

J. H. HEMPEN.

SEED CLEANER.

APPLICATION FILED NOV. 13, 1907.

898,883.

Patented Sept. 15, 1908.

2 SHEETS—SHEET 1.

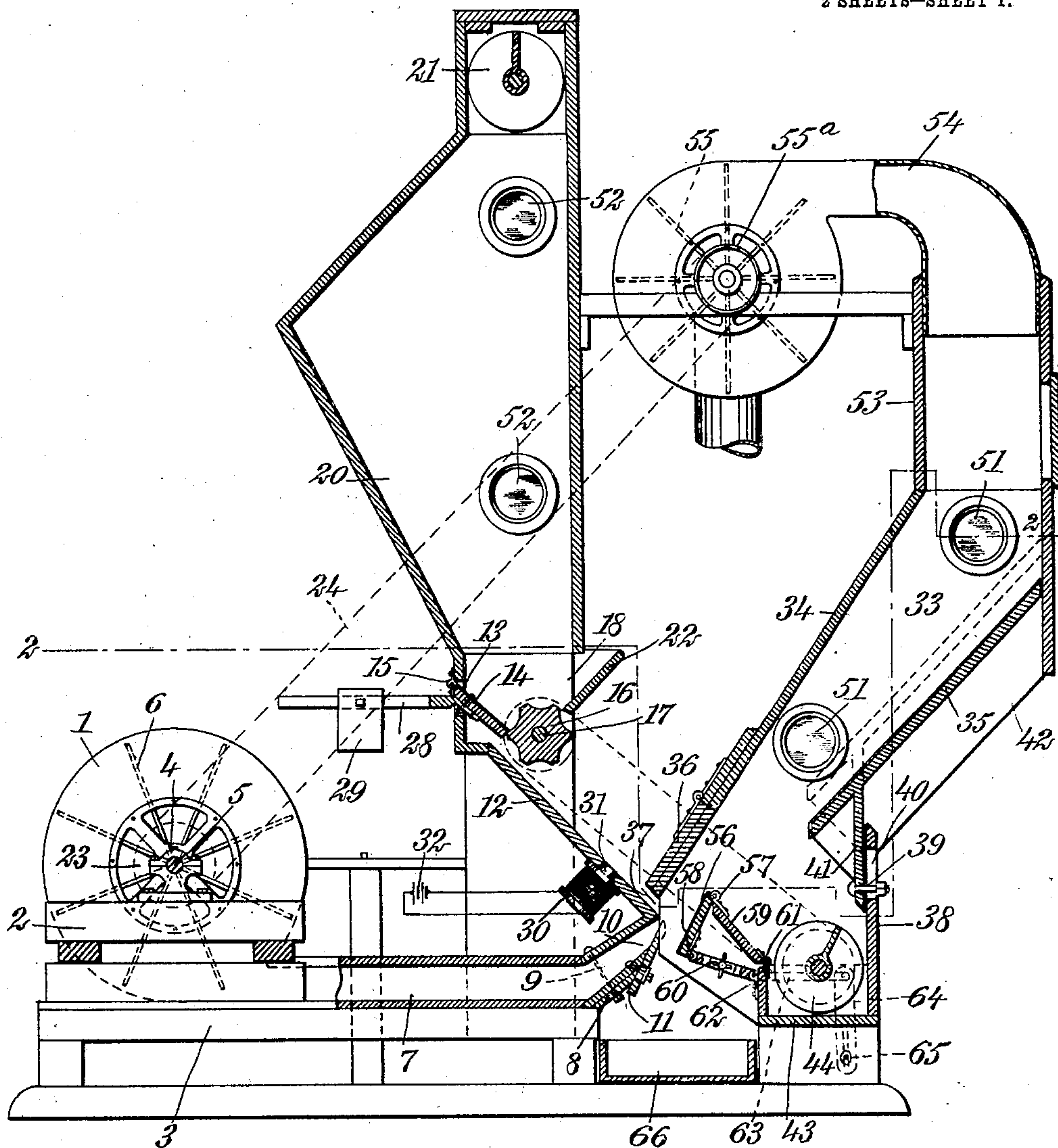


Fig. 1.

WITNESSES

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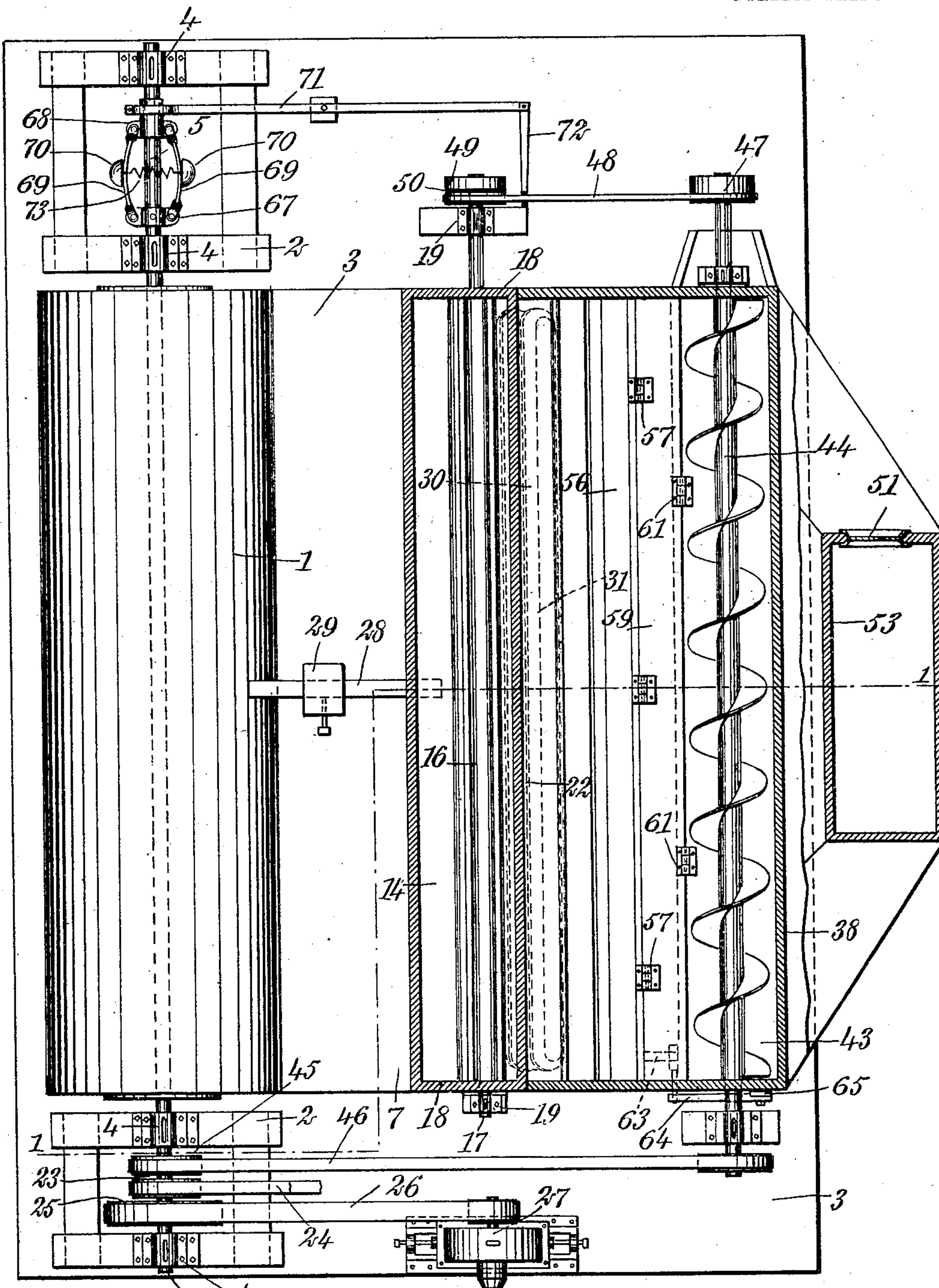
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Fig. 2.

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JOHN HENRY HEMPEN, OF ALEXANDRIA, LOUISIANA.

SEED-CLEANER.

No. 898,883.

Specification of Letters Patent.

Patented Sept. 15, 1908.

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To all whom it may concern:

Be it known that I, JOHN HENRY HEMPEN, a citizen of the United States, and a resident of Alexandria, in the parish of Rapides and State of Louisiana, have invented a new and Improved Seed-Cleaner, of which the following is a full, clear, and exact description.

This invention relates to seed cleansers, and is particularly useful in connection with apparatus for cleansing and freeing from foreign substances, cotton-seed, rice, wheat, corn and other grain.

An object of the invention is to provide a simple, strong and efficient seed cleanser which frees the seed from chaff and trash, as well as from particles of foreign matter or other impurities of higher specific gravity than the seed.

A further object of the invention is to provide a device of the class described which is automatic in operation, which can be adjusted for use in cleansing seeds or granular material of different kinds, and in which impurities capable of magnetic attraction are removed from the material by means of an electro-magnet.

A still further object of the invention is to provide a seed cleaner in which the feeding mechanism is so governed that the operation of the device is uniform at all times.

Another object of the invention is to provide a device of the class described, which will remove all impurities not capable of magnetic attraction and heavier than the material being cleaned, by rejecting these impurities gravitationally at the point where the air blast blows the material into the separator.

The invention consists in the construction and combination of parts to be more fully described hereinafter and particularly set forth in the claims.

Reference is to be had to the accompanying drawings forming a part of this specification, in which similar characters of reference indicate corresponding parts in both views, and in which

Figure 1 is a transverse section of the device on the line 1—1 of Fig. 2, and Fig. 2 is a transverse section on the line 2—2 of Fig. 1.

Before proceeding to a more detailed explanation of my invention, it should be understood that while the same is particularly useful in cleansing and freeing seeds and grains from impurities it can also be used in the separation of other granular material.

For various industrial purposes it is necessary to employ raw material such as seeds and grains, as free as possible from all impurities as well as dirt, dust, chaff, trash, fibers, etc. My cleansing apparatus is so designed that it is practically automatic in action and thoroughly separates the granular material from the impurities. To effect this I make use of an air blast which forces the material with the impurities of a lighter nature into a separator. The separator is so constructed that as the material progresses therein the velocity of the air current carrying it decreases, owing to the widening of the separator, and consequently a point is finally reached where the air blast is not of sufficient power longer to support the material, which falls upon a slide and then passes into the conveyer. The lighter impurities however, are carried further into the separator and are drawn out of the same by means of an exhaust fan; the impurities heavier than the material undergoing the cleaning operation automatically separate themselves from the material through the action of gravity, the air blast which forces the material into the separator not being sufficiently strong similarly to affect the heavier impurities. Furthermore, I employ an electro-magnet to gather impurities capable of magnetic attraction, such as fragments of iron and steel.

Referring more particularly to the drawings, 1 represents a blower casing mounted upon a suitable frame carried by the base of the cleaner. The frame 2 has bearings 4 in which is journaled a shaft 5 which extends through the casing 1 and carries the blades 6 of the blower. A substantially horizontal flue 7 is mounted upon the base of the device and communicates interiorly with the blower. The extremity of the flue remote from the blower is disposed upwardly at an angle with the horizontal, and at the lower side has a reinforcing plate 8 secured in position by means of bolts 9. At the lower edge of the flue is adjustably arranged a flute 10 movably held in position by means of bolts 11 arranged in slots of the flute. The flute, which forms the lower lip of the flue outlet can be so adjusted as to regulate the air blast leaving the flue. At the upper edge of the flue outlet is arranged a partition 12 inclined at an angle with the horizontal, and having the upper portion vertically disposed and provided with an opening 13. An adjustable back-board 14, is mounted by means of hinges 15

at the opening 13, and extends over the upper edge of the partition 12 toward the fluted roller 16, mounted upon a shaft 17, passing through the sides 18 of the housing and journaled in suitable bearing brackets 19. Arranged above the back-board and the fluted roller is a feeding hopper 20, having a conveyer or elevator 21 arranged above the same and supplied with material thereby. At the side of the roller remote from the back-board is an inclined board 22, arranged at an angle with the wall of the hopper thereabove and leaving an opening between this wall and itself. The back-board 14 has an arm 28, extending through the opening 13 to the outside of the housing and carrying a sliding weight 29, for a purpose which will appear hereinafter.

The partition 12 carries at the under side an electro-magnet 30, the core 31 of which extends through a suitable opening in the partition, and the coils of which are connected with a suitable source 32 of electrical supply. It will be understood that when the electro-magnet is energized, it will attract and hold all material capable of magnetic attraction which is mixed with the seed sliding down the partition from the feeding mechanism thereabove.

At the side of the partition remote from the blast fan is arranged a separator 33. The latter has upper and lower walls 34 and 35 respectively, arranged at an angle with the horizontal and diverging, so that the cross-sectional area of the separator is smallest at its lower end. At the lower end of the upper wall 34 is a hinged door 36 which, when closed, leaves a space 37 adjacent to the partition 12 for the passage of the material toward the outlet of the air flue 7. The door 36 gives access to the separator and to the space above the partition 12, for purposes of repairing or cleaning the parts, and extends beyond the lower edge of the lower wall 35 of the separator. The latter wall 35 of the separator is adjustably mounted upon the back wall 38 of the housing, by means of bolts 39 which are arranged slidably in slots 40 of the back wall, and pass through a vertically disposed portion 41 of the lower wall 35 of the separator. The latter has sides 42, which slide at the edges of the back wall 38 when the wall 35 is adjusted. Below the separator and underneath the lower edge of the back wall 35 is arranged a trough-like casing 43, in which is mounted a conveyer 44; the latter, together with the conveyer 21 is preferably of the helical type. The conveyer 44 is driven from a pulley 45 rigid with the shaft 5, by means of a belt 46, and at the end opposite to the belt 46 the shaft of the conveyer 44 has a rigid pulley 47; adapted to be operatively connected by means of a belt 48, with a rigid pulley 49, or a loose pulley 50, mount-

ed upon the shaft 17 of the fluted feeding roller. The separator 33 is provided with sight glasses 51, by means of which the operation can be examined by the person in charge. The hopper 20 is provided with similar sight glasses 52. At the upper end the separator has a flue 53 communicating with the inlet duct 54 of a suction blower 55, preferably driven from the shaft 5, by means of a pulley 23, on said shaft, connected by a belt 24 with a pulley 55^a on the shaft of the blower 55. The conveyer 21 is driven by any suitable means for the purpose. The shaft 5 also has mounted thereon a pulley 25, operatively connected by means of a belt 26, with a prime mover 27, of any suitable type, and serves to exhaust the air from the separator 33.

Adjacent to the flute 10 is arranged a cant board 56, mounted by means of hinges 57 and 58 upon carriers 59 and 60. The latter are arranged to swing by means of hinges 61 and 62 at the inner edge of the casing 43. An arm 63 is rigidly secured to the carrier 59, and at the end remote from the carrier, said arm is pivoted to the extremity of a link 64. The latter has a slotted portion in which is arranged a locking bolt 65, mounted upon the base of the device and serving to hold the link in a plurality of positions. By means of the link, the arm and the carriers, the cant board can be arranged in a plurality of positions with respect to the air flue outlet.

The back-board 14, the cant board 56, and the lower wall 35 of the separator are preferably faced with sheet metal to prevent excessive wear of the parts. It will be understood that the back wall 35 can be removed by taking out the bolts 39 to give access to the interior of the separator 33, and that where necessary, man-holes or other openings can be provided to facilitate the cleaning and repairing of the device.

The shaft 5 extends laterally beyond the blower casing at the end remote from the driving pulleys and has a fixed collar 67 and a slidable collar 68, connected by flat springs 69 which carry weights 70. The collars, the springs and the weights form a governor. The movable collar 68 is connected with a lever 71, which at the end remote from the collar has a pivoted belt controller 72, for shifting the belt 48 which it engages. If the shaft 5 revolves at too low a rate of speed, the weights 70 under the tension of a spring 73 and the flat springs 69, approach the shaft and slide the collar 68 away from the collar 67, thereby moving the lever 71 and actuating the belt controller to shift the belt from the rigid to the loose pulley. In consequence, the feeding roller ceases to operate and no more material is fed from the hopper until the fan upon the shaft 5 is again speeded up.

The operation of the device is as follows: The seed is fed from the hopper by means of

the fluted roller which revolves and allows the material to pass bit by bit on to the partition 12. As the material accumulates upon the back-board 14 the latter is moved outwardly, swinging the weight 29 upward to increase the opening between the back-board and the roller, and to permit a greater quantity of the material to pass therebeyond. The weight 29 can be adjusted for use in connection with different materials. As the material passes over the partition the impurities capable of magnetic attraction are removed therefrom by means of the magnet 30. The material then passes through the opening 37 and over the outlet opening of the air flue. The air blast immediately propels the material toward the separator, the cant board 58 serving as a guide. All impurities which are of such weight that the air blast is not powerful enough to propel them, fall into a trash tray 66 where they can be removed. The air blast propels the material into the separator until the increasing cross-sectional area of the same so weakens the blast that it can no longer support the material, which falls upon the lower wall of the separator and slides down the same to the conveyer which carries off the cleaned material. The impurities lighter than the material pass into the separator to a further point, being borne by the air blast, and are removed from the separator by means of the suction fan 55 which draws these impurities off. As the back of the separator is adjustable, the cross-sectional area of the same can be regulated for materials of different kinds. Similarly, the cant board can be adjusted to deflect the air blast carrying material toward the separator. In addition to this, the lip of the air flue outlet can be controlled and adjusted by means of the adjustable flute 10.

Having thus described my invention I claim as new, and desire to secure by Letters Patent:—

1. In a device of the class described, an air flue, means for forcing air through said air flue, said flue forming a tapering outlet provided with a lip slidable in the direction of the taper whereby said outlet can be adjusted, means for directing the material over said outlet, and an air-blast separator arranged to receive the material adjacent to said air flue outlet.

2. In a device of the class described, an air flue having a tapering outlet provided with an inclined flute adjustable in the direction of the taper whereby said outlet can be adjusted, means for forcing air through said flue, means for directing the material across said outlet of said flue, an air-blast separator, means for directing the material from said flue outlet into said separator, and means for adjusting said directing means.

3. In a device of the class described, a separator, air blast producing means for di-

recting material into said separator, pivoted carriers arranged between said means and said separator, a cant board pivoted upon said carriers, and means for holding said carriers in a plurality of positions.

4. In a device of the class described, feeding mechanism, an air flue having an outlet, means for forcing air through said outlet, means for conducting material from said feeding mechanism to said outlet, an air blast separator, a movable carrier, a swinging cant board arranged upon said carrier, and means for holding said carrier in a plurality of positions.

5. In a device of the class described, automatic feeding mechanism, an air flue having an outlet, means for forcing air through said outlet, means for conducting material from said feeding mechanism to said outlet, an air blast separator, a pivoted carrier, a swinging cant board arranged upon said carrier, and means for holding said carrier in a plurality of positions, said separator being adjustable to permit the cross-sectional area thereof to be altered.

6. In a device of the class described, an air blast separator, a flue for directing air into said separator, means for directing material between said flue and said separator, a cant board arranged adjacent to the outlet of said flue, carriers pivotally connected with said cant board, said carriers being mounted to swing, one of said carriers having an arm rigid therewith, and means for holding said arm in a plurality of positions.

7. In a device of the class described, an air flue having an outlet, means for forcing air through said flue, means for directing material across said outlet, a pivoted carrier having a cant board and arranged adjacent to said outlet means for holding said carrier in a plurality of positions, an air blast separator arranged to receive material from said outlet, said separator having walls diverging from the end adjacent to said outlet, one of said walls being adjustable in a direction parallel to itself and transverse of its length whereby the cross-sectional area of said separator can be altered, means for exhausting the air from said separator, and a chamber adapted to receive material from the lower wall of said separator.

8. In a device of the class described, an air flue having an outlet, means for forcing air through said flue, means for directing material across said outlet, pivoted carriers arranged adjacent to said outlet, a cant board pivoted upon said carriers, means for holding one of said carriers in a plurality of positions, an air blast separator having walls at an angle with the horizontal and at an angle with each other, the lower of said walls being adjustable, said separator having an opening to receive material from said flue, said separator being narrowest at said opening, means for

exhausting the air from said separator, a chamber arranged to receive material from the lower wall of said separator, and means for guiding material from said flue outlet into said separator.

9. In a device of the class described, a feeding hopper having an opening, a feeding roller at said opening, and an air flue, means for directing material from said feeding roller to the outlet of said flue, a fan for forcing air through said flue, a governor controlled by said fan, driving means for said roller, and means for operatively connecting said governor and said driving means of said roller, whereby said roller is caused to stop when said fan exceeds a predetermined rate of revolution.

10. In a device of the class described, feeding mechanism, means for producing an air blast at said feeding mechanism, an air blast separator arranged to receive the air blast from said means, and governing means controlled by said air blast producing means, said governing means controlling said feeding mechanism, whereby said feeding mechanism is caused to stop when said air blast exceeds a predetermined velocity.

11. In a device of the class described, feeding mechanism, means for producing an air blast at the discharge of said feeding mechanism, a separator arranged to receive said air blast, and means for automatically governing said feeding mechanism by said air blast producing means, whereby said feeding mechanism is rendered inoperative when said air blast producing means exceed a predetermined speed of operation.

12. In a device of the class described, feeding mechanism having an outlet, means for producing an air blast across said outlet, a governor operable by said air blast producing means, means for connecting said governor and said feeding mechanism, whereby the former controls said feeding mechanism, and a separator arranged to receive the air blast after the same passes beyond said feeding mechanism.

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

JOHN HENRY HEMPEN.

Witnesses:

JAS. ANDREWS,
L. J. HAKENYOS.