

(No Model.)

2 Sheets—Sheet 1.

J. H. CROSBY.
SMOKE CONSUMING FURNACE.

No. 571,752.

Patented Nov. 24, 1896.

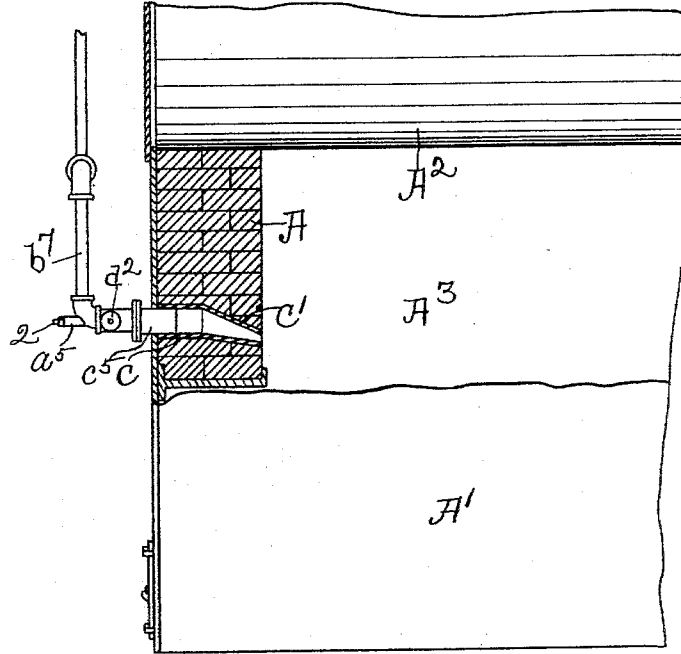


Fig. 1.

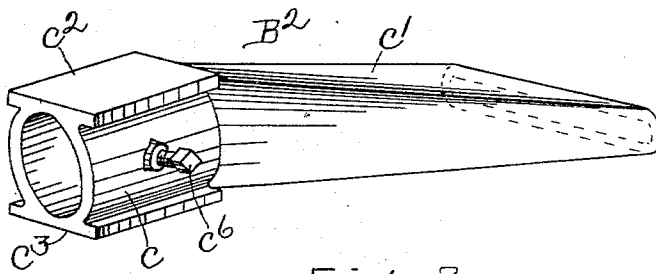


Fig. 2.

WITNESSES.

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ATTY

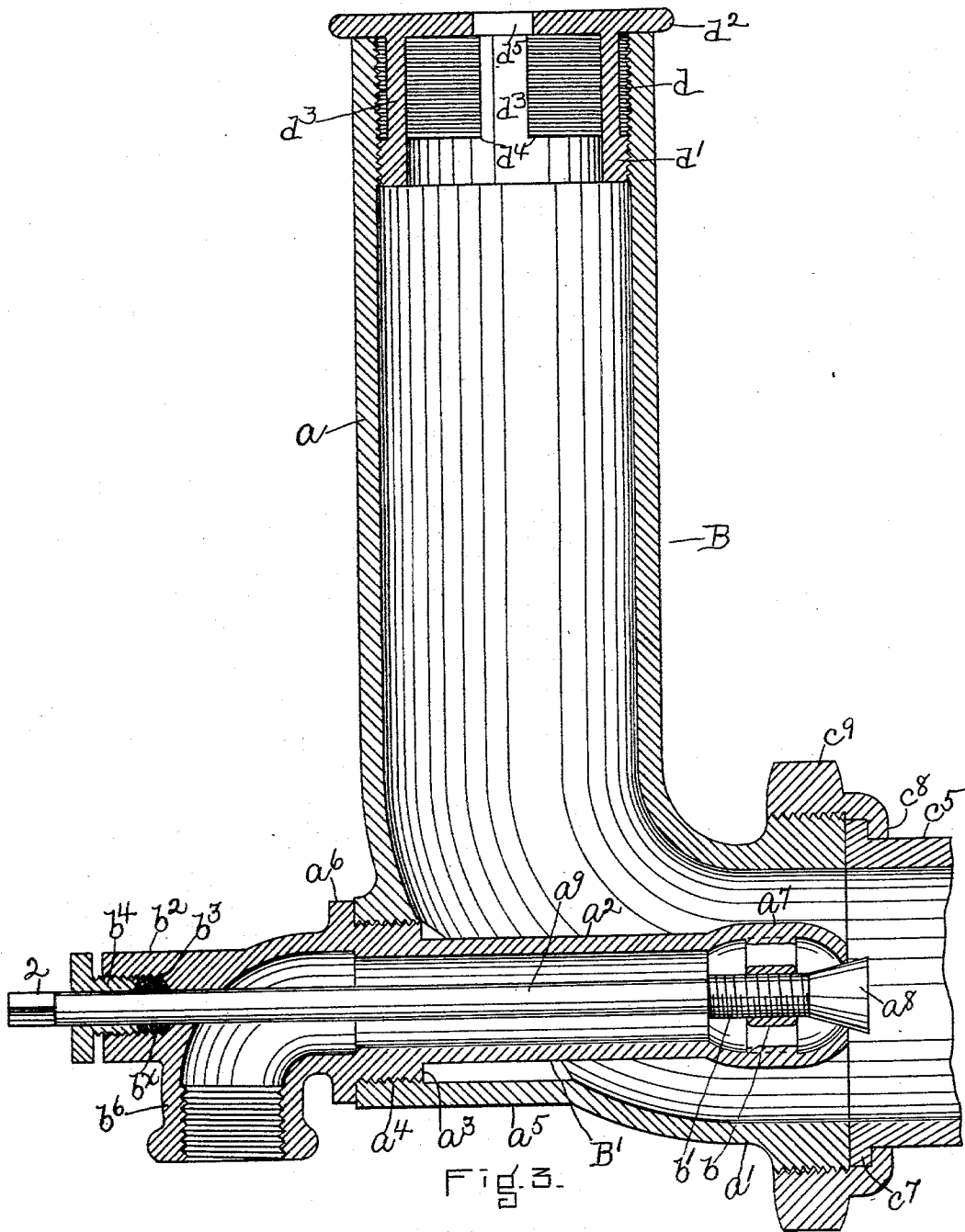
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UNITED STATES PATENT OFFICE.

JAMES H. CROSBY, OF SOMERVILLE, MASSACHUSETTS, ASSIGNOR TO
BENJAMIN S. AGNEW, OF BOSTON, MASSACHUSETTS.

SMOKE-CONSUMING FURNACE.

SPECIFICATION forming part of Letters Patent No. 571,752, dated November 24, 1896.

Application filed July 29, 1896. Serial No. 600,948. (No model.)

To all whom it may concern:

Be it known that I, JAMES H. CROSBY, of Somerville, in the county of Middlesex and State of Massachusetts, have invented an Improvement in Smoke-Consuming Furnaces, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

10 This invention relates to smoke-consuming apparatus of that class which supply air and steam to the fire-box or combustion-chamber of a furnace to promote the combustion of the smoke and finer particles of carbon therein.

15 Prior to this invention I am aware that steam has been supplied to the fire-box in fine streams by causing the steam to pass through substantially small orifices in a device commonly called a "nozzle," which is inaccessible from the outside of the furnace after once placed in position, and which in practice becomes clogged up and practically inoperative after little use.

My present invention relates more particularly to a nozzle for the passage of the steam into the air-admission pipe, which nozzle is provided with a discharge mouth or port controlled by a valve which is capable of being operated from the outside of the furnace after the apparatus has been set up in its operative position. The air-admission pipe is connected, as will be described, to a deflector embedded in the brickwork of the furnace and of a novel construction, as will be described, which serves to keep the deflector in its proper position while the furnace-wall is being built up and thereafter. These and other features of this invention will be pointed out in the claims at the end of this specification.

40 Figure 1 represents in side elevation, partially broken away, a sufficient portion of a smoke-consuming furnace embodying this invention; Fig. 2, a detail in perspective of the deflector; Fig. 3, a sectional detail, on an enlarged scale, of the air-admission pipe and steam-nozzle, the latter being turned into a position substantially at right angles to that shown in Fig. 1.

Referring to Fig. 1, A represents the front wall of a furnace A', which may be of any suitable or desired construction, and A² a boiler supported above the fire-box or combustion-chamber A³ of the said furnace. The furnace A' is provided with devices for promoting the combustion of smoke and the finer particles of carbon, and the said devices are constructed in a manner as will be described.

Referring to Fig. 3, B represents an air-supply pipe comprising the substantially long leg or arm a and a substantially short leg or arm a', into which extends a nozzle B', comprising, essentially, a pipe or tube a², provided at its rear portion with an enlargement a³, having screw-threads a⁴, which engage screw-threads on the interior of a hollow extension a⁵ of the arm a', which hollow extension supports the nozzle within the pipe B. The pipe or tube a² is provided with an annular flange a⁶, adapted to be seated against the end of the extension a⁵, and at its front end the tube or pipe a² is preferably provided with an enlarged head a⁷, provided with preferably a contracted mouth or outlet-port, with which coöperates a conical or tapering valve a⁸, having its stem a⁹ extended back through the nozzle or tube a² to the outside of the same, so that its projecting end 2 is accessible from outside the furnace when the apparatus is set up in its operative position, as shown in Fig. 1. The valve-stem a⁹ is supported at or near its opposite ends, as herein shown, by means of a bridge or cross-piece b in the head a⁷, which is provided with a screw-threaded opening adapted to be engaged by screw-threads b' on the valve-stem, the rear end of the valve-stem being extended through a hollow projection b², provided with a threaded socket b³, into which enters a threaded hollow nut or plug b⁴, through which the valve-stem extends, the socket b³ being designed to receive suitable packing material b^x, with which the valve-stem may be packed steam-tight.

The nozzle or tube a² is provided with a bend or arm b⁶, constituting the steam-inlet for the nozzle or tube, to which may be connected a steam-supply pipe b⁷, (see Fig. 1.)

which in practice communicates with the steam-dome of the boiler A². The air-admission pipe B, with its attached steam-nozzle B', is designed to be located outside of the furnace and is preferably attached to the front wall A of the same, whereby the valve-stem a⁹ is located in a convenient position for the engineer or other person running the furnace.

The pipe B is preferably attached to a deflector pipe or casting B², preferably of the construction shown in Fig. 2, it consisting of a substantially tubular rear portion c and a tapering substantially flattened front portion c', the tubular rear portion c having substantially flat top and bottom plates or surfaces c² c³ to facilitate the building up of the furnace-wall, and the connection to it of the air-pipe B without danger of turning or otherwise deranging the deflector when once set in position. The air-pipe B may and preferably will be connected to the deflector by means of a coupling-sleeve c⁵, adapted to have its front end inserted into the tubular section c of the deflector and secured therein by set-screws c⁶, extended through substantially diametrically opposite sides of the section c, the rear end of the coupling-sleeve c⁵ having a flange c⁷, adapted to be engaged by a flange c⁸ on a collar or ring c⁹, screw-threaded on its interior to engage the screw-threaded end of the arm a' of the pipe B, as shown in Fig. 3.

The air-pipe B may and preferably will be provided with means for regulating the supply of air, and in the present instance the pipe B is provided at the end of the arm a with internal screw-threads d, which are engaged by a threaded ring d', connected to a cap d² by a series of arms d³, forming between them air-admission ports or spaces d⁴, the said cap being provided, as shown, with an air port or opening d⁵.

By reference to Fig. 3 it will be seen that the steam-nozzle may be turned so as to enable it to be easily and quickly connected to the steam-supply pipe b', and thereby enable the said pipe to be placed in the most convenient or desired position with relation to the appurtenances on the front of the boiler. Furthermore, it will be seen that the amount of steam supplied to the fire-box may be controlled at the will of the operator while the apparatus is in operation, thereby avoiding the necessity of shutting off the supply of steam to the furnace in order to remove the steam-nozzle and clean the same. So, also, it will be seen that the valve a⁸ may be opened wide to admit of a large quantity of steam, which will flush out or clean the nozzle from deposits or foreign matter and thereby prevent clogging up of the discharge-port of the nozzle. Furthermore, it will be seen that the amount of steam supplied from the boiler to the nozzle need not be reduced by a valve in the supply-pipe b', as now commonly practiced, which reduces the pressure at the discharge-mouth of nozzles as now constructed

and known to me, but the full boiler-pressure can be maintained up to the mouth of the nozzle and the quantity of steam reduced at that point. The amount of air supplied to the boiler may be governed by regulating the cap d².

I have herein described the nozzle B' as a steam-nozzle, but I do not desire to limit my invention in this respect, as the said nozzle may be used to advantage for supplying natural or other gas to a fire-box.

I claim—

1. The combination with a furnace, of an air-admission pipe B composed of the legs or arms a a', means to connect the arm a' with the fire-box of the furnace, a steam-admission pipe or nozzle provided at one end with an outlet port or mouth and at its opposite end with a bend b⁶, forming the inlet for said nozzle, and having an extension b³ in line with the outlet-mouth, the said nozzle having screw-threads a⁴ to engage a screw-threaded opening in the arm a' and also having a flange a⁶ to abut against the arm a', and a conical valve coöperating with the outlet-mouth of the steam-nozzle and having a stem extended back through the nozzle and through the extension b³ of the same, substantially as described.

2. The combination with a furnace, of an air-admission pipe B composed of the legs or arms a a', the arm a having internal screw-threads d, a steam pipe or nozzle extended into the arm a' and provided with a discharge port or mouth within the arm a' and with a bend b⁶ outside of the arm a' constituting an inlet for said nozzle, which is detachably secured to said arm a, a valve coöperating with said discharge port or mouth and provided with a stem extended back through the said nozzle, and a cap d², a threaded ring d' engaging the screw-threads d and a series of arms connecting said cap and ring to form air-admission spaces d⁴, substantially as described.

3. The combination of the following instrumentalities, an air-admission pipe, a deflector provided with an inclined front section c' and a tubular rear section c having top and bottom substantially flat surfaces, a coupling-sleeve c⁵ extended into the tubular section c of the deflector, means to secure said sleeve in said deflector, a ring c⁹ coupling the sleeve c⁵ to the air-admission pipe, and a steam-supply pipe or nozzle extended into the said air-pipe and provided with a valve accessible from the outside of the air-pipe, substantially as described.

4. The nozzle B' consisting of a pipe or tube a provided with an enlarged head a' having a contracted discharge port or mouth at one end and having an inlet-port at or near its opposite end at an angle to the discharge-mouth, a bridge b in the head a' having a screw-threaded opening, a valve coöperating with the discharge-mouth and provided with

a stem extended back through the opening in the said bridge and through the end wall of the said pipe beyond the inlet-port and provided with screw-threads at its front end to engage the screw-threaded opening in the bridge *b*, substantially as described.

In testimony whereof I have signed my

name to this specification in the presence of two subscribing witnesses.

JAMES H. CROSBY.

Witnesses:

JAS. H. CHURCHILL,

J. MURPHY.