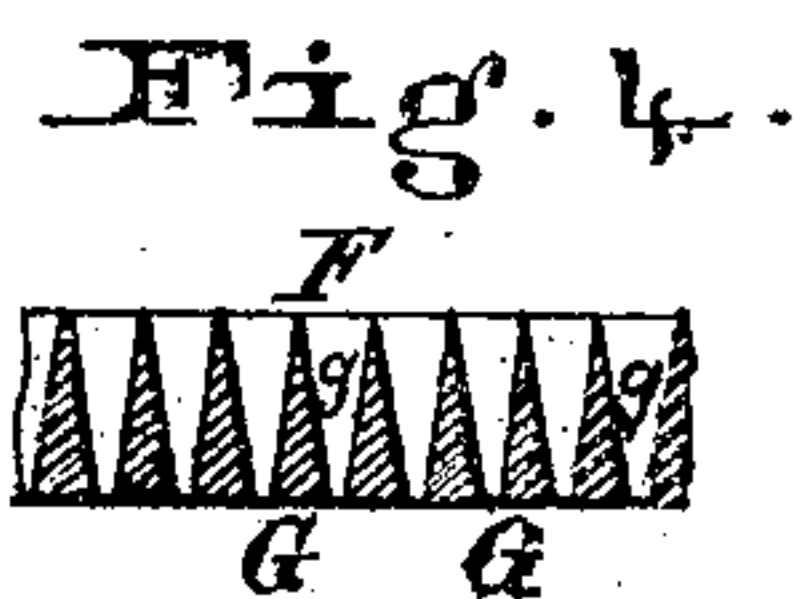
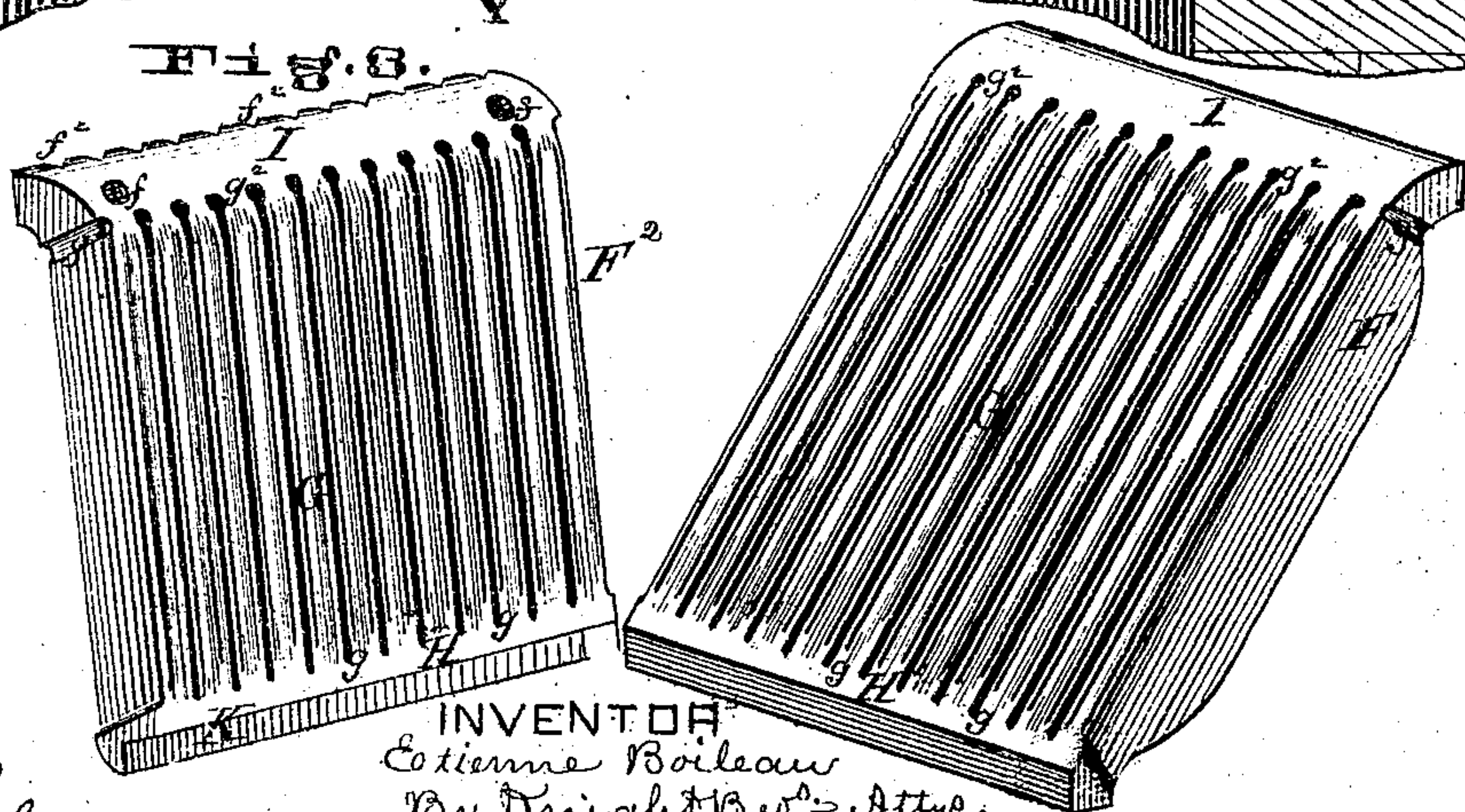
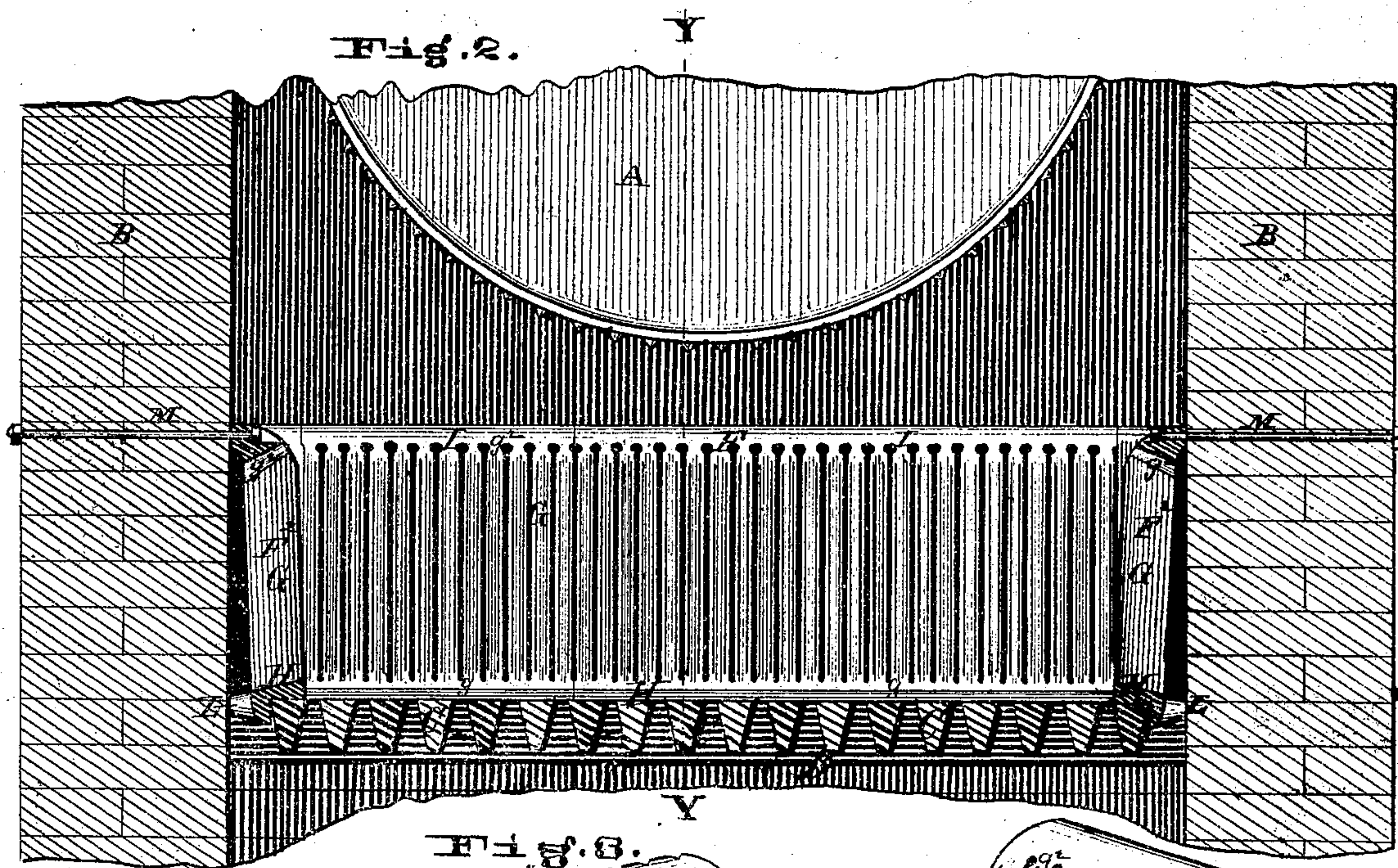
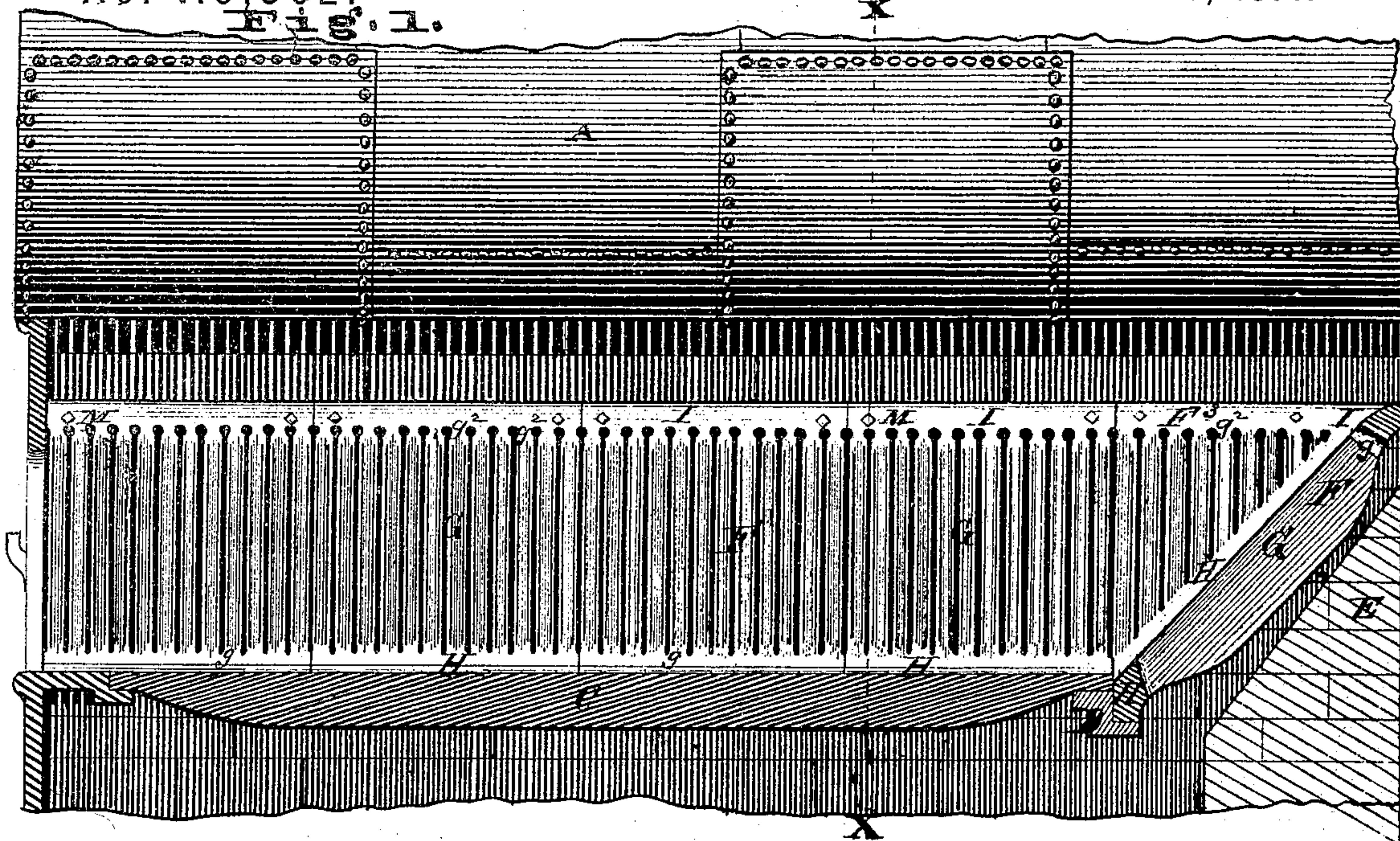


ETIENNE BOILEAU. Improvement in Fire Plates for Boiler Furnaces.
No. 119,562. Patented Oct. 3, 1871.



ATTEST
Wm. H. Burton
Walter Allen

INVENTOR
Etienne Boileau
By *Knights & Co.* Attys.

UNITED STATES PATENT OFFICE.

ETIENNE BOILEAU, OF ST. LOUIS, MISSOURI.

IMPROVEMENT IN FIRE-PLATES FOR BOILER-FURNACES.

Specification forming part of Letters Patent No. 119,562, dated October 3, 1871.

To all whom it may concern:

Be it known that I, ETIENNE BOILEAU, of the city and county of St. Louis and State of Missouri, have invented certain new and useful Improvements in Fire-Plates for Furnaces, Stoves, &c., of which the following is a specification:

This invention relates to improvements on the fire-plates patented to me the 6th day of July, 1869, No. 92,253. My present improvement consists principally in carrying the narrow slots in the plate almost to its upper edge, so as to preserve the upper edge from fusion, as it was found liable to be destroyed by heat in the hotter class of furnaces.

The drawing represents my fire-plates as applied to a boiler-furnace.

Figure 1 is longitudinal section at the line Y Y, Fig. 2, of a boiler-furnace to which my fire-plates are applied. Fig. 2 is a transverse section of the same at line X X, Fig. 1. Fig. 3 is an enlarged perspective view of the rear and side fire-plates. Fig. 4 is a horizontal section of a portion of one of the fire-plates.

A is the steam-boiler, supported in the usual manner. B are the side walls of the furnace. C are the grate-bars, that may be of any form. D is the bearing-bar supporting the rear end of the grate-bars. E is the bridge-wall. F F² are, respectively, the rear and side fire-plates, they being similar in the main points of construction, but having some minor differences to fit them for their particular situations. These fire-plates have slits or slots *g*, very narrow at the fire-face, but widening toward the back of the plate, and extending almost the whole distance from the bottom H to the top I. These slots may be made one-fourth of an inch wide at the fire-face and three-fourths of an inch, more or less, at the back of the plate. The plates may be made three inches in thickness. The bars G of the plate may be made three-fourths of an inch thick at the fire-face, and may be a sixteenth of an inch thick at the rear part. At the upper end of the slots *g* are enlargements *g*², forming passages for the heated air, and by their direction acting to project the air into the fire-space above the fuel. The plates F² have rabbets K to receive the corner of the grate-bar upon which the plate is supported. L is a lug that rests against the side of the wall B to hold the lower end of the plate at the proper distance therefrom. At the upper edge of this

plate are holes *f*, to receive bolts M passing through the walls B. The plates F², when in position, are slightly inclined backward, as shown in Fig. 2, so that the air-space between the plate and the wall is narrower at top than bottom. *f* are notches forming air-passages between the wall and the plate. The plates F are made somewhat longer than those F², so that when they are inclined at an angle of about forty-five degrees, more or less, their top will be at the same level as that of the plates F², as shown in Fig. 1. The lower ends of the plates F rest on the bearing-bar D and their upper ends against the bridge-wall E, with whose top they should be about flush. F³ is a triangular plate, made to fit the space between the inner plate F² and the plate F. It is similarly slotted to the plates F and F². The slots G have four purposes, first, to allow the expansion and contraction of any portion of the plate without affecting the remainder; second, the circulation of cool air in proximity to the fire-face to prevent the overheating of the metal; third, the heating of the air for the purpose of consuming the smoke; and fourth, allowing the passage of a small quantity of air into the fire. The first three purposes I conceive to be of much the greater consequence, and, in fact, to constitute the valuable elements of the plate.

In the use of my plate, as described in patent No. 92,253, in furnaces of steam-boilers, I found that the portion between the upper ends of the slots and the jet-holes became overheated and destroyed, and to obviate this difficulty I extended the slot upward so as to communicate with the said jet-holes, and the circulation of air in the said upward extension was found to fully answer the purpose intended, the upper edge of the plate becoming sufficiently refractory.

Where a solid tile is used at the bridge-wall the clinkers become caked against the same, and where open grate-bars are used in that position the fire varies in temperature to such an extent as to disastrously affect the boiler at that point; and the bars also become quickly destroyed. With my plate it is found that the heat is steady and the consumption of fuel perfect, and that the jets of heated air through the passages *g*² cause an unusually thorough combustion of the smoke. The depth of the bars G is so great in comparison with their thickness that the portion of surface exposed directly to the heat of the fire is not more

than one-fifth or one-sixth part of their whole surface, the remainder being in contact with the air-current flowing upward along the slots g , and consequently the bars are kept sufficiently cool for their preservation, the air at the same time becoming heated and finding vent through the jet-passages g^2 . The air also passes to some extent through the slots g , being impelled thereto by the gradually-contracting air-spaces behind the plates $F F^2 F^3$. The form and size of my plates are varied according to circumstances. For instance, for application to a locomotive-furnace the plates F would be made shorter and inclined less from the vertical, and in any case

the plate might be modified in form to meet the requirements and to render it applicable to all kinds of fire-places, stoves, and furnaces.

I claim as my invention—

The fire-plates $F F^2 F^3$, having narrow slits or slots g , terminating at the upper end in air-passages g^2 , substantially as set forth.

In testimony of which invention I hereunto set my hand.

ETIENNE BOILEAU.

Witnesses:

SAML. KNIGHT,
R. T. BRADLEY.

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