No. 649,533. Patented May 15, 1900.

R. H. BURNS.

SMOKE PREVENTING APPARATUS.

(Application filed Sept. 21, 1899.)

(No Model.)

Fig. 1.

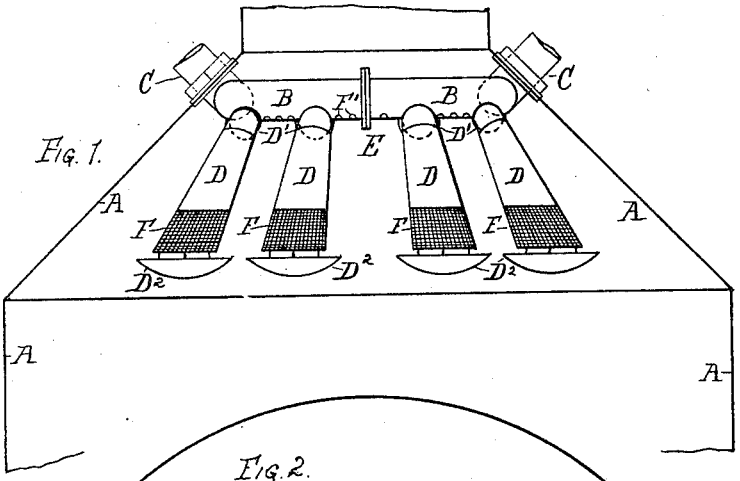


Fig. 2.

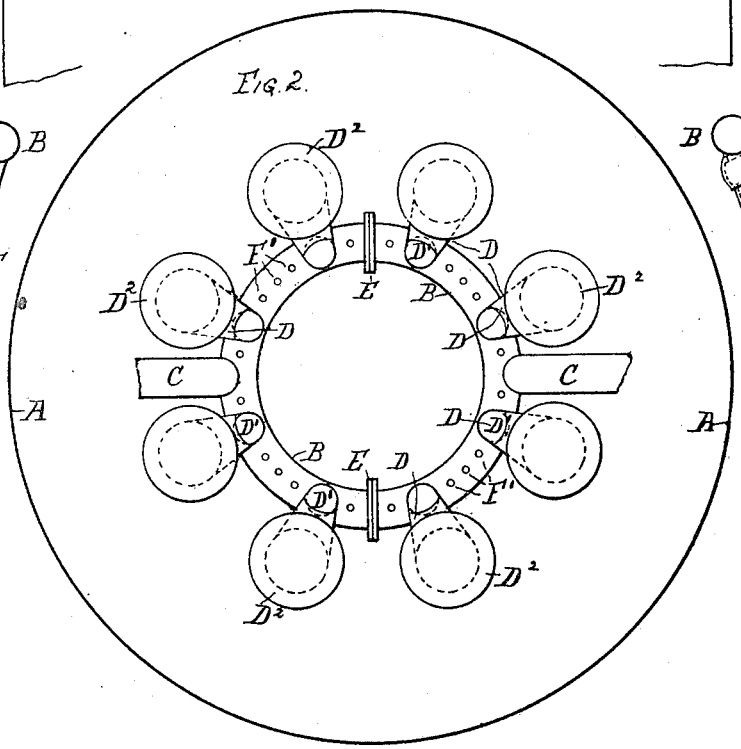
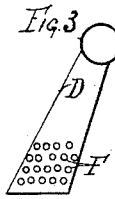


Fig. 3



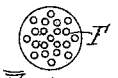
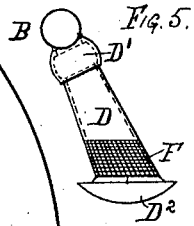


Fig. 4.

Fig. 5.



WITNESSES:-

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UNITED STATES PATENT OFFICE.

ROBERT HENRY BURNS, OF NEW YORK, N. Y.

SMOKE-PREVENTING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 649,533, dated May 15, 1900.

Application filed September 21, 1899. Serial No. 731,240. (No model.)

To all whom it may concern:

Be it known that I, ROBERT HENRY BURNS, a citizen of the United States, residing at New York, (Brooklyn,) county of Kings, and State of New York, have invented certain new and useful Improvements in Smoke-Preventing Apparatus, of which the following is a specification, reference being had to the accompanying drawings.

My invention relates to and has for its object the improvement of the vertical boiler and the admission of a supply of atmospheric air or like combustion-assisting medium to the casing or hood of said boilers, whereby an antagonistic impingement and a resultant heating and mingling of the admitted medium with the moving furnace-gases are effected, causing an increased combustion and more efficient combination of the admitted air and the fuel-gases.

My improvements consist in the insertion within the flue's casing or hood of a vertical boiler of an inlet duct or pipe shaped to conform to the sidings of said casing or hood, through which air or combustion-assisting medium is introduced inside of said casing or hood and brought into impingement contact with the furnace-gases. This conforming inlet or duct is provided with perforations, ducts, funnels, and the like as a means for projecting the admitted air or combustion-assisting medium in various directions and to various localities to provide for the greatest efficiency of combustion.

To secure an economical and efficient combustion of the fuel and its gases in a heating, evaporating, or like apparatus, it is quite essential that as much heat as possible shall pass from the fire and combustion to the heating, evaporating, or work to be done. It is likewise essential and necessary that a certain quantity of the manufactured heat shall pass out through the flue, chimney, or uptake for draft purposes. If now a sufficient and final combustion of any spare or unburned fuel or gases be provided for and secured within the casing, flue, or chimney through a new and independent supply of the combustion effecting and assisting medium, a maximum efficiency will have been provided for and attained, since a greater quantity of heat has been permitted to pass to the heating or evaporating, while the subchamber combustion has furnished the heat for chimney circulation and discharge.

Referring to the accompanying drawings, Figure 1 represents a vertical section through a boiler-casing with the air-feeding device shown in end elevation. Fig. 2 represents a plan view of the air-feeding device looking upward. Figs. 3 and 4 represent special details of the outlet pipes or ducts provided with perforations in sides and bottom. Fig. 5 represents a special detail showing ball-joint between the outlet pipes or ducts and the air-inlet chamber.

Similar letters of reference designate like parts, portions, or details in all the figures.

Letter A designates a boiler casing, continuation, hood, and uptake or flue.

B designates an inlet duct or chamber, made, preferably, to conform to the shape or periphery of the casing or hood. Such shape or periphery is generally circular, although at times made of square or many-sided formation. The preferred shape and condition are such that the movement of gases of combustion to and through the uptake or flue shall not be obstructed.

C designates one or more inlet-nozzles for the admission of the air or combustion-assisting medium and for the support of the apparatus as a whole.

D designates a plurality of pipes, ducts, funnels, or the like connected with or suspended from the inlet duct or chamber B to carry or project the admitted air or combustion assisting medium in the various or necessary directions to pass piping or to reach any desired corner or locality.

Letter E designates one or more joints or parting connections to provide for the admission of the apparatus and parts or portions through manholes or openings.

F designates gauze outlets, perforations, and the like located at the ends of said funnels. Perforations, gauze, or foraminated outlets may likewise be located within the material or shell of inlet duct or chamber, as indicated at F'.

The economic usefulness of a vertical boiler is often impaired through free and unhindered passage of the unconsumed gases or unabsorbed heat directly up the chimney. Often

sparks, light fuel, and unconsumed portions pass the hood to chimney and are lost.

By my improvements a controlled admission of new air or combustion-assisting medium is forced or admitted to the casing-chamber or hood to meet, impinge upon, mingle with, and assist in the final and full combustion of these sparks, light fuel, or unconsumed gases of combustion coming from the furnace past the water-tubes or through the fire-tubes of the vertical boiler in its several designs, constructions, and practices.

To provide for a controlled projection of the air or combustion-assisting medium in any direction to any point or to enable the funnels D to swing clear of any located pipes, tubes, &c., of the inclosed boiler, a universal joint is preferably located at D′, as indicated in Figs. 1 and 2 and specially detailed in Fig. 5, to connect said pipes or ducts D with the inlet-chamber B. To provide for a special guidance of the air or combustion-assisting medium, a shield, covering, or umbrella-like protection D^2 is attached at the ends of the ducts or funnels D, as shown in Figs. 1, 2, and 5.

What I claim as new, and desire to secure by Letters Patent, is—

1. In combination with the upper casing or hood of a vertical boiler, a conforming inlet-chamber for the admission of air or combustion-assisting medium and a plurality of suspended outlet-pipes, substantially as and for the purposes set forth.

2. In combination with the upper casing or hood of a vertical boiler, a conforming inlet-chamber for the admission of air or combustion-assisting medium, a plurality of suspended outlet-pipes, and a universal joint connecting said outlet-pipes with said inlet-chamber substantially as and for the purposes set forth.

3. In combination with the upper casing or hood of a vertical boiler, a conforming inlet-chamber for the admission of air or combustion-assisting medium, a plurality of suspended outlet-pipes, and a shield located at the discharge ends of said outlet-pipes, substantially as and for the purposes set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ROBERT HENRY BURNS.

Witnesses:

WM. H. WEIGHTMAN,

JOHN D. CALKINS.