

No. 756,179.

PATENTED MAR. 29, 1904.

J. MIYABARA.
WATER TUBE BOILER.

APPLICATION FILED SEPT. 26, 1903.

NO MODEL.

2 SHEETS—SHEET 1.

Fig. 2

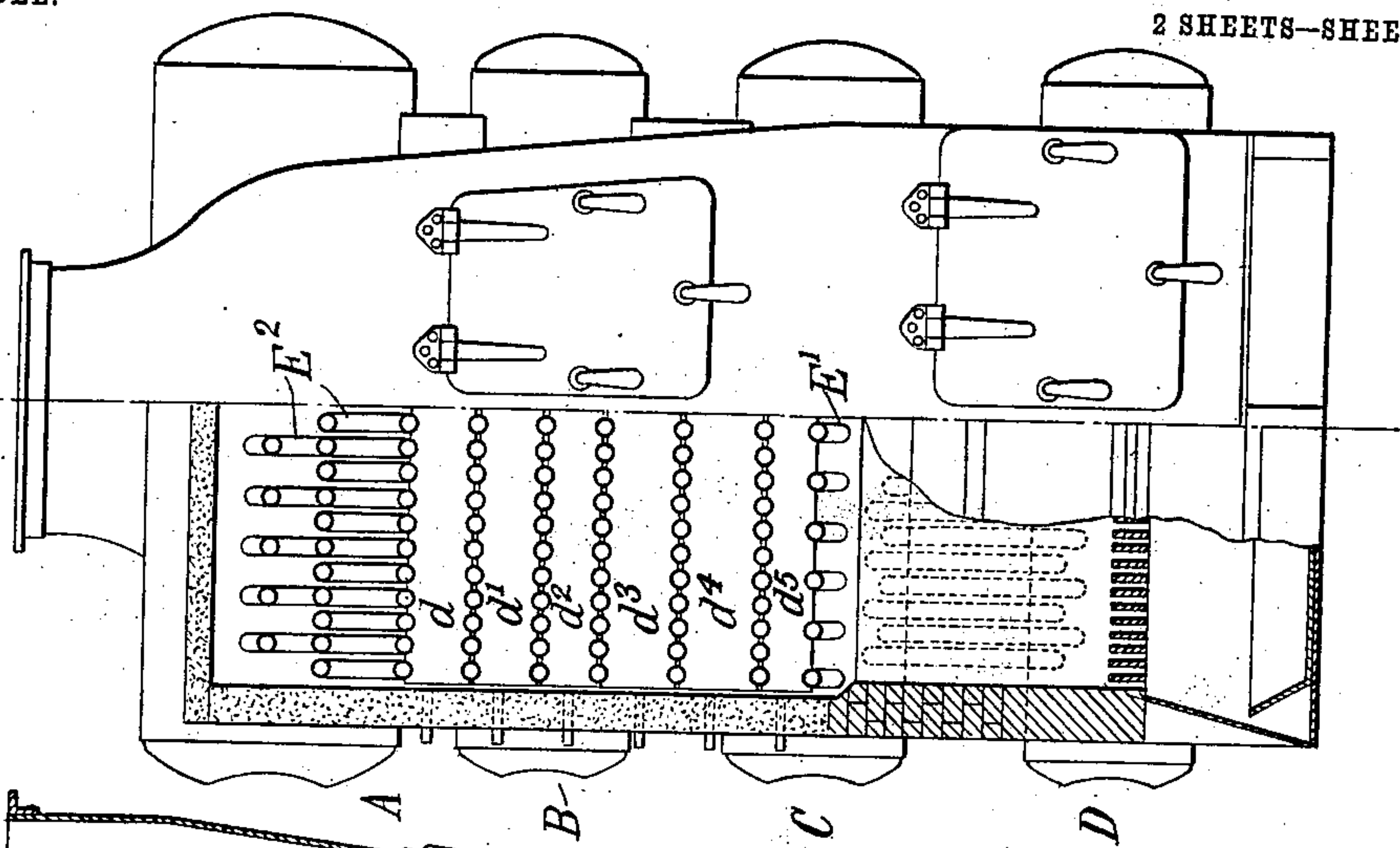
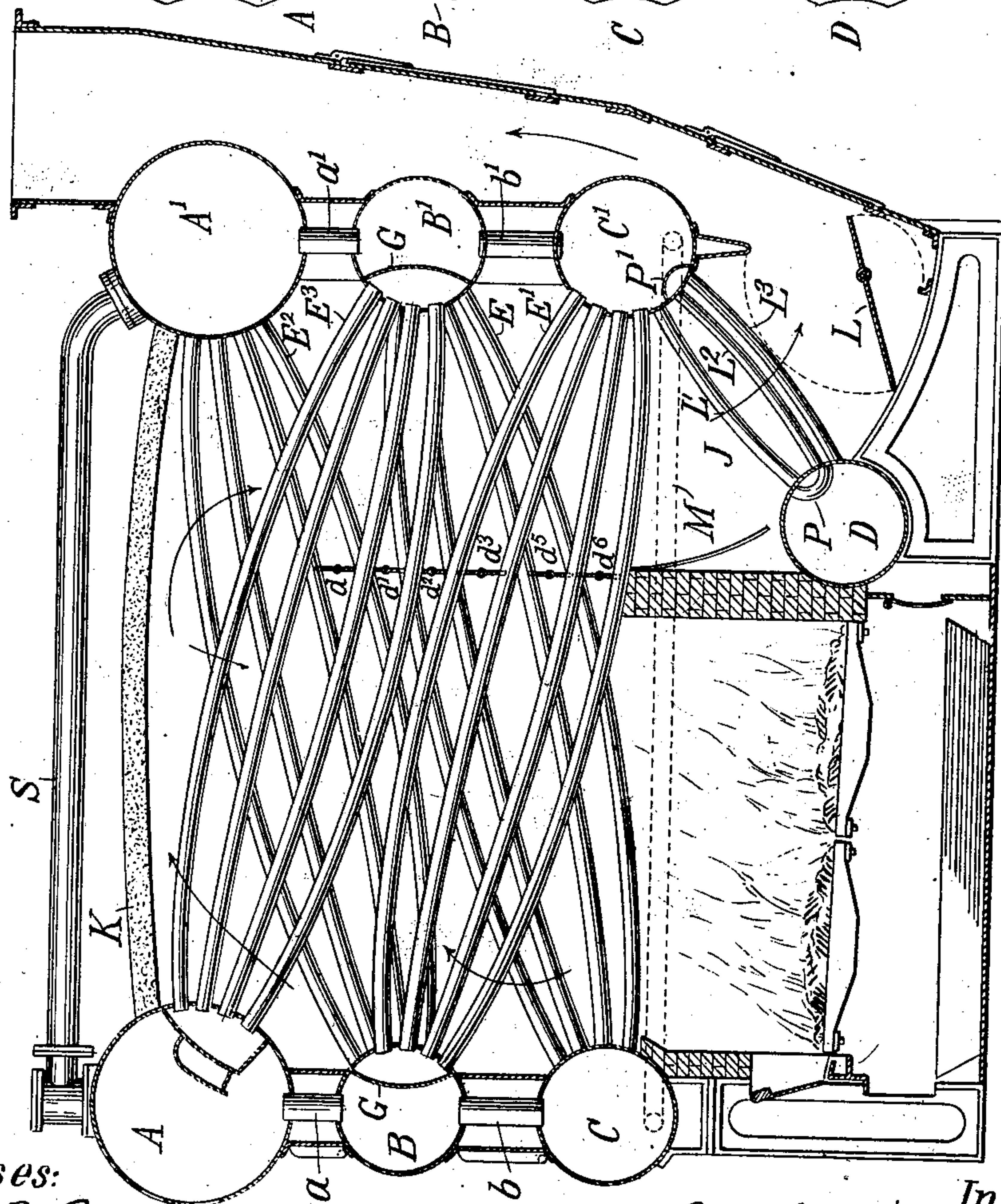


Fig. 1



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2 SHEETS—SHEET 2.

Fig. 3

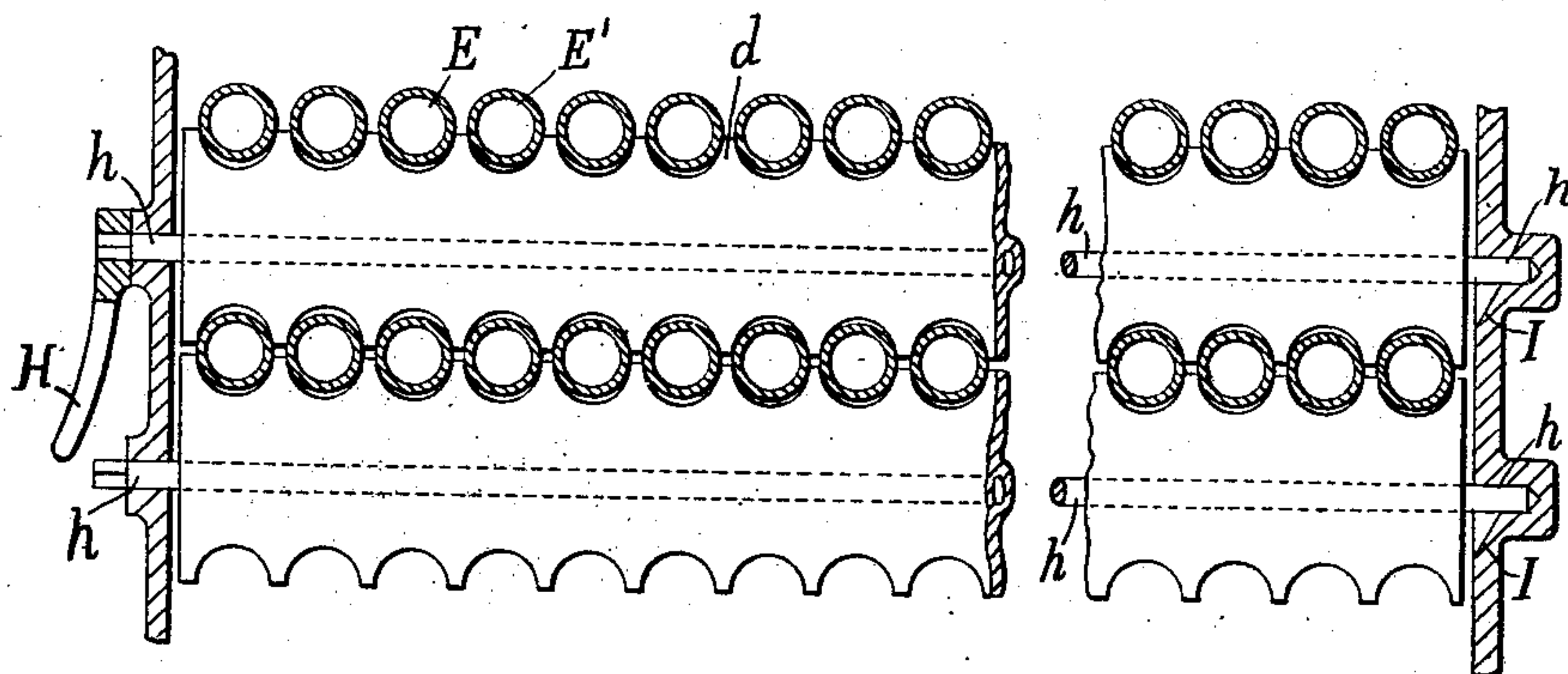
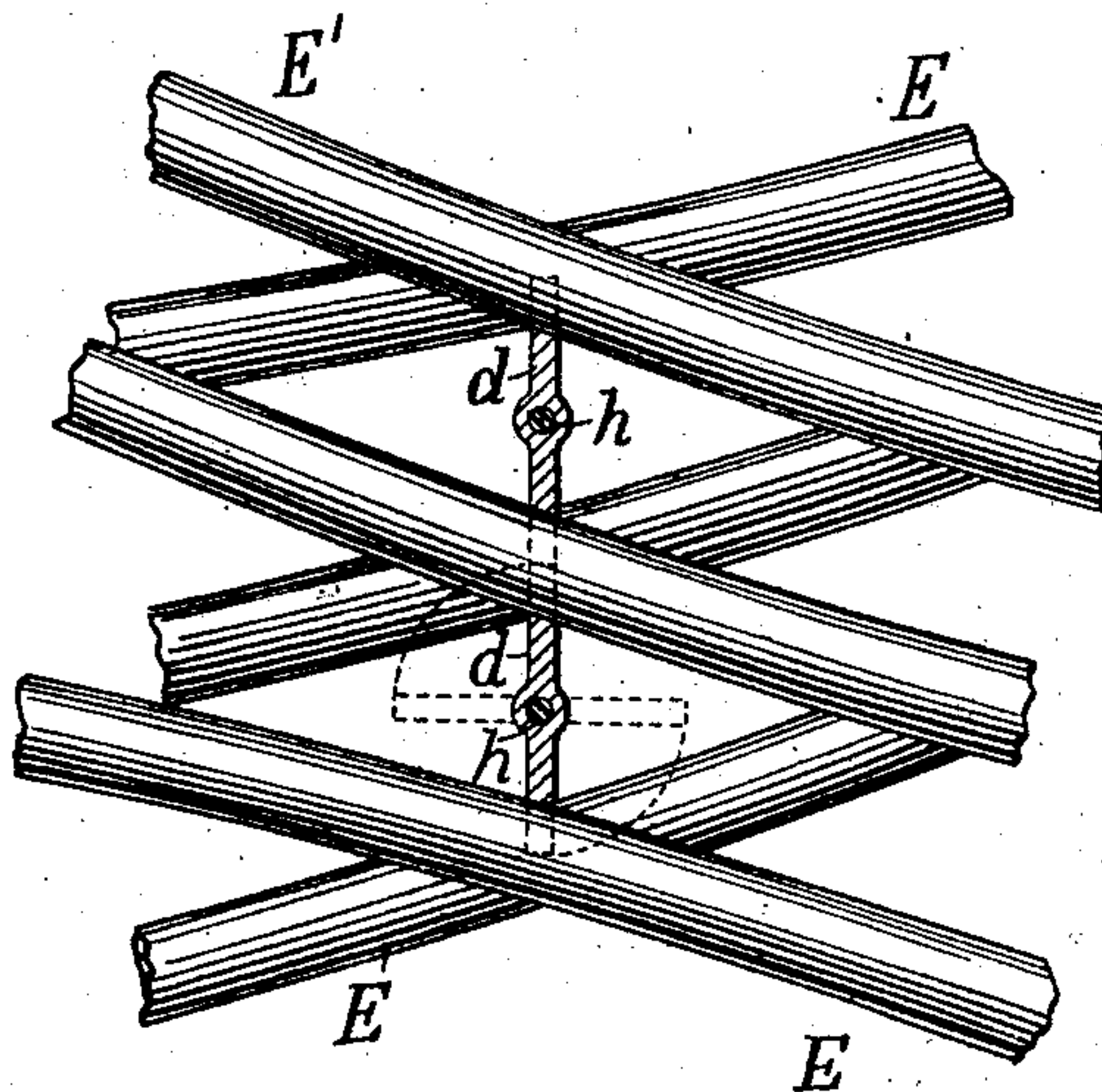


Fig. 4



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UNITED STATES PATENT OFFICE.

JIRO MIYABARA, OF TOKIO, JAPAN.

WATER-TUBE BOILER.

SPECIFICATION forming part of Letters Patent No. 756,179, dated March 29, 1904.

Original application filed August 3, 1901, Serial No. 70,723. Divided and this application filed September 26, 1903. Serial No. 174,738. (No model.)

To all whom it may concern:

Be it known that I, JIRO MIYABARA, a subject of the Emperor of Japan, and a resident of Tokio, Japan, have invented a new and Improved Water-Tube Boiler, of which the following is a full, clear, and exact description.

My invention relates to improvements in water-tube boilers, and particularly to those of the type shown in my United States Patent No. 633,699, of September 26, 1899. In my said patent series of superposed horizontal drums presented surfaces which constituted the walls of the water-tube compartment of the furnace, between which walls the heated gases ascended from the furnace underneath to the flue on top. In my present improvement the furnace-walls of the water-tube compartment still present the two series of superposed horizontal drums, but the fuel-compartment underlies only a portion of the water-tube compartment and the exit to the flue is transposed to a position beneath said water-tube compartment, while a partition is so arranged as to cause the heated gases to pass upward from the fuel-compartment adjacent to the furnace-wall presenting one series of drums and downward adjacent to the wall presenting the other series of drums.

In the drawings accompanying and forming a part of this specification I have shown my invention embodied in the form which is at present preferred by me.

Referring to the drawings, in which similar letters of reference indicate corresponding parts in all the figures, Figure 1 is a sectional elevation of a boiler, taken from front to rear or in the direction of the tubes. Fig. 2 is a rear elevation of a boiler, one-half being a section taken back of the baffle-plates shown in Fig. 1. Figs. 3 and 4 are details showing the baffle-plates and their position relatively to the tubes.

The general form of my boiler consists of a plurality of chambers, preferably cylindrical shells, as A, B, and C, connected by short water-circulating tubes *a b* at one end of the boiler, and similar chambers, as the shells A' B' C', connected by the water-circulating tubes *a' b'* at the other end of the boiler, and

series of inclined water-circulating tubes E, E', E², and E³, connecting each of the chambers with the chamber next above it in position at the opposite end of the boiler, the same being in this respect substantially like the boiler shown in my previous patent, No. 633,699, previously referred to. These chambers, with their connecting water-circulating pipes, form two water-walls at opposite ends of the furnace, and the individual chambers act as headers for the reception of the series of inclined tubes which connect opposite walls. The chambers intermediate the end ones of either series, as the chambers B and B', have deflecting-diaphragms G, which separate the upward and downward currents.

As shown in Fig. 1, I have provided a gas deflecting partition consisting of a series of baffle-plates *d d' d²*, &c., which are shown in detail in Figs. 3 and 4. These extend across the boiler among the tubes and are adapted to create a circuitous route for the gases, so that they remain longer in contact with the tubes and their heat is more efficiently extracted. Each plate has its edges notched to fit the tubes adjacent and is mounted on a pivot by which it may be turned, so as to deflect the gases from the most direct course or so as to leave the direct course unobstructed, as is shown by the dotted-line position in Fig. 4. The pivots *h* of these baffle-plates extend through the inclosing wall or plates of the boiler and are provided with handles H, by which they may be turned as desired.

When turned into the horizontal position, as shown by dotted lines in Fig. 4, the baffle-plates may be drawn out or inserted by providing a proper opening at one side of the boiler. The socket I for the reception of the pivot at the farther end of the plate may be coned or enlarged, as shown in Fig. 3, so as to facilitate insertion of said pivot when the plate is inserted. To permit withdrawal, the other end should have an adjustable support in a slot provided in the casing. Where space will permit, each baffle-plate may be made as a single piece, or if space at the side of the boiler is limited they may be made in short sections, which may be connected as inserted.

Each baffle-plate may, if desired, be made of a metal framework (plates or otherwise) having sheets or cloth or composition of asbestos or other refractory material or special fire-brick secured thereto. This refractory material may be placed between metal plates or outside thereof, or both between and outside, as desired. Asbestos when used makes a sort of yielding contact with the tubes.

In Fig. 1 a single set of baffle-plates is shown, which are located above the bridge-wall at the rear of the furnace.

Immediately back of the bridge-wall and on the opposite side of the passage J, through which the gases are conveyed to the uptake, from that occupied by the chamber C' is a feed-drum D, to which the feed-pipe is connected. This feed-drum is connected with the chamber C' by a series of feed heating-pipes L' L² L³, and the feed-drum D and water-chamber C' have diaphragms P and P' within them and connecting the ends of different pipes, so that the feed-water before being freely discharged into the chamber C' makes a circuit back and forth across the chamber J, and is thus heated by the escaping gases. Partitions also extend across the space between diaphragms P P' and the wall of the drums or chambers D and C', dividing this space into several sections, thus compelling the feed-water to travel an additional number of times between said drums. The two chambers C and C' are also directly connected by a pipe M, so as to equalize the supply to both ends of the boiler. A damper L is pivoted in the chamber J, so that the area of the connection with the uptake may be varied as desired. The uptake instead of being at the back of the boiler may be divided into two parts and placed at the side of the boiler. A ceiling K, of fire-brick or other refractory material, is preferably placed over the combustion-chamber or from chamber A to chamber A'. The two upper chambers A and A' act as steam-domes and may be connected by a steam-pipe, as S.

The baffle-plate may preferably be made of two thin metal plates having a longitudinal axis of hollow rod or shaft between them and fastened together by means of suitable bolts and nuts, asbestos sheets or cloth being interposed between the two plates entirely or asbestos tape between their edges only, in either case asbestos projecting beyond the edges in order to give soft or yielding contact with tubes.

Where the intense flame impinges on, the baffle-plate may be covered on the faces with asbestos sheets or composition or some other suitable refractory material.

In some cases the baffle-plate may be made of special fire-brick or some other refractory material, either partially or wholly, mounted

on a longitudinal axis made of hollow metallic rod.

In case the baffle-plates are made in sections the plates of the adjacent sections are to overlap each other and the hollow axial rods are to be connected together by means of socket-joints, the whole being secured by bolts and nuts or by some other simple means.

The handle end of the longitudinal axis of each baffle-plate rests on a semicircular recess formed in the slot cut in a vertical frame, making a part of the boiler-casing, and held tight by a cover or door for the slot-opening with a similar recess to keep the axial rod in place, this cover being secured to the framework by means of a T-shaped bolt and butterfly-nut or some other simple device, so that the cover may easily be opened or closed.

It is evident that changes may be resorted to in the form and arrangement of the several parts without departing from the spirit and scope of my invention. Hence I do not wish to limit myself strictly to the structure set forth.

This application is filed as a division of application Serial No. 70,723, filed August 3, 1901, and I therefore do not claim herein that which is claimed therein.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a water-tube-boiler furnace, in combination a water-tube compartment, opposite walls of which present series of superposed horizontal drums, a fuel-compartment beneath the same, an exit to the flue also beneath the same and a partition whereby the heated gases are directed from said fuel-compartment upward adjacent to the furnace-wall presenting one series of drums and thence downward adjacent to the furnace-wall presenting the other series of drums.

2. In a water-tube-boiler furnace, in combination, a water-tube compartment, opposite walls of which present series of superposed horizontal drums, a fuel-compartment beneath the same, an exit to the flue also beneath the same, the opposite walls of which present drums and a partition whereby the heated gases are directed from said fuel-compartment upward adjacent to the wall presenting one series of drums and thence downward adjacent to the wall presenting the other series of drums, and thence between the drums in the walls of said exit to the flue.

In testimony whereof I have signed my name to this specification in the presence of the two subscribing witnesses.

JIRO MIYABARA.

Witnesses:

JOHN MCLEAN,
KINBEI TOYODA.