G. C. RICHARDS.

FUME CONDENSER.

APPLICATION FILED APR. 30, 1917.

1,272,528.

Patented July 16, 1918.

Fig. 1.

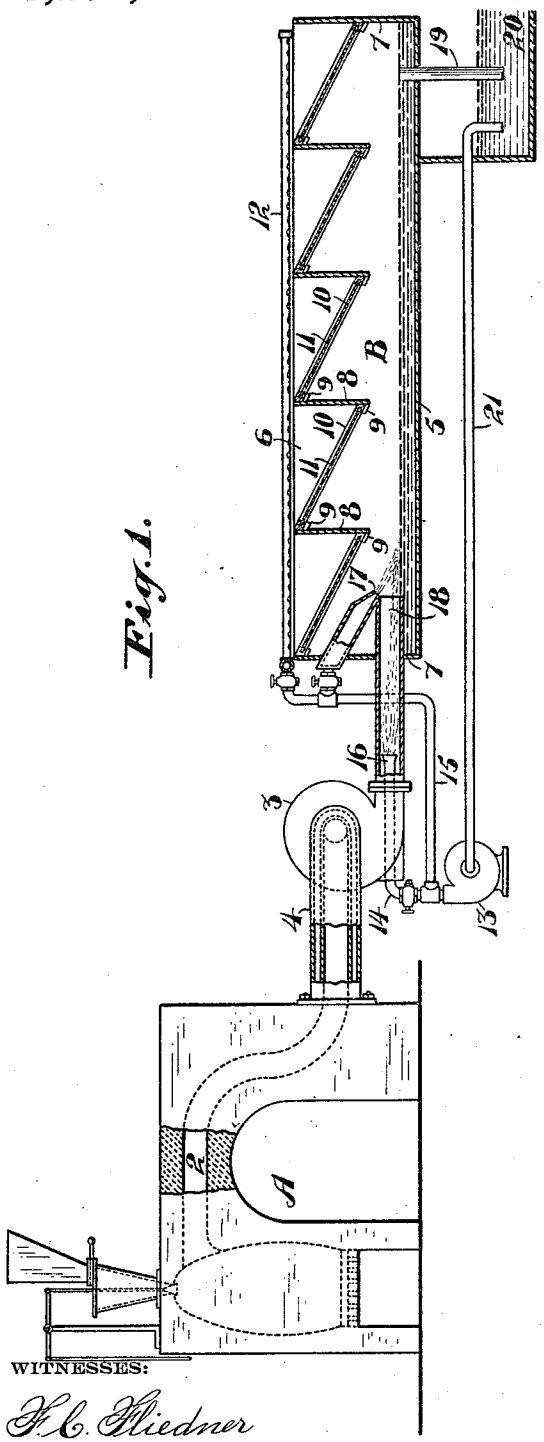
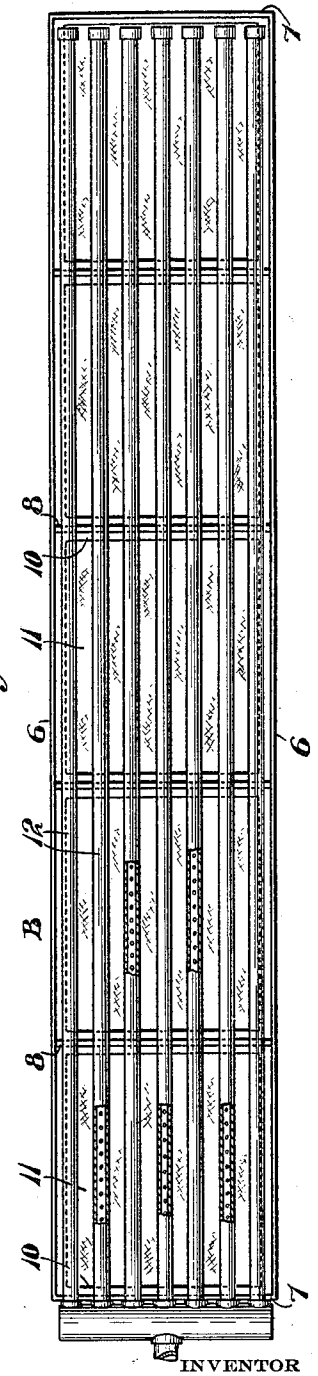


Fig. 2.



WITNESSES:

F. C. Fliedner

Julius C. Bensch.

INVENTOR

George C. Richards,

BY Strong & Townsend

ATTORNEYS

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

GEORGE C. RICHARDS, OF BERKELEY, CALIFORNIA.

FUME-CONDENSER.

1,272,528. Specification of Letters Patent. Patented July 16, 1918.

Application filed April 30, 1917. Serial No. 165,594.

To all whom it may concern:

Be it known that I, GEORGE C. RICHARDS, a citizen of the United States, residing at Berkeley, in the county of Alameda and State of California, have invented new and useful Improvements in Fume-Condensers, of which the following is a specification.

This invention relates to a fume condenser.

One of the objects of the present invention is to provide a simple, cheaply manufactured, easily operated, efficient fume condenser adapted to be used in connection with smelters, retorts, garbage burners and furnaces in general when certain ores or materials are handled and where escaping fumes or smoke are objectionable both from a sanitary and economical point of view. Another object of the invention is to provide a fume condenser which may be directly connected with the escape flue of a smelter or like device, and in which all escaping fumes or gases are subjected to a water spray action and contact with a series of water sprayed fabric surfaces to promote condensation. Further objects will hereinafter appear.

The invention consists of the parts and the construction and combination of parts as hereinafter more fully described and claimed, having reference to the accompanying drawings, in which—

Figure 1 is a central, vertical, longitudinal section through the condenser, showing it connected with a blower and a furnace.

Fig. 2 is a plan view of the condenser.

Referring to the drawings in detail, A indicates a standard form of furnace which may be used for reducing cinnabar, zinc, antimony or like ores, or which might be employed for burning garbage or other material. 2 indicates the main escape flue connecting with the furnace chamber; 3 a blower; and B the condenser in general. Any suitable form of suction blower may be employed and this, together with the flue connecting tube 4, is preferably water-jacketed to maintain the temperature as low as possible.

The fume condenser proper consists of a box-like structure comprising a bottom section 5, sides 6 and ends 7. The box is preferably narrow and long, as shown, and is otherwise provided with a plurality of downwardly extending baffle plates 8. Formed on the lower and upper end of each baffle plate is a seat projection 9 for the reception of a frame 10 carrying a canvas fabric 11. The baffle plates extend approximately half way down into the box and each canvas supporting frame 11, therefore, assumes an inclined position approximately such as shown.

Extending longitudinally of the box, above the canvas frames and the baffle plates 8, is a series of spray pipes 12 to which water is delivered from a circulating pump 13. Also connected with the pump, through pipes 14 and 15, is a pair of spray nozzles 16 and 17; the nozzle 16 being capable of projecting a cone-like jet and being preferably positioned in the discharge end of the blower, while the nozzle 17 is preferably designed to discharge a flat or sheet-like spray just ahead of the discharge pipe 18 which enters the box-like chamber of the fume condenser. The condenser is otherwise provided with an overflow pipe 19 which connects with a sump 20, where the water is permitted to cool and the denser particles are permitted to settle and the suction side of the pump may be directly connected with the sump by a pipe 21 to re-circulate the water, if desired.

In actual operation, with the blower revolving, it can readily be seen that a sufficient suction is obtained to draw all the fumes, smoke and gases from the furnace through the flue 2 and the blower casing 3 and discharge the same through the pipe 18 directly into the box-like chamber of the condenser. The gases in discharging from the blower are first subjected to the spray action of the nozzle 16 and then to the spray action of the nozzle 17. The sheet-like spray here produced serves as a secondary condenser and at the same time deflects the discharging gases in a downward direction, thereby preventing the major portion of the gases from striking the first fabric surface. The pump 13 being operated at the same time produces sufficient pressure to operate the nozzles 16 and 17 and also delivers a

sufficient volume of water to project a spray from the pipes 12 downwardly against the upper surfaces of the fabric covered frames 11. The fumes can only escape from the box-like chamber by passing through the fabric surfaces and as they are here brought into intimate contact with the water saturated fabric and the water spray exerted against same, they will immediately condense and there adhere to the fabric surface or fall back into the bottom of the condenser where they are washed out by the discharging water and finally delivered through the pipe 19 into the sump 20, where they are permitted to settle and are finally removed, when desired.

In actual practice it has been found that comparatively small quantities of condensable matter adheres to the canvas or fabric surfaces as these are always subjected to the water spray discharging from the pipes 12. This spray action removes the condensed material before it can build up to such an extent as to clog the several surfaces provided and they are, therefore, retained clean and open to permit the air to freely discharge from the condenser, thus preventing the formation of pressure within the condenser or back pressure on the blower.

A condenser constructed as here shown, employed in connection with a smelter handling sulfid ores, was found to be so efficient in action that it was impossible to detect any sulfur odor or traces of same when analyzing the discharging air passing through the water sprayed canvas surfaces. It has also been found to be very efficient when employed in connection with cinnabar furnaces as the large condensing surfaces provided immediately precipitate the quicksilver and permit it to settle in the bottom of the box-like chamber, where it can be easily removed or continuously permitted to discharge through the pipe 19.

While two specific uses are here described, I wish it understood that it can be equally efficiently employed in connection with garbage burners and other forms of furnaces; and that while the canvas surfaces are here shown as inclined, it is obvious that they may be positioned either horizontally or vertically, and that two or more superposed layers may be employed, if desired.

The materials and finish of the several parts of the fume condenser may otherwise be such as the experience and judgment of the manufacturer may dictate.

I wish it understood that various changes in form, proportions and minor details of construction may be resorted to within the scope of the appended claims and that I do not wish to limit myself to the specific design and construction here shown.

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

1. A fume condenser comprising an open, elongated, box-like structure, a plurality of vertically positioned baffle plates extending crosswise of the box, a plurality of fabric covered frames angularly disposed between the baffle plates forming a covering for the box, means for directing a water spray against the fabric covering, and means for forcing the fumes to be condensed into the box.

2. A fume condenser comprising an open, elongated, box-like structure, a plurality of vertically positioned baffle plates extending crosswise of the box, a plurality of fabric covered frames angularly disposed between the baffle plates forming a covering for the box, means for directing a water spray against the fabric covering, means for forcing the fumes to be condensed into the box, and means for draining the box.

3. A fume condenser comprising an elongated box-like structure, a series of angularly disposed fabric covered frames forming a covering for the box, means for retaining the fabric in a wet condition and means for forcing the fumes to be condensed into the box and through the canvas covering.

4. A fume condenser comprising an elongated box-like structure, a series of angularly disposed fabric covered frames forming a covering for the box, means for directing a water spray against the fabric covering and means for forcing the fumes to be condensed into the box.

5. A fume condenser comprising an elongated box-like structure, a series of angularly disposed fabric covered frames forming a covering for the box, means for directing a water spray against the fabric covering, a pipe connected with the box through which the fumes pass which are to be condensed and a spray-nozzle interior of the box disposed forward of the pipe to discharge the spray across the fumes as they enter the box.

6. A fume condenser comprising an elongated box-like structure, a plurality of vertically positioned baffle plates extending cross-wise of the box, a plurality of fabric covered frames angularly disposed between the baffle plates and forming a covering for the box, means for delivering water to the upper surface of each fabric covered frame and means for forcing the fumes to be condensed into the box.

7. A fume condenser comprising an elongated box-like structure, a plurality of vertically positioned baffle plates extending cross-wise of the box, a plurality of fabric covered frames angularly disposed between the baffle plates and forming a covering for the box, means for delivering water to the

upper surface of each fabric covered frame, means for forcing the fumes to be condensed into the box, means for delivering water to the interior of the box, means for maintaining a predetermined water level within the box and means for draining the box.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

GEORGE C. RICHARDS.

Witnesses:
HOWARD J. PEIRSOL,
GEORGE J. GILBERT.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."