also in one end of each of the compartments 27 and 28 corundum polishing disks 35 and 36. The various cleaning and polishing elements 33 and 34 are, as shown in Figs. 5 to 8 inclusive, so formed as to constitute screw conveyers when assembled upon the shaft 5, although in the case of the cleaning elements 33 each of the disk like hubs 37 has a series of conical cleaning points 38 on one face and relatively short blades of steep pitch of the peculiar construction shown in Figs. 9 and 10. As shown in these figures the cleaning elements are provided with radial teeth extended at their outer ends to form peripheral teeth. The blades of the polishing elements are preferably of less pitch and are fewer in number than those of the cleaning elements shown in Figs. 5 and 6 so that while all of the elements employed may, as shown in Fig. 1, be of the same construction, I preferably provide elements such as those shown in Figs. 7 and 8 for the compartments 27 and 28, using elements of the construction shown in Figs. 5 and 6 for the compartment 29.

The cylindrical screen 32 is open along

the top and the partitions 30 and 31 have top openings adjacent the openings in said screen as indicated at 39 and 40; the latter of these openings having an adjustable valve 41 in the form of a sliding blade controlled by a hand wheel 42 whereby the rapidity of flow of the grain from the compartment 28 to the compartment 29 may be regulated. An opening 43 connects the compartment 29 with the casing 3, and this latter, as shown in Fig. 3, has interior partitions arranged to provide an air trunk or conduit 44 leading upward along one side of said casing, across the top and down the other side thereof.

The opening 43 is placed to discharge onto an inclined surface 45 which at intervals is provided with transverse rows 46 and 46′ of teeth designed to break up or separate the grain into a number of small streams as it flows down said surface. From this latter it is delivered into the uptake of the trunk 44, whose downwardly delivering portion opens into a compartment of the casing 3 having an inclined floor 47 terminating in a delivery spout 48 normally closed by an automatic valve 49 which opens from time to time to permit the escape of the accumulated heavy particles of dust, chaff, etc. Leading from the lower end of the uptake of the shaft 44 is a grain delivering spout 50 normally closed by the two valves 51 and 52, which, like the valve 49, automatically remain in or return to their closed positions, although being designed to open to permit of the escape of the cleaned grain after a predetermined amount has accumulated.

The delivery end of the trunk 44 is supplied with an adjustable valve 53 whose position may be regulated by turning a thumb nut on a bolt 54 attached to it to vary the flow of air through said trunk into the compartment 55. This latter communicates through an opening 59 concentric with the shaft 5, with the casing 4, serving as the intake for a fan 56 mounted within a suitable inclosure 70; there being also an opening 58 leading from the lower part of the casing 4 into the compartment 57 of the casing 3. The fan inclosure 70 communicates through a tangentially placed opening 71 with a settling chamber 63 in the lower part of the casing 4, and the wall or floor 60 of this chamber is gently curved eccentrically to the shaft 5 away from this opening, downwardly and over to the conveyer trough 8. A curved plate or body of sheet material 61 is mounted within the settling chamber a short distance away from and parallel with this floor 60 and like it extends from a point at or adjacent the outlet 71 of the fan inclosure 70 to a point immediately over the conveyer trough 8 so as to form with said floor a relatively thin conduit curved downwardly from the fan outlet and designed to conform to the path which is taken by the particles of dust or other material carried around and finally discharged by the fan.

Under operating conditions power is applied to the pulley 6, thereby turning the shaft 5 and its fan 56, with the cleaning and polishing elements 33 and 34. The fly wheel 7 is likewise turned and serves to balance the shaking shoe 19 which is continuously vibrated by the action of the eccentric 26. The chaff and large pieces of foreign material fed with the grain into the shaking shoe are thus caused to travel down the inclined surface of the screen 20 into the spout 21 from which they are discharged, while the grain passes through said screen into the hopper 16. When a predetermined amount of grain has accumulated the valve 18 opens and permits it to flow into the compartment 27 where, under the action of the elements 33 and the corundum disk 35, any adhering particles of dirt, etc., are removed and caused to pass through the screen 32 into the bottom of the casing 2. From here such material falls into the conveyer trough 8, and as the conveyer 9 is driven from the shaft 5 through the belt 12, it carries said material past the valve 13 out of the casing. Since the grain in the compartment 27 is considerably agitated by the elements 33, it is gradually thrown through the opening 39 into the compartment 28 where it is still further cleaned and ultimately thrown through the opening 40 into the polishing compartment 29. Here the last particles of dirt are removed and with the dirt from the compartment 28, pass through the screen 32 into the conveyer trough 8. From the compartment 29 the grain passes through the opening 43 into the casing 3 where it strikes the inclined surface 45 and is separated by the toothed edges 46 and 47 into thin streams as it falls into the trunk 44. In this latter there is a rising current of air caused by the operation of the fan 56, so that while the perfectly sound and completely cleaned grain falls to the bottom of said trunk and passes the valves 51 and 52 of the delivery spout 50, the fine particles of dust and any other like material are carried upwardly in the trunk 44, across the top of the casing 3 and downwardly past the valve 53 into the chamber 55, where the heavier portions settle on the inclined floor 47 and pass into the delivery spout 48 from whence they are discharged from time to time by the valve 49. The air still carrying the lighter particles of dust, flows through the intake opening 59 into the fan inclosure 70 where it is given a rotary motion and discharged tangentially into the settling chamber 63. Since the particles of dust, no matter how small and light, are heavier than air

and naturally are so acted on by centrifugal force as to assume or tend to assume positions as far as possible from their center of rotation, practically all of the light dust particles still carried by the air pass into the conduit formed by the walls or plates 60 and 61, from whence they are delivered into the conveyer trough 8. Since the fan inclosure opens into the relatively large settling chamber 63, any dust particles not entering the above mentioned conduit fall under the action of gravity onto the upper surface of the plate 61 upon which they gradually travel downwardly until they likewise pass into the conveyer trough; there being provided an adjustable plate or valve 62 carried on a spindle 64 so arranged that the distance of its free end from the plate 61 may be varied as desired. Air from the settling chamber 63 passes through the opening 58 into the casing 3 and thence through the chamber 57 into the uptake of the trunk 44.

By means of the apparatus above described, I have found it possible to completely and satisfactorily clean grain in a shorter time than has hitherto been possible and in addition to completely separate such grain from the dust, etc., removed from it. Moreover, the same body of air is repeatedly used for the purpose of such separation.

The detail features of the dust separating mechanism are not claimed in the present application, as they are described and claimed in a separate application for patent filed by me of even date herewith.

While I preferably use corundum plates or blocks 35 and 36 for cleaning or polishing the grain forced against them by the helical blades it is to be understood that other abrading substances such as sand stone or corrugated or otherwise roughened iron or steel plates may be used without departing from my invention.

I claim:—

1. The combination in a grain cleaning machine of a casing; a driving shaft; cleaning elements in said casing on the shaft provided with helical blades each having a series of radially projecting teeth extended at their ends to form peripheral teeth.

2. The combination in a grain cleaning machine of a casing; a shaft therein; an abrading member in the casing; and a cleaning member mounted on the shaft adjacent said abrading member, said cleaning member consisting of a hub provided with a series of projections extending toward the abrading member, and a helical blade mounted on said hub.

3. The combination in a grain cleaning machine of a casing; a partition in the casing dividing it into compartments; a screen extending through said compartments and open at the top; there being an opening in the partition adjacent said opening in the screen; a valve for said partition opening; and grain cleaning means in the compartments.

4. The combination in a grain cleaning machine of a casing; a vertical partition in the casing, dividing it into compartments; a cylindrical screen extending through said compartments and open at the top; there being an opening in the partition adjacent said opening in the screen; means for feeding material to the first compartment; and grain cleaning means in the compartment.

5. The combination in a grain cleaning machine of a casing having a plurality of communicating compartments; a shaft extending through the compartments; and two series of cleaning elements in the compartments, said cleaning elements being provided with roughened helical blades; and the blades of the elements in one compartment being of a pitch different from those in the other compartment.

6. The combination in a grain cleaning machine, of a casing; a substantially cylindrical screen mounted horizontally in the casing; a partition dividing the casing and screen into compartments; a shaft extending through said screen; a fixed abrading member in the screen at one end thereof; helical blades on the shaft in the screen; means for feeding grain to that end of the screen distant from the abrading means; there being openings in the screen on opposite sides of the partition; an opening in the partition adjacent said screen openings; and an outlet from one of the compartments; with means for driving the shaft.

7. The combination in a grain cleaning machine, of a casing; a substantially cylindrical screen mounted horizontally in the casing and having a number of compartments; a shaft extending axially through the screen; a disk of abrading material fixed at one end of each compartment; a number of closely assembled helical blades mounted on the shaft and placed to force a body of grain toward the abrading disk; there being an opening for the screen adjacent said disk; and means for feeding grain to the screen.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

AUGUSTUS WOLF

Witnesses:
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WM. A. BARR.