

H. K. HANSEN.
GRAIN SEPARATOR.
APPLICATION FILED APR. 23, 1906.

924,986.

Patented June 15, 1909.

3 SHEETS—SHEET 1.

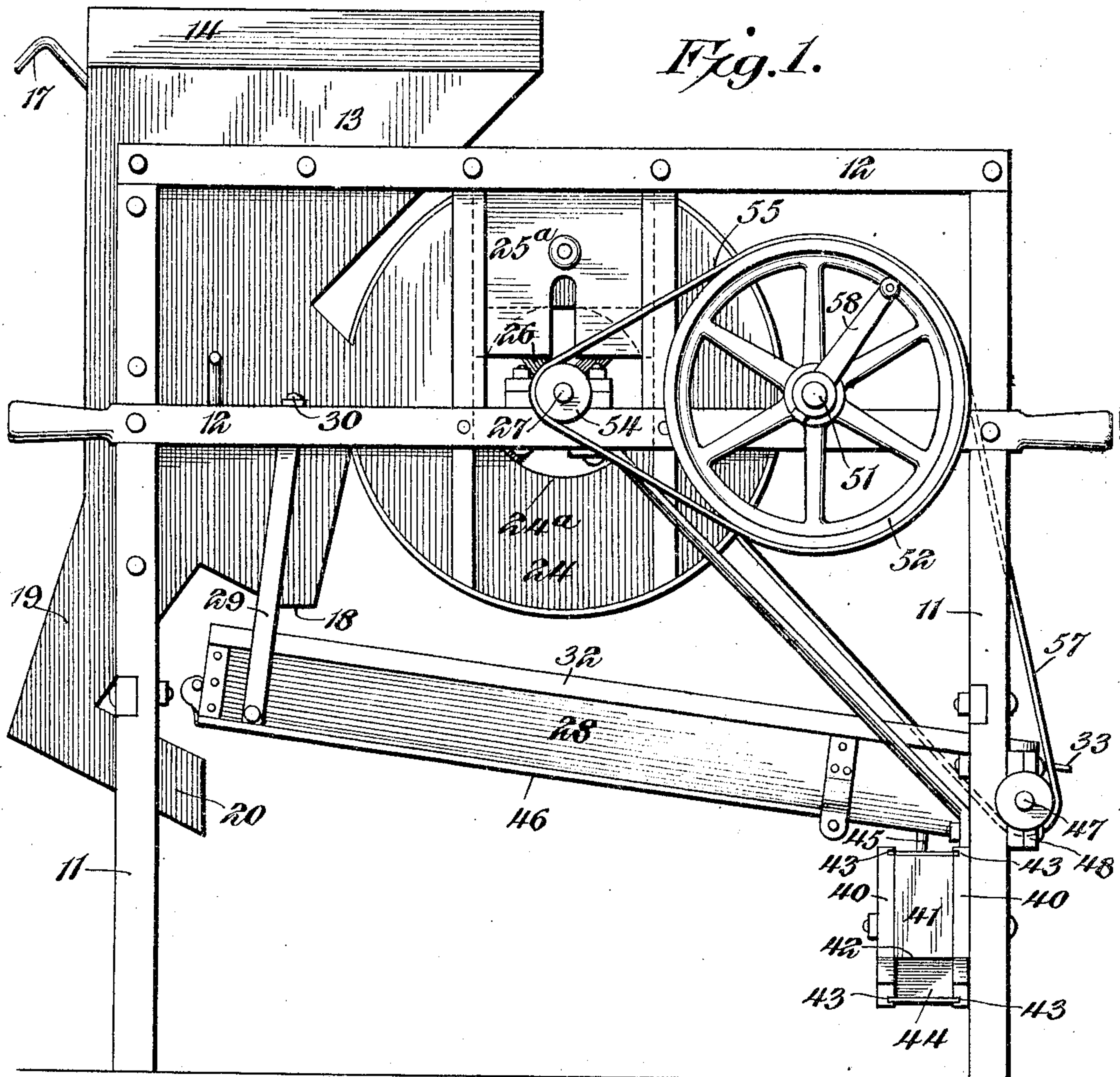
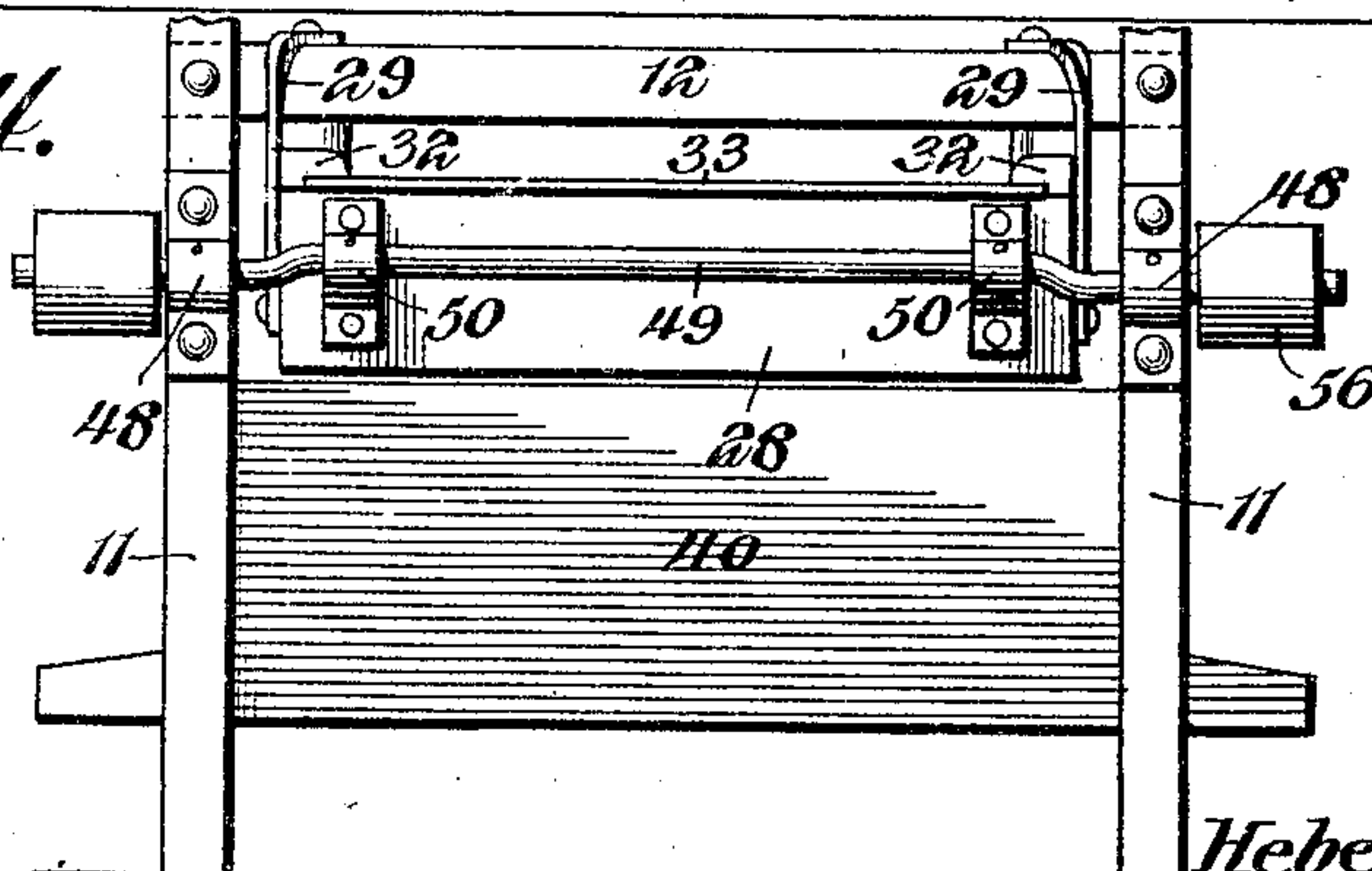


Fig. 4.



Inventor,
Heber K. Hansen,

Witnesses
Howard A. Orr.
B. J. Carter.

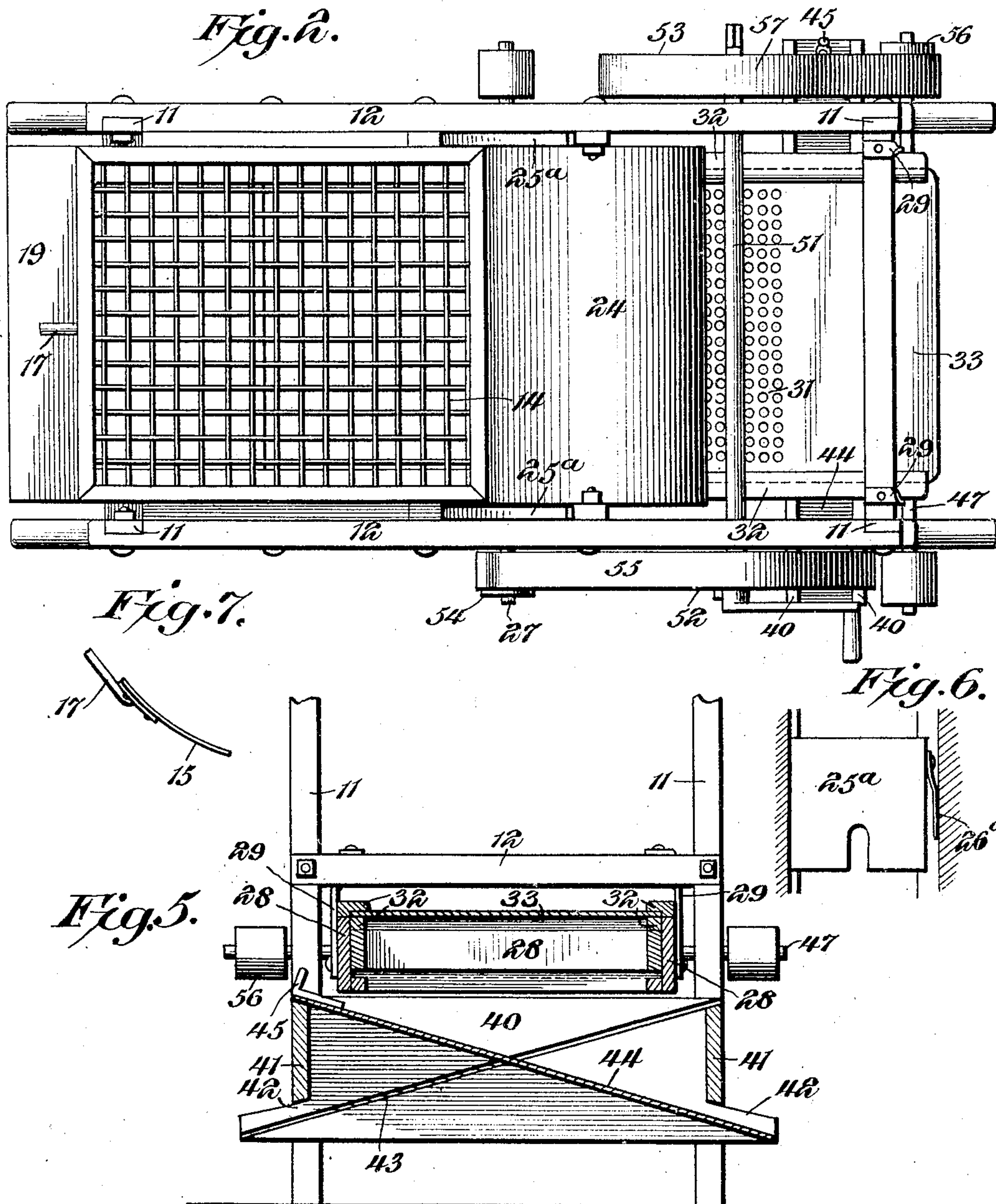
By
E. J. Siggers
Attorney

H. K. HANSEN.
GRAIN SEPARATOR.
APPLICATION FILED APR. 23, 1906.

924,986.

Patented June 15, 1909.

3 SHEETS—SHEET 2.



Heber K. Hansen, Inventor,

By

C. G. Siggers.

Attorney

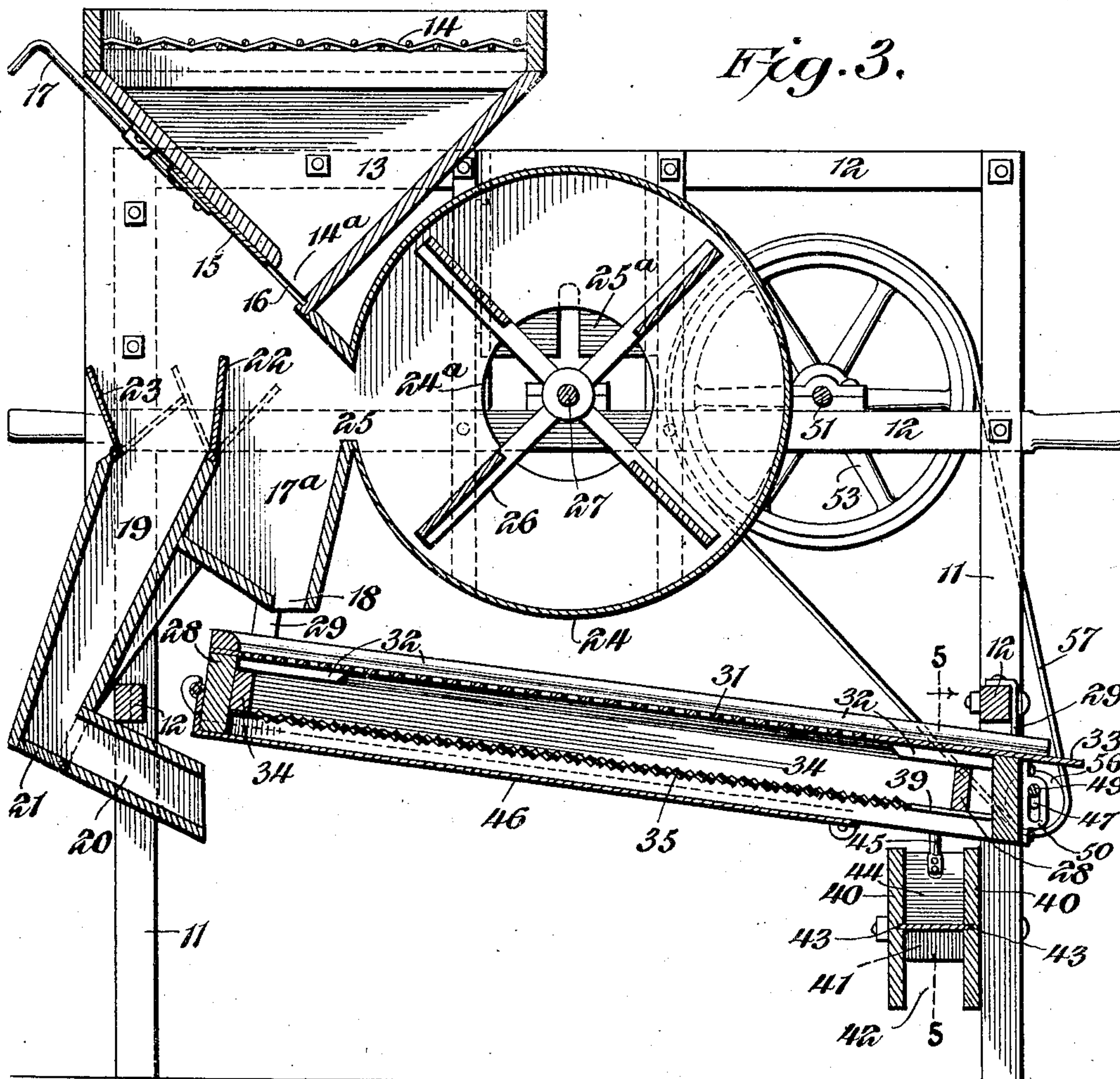
Witnesses
Howard D. Orr.

B. H. Foster.

APPLICATION FILED APR. 23, 1908.

Patented June 15, 1909.

3 SHEETS—SHEET 3.

 \mathbb{R}_f

E. G. Figgers.

Attorney.

Howard D. Orr.

B. G. Foster.

UNITED STATES PATENT OFFICE.

HEBER K. HANSEN, OF LOGAN, UTAH, ASSIGNOR OF ONE-FOURTH TO FRED TURNER AND ONE-FOURTH TO N. RALPH MOORE, OF LOGAN, UTAH.

GRAIN-SEPARATOR.

No. 924,996.

Specification of Letters Patent.

Patented June 15, 1909.

Application filed April 23, 1906. Serial No. 313,222.

To all whom it may concern:

Be it known that I, HEBER K. HANSEN, a citizen of the United States, residing at Logan, in the county of Cache and State of Utah, have invented a new and useful Grain-Separator, of which the following is a specification.

This invention relates to means for separating grain and seed of different characters.

One of the principal objects is to provide a novel combination of elements, whereby a thorough preliminary separation of chaff, dust and the like from the grain or seed, a secondary separation of the different grades of seed, and the final separation of the heavier trash and different types of seed or grain are successively accomplished.

The preferred embodiment of the invention is illustrated in the accompanying drawings, wherein:—

Figure 1 is a side elevation of the separator. Fig. 2 is a top plan view of the same. Fig. 3 is a longitudinal sectional view there-through. Fig. 4 is an end elevation of the lower portion of the machine, showing the means for shaking the shoe. Fig. 5 is a vertical sectional view on the line 5—5 of Fig. 3. Fig. 6 is a detail sectional view showing the inlet controlling gates for the fan. Fig. 7 is a detail view of the controlling gate for the feed hopper.

Similar reference numerals designate corresponding parts in all the figures of the drawings.

In the embodiment illustrated, a suitable frame is employed, comprising supporting standards 11, with longitudinal and transverse bars 12 fastened thereto. A feed hopper 13 is mounted on one of the upper corners of the frame, and preferably has a protecting screen 14 of comparatively large mesh arranged upon it, said screen permitting the passage of grain and the like, but prohibiting the introduction of large bodies or articles, which may be mixed with the grain to be cleaned. In the present embodiment, the screen 14, is shown as horizontally arranged, and it is evident that it may be located at an inclination, so that articles which will not pass therethrough will gravitate therefrom. The bottom of the hopper is provided with a discharge opening 14^a, controlled by a sliding gate 15, operating in grooves 16, and having a suitable handle 17. As shown in Fig. 7, the

gate 15, prior to its introduction into the grooves, is curved so that it will frictionally engage the walls of said grooves, and thus be maintained in any desired position without the necessity of fastening means.

Arranged directly beneath the discharge opening 14, and supported in the frame, is a conduit that is in the form of a conducting hopper 17^a, having a comparatively large receiving mouth at its upper end and a smaller discharge opening 18. Disposed directly in rear of the conducting hopper 17^a is another conduit 19, the front wall thereof constituting a portion of the rear wall of the hopper 17^a. The conduit 19 also has an upper receiving mouth, and furthermore is provided at its lower end with an offset discharge spout 20. A trap door 21, located in the bottom of the spout 20 at its junction with the main body of the conduit, is movable across the spout, and thus provides an opening in said bottom, as will be evident by reference to Fig. 3. The inlet mouths of the conduits 17^a and 19 are disposed in spaced relation to the bottom of the feed hopper 13, and hinged on the rear walls of said conduits are deflector leaves 22 and 23, the leaf 22 swinging across the said space, and being movable over the inlet mouth of the hopper 17^a, the leaf 23 in like manner moving across the space and being movable to a position to entirely close the conduit 19. A fan casing 24 has a delivery throat 25 for directing a blast of air through the space between the conduits and feed hopper, and said casing has inlets 24^a, controlled by sliding gates 25^a. These gates carry friction springs 26^a, one of which is shown in Fig. 6, said springs serving to hold the gates in different positions. In the casing is arranged a suitable rotary fan 26 carried on a shaft 27 that is journaled on certain of the side bars of the frame.

A shaking shoe is suspended from the supporting frame, and comprises an oblong frame 28, suspended at an inclination by straps 29, the upper set of straps being held by fasteners 30 that permits the upper end of the shoe to be raised or lowered. This frame carries an upper comparatively coarse screen plate 31 that is fastened between upper and lower strips 32. The lower strips detachably fit within the frame 28, the upper strips constituting flanges that prevent the material moving from the sides of the screen plate. This plate 31 has a lower imperforate apron

33, which extends over the lower end of the frame, and projects some distance beyond the same, as shown in Fig. 3.

Detachably located within the shoe frame 28 is another frame 34, to which is secured a novel separating screen 35. No claim is made herein to this screen, as the same constitutes the subject-matter of a divisional application filed on April 3, 1907, Serial No. 366,190. The said screen 35 terminates short of the lower end of the frame 28 to provide a discharge opening 39, and beneath this opening is located a reversible delivery spout. The spout comprises side walls 40 secured to the adjacent standards, and connected at their ends by end walls 41, the lower portions of the side walls projecting beneath the end walls 41, as shown at 42. The said side walls 40 have oppositely inclined sets of grooves 43 in their inner sides, and a removable bottom plate 44 is slidable in either set of grooves, being preferably provided with a handle 45, by means of which it may be removed and inserted. By this arrangement, the bottom 44 can be located at an inclination in either direction, so that the spout may be made to deliver from either side of the machine. It is believed that this will be evident by reference to Fig. 5. Carried by the under side of the shoe is a suitable grain pan 46 that is secured to the frame 28 in any suitable manner, and terminates short of the above described delivery spout. The shoe is actuated by a shaft 47, journaled, as shown at 48 on certain of the standards 11, and having an eccentric portion 49 that operates in boxings 50, secured to the end of the shoe frame 28.

The machine can of course be either power or manually operated. In the present embodiment, the same is to be run by hand. Therefore, a drive shaft 51 is journaled on the frame and projects beyond the sides thereof, this shaft having pulleys 52 and 53 on its projecting portions. The pulley 52 is connected to a pulley 54 on the fan shaft 27 by a belt 55 and the pulley 53 is connected to a pulley 56 on the shaking shaft 47 by a belt 57. The drive shaft 51 projects beyond both pulleys 52 and 53, and a handle crank 58 is arranged to be attached to either end.

The operation of the machine may be briefly described as follows: The material to be cleaned and separated is introduced into the hopper 13, and is fed therefrom at any desired rate, the flow being of course controlled by the gate 15. If now, the fan is in operation, it will be apparent that the blast therefrom will operate transversely of the stream of material, flowing from the discharge opening 14^a of the hopper, and all chaff, dust, and the like will be blown from the rear of the machine. The heavier grain and material will enter the conduit or hopper 17^a, the same being controlled in a manner

well understood by the deflector leaf 22. The lighter and less valuable grain will be blown rearwardly and enter the conduit 19, the size of the mouth of which is controlled by the deflector leaf 23. The grain passing into the conduit 19, will gravitate there-through and either be discharged through the spout 20 or through the opening controlled by the trap 21. The heavier material and grain, however, which enters the hopper 17^a, will pass therefrom on to the shaking shoe. The large articles, such as unthreshed heads, sticks and the like, which have passed the screen 14, will move downwardly over the screen 31, and be delivered from the apron 33. The grain, however, will pass through the opening of the screen 31, and fall upon the screen 35. One class of the grain will not pass therethrough but thereover, and consequently will find its way into the discharge spout 40. The material, which does pass through said screen 35, will be moved downwardly upon the grain pan 46, and drop from the end of the same. As a result, it will be seen that there are six distinct separations in this very simple structure, so that the grain will not only be cleaned, but effectively separated. Moreover by reversing the chute bottom and securing the handle crank on the opposite side of the shaft 51, the machine can be operated from the opposite side. Moreover, the structure as a whole is open to change and modification within the scope of the claims hereto appended, and is not limited to the exact details and arrangement shown.

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

1. In a separator of the character described, the combination with a supporting frame, of a feed hopper mounted thereon and having a lower discharge opening, a gate for controlling the discharge opening, conduits having upper receiving mouths located beneath and in spaced relation to the feed hopper, one of said conduits extending below the other and having an offset delivery spout, deflector leaves pivoted on the upper ends of the rear walls of the conduits, a fan casing having a delivery throat communicating with the space between the feed hopper and conduits, a rotary fan located in the casing, a shaking screen supported at an inclination on the frame and having its upper end disposed beneath the shorter conduit, the other conduit extending below the upper end of the screen, and means for rotating the fan and shaking the screen.

2. In a separator of the character described, the combination with feeding means, of a fan, a screen that receives the material, means for actuating the screen, and a delivery spout located beneath the discharge end of the screen and comprising side walls and

end walls connecting the side walls and terminating short of their lower edges, the portions of said side walls beneath the end walls projecting beyond the latter, said side walls
5 having oppositely inclined sets of grooves extending beneath the end walls and in the projecting portions of such side walls, and a detachable bottom that fits in either set of grooves and extends the length of the spout.
10 3. In a separator of the character described, the combination with a supporting frame, of a feed hopper mounted thereon and having a lower discharge opening, conduits having upper receiving mouths located side
15 by side beneath and in spaced relation to the feed hopper, one of said conduits extending below the other and having an offset delivery

spout, deflector leaves arranged between the receiving mouths of the conduits and the discharge opening of the feed hopper, a fan for
20 delivering a blast of air between the feed hoppers and conduits, a shaking screen supported at an inclination on the frame and having its upper end disposed beneath the shorter conduit and above the offset delivery
25 end of the longer conduit, and means for rotating the fan and shaking screen.

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

HEBER K. HANSEN.

Witnesses:

J. Z. STEWART, Jr.,
C. T. BARRETT.