No. 745,450. PATENTED DEC. 1, 1903.

W. V. MEYER.

SEPARATOR.

APPLICATION FILED OCT. 3, 1902.

NO MODEL. 2 SHEETS—SHEET 1.

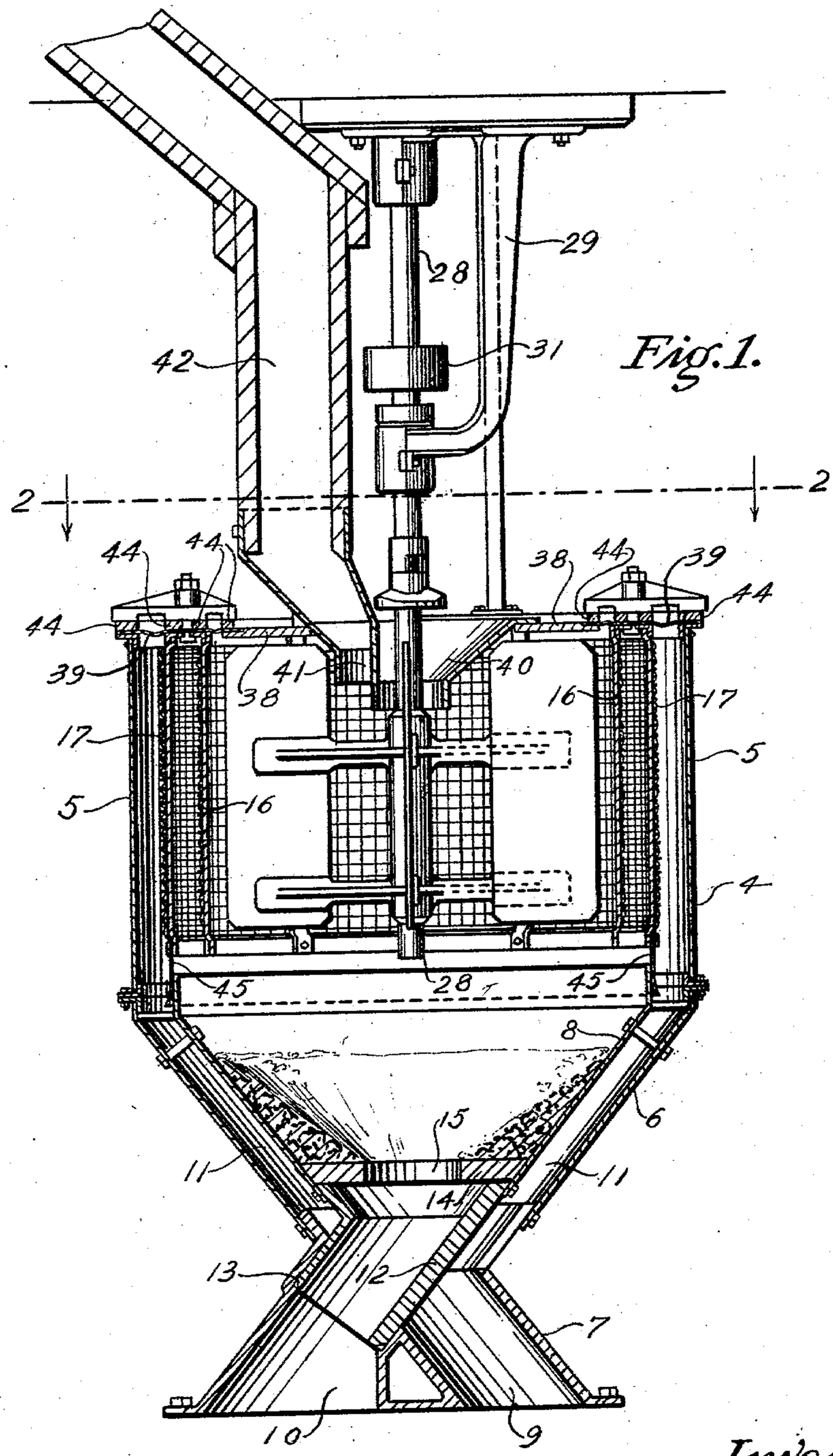

Fig. 1.

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NO MODEL. 2 SHEETS—SHEET 2.

Fig. 2.

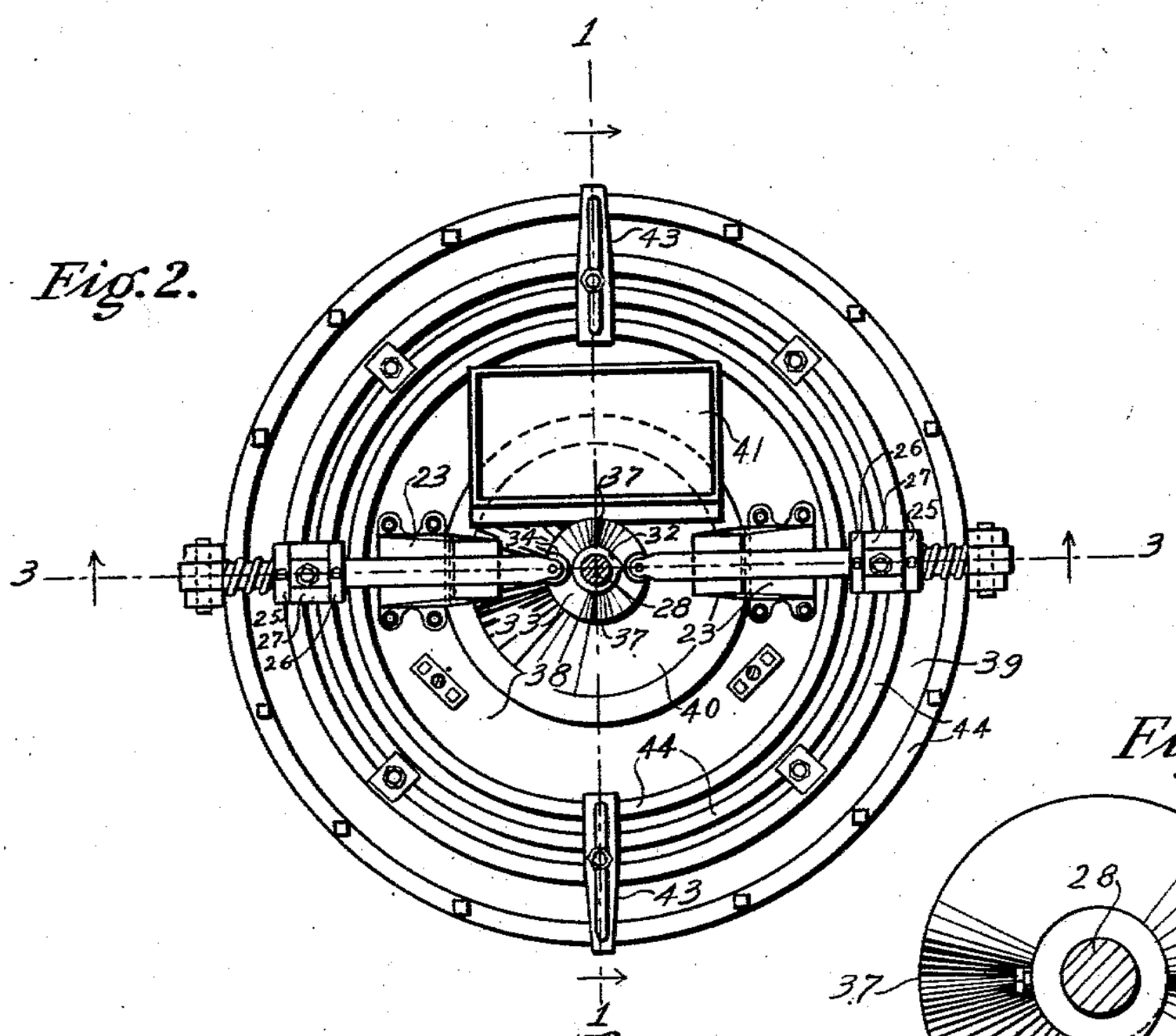


Fig. 4.

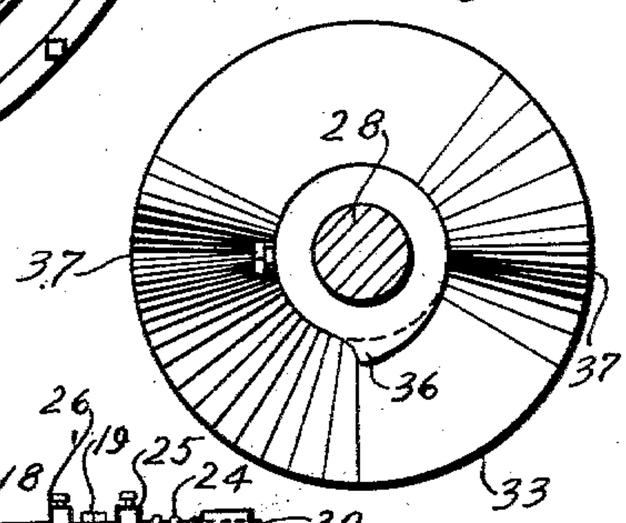
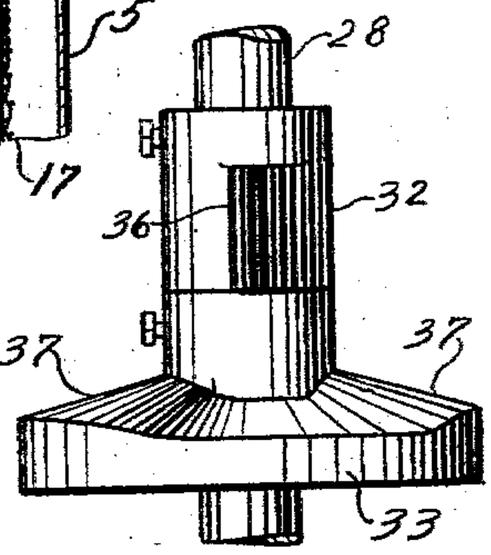


Fig. 3.

Fig. 5.



Witnesses:
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Wm V. Meyer,
by Rummler & Rummler,
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No. 745,450. Patented December 1, 1903.

UNITED STATES PATENT OFFICE.

WILLIAM V. MEYER, OF CHICAGO, ILLINOIS.

SEPARATOR.

SPECIFICATION forming part of Letters Patent No. 745,450, dated December 1, 1903.

Application filed October 3, 1902. Serial No. 125,723. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM V. MEYER, a citizen of the United States of America, and a resident of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Separators, of which the following is a specification.

The main objects of my invention are to provide an improved form of separator or screening device suitable for quickly and thoroughly separating crushed ore, broken stone, and similar substances into grades of varying degrees of coarseness; to provide improved means for agitating the screen within the casing; to provide for readily removing the screen from its casing for the purpose of repairing said screen, and to avoid excessive wear on the lower parts of the casing. I accomplish these objects by the device shown in the accompanying drawings, in which—

Figure 1 is a vertical section of a screening device constructed according to my invention. Fig. 2 is a horizontal section of the same along the line 2 2 of Fig. 1. Fig. 3 is a vertical section of the upper part of the casing and screens along the line 3 3 of Fig. 2. Fig. 4 is a top plan of the cams for agitating the screen. Fig. 5 is a side elevation of the same.

In the construction shown the casing 4 consists of a vertically-disposed hollow cylindrical body 5, of sheet metal, which is securely connected to a conical hopper 6, which is in turn supported by a base-casting 7. A second conical hopper 8 is rigidly secured concentrically within the hopper 6. The hopper 8 is considerably smaller than the hopper 6, as will be seen in the drawings. The casting 7 is provided with two independent passages 9 and 10. The passage 9 connects with the space 11 between the hoppers 6 and 8, while the passage 10 communicates with the interior of the hopper 8 by means of the hollow casting 12. The joint 13 upon the castings 12 and 7 is preferably filled with cement, so that said joint will be air-tight. The passage at the mouth of the casting 12 is reduced by a wooden platform 14, having a centrally-located aperture 15 therein. This platform causes the material to bank up, as shown in Fig. 1, and thus protect the thin walls of the hopper 8 against wear.

Two concentric annular screens 16 and 17 are rigidly secured together and suspended above the hopper 8 and concentrically within the body 5 of the casing 4. The movable screens 16 and 17 are suspended from a pair of radially-disposed horizontal beams 18 by means of the bolts 19. The beams 18 are pivotally connected by pins 20 to brackets 21, which are rigidly secured to the casing 4. The pins 20 are preferably seated in longitudinal slots 22 in the beams 18 to permit of longitudinal movement of said beams. The inner ends of the beams 18 are seated in the guides 23, which are rigidly secured to the supporting-framework above the casing 4. Each of the beams 18 is normally urged inwardly by means of a spiral spring 24, which bears between the casting 12 and a collar 25, which is adjustably secured to the beam 18. The beams 18 are confined against radial movement relatively of the screens 16 and 17 by means of the collars 25 and 26, which bear upon opposite sides of the lugs 27, which are rigid on said screens.

A vertically-disposed shaft 28 is journaled concentrically of the screens 16 and 17 in the bracket 29, which forms part of the supporting-framework above the casing 4. The shaft 28 extends downwardly within the screen 16 and has rigidly secured thereto the vertically-disposed vanes 30. Power is applied to the shaft 28 by a belt which connects the pulley 31 with driving mechanism. (Not shown in the drawings.)

Two cams 32 and 33 are secured to the shaft 28 in suitable position to respectively engage the rollers 34 and 35, which are journaled at the ends of the beams 18. The cam 32 is provided with a transversely-projecting part 36, which is adapted to cause a transverse shifting of the beams 18. Similarly, the cam 33 is provided at diametrically opposite points with projections 37, which simultaneously lift the two beams 18. The central part of the upper end of the casing 4 is covered by the plate 38, which is connected to the screens 16 and 17 and to the body 5 of the casing 4 by means of a canvas diaphragm 39, which is sufficiently loose to permit of the required movement of the screens 16 and 17. The plate 38 is rigidly connected to the supporting-framework above the casing and is provided with two centrally-located and independent

inlet-passages 40 and 41. The passage 40 communicates with the air above the plate 38, while the passage 41 connects with a chute 42, through which the substance to be screened is delivered to the interior of the casing 4. The screens 16 and 17 are supported at points intermediate of the beams 18 by means of the short beams 43, which rest loosely upon the upper rim of the body 5 of the casing and the plate 38. The canvas diaphragm 39 is secured in position by means of the rings 44, which are bolted through said diaphragm 39 to the adjacent structure. The inner screen 16 is of considerably-coarser mesh than the outer screen 17 and serves to protect said outer screen from injury by large fragments which may be hurled outward by the vanes 30. The lower edge of the outer screen 17 is connected to the upper end of the inner hopper 8 by means of an apron 45, of canvas or similar material, which loosely fits over the upper end of the hopper 8 and prevents the fine particles of matter which have sifted through the screen 17 from passing into the hopper 8. The apron 45 is sufficiently loose to permit of the required movement of the screens 16 and 17.

The operation of the device shown is as follows: Consider that the shaft 28 is rapidly rotated by a belt passing over the pulley 31. The vanes 30 will cause the air within the casing to be forced centrifugally outward and to be replaced by air entering the passages 40 and 15, as indicated by arrows in Fig. 1. If now a quantity of matter—such as crushed ore, broken stone, &c.—enters the casing through the chute 42 and the passage 41 the heavier fragments of said matter will be unaffected by the air-currents and will fall straight downward into the hopper 8 and out through the passage 10. Particles of matter which are light enough to be unaffected by the strong air-currents induced by the rotation of the vanes 30 will be projected outwardly against the screen 16. Such particles which are sufficiently fine to pass through the meshes of both screens will enter the space 46 between the screen 17 and the body 5, and will fall downward into the hopper 6. All other particles will be stopped by the screens 16 and 17 and will fall downward into the hopper 8. The cams 32 and 33 by their engagement with the beams 18 will cause the screens to reciprocate both horizontally and vertically, thereby loosening any fine particles which adhere to the screens and tend to clog same. Fine particles of matter which may have been carried below the vanes 30 by the heavier matter will be lifted by the currents of air which are drawn upward through the passage 10. This upward air-current thus adds considerable to the efficiency of the device. Such particles of matter as have passed the screen 17 and entered the hopper 6 will pass outwardly through the passage 9, where they may be conducted by suitable chutes to a suitable compartment. The coarser particles which are gathered by the hopper 8 will pass outward through the passage 10, from which they may be returned to the crusher and reground before being again passed through the device herein shown.

To remove the screens from the casing, the canvas diaphragm 39 is loosened from the rim of the casing 4 and from the plate 38. Suitable hoisting apparatus is now connected to the screens 16 and 17, the bolts 19 are released, and the beams 18 turned on the pivots 20 and allowed to hang over the sides of the casing 4. The screens may then be lifted up out of the casing and repairs to same easily effected.

It will be seen that numerous details of the construction shown may be altered without departing from the spirit of my invention. I therefore do not confine myself to such details, except as hereinafter limited in the claims.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In a separator, the combination of a frame; a screen movably mounted in said frame, being open at the top and bottom and having annular vertically-disposed perforated walls; means within the screen, rotatable relatively thereof and adapted to discharge particles of matter outwardly against said screen; means for causing said screen to vibrate horizontally; and a suitable casing surrounding said screen and adapted to gather the particles which pass through said screen.

2. In a separator, the combination of a frame; a vane revoluble on a vertically-disposed axis in said frame; an annular screen, surrounding the path of said vane, said screen being open at its upper and lower ends and being movably mounted in said frame; means for rotating said vane independently of said screen; and means for causing said screen to vibrate horizontally.

3. In a separator, the combination of a frame; a vertically-disposed shaft journaled in said frame; a vane rigidly secured to said shaft and revoluble therewith; an annular screen having vertically-disposed perforated walls, surrounding the path of said vane and movably mounted in said frame; means for rotating said shaft independently of said screen; and a cam mounted on said shaft and adapted to cause said screen to vibrate, substantially as and for the purpose specified.

4. In a separator, the combination of a frame; a vertically-disposed shaft journaled in said frame; a vane rigidly secured to said shaft and revoluble therewith; a horizontally-disposed beam movably mounted in said frame; a vertically-disposed annular screen surrounding the path of said vane and secured to said beam; a cam mounted on said shaft and adapted to engage said beam in suitable manner to impart a horizontal movement to said beam and screen.

5. In a separator, the combination of a casing; a hopper secured within said casing; a

vertically-disposed annular screen movably mounted within said casing and above said hopper open at the top and bottom; rotating means for discharging particles of matter against said screen; suitable flexible connection between the adjacent edges of said screen and hopper, forming an inclosed passage-way, and means for agitating said screen, substantially as and for the purpose specified.

6. In a separator, the combination of a frame; a vertically-disposed shaft journaled in said frame; a vane rigidly secured to said shaft and revoluble therewith; a horizontally-disposed beam movably mounted in said frame; a vertically-disposed annular screen surrounding the path of said vane and secured to said beam; a cam mounted on said shaft and adapted to engage said beam in suitable manner to impart a horizontal movement to said beam and screen; and a spring normally urging said beam against the action of said cam, substantially as and for the purpose specified.

7. In a separator, the combination of a frame; a casing secured in said frame; a vertically-disposed annular screen within said casing; a pair of horizontally-disposed beams extending radially of said screen above same, and being secured thereto; means for projecting particles of matter outwardly against said screen; and mechanism for agitating said beams and thereby causing said screen to vibrate; said beams being pivotally mounted in said frame and adapted to be turned out of the way to permit the removal of said screen through the top of said casing.

8. In a separator, the combination of a frame; a vertically-disposed annular screen, open at its upper and lower ends and movably mounted in said frame; rotating means for discharging particles of matter outwardly against said screen; means for causing said screen to vibrate horizontally; a suitable casing surrounding said screen and adapted to gather the particles which pass through the screen; said casing being funnel-shaped at its lower part; and an annular member 14 seated in the funnel-shaped part and forming an inwardly-projecting shoulder adapted to cause the material falling into said funnel-shaped part to bank up along the side walls and protect said walls from wear, substantially as described.

Signed at Chicago this 25th day of September, 1902.

WILLIAM V. MEYER.

Witnesses:
EUGENE A. RUMMLER,
BLANCHE MICHAEL.