(No Model.)

G. A. BARTH.

SMOKE CONSUMING FURNACE.

No. 260,824. Patented July 11, 1882.

Fig. 1.

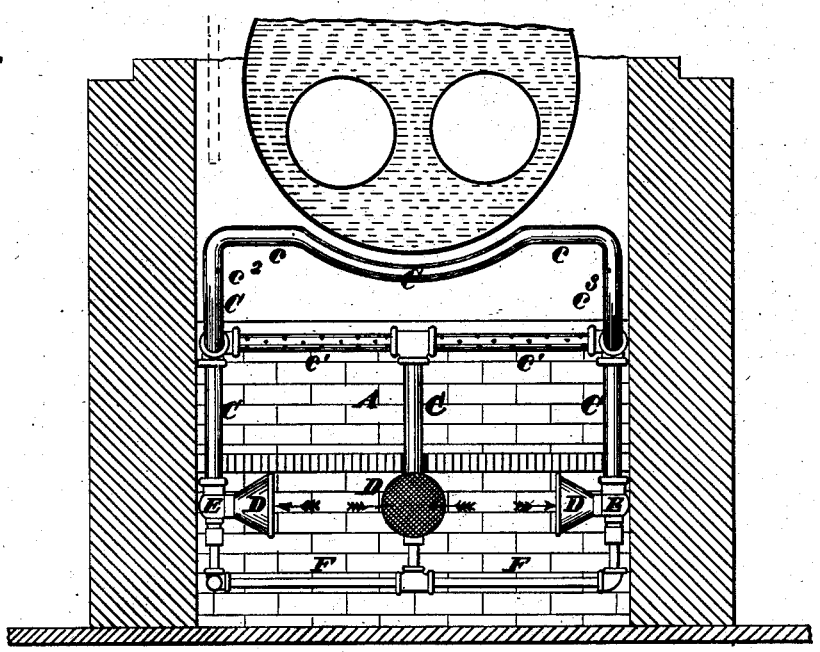
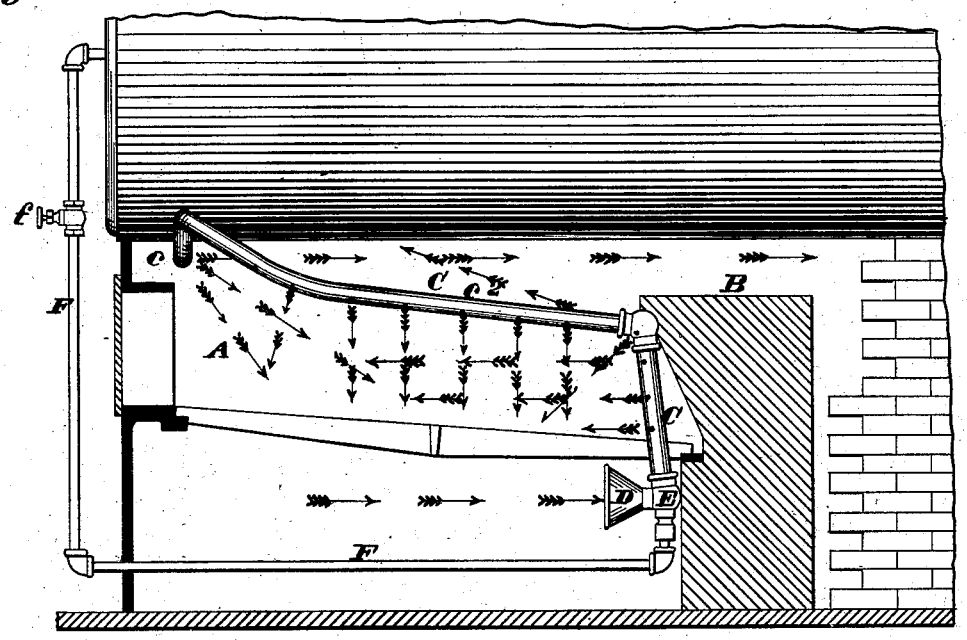


Fig. 2.



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UNITED STATES PATENT OFFICE.

GUSTAV A. BARTH, OF ST. LOUIS, MISSOURI.

SMOKE-CONSUMING FURNACE.

SPECIFICATION forming part of Letters Patent No. 260,824, dated July 11, 1882.

Application filed January 30, 1882. (No model.)

To all whom it may concern:

Be it known that I, GUSTAV A. BARTH, a citizen of the United States, residing at the city of St. Louis, in the State of Missouri, have invented certain new and useful Improvements in Smoke-Consuming Furnaces, of which the following is a specification.

This invention relates to certain improvements in that class of smoke-consumers for steam-boiler furnaces in which combined jets of steam and air are discharged into the combustion-chamber to assist combustion; and this invention consists in an improved arrangement of parts, as will hereinafter more fully appear, whereby the above object is attained in a very perfect and efficient manner.

In the drawings, Figure 1 is a transverse section, illustrating my improvements as applied to a horizontal steam-boiler furnace; and Fig. 2 is a longitudinal section of the same.

Referring to the drawings, A represents the combustion-chamber of the furnace, the bridge-wall B of which is arranged so as to have a forwardly-overhanging portion, as shown, the purpose of this construction being to retard the backward passage of the products of combustion from the combustion-chamber before they have been intimately mixed with the air and steam supply and their combustion effected.

Within the combustion-chamber A is arranged a perforated distributing-pipe, C, extending around the four sides of the said chamber, and consisting of transverse pipes, one, *c*, at the forward end of the combustion-chamber, and the other, *c'*, immediately forward of the bridge-wall, and longitudinal pipes c^2 c^3 arranged at the sides of the combustion-chamber. These pipes are connected together in any suitable manner and communicate one with the other, and their discharging perforations or orifices are arranged at different angles from a horizontal plane, so as to discharge the air and steam (used for promoting combustion) in all directions onto the fuel and into the products of combustion arising therefrom. By this means the heated air and steam are brought into intimate and thorough contact with the products of combustion, so that the combustion of the gaseous combustible matter arising from the fuel will be effected in a very perfect manner within the combustion-chamber.

The air-supply for the discharge-pipes *c c'*, &c., is taken from underneath the fire-grate, as shown, through funnels D, at the rear and sides of the rear end, having their mouths protected by a covering of wire-gauze to prevent access of dirt, &c., to the interior of the pipes, and said air-supply is forced through the discharge-pipes *c c'*, &c., by means of a steam-injector, E, at the rear and sides of the rear end of any suitable form and construction. The steam used by such injector mingles with air-supply, and in their passage through the pipes *c c'*, &c., they become highly heated, in which state they materially aid the combustion of the fuel and its gaseous products. One or more of these injectors may be used in connection with my improved construction, as may be found necessary or convenient, and they have their supply of steam furnished from the boiler by suitable pipe-connection, F, the passage of steam through which is under control of the engineer by means of a stop-valve, *f*.

In constructing my improved apparatus the discharge or distributing pipes *c c'*, &c., may be of iron, fire-clay, or other suitable refractory material, and they may be arranged partly embedded in the wall or wholly projecting, as desired. The forward distributing-pipe is arranged up adjacent to the bottom of the boiler, and a number of its perforations discharge backwardly in a horizontal plane near the bottom of the boiler, so as to carry off the burned gaseous matter from the combustion-chamber and assist the draft of the furnace.

While my improvement is shown in the drawings as applied to a horizontal steam-boiler furnace, still it is evident that it can be readily modified to suit other forms of furnaces without departing from the spirit my invention.

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

1. In combination with a perforated pipe extending around the four sides of the furnace, the pipe F, injector E, and funnel-openings D, located at the rear of the furnace, substantially as and for the purpose set forth.

2. The pipe surrounding the furnace and provided with perforations pointing in different directions, and so arranged that one set of the perforations point directly back over the bridge-wall to increase the draft, as set forth.

3. The combination of steam-pipe F, injec-

tor E, funnel D beneath the grate, vertical pipe C, transverse rear pipe *c*, transverse front pipe *c'* above the combustion-chamber, side connecting-pipes, c^2 c^3, and bridge-wall B, as set forth, the pipes C *c' c* c^2 c^3 having perforations for directing the combined steam and hot air from beneath the grate into the combustion-chamber, as explained.

4. The combination of rear and side funnels, D, beneath the grate, at the rear end of the furnace, the rear and side vertical pipes, C, the rear and side injectors, E, and transverse and longitudinal perforated pipes *c' c* c^2 c^3 beneath the boiler, as set forth.

5. The front transverse pipe, *c*, having perforations for directing the combined hot air and steam over the bridge-wall to carry off the burned gaseous matter and to assist the draft, in combination with a system of pipes, C *c'* c^2 c^3, at the rear end and sides of the furnace, the funnel D, and steam injector and pipe E F, as set forth.

In testimony whereof I have hereunto set my hand this 26th day of January, 1882, at St. Louis, State of Missouri.

GUSTAV A. BARTH.

In presence of—
FRANK P. LOPEMAN,
ROBERT BURNS.