

No. 689,258.

Patented Dec. 17, 1901.

G. WALTER.
MIDDLINGS PURIFIER.

(Application filed Nov. 4, 1899. Renewed Oct. 17, 1901.)

(No Model.)

3 Sheets—Sheet 1.

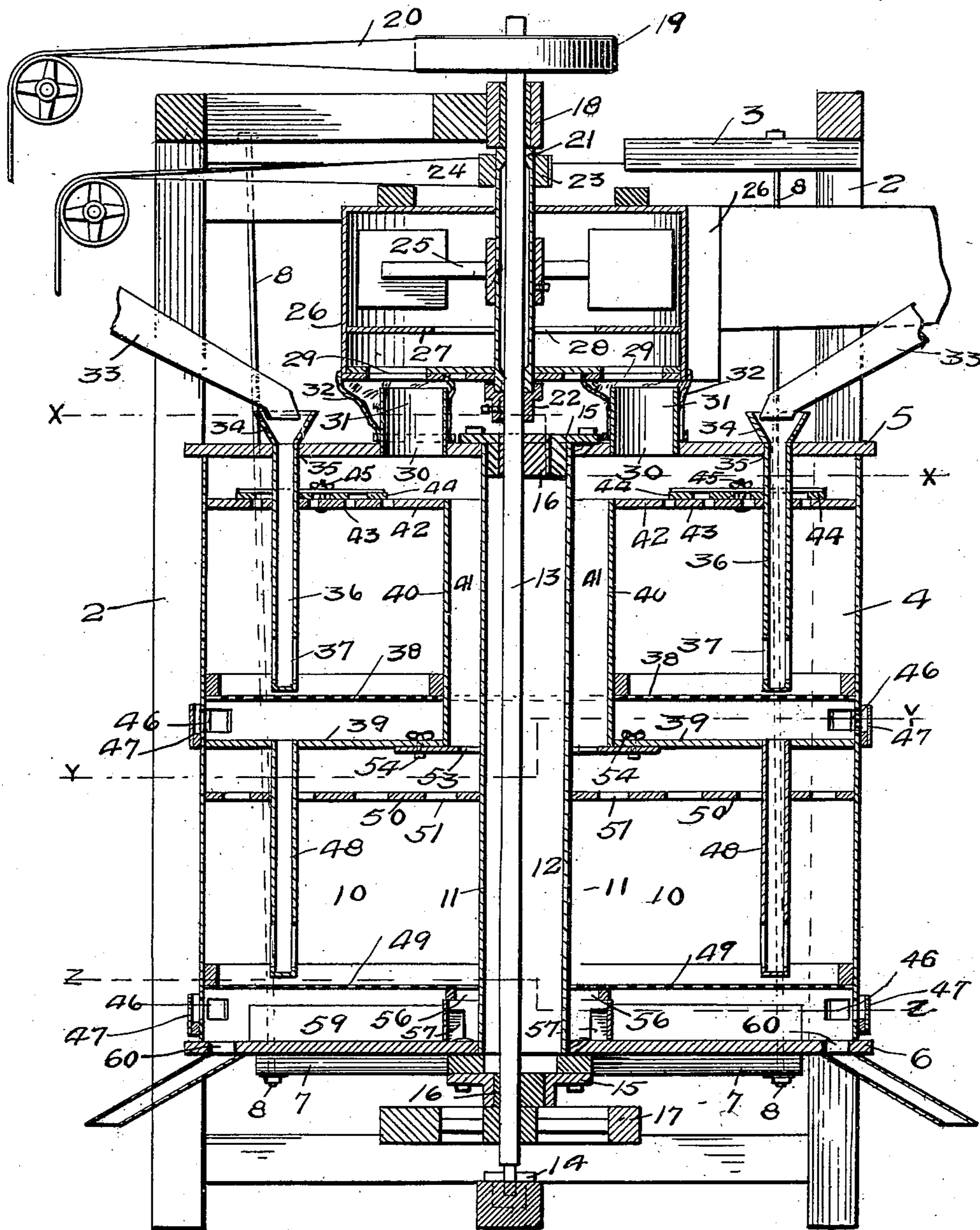


FIG. 1.

WITNESSES

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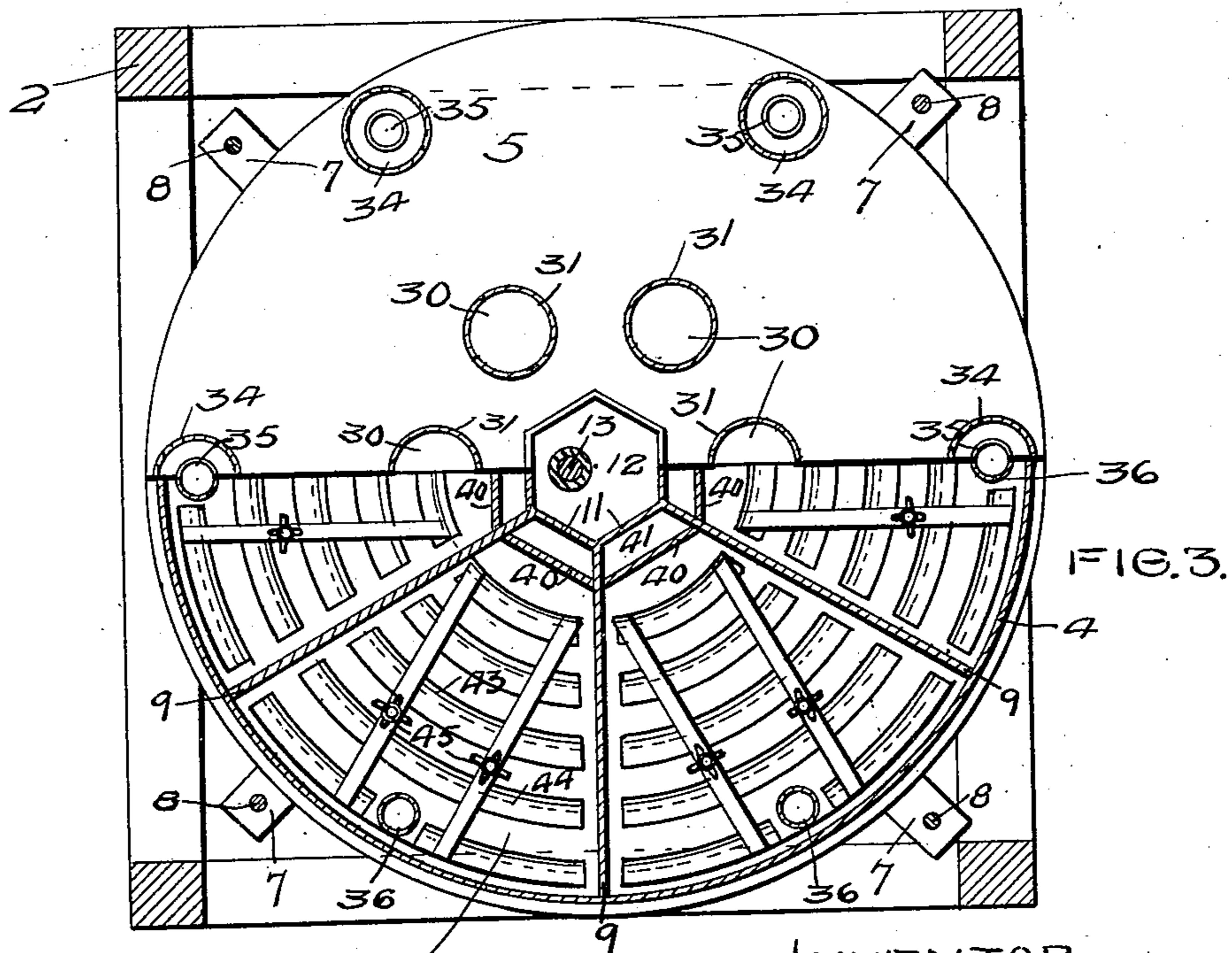
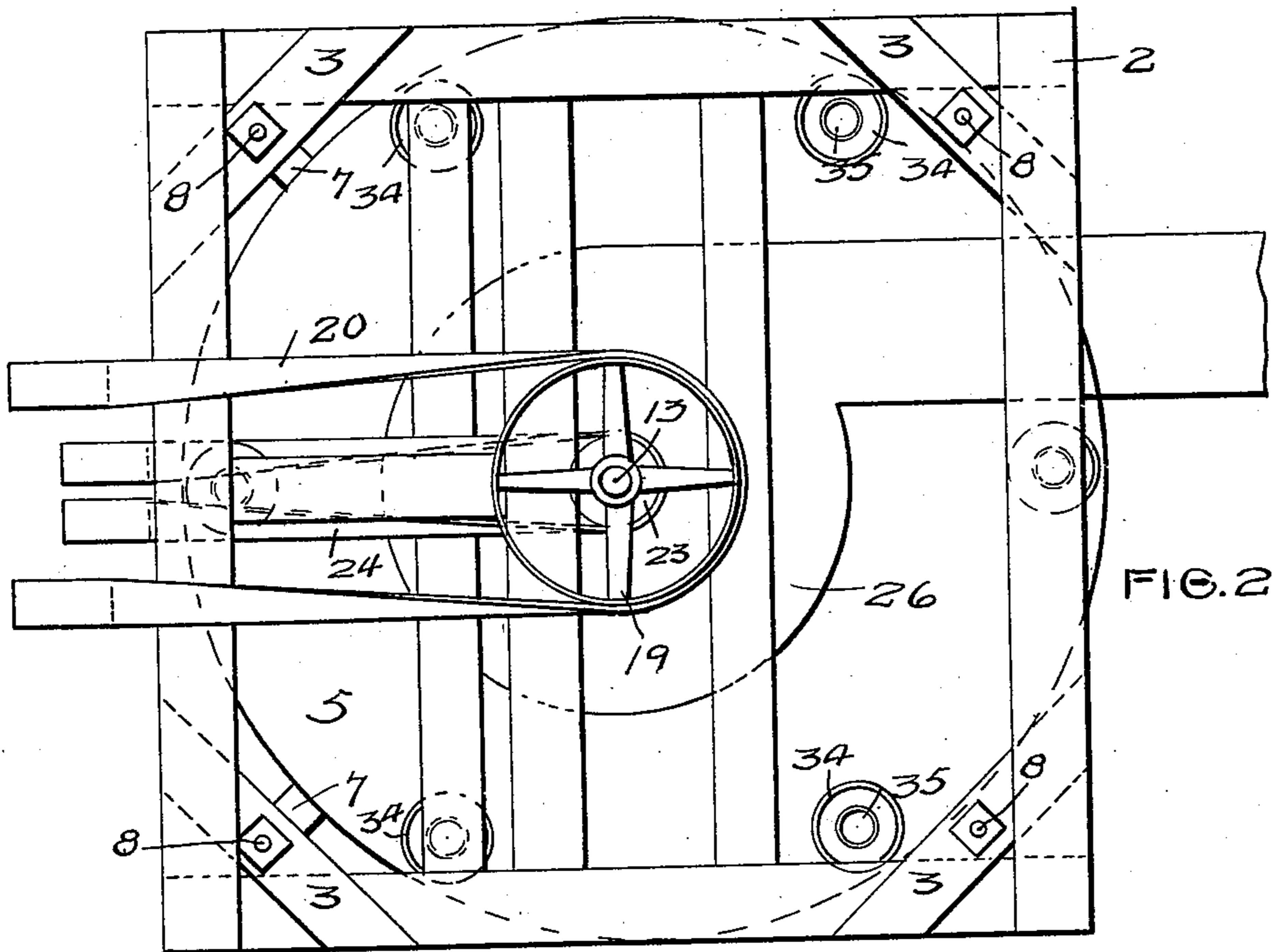
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(No Model.)

3 Sheets—Sheet 2.



WITNESSES

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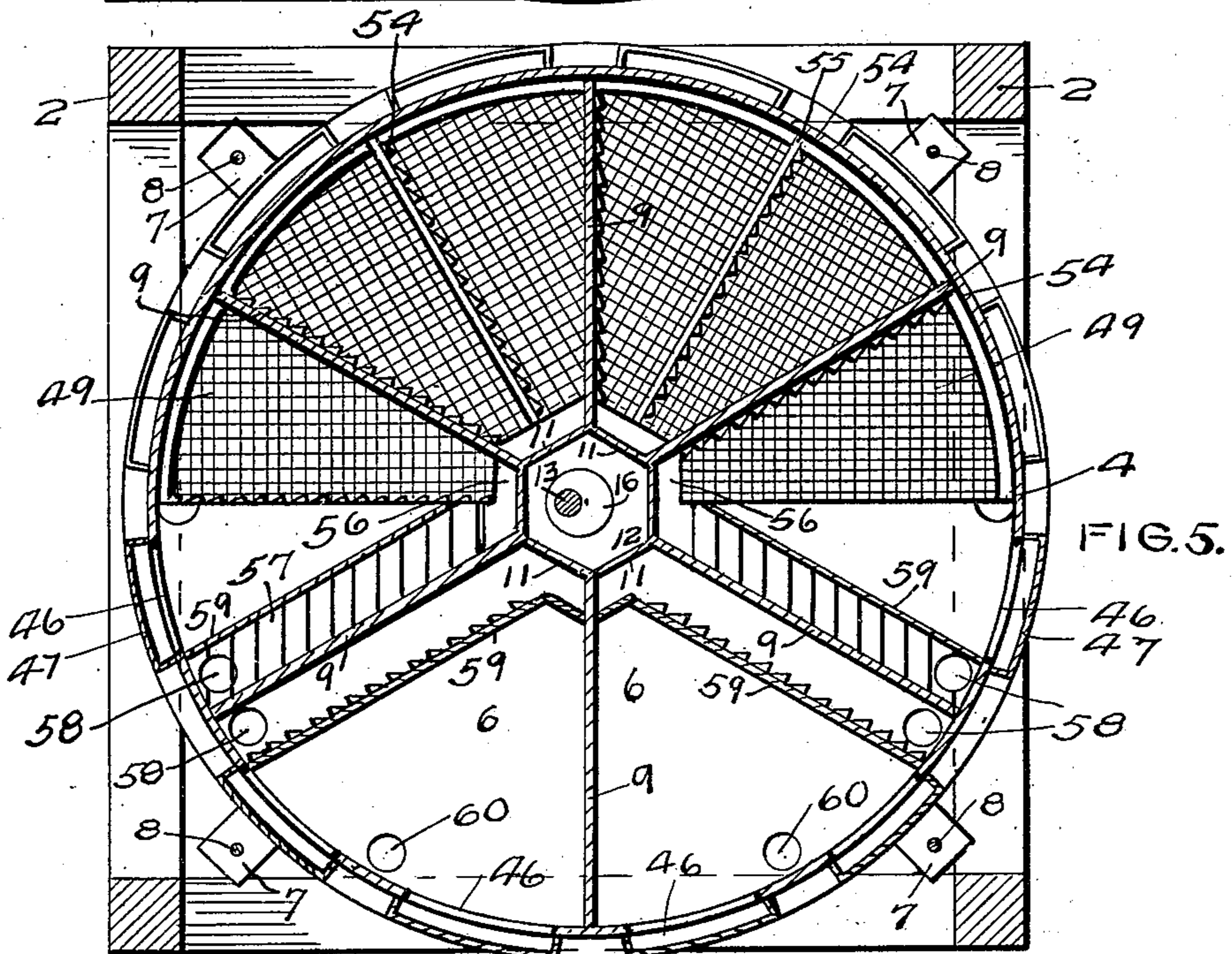
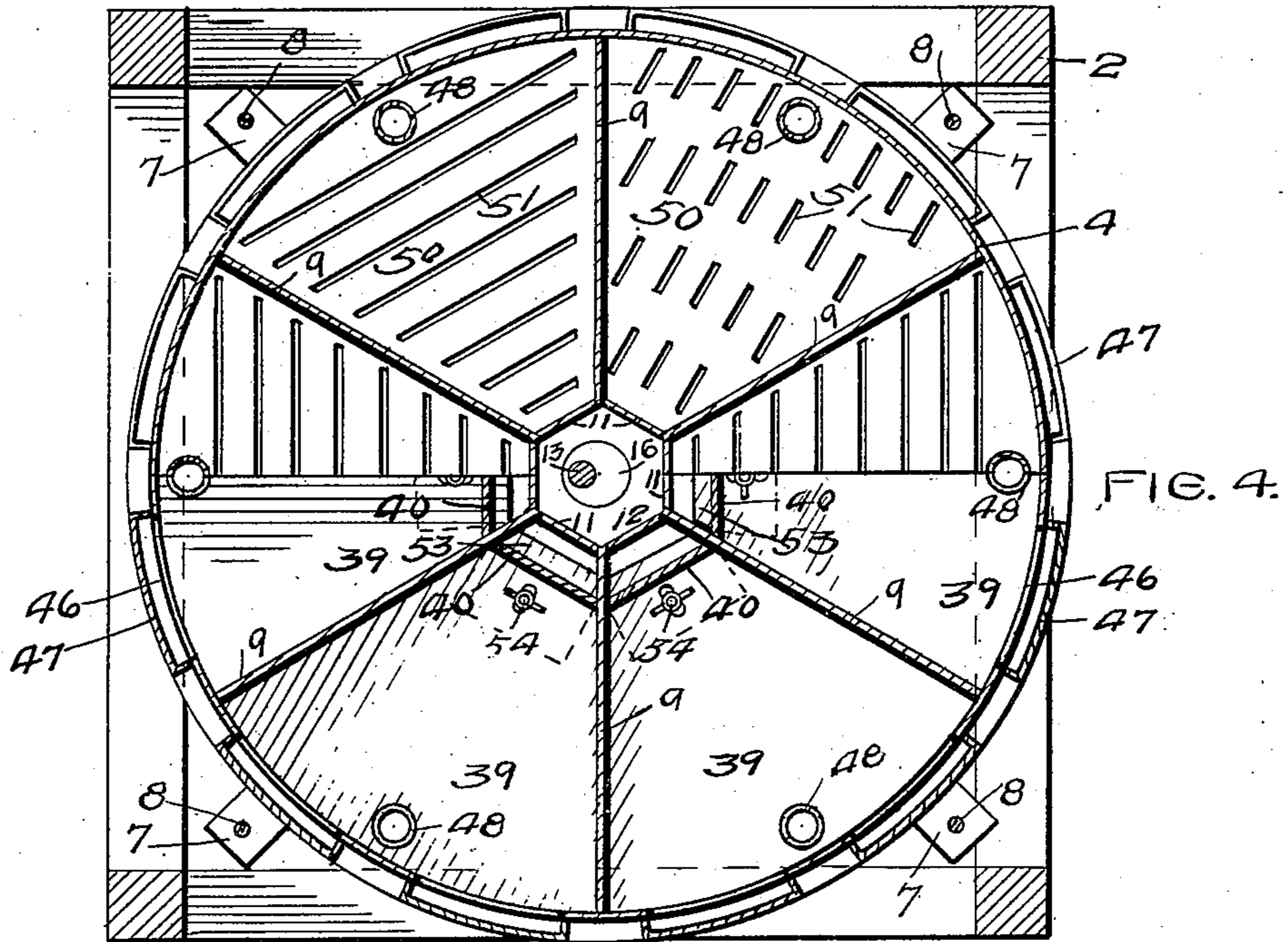
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3 Sheets—Sheet 3.



WITNESSES
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UNITED STATES PATENT OFFICE.

GEORGE WALTER, OF MARYSVILLE, KANSAS.

MIDLINGS-PURIFIER.

SPECIFICATION forming part of Letters Patent No. 689,258, dated December 17, 1901.

Application filed November 4, 1899. Renewed October 17, 1901. Serial No. 79,028. (No model.)

To all whom it may concern:

Be it known that I, GEORGE WALTER, of Marysville, Marshall county, Kansas, have invented certain new and useful Improvements in Middlings-Purifiers, of which the following is a specification.

My invention relates to machines for purifying middlings of dust, fine flour, and particles of bran; and the primary object of the invention is to provide a machine of such construction that several grades of stock may be placed therein and purified at the same time, thus combining in one the functions and efficiency of several machines.

A further object is to provide a machine wherein the dust and fine flour are first taken out of the material, then the particles of bran, and finally the coarser middlings separated from the finer.

A further object is to provide a purifier that is simple and compact in construction, and consequently cheap to manufacture and occupying but little space, and, easy running, is therefore economical to operate.

The invention consists generally in a casing having a rotating or gyrating motion, the interior of said casing being divided into a series of vertical compartments or chambers wherein the separating devices are arranged each independent of the other.

Further, the invention consists in providing means for maintaining independent currents of air through the several compartments or chambers.

Further, the invention consists in improved means for regulating the currents of air within the chambers.

Further, the invention consists in improved means for feeding the stock upon the separating devices within each chamber.

Further, the invention consists in improved means for separating the coarser and finer middlings just before the material leaves the machine.

Further, the invention consists in various constructions and combinations, all as hereinafter described, and particularly pointed out in the claims.

In the accompanying drawings, forming part of this specification, Figure 1 is a vertical sectional view of a middlings-purifier embodying my invention. Fig. 2 is a plan view

of the same. Fig. 3 is a horizontal section on the line $x x$ of Fig. 1. Fig. 4 is a horizontal section on the line $y y$ of Fig. 1. Fig. 5 is a similar section on the line $z z$ of Fig. 1.

In the drawings, 2 is an upright frame, of wood or other suitable material, preferably square in cross-section, having short braces 3 at its upper corners, whereon the casing of the machine is suspended or hung. The casing 4 is shown circular in the drawings, but may be made square or polygonal, and is provided with a top 5 and a bottom 6, to the under side of which bars 7 are secured, and projecting beyond the edges of said casing are secured to the rods 8, that are in turn at their upper ends supported by the braces 3 and permit a swinging or gyrating movement to be imparted to the machine. The interior of the casing 4 is divided by partitions 9 into a series of independent vertical compartments or chambers 10. I have shown six of these in the drawings accompanying this specification, but there may be a greater or less number, if preferred, according to the number of grades the operator desires to purify at the same time, and at the inner ends of said partitions I provide a wall 11, forming a vertical hexagonal chamber 12 in the center of the casing. I do not, however, confine myself to the hexagonal form of this chamber, as it may be round or square or any other desired form, according to the shape of the compartments into which it is desired to divide the interior of the casing. Within the chamber 12, at one side of the center thereof, is an upright shaft 13, supported at its lower end in a step 14.

Securely bolted to the top and bottom of the casing at each end of the chamber 12 are eccentric straps or rings 15, and turning in said straps or rings are eccentrics 16, secured to the shaft 13, and whereby a swinging or gyrating motion is imparted to the casing as said shaft is revolved. At the lower end of the shaft 13 is a balance-wheel 17, and at its upper end said shaft is mounted in a bearing 18 and provided with a pulley 19, over which a belt 20 passes to a suitable source of power. Below the bearing 18 on said shaft is a sleeve 21, supported at its lower end in a hub 22 and its upper end provided with a pulley 23, driven by a belt 24 at a considerably higher speed than that of the machine itself, pref-

erably in the ratio of three to one. Below the pulley 23 on said sleeve is secured a fan 25, inclosed by a stationary casing 26, provided with a horizontal partition 27, dividing its interior into an upper and lower compartment, said partition having a central opening 28 around said sleeve, permitting communication between said compartments. The bottom of said fan-casing is provided with a series of openings 29, leading into the lower compartment of the fan-casing, there being as many of these openings as there are vertical compartments in the machine-casing beneath, and the top 5 of said machine-casing is provided with a corresponding number of openings 30, in which pipes 31 are inserted, their upper ends being beneath said openings 29 to permit free circulation of air through the machine up into the fan-casing. I prefer to connect the pipes 31 with the fan-casing by hoods 32, which prevent the escape of air and the material carried thereby, while permitting the swinging or gyrating motion of the machine independently of the stationary fan-casing.

As heretofore stated, the interior of the casing 4 is divided into a series of vertical compartments, and these compartments are each independent of the other, and I prefer to arrange in each a complete system of purifying devices comprising sieves of different mesh, means for regulating the air-currents, spouts, and gathering devices, thus permitting the machine to be used for purifying or separating different grades of middlings at the same time, and I may employ sieves of different mesh in each chamber, according to the character of the material to be purified. I am thus able to combine the mechanism of several purifying machines in one, producing a compact apparatus and effecting a considerable saving in the power required to clean or purify a certain quantity of stock in a given time. To this end I provide a series of spouts 33 and a corresponding number of hoppers 34, arranged over openings 35 in the top of the machine-casing and leading into the interior of the same, there being as many openings with their respective spouts and hoppers as there are separate vertical compartments within the machine-casing. The separating or purifying devices within the machine-casing are substantially the same for each compartment or chamber, except with respect to the mesh of the sieves, and a description of the apparatus of one chamber will therefore suffice for all; but it must be understood that I do not confine myself to the use of the same number of sieves and other purifying devices in each of the several chambers, as a larger number of sieves may be employed in some chambers than in others, and in various ways the devices may be modified to suit the condition and grade of the stock that it is desired to pass through the machine.

Depending from the openings 35 into each chamber is a spout 36, having a closed lower

end and slots 37 in its side walls, and beneath and near the lower end of the spout 36 is a comparatively coarse sieve 38, upon which the material falling through the spout out of the slots 37 is discharged. Beneath each sieve 38 is a gathering-board 39, having at its inner end a vertical division wall or partition 40, forming with the wall of the chamber 12 and a partition-wall 9 a vertical air trunk or passage 41 and connected at its upper end to a horizontal floor 42, that is provided with a series of slats 43, transverse or radial, as preferred, adapted to be closed by a slide 44, that is regulated by means of a thumb-screw 45. The wall of the casing is provided with openings 46, leading into the space between the screen 38 and the gathering-board 39, and upon the outer wall of the casing I prefer to arrange a ring 47, that projects up over said openings and prevents any of the material from being thrown out through the same, while permitting air to pass into the space between the screen and the gathering-board. As the current of air passes through the material upon the screen the dust and fine flour will be taken up and carried up through the openings 43, and thence into the fan-casing to be discharged through the opening in the wall thereof, the volume of said current being regulated by means of the slide 44. The motion of the machine shakes the bran and remaining portion of the stock through the sieve 38 upon the gathering-board, which is provided with a spout 48, corresponding to the spout 36, heretofore described and into which the material is fed by the movement of the machine. Beneath the lower end of said spout 48 is a screen 49, below which in the wall of the casing is an opening and a ring corresponding to the ring described above. Near the upper end of the spout 48 is a horizontal plate 50, provided with a series of holes or perforations 51, and at the lower end of the air-trunk 41 is a slide 53, regulated by a thumb-nut 54. The stock falling through the spout 48 upon the sieve 49 is evenly distributed thereon by the gyrating motion of the machine, and the air-current passing up through the stock from the opening 46 gathers up the lighter particles of bran and conveys the same through the perforations in the plate 50 up through the air-trunk 41 into the fan-casing from whence it is discharged through the opening therein. The plate 50 causes the current of air to be evenly distributed over the screen, and the slide 53 permits the operator to control the volume of the air-current.

Upon one side of the sieve 49, at the bottom of the dividing-partitions, I prefer to form a series of teeth or projections 54, and near the middle of said screens a rib 55, having on one side a series of teeth corresponding to those upon the side of the partition-wall. These teeth aid in advancing the material toward the inner end of the sieve, which otherwise would dance around in a circle without advancing. Each sieve 49 in the machine that

I have herein shown is in the form of a segment of a circle and at its inner end is cut away, forming a space 36 between the end of the screen and the wall of the chamber 12.

5 As the stock falls through the spout 48 upon the screen 49 the particles of bran will be picked up and carried away by the air-current, the purified middlings will fall through the screen, and the heavier coarser tailings

10 will be moved by the gyrating motion of the machine, aided by the teeth 54, toward the center thereof and be discharged through the openings 56 into radial passages 57, that lead to discharge-holes 58 near the circumference

15 of the part 6. I prefer to provide one of these passages 57 in the bottom of each chamber, beneath each of the screens 49, and one of the partition-walls 9 and a parallel division-board 59 forming the sides of each passage,

20 and on the bottom of the same I prefer to arrange cross-slats, forming steps which serve to advance the material from the center toward the discharge-opening during the gyrating motion of the machine. Instead of providing slats on the bottom passage I may

25 form a series of teeth in the side of the division-board, as shown in the drawings, said teeth having the same functions as the cross-slats to advance the material toward the discharge-opening. I also provide in the bottom

30 of each chamber beneath the screen 49 a hole or discharge-opening 60, through which the purified middlings that drop through the sieve 49 upon the bottom 6 are discharged.

35 Instead of cutting recesses or indentations in the sides of the sieves and the division-walls forming the series of teeth above referred to I may secure slats to the sieves and walls and provide a series of serrations or

40 teeth in the edges of the slats. I prefer to use the tapering or segmental form of sieve which I have described, as the body of material moving over the sieve through the swinging or gyrating motion of the machine

45 will gradually become less as it moves toward the center, and as the sieve grows narrower it accommodates itself to the decreasing bulk of the material, and the result is that a sheet of stock of uniform thickness is spread over

50 each sieve during the operation of the machine.

The operation of my improved purifier is as follows: The middlings having been graded according to the sieves through which it is desired to pass the stock, the material is fed

55 through the spouts and hoppers into the depending spouts 36 and falls upon the sieves at the lower ends thereof. The machine having been set in motion, the material is moved

60 back and forth over the sieves, and the air-current established by the suction-fan lifts the dust and finer particles of flour that adhere to the middlings and carries the same up through the slots in the plate 42 and into the

65 fan-casing to be blown away. A further separation is also effected of the dust and fine flour from the middlings as the material falls

from the sieves 38 upon the gathering-boards beneath. The motion of the machine causes the material to move over the gathering-boards and fall into the spouts 48, from which it is discharged upon the lower set of sieves 49. The purified middlings drop through these sieves upon the bottom of the casing and are from thence discharged into a suitable receptacle. The tailings and heavier coarser particles are advanced by the motion of the machine over the sieves 49 from the circumference toward the center and drop from the ends of said sieves through the opening 56 into the passages beneath and thence to discharge-openings near the circumference of the casing. During the period that the material is moving over the sieves 49 it is subjected to a strong current of air, which picks up the lighter particles of bran and carries the same up through the air-trunk 41 to the fan-casing. The middlings are thus separated from dust, fine flour, and particles of bran and pass out at the bottom of the machine in a purified condition, and as each of the chambers within the casing is independent of the others the operator is able to purify as many different grades of stock as there are independent chambers in the machine, sieves of different mesh being employed, according to the grade of stock that it is desired to pass through the machine.

I am aware that the separating devices and their arrangement within the machine may be modified considerably; also, the position of the suction-fan and its connection with the gyrating machine, and in various other ways the mechanism that I have herein shown and described may be altered, and I therefore do not wish to be confined to the details of construction herein shown and described.

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

1. In a middlings-purifier, the combination, with a gyrating casing divided by vertical partitions into a series of independent compartments, of a suction-fan arranged above said casing and having an independent connection with each of said compartments through the top of said casing, a sieve 38 provided in each of said compartments, and stationary with respect to said casing, independent spouts provided in the top of said casing and adapted to deliver the material upon said sieves, a slotted floor or plate provided in the upper part of each of said compartments above said sieves, means for regulating currents of air through said slots and said casing being provided in its walls beneath said sieves with air-inlet openings 46 whereby when said fan is operated, a current of air will be established vertically in each compartment through said sieves and the material thereon, substantially as described.

2. In a middlings-purifier, the combination, with a gyrating casing divided by vertical partitions into a series of compartments, of a suc-

tion-fan arranged above said casing and having independent air trunks or passages connected with each of said compartments, a sieve provided in each of said compartments and stationary with respect to said casing, spouts for delivering the material upon said sieves, said casing being provided with openings in its walls beneath said sieves whereby when said fan is operated a current of air will be established through each of said compartments and through said sieves and the material thereon and through the top of said casing, and means for regulating said currents of air, substantially as described.

3. In a middlings-purifier, the combination, with a gyrating casing divided by vertical partitions into a series of compartments, of a stationary fan-casing supported above said gyrating casing, a series of openings provided in the bottom of said fan-casing, flexible hoods provided over said openings, a fan provided within said casing, a series of pipes provided in the top of said gyrating casing beneath the openings in said fan-casing there being one pipe for each compartment, said pipes fitting within said hoods and extending to a point near the bottom of said fan-casing, whereby when said fan is operated said pipes will prevent the contraction of said hoods and the consequent stoppage of the air-current, substantially as described.

4. In a middlings-purifier, the combination, with a gyrating casing divided by vertical partitions into a series of independent compartments, of a stationary fan-casing supported above said gyrating casing and having openings in its bottom communicating through independent air trunks or passages with the tops of said compartments, respectively, a fan provided within said casing and a plate having a central opening provided beneath said fan, and forming a dust-settling chamber in the bottom of said fan-casing, substantially as described.

5. In a middlings-purifier, the combination, with a gyrating casing, of a shaft whereon said casing is mounted, a hub provided on said shaft, a sleeve supported on said hub, a fan secured upon said sleeve and revoluble therewith, a stationary fan-casing supported above said gyrating casing and inclosing said fan, and air trunks or passages connecting said fan-casing with the interior of said gyrating casing, substantially as described.

6. In a middlings-purifier, the combination, with a gyrating casing divided by vertical partitions into a series of independent compartments, of a stationary fan-casing supported above said gyrating casing, a suction-fan provided within said fan-casing, air trunks or passages connecting said fan-casing with the tops of said compartments, respectively, a sieve provided in each of said compartments and stationary with respect to said casing, spouts provided in each of said compartments and adapted to deliver the material upon the sieve therein, said gyrating casing being pro-

vided in its walls below said sieves with a series of air-inlet openings 46, and rings 47 provided on said casing over said openings, substantially as described.

7. In a middlings-purifier, the combination, with a gyrating casing, divided by vertical partitions into a series of independent compartments, of a suction-fan supported above said casing, independent air passages or trunks connecting the tops of each of said compartments, respectively, with said fan, whereby independent vertical currents of air may be maintained through said compartments, a sieve 38 provided in each of said compartments, spouts 36 provided in each of said compartments to deliver the material upon said sieves, air-inlet openings 46 provided in the walls of said casing below said sieves, slotted plates or floors provided above said sieves in each of said compartments, means for regulating the currents of air through said slots, a gathering-board provided in each compartment beneath the sieve therein to receive the material therefrom, spouts leading from said gathering-boards, and sieves provided in the bottom of said compartment beneath said gathering-board spouts, substantially as described.

8. In a middlings-purifier, having a series of independent vertical compartments or chambers, spouts 36, sieves 38 beneath the same, gathering-boards 39, said purifier having openings in its walls between said sieves and said gathering-boards, the vertical partitions 40 forming the air-trunk 41, the slotted plates 42, the spouts 48 connected with said gathering-boards, the sieves 49 beneath said spouts 48, the inner ends of said sieves being cut away forming openings 56, and discharge-openings provided in the floor beneath said sieves 49, substantially as described.

9. In a middlings-purifier, the combination, with a gyrating casing divided by vertical partitions into a series of compartments, of a suction-fan casing supported above said gyrating casing and connected with said compartments, respectively, by a series of air trunks or passages, a fan arranged within said fan-casing, sieves 38 provided in said compartments and stationary with respect to said gyrating casing, spouts wherefrom the material is delivered upon said sieves, slotted floors or plates provided in the upper part of said compartments, means for regulating the passage of air through said slots, gathering-boards 39 provided beneath said sieves, spouts 48 leading therefrom, sieves 49 provided beneath said spouts 48 and stationary with respect to said casing, and openings 46 provided in the walls of said gyrating casing beneath said sieves 38 and 49, whereby when said fan is operated a vertical current of air will be established through each of said compartments and through the material upon said sieves, substantially as described.

10. In a middlings-purifier, the combination, with a gyrating casing divided by verti-

cal partitions into a series of compartments, of a suction-fan provided above said fan-casing and having air trunks or passages connected with the tops of said compartments, respectively, sieves 38 provided in each of said compartments and stationary with respect to said gyrating casing, slotted plates or floors provided above said sieves 38, means for regulating the passage of air through said slots, gathering-boards provided beneath said sieves in each of said compartments, spouts leading therefrom, sieves 49 provided beneath said gathering-boards and also stationary with respect to said gyrating casing, air-trunks 41 leading from the space beneath said gathering-boards to the top of said compartments above said slotted floors, and air-inlet openings provided in the walls of said gyrating casing below said sieves 38 and 49 whereby vertical currents of air may be established through said sieves and the material thereon, substantially as described.

11. In a middlings-purifier, the combination, with a gyrating casing divided by partitions into a series of vertical compartments, of a sieve 49 provided in the lower part of each compartment, each sieve being provided with a series of teeth or projections extending radially thereon from center to circumference whereby the material thereon will be advanced toward the center of said casing by the movement of the machine, said sieve being cut away at its inner end forming a discharge-opening, a radial passage 57 provided beneath said discharge-opening and said sieve, whereby to the material is delivered from said sieve, said passage having a slatted or step-like bottom, and a discharge-opening at its outer end near the circumference of said casing, and means for maintaining a current of air through said sieve, substantially as described.

12. In a middlings-purifier, the combination, with the gyrating casing divided by vertical partitions into a series of independent compartments, of a suction-fan provided above said casing and connected with each of said compartments through the top of said casing, a stationary sieve provided in the upper part of each compartment, slotted floors or plates provided above each sieve, means provided on said plates for closing said slots, gathering-boards provided in each compartment beneath the sieve therein, spouts leading from said gathering-boards, stationary sieves 49 provided in the lower part of com-

partments to receive the material from said gathering-board spouts, said sieves 49 having their inner ends cut away forming discharge-openings, radial passages provided beneath said sieves 49 to receive the material therefrom, discharge-spouts connected with the outer ends of said passages, and air-inlet openings provided in the walls of said gyrating casing below said sieves, whereby when said fan is operated a vertical current of air is established through each of said sieves and the material thereon, substantially as described.

13. In a middlings-purifier, the combination, with a gyrating casing divided by vertical partitions into a series of independent compartments, of a fan-casing supported above said gyrating casing, a fan provided therein, air trunks or passages connecting said fan-casing with said compartments through the top of said gyrating casing, sieves 38 provided in the upper part of said compartments and stationary with respect to said gyrating casing, sieves 49 provided in the lower part of said compartments and also stationary with respect to said casing, said sieves 49 being cut away at their inner ends forming discharge-openings near the center of said casing, radial passages provided beneath said sieves and said discharge-openings to receive the material therefrom, said passages being provided with discharge spouts or openings near the circumference of said casing and said casing being provided with air-inlet openings in its walls below said sieves 38 and 49, whereby when said fan is operated vertical currents of air will be established through said sieves and the material thereon substantially as described.

14. The combination, with a frame, of a shaft 10 mounted thereon, a gyrating casing operatively connected with said shaft, means for driving said shaft, a sleeve 13 provided on said shaft, a fan secured on said sleeve, a fan-casing connected with said gyrating casing, and means for driving said fan and said sleeve independently of said shaft, substantially as described.

In witness whereof I have hereunto set my hand this 24th day of October, 1899.

GEORGE WALTER.

In presence of--

JOSEPH SIVERLING,

FRANK J. SIVERLING.