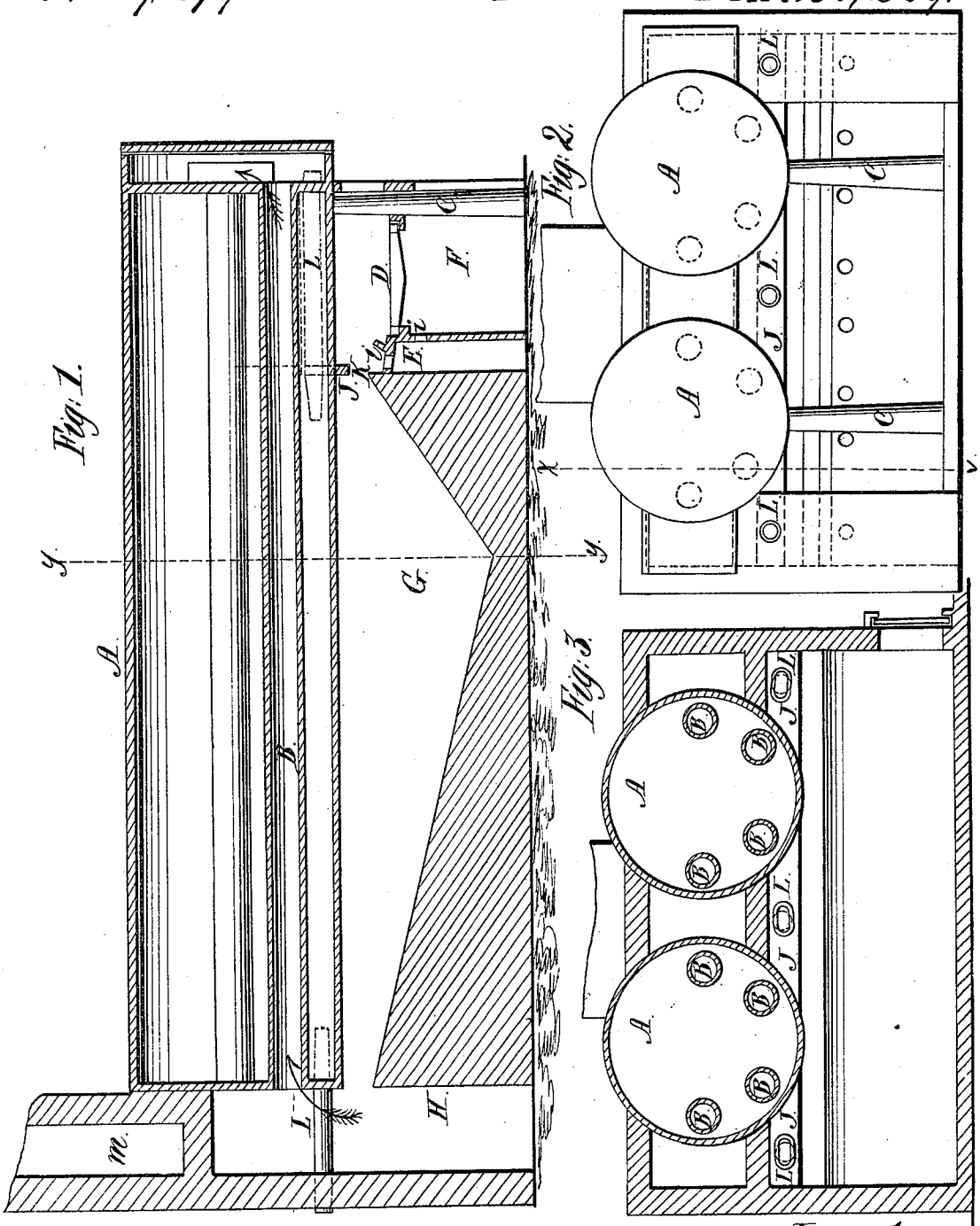
J. Morgan.

Steam Boiler Furnace.

No. 87,279. Patented Feb. 23, 1869.



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United States Patent Office.

ISAAC MORGAN, OF QUINCY, ILLINOIS.

Letters Patent No. 87,279, *dated February* 23, 1869.

IMPROVEMENT IN STEAM-BOILER FURNACES.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that I, ISAAC MORGAN, of Quincy, in the county of Adams, and State of Illinois, have invented a new and useful Improvement in Furnaces; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to make and use the same, reference being had to the accompanying drawings, forming part of this specification.

This invention has for its object, to consume the gaseous products of combustion, escaping from the furnaces of steam and other boilers, and consists in the arrangement of a partition over the end of the bridge-wall, and a series of hot-air tubes between the boilers, and projecting slightly through the partition, whereby the gaseous products of combustion are directed in a broad sheet through the contracted throat formed by the bridge-wall and partition, and, mingling with the intensely-heated air from the tubes, are consumed.

Figure 1 represents a longitudinal section of a steam-boiler, through the line *x x*, fig. 2.

Figure 2 is a front view of the furnace, showing the boilers in position, but with the front plate removed.

Figure 3 is a vertical cross-section, through the line *y y*, fig. 1.

Similar letters of reference indicate like parts.

A represents the boilers, which are of that class known as flue-boilers.

B represents the flues.

C C are supports, under the front end of the boilers.

D (fig. 1) represents the grate-bars.

E is the bridge-wall.

F is the ash-pit.

G is the combustion-chamber, and

H is the smoke-chamber.

J represents a transverse plate or partition, which fills up the space between the boilers, the outer sides of the boilers, and the wall, so that the upper line of the narrow throat K, beneath the boilers, is parallel with the top of the bridge-wall its entire length.

At the front end of the boiler, directly over the furnace, there are three or more air-tubes L, which convey heated air into the combustion-chamber G.

It is well known by those who are acquainted with the subject, that where there is not a sufficient quantity of atmospheric air (or oxygen) supplied to the burning fuel, carbonic-oxide gas is the result, which gas passes off and escapes from the ordinary chimney, carrying with it large amounts of carbon unconsumed.

This gas is, of course, generated at a high temperature, and if, when at that temperature, it is supplied with an additional quantity of oxygen, its carbon is consumed, and fuel saved. This additional quantity of oxygen I supply through the air-tubes L.

These tubes, it will be seen, pass over the fire at the front end of the boiler, and project slightly through the partition J, above the throat K; consequently they are kept red hot, so that the air which passes through them becomes intensely heated before it is discharged into the combustion-chamber.

The operation is as follows: The gaseous products of combustion rising from the furnace D, impinge against the wall between the boiler and sides enclosing them, and are thence directed in currents to the partition J, which deflects them in a broad sheet through the contracted throat K, at which point they are met by the intensely-heated air from the tubes L, and consumed.

The tubes L, at the rear end of the boiler, are used simply as a means for inspecting the interior of the combustion-chamber.

I am aware that air has been introduced to the combustion-chamber of steam-boilers, through and also immediately behind the bridge-wall, by means of pipes, or by openings in the bridge-wall, or behind it; but such arrangements I do not claim, as they do not permit the heated air to thoroughly mingle with the gaseous products; but

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

The described arrangement of the partition J and hot-air tubes L, with relation to each other, the bridge-wall, the furnace F, and the boiler A, for the purpose specified.

ISAAC MORGAN.

Witnesses:

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