

(No Model.)

B. TOPMILLER.
STEAM BOILER FURNACE.

No. 274,854.

Patented Mar. 27, 1883.

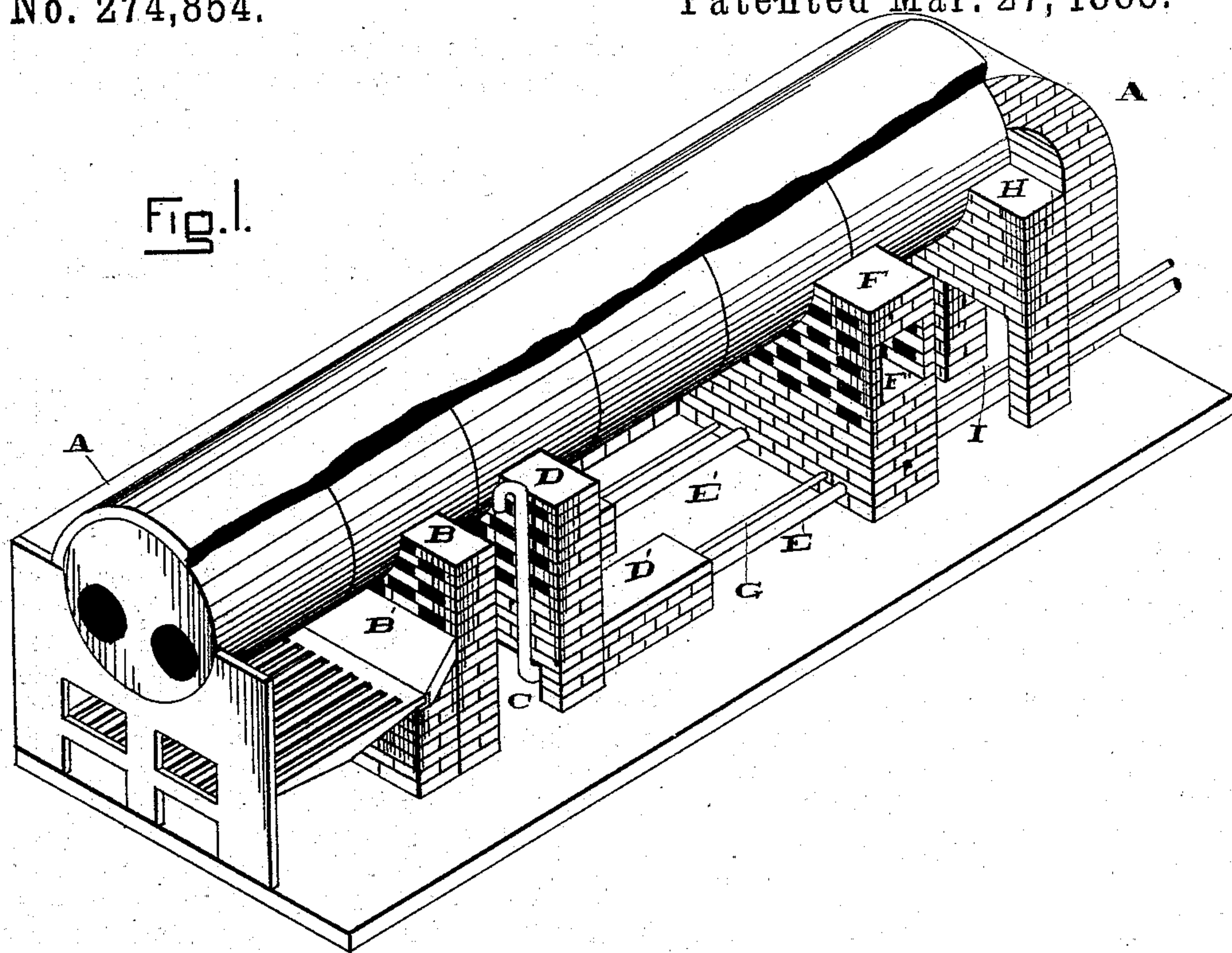
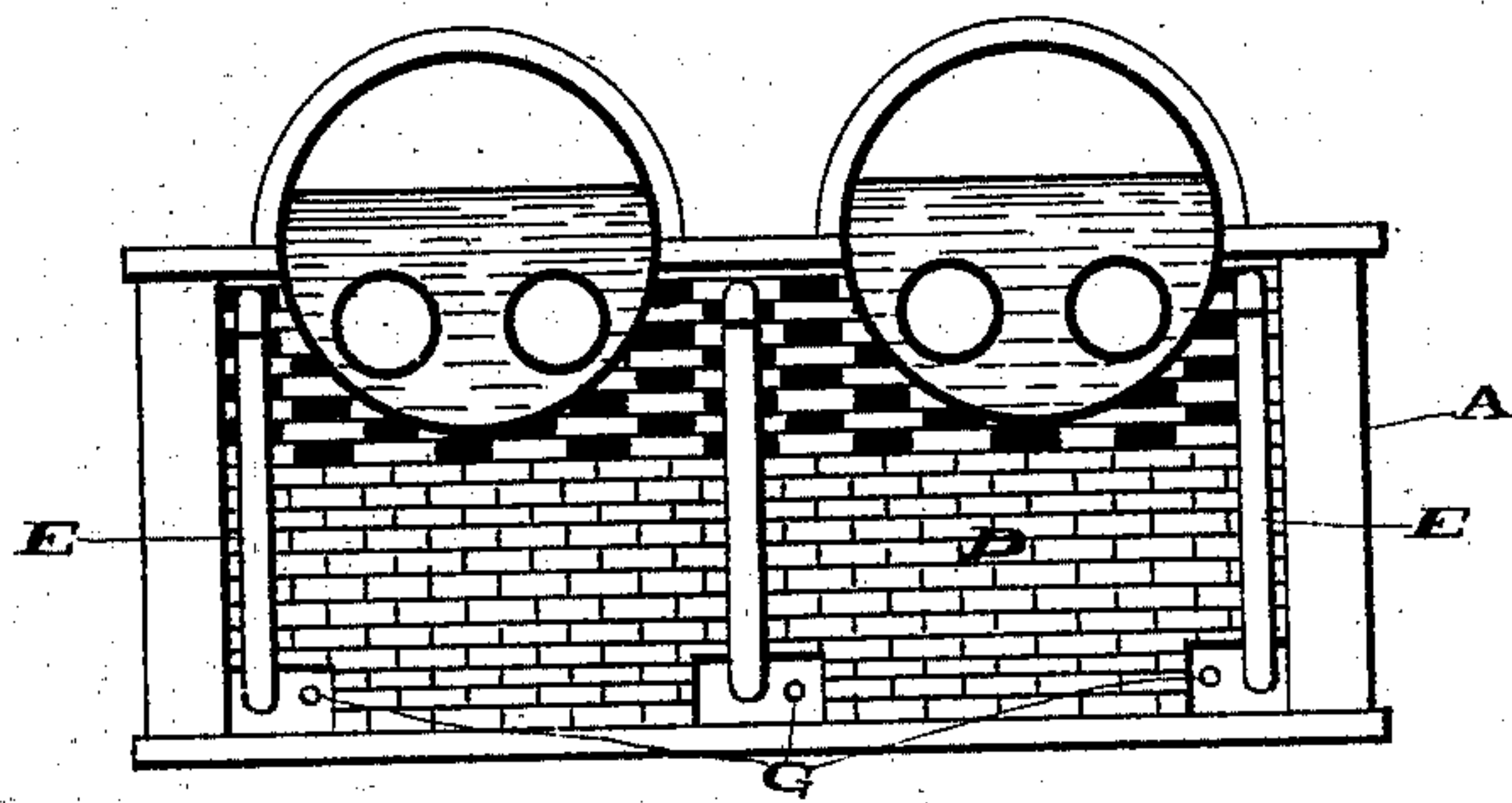


Fig. 2.



ATTEST

Horatio V. Herold

D. S. Oliver

INVENTOR

Bernard Topmiller

By Geo. J. Murray
Atty

UNITED STATES PATENT OFFICE.

BERNARD TOPMILLER, OF CINCINNATI, OHIO, ASSIGNOR OF ONE-HALF TO
SIMON OBERMAYER AND JACOB HEINZHEIMER, OF SAME PLACE.

STEAM-BOILER FURNACE.

SPECIFICATION forming part of Letters Patent No. 274,854, dated March 27, 1883.

Application filed June 23, 1882. (No model.)

To all whom it may concern:

Be it known that I, BERNARD TOPMILLER, a citizen of the United States, residing at Cincinnati, county of Hamilton, State of Ohio, have invented certain new and useful Improvements in Steam-Boiler Furnaces, of which the following is a specification.

The object of my invention is to economize fuel, promote combustion, and prevent smoke in steam-boiler furnaces. These objects are accomplished by breaking the volume of the carbonaceous gases and supplying them with their full quotient of atmospheric oxygen within the furnaces, before they are cooled below the temperature of flame, by the means illustrated in the accompanying drawings, in which—

Figure 1 is a perspective view in broken section of a steam-boiler furnace provided with my improvements. Fig. 2 is a transverse vertical section taken back of the grate-bar-supporting wall, looking to the rear.

Referring to the parts which are indicated by similar reference-letters wherever similar parts occur in the different views, A represents the outer wall or masonry of the furnace. The space within the wall and underneath the boiler, or boilers, if there be more than one, is divided into chambers by four walls running transversely across the furnace. The first wall, B, which supports the inner ends of the grate-bars, has an upward extension at the rear which encircles the boiler. An inclined tile, B', is fitted between the ends of the grate-bars and the upward extension of wall B. Above this tile the wall is perforated, making a number of small flues, through which the gaseous products of combustion must pass to a chamber, C, between walls B and D. Within this chamber C the divided streams of the gases are supplied with oxygen, conveyed through pipes E from the outside of the furnace, and pass through similar perforations in wall D into the large chamber E', between walls D and F. The lighter portions of the gases are carried forward in the line of the draft through perforations in wall F, receiving in their passage a fresh supply of oxygen in a chamber, F', in wall F, which chamber extends the entire length of the wall F and through the side walls of the furnace, and is

provided with "hit-and-miss" valves to regulate the supply of air. The flues D', which pass through wall D and extend into chamber F', return a portion of the gases to the chamber C. The gases passing through these flues are supplied with oxygen by pipes G, which lead from outside the furnace and terminate within the flues D'. At the rear end of the boiler or boilers is a wall, H, which has flues I through it, near the bottom, through which the products of combustion pass to the boiler-flues, and thence to the uptake. The flues D' are covered on top with a tile, which may be removed for the purpose of cleaning the flues. For a single boiler-furnace two sets of pipes, E G, and flues D' I are employed, one upon each side of the furnace; but in a two-boiler furnace three sets of pipes and their flues are used, as seen in Fig. 2.

It will be seen that the gases arising from the incandescent fuel are retarded and their volume broken within the chambers underneath the boiler, where they receive a sufficient amount of highly-heated atmospheric oxygen to produce perfect combustion. The walls and flues becoming highly heated soon after the fire is started, prevent the gases from cooling below the temperature, at which the carbon contained in them seizes upon the oxygen of the air and combines with it to produce complete combustion.

It is evident that the exact number and location of the transverse walls and pipes for supplying air to the gases within the chambers formed by them may be somewhat varied without departing from the principle of my invention, and good results will be attained without the rear wall, H, the main object of this being to deflect the gases and compel their passage through the flues I in contact with the supply-pipes E G. Indeed, good results will be accomplished by the two walls B and D with a chamber like F' in the wall D; but experience has demonstrated that the best results are attained by the furnace I am now using, which is the one described here, and represented in the drawings hereto annexed.

I am aware that a steam-boiler furnace provided at the rear of the fire-chamber with a combustion-chamber having its front and rear walls perforated has heretofore been

known, the products of combustion during their passage through said chamber being supplied with oxygen by means of an upwardly-discharging air tube or pipe; but in such furnace the boiler terminated at its front end about midway of the length of the combustion-chamber, so that the entire length of the furnace was equal to the length of the boiler plus the length of the fire-chamber and a part of the combustion-chamber, and the direct heat of the fire was not felt by the boiler. By my arrangement I effect a great economy of space, which in many instances is a matter of no small importance, besides reducing the quantity of material used in constructing the furnace.

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

1. In a steam-boiler furnace, the combination, substantially as specified, of wall B, located back of the bridge-wall, extending up around the boiler, and the entire portion above the bridge-wall perforated, the wall D, forming with wall B the chamber C, the upper portion of said wall perforated, similarly to wall B, with pipes E, extending from the rear of the furnace and discharging into said chamber C between the perforated upper portions of walls B D.

2. In a furnace of the character described, the combination, substantially as specified, of the walls B D, forming chamber C, with flue D' and pipes E G, said pipes extending from the rear of the furnace, and the pipe E, arranged to discharge between the walls B D in the upper portion of chamber C, and the pipe G, having its discharge end within flue D' for the purpose of supplying heated air to gaseous fuel.

3. The combination, in a steam-boiler furnace, of walls B D F, each having their upper portions transversely perforated with flues D', chamber F', and pipes E G, said parts being located and arranged substantially as shown and described.

4. In a steam-boiler furnace, the combination, substantially as specified, of the walls B D F and H, flues D' I, and hot-air pipes E G, said walls B D and F having their upper portions perforated, as shown, and the wall E, having the chamber F', into which its transverse perforations open, said chamber communicating with the external air.

BERNARD TOPMILLER.

Witnesses:

D. S. OLIVER,
GEO. J. MUNDY.