(No Model.) 2 Sheets—Sheet 1.

E. FALES.

APPARATUS FOR GENERATING STEAM.

No. 445,884. Patented Feb. 3, 1891.

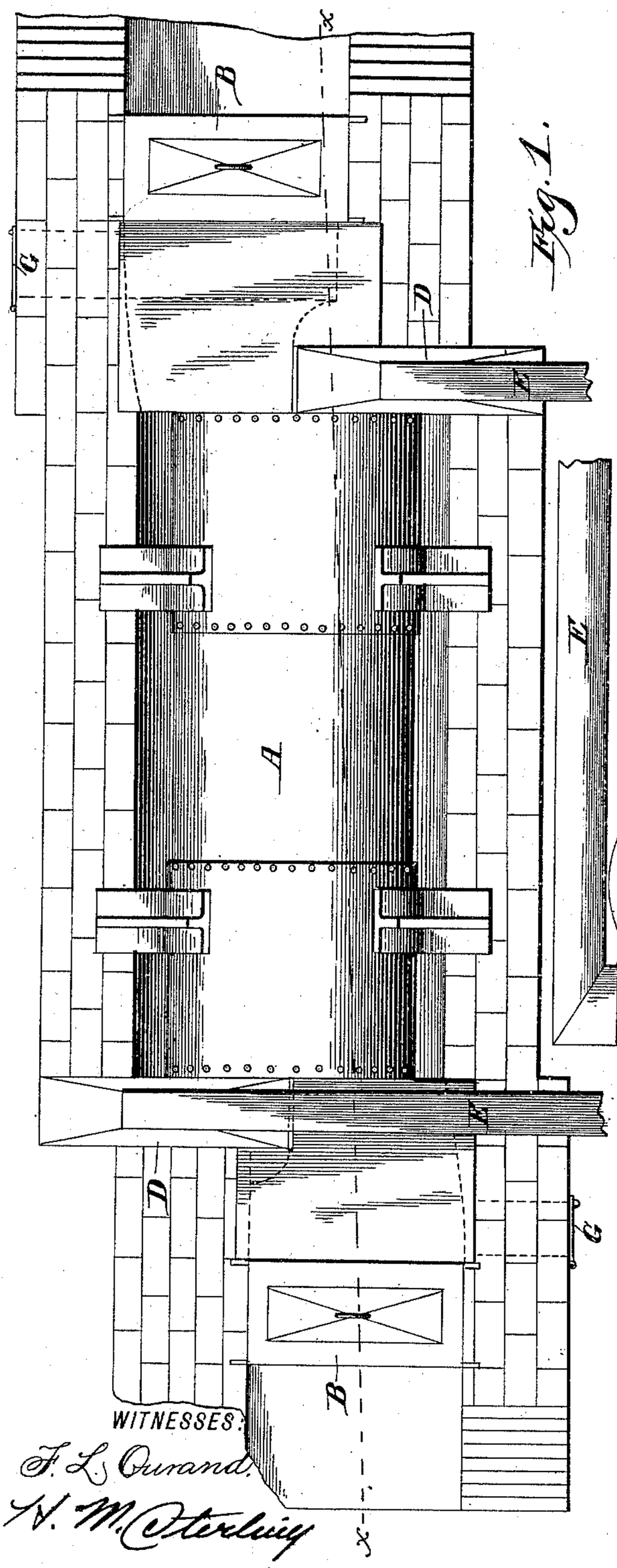

Fig. 1.

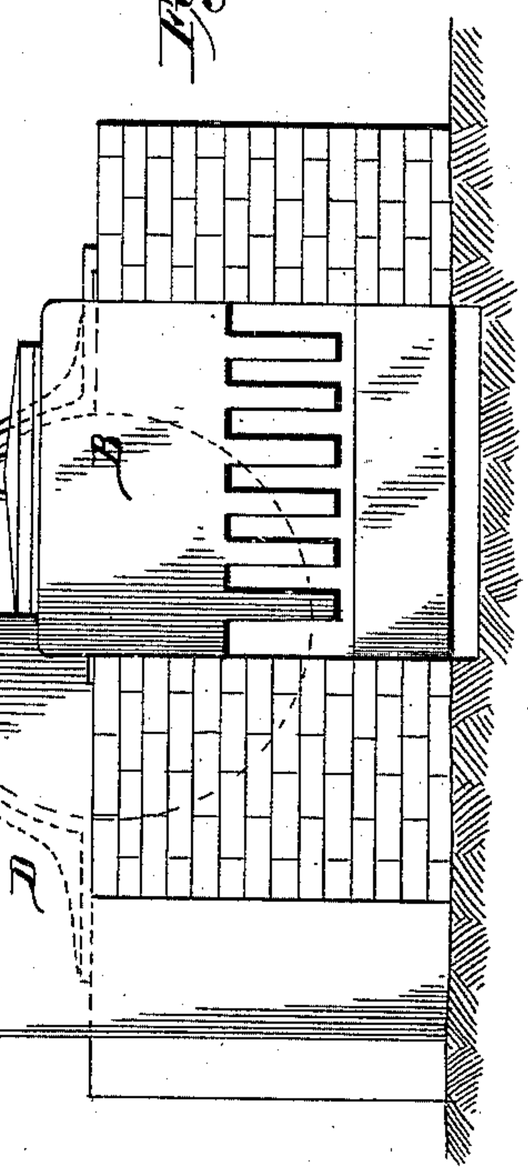

Fig. 2.

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(No Model.) 2 Sheets—Sheet 2.

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APPARATUS FOR GENERATING STEAM.

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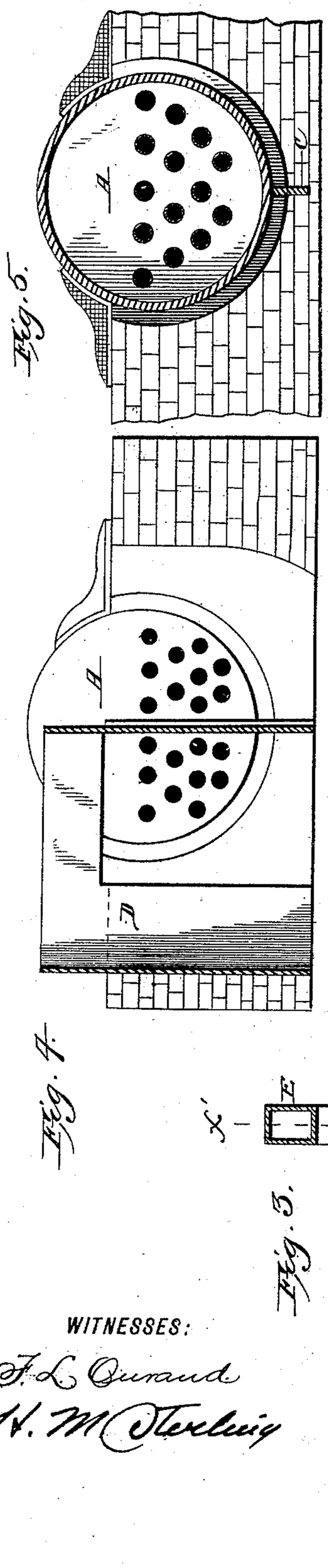

Fig. 5.

Fig. 4.

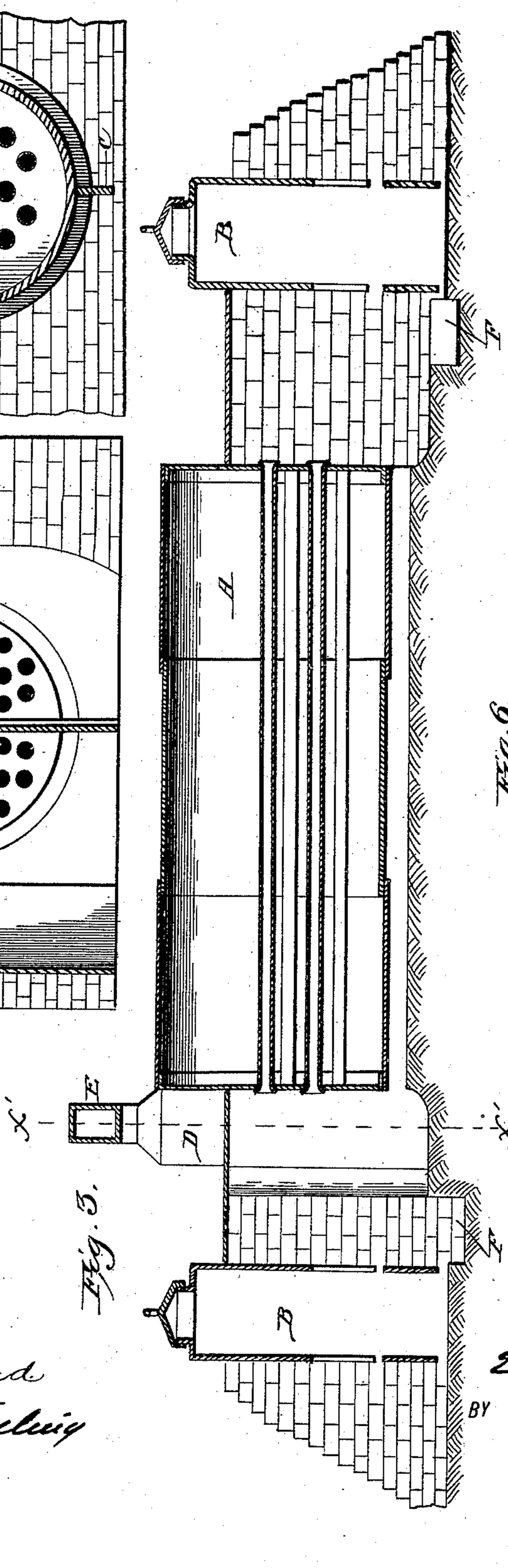

Fig. 3.

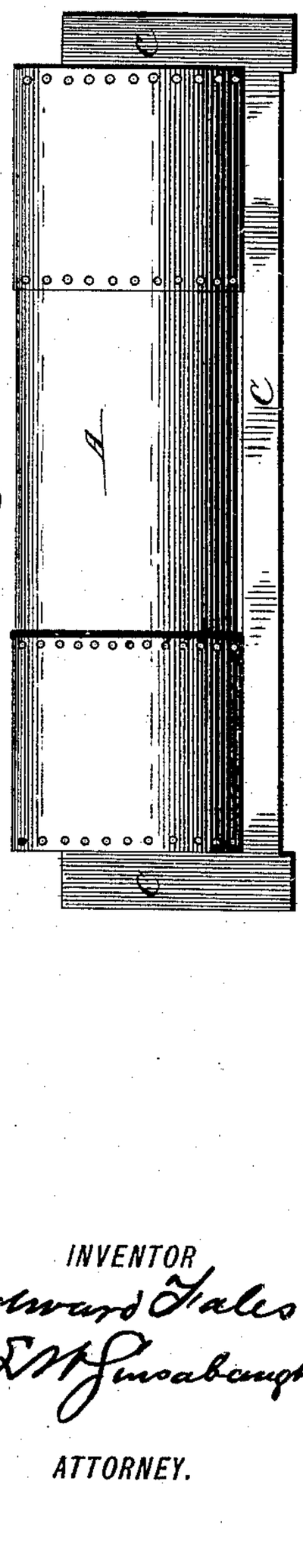

Fig. 6.

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UNITED STATES PATENT OFFICE.

EDWARD FALES, OF PHILADELPHIA, PENNSYLVANIA.

APPARATUS FOR GENERATING STEAM.

SPECIFICATION forming part of Letters Patent No. 445,884, dated February 3, 1891.

Application filed May 27, 1890. Serial No. 353,343. (No model.)

To all whom it may concern:

Be it known that I, EDWARD FALES, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented new and useful Improvements in Methods of and Apparatus for Generating Steam; 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 a new and useful method of and apparatus for generating steam in steam-boilers and other purposes.

The object of my invention is to create and maintain a uniform heat in both ends of a steam-boiler, so that the contractions and expansions incident to heat for generating the steam will be more evenly distributed and the boiler rendered less liable to destruction.

My invention consists therefore, broadly, in dividing the flue portion of the boiler into two portions by a longitudinal division plate or wall and in placing two furnaces, one at each end of the boiler, to register with the flues and spaces below the boiler, so that the heat from the furnaces will be more evenly distributed throughout the boiler and a greater amount of steam generated with a given amount of fuel than has been ordinarily produced.

The furnaces which I prefer to use are such as are shown, described, and claimed in patents granted to me November 19, 1889, and numbered 415,626 and 415,627; but of course I do not limit myself to the use of such furnaces, as other suitable furnaces may be used without departing from the spirit of my invention.

Referring to the accompanying drawings, Figure 1 is a top or plan view of a steam-boiler with the furnaces arranged at each end thereof. Fig. 2 is an end view. Fig. 3 is a vertical longitudinal sectional view taken on the line $x\,x$ of Fig. 1. Fig. 4 is a vertical sectional view taken on the line $x'\,x'$ of Fig. 3. Fig. 5 is also a vertical sectional view of the boiler. Fig. 6 is a side view of the boiler, showing the plates or walls which separate the fire-flues into two divisions.

A indicates the boiler, mounted on a bed of masonry or other suitable support, said boiler being by preference of the type known as a "flue-boiler."

B are furnaces located at each end of the boiler and at opposite sides. These furnaces are by preference the same as are embraced in the patents above referred to, and in which the fuel is fed down to the point of combustion by gravity, and the air to support combustion is fed through the incandescent fuel at right angles to the magazine or fire-pot, said products of combustion being carried directly into the tubes of the boiler and underneath one-half of the boiler.

C is a vertical division wall or plate placed at each end of the boiler, and extends underneath the same from end to end, as shown in Fig. 6. The division wall or plate directs the products of combustion from one of the furnaces through one half of the flues of the boiler and underneath one half of the same, while the products of combustion from the other furnace is directed through the other half of the flues of the boiler and underneath the same, but in a reverse direction, so that a uniformity of heat is maintained, greater results obtained on a given amount of fuel than has been commonly obtained, and a drier steam made than can be produced in boilers where only a single fire is used at one end of the boiler.

D are chambers which receive the waste products of combustion after having passed through the flues of the boiler and from which they are conducted by means of the pipes E to a common stack or chimney.

Immediately in the rear of the furnaces are located trenches or chambers F. The office or function of these trenches or chambers is to enlarge the chamber between the ends of the boiler in front of the furnaces, so that a reverberatory action takes place in the bottom of the chamber, which reverberatory action is produced by a part of the products of combustion which fail to enter the flues or the spaces beneath the boiler when first projected from the furnace, but afterward rise and are mingled with the flame from the furnace, and in this way producing a partial hot-air vacuum to increase the draft of the furnace. These

trenches or chambers F open out into the external air, but are closed by suitable doors G, which prevent the external air from entering the chamber.

The operation of my device is as follows: The fires are lighted in both furnaces, and the products of combustion are carried through the flues of the boiler and underneath the same on one side of the plate or division-wall C, and, as before stated, the products of combustion pass through the tubes and underneath the boiler in opposite directions, and both ends of the boiler are kept at a uniform temperature and the steam produced is of a dry character, while the injurious effects of the heat on the boiler caused by the expansion and contraction of the metal are in a large measure obviated.

What I claim is—

1. The method herein described of generating steam in steam-boilers and for other purposes, which consists in dividing the boiler-flues into two vertical divisions and placing furnaces at each end of the boiler, so as to direct the products of combustion from the furnaces into and through the flues formed by the division plate or wall in opposite directions, as set forth.

2. In a steam-boiler of the character described, the vertical division plate or wall which divides the boiler into two longitudinal compartments, and furnaces located at each end of the boiler, which project the products of combustion into the tubes on each side of the division-plate and also underneath the boiler, as set forth.

3. In a steam-boiler of the character described, the furnaces located at each end thereof and arranged to project the products of combustion in opposite directions through the flues of the boiler and underneath the same, and a trench or chamber located in the rear of and at the bottom of the furnace to impart to a portion of the products of combustion a reverberatory action or partial hot-air vacuum to increase the draft of the furnaces, as set forth.

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

EDWARD FALES.

Witnesses:
L. W. SINSABAUGH,
H. M. STERLING.