

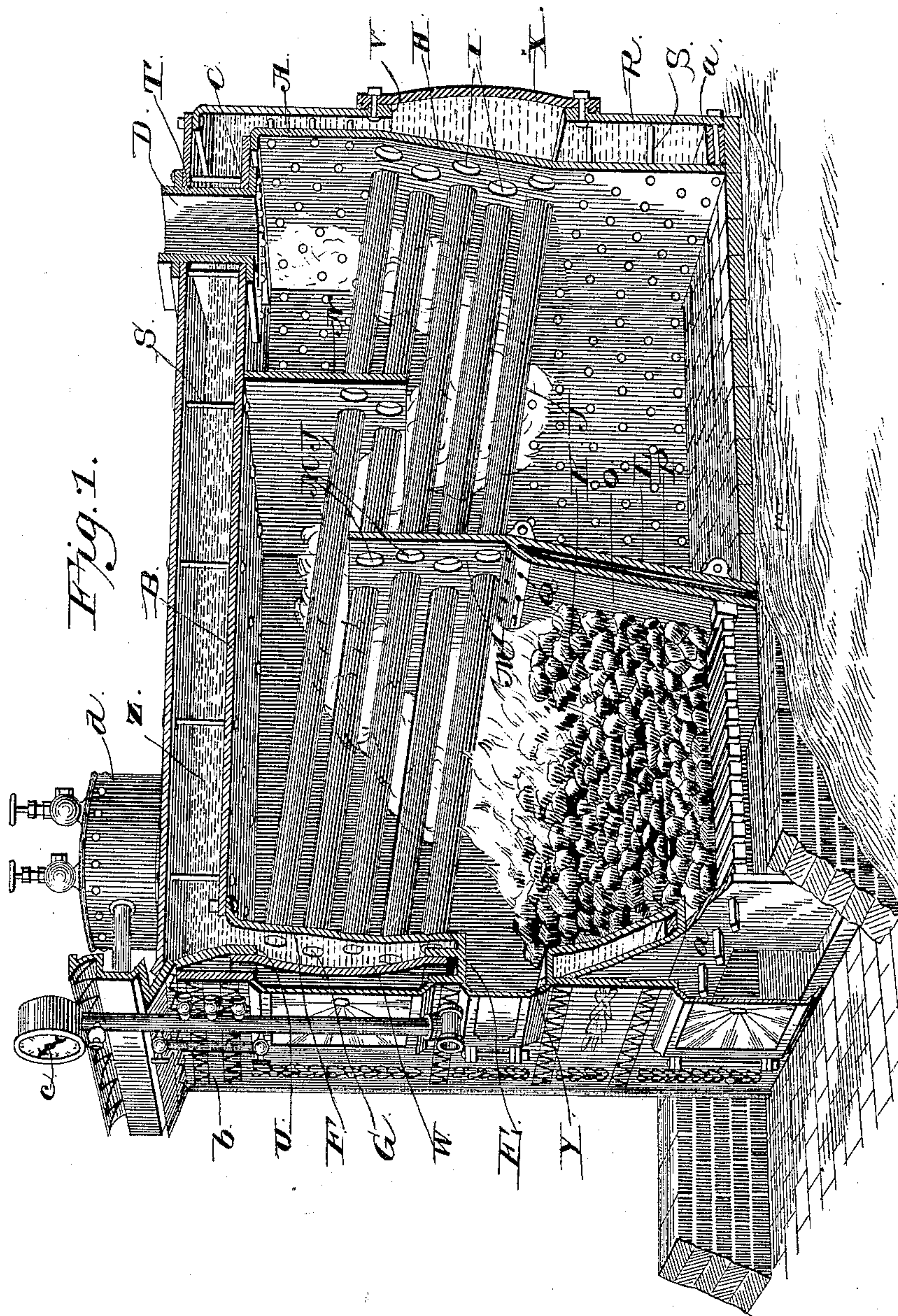
(No Model.)

2 Sheets—Sheet 1.

H. H. LINDEMUTH.
WATER TUBE STEAM BOILER.

No. 433,415.

Patented July 29, 1890.



Witnesses
M. Fowler
R. W. Bishop.

Inventor
Harry H. Lindemuth

By *His* Attorneys
A. Snow & Co.

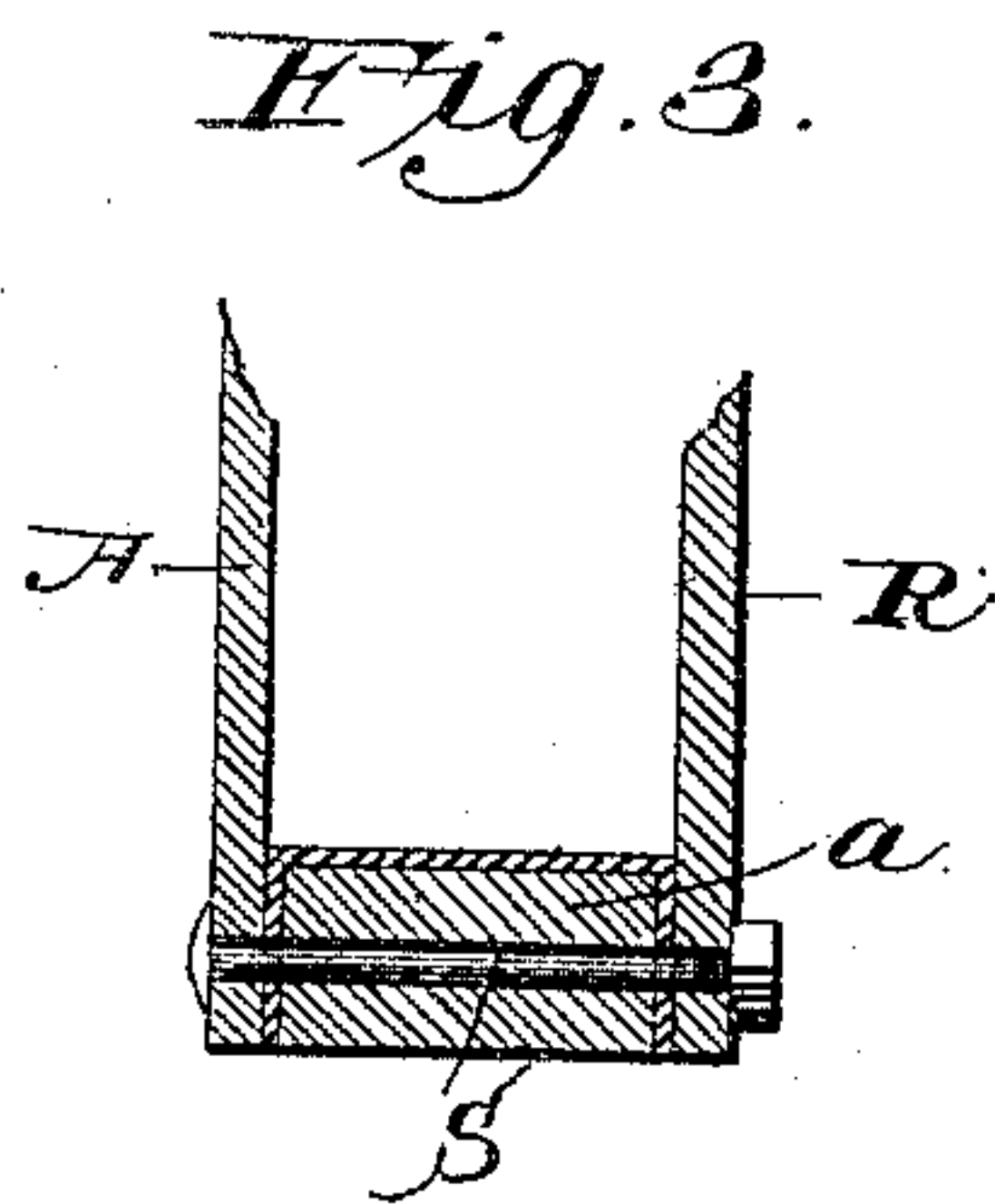
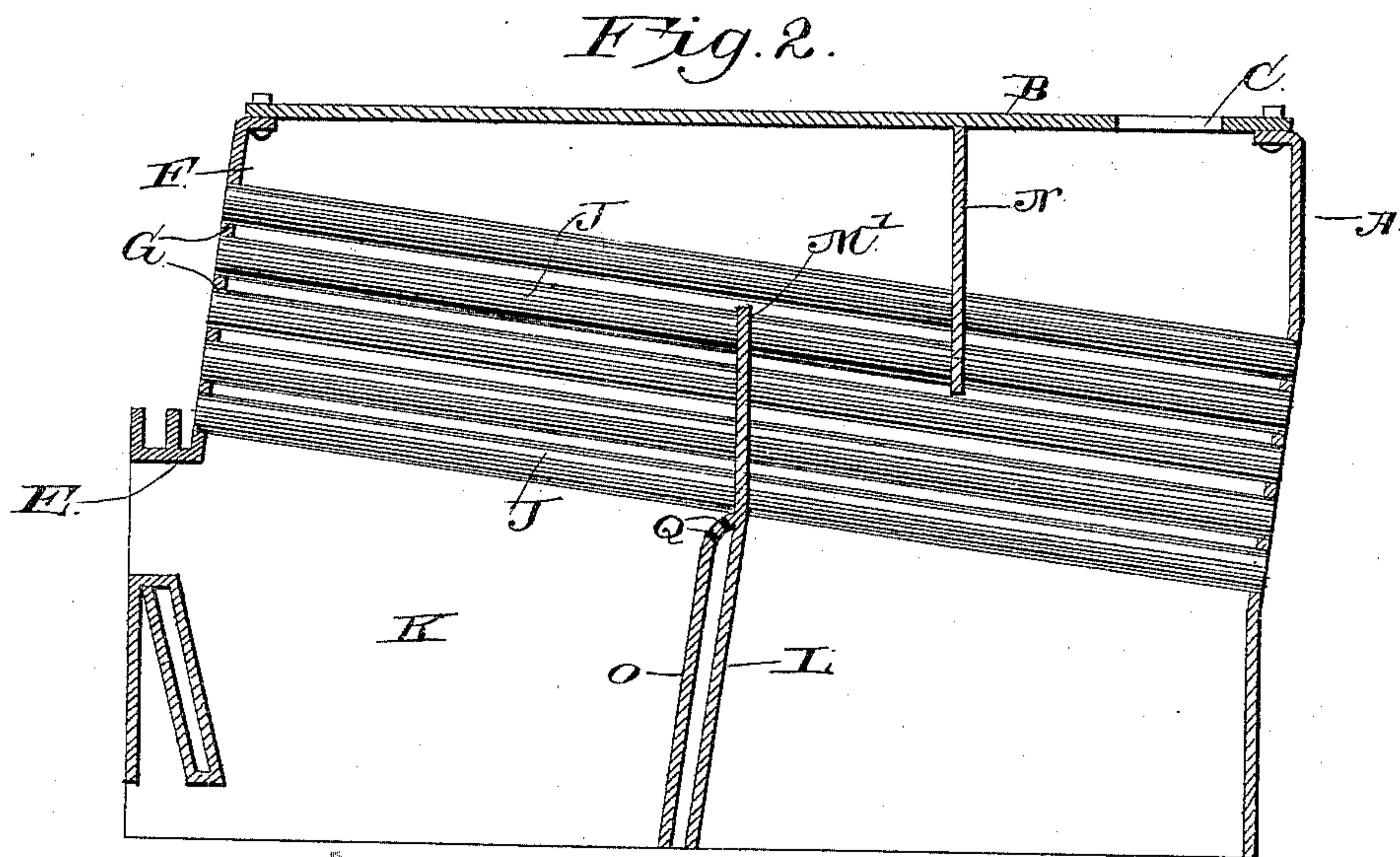
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UNITED STATES PATENT OFFICE.

HARRY H. LINDEMUTH, OF MOUNT JOY, PENNSYLVANIA, ASSIGNOR OF
ONE-HALF TO PETER L. KREISS, OF SAME PLACE.

WATER-TUBE STEAM-BOILER.

SPECIFICATION forming part of Letters Patent No. 433,415, dated July 29, 1890

Application filed January 8, 1889. Serial No. 295,730. (No model.)

To all whom it may concern:

Be it known that I, HARRY H. LINDEMUTH, a citizen of the United States, residing at Mount Joy, in the county of Lancaster and State of Pennsylvania, have invented a new and useful Improvement in Water-Tube Steam-Boilers, of which the following is a specification.

This invention relates to improvements in water-tube steam-boilers; and it consists in certain novel features hereinafter described and claimed.

In the accompanying drawings, Figure 1 is a perspective sectional view of my improved boiler. Fig. 2 is a sectional view of the inner casing, and Fig. 3 is a detail sectional view.

Referring to the drawings by letter, A designates the inner casing, which is constructed of metallic plates B, bolted together, as shown. The top of the casing is provided near its rear end with an escape-opening C for the products of combustion, and a thimble D is secured to the top of the casing and extends through said opening and a similar opening in the outer casing, hereinafter referred to. The front end of the casing is provided with a suitable opening E for the purpose of permitting the feed of fuel, and the said front end of the casing above said feed-opening is inclined slightly upward and rearward, as clearly shown. This inclined portion F is further provided with a number of openings G, in which the front ends of the boiler-tubes are secured. The rear end of the casing is provided about its central portion with a similar inclined part H, provided with a number of openings I, in which the rear ends of the boiler-tubes are secured. The boiler-tubes J are thus secured in the casing, so as to have a downward and rearward inclination, as shown.

The fire-chamber K is provided in the front end of the inner casing, and the fire-wall L, forming the rear end of the fire-chamber, is extended upward a suitable distance and provided with openings M, through which the boiler-tubes pass, the said extended portion M' forming a deflecting-support.

N designates a similar deflecting-support secured to the top of the casing and depending therefrom. This deflecting-support N is

arranged in rear of the support M', and its lower edge is slightly below the plane of the upper edge of the said front support. The products of combustion and heated air rising from the fire-chamber are thus given a tortuous circulation toward the rear end of the casing.

O designates a shield, which is arranged at a slight distance in advance of the fire-wall, and has its upper edge curved rearwardly to the said fire-wall and secured thereto. An air-flue P is thus provided between said shield and the fire-wall, and the curved portion of said shield is provided with a number of perforations Q, through which the air passes to the space over the fuel in the fire-chamber.

R represents the outer casing, which is also constructed of metallic plates bolted or otherwise suitably secured together, and the said outer casing is secured firmly in its proper relative position to the inner casing by means of the long bolts S, which pass through the said inner and outer casings and are provided with suitable securing-nuts. The top of this outer casing is provided near its rear end with an escape-opening T, through which the thimble D, above referred to, passes, the said thimble being riveted to the top of the casing and being adapted to be secured to a suitable smoke-pipe or other escape. In practice it will be understood of course the casings are built into or around the thimble, as the flanges on the thimble prevent its being inserted through the openings in the casings. The front and rear ends of the outer casings are provided with openings U V opposite to the front and rear ends of the boiler-tubes, respectively, which are closed by suitable covering-plates W X. These covering-plates are secured to the casing in any suitable manner so as to be readily removable for the purpose of repairing or cleaning the tubes, and yet form a water-tight joint with the casing.

The front end of the outer casing is provided with a fuel-feed opening Y, which registers with the feed-opening in the inner casing, and the space between the two casings forms a water-chamber Z. The lower end of this water-chamber is closed by a frame a, which extends entirely around the said lower end

of the chamber and is calked to prevent leakage. The boiler is provided with a suitable metallic front *b*, which may be of any desired construction, and carries the ordinary steam-gage *c*. The steam-dome *d* is arranged on top of the outer casing, and is of the usual or any preferred construction.

In practice the water-space is filled with water, which passes through and fills the boiler-tubes, as will be readily understood. The fire is kindled in the fire-chamber and the fresh cold air passes through the ash-pit beneath the same and up through the flue *P* in front of the fire-wall, entering the fire-chamber and creating a draft. The products of combustion and the heated air rising from the fire pass over the top of the front deflecting-support *M'*, and then pass toward the rear deflecting-support *N*, which directs the same downward into the air-chamber in rear of the fire-walls. The current of heated air then takes an upward turn toward the escape-pipe. It will thus be seen that the products of combustion and heated air are caused to circulate around the boiler-tubes and entirely heat the same. The downward inclination of the boiler-tubes facilitates the passage of the water therethrough, so that a constant circulation of the water will be secured and a thorough conversion of the same into steam will be effected.

Should one of the boiler-tubes be broken or otherwise injured, the covering-plate at either or both ends of the boiler is removed to facilitate the repairing of the said tube or to permit the old tube to be removed and a new one substituted.

The deflecting-supports, besides controlling the circulation of the heated air, serve, also, as supports for the boiler-tube, thereby relieving the ends of the inner casing of a great

portion of the weight of the said tubes, and consequently preventing buckling of the said ends of the casing.

It is evident from the foregoing description, taken in connection with the accompanying drawings, that I have provided a very simple and efficient steam-boiler, and its advantages are thought to be obvious.

Having thus described my invention, I claim—

1. The combination of the inner and outer casings, the fire-wall arranged within the inner casing, a shield arranged in advance of the fire-wall and having its upper portion perforated and curved backward to the fire-wall and the boiler-tubes secured in said inner casing, as and for the purposes set forth.

2. A steam-boiler comprising an inner casing, an outer casing surrounding the same and forming a water-chamber therewith, the said inner and outer casings having aligned escape-openings, a flanged thimble secured in said openings by bolts passed through its flanges and the casing, a frame secured between said casings and forming the bottom of the water-chamber, and the boiler-tubes secured in the inner casing and communicating with the water-chamber, as set forth.

3. In a steam-boiler, the fire-wall *L*, a shield *O*, arranged at a slight distance in advance of the fire-wall so as to form an air-flue *P*, the bottom of which is open, the top of the shield closing the top of the flue, and the perforations *Q* in the top of the shield, as set forth.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in presence of two witnesses.

HARRY H. LINDEMUTH.

Witnesses:

C. S. GREIDER,

MINNIE A. HIESTAND.