April 25, 1933. J. B. GAFFNEY 1,905,458

SEPARATOR

Filed March 1, 1928

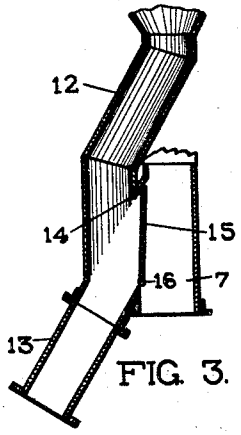


FIG. 3.

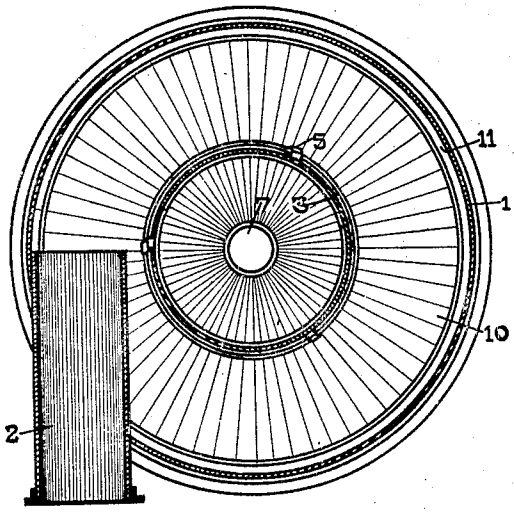


FIG. 2.

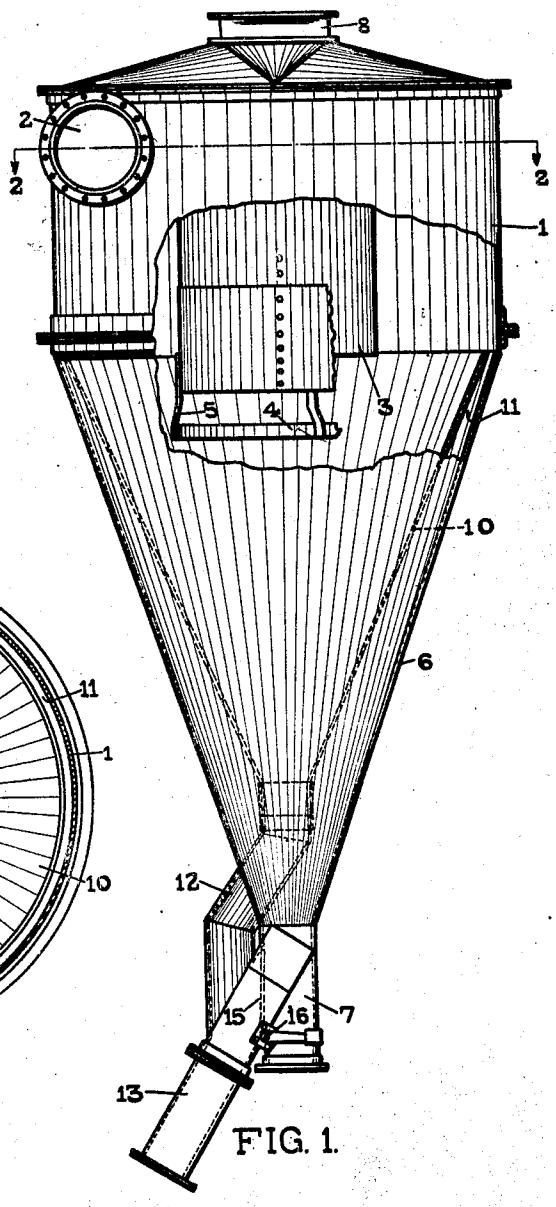


FIG. 1.

Joseph B. Gaffney INVENTOR

BY

Gifford & Scull

ATTORNEY

Patented Apr. 25, 1933 1,905,458

UNITED STATES PATENT OFFICE

JOSEPH B. GAFFNEY, OF BETHLEHEM, PENNSYLVANIA, ASSIGNOR TO FULLER LEHIGH COMPANY, OF FULLERTON, PENNSYLVANIA, A CORPORATION OF DELAWARE

SEPARATOR

Application filed March 1, 1928. Serial No. 258,389.

This invention relates to a device for separating particles of material of different sizes so that the particles of small size will be collected and particles of larger size will be separately collected. The invention is especially useful in separating fine particles of coal from the coarse particles, as the coal comes from a pulverizer. This is sometimes desirable because it is desired to have the coarse coal free from the finer particles for metallurgical purposes, for example.

The invention will be understood from the description in connection with the accompanying drawing in which Fig. 1 is a vertical section of the device partly broken away; Fig. 2 is a section along the line 2—2 of Fig. 1; and Fig. 3 is a vertical section of some of the details partly broken away.

In the drawing reference character 1 indicates the upper cylindrical portion of the separator that is provided with a tangential inlet 2 and an inner concentric cylinder 3. A baffle 4 is provided below the lower open end of the cylinder 3 and is attached thereto by means of the spacing supports 5.

A conical portion 6 extends from the lower end of the cylindrical portion 1 and terminates in an outlet 7 at the bottom. An outlet 8 for air is provided at the top of the cylindrical portion 1. An inner cone 10 of smaller size than the cone 6 is located coaxially with the cone 6, leaving an annular space 11 increasing in size downwardly between the cones. A connection 12 extends from the lower end of the inner cone 10 through the wall of the cone 6 and enters the inclined outlet 13. A slip joint may be provided between the upper end of the connection 12 and the lower end of the cone 10. The upper end of the inclined outlet 13 is provided with an extension 14 that leads into the outlet 7. The extension 14 is closed by means of a by-pass gate or valve 15 that is hinged as indicated at 16.

The inner cone may be made adjustable longitudinally to vary the size of the annular space 11 between the cones.

The operation is as follows: Powdered coal, for example, from a pulverizer or powdered coal mill is blown by air through the inlet 2 into the cylindrical portion 1 and due to the tangential position of the inlet, the material is given a whirling motion that causes the coarser particles to be thrown outwardly along the inner wall of the device and descend through the space 11 between the inner and outer cones, thence passing out through the outlet 7 into any convenient receptacle. The finer particles pass down through the inner cone 10 while the air passes around the baffle 4 upwardly through the cylinder 3 and out through the outlet 8. The finer particles pass through the connection 12 and outlet 13 to any convenient receptacle. When it is desired to mix a portion or all of the coarser particles with the fine particles, the gate or valve 15 can be turned part way or all the way over, thus causing the fine particles and a portion or all of the coarse particles to pass out together through the outlet 13. When the cone 10 is adjusted axially the annular space 11 is varied so that the separation of the coarse and fine particles from each other can be regulated within wide limits. The smaller the space 11 is the larger is the amount of the coarser particles that is carried off with the fine particles.

I claim:

1. In a separator, a cylindrical upper portion, a tangential inlet into said cylindrical portion, a conical portion extending downwardly from said cylindrical portion, a second conical portion within said first-named conical portion and spaced therefrom, extending downwardly from adjacent said cylindrical portions, separate outlets from said conical portions, and means for maintaining said conical portion in different adjusted positions with respect to each other so that the distance between said conical portions may be varied.

2. In a separator, a cylindrical upper portion, a tangential inlet into said cylindrical portion, a conical portion extending downwardly from said cylindrical portion, a second conical portion within said first named conical portion and spaced therefrom, extending downwardly from adjacent said cylindrical portions, separate outlets from said conical portions, and means for maintaining

one of said conical portions in different positions longitudinally with respect to the other.

3. In a separator, a cylindrical upper portion, a tangential inlet into said cylindrical portion, a conical portion extending downwardly from said cylindrical portion, a second conical portion within said first-named conical portion and spaced therefrom extending downwardly from adjacent said cylindrical portion, separate outlets from said conical portions, and means for varying the size of the space between said conical portions.

4. In a separator, a cylindrical upper portion, a tangential inlet into said cylindrical portion, a portion extending downwardly from said cylindrical portion, a second portion extending downwardly from said cylindrical upper portion within said first-named downwardly extending portion and spaced therefrom to leave an opening between the upper ends of said downwardly extending portions, separate outlets from said downwardly extending portions, and means for varying the size of the opening between said downwardly extending portions.

JOSEPH B. GAFFNEY.