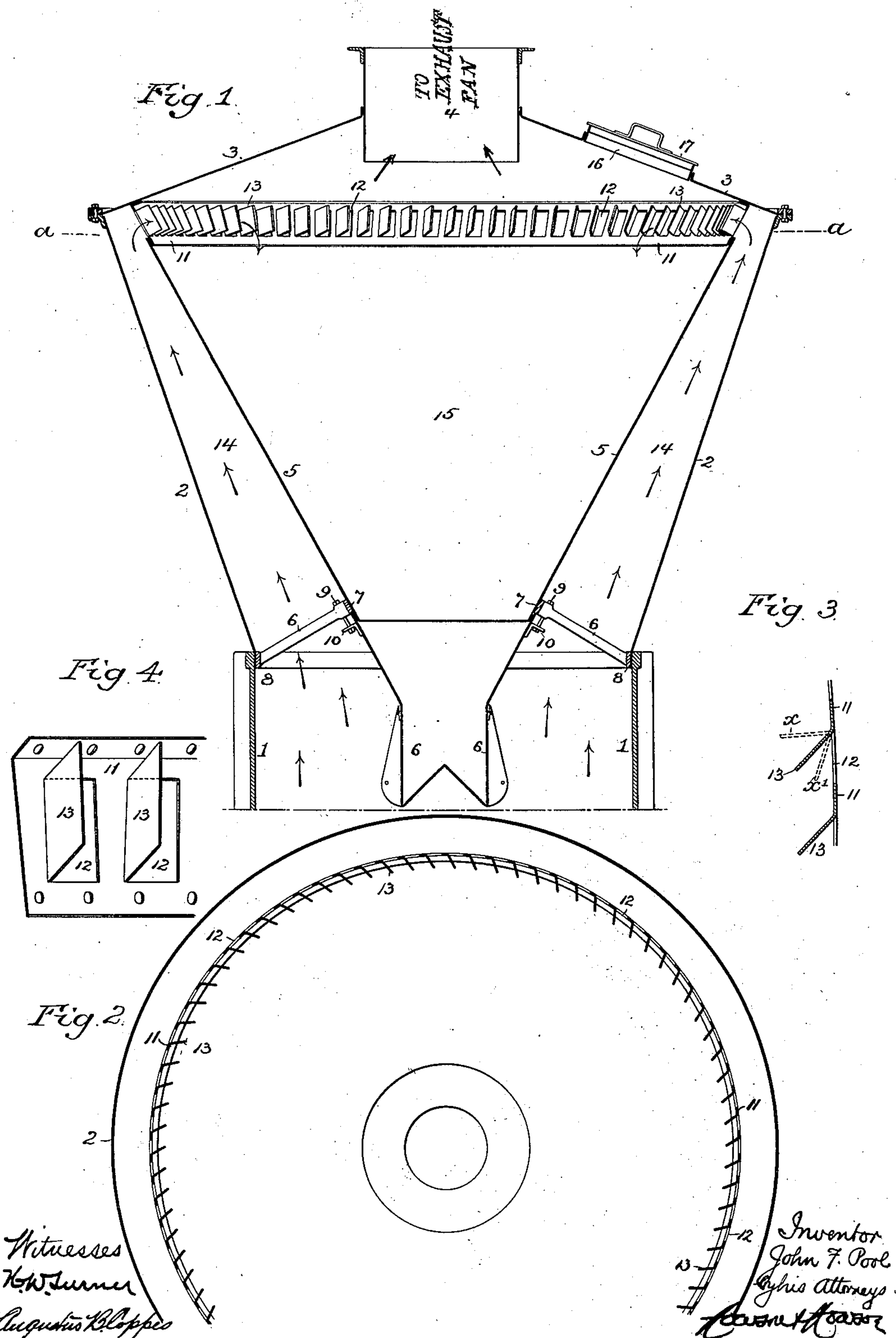


No. 870,383.

PATENTED NOV. 5, 1907.

J. F. POOL.  
SEPARATOR FOR POWDERED MATERIAL.

APPLICATION FILED APR. 11, 1905.



Witnesses  
H. W. Turner  
Augustus K. Loppes

Inventor  
John F. Pool  
By his Attorneys  
C. W. H. H. H. H.



# UNITED STATES PATENT OFFICE.

JOHN F. POOL, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO THE AMERICAN SUGAR REFINING COMPANY, OF JERSEY CITY, NEW JERSEY, A CORPORATION OF NEW JERSEY.

## SEPARATOR FOR POWDERED MATERIAL.

No. 870,383.

Specification of Letters Patent.

Patented Nov. 5, 1907.

Application filed April 11, 1905. Serial No. 254,954.

*To all whom it may concern:*

Be it known that I, JOHN F. POOL, a subject of the King of England, residing in Philadelphia, Pennsylvania, have invented certain Improvements in Separators for Powdered Material, of which the following is a specification.

My invention relates to that class of separators in which the product of a grinding mill is carried upwardly by a draft of air into a chamber or chambers above the mill, so that the heavier and larger particles may be permitted to separate by gravity from the lighter and smaller particles which are carried off by the air draft, the object of my invention being to so construct a separator of this character as to obtain a more finely divided product than is possible with such separators as ordinarily constructed. This object I attain in the manner hereinafter set forth, reference being had to the accompanying drawing, in which

Figure 1, is a vertical sectional view of a separator for powdered material constructed in accordance with my invention; Fig. 2, is a partial sectional plan view of the same on the line *a-a*, Fig. 1; Fig. 3, is an enlarged sectional plan view of part of the separator; and Fig. 4, is an enlarged perspective view of part of the same.

In Fig. 1, of the drawing, 1 represents part of a cylindrical casing which forms an upward continuation of the casing of the grinding or pulverizing mill, in connection with which the separator is used, and mounted upon and forming an outwardly flaring upward continuation of this casing 1 is an inverted frusto-conical casing 2 having a frusto-conical cap or hood 3, with central pipe 4, which in practice, is in connection with the fan or other exhausting device whereby a draft of air through the separator and through the casing of the mill is maintained.

Within the casing 2 is an inverted frusto-conical drum 5 having a bottom of inverted V shape, and side outlets normally closed by means of automatic valves 6, which will open against the pressure of powdered material accumulating in the lower portion of the drum and will permit the same to flow back again into the mill to be reground.

The lower part of the drum 5 is supported by means of inclined struts or braces 6 interposed between an external ring 7 on the drum and an internal ring 8 at the top of the casing 1, and the lower section of the drum, which carries the valves 6, is preferably detachable, being supported by means of bolts 9, which engage the struts 6 and also engage brackets 10 or a ring on said lower section of the drum.

The top portion of the drum 5 is formed by a ring 11 whose flanged top is secured to the cap or hood 3, and this ring has in it a multiplicity of openings 12, preferably

formed by striking up, from the metal of which the ring is composed, a corresponding number of vanes or shutters 13, which may be inclined at any desired angle in respect to the inner face of the ring.

When the separator is constructed in this manner the powdered material will, when the exhaust mechanism which is connected with the pipe 4 is in operation, rise through the casing of the mill and thence through the chamber 14 between the casing 2 and drum 5, as indicated by the arrows in Fig. 1, and, on reaching the top of said chamber, will be deflected inwardly through the openings 12 in the ring 11 into the chamber 15 within the drum 5. Here an opportunity is afforded for the separation by gravity of the larger and heavier particles of powdered material from the smaller and lighter particles, only the latter being carried up by the draft of air through the pipe 4, the heavier particles settling to the bottom of the drum 5 and escaping finally beneath the valves 6, so as to return to the mill for being reground.

If it is desired to increase the time of retention of the powdered material in the chamber 15 the vanes or shutters 13 may be set at such an angle as to deflect the particles of powdered material from the radial lines which they would naturally follow in entering the chamber 15 through the openings of the ring 11 in the absence of any such deflecting vanes or shutters, a whirling motion being thereby imparted to the particles within the chamber 15, and the force of this whirling motion being dependent upon the angle of adjustment of the vanes or shutters, thus, if the vanes are adjusted to the angle shown by full lines in Fig. 3 a gentle whirling motion will be imparted to the particles, while if they are adjusted to the position, say, of the dotted line *x*, there will be no whirling motion, and if they are adjusted to the position shown by the dotted line *x'* there will be a more forcible whirling motion due to the sharper angle of the vanes and to the more rapid flow of air through the openings 12, because of the decreased area of said openings which results from this disposition of the vanes. Any desired action upon the powdered material can thus be obtained by a proper disposition of the vanes 13, and in order to permit of change in the angle of the vanes without dismemberment of the separator the cap or hood 3 is provided with a man-hole 16 having a removable cover 17, as shown in Fig. 1.

A separator, such as that forming the subject of my invention can be operated with a lighter draft of air than separators of this type which are provided with overlapping conical hoods for causing the powdered material, after rising, to descend before it can escape, hence I am enabled to obtain a more finely divided product than can be obtained from such previous sepa-



rators, because of the fact that the draft can be so light that only particles in a state of extremely fine subdivision will be carried off by said draft.

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

1. In a separator for powdered material, the combination of an outer casing forming a continuation of the casing of a grinding mill, a drum centrally disposed within  
10 said casing and forming a chamber between its outer wall and the inner wall of the casing, and a draft pipe disposed above the casing and communicating with the interior of said drum, the chamber surrounding said drum being in communication with the interior of the same  
15 through openings at its top through which the lighter particles of material can flow laterally, and said drum being disposed wholly within the casing and communicating at its bottom with the grinding mill casing from which said powdered material is drawn.

2. In a separator for powdered material, the combination of an outer casing forming a continuation of the casing of a grinding mill, a drum centrally disposed within  
20 said casing and forming between it and the casing an annular chamber, and a draft pipe disposed above the casing and communicating with the interior of the drum, said  
25 drum being also in communication with said chamber through openings around the top of the drum, which openings are provided with adjustable vanes or shutters, and being disposed wholly within the casing and communicating at its bottom with the grinding mill casing from which  
30 said powdered material is drawn.

3. In a separator for powdered material, the combination of an outer casing forming a continuation of the casing of a grinding mill, a drum centrally disposed within  
35 the same, and a draft pipe disposed above the casing and communicating with the interior of said drum, said drum forming a chamber between it and the casing and being in

communication with said chamber through openings formed in the upper wall of the drum, said openings being provided with struck-up vanes or shutters susceptible of inclination with respect to the inner face of the drum, and  
40 said drum being disposed wholly within the casing and communicating at its bottom with the grinding mill casing from which said powdered material is drawn.

4. In a separator for powdered material, the combination of an outer casing forming a continuation of the casing of a grinding mill, a drum centrally disposed within the  
45 same with its axis substantially vertical and forming with the casing a chamber, said drum having in its upper portion openings through which the lighter particles of material can flow, a draft pipe disposed above the casing and  
5 communicating with the chamber inside the drum, said drum being disposed wholly within the casing and communicating at its bottom with the grinding mill casing from which said powdered material is drawn, and valve  
55 mechanism controlling such communication.

5. In a separator for powdered material, the combination of an outer casing forming a continuation of the casing of a grinding mill, a drum centrally disposed within  
60 the same and supported with its axis substantially vertical and forming with the casing a chamber, a draft pipe disposed above the casing and communicating with the chamber within said drum, the latter having openings at  
its top communicating with the chamber exterior the same and openings at its bottom communicating with the  
65 grinding mill casing from which said powdered material is drawn, and swinging plates forming valves and normally closing said bottom openings.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

JOHN F. POOL.

Witnesses:

WALTER CHISM,  
WM. E. SHUPE.