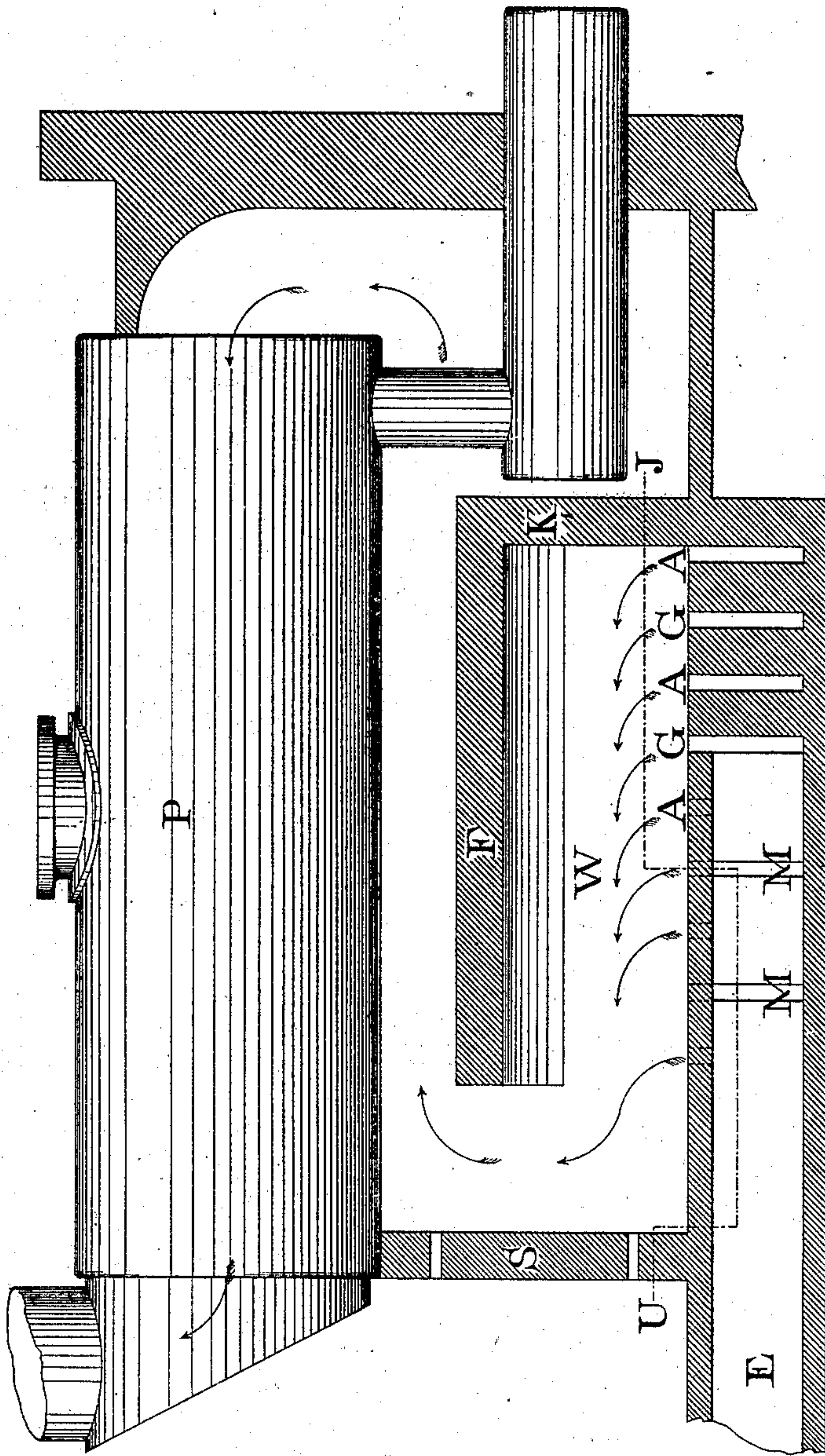


A. L. HOLLEY.
Steam Boiler Furnace.

No. 238,235.

Patented March 1, 1881.

FIG. 1—Section on EB, FIG. 3 —



Attest:
Geo. T. Smallwood Jr.
Walter Allen

Inventor:
Alexander L. Holley
By *Knight Bros*
Atty.

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FIG. 2.

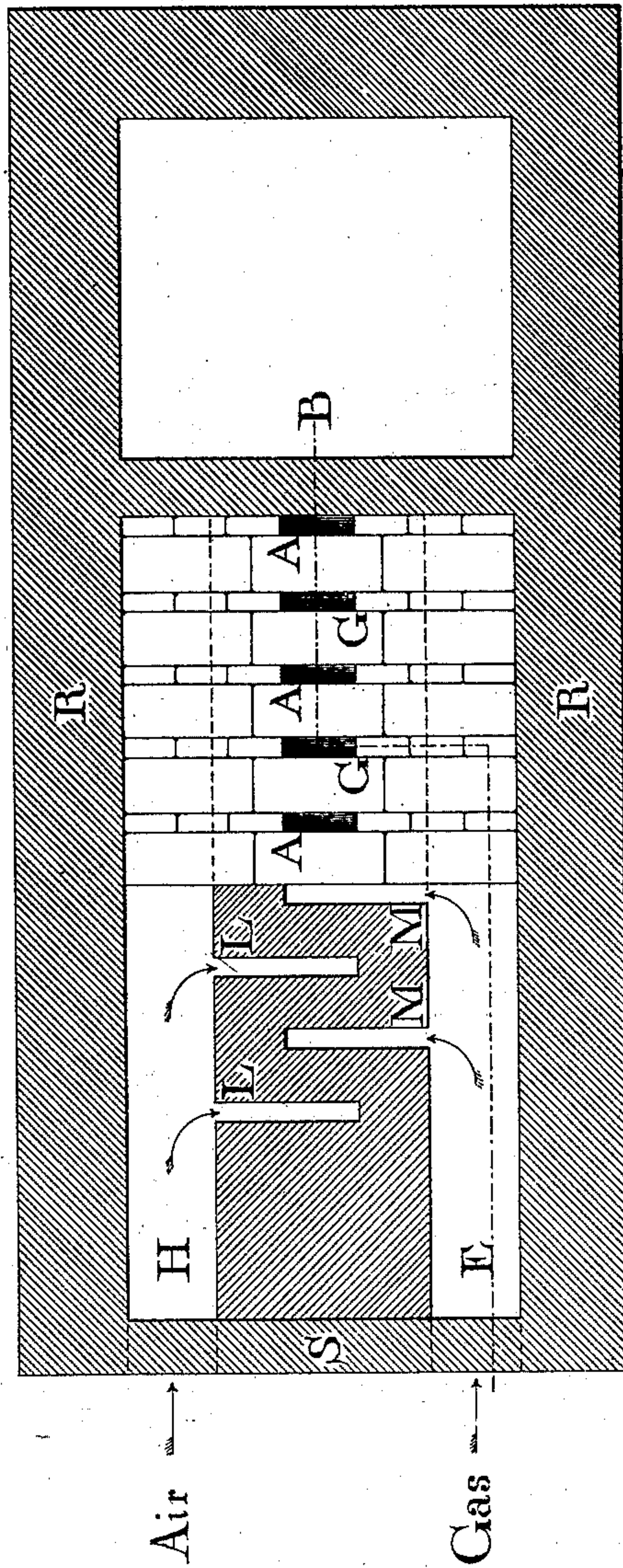
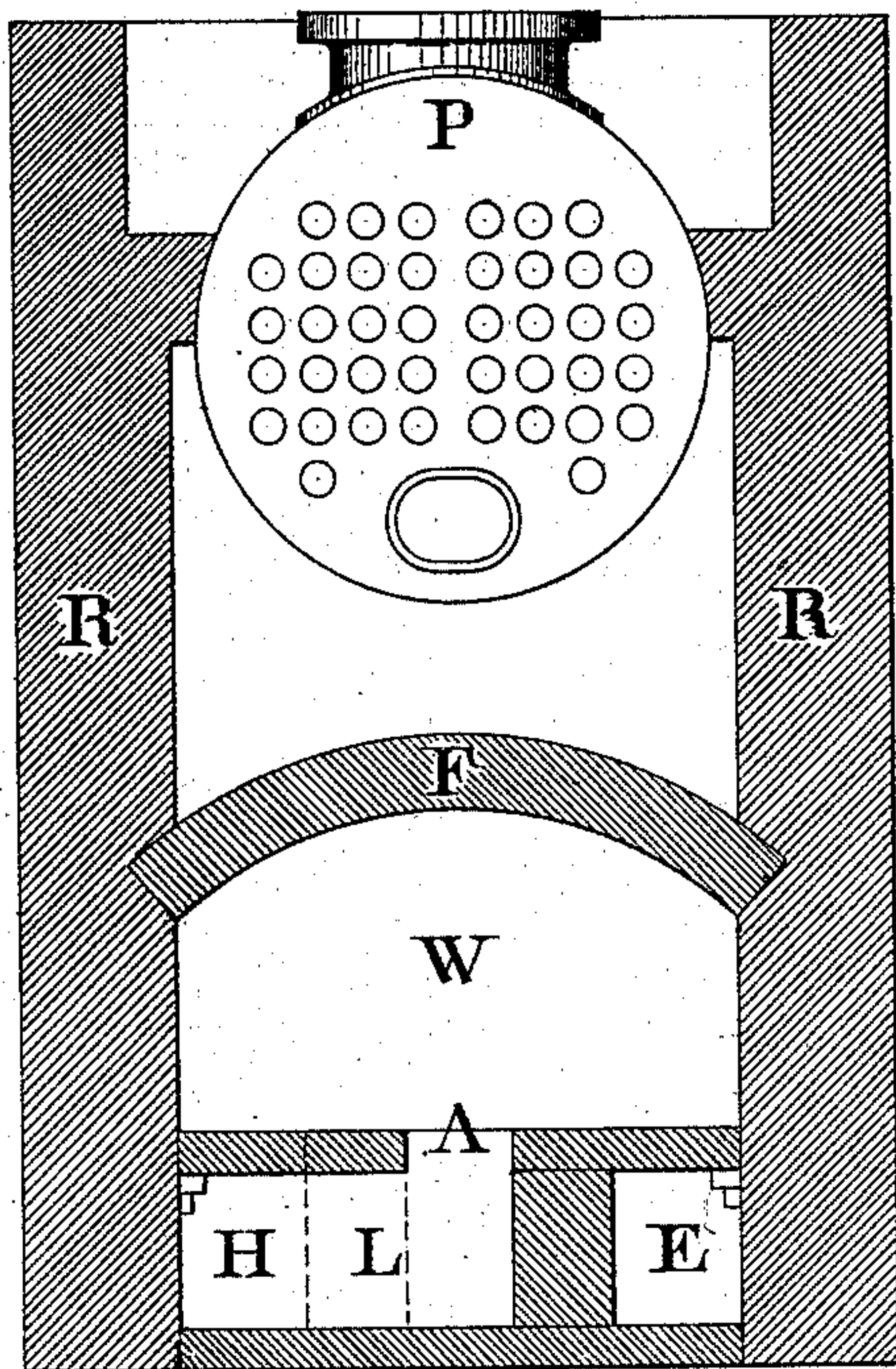


FIG. 3—Section on UJ, FIG. 1.

Attest
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UNITED STATES PATENT OFFICE.

ALEXANDER L. HOLLEY, OF BROOKLYN, NEW YORK.

STEAM-BOILER FURNACE.

SPECIFICATION forming part of Letters Patent No. 238,235, dated March 1, 1881.

Application filed January 24, 1880.

To all whom it may concern:

Be it known that I, ALEXANDER LYMAN HOLLEY, of Brooklyn, in the county of Kings and State of New York, have invented an Improvement in Steam-Boiler Furnaces, of which the following is a specification.

The use of gaseous fuel for steam-boilers has, among others, the following advantages: The boiler is not injured by the influx of cold air due to firing solid fuel in the ordinary manner; complete combustion may be maintained; and fires in improved gas-producers, as compared with those in ordinary boiler-furnaces, may be cleaned with less labor and less waste of fuel.

A serious objection to the use of gas-fuel for boilers has been the incomplete combustion of the gas, due to its being cooled before combustion by the comparatively cold surfaces of the boiler, and also due to the imperfect mixture of air and gas.

My invention relates to means for the admission of gas and air, and to the construction of a furnace which provides the conditions of complete combustion, and which is also cheap and durable. The conditions of combustion are a complete mechanical mixture of air and gas, room for combustion, and a temperature of the combustion-chamber which will ignite the combustible mixture. I provide for these conditions in the manner shown in the accompanying drawings, in which—

Figure 1 is an elevation of a return-tube boiler, P, and a longitudinal vertical section of the combustion-chamber W and the gas-burner. Fig. 2 is a vertical cross-section of the same. Fig. 3 is a horizontal section of part of the gas-burner and part of the combustion-chamber.

The same letters refer to the same parts in all the drawings.

The flue E extends under the boiler and conveys gas to the burner from any suitable gas-producer. The flue H conveys air to the burner. These flues may enter from the front or rear or side of the apparatus, and the flow of gas and air through them must be regulated by valves in any suitable manner known to the users of ordinary gas-furnaces.

The burner consists of a series of alternate

gas-ports, G G, and air-ports A A in the floor of the combustion-chamber. The gas-ports G receive gas from the gas-flue E by means of slits M M in the inner side wall of the said gas-flue. The air-ports A communicate with the air-flue H by means of similar slits, L.

The combustion-chamber W is formed by the side walls, R, and walls S K of the furnace, or by any suitable refractory walls adapted to the kind of boiler used, and of a brick or mineral roof, F, which is so arranged as to cause the gas and air jets from the ports A A G G to mingle in their passage toward the boiler; also to give an ample space for combustion; also to throw the hot gaseous products of combustion against the part of the boiler where the fire-box would ordinarily be situated.

When the walls of the combustion-chamber are once heated to a temperature sufficient to ignite the combustible mixture of air and gas, the said mixture is ignited as fast as formed, and is more or less completely burned in the chamber. It is not practically essential that the whole of the combustible mixture should be burned in the chamber; a part of it, when once lighted, will burn nearly completely in passing over the top of the combustion-chamber. It is essential to economical combustion that a chamber interposed between the air and gas ports and the boiler should promote the mixture, ignition, and combustion of the air and gas.

The sizes of air and gas ports and flues must depend on the amount of gas to be burned. The common gas-furnace practice affords sufficient data on this subject. These sizes may be made smaller in proportion to the pressure at which the air and gas enter the burner.

It is obvious that the ports may be placed much nearer together, and that several rows of ports may be employed, in order to more quickly mix the air and gas. I find, however, that the burner shown in the drawings, which may be cheaply built of ordinary fire bricks and tiles, is durable and effective.

The regenerative system may be applied to this apparatus by preheating the air or gas, or both, in passages formed in the walls of the combustion-chamber, or by any of the ordinary methods.

I am aware that gas-furnaces have been before constructed in such manner that the air

and gas are mixed before they pass into the combustion-chamber; also, that diaphragms have before been placed in coal-fired boiler-furnaces for the purpose of igniting a mixture
5 of air and gas. These, therefore, I do not claim.

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

1. In a gas-furnace for steam-boilers, the combustion apparatus consisting of the alter-
10 nate ports A G, and the diaphragm F, so placed over them as to throw together the jets issuing from said ports, and to form a hot chamber, W,

for igniting and burning the mixture, when the said mixing, igniting, and burning are done in the chamber W, substantially as de- 15 scribed.

2. The air and gas mixing apparatus consisting of the ports A G, and the diaphragm F, so placed over them as to throw together the jets issuing from said ports.

ALEXANDER LYMAN HOLLEY.

Witnesses:

WALTER D. EDMONDS,
FRANK H. HYATT.