

(No Model.)

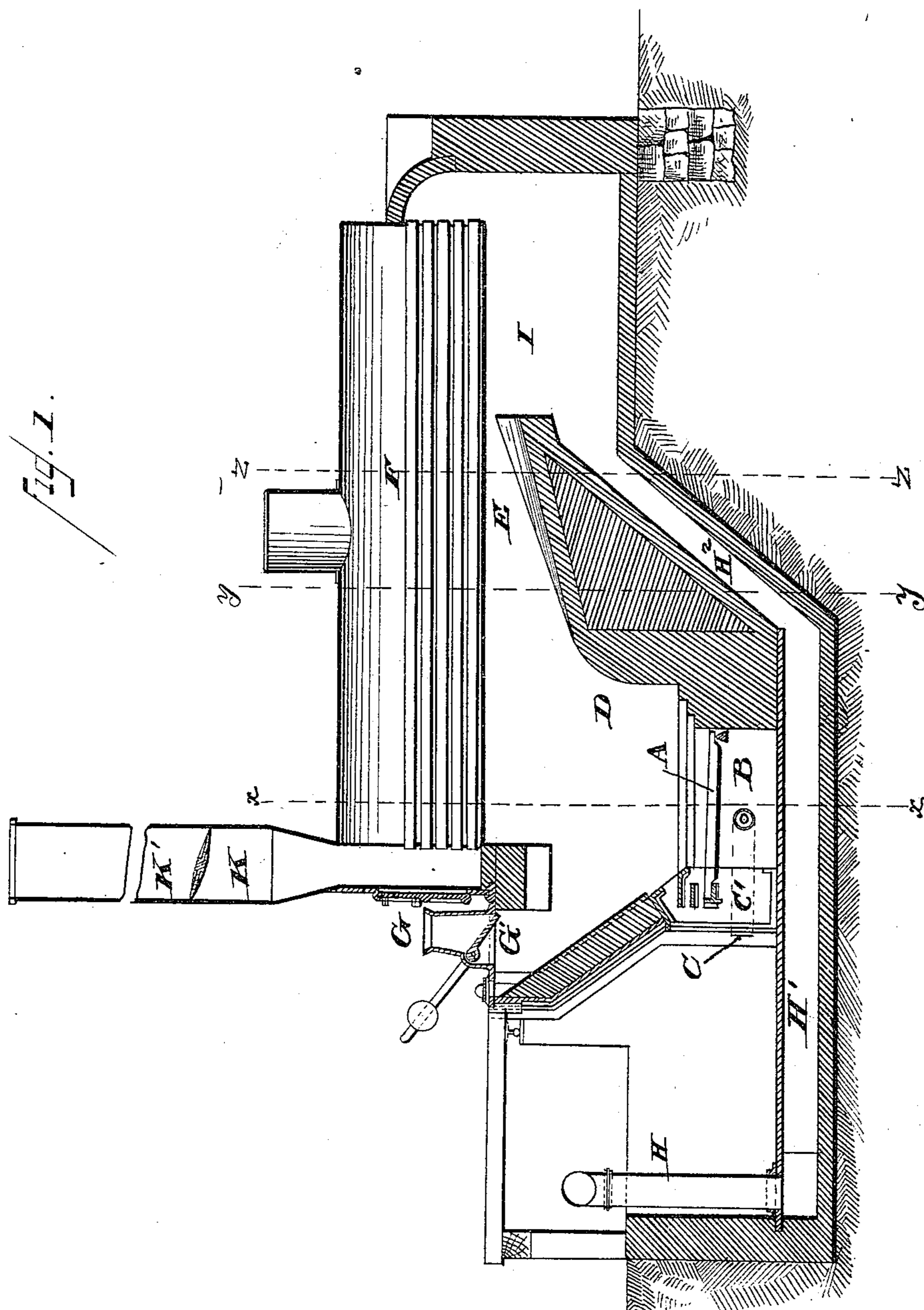
3 Sheets—Sheet 1.

M. V. SMITH.

STEAM BOILER SMOKE CONSUMING FURNACE.

No. 440,235.

Patented Nov. 11, 1890.



Witnesses.
F. L. Ourand
Alec Mahon

Inventor.
M. V. Smith
BY
S. M. Ginsburgh
Attorney.

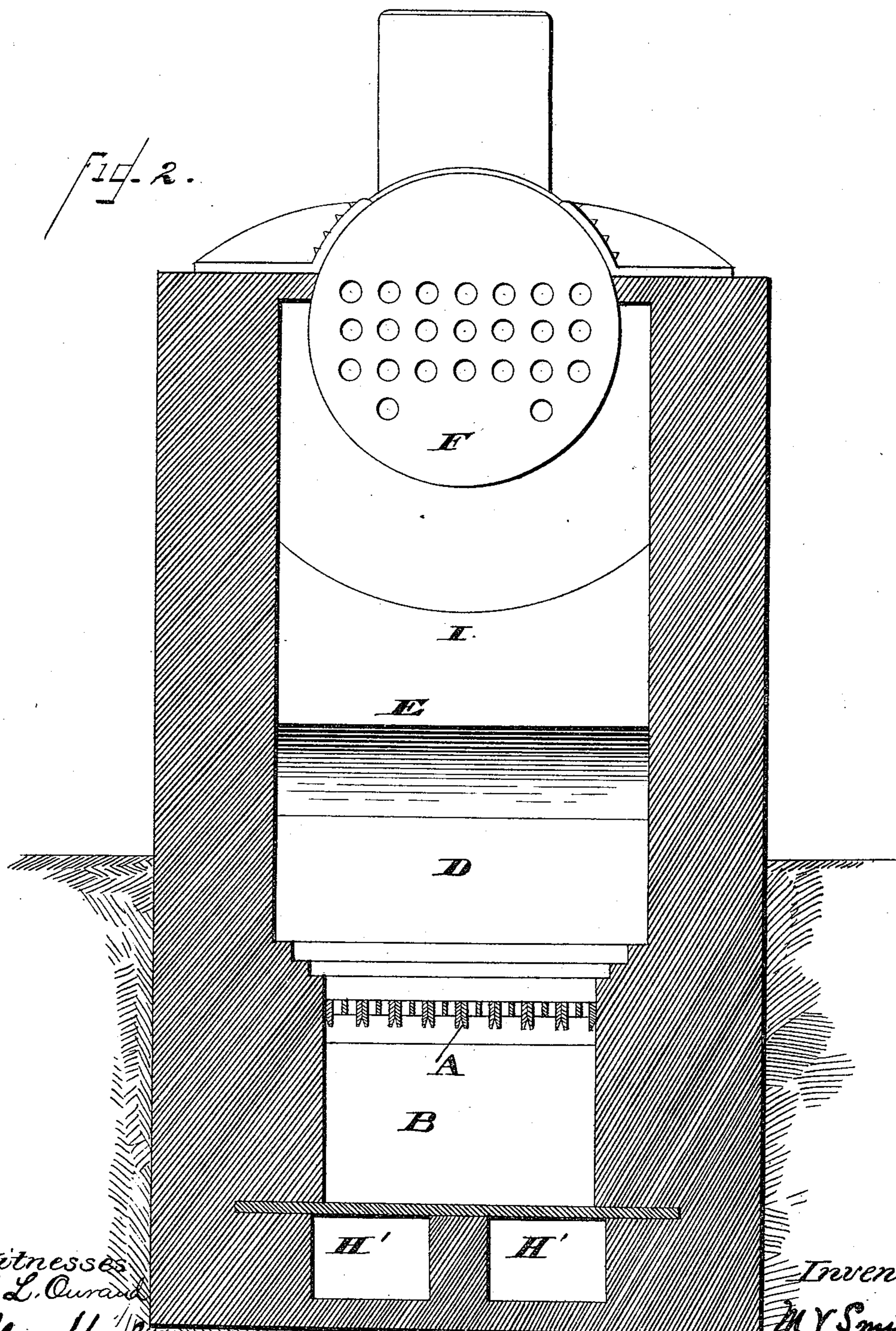
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3 Sheets—Sheet 2.

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Inventor
M. V. Smith
By
S. M. Fiascaluph
Attorney

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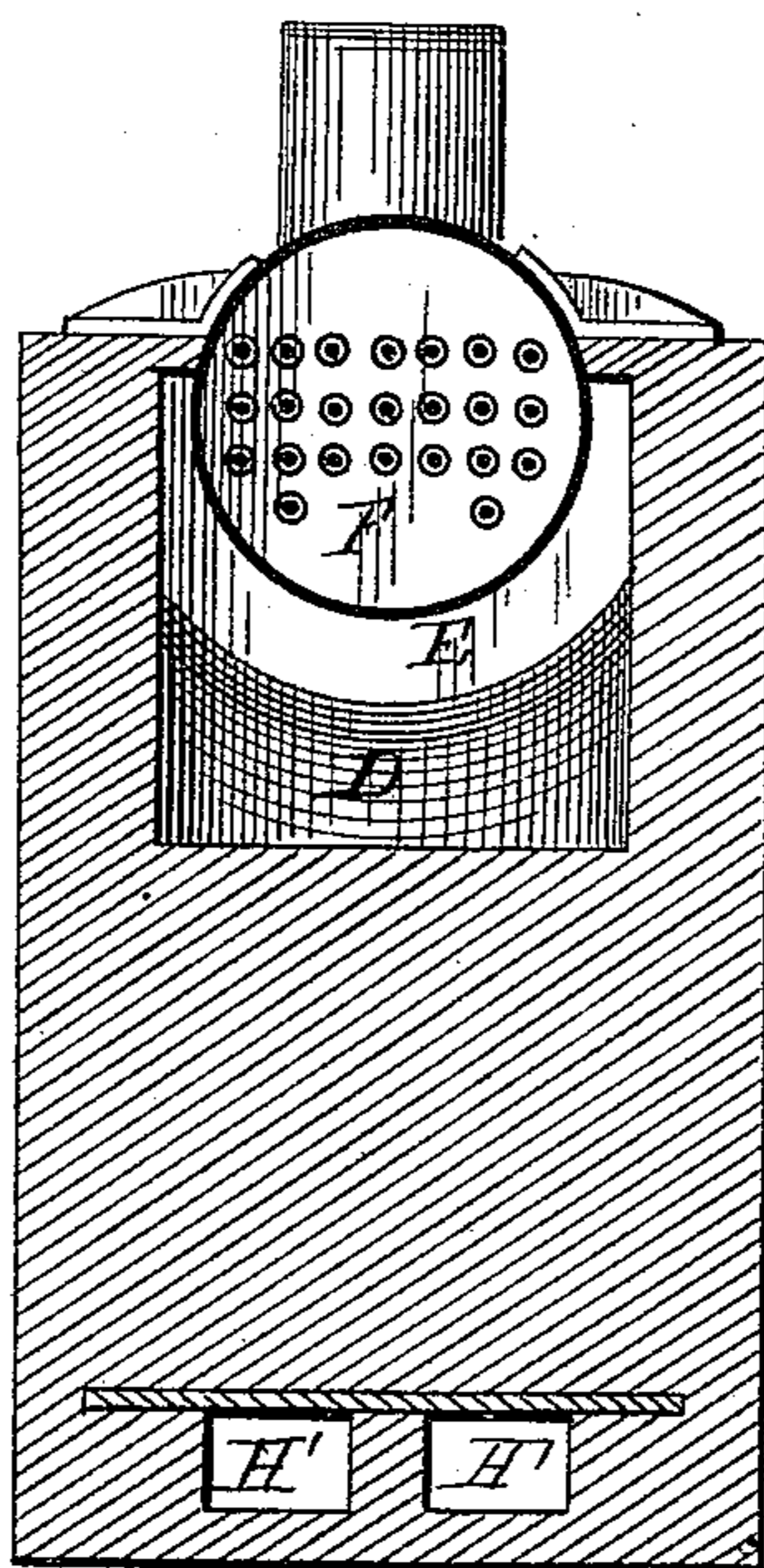


Fig. 3.

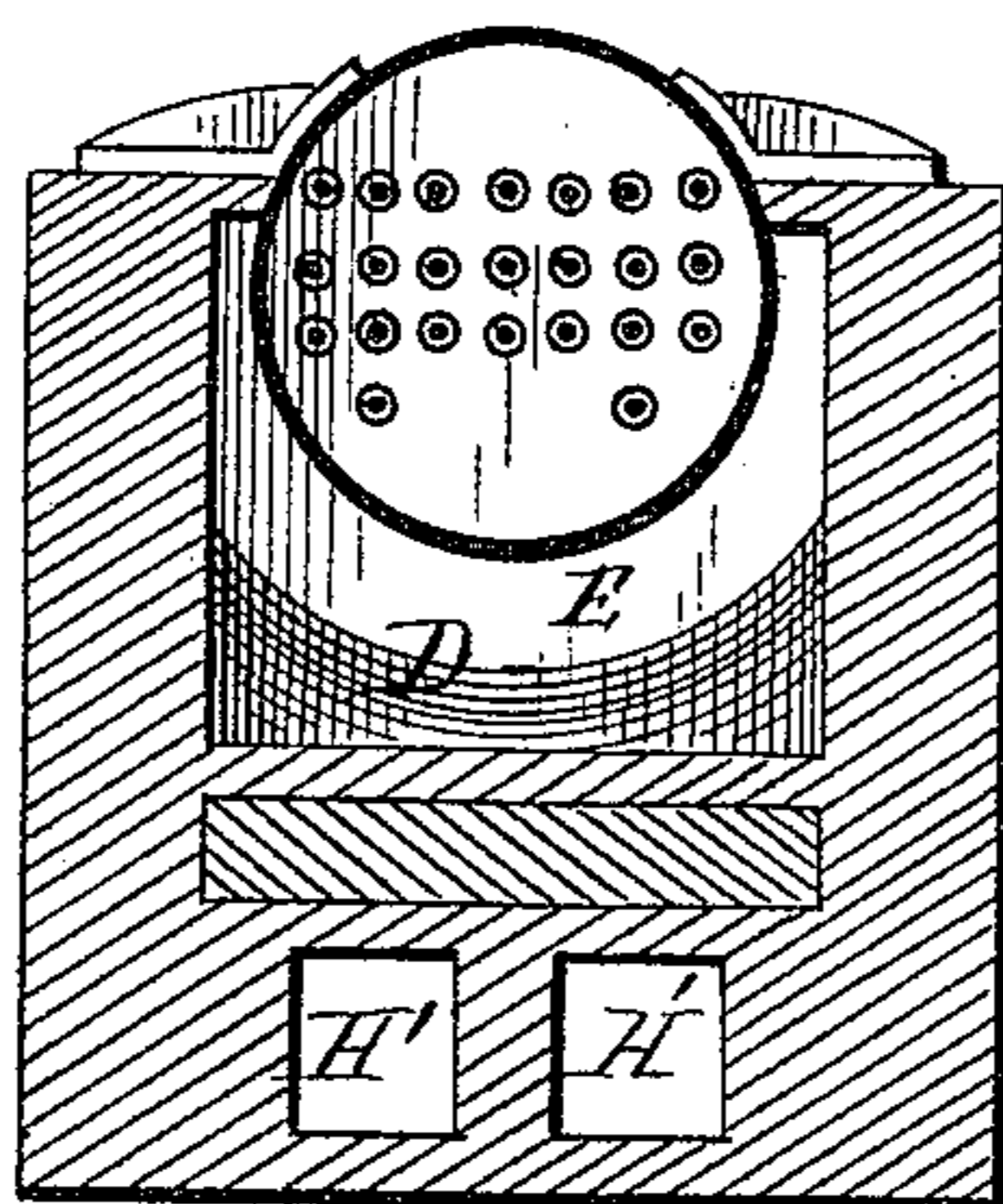


Fig. 4.

WITNESSES
P. L. Curand.
Alex Mahon

INVENTOR
Martin V Smith
By
Spencer B. Fursbaugh
Attorney

UNITED STATES PATENT OFFICE.

MARTIN V. SMITH, OF PITTSBURG, PENNSYLVANIA.

STEAM-BOILER SMOKE-CONSUMING FURNACE.

SPECIFICATION forming part of Letters Patent No. 440,235, dated November 11, 1890.

Application filed March 3, 1890. Serial No. 342,510. (No model.)

To all whom it may concern:

Be it known that I, MARTIN V. SMITH, a citizen of the United States, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented new and useful Improvements in Steam-Boiler Smoke-Consuming Furnaces; and I do hereby declare the following to be a full, clear, and exact description of said invention, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

My invention relates to improvements in steam-boiler smoke-consuming furnaces.

The object of my invention is first to make a highly-combustible gas at a very high temperature under one end of the boiler in a gas-producer, and then to burn the gas under the other end of the boiler to a perfect combustion before passing into the stack, and thus produce a perfect smoke-consumer; and to this end the invention consists, first, in extending and inclining the fire-bridge of the furnace into close proximity to the boiler-shell, forming a contracted throat or nozzle inclining from the gas-producer to the point at which the gas is forced into the combustion-chamber, giving it, as it were, a reverberatory action.

It further consists in forming a large combustion-chamber under the boiler and in supplying said combustion-chamber with a supply of air sufficient to insure a perfect combustion of the gases before passing to the stack, and to certain details in the construction and arrangement of parts, all as hereinafter explained.

In the accompanying drawings, Figure 1 is a longitudinal section of my improved steam-boiler furnace, and Fig. 2 is a transverse vertical section of the same on the line $x x$, Fig. 1. Fig. 3 is a transverse section on the line $y y$, Fig. 1. Fig. 4 is a section on the line $z z$ of same figure.

The producer or generator chamber of the furnace is constructed similar to the producing-chamber used by the Siemens process.

The fire-bridge inclines backward and upward to a point in close proximity with the boiler, forming a contracted throat or nozzle E.

The boiler F is of the well-known return-

flue type, with the front end thereof arranged to extend well over the producer, leaving room in front of it for the coal or feed hopper G, hereinafter referred to.

A vertical flue or flues H, communicating with the outer air, extends down and communicates with a horizontal flue or flues H', extending under the producer, which in turn communicates with an inclined flue or flues H'', extending under the fire-bridge, and finally leading into the combustion-chamber I. This combustion-chamber I is made sufficiently large, so that the gases mingling therein with the additional supply of air coming through the flues H H' H'' will cause a perfect combustion of the gases before the same pass through the boiler-flues to the stack.

The stack K communicates with the flues of the boiler and is provided with a damper K', and said stack is made of sufficient height not only to carry off the products of combustion from the combustion-chamber, but to act to draw in a sufficiency of air or cause sufficient draft through the flues H H' H''.

The hopper G, before referred to, is provided with a cover G' or valved opening to admit the coal, but is to be closed tightly to prevent the escape of any of the gases therethrough.

The operation is as follows: The producer being partially filled with coke, which, being ignited, coal or other fuel is supplied through the hopper G, air being admitted through the pipe C, and the air being injected into the fuel by means of a few brisk jets of steam from the steam-pipe C', the said steam and air pipes being located under the grate, causing the fuel to become gasified, as described in the patent before referred to, and the heated gases passing up are crowded by the nozzle closely against the boiler, so that the full heat is given to the boiler before the gases pass into the combustion-chamber I, and also giving the gas, as it were, a reverberatory action. As the gas passes out of the nozzle, it meets an additional supply of air coming through the flues H H' H'' and mingling in the large combustion-chamber G, causing a perfect combustion of the gases before they pass into the stack, thus consuming the smoke which would otherwise escape through said stack.

Having now described my invention, what

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

1. In a steam-boiler furnace, the boiler extending over the producer, the enlarged combustion-chamber located under the rear of the boiler, and the fire-bridge extending and inclining up from the gas-producer and in close proximity with the boiler, forming a gradually-inclining throat or nozzle and opening directly into the enlarged combustion-chamber at a point under the boiler, substantially as and for the purpose set forth.

2. In a steam-boiler furnace, the boiler extending over the producer, the combustion-

chamber located under the rear of the boiler, 15
flues leading from the outer air directly into the combustion-chamber, and the fire-bridge extending and inclining up from the gas-producer to a point at which the gas is forced into the combustion-chamber directly over 20
the air-admission, substantially as and for the purpose set forth.

In testimony whereof I affix my signature in the presence of two subscribing witnesses.

MARTIN V. SMITH.

Witnesses:

W. C. HENDERSON,
ARTHUR VON SENDEN.