

(No Model.)

A. STIRLING.
STEAM BOILER.

No. 407,260.

Patented July 16, 1889.

Fig. 2.

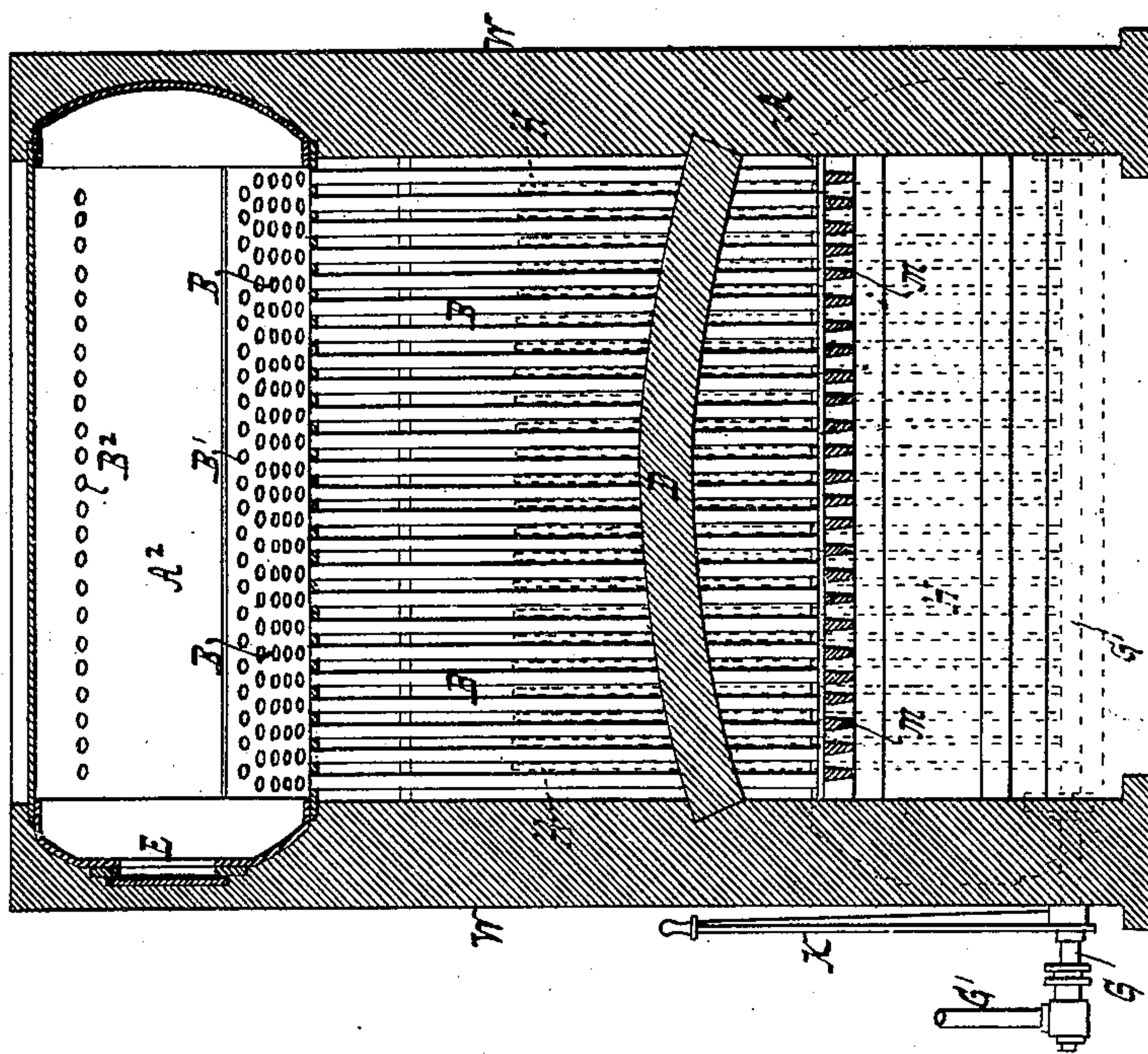
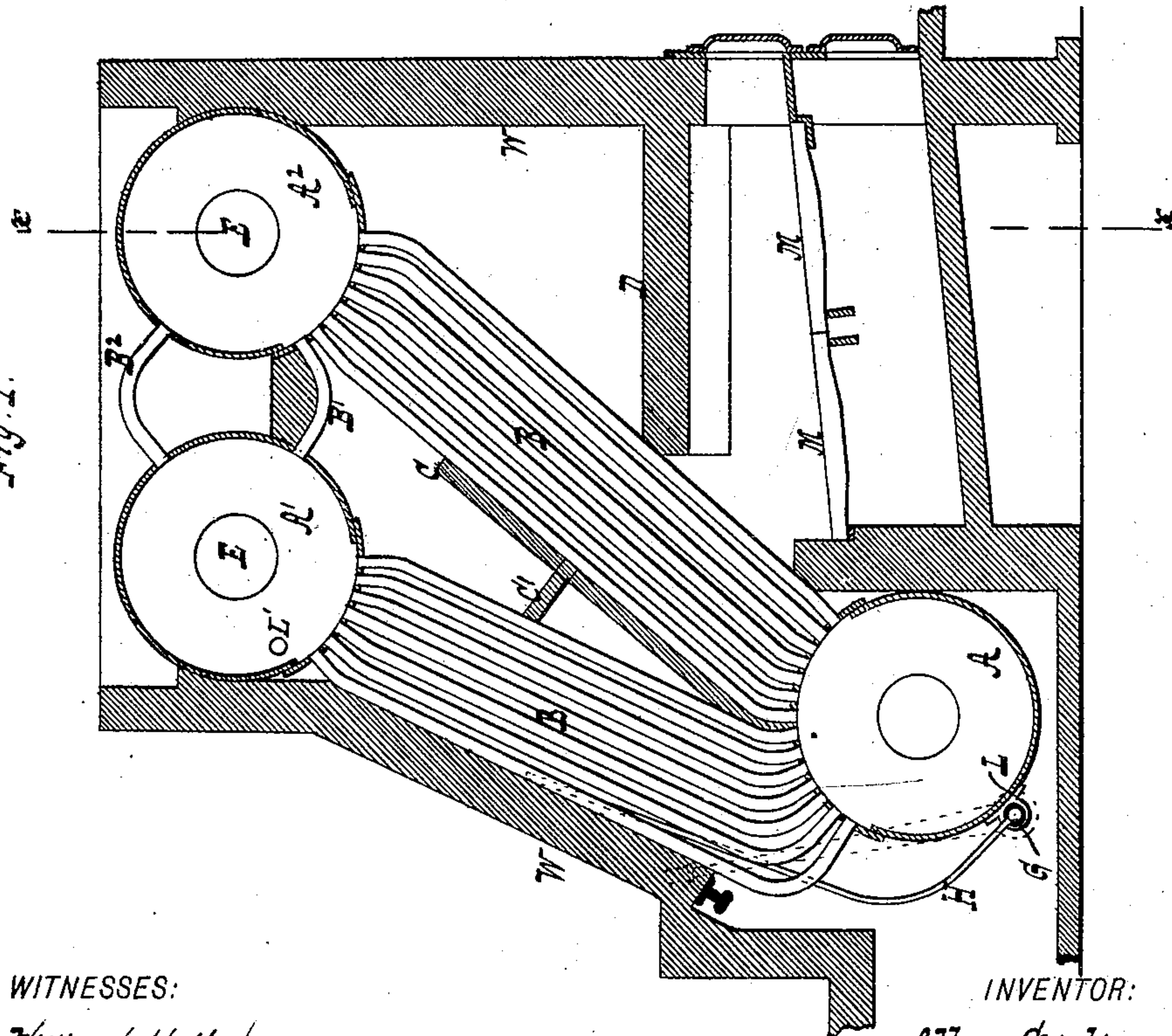


Fig. 1.



WITNESSES:

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UNITED STATES PATENT OFFICE.

ALLAN STIRLING, OF NEW YORK, N. Y., ASSIGNOR TO THE INTERNATIONAL
BOILER COMPANY, (LIMITED,) OF SAME PLACE.

STEAM-BOILER.

SPECIFICATION forming part of Letters Patent No. 407,260, dated July 16, 1889.

Original application filed February 28, 1889, Serial No. 301,437. Divided and this application filed June 11, 1889. Serial No. 313,873. (No model.)

To all whom it may concern:

Be it known that I, ALLAN STIRLING, a citizen of the United States, residing at New York, in the county and State of New York, have invented new and useful Improvements in Steam-Boilers, of which the following is a specification.

My invention relates to certain improvements in water-tube boilers, as pointed out in the following specification and claims, and illustrated in the accompanying drawings, in which—

Figure 1 represents a transverse vertical section in the plane $y y$, Fig. 2. Fig. 2 is a longitudinal vertical section in the plane $x x$, Fig. 1.

Similar letters indicate corresponding parts.

Heretofore in the so-called "water-tube" boilers, in which the water is in the tubes and the flame outside, the tubes have usually been inserted in headers made of cast metal so arranged that a number of tubes have only one outlet to the steam and water space above and of the mud-drum beneath. In these boilers there is no circulation through the mud-drum, and the enormous velocity of the currents in the outlets to the steam and water space is detrimental to the boiler and precludes a proper circulation. Water-tube boilers as heretofore constructed have also been found objectionable because of the large space which they occupy and the large number of hand-holes with covers and bolts necessary to get at the inside of the tubes for cleaning, and it has also been found impossible to get at the outside of the tubes to clean them from soot. These disadvantages have been obviated by my invention.

In the accompanying drawings, the letter A designates the mud-drum, and A' A^2 are the steam and water drums.

B B are the water-tubes connecting the mud-drum A with the upper drums A' A^2 . B' are water-tubes and B^2 steam-tubes connecting the two upper drums. Each of the drums is provided with a man-hole E, through which access can be had to its interior.

On the outside of the mud-drum are secured the journals L, in which the pipe G can be

freely turned by means of a lever K. The pipe G connects by a pipe G' with the steam-space of one of the upper drums, and it is provided with a series of branch tubes or nozzles H, which are so distributed that they can swing through the spaces between the water-tubes B, extending from the mud-drum A to the upper drum A' .

W W is the brick setting. D is the fire-brick arch of the furnace. C is the fire-brick partition, and M are the grate-bars.

From this description it will be seen that in my boiler each of the water-tubes B has an independent outlet to the steam and water drum above, and also an independent outlet to the mud-drum below, the boiler being constructed of wrought metal and so arranged that the water is forced to pass through the mud-drum and deposits its sediment therein. Only three man-holes are necessary for complete access to every part, and the outside of those water-tubes on which the soot is formed can be readily cleaned by means of the steam-nozzles H. The two sets of tubes are connected into the upper drums, so as to allow for the expansion and contraction. For this purpose each of the water-tubes B is curved at one or both ends. The brick arch D of the furnace aids materially in the proper combustion of the gases, and the peculiar arrangement of this arch and the fire-brick partition directs the gaseous products of combustion so that they pass over every part of the heating-surface, and so break up the currents as to extract the available heat therefrom.

As seen from Fig. 1, the flame on striking the arch D is thrown between the water-tubes B, leading into the drum A, and the partition C compels the flame to ascend between said water-tubes, and after it has passed the top edge of this partition it descends between the water-tubes B, which lead from the drum A' into the drum A. A shelf C' , which projects from the partition C, compels the flame to pass between the pipes B. The feed-water is introduced into the drum A' at L' .

I do not claim in this application for a patent the following: In combination with the water-tubes of a boiler, a movable steam-pipe

in proximity to said tubes, and a perforated branch pipe connected to said movable pipe, such claim being embodied in an application for a patent filed by me February 28, 1889, Serial No. 301,437, of which said application this is a division.

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

1. A water-tube boiler consisting of the single mud-drum A, the two elevated steam and water drums A' A², the water-tubes B', connecting the water-spaces of the steam and water drums, the steam-tubes B², connecting the steam-spaces of said steam and water drums, and two sets of water-tubes B B, directly connected, respectively, at their upper ends with the steam and water drums and both sets connected at their lower ends with the single mud-drum, substantially as described.

2. A water-tube boiler consisting of a furnace structure, a single mud-drum A, the two

elevated steam and water drums A' A², having their steam and water spaces respectively placed in communication, two sets of water-tubes B B, directly connected, respectively, at their upper ends with the steam and water drums and both sets connected at their lower ends with the single mud-drum, the fire-brick arch D, extending over the fire-place from the wall of the furnace structure to the front set of water-tubes, and the fire-brick partition C, inclined between the two sets of water-tubes and located between the single mud-drum and the two steam and water drums, substantially as described.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

ALLAN STIRLING.

Witnesses:

W. HAUFF,
E. F. KASTENHUBER.