A. J. MEYER.

SEPARATOR.

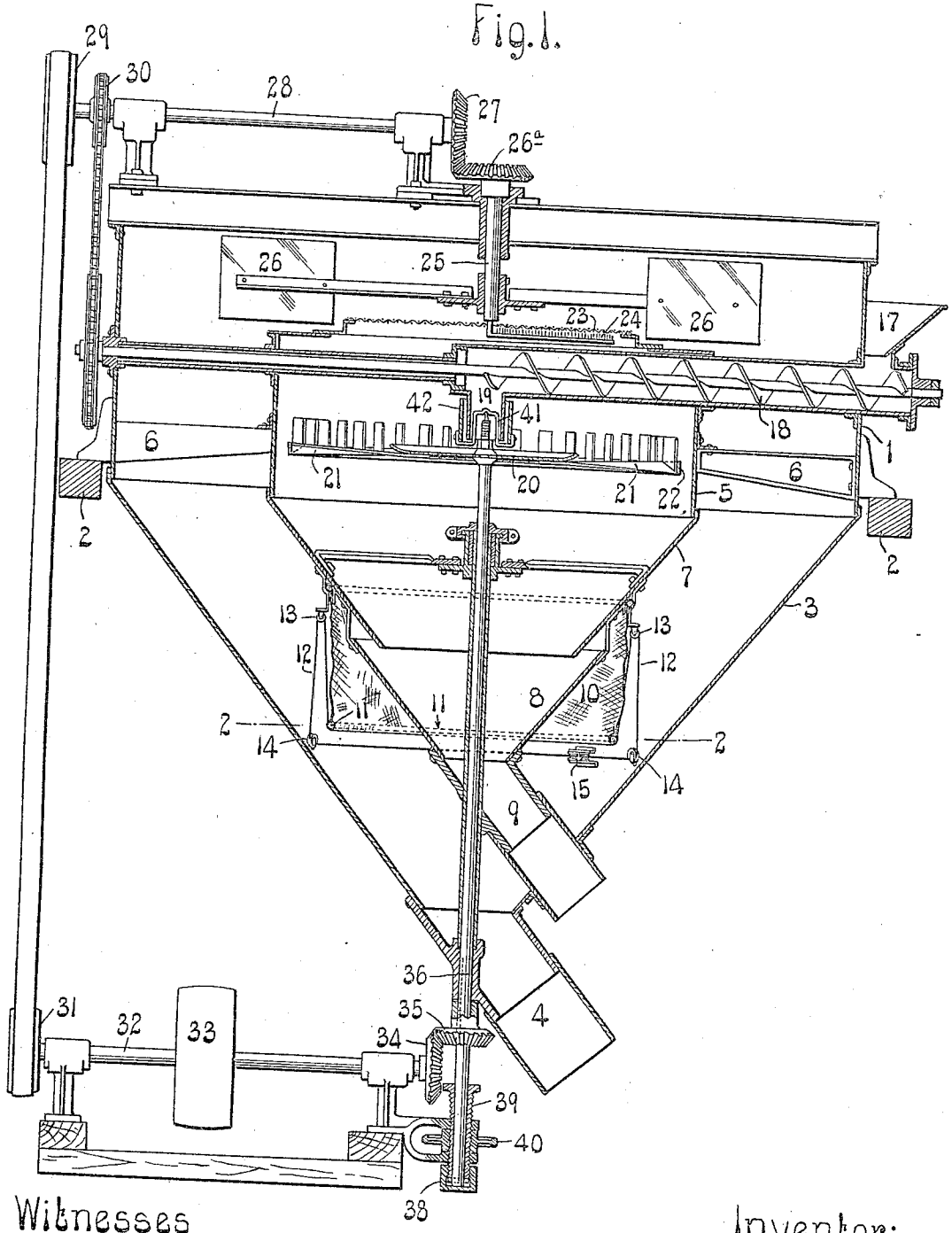
APPLICATION FILED FEB. 2, 1909.

952,459.

Patented Mar. 22, 1910.

2 SHEETS—SHEET 1.

Fig. 1.



Witnesses

A. J. McCauley

Lewis Clark.

Inventor:

Albert J. Meyer

by F. R. Cornwall

Atty.

A. J. MEYER.

SEPARATOR.

APPLICATION FILED FEB. 2, 1909.

952,459.

Patented Mar. 22, 1910.

2 SHEETS—SHEET 2.

Fig. 2.

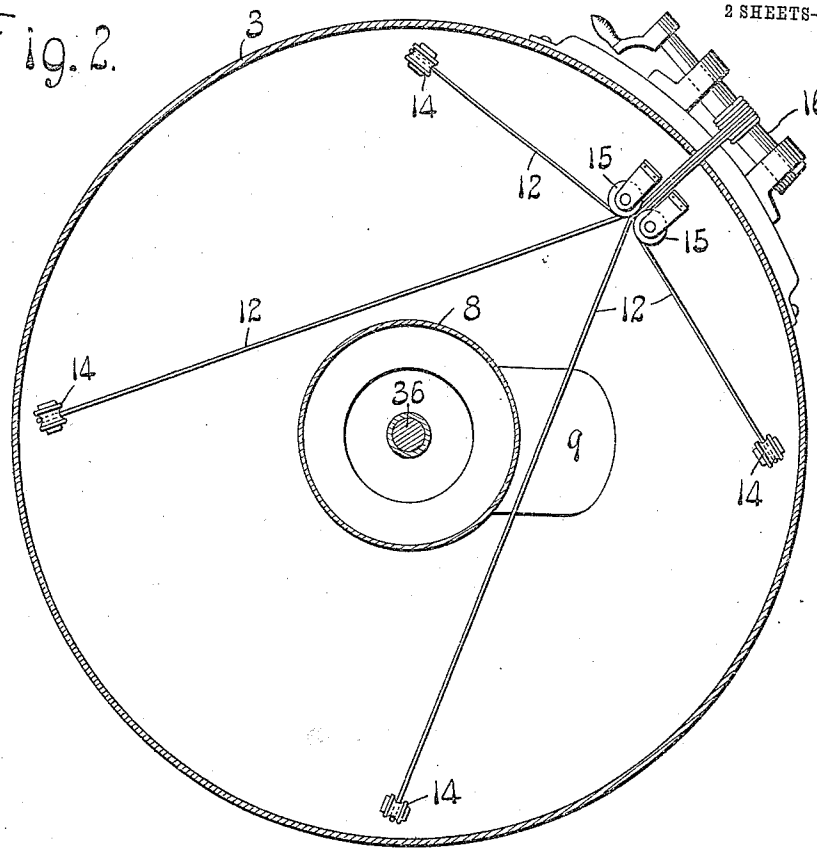


Fig. 3.

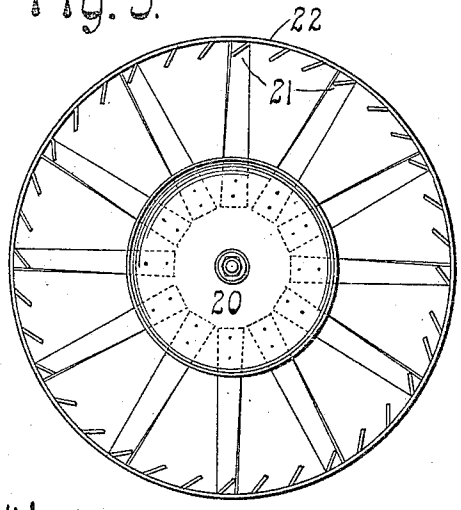
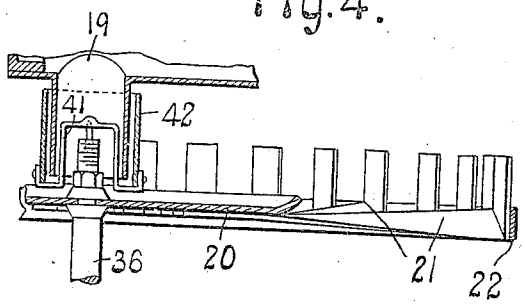


Fig. 4.



Witnesses

A. J. McCauley

Lenore Clark.

Inventor:

Albert J. Meyer

by F. R. Cornwall

Att'y.

UNITED STATES PATENT OFFICE.

ALBERT J. MEYER, OF CAPE GIRARDEAU, MISSOURI, ASSIGNOR OF ONE-HALF TO C. J. CRAWFORD, OF CAPE GIRARDEAU, MISSOURI.

SEPARATOR.

952,459. Specification of Letters Patent. Patented Mar. 22, 1910.

Application filed February 2, 1909. Serial No. 475,586.

To all whom it may concern:

Be it known that I, ALBERT J. MEYER, a citizen of the United States, residing at Cape Girardeau, county of Cape Girardeau, Missouri, have invented a certain new and useful Improvement in Separators, of which the following is a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 represents a vertical sectional view through my improved separator; Fig. 2 is an enlarged cross sectional view on line 2—2, Fig. 1; Fig. 3 is a plan view of the agitator; and Fig. 4 is a detail view illustrating the agitator and feed opening.

This invention relates to separator for grading pulverized materials or separating the lighter particles from the heavier, and it consists in the construction, arrangement and combination of the several parts, all as will hereinafter be described and afterward pointed out in the claims.

My invention is designed for use in the grading and separation of various products, such as cement and the like, which products are usually previously reduced by being pulverized.

In the drawings, 1 indicates the cylindrical portion of the outer casing or shell supported by suitable brackets upon timbers 2. The lower part 3, of this outer casing is conical in form and provided with a discharge conduit 4 for the finished product.

5 is the cylindrical head portion of the inner casing or shell, supported preferably centrally with relation to the outer casing by means of bracket arms 6.

7 is the lower conical portion of the inner casing, which discharges into a supplemental conical portion 8, having a discharge spout 9 for the tailings. There is a space between the cones 7 and 8 through which air may be drawn.

10 indicates a flexible curtain, made preferably of canvas, which is suspended from a ring secured in position on cone 7 which ring makes an airtight joint between the cone and the curtain. The lower end of this curtain is provided with a ring 11, whose weight tends to hold the curtain down, said ring also serving to space the curtain properly between the two cones. At points around the ring 11, are secured cords or cables 12, said cords passing up over pulleys 13 mounted on suitable brackets secured to cone 7, and under suitable pulleys 14, whence they lead to between pulleys 15 arranged on brackets secured to cone 3, and pass through an opening in cone 3 and around a winding shaft 16 arranged outside of cone 3, said shaft being provided with a handle and a ratchet and pawl mechanism, for obvious reasons.

The material to be fed into the separator is discharged into a hopper 17, from which it is conveyed by means of a screw conveyer 18 to the feed opening 19, located centrally with respect to the inner casing. Under this feed opening is a disk 20 having an upwardly extending marginal flange which tends to throw the material upwardly and outwardly when the disk is rotating. To this disk are secured a series of agitators in the form of blades or angled flights 21 which act as fan blades to force the air and material upwardly. In this manner the material is thoroughly broken up and the finer particles forced upwardly with the air current, the heavier particles, of course, falling and passing down through the tailings spout 9. A ring 22 may be used to support the outer ends of the agitator blades 21. When flaky material, such as graphite, is being separated, the top of the inner casing is provided with a screen 23 through which the dust-laden air passes. A brush 24 operates on the under side of this screen so as to keep it free and open for the dust-laden air. This brush is mounted upon a shaft 25 which shaft carries fan blades 26 operating in the upper portion of the head of the outer casing. For many materials this screen and brush arrangement is unnecessary. The gearing for driving this brush and fan may be in the form of miter gears 26^a—27 as shown, upon the shaft 28, on which latter shaft may be arranged pulleys or sprockets 29 and 30, the latter driving the feed screw 18 and the former being belted to a pulley 31 on the driving shaft 32.

33 is a pulley which is belted to the source of power for driving the device. On the shaft 32 is a miter gear 34 meshing with a companion gear 35 feathered on a shaft 36 mounted in suitable bearings in cones 3 and

8 and spider arms 37, the upper end of said shaft 36 carrying the disk 20 and agitator blades before described.

In order to adjust the shaft 36 and its carried parts, I mount the lower end of said shaft in a thrust bearing 38, carried at the lower end of a threaded sleeve 39. A hand nut 40 operates between lug extensions on one of the driving shaft pedestals, and by rotating this hand nut the shaft 36 may be adjusted vertically so as to adjust the position of the disk 20 and agitator blades 21 with respect to the feed opening and screen. This adjustment can, of course, be effected while the machine is in operation, as the gear 35 is feathered on the shaft and permits longitudinal movement of the shaft therethrough while maintaining its driving connection therewith.

To maintain the relation between the walls of the feed opening and the disk 20, I adjust spider arms 41 in the upper end of the shaft 36, which spider arms carry a sleeve 42 arranged outside of the walls of the feed opening 19. The spider arms 41 are provided with a centrally arranged post having a threaded connection to the upper end of shaft 36, whereby said spider arms may be adjusted with relation to said shaft, shown in Fig. 4, or if desired, as also shown in said figure, the upper end of shaft 36 may be threaded on the disk 20 clamped between jam-nuts arranged on said threaded portion whereby the disk 20 may be adjusted. Thus, when the disk 20 is adjusted, the pipe 42 may be adjusted with it. The pipe 42 can, however, be adjusted with respect to the disk so as to force the material entering the machine to drop close to the disk 20 before it is free to fly outwardly by centrifugal force. The revolving arms 41 serve to keep the feed spout free and open.

In operation, assuming that power is transmitted to the device through the pulley 33 and the several parts are properly belted and driven, and the material to be separated is fed into the feed hopper 17: The material is discharged on to the rotating disk 20, thrown outwardly by centrifugal force, and upwardly by the up-turned marginal flange of said disk. The angled flights or agitator blades 21 also create an upward current of air which causes the fine particles of material to be carried upwardly. These angled flights 21 are preferably in the shape of flat plates secured to the under side of disk 20, their outer ends being twisted so as to move a greater volume of air as the distance from the axis of rotation increases. The twisted ends of these angled flights are substantially on the same horizontal plane as the disk and the material spread by the disk will be forced to pass over these angled flights and through the upward currents of air generated thereby. The heavier or coarser particles will fall down and pass out through the spout 9. The fan blades 26 will force the air outwardly into the outer casing, drawing the dust-laden air through the screen 23 (if a screen is used), which screen is practically the eye of the fan; the brush 24 keeps the screen clean. The dust-laden air is caused by the fan blades 26 to be whirled around in the outer casing, the particles of dust moving outwardly by centrifugal force against the vertical and inclined walls 1—3 of said outer casing until finally the dust passes out through the spout 4 as a finished product. The air, freed from its dust, finds escape from the outer casing, and indeed, is drawn into the inner casing through the space between the cones 7 and 8. This indrawn air is forced to enter the inner casing by a downward movement, after which it is drawn upwardly by the instrumentalities heretofore described, and in being drawn upwardly it meets the downwardly moving tailings and relieves them of any adhering finer particles which may not have been separated in the upper enlarged chamber in the inner casing. There is no tendency for the coarser particles of material in the inner chamber to escape through the opening between the cones 7 and 8 into the outer casing, because to get into the outer casing, such particles of material would not only have to move counter to gravity, but also counter to the inrushing air which at this point moves downwardly. The agitator blade 21 tends to throw the heavier particles of material outwardly against the vertical wall 5 of the inner casing and said heavier particles can freely fall between the ring 22 and said wall. The air is caused to whirl around in the head 5 by means of the agitator blade at the time that it is being drawn upwardly. To regulate the volume of air admitted through the space between cones 7 and 8, the curtain 10 is raised or lowered as required, depending upon the material being treated, its fineness, etc.

I am aware that changes in the construction and arrangement of the parts of my device can be made and substituted for those herein shown and described, without departing from the nature and principle of my invention.

Having thus described my invention, what I claim is:

1. In a separator, an outer casing, an inner casing, a fan arranged at the upper end of the inner casing, a feed conduit leading into the inner casing, a rotatable spreading disk provided with an upturned marginal edge in said inner casing immediately under said lateral feed conduit onto which disk the material to be separated is delivered, angled flights carried by said disk for breaking up the material and forcing a current of air

upwardly therethrough, and means for rotating the disk and fan at different speeds.

2. In a separator, an outer casing, an inner casing, a fan and screen over an opening in the inner casing, which opening constitutes the eye of the fan, a brush operating over the face of said screen, a feed conduit leading laterally into the inner casing, a rotatable spreading disk in said inner casing onto which the material to be separated is delivered, said disk having an upturned marginal edge, and angled flights projecting beyond said edge, and means for rotating the disk and fan at different speeds.

3. In a separator, an outer casing, an inner casing, means for creating circulation of air through said casings, said air moving upwardly in the inner casing and downwardly in the outer casing, an air inlet opening in said inner casing, a flexible curtain suspended from said inner casing at a point above said inlet opening, means for raising and lowering said curtain to regulate the amount of air entering said inlet opening, a feed conduit leading into the inner casing, a conveyer arranged in said conduit, a rotatable disk on which the material is fed, and agitator blades carried by said disk and extending in the horizontal plane of the disk.

4. In a separator, an outer casing, an inner casing, means for creating a circulation of air through said casings, said air moving upwardly in the inner casing and downwardly in the outer casing, a feed conduit leading laterally into the inner casing, a conveyer in said conduit, a rotatable disk onto which the material is fed, said disk having an upturned marginal edge to deflect the material upwardly, and agitator blades secured to said disk and extending in the horizontal plane thereof, one edge of said agitator blades being gradually bent or twisted at their outer ends so as to be arranged at a deeper angle whereby a greater quantity of air may be moved by said blades as the distance increases from the axis of rotation.

5. In a separator, an outer casing, an inner casing, means for creating a circulation of air through said casings, said air moving upwardly in the inner casing and downwardly in the outer casing, a feed conduit leading into the inner casing, a rotatable disk onto which the material is fed, agitator blades secured to said disk and extending in the horizontal plane thereof, one edge of said agitator blades being gradually bent or twisted at their outer ends whereby a greater quantity of air may be moved thereby as the distance increases from the axis of rotation, and a spacing ring to which the outer twisted ends of said blades are secured.

6. In a separator, a conical outer casing and a conical inner casing, said inner casing having an air inlet opening and a flexible curtain suspended from the inner cone by an airtight joint arranged above said air inlet opening, the lower edge of said opening coöperating with the outer cone to regulate the admission of air through the air inlet opening.

7. In a separator, a casing, a feed conduit leading into the said casing, a rotatable disk onto which the material to be separated is fed, angled flights carried by the disk for assisting the disk in spreading the material and forcing an upward circulation of air therethrough, means for rotating said disk and flights, means for adjusting said disk and flights relative to said feed opening, said adjusting means being operable while said device is rotating, a fan within the casing for causing a circulation of air through the casing, and means for rotating said fan at a different speed from that at which said disk and flights are rotating.

8. In a separator, a casing, a feed conduit leading thereinto in a lateral direction, a conveyer in said conduit, agitator blades carried by said disk and extending outwardly beyond the edge thereof and in the horizontal plane of said disk, a shaft on which said disk and blades are mounted, and means for adjusting said shaft and its carried parts without disturbing said driving connection.

9. In a separator, an outer conical casing and an inner conical casing, the latter having an air inlet opening, and an annular or circular flexible curtain connected to the inner cone by a ring forming an airtight joint above said inlet opening, said curtain having a weighted lower edge.

10. In a separator, an outer conical casing and an inner conical casing, the latter having an air inlet opening, a flexible curtain connected to the inner cone by a ring forming an airtight joint above said air inlet opening, said curtain having a weighted lower edge, and means connected to the curtain at its lower edge for raising and lowering the same.

11. In a separator, an outer conical casing and an inner conical casing, the latter having an air inlet opening, a flexible curtain connected to the inner cone by a ring forming an airtight joint above said air inlet opening, said curtain having a weighted lower edge, means connected to the curtain at its lower edge for raising and lowering the same, cables connected to the lower edge of said curtain, and means for winding and unwinding said cable.

12. In a separator, a feed spout, an adjustable rotating disk below said feed spout, a spout section carried by said disk, and means for adjusting said disk relative to said spout section.

13. In a separator, a feed spout, an ad-

justable rotary disk below said feed spout, spider arms carried by said disk, and operating in said spout, means for adjusting said arms with respect to said disk and a spout section mounted on said spider arms and adjustable therewith with respect to said disk.

In testimony whereof I hereunto affix my signature in the presence of two witnesses, this 29th day of January 1909.

ALBERT J. MEYER.

Witnesses:

JARED S. JOHNSON,

C. J. CRAWFORD.