C. E. TUTWILER.

DUST COLLECTOR AND SEPARATOR.

APPLICATION FILED JULY 6, 1915.

1,267,715. Patented May 28, 1918.

Fig. 1.

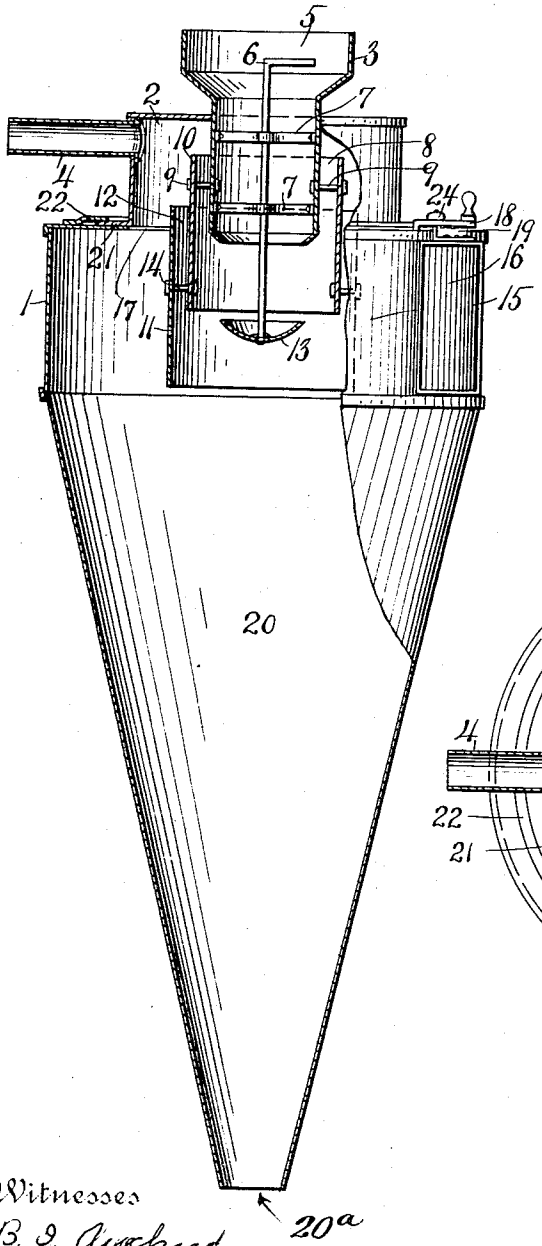


Fig. 2.

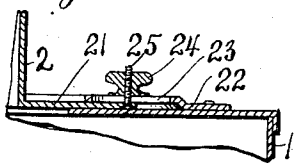


Fig. 3.

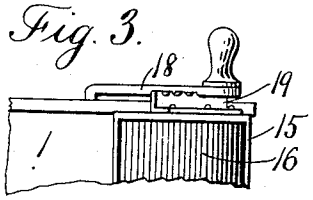
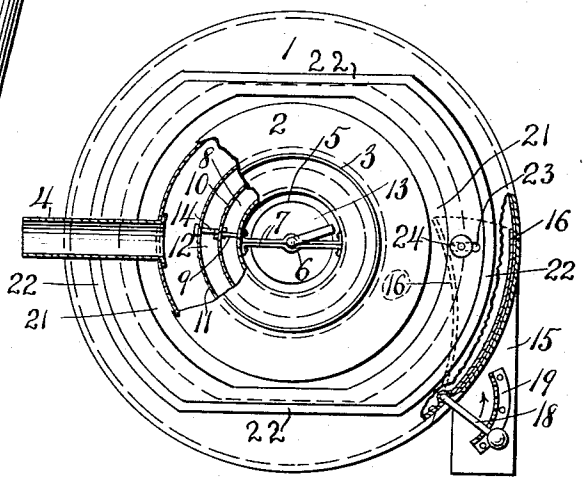


Fig. 4.



Witnesses

B. J. Auchard

P. J. Hemphill

Inventor

Caswell E. Tutwiler

By H. K. Stuckjor

Attorneys

UNITED STATES PATENT OFFICE.

CASWELL E. TUTWILER, OF CLAY CENTER, KANSAS.

DUST COLLECTOR AND SEPARATOR.

1,267,715. Specification of Letters Patent. Patented May 28, 1918.

Application filed July 6, 1915. Serial No. 38,056.

To all whom it may concern:

Be it remembered that I, CASWELL E. TUTWILER, a citizen of the United States, residing in the city of Clay Center, in the county of Clay and State of Kansas, have invented certain new and useful Improvements in Dust Collectors and Separators, of which the following is a specification, reference being had to the accompanying drawings, forming a part hereof.

My invention relates to dust collecting and separating devices especially adapted for use in flour and other mills, and particularly to separating devices of the centrifugal type.

The principal object of the invention is to improve the efficiency and operation of such devices so as to enable them to produce a more perfect separation. To this end I provide a central air outlet flue or conduit extending downwardly into the separating chamber, and so mounted as to be laterally adjustable relative to the axis thereof. I also preferably provide a swinging shutter pivotally mounted in the separating chamber adjacent the mouth of the air inlet conduit. By means of these instrumentalities, the incoming current of dust-laden air can be regulated as required, and the number of spirals or whirling motions of the dust particles controlled so as to practically eliminate back pressure and produce a very complete separation.

In order that the invention may be clearly understood, reference is had to the accompanying drawing, forming part of this specification, and illustrating one way in which the above mentioned principles of construction may be carried out.

In the drawing:—

Figure 1 is a vertical sectional view of an apparatus embodying my invention. Fig. 2 is a detail vertical sectional view of the regulating mechanism. Fig. 3 is a detail view of the controlling device for the shutter valve. Fig. 4 is a plan view of the apparatus with portions of the top thereof broken away for the purpose of disclosing the interior construction.

Similar numerals of reference indicate like parts throughout the several views.

The ordinary hopper 20, of inverted cone shape, has the dust discharge opening 20^a at its lower end or apex. At the upper end of the hopper is a separating chamber 1, on top of which is mounted an air chamber 2, provided with a vent 4. An air outlet conduit extends downwardly through the top of the air chamber and into the separating chamber, and, as shown in the drawing, such conduit preferably comprises a series of three graduated flues 11, 10, and 3, which are suspended one within the other by means of bolts 14 and 9, respectively, and communicate one with the other directly into the hopper which receives the dust in the usual manner through duct 15 and separating chamber 1. The heavier particles which are carried by the outer current of air follow the passage 12 at the side of the largest flue 11, and the lighter particles follow the passage 8 at the side of the middle flue 10, both discharging into the air chamber 2, from which they are conveyed through vent 4 either to the product below the hopper, or are returned to the eye of the fan and again pass through the separator, while the cleaned current of air passes out through the opening 5. The dust is finally delivered from the discharge opening 20^a at the bottom of the hopper. A disk 13 preferably bowl shaped as shown, secured to the lower end of the rod 6 suspended by bridges 7 secured to the inner walls of the flue 3, may be raised or lowered at will, and serves to regulate and control the force of the current of air at the bottom of the hopper 20, as also that passing through the flues 10 and 12 and out through the vent 4.

The entrance from the air duct 15 to the chamber 1 is provided with a shutter or valve 16 controlled by lever 18 engaging ratchet plate 19. All three of the flues 11, 10, and 3, pass through an elongated slot or aperture 17 in the top of the separating chamber 1, and, together with the chamber 2, are secured to a slidable lid or flange 21 traveling in guide members 22 secured to such top. Aperture 17 in one direction is of equal diameter with that of the air chamber 2 and in the other direction is somewhat greater than the diameter of the air chamber and flues, thereby permitting of the sliding of such lid and consequently of the flues and air chamber secured thereto as aforesaid in order to throw the central line of the flues out of alinement with the center of the opening in the bottom of the hopper; whereby the distance between the flues and wall of the separating chamber may be diminished when the air chamber

is moved in one direction and increased when moved in the other direction. When the flues are moved away from the air duct 15 and the distance between the same is increased the back pressure will be reduced and at the same time the whirling motions in the separator will be changed.

A screw 25 secured to said lid and fitted with thumb-nut 24 travels in slot 23 in the guide-member 22, by means of which the position of said flues and air chamber may be laterally adjusted.

It is well known that atmospheric conditions, as also the variant action of different fans, greatly affect the movement of the dust-laden air entering the hopper, requiring different adjustments of the center line of the flues with relation to the center of the opening in the bottom of the hopper. This I effectually accomplish by securing the flues and air chamber to a slidable lid closing an elongated opening in the top of the separating chamber as hereinbefore described.

The principal advantage of my improvement is the complete control and regulation of the air currents within the separator, whereby the so-called back pressure is eliminated or reduced to a negligible quantity and a more nearly perfect separation of the dust thereby effected.

What I claim is:—

1. In a dust collector and separator, the combination with a hopper having a discharge opening at its lower end, of a separating chamber mounted on the upper end of said hopper and having an apertured top, an air outlet flue slidably movable in the aperture of said top, one dimension of said aperture being greater than the diameter of said flue, and means for delivering dust laden air into said separating chamber.

2. In a dust collector and separator, the combination with a hopper having a discharge opening at its lower end, of a separating chamber mounted on the upper end of said hopper and having an apertured top, an air outlet flue extending through the aperture of said top, one dimension of said aperture being greater than the diameter of said flue, whereby said flue may be laterally adjusted in such aperture, and means for delivering dust-laden air into the side of said separating chamber.

3. In a dust collector and separator, the combination with a hopper of inverted cone shape having a discharge opening at its apex, of a separating chamber mounted on the upper end of said hopper and having an air inlet and an apertured top, and an air outlet flue extending through the aperture of said top, one dimension of said aperture being greater than the diameter of said flue, whereby said flue may be slidably moved in such aperture and adjusted laterally relative to the axis of said cone-shaped hopper.

4. In a dust collector and separator, the combination with a hopper having a discharge opening at its lower end, of a separating chamber mounted on the upper end of said hopper and having an air inlet and an apertured top, an air outlet flue extending through the aperture of said top, one dimension of said aperture being greater than the diameter of said flue, whereby said flue may be laterally adjusted in such aperture, and a supporting flange associated with said flue and resting upon said top, said flange being of such size and shape as to cover said aperture in all positions of said flue.

5. In a dust collector and separator, the combination with a hopper having a discharge opening at its lower end, of a separating chamber mounted on the upper end of said hopper and having an air inlet and an apertured top, an air outlet flue extending through the aperture of said top, one dimension of said aperture being greater than the diameter of said flue, whereby such flue may be laterally adjusted in such aperture, a supporting flange surrounding said flue and resting upon said top, said flange being of such size and shape as to cover said aperture in all positions of said flue, and means for clamping said flue in adjusted position.

6. In a dust collector and separator, the combination with a hopper having a discharge opening at its lower end, of a separating chamber mounted thereon, an air chamber surmounting said separating chamber and provided with a discharge vent, a flue concentrically mounted within and carried by said air chamber and opening upwardly through the top thereof, means for delivering dust laden air into the side of said separating chamber, and means for adjusting said air chamber and flue together, laterally of said separating chamber, so as to bring said flue into and out of alinement with the discharge opening at the lower end of said hopper.

7. In a dust collector and separator, the combination with a hopper having a discharge opening at its lower end, of a separating chamber mounted thereon, an air chamber surmounting said separating chamber and provided with a discharge vent, a concentric series of flues carried by said air chamber, and rising one above the other, said flues having diameters progressively decreasing upwardly, the smallest opening up through the top of said air chamber, and means for adjusting said series of flues and air chamber laterally, so as to bring the common axis of said flues into and out of alinement with the discharge opening in the bottom of said hopper.

8. In a dust collector and separator, the combination with a hopper having a discharge opening at its lower end, of a separating chamber mounted at the upper end thereof and having an apertured top, an air outlet flue extending through the aperture of said top and projecting into said separating chamber, an inlet conduit arranged to deliver dust-laden air tangentially into the annular space between said flue and the walls of said separating chamber, an adjustble shutter pivotally mounted adjacent the mouth of said conduit, means for adjusting the same to regulate the incoming air, and means for shifting said flue laterally toward and from said shutter, one dimension of said aperture being greater than the diameter of said outlet flue, to permit such movement.

9. In a dust collector and separator, the combination with a hopper having a discharge opening at its lower end, of a separating chamber mounted thereon, an air chamber surmounting said separating chamber and provided with a discharge vent, an air outlet flue concentrically carried by said air chamber and projecting into said separating chamber, an inlet conduit arranged to deliver dust laden air tangentially into the annular space between said flue and the walls of said separating chamber, an adjustable shutter pivotally mounted adjacent the mouth of said conduit, means for adjusting the same to regulate the incoming air, and means for shifting said flue laterally toward and from said shutter.

10. In a dust collector and separator, the combination with a hopper having a discharge opening at its lower end, of a separating chamber having an air inlet, and a slotted top mounted on the upper end of the hopper, guide members secured to said top and an air outlet flue slidably movable in said slot, and controlled in such movement by said guide members.

CASWELL E. TUTWILER.

Witnesses:
B. I. AUCHARD,
MATH DIETRICH, Jr.