

(No Model.)

2 Sheets—Sheet 1.

J. GASTEIGER.
STEAM BOILER OR OTHER FURNACE.

No. 448,808.

Patented Mar. 24, 1891.

Fig. 2.

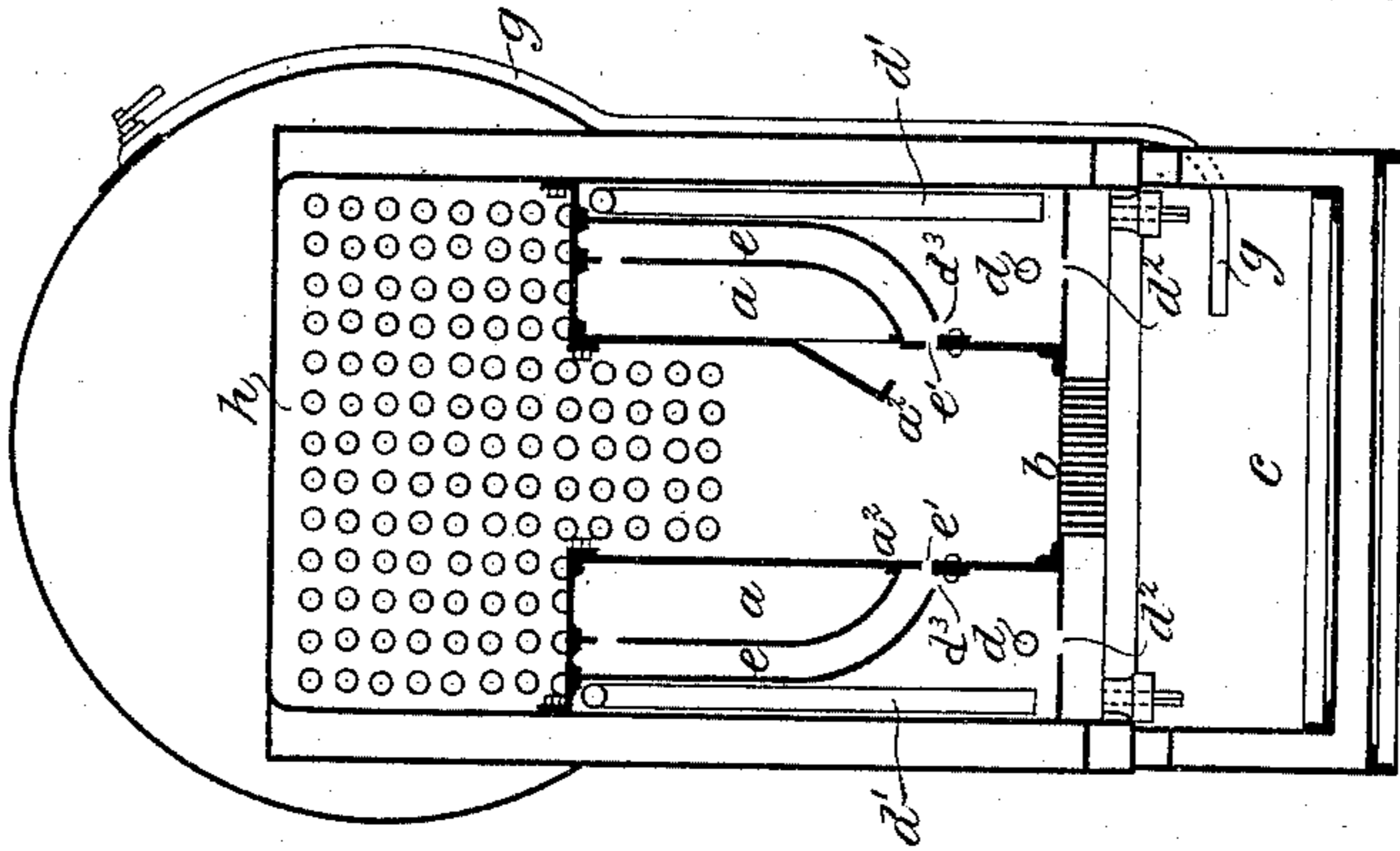
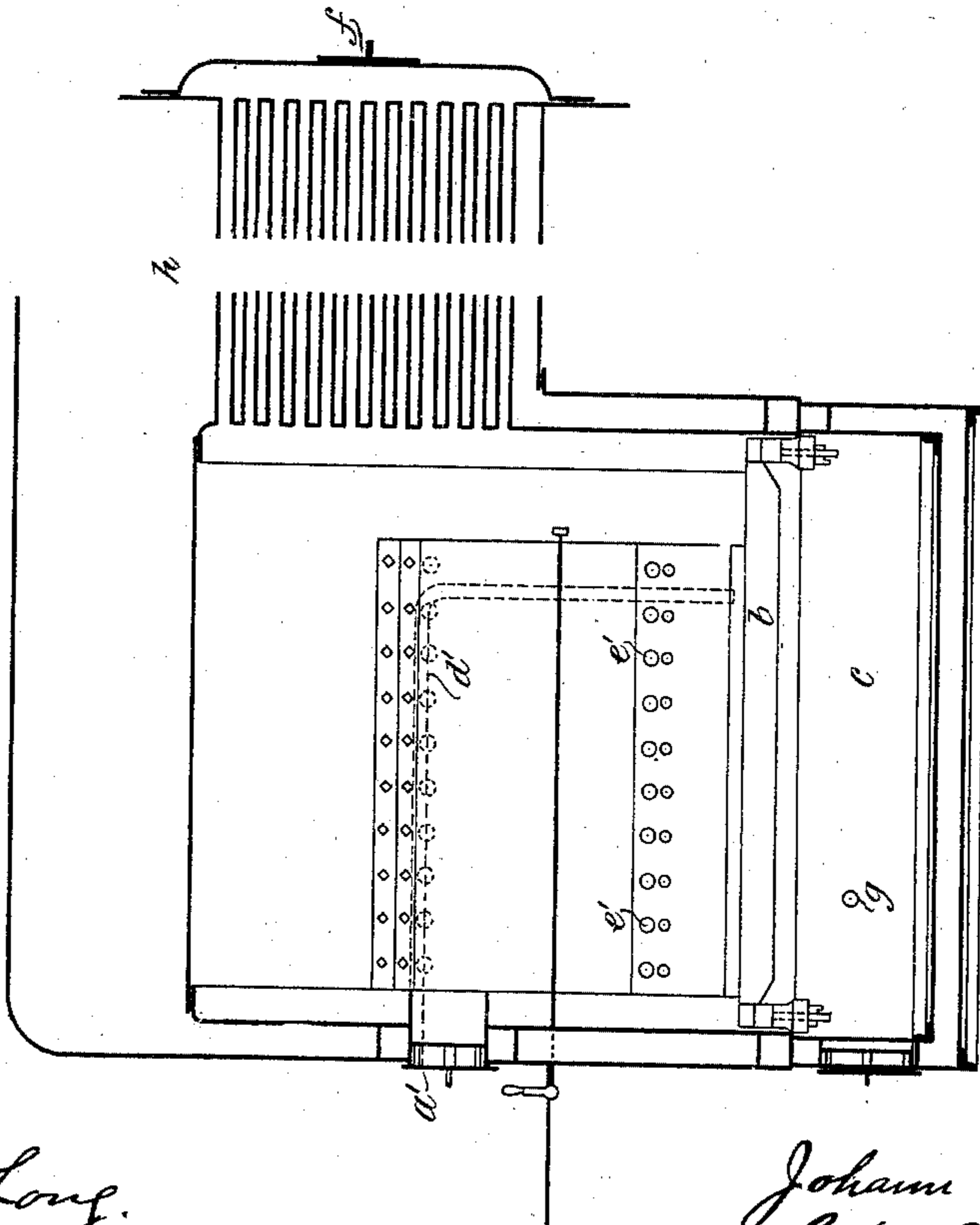


Fig. 1.



Witnesses.

Baltus D. Long.
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Inventor:
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By his Atty's.

Baldwin Davidson & Wright

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Fig. 4.

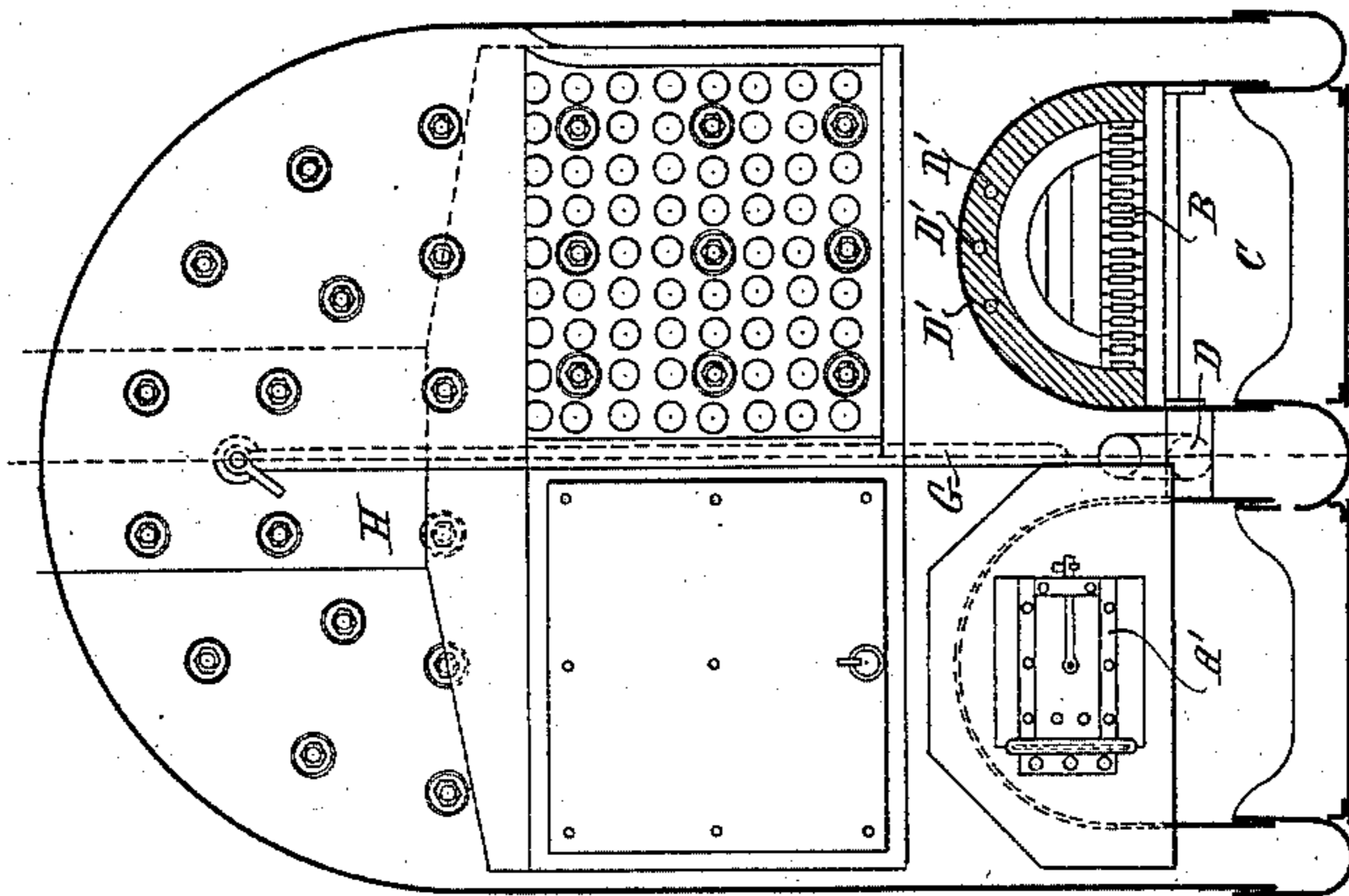
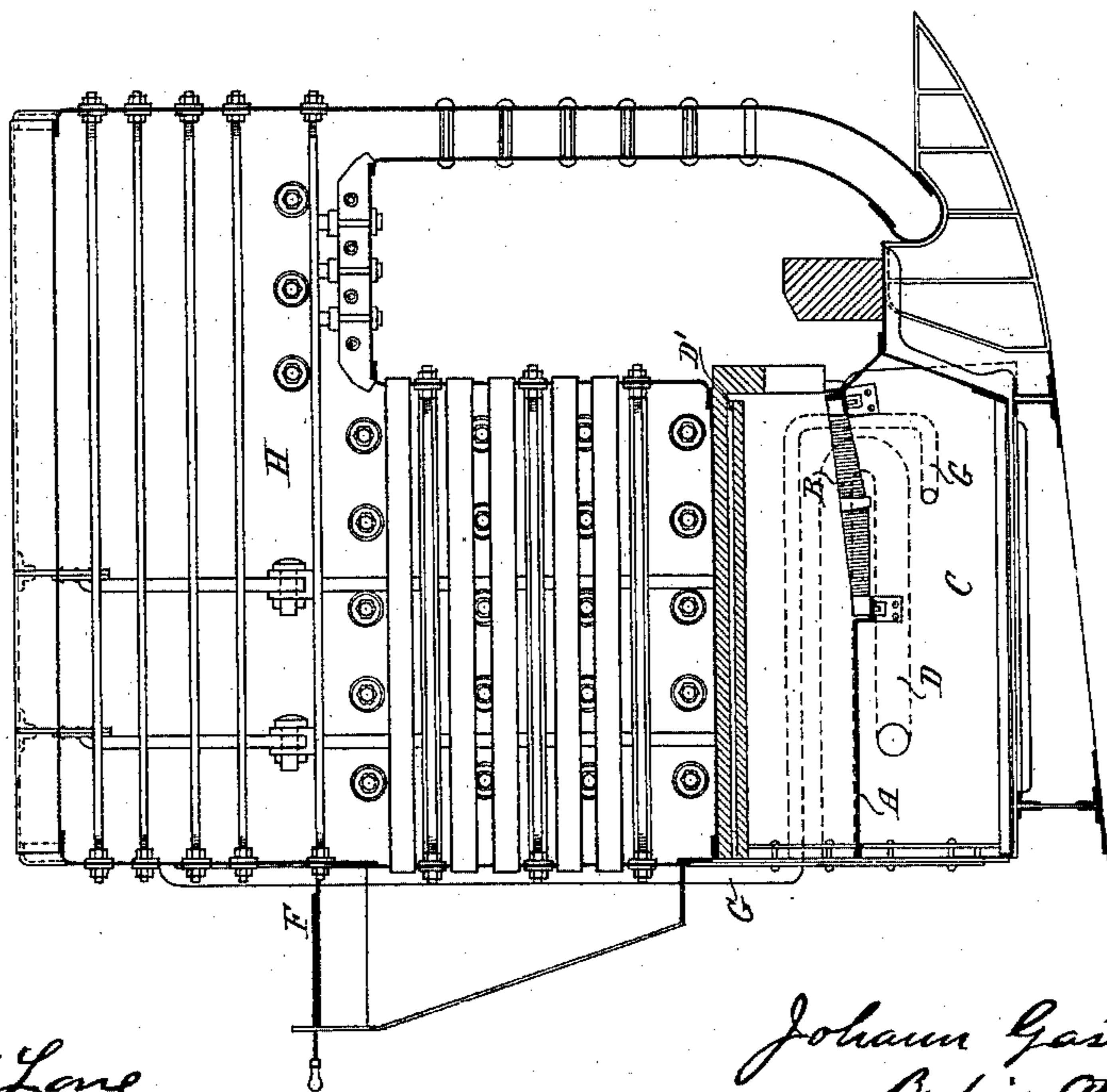


Fig. 3.



Witnesses.

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UNITED STATES PATENT OFFICE.

JOHANN GASTEIGER, OF VIENNA, AUSTRIA-HUNGARY.

STEAM-BOILER OR OTHER FURNACE.

SPECIFICATION forming part of Letters Patent No. 448,808, dated March 24, 1891.

Application filed April 22, 1890. Serial No. 348,985. (No model.)

To all whom it may concern:

Be it known that I, JOHANN GASTEIGER, engineer, a subject of the Emperor of Austria-Hungary, residing at 3 Rennweg, Vienna, in the Empire of Austria-Hungary, have invented certain new and useful Improvements in Steam-Boiler and other Furnaces, of which the following is a specification.

According to this invention I construct a steam-boiler or other furnace in such manner that the coal used is distilled and the gas produced caused to pass over a coke-fire, up through which steam is made to rise and to be consumed, together with the gas which rises up from the coke. The coal to be distilled is either placed onto a plate situated between the front door and the fire-bars or into chambers at the two sides of the fire.

In Figures 1 and 2 I have shown a steam-boiler furnace with distilling-chambers at the two sides. Fig. 1 is a longitudinal section, and Fig. 2 a transverse section. In Figs. 3 and 4 I have shown a steam-boiler furnace with a plate at the front, onto which the coal to be distilled is to be placed. Fig. 3 is a longitudinal section, and Fig. 4 a front elevation, with one half in section.

In Figs. 1 and 2, *a* are the distilling-chambers at the sides of the fire. *b* are the fire-bars on which a coke-fire is to be maintained. *c* is the ash-pit. *d* are pipes for conducting air to the space below the distilling-chambers. *d'* are passages by which air can pass to the back of the fire. *d²* are passages for allowing air to pass to the ash-pit. *e* are pipes beneath the distilling-chamber, by which gases are led from the top of the distilling-chambers and discharged through outlets *e'* into the fire-chamber above the glowing coke on the fire-bars. *d³* are orifices immediately below the gas-outlets *e'*. Through these orifices air is supplied to the gas just as it issues from the outlets *e'* and effects the combustion of the gas. *a'* are doors by which coal can be supplied into the distilling-chambers. *a²* are doors by which, when coal has been distilled in these chambers, the resulting coke can be discharged onto the fire-bars. *h* is the steam-boiler, which is shown as being of the ordinary locomotive type. *g* is a pipe by which steam can be conveyed from the boiler to the ash-pit below the fire-bars. *f* is a

damper by which the passing away of the burned gases from the furnace can be controlled.

In Figs. 3 and 4, *A* is the plate at the front of the furnace. *A'* is a door at the front. *B* are the fire-bars. *C* is the ash-pit. *D* are pipes for introducing heated air to the ash-pit. *D'* are pipes for admitting heated air to the fire-chamber at the back above the fire-bars. *H* is the steam-boiler. *G* is a pipe for admitting steam from the boiler to the ash-pit. *F* is a damper for controlling the passing away of the burned gases.

In starting the furnace a necessary quantity of coke is placed in a glowing condition onto the fire-bars of the furnace. At the same time coal is placed into the distilling-chambers *a*, Figs. 1 and 2, or onto the plate *A*, Figs. 3 and 4. As the coal is distilled and the gases are driven out they must pass over the glowing coke, to be there consumed. The steam which is conveyed from the boiler through the pipe *g* to below the fire-bars not only keeps the bars cool, but also as it rises up through the glowing layer of coal is converted into combustible gases, which in the process of combustion develop an unusually large degree of heat. In order to insure the combustion of any gas which may not have been entirely consumed over the glowing layer of coke, intensely-heated atmospheric air is introduced at the back of the fire-chamber through the air-passages *d'* in Figs. 1 and 2 and *D'* in Figs. 3 and 4. The pipes by which air is admitted to the furnace must be so arranged that the air requisite for the burning process shall become intensely heated, and it is very important that no air shall enter the furnace except through these heating-pipes.

Furnaces constructed to act in the manner above described are of very great value, because through the complete combustion obtained in them a heat unusually free from smoke is produced, which can be conveyed into chambers or kilns in which bricks or pottery or various other things which require to be exposed to a very high temperature are placed. Boilers also can be intensely heated.

The furnaces can be used not only for fixed boilers and furnaces, but also locomotive-boilers, and in particular for ships' boiler-furnaces, in which an enormous saving of

coal and other fuel will be effected, to say nothing of other advantages.

With ships' boilers especially, in order to prevent the rivets or bolts from becoming
5 leaky and to protect the boiler-plates, the fire-chamber is lined with fire-brick, as shown by the drawings, Figs. 3 and 4.

I claim—

1. A steam-boiler or other furnace having
10 fire-bars on which a glowing fire is to be maintained, a closed space or chamber without grate-bars away from the fire for containing coal to be distilled, a passage from such space or chamber conveying the gas arising from
15 the distillation to the fire over the fire-bars, an ash-pit below the fire-bars, a boiler heated by the fire, a pipe for admitting steam from the boiler to the ash-pit below the fire-bars, and air-admission pipes heated by the fire for
20 admitting air for supporting combustion.

2. A steam-boiler or other furnace having a central combustion-chamber provided with fire-bars on which a glowing fire is to be maintained, a closed chamber at each side of the fire for containing coal to be distilled, a pas- 25 sage between these chambers for the products of combustion from the fire on the grate-bars, pipes or passages conveying gas arising from the distillation in the closed chamber and delivering it to the fire above the grate-bars, an 30 ash-pit below the fire-bars, and air-admission pipes heated by the fire for admitting air for supporting combustion.

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