

(No Model.)

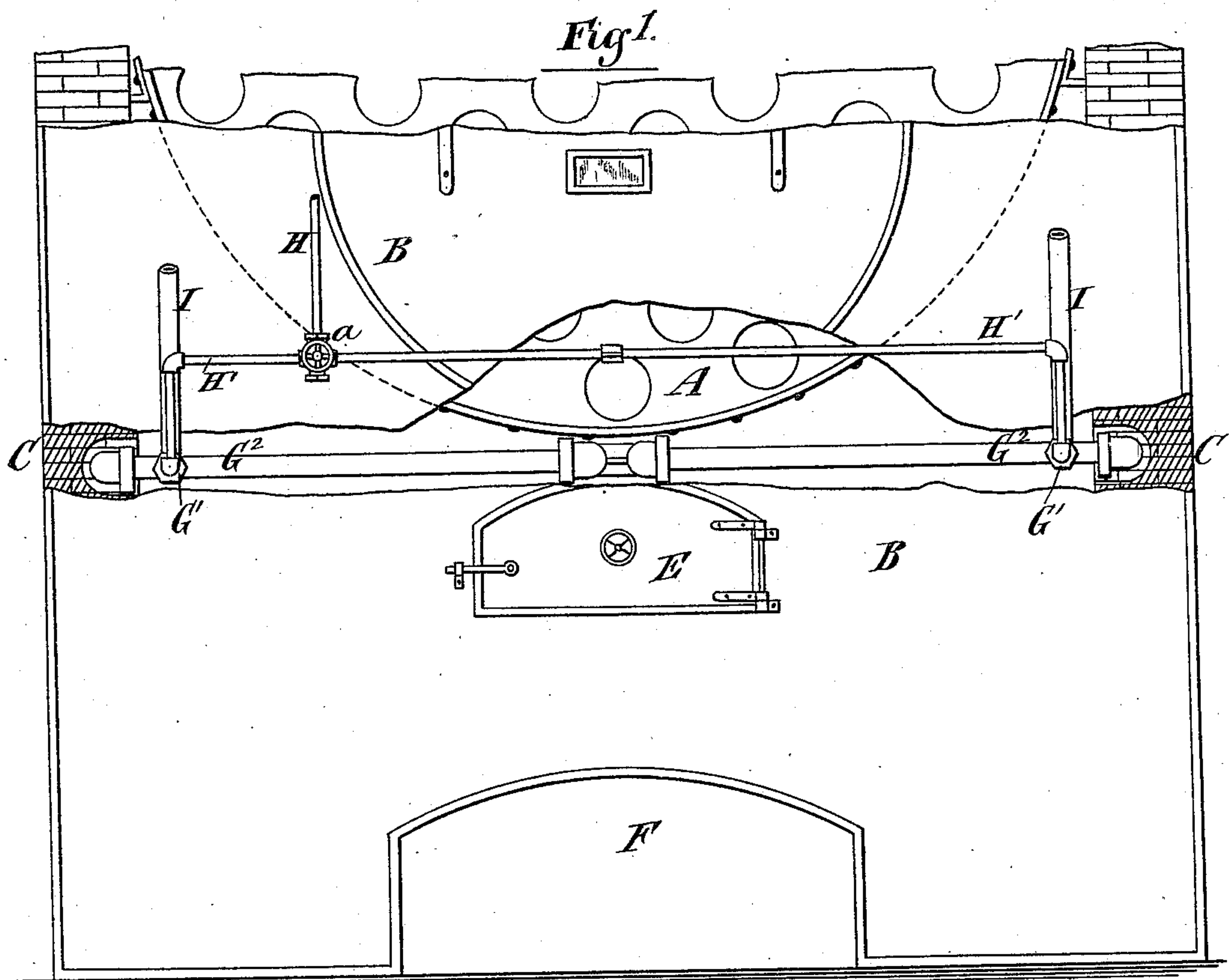
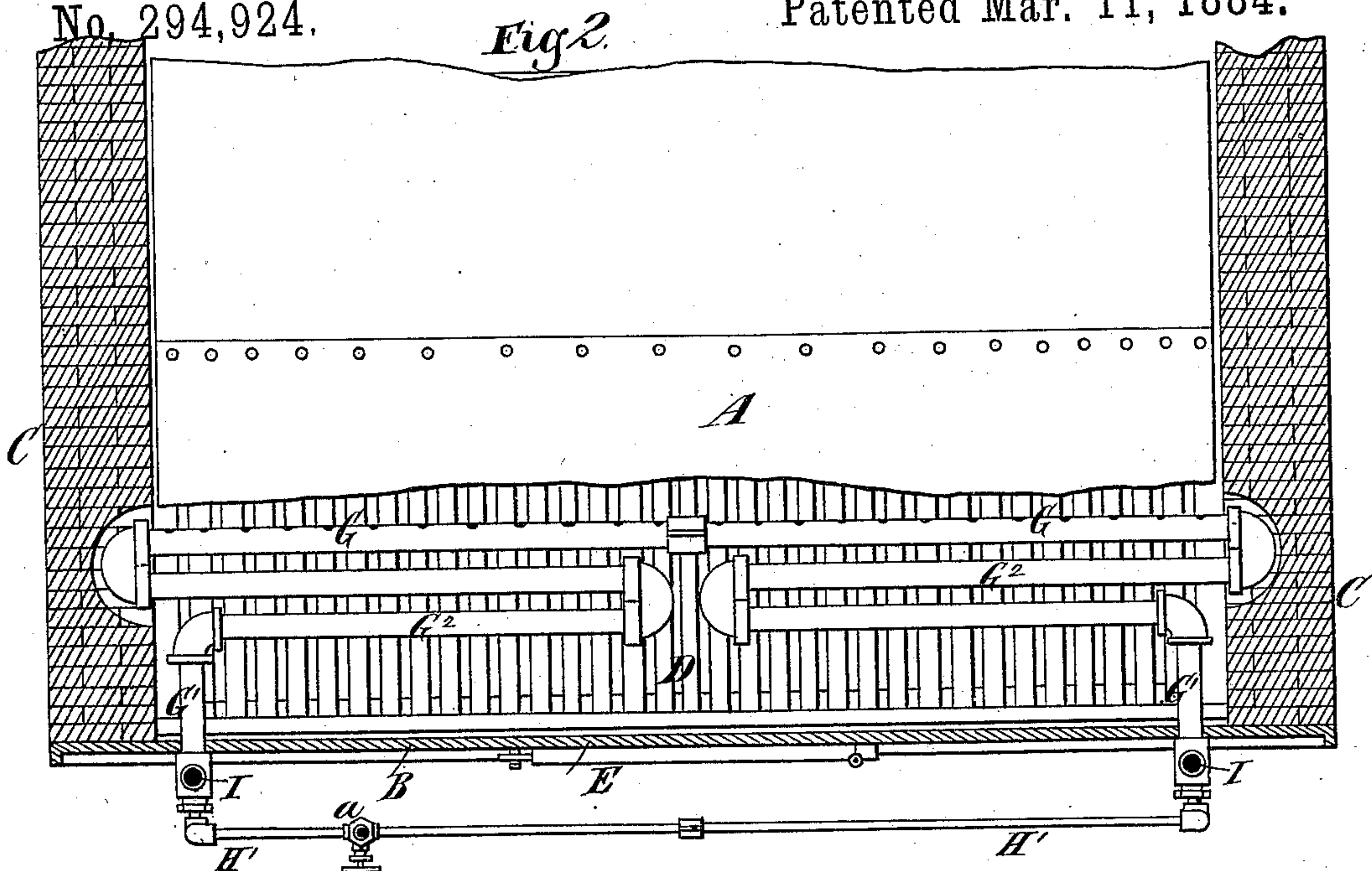
3 Sheets—Sheet 1.

J. B. SMITH, C. A. PRESLER & E. FOX.

FURNACE FOR STEAM BOILERS.

No. 294,924.

Patented Mar. 11, 1884.



Witnesses:

George H. Bott
Herbert Southwick

Inventor:

John B. Smith, Charles A. Presler,
Edward Fox, by their Attorneys, Ernest Abbott.

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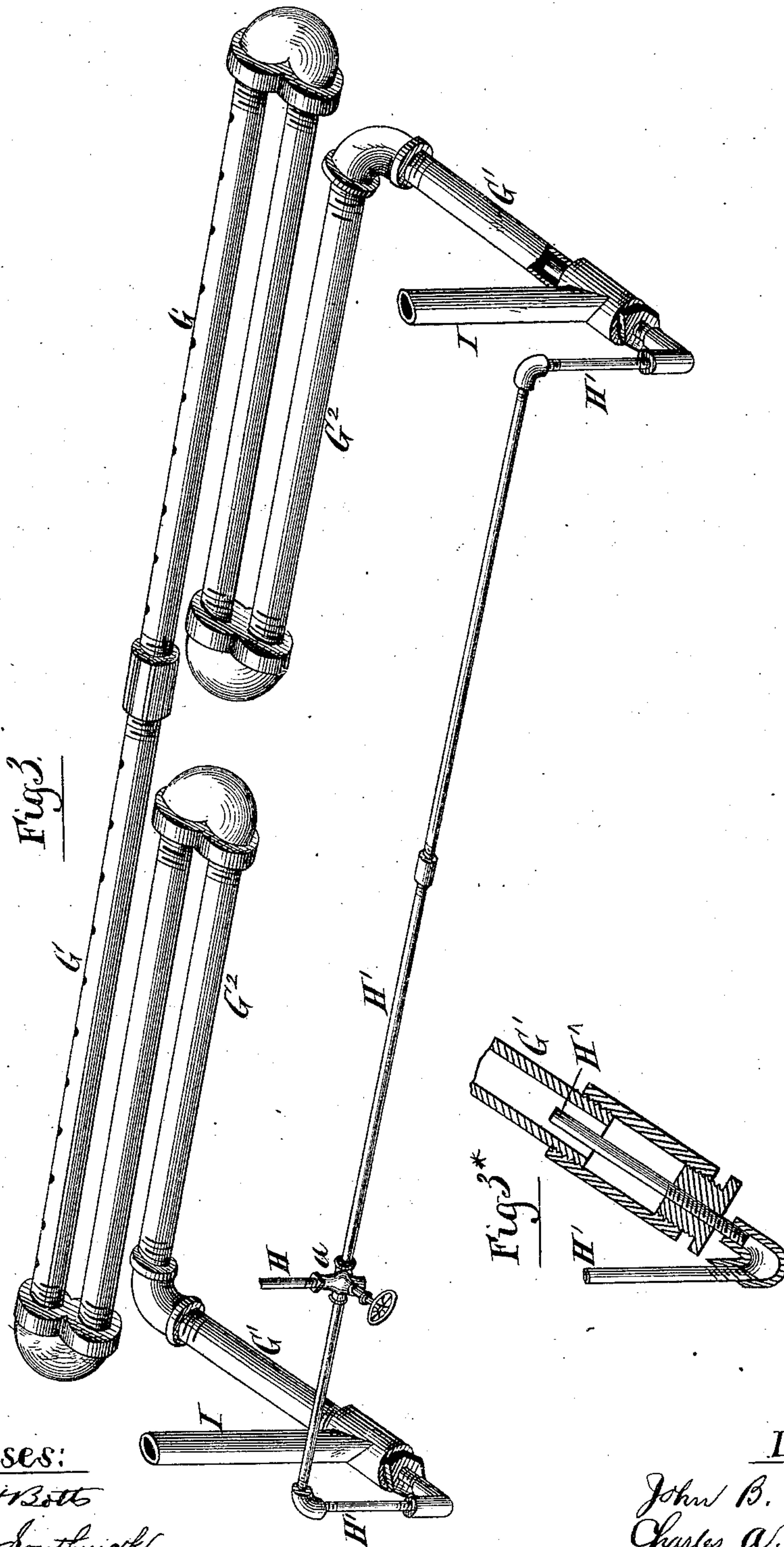
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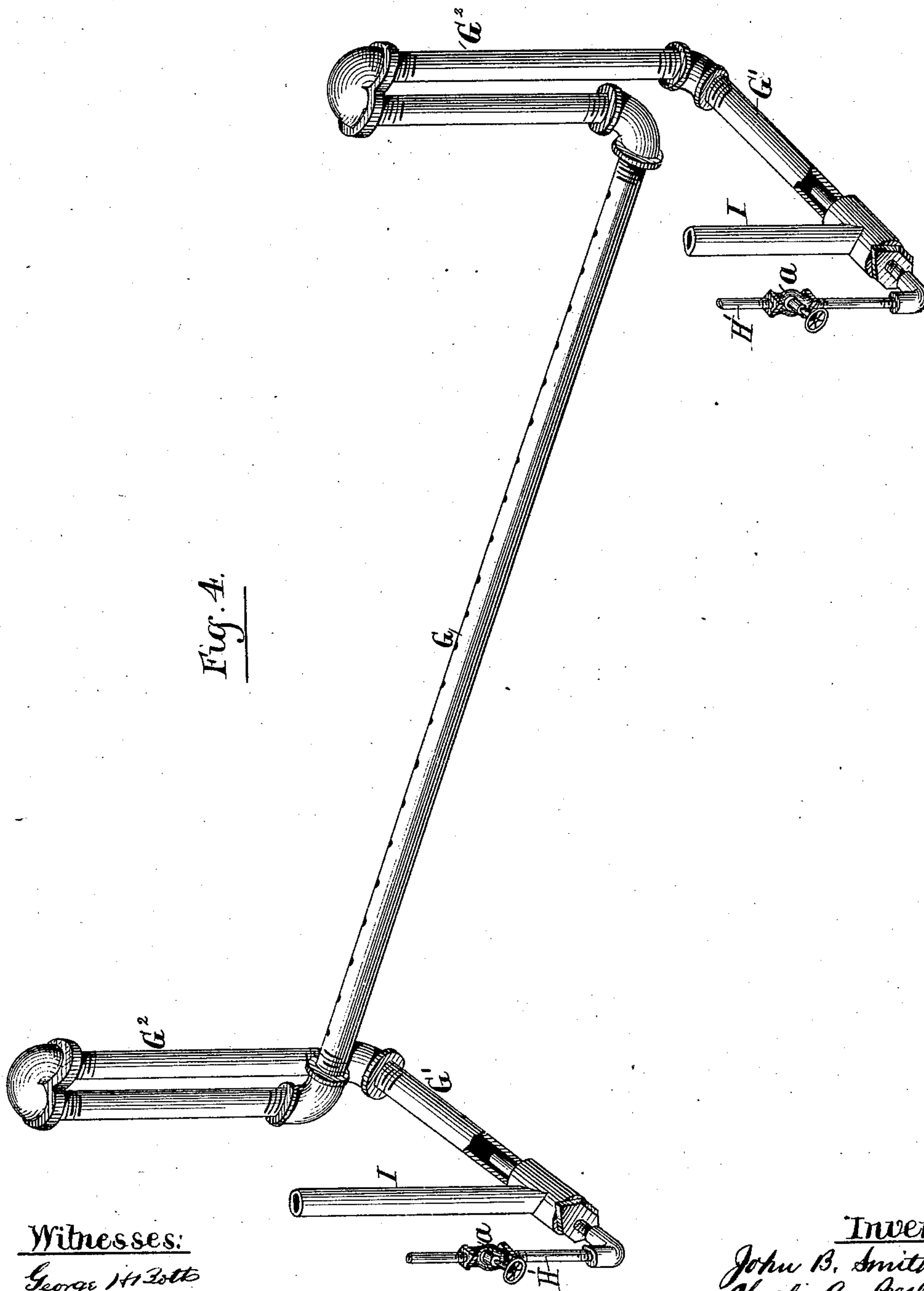
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UNITED STATES PATENT OFFICE.

JOHN B. SMITH AND CHARLES A. PRESLER, OF NEWARK, NEW JERSEY,
AND EDWARD FOX, OF BROOKLYN, NEW YORK, ASSIGNORS TO THEM-
SELVES, AND ANDREW ALBRIGHT, OF NEWARK, NEW JERSEY.

FURNACE FOR STEAM-BOILERS.

SPECIFICATION forming part of Letters Patent No. 294,924, dated March 11, 1884.

Application filed March 14, 1883. (No model.)

To all whom it may concern:

Be it known that we, JOHN B. SMITH and CHARLES A. PRESLER, citizens of the United States, residing at Newark, in the county of Essex and State of New Jersey, and EDWARD FOX, a citizen of the United States, residing at Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Furnaces for Steam-Boilers and other Purposes, of which the following is a full, clear, and exact description.

Our invention, although particularly applicable to steam-boiler furnaces, may be embodied in other furnaces; and the object of the invention is to obtain a better and more nearly perfect combustion, and thereby to effect an economy of fuel, and also, so far as is possible, to prevent smoke and the escape of noxious gases from the furnace-chimney and the accumulation of soot, especially where soft or bituminous coal is used.

Our invention relates to furnaces wherein are employed devices for injecting or producing currents of steam and air into the furnace to mingle with the gaseous products of combustion and supply the oxygen and hydrogen necessary for their combustion; and the invention consists in a novel arrangement of such devices and in a novel manner of combining them with the furnace, whereby the best results are attained.

In the accompanying drawings, Figure 1 is a front elevation, partly in section, of a portion of a boiler and furnace embodying our invention. Fig. 2 is a horizontal section thereof. Fig. 3 is a perspective view of the devices (represented in Figs. 1 and 2) for introducing air and steam. Fig. 3* is a detail view hereinafter referred to. Fig. 4 is a view similar to Fig. 3, but showing a modified arrangement of pipes.

Similar letters of reference designate corresponding parts in all the figures.

Referring first to Figs. 1, 2, and 3, A designates the boiler, B the front plate of the furnace, and C the masonry forming the boiler-setting.

D designates the furnace-grate, and E F respectively designate the fire and ash-pit doors.

Arranged transversely across the front portion of the furnace, above the fire-door E, is a distributor or distributing-pipe, G, which is perforated with numerous holes, forming jet-orifices, and to which lead two inlet-pipes, G', which, as here shown, communicate with opposite ends thereof.

H designates a steam-pipe, which communicates, through a suitable valve, *a*, and by means of two branches, H', with the two inlet-pipes G'; and I I designate air-pipes, which extend transversely into the said inlet-pipes G'. The ends of the steam-pipes H' project considerably into the ends of the inlet-pipes G', as shown in Figs. 3 and 3*, and beyond the points where the air-pipes I enter said inlet-pipes. Hence the steam issuing into the inlet-pipes G' from the pipes H' forms injector currents or jets, which induce currents of air through the pipes I, and these currents of air and steam become thoroughly commingled in the inlet-pipes G'. As here represented, the inlet-pipes G' do not lead directly to the distributing-pipe G, but are extended to and fro across the furnace, so as to form heaters G² for the commingled air and steam, and hence before the mixture reaches the distributing-pipe G it is in a highly-heated condition, and issues from said distributing-pipe in fit condition to combine with the gaseous products of combustion in the upper furnace, and thereby effect their consumption immediately below and in contact with the boiler.

The distributing-pipe G, the inlet-pipes G', and heater-pipes G², with all their connections, may be made up of ordinary steam-pipe and fittings, as best shown in Figs. 3 and 4, and may be applied to any boiler-furnace with little trouble and at small expense. We might employ only one inlet-pipe, G', for air and steam, but prefer two, as the air and steam will then be supplied to the two ends of the distributing-pipe, and will be ejected therefrom more uniformly throughout its length. By this arrangement of devices it will be seen that we supply the highly-heated air and steam across the entire width of the furnace, and at a point above the fire-door and immediately below the boiler, where are always greater

quantities of gaseous products of combustion, and by supplying the necessary quantity or volume of oxygen and hydrogen thus uniformly across the furnace their intimate contact
5 with the whole volume of gases is effected and a very thorough combustion insured.

The arrangement of pipes described would be apt to burn out after a time, and we may therefore carry out our invention as shown in
10 Fig. 4. The arrangement shown in Fig. 4 differs from that shown in Fig. 3 in having the heater-pipes G^2 extending vertically, instead of horizontally, so that the fire will not impinge so directly against them, and they will
15 not so soon burn out. The distributor G is also arranged inward of the heater-pipes and nearer the front of the boiler, and steam is supplied to each of the inlet-pipes G' by separate pipes H' , each provided with a valve, a , for
20 controlling the admission of steam.

What we claim as our invention, and desire to secure by Letters Patent, is—

The combination and arrangement, substantially as shown and described, with a furnace, of a perforated distributing-pipe, G , the inlets
25 G' , the steam-pipes and the air-pipes opening into said inlets, and the heating-coils G^2 , interposed within the furnace between the inlets and the distributing-pipe, for the purpose
30 specified.

In testimony whereof we have hereunto set our hands this 10th day of March, A. D. 1883.

JOHN B. SMITH.
CHARLES A. PRESLER.
EDWARD FOX.

Witnesses:

ANDREW ALBRIGHT,
SAMUEL T. WILLIAMS.