

No. 840,301.

PATENTED JAN. 1, 1907.

W. M. COOK.  
SEPARATOR.

APPLICATION FILED DEC. 13, 1905.

2 SHEETS—SHEET 1.

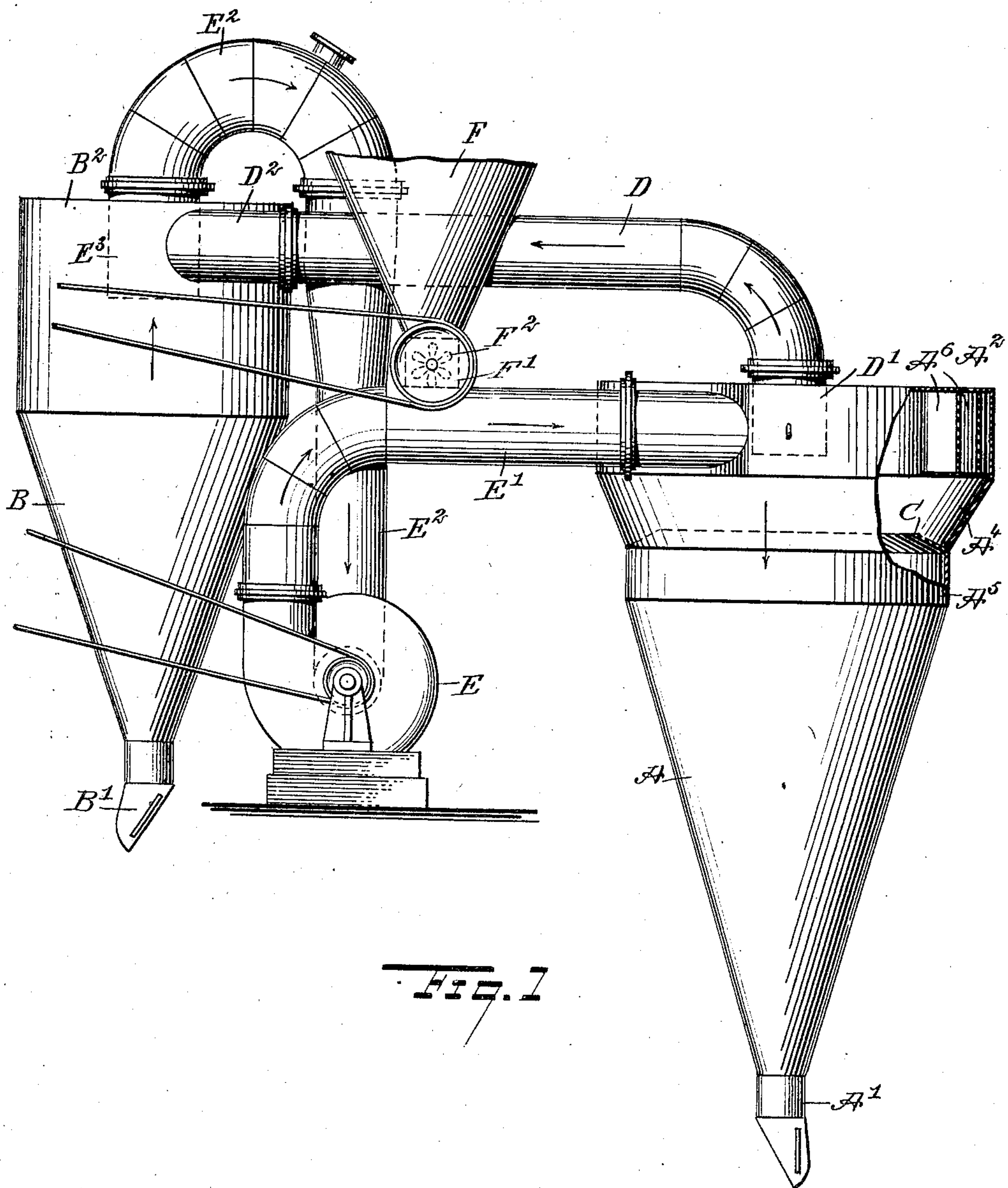


FIG. 1

WITNESSES:

*John Bergstrom*  
*Geo. H. Cook*

INVENTOR

*Walter M. Cook*

BY

*Wm. M. Cook*

ATTORNEYS

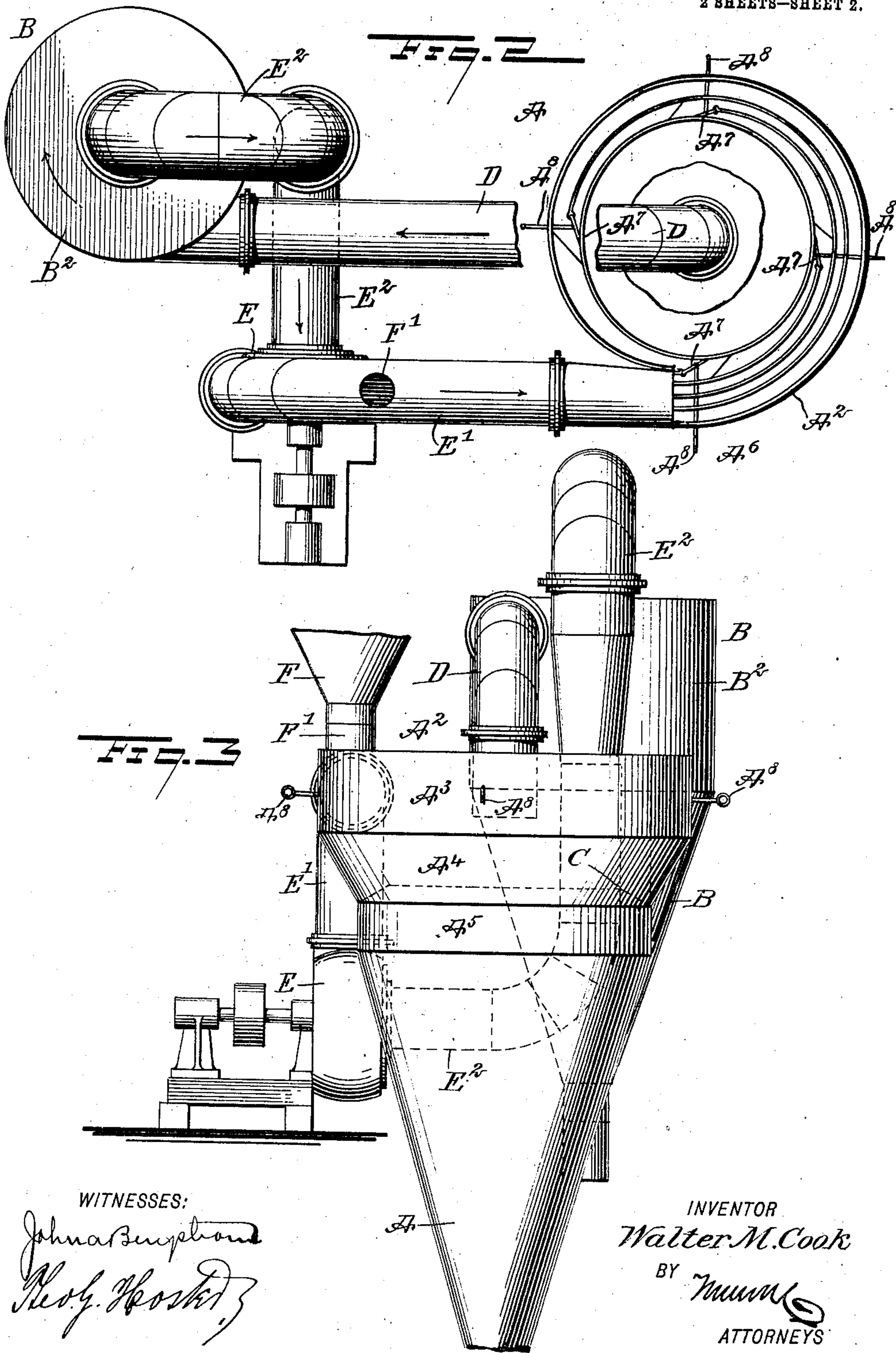
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2 SHEETS—SHEET 2.



WITNESSES:

*John A. Symington*  
*Rev. G. Hoskins*

INVENTOR

*Walter M. Cook*

BY

*Mumford*

ATTORNEYS



# UNITED STATES PATENT OFFICE.

WALTER M. COOK, OF LUDLOW, VERMONT, ASSIGNOR OF ONE-HALF TO  
CHRISTIAN M. LAURITZEN, OF CHICAGO, ILLINOIS.

## SEPARATOR.

No. 840,301.

Specification of Letters Patent.

Patented Jan. 1, 1907.

Application filed December 13, 1905. Serial No. 291,561.

*To all whom it may concern:*

Be it known that I, WALTER M. COOK, a citizen of the United States, and a resident of Ludlow, in the county of Windsor and State of Vermont, have invented a new and Improved Separator, of which the following is a full, clear, and exact description.

The invention relates to grinding-mills and like reducing-machines for reducing dry substances to powder; and its object is to provide a new and improved separator arranged to insure a thorough and complete separation of the tailings from the finished product in a comparatively simple and inexpensive manner.

The invention consists of novel features and parts and combinations of the same, which will be more fully described herein-after and then pointed out in the claims.

A practical embodiment of the invention is represented in the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the views.

Figure 1 is a side elevation of the improvement. Fig. 2 is a plan view of the same, and Fig. 3 is an end view of the same.

The collector A for receiving the tailings and the collector B for receiving the finished product are both preferably made of inverted-cone shape, as plainly illustrated in the drawings, and the said collectors are provided at their lower ends with suitable discharge devices A' B' for continually discharging the tailings and the finished product. The collectors A and B are provided at their upper ends with heads A<sup>2</sup> B<sup>2</sup>, of which the head A<sup>2</sup> for the tailings-collector A has the top portion A<sup>3</sup> made approximately spirally and terminating at its lower end in a conical portion A<sup>4</sup>, connected at its lower end with the cylindrical portion A<sup>3</sup> on the base of the collector A. The top portion A<sup>3</sup> is provided with a plurality of spiral channels A<sup>6</sup>, all starting from one point and opening sidewise into the head A<sup>2</sup> at different points of its circumference, as will be readily understood by reference to Fig. 2. The outlet from each channel A<sup>6</sup> into the head A<sup>2</sup> is controlled by a suitable gate A<sup>7</sup>, preferably in the form of a hinged gate adapted to be opened or closed by the use of a rod A<sup>8</sup>, pivotally connected with the gate A<sup>7</sup> and extending to the outside of the head A<sup>2</sup> to allow the operator to take

hold and manipulate the rod A<sup>8</sup> with a view to set each gate A<sup>7</sup> into the desired position. At the junction of the parts A<sup>4</sup> and A<sup>5</sup> is arranged an inwardly-extending and slightly upwardly inclined annular deflector C for deflecting the tailings and causing the same to drop over the deflector C down into the collector A.

The head A<sup>2</sup> of the tailings-collector A is connected by a pipe D with the head B<sup>2</sup> of the finished-product collector B in such a manner that the end D' of the pipe D extends centrally into the cylindrical portion A<sup>3</sup> of the head A<sup>2</sup>, while the other end D<sup>2</sup> of the said pipe D extends tangentially into the head B<sup>2</sup> at or near the top thereof. Into the starting ends of the spiral channels A<sup>6</sup> in the top portion A<sup>3</sup> of the head A<sup>2</sup> for the tailings-collector A discharges tangentially the discharge-pipe E' of a fan or blower E of any approved construction and having its inlet-pipe E<sup>2</sup> connected centrally with the head B<sup>2</sup> of the finished-product collector B, the end E<sup>3</sup> of the said pipe E<sup>2</sup> extending a short distance down into the head B<sup>2</sup>, as plainly indicated in Fig. 1. Into the discharge-pipe E' of the fan or blower E leads the spout F' of a hopper F, into which passes the material to be treated directly from the grinding-mill or other reducing-machine, the spout F' of the said hopper F being provided with a suitable feed-wheel F<sup>2</sup> for feeding the material in measured quantities into the discharge-pipe E' of the fan or blower E.

The operation is as follows: When the separator is in action, then the blast from the fan or blower E carries the material dropped into the discharge-pipe E' from the hopper F forward into the spiral top A<sup>3</sup> of the head A<sup>2</sup>, so that the material is forced through the spiral channels A<sup>6</sup> and discharged through the open gates A<sup>7</sup> into the head A<sup>2</sup>, in which the material is whirled around, whereby the tailings separate from the air-blast and the product, and the tailings gradually drop or settle in the collector A, while the finished product and air-blast is discharged up by the pipe D and delivered by the latter into the head B<sup>2</sup> of the finished-product collector B. Now the material as it is discharged into the head B<sup>2</sup>, is whirled around therein, as the pipe D<sup>2</sup> opens tangentially into the head B<sup>2</sup>, and the air-blast is sucked up by the pipe E<sup>2</sup>, which is the inlet or suction pipe for the fan



or blower E. The finished product separated from the air-blast in the head B<sup>2</sup> drops into the finished-product collector B, from which it continually discharges through the outlet-spout B'.

From the foregoing it will be seen that the tailings-collector A receives the material in a blast produced by the action of the fan E, while the air separated in the head B<sup>2</sup> is sucked up by the suction-pipe E<sup>2</sup>, which returns the air back to the fan E after separation has taken place, to be again set into the collector A, together with a new charge of material delivered to the pipe E' from the hopper F.

By the arrangement described a direct separation of the tailings and the material takes place in the head A<sup>2</sup> of the tailings-collector A by whirling the material around and causing the tailings to drop down, while the finished product, together with the air, is sucked up out of the head by the pipe D, which latter carries the material over into the head B<sup>2</sup>, in which a like whirling action takes place to insure complete and thorough separation of the finished product from the air, which latter passes by way of the suction-pipe E<sup>2</sup> back to the fan, to be again set in the head A<sup>2</sup> for collection in the collector A<sup>2</sup>, as previously explained.

It will further be seen that by the arrangement described the finished product settles in the collector B, while the air goes back to the exhaust-fan E.

By reference to the drawings it will be noted that the pipe ends D' and E<sup>3</sup> extend sufficiently far down into the heads A<sup>2</sup> and B<sup>2</sup> to cause the blast of air and the material carried along by the same to whirl around the said pipe ends, and hence the heavier tailings in the head A<sup>2</sup> are not liable to be sucked up into the pipe D, and the finished product is not liable to be sucked up into the pipe E<sup>2</sup>. It will also be noted that the tailings on gradually dropping within the cylindrical portion A<sup>3</sup> finally reach and slide down the conical portion A<sup>4</sup> onto the deflector C, over the inner edge of which the tailings finally pass and drop by their own weight into the collector A and discharge continually therefrom. It is also understood that the force of the air-blast in the head A<sup>2</sup> is sufficiently strong to carry the product along into the pipe D while the tailings are separated. In the head B<sup>2</sup> the force of the air-blast has sufficiently diminished to allow separation of the finished product and the air.

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

1. In a separator, a tailings-collector having a circular head provided with an air-supply pipe communicating therewith at a tangent to the periphery thereof, said head having a plurality of independent concentric spiral

passages leading from the supply-pipe and opening at different points into the head, gates for controlling the openings of the passages, means outside of the head for manipulating the gates, a collector for the finished product, provided with a circular head, a blower communicating with the supply-pipe of the tailings-collector, a hopper connected with the supply-pipe, a pipe leading from the tailings-collector and communicating at a tangent with the head of the collector for the finished product, and a pipe leading from the collector for the finished product to the blower, whereby a continuous circulation of air is assured through the collectors.

2. In a separator, a tailings-collector having a circular head provided with an air-supply pipe communicating therewith at a tangent to the periphery thereof, said head having a plurality of independent concentric spiral passages leading from the supply-pipe and opening at different points into the head, a blower communicating with the supply-pipe, a hopper connected with said supply-pipe between the blower and the tailings-collector, a collector for the finished product, provided with a circular head, a pipe leading from the tailings-collector and communicating at a tangent with the head of the collector for the finished product, and a pipe leading from the collector for the finished product to the blower, whereby a continuous circulation of air is secured through the collectors.

3. In a separator, a tailings-collector having a circular head provided with an air-supply pipe communicating therewith at a tangent to the periphery thereof, said head having a plurality of independent concentric spiral passages leading from the supply-pipe and opening at different points into the head, gates for controlling the openings of the passages, and means outside of the head for manipulating the gates.

4. In a separator, a tailings-collector having a circular head provided with an air-supply pipe communicating therewith at a tangent to the periphery thereof, said head having a plurality of independent concentric spiral passages leading from the supply-pipe and opening at different points into the head, and means for controlling said openings.

5. In a separator, a tailings-collector having a circular head provided with an air-supply pipe communicating therewith at a tangent to the periphery thereof, said head having a plurality of independent concentric spiral passages leading from the supply-pipe and opening into the head at points spaced apart circumferentially from each other.

6. In a separator, a tailings-collector having a circular head provided with an air-supply pipe communicating therewith at a tangent to the periphery thereof, said head having a plurality of independent concentric spiral



ral passages leading from the supply-pipe and opening into the head.

7. A separator provided with a tailings-collector having a head, spiral channels in the said head and starting from one point and opening into the head at different points of the circumference of the head, an adjustable gate at the discharge end of each channel, and a blower having a discharge-pipe opening into the starting ends of the said channels.

8. A separator, provided with a tailings-collector having a head, spiral channels in the said head and starting from one point and opening into the head at different points of the circumference of the head, an adjustable gate at the discharge end of each chan-

nel, a blower having a discharge-pipe opening into the starting ends of the said channels, a discharge-pipe leading centrally out of the said head, the said discharge-pipe extending a distance down in the head, and a deflector in the said head below the said channels and inclined inwardly and upwardly toward the entrance end of the said discharge-pipe.

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

WALTER M. COOK.

Witnesses:

THEO. G. HOSTER,  
EVERARD B. MARSHALL.