

Dec. 13, 1927.

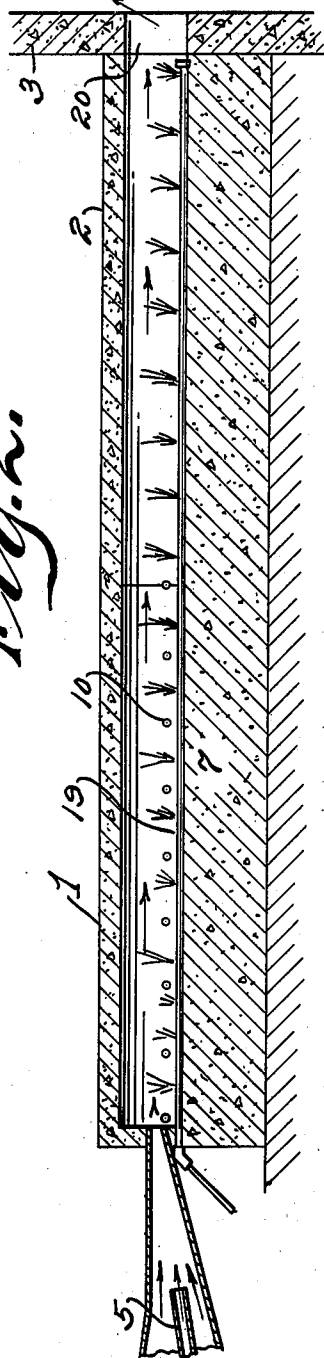
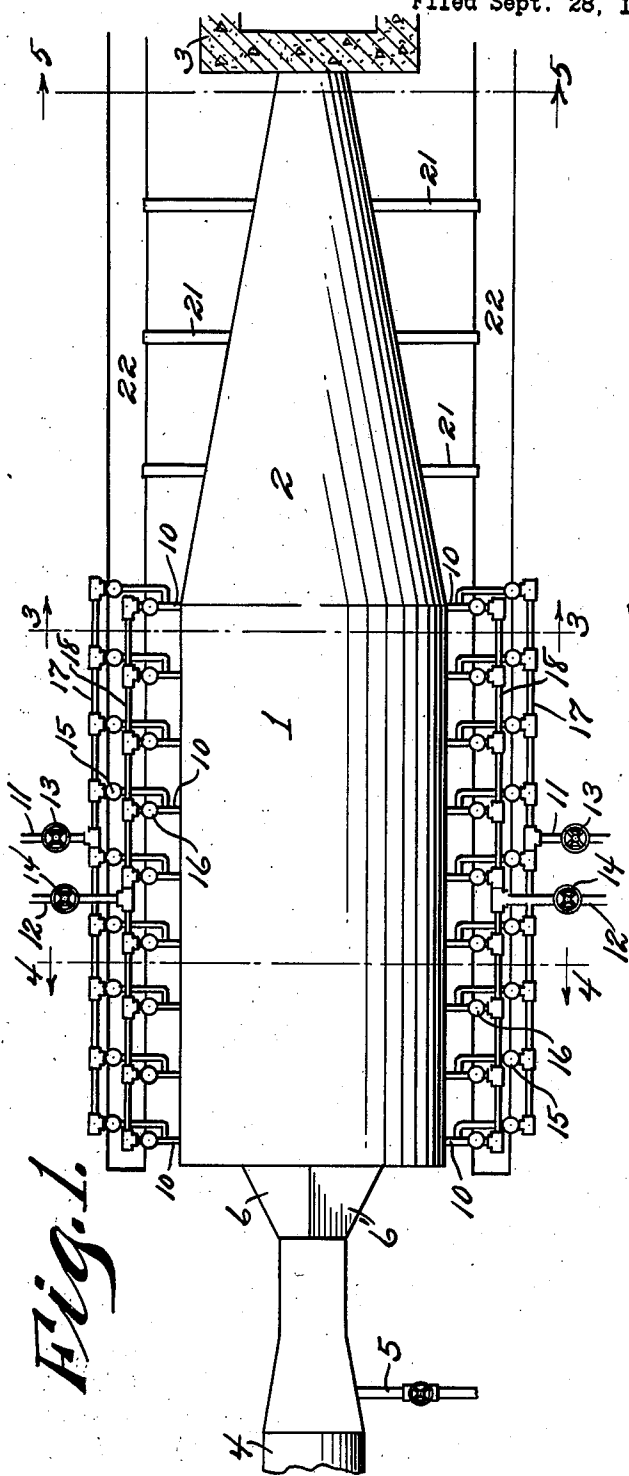
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1,652,956

PROCESS AND APPARATUS FOR TREATING GASES, FUMES, AND THE LIKE

Filed Sept. 28, 1925

2 Sheets-Sheet 1



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Fig. 3.

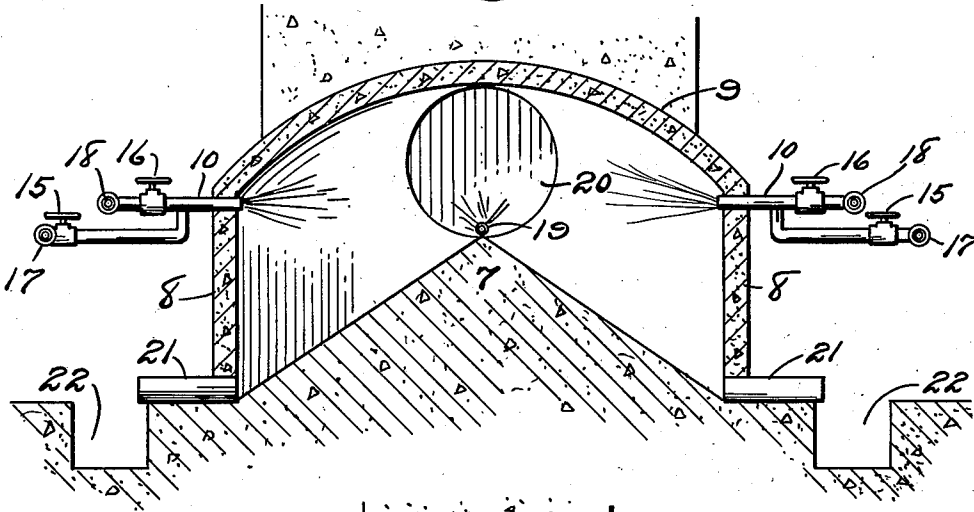


Fig. 5.

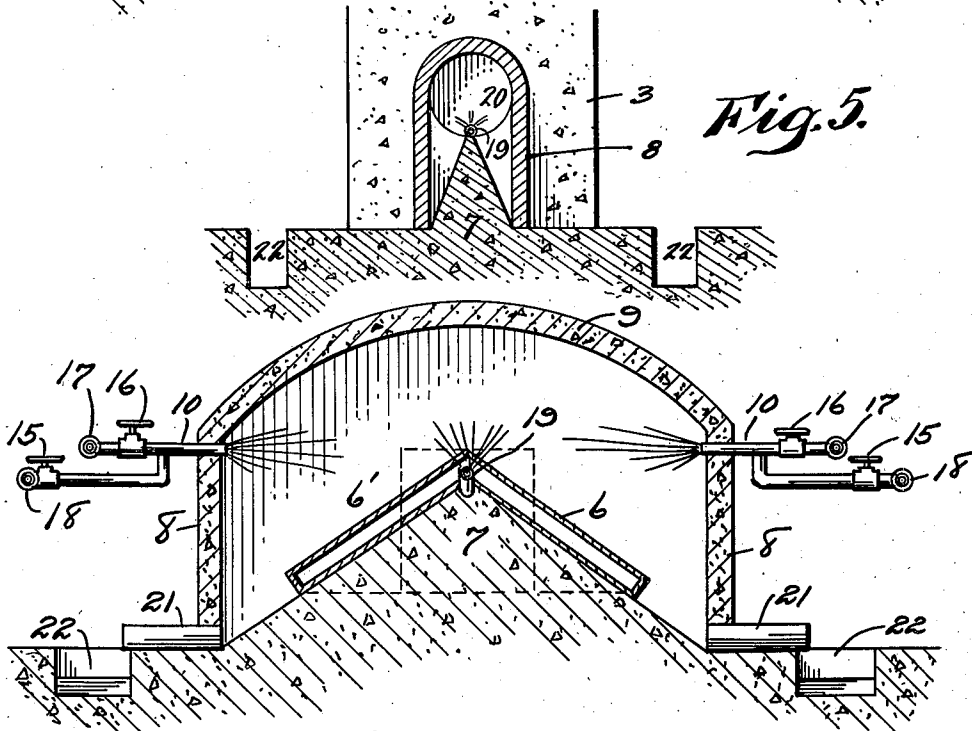


Fig. 4.

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PROCESS AND APPARATUS FOR TREATING GASES, FUMES, AND THE LIKE.

Application filed September 28, 1925. Serial No. 59,216.

This invention relates to a process and apparatus for treating gases issuing from smelters or other metallurgical apparatus or produced in other metallurgical operations, blast furnaces and the like, or other gases containing noxious or objectionable particles of solid, liquid or gaseous matter. Its object is to produce a new and improved apparatus and process for separating particles of solid, liquid or gaseous matter from fumes, smokes or gases in a more efficient and practical way than has heretofore been the case.

The nature of the apparatus and process will be best understood and followed from a consideration of the following description considered with the accompanying drawings.

In the drawings which accompany this description

Fig. 1 represents a plan view of the apparatus embodying my invention.

Fig. 2 is a longitudinal sectional elevation of Fig. 1.

Fig. 3 is a transverse section taken on the line 3—3 of Fig. 1 and looking in the direction of the arrows.

Fig. 4 represents a transverse section on the line 4—4 of Fig. 1 looking in the direction of the arrows.

Fig. 5 is a transverse section on line 5—5 of Fig. 1 looking in the direction of the arrows.

Referring to the drawings numeral 1 indicates the main body portion or chamber of the washer or condenser. A cone shaped body 2 leads from this main body portion or chamber to the stack or chimney 3 affording an outlet for the washed or purified gases. The gases to be washed or purified enter by means of the inlet 4 and are assisted in their travel through the apparatus by an injection of wet steam from the pipe 5 entering a constricted portion of the gas inlet pipe 4, thereby insuring a continuous travel of the gases through the apparatus. The inlet 4 is flattened, as shown in Figs. 1 and 4, at its point of entry in the part 1 of the apparatus into two parts 6 and 6' conforming with the angular or conical shaped bottom 7 of the apparatus. The angular or conical shaped bottom continues throughout the length of the apparatus from the point where the gases enter through 6—6' to where they leave at the stack 3. Over the conical shaped bottom 7 is constructed the

side walls 8 and the dome shaped top 9 of the portions 1 and 2 of the apparatus. While the bottom has been shown with a shape the cross-section of which is angular or triangular, I do not desire to be restricted to this particular shape as I may make the bottom of arcuate shape either convex or concave or any equivalent shape. The parts 6—6' of the inlet means necessarily must be made to conform with the shape that the bottom 7 assumes.

As is shown in Figs. 1, 3 and 4 the apparatus is provided with water spray nozzles 10 entering both sides of the apparatus through the vertical walls 8 thereof. These spray atomizing nozzles 10 are supplied with water from the water line 11 and with air from the air line 12, the purpose of the air being to forcibly inject and minutely divide the water as it leaves the nozzles 10. Suitable valves 13 and 14 respectively control the water line 11 and the air line 12 while valves 15 and 16 respectively control the admission of water and air to each of the individual nozzles 10 as indicated in Figs. 1, 3 and 4. As shown in Figs. 1, 3 and 4 the main water and air lines 11 and 12 are connected through suitable pipe connections 17 and 18 with the individual nozzles 10 and their connections.

At the top of the angular bottom 7 there is provided a spray 19 composed of a pipe perforated at frequent intervals designed to spray jets of water in a vertical and lateral direction in the portions 1 and 2 of the apparatus. It is to be observed that the water spray 19 is designed to spray water in both portions 1 and 2 of the apparatus, while the sprays from the nozzles 10 are only effective in the portion 1 of the apparatus. The gases are therefore continuously being subjected to the action of a cleansing agent while they are being constricted in the conical portion 2 of the apparatus on their way to the outlet 20 in the stack 3.

The water, condensed steam and collected particles flow out from the portions or compartments 1 and 2 through the discharges 21 arranged at the base of the angular or conical portion 7 and passing through the side walls 8. The quantity of water and contained particles leaving the apparatus through the discharges 21 is usually sufficient to effectively seal these discharges from the outflow of gas or fumes through them,

but when the conditions are such that the quantity of water used and the matter contained by it after use does not accomplish this function valves or other restricting means may be inserted in the discharges 21 to reduce their capacity, or the discharges 21 may, by means of an elbow attached thereto, depend below the liquid level of the discharged water in the discharge launders or flumes 22, thereby forming a hydraulic seal. The apparatus may be constructed of brick, reinforced concrete or other masonry construction or may be constructed of any other materials capable of resisting any corrosive or destructive action of the gases treated.

Within the interior of the conical body portion 2 baffles may be provided for collecting and arresting entrained particles. These baffles may consist of wires or screens hung from the top of the body portion 2 or otherwise supported therein, and should be constructed of such material that the corrosive action of the gases will be resisted. The baffles may be provided in only a part of the chamber or throughout its whole length.

In operation gases or fumes enter the inlet 4 and are assisted in their passage through the apparatus by the injection of wet steam from the pipe 5. The steam not only assists the motion of the gases through the apparatus but moistens and permeates the solid or semi-solid matter contained therein. The steam contained in and surrounding the particles becomes condensed through the cooling action of the water sprays, whereby a rapid precipitation occurs not only due to the steam condensing within the particles but upon them also. The stream of gas is then flattened out into two inclined portions in the parts 6-6' and then passes along the top of the angular or conical shaped bottom 7 of the portions or compartments 1 and 2. While the gases are thus spread out in a roof shaped fashion they are subjected to the action of the wet steam from the pipe 5, water and air from the nozzles 10 and the water from the water spray 19. After the gases leave portion or compartment 1 they enter the conical portion or compartment 2 of the apparatus where they are subjected to a constricting or compressing action due to the gradually decreasing cross-sectional area of the conical part 2 while being subjected to the action of water spray 19. After the treatment in the portion 2, the gases leave by means of the outlet 20 and escape through the stack 3.

Having described my invention, what I claim and desire to secure by Letters Patent is:

1. An apparatus for treating gases comprising a main chamber and a conical chamber attached at its base to the main chamber, spray means for each of said chambers,

a floor for said chambers formed of inclined portions, gas inlet means for the main chamber conforming to the shape of said floor and gas outlet means in said conical portion.

2. An apparatus for treating gases comprising a main chamber and a conical chamber attached at its base to the main chamber, spray means for each of said chambers, a floor for said chambers formed of reversely inclined intersecting portions, gas inlet means for the main chamber conforming in shape to the shape of said floor and gas outlet means in said conical portion.

3. An apparatus for treating gases comprising a spray chamber having a floor comprising reversely inclined intersecting portions with the line of intersection of said portions being the uppermost portion of said floor, and means for spreading gases as a layer over said portions.

4. An apparatus for treating gases comprising a main chamber and a conical chamber attached at its base to said main chamber, spray means for each of said chambers, a floor for said chambers comprising reversely inclined intersecting portions with the line of intersection being the uppermost portion of said floor, gas inlet means for said main chamber conforming in shape with the shape of said floor and gas outlet means in said conical portion.

5. Apparatus for treating gases comprising a spray chamber with a floor comprising reversely inclined intersecting portions with the line of intersection of said portions being the uppermost portion of said floor, and conduit means for spreading gases as a layer over said portions said conduit means conforming in shape with the shape of said floor and being much less in cross sectional area than the area of the cross section of said spray chamber.

6. An apparatus for treating gases comprising a spray chamber having a floor comprising reversely inclined portions said portions sloping downwardly toward the sides of the spray chamber and conduit means for spreading gases as a layer over said portions, said conduit means being less in cross sectional area than the area of the cross section of said spray chamber.

7. An apparatus for treating gases comprising a spray chamber having a floor, said floor comprising reversely inclined intersecting portions sloping downwardly from the line of intersection to the sides of the chamber, and spray means near the line of intersection and extending parallel therewith.

8. An apparatus for treating gases comprising a main chamber and a conical chamber attached at its base to the main chamber, a floor for said chambers formed of reversely inclined portions sloping downwardly toward the sides of said chambers, spray means near the highest portion of said floor

and extending the length of both chambers, and other spray means for the main chamber and positioned in the walls thereof.

5 9. An apparatus for treating gases comprising a main chamber and a conical chamber attached at its base to said main chamber, spray means for each of said chambers, a floor for said chambers comprising reversely inclined portions, said portions sloping
10 downwardly toward the sides of the chamber, gas inlet means for said main chamber conforming in shape with the shape of said

floor, and gas outlet means in said conical chamber.

10. An apparatus for treating gases comprising a spray chamber having a floor, said floor comprising reversely inclined portions sloping downwardly from a position within the interior of said chamber toward the sides of said chamber, and spray means near
20 the highest portion of said floor.

In testimony whereof I affix my signature.

GEORGE S. PURTYMAN.