

No. 791,566.

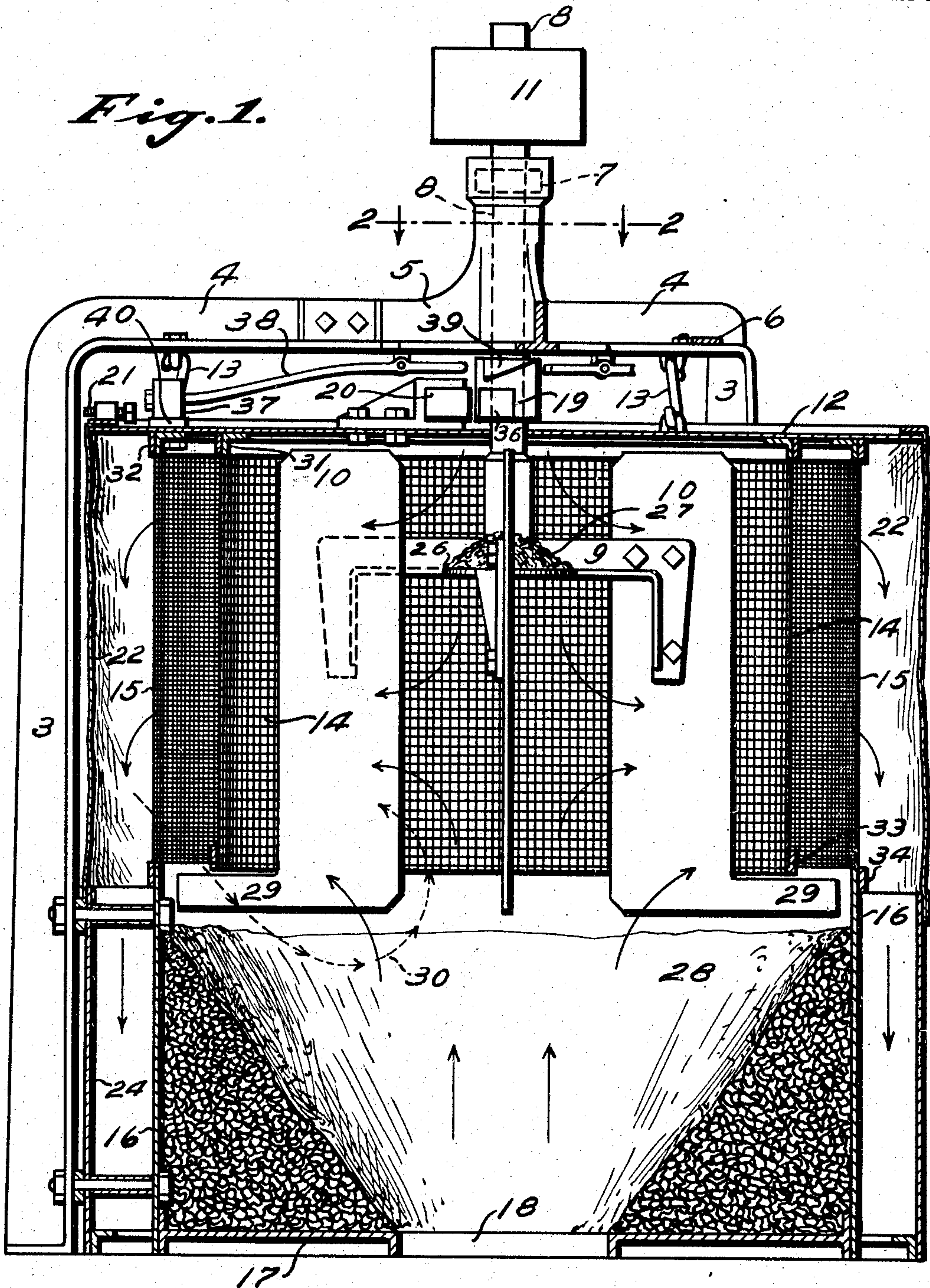
PATENTED JUNE 6, 1905.

W. V. MEYER.
SEPARATOR.

APPLICATION FILED JULY 1, 1904.

2 SHEETS—SHEET 1.

Fig. 1.



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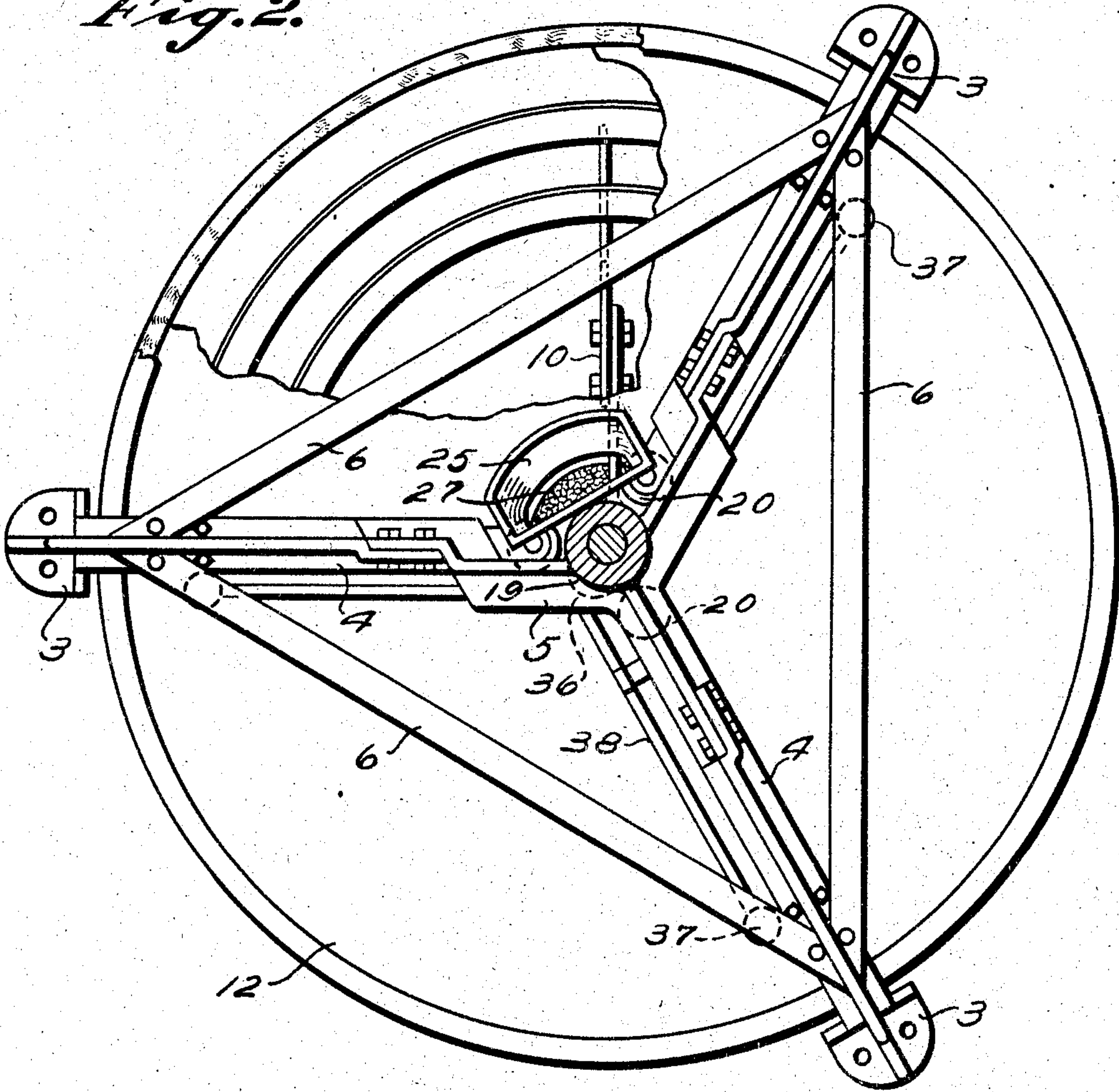
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2 SHEETS—SHEET 2.

Fig. 2.



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UNITED STATES PATENT OFFICE.

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SPECIFICATION forming part of Letters Patent No. 791,566, dated June 6, 1905.

Application filed July 1, 1904. Serial No. 214,926.

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.

My invention relates to screening and separating devices for separating the finely-divided from the coarser particles in a mass of crushed stone, ore, or similar substance.

The main object of my invention is to provide simple and improved construction for separators of the type wherein the particles of matter to be screened are caused to fall and are then drawn out of their course by transverse air-currents, the larger particles being intercepted by a suitable screen. I accomplish this object by the device shown in the accompanying drawings, in which—

Figure 1 is a vertical section of a separator constructed according to my invention. Fig. 2 is a top plan of the same, partly broken away, to show the concentric arrangement of the screens.

In the construction shown the supporting-frame consists of three vertically-disposed standards 3, having horizontally-disposed arms 4, extending toward each other at their upper ends and connected by means of a bearing member 5. Additional rigidity is provided by means of the braces 6. Journaled in the member 5 and supported therein by the collar 7 is a vertically-disposed shaft 8. At the lower end of the shaft 8 is rigidly secured a member having a plurality of radially-disposed arms 9, carrying vanes 10. The upper end of the shaft 8 is provided with a pulley 11, which connects with suitable power for rotating the vanes 10.

A horizontally-disposed circular plate 12 is loosely hung from the arms 4 of the frame above the vanes 10 by means of links 13. Rigidly secured at their upper ends to the plate 12 are two annular screens 14 and 15, having vertically-disposed walls arranged concentrically of each other and of the path of the vanes 10. Both of the screens 14 and 15 are open at their lower ends, the lower edge of the screen 15 being connected to the upper

edge of a hopper 16, which is preferably provided with a flat floor 17, having a contracted central opening 18, as shown in Fig. 1.

The shaft 8 is provided with a cam 19, and the plate 12 is provided with three bumpers 20, each disposed in radial alinement with one of the standards 3 and adapted to engage a projection 36 on the cam 19 for agitating the screens. The plate 12 is provided with a second set of bumpers 21 at its outer edge in suitable position for engaging the standards 3 for limiting the outward swinging of the plate 12. The bumpers 21 are preferably adjustable, as shown.

Additional agitation of the screens is obtained through the action of the hammers 37, of which there are three, one being pivotally mounted on each of the arms 4 of the frame. The inner ends of the levers 38, which carry the hammers 37, are adapted to be engaged by an inclined projection 39 on the cam 19. This projection is arranged so as to raise the hammer 37 and permit the same to fall suddenly, striking a blow over the edge of the screen 15. The plate 12 is provided with suitable pads 40 at the points thereon which are struck by the hammers 37.

The plate 12 extends a considerable distance outward beyond the screen 15 and has secured to its outer edge an annular canvas curtain 22, the lower edge of which is removably connected to the upper edge of an annular casing 24, which forms a continuation of the curtain 22 and surrounds the hopper 16. The plate 12 is provided at its middle part with a hopper-like chute 25, through which granular matter may be fed into the separator from a supply-chute. (Not shown in the drawings.) The arms 9 have secured thereto at their middle part a plate 26, which prevents the direct downward flow of matter delivered from the chute 25 and causes such matter to bank up on the plate 26, as indicated at 27, and to be deflected outwardly into the path of the vanes 10. This banking up of the material at 27 also protects the arms 9 from wear. A similar banking of the material at 28 in the hopper 16 protects the walls of the hopper from wear.

The inner screen 14 is of considerably coarser

mesh than the outer screen 15 and serves to protect said outer screen from contact with the coarser particles of matter, the outer screen being of the mesh to which it is desired to screen the material. The vanes 10 preferably extend outwardly at 29 below the screen 14 to a point near the lower edge of the screen 15 for the purpose of preventing an eddy of air from carrying particles of matter which have already passed the screen 15 backwardly through the screen 15 at its lower part and below the vanes 10, as indicated by the dotted arrow 30 in Fig. 1. This extension of the vanes and prevention of return flow of air is found to greatly increase the efficiency of the separator.

Each of the screens preferably consists of a sheet of woven-wire fabric wound into cylindrical form and secured together at its lap-
ping edges. The screens are secured to the plate 12 by means of bands of angle-iron 31 and straps 32, which are bolted together. The lower end of the screen 14 is reinforced by a strap 33, and the lower end of the screen 15 is secured to the upper end of the hopper 16 by means of a strap 34.

The operation of the device shown is as follows: The shaft 8 is rotated by means of a belt connecting the pulley 11 with a suitable power-supply, and the material to be separated, such as ground ore or similar matter, is delivered to the interior by means of the chute 25. Air also enters at the chute 25 and through the aperture 18, the rotating vanes causing currents of air to be drawn in axially of the vanes and to flow outwardly through the screens, as indicated by the arrows in Fig. 1. These air-currents carry with them the finely-divided particles of matter. The coarser particles of matter are hurled outwardly against the screens, together with the finer particles, by means of the rotating vanes and then fall down into the hopper 16, being finally discharged at the aperture 18 and returned to the crusher before being again passed through the separator. Such particles of matter as pass through the screen 15 fall downwardly in the passage between the hopper 16 and the walls of the casing 24 and are then collected by a suitable hopper and conveyed away by mechanism not shown. As the shaft 8 rotates the lug 36 of the cam 19 strikes intermittent blows upon the bumpers 20, causing the plate 12 to swing on the links 13 until stopped by a jar as the bumpers 21 engage the standards 3. As the shaft 8 rotates the cam 19 causes each of the hammers 37 to be intermittently raised and dropped upon the plate 12. Although the jarring of the plate 12, through the action of the cam, bumper, and hammer, is sufficiently violent to dislodge any particles tending to accumulate on the screens, the range of movement of the plate 12 is slight, and the screen 15 may be rigidly secured to the hopper 16, as

the construction of the screen is sufficiently yielding to permit of the required agitation. The blades 29 at the lower ends of the vanes 10 insure an outward flow of air even at the lowest point of the screen 15, and thereby prevent air from flowing downwardly between the screens 14 and 15 and again being acted upon by the vanes, as indicated by the dotted arrows at 30. Such return flow of air would of course greatly reduce the efficiency of the device. By removing the strap 23 and throwing the canvas apron 22 up over the edge of the plate 12 the screens 14 and 15 become readily accessible for the purpose of inspecting or repairing the same. The screens may then be removed by simply releasing the straps which secure them and unwinding the screens from their supporting-angles.

It will be seen that numerous details of the construction shown may be altered without departing from the spirit of my invention.

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

1. In a separator, the combination of a frame; a vertically-disposed shaft journaled in said frame; a vane rigidly secured to said shaft and rotatable 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; a feed-chute adapted to discharge particles of matter into the upper end of said screen, near the middle part of the same; a deflector below the chute for deflecting outwardly toward said vane the particles of matter delivered by said chute; and suitable means for vibrating said screen, substantially as described.

2. In a separator, the combination of a frame; a vane rotatable on a vertically-disposed axis in said frame; a pair of concentrically arranged annular screens having vertically-disposed walls surrounding the path of said vane, said screens being open at their lower ends and being movably mounted in said frame; means for rotating said vane independently of said screens; said vane being extended outwardly below the inner screen and toward the outer screen, substantially as described.

3. In a separator, the combination of a frame, a horizontally-disposed plate movably mounted in said frame; a vertically-disposed annular screen secured to said plate and depending therefrom, said screen being open at its lower end; means for agitating said screen; rotating means for discharging particles of matter against said screen; a hopper in said frame having its upper edges connected with the lower edges of said screen; a casing surrounding said hopper but spaced therefrom to provide a passage-way between the hopper and casing; and a flexible annular curtain surrounding said screen, spaced therefrom and connecting said plate with the upper edge of said casing, said curtain being adapted to be

drawn aside to permit of ready access to said screen, substantially as described.

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 rotatable therewith; an annular screen having vertically-disposed perforated walls surrounding the path of said vane, and movably mounted in said frame; means for rotating
10 said shaft independently of said screen; a feed-chute adapted to discharge particles of matter into the upper end of said screen, near the middle part of the same; a horizontally-dis-

posed plate secured to the shaft at the upper end of said vane and extending across the path 15 of particles delivered by said chute, said plate being adapted to deflect said particles outwardly toward said vane; and suitable means for agitating said screen, substantially as described. 20

Signed at Chicago this 28th day of June, 1904.

WILLIAM V. MEYER.

Witnesses:

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