May 20, 1930. J. WHITMORE 1,759,382

APPARATUS FOR SEPARATING AND COLLECTING DUST

Filed April 30, 1924

Fig. 1.

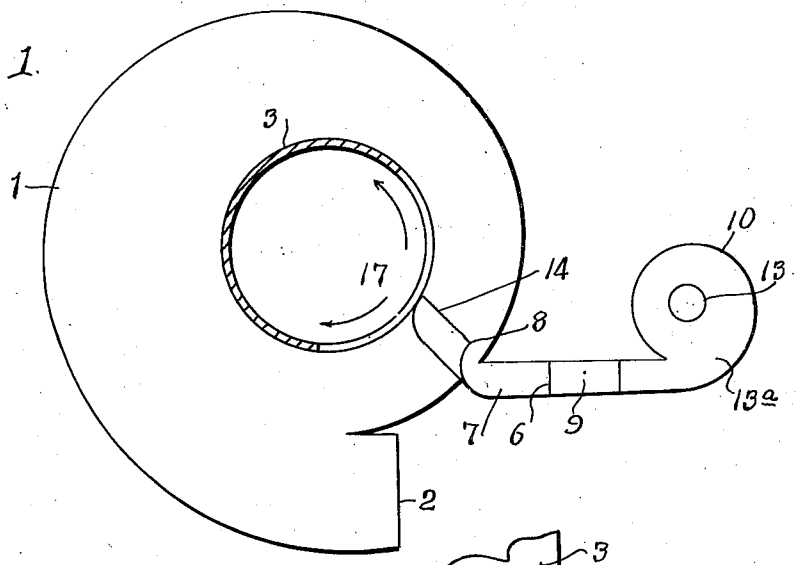


Fig. 2.

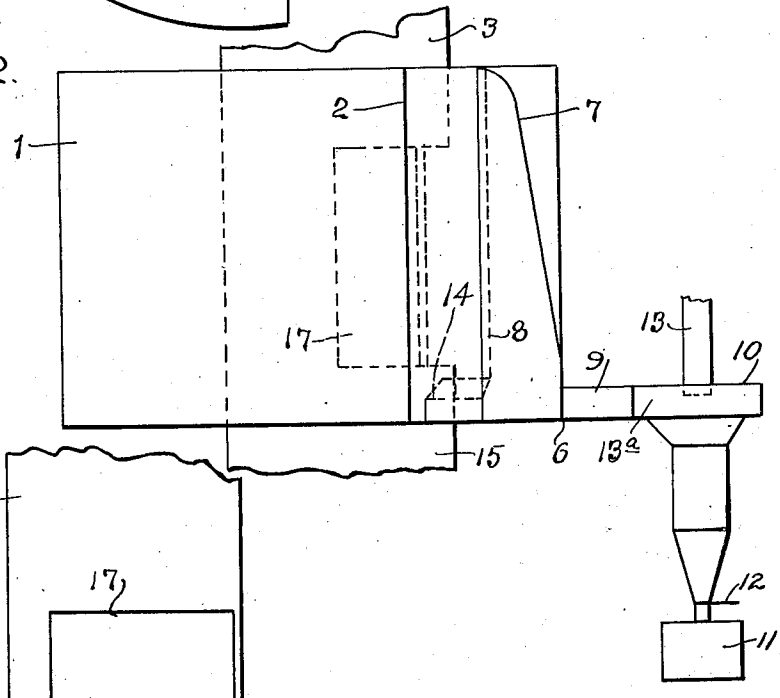
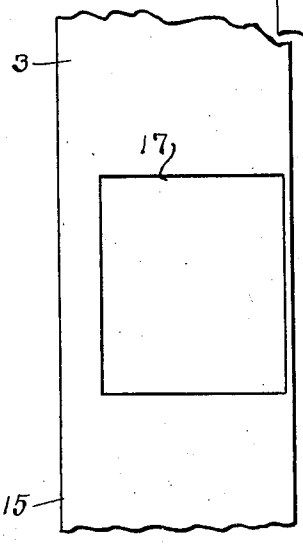


Fig. 3.



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APPARATUS FOR SEPARATING AND COLLECTING DUST

Application filed April 30, 1924, Serial No. 710,106, and in Great Britain May 3, 1923.

This invention relates to dust separating and collecting apparatus, more particularly for use in connection with boiler power plants, heating and calcining furnaces and the like.

The object of the invention is to provide a more efficient apparatus for separating by means of centrifugal force, removing, and collecting, the dust and grit from the gaseous products of combustion from furnace plants of the above indicated kind, relatively to the methods and apparatus heretofore commonly employed for this purpose.

In the method of operating, according to my present invention, after the primary separation of the dust and grit has been effected by means of centrifugal force from the dust-laden gases, the main body of the purified gases is removed, preferably with the aid of a forced draught, and the separated dust is carried through a tangential outlet, communicating with a secondary collector, by a portion of the original gases, where it is separated and collected, while the gases escape through the outlet in the top of the secondary collector, the dust falling into a suitable receiver through the dust outlet at the bottom.

Referring to the drawings:

Figure 1 is a plan view of the apparatus of my invention;

Figure 2 is a side elevation thereof;

Figure 3 is a side elevation of the chimney with the collector housing removed.

Figures 1, 2 and 3 indicate my apparatus in which the volute casing 1 has a dust laden air inlet 2 provided with a chimney 3 passing through the volute casing and located eccentrically thereof.

The chimney has a port in the side thereof designated 17, through which the dust free air makes its exit into and up the chimney. The opening 17 in the chimney 3 is located in that portion of the chimney which is closest to the wall of the volute 1.

Interposed between this opening 17 and the wall 1 in the minimum space between the chimney and the volute wall 1 is a horizontally disposed lip 14 on the floor of the casing 1. A vertical skimmer lip 8 cooperates with the lip 14 in collecting the dust. The lip 8 discharges into a vertically disposed pocket 7 which tapers downwardly and outwardly where it discharges into a passageway designated 6 and 9 through which the collected dust laden air flows to the secondary collector 13^a.

The dust so collected by the lips 8 and 14 passes with some of the air into the pocket 7 and passageways 6 and 9 and thence to the secondary collector 13^a which has a top 10 in which is located the exit pipe 13 for dust free air from the secondary collector 13^a. The dust collected in the secondary collector 13^a is deposited into the hopper 11, the entrance to which is controlled by the valve 12.

The opening 17 in the chimney may extend for a considerable distance around the circumference of the chimney, or if desired, instead of having one large opening, a plurality of comparatively small apertures may be provided. 15 indicates the lower end of the chimney which is continuous with the chimney portion 3 passing through the primary volute casing 1.

It will be understood that I desire to comprehend within my invention such modifications as may be necessary to adapt it to varying conditions and uses.

What I claim and desire to secure by Letters Patent is:—

1. Dust collecting apparatus comprising in combination, a volute primary vortex chamber having a substantially vertical axis, a tangential inlet thereto on the maximum radius of the volute for the dust-laden gases, a chimney extending from the primary vortex chamber for the main volume of purified gases, a tangential outlet about at the minimum radius of the volute for the centrifugally separated dust accompanied by a certain quantity of the original volume of gas, a pocket in communication with said tangential dust outlet, an outlet from said pocket, a secondary vortex chamber having a continually decreasing diameter connected to the outlet from said pocket, an outlet from the secondary vortex chamber to enable an unimpeded flow of the purified gas to take place and a dust outlet at the lower part of the said secondary vortex chamber.

2. In a dust collecting apparatus, the combination of a primary vortex chamber having a tangential inlet, a tangential air and dust outlet, a centrally-located vertical chimney forming an air exit, a secondary vortical chamber connected to the air and dust outlet, a dust free air exit from the secondary chamber, and a lip extending from the air and dust outlet into the primary chamber.

3. A dust collecting apparatus comprising in combination, a volute primary vortex chamber having a substantially vertical axis, a tangential inlet thereto on the maximum radius of the volute for the dust laden gases, a chimney passing axially through the primary vortex chamber, an opening in the wall of that part of the chimney within the primary vortex chamber, a tangential outlet about at the minimum radius of the primary vortex chamber for the centrifugally separated dust accompanied by a certain amount of the original volume of gas, a pocket extending the full height of the primary vortex chamber in communication with said tangential dust outlet, an outlet from said pocket, a secondary vortex chamber having a continually decreasing radius of vortex, a connection from the outlet from said pocket to said secondary vortex chamber, an outlet from the secondary vortex chamber to enable an unimpeded flow of the purified gas to take place, and a dust outlet at a lower part of the secondary vortex chamber.

4. A dust collecting apparatus comprising in combination, a volute primary vortex chamber having a substantially vertical axis, a tangential inlet thereto on the maximum radius of the volute for the dust laden gases, a chimney from the primary vortex chamber for the main volume of the purified gases, a tangential outlet about at the minimum radius of the volute for the centrifugally separated dust, accompanied by a certain quantity of the original volume of gas, a pocket extending the full height of the chamber in communication with said tangential dust outlet, an outlet from said pocket, a secondary vortex chamber having a continually decreasing diameter, a connection from said outlet to said secondary vortex chamber, an outlet from the secondary vortex chamber to enable an unimpeded flow of the purified gas to take place, and a dust outlet at the lower part of the said secondary vortex chamber.

5. In a dust collecting apparatus, the combination of a primary vortex chamber having a tangential inlet, a tangential air and dust outlet, a chimney forming an air exit passing centrally through the primary vortex chamber having an opening in the wall of that part of the chimney within the primary vortex chamber, a second vortical chamber connected to the air and dust outlet, a dust-free air exit from the secondary chamber, a pocket extending the full height of the primary vortex chamber and a vertical lip coextensive with the pocket and projecting inwards into the said chamber from the pocket.

In testimony whereof, I affix my signature.

JOHN WHITMORE.