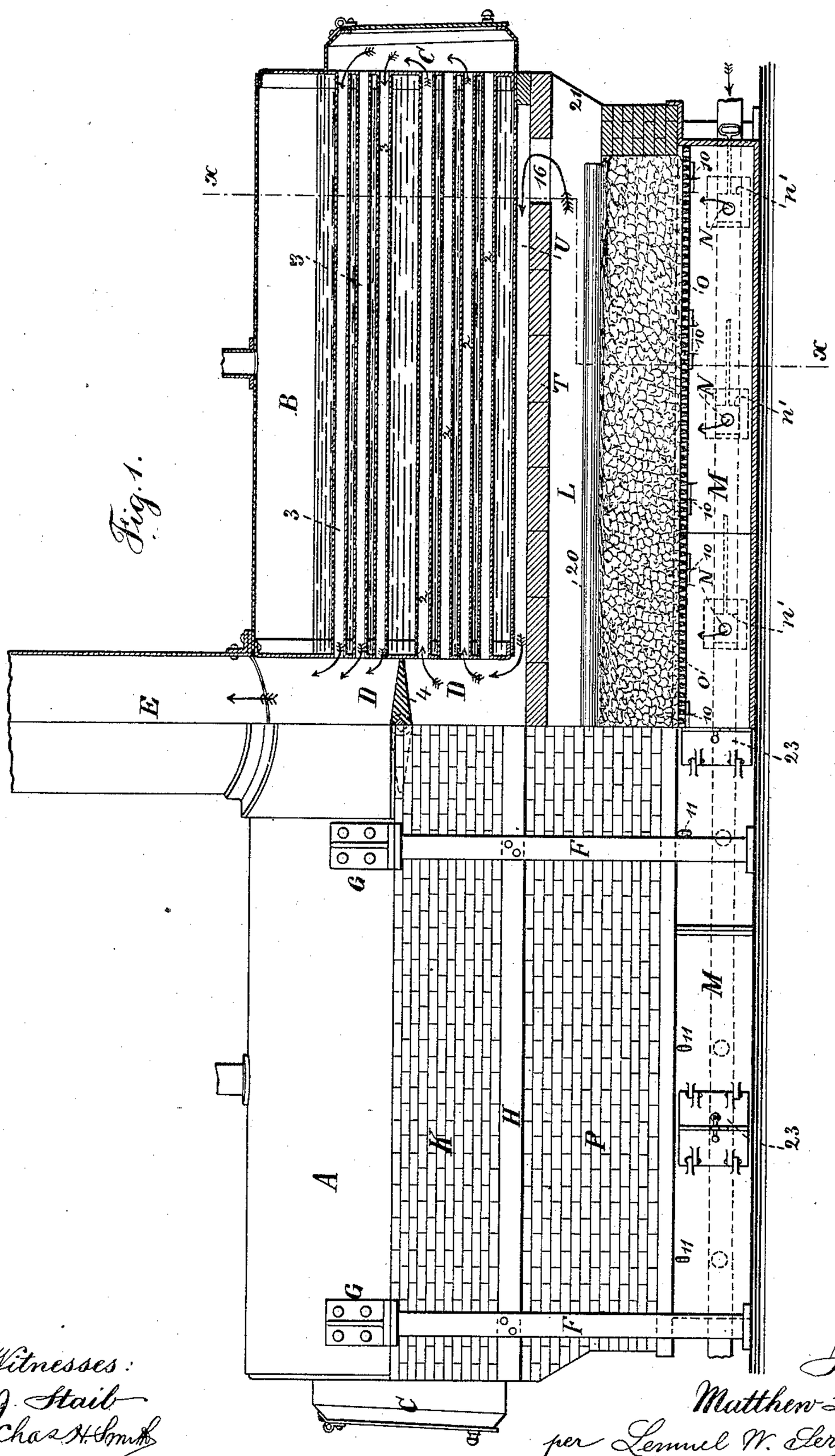
(No Model.)

2 Sheets—Sheet 1.

M. L. RITCHIE.

FURNACE.

No. 387,317. Patented Aug. 7, 1888.



Witnesses:
J. Stail
Chas H. Smith

Inventor:
Matthew L. Ritchie
per Lemuel W. Serrell atty.

(No Model.)

2 Sheets—Sheet 2.

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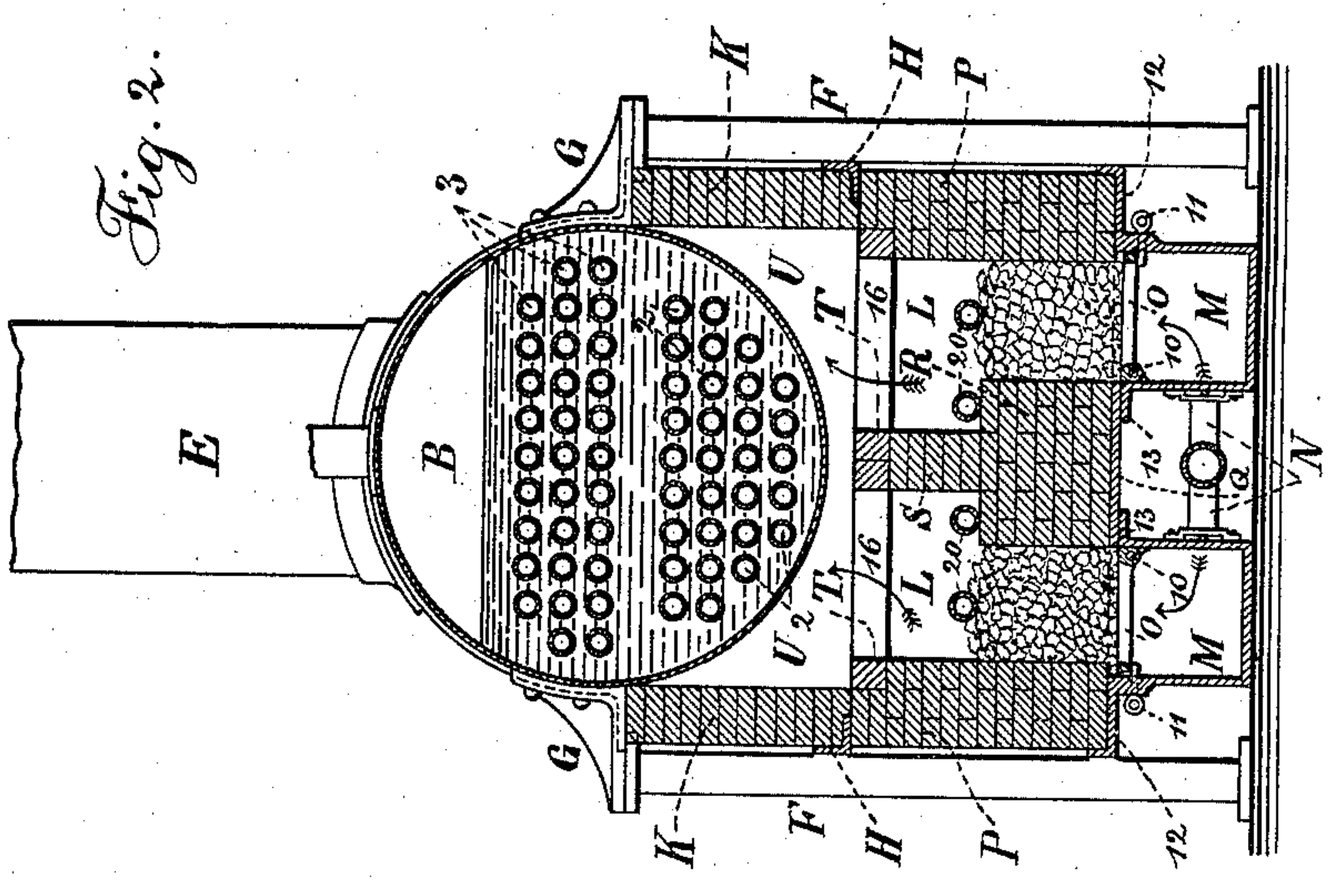
Fig. 2.



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Matthew L. Ritchie
per Lemuel W. Serrell Atty.

UNITED STATES PATENT OFFICE.

MATTHEW L. RITCHIE, OF NEW YORK, N. Y., ASSIGNOR TO THE EAGLE TUBE COMPANY, OF SAME PLACE.

FURNACE.

SPECIFICATION forming part of Letters Patent No. 387,317, dated August 7, 1888.

Application filed March 5, 1888. Serial No. 266,220. (No model.)

To all whom it may concern:

Be it known that I, MATTHEW L. RITCHIE, of the city and State of New York, have invented an Improvement in Furnaces, of which the following is a specification.

Furnaces have heretofore been made in which a fire-chamber is of sufficient length to receive articles to be heated, and in which furnaces the surplus heat passing off from the fire-chamber has been economized for various purposes—such, for instance, as heating a steam-boiler; but heretofore most of such apparatus have been complicated and occupied a large space, and much of the surplus heat has been wasted before it reached the place where it was utilized.

My invention is made for economizing space and directing the surplus heat in an advantageous manner for use, and the construction of the furnace is such that it is easily repaired or rebuilt in those places where it may be burned out by the intensity of the heat. I employ in carrying out my invention inclosing-walls, and fire-chambers, and ash-pit inclosures, and grate-bars, tiles, and central walls, and partitions with various openings, all of novel and peculiar construction, as hereinafter set forth, and in connection therewith I employ one or more steam-boilers and supporting-walls for the same.

In the drawings, Figure 1 is an elevation at one end of the furnace and a section near the other end. Fig. 2 is a cross-section at the line *x x*.

I make use of two steam-boilers, A and B, of any desired size or construction. I prefer to make use of the return-flue tubular boilers, as represented, in which 2 2 are the tubes of the lower range, and 3 3 the tubes of the upper range, and C the hood or end flue of each boiler; and between these two boilers A and B there is a flue, D, beneath the smoke-stack or chimney E, and in this flue D is a damper, 4, to close the flue D between the two ranges of tubes 2 and 3.

The boilers A and B are supported on columns F, with brackets G at the upper ends fastened upon the boilers, so that these boilers are supported in place and the brick-work can be removed and repaired without disturbing the boilers, and these columns F are connected together by the angle-irons H, which also form supports for the brick-inclosure K at the sides of the boilers, so that such brick-inclosure K is not injured by the removal of the brick-work below the angle-irons H, and this brick-work K, being exposed to but little heat, has to be repaired but seldom.

The fire chambers L extend from end to end beneath the boilers and above the ash-pits M. These ash-pits M are preferably in the form of cast-iron boxes, made in sections, into which the air-blast is admitted from the pipes N, and there are dampers *n'* that regulate the quantity of blast admitted into the ash-pit.

The grates O are at the upper portions of the ash-pits and below the fire-chamber, and such grates O are preferably in sections, and each section provided with hinged supports 10 at one side of the cast-iron case, forming the ash-pit, so that the grate-section can be dumped by allowing it to swing downwardly upon such hinges 10, and when it is raised it is supported in place by suitable pins or catches, 11, at the opposite side to the hinges.

The space between the ash-pits M and at each side thereof may be filled in with brick-work; but I prefer to extend the cast-iron cases forming the ash-pits with lateral flanges 12 at the top edges for supporting the brick-work P, that runs along beneath the angle-iron H, and also to provide flanges 13, upon which rests the plate Q, that supports the central pier or partition, R, of fire-brick between the two fire-chambers L, and there is a narrow fire-brick partition, S, running along upon the pier R, and the tiles T of fire-brick resting upon the partition S and the inner edges of the walls P form a partition between the fire-chamber L and the flue-chambers U beneath the boilers.

The ends of the fire-chambers L are closed up as high as the top of the pier R, as seen in Fig. 1, and above this the ends of such fire-chambers are open up to the tile partition T, and there are openings through this tile partition T at 16, so that the products of combustion rise in the fire-chamber and travel toward the ends thereof and pass up through the opening 16 into the flue and combustion-chambers U under the respective boilers A and B, and such products of combustion pass

along such flue-chambers U toward the central flue, D, and when the damper 4 is opened the products of combustion pass directly up into the chimney E; but when such damper 4 is closed such products of combustion pass along through the flue-tubes 2 into the flues C, and return through the flue-tubes 3 into the flue D, and thence to the chimney.

The tubes or bars 20 that are to be heated can be laid directly upon the coal or fuel in the fire-chamber, or upon the top of the partition or pier R, as seen in Fig. 2, and such tubes or bars are exposed to a very uniform heat, because the products of combustion pass along toward the openings 21, through which such tubes or rods have been inserted, and then the products of combustion pass away by the opening 16, and these tubes or rods 20 are easy of access and can be inserted or withdrawn from time to time, as required, and the heat or gases do not pass out from the furnace into the building, because the flue 16 is directly above the openings 21, and air is drawn in at these openings 21 to promote a perfect combustion of the gases rising from the fuel as such gases pass in beneath the steam-boiler, and the heat is conveyed so directly to the steam-boiler that there is great economy in fuel, and it is only necessary to maintain sufficient rapidity of combustion to heat the rods or tubes to the proper temperature for rolling, drawing, or otherwise working the same.

It is to be understood that those portions of the walls that are exposed to the intense heat of the fire are to be made of fire-bricks, and they can be taken down and repaired from time to time, as required, and it is preferable to provide a door, 23, in each of the ash-pit sections M, so that ashes and clinkers can be removed through this door after the grates have been dumped, and access is also given for making the fire and removing the ashes from time to time.

I claim as my invention—

1. The combination, with the steam-boiler, and the walls K, inclosing the sides thereof and forming the flue U, of the fire-chambers extending from end to end of the boiler, the ash-pit inclosures M, grate-bars O, side walls, P, central wall, R, and partition S, and tiles T, also extending from end to end of the boiler, there being an opening at 16 in the tiles near the front of the boiler for passing products of combustion, and a front opening at 21, substantially as and for the purposes set forth.

2. The combination, with the steam-boiler, inclosing-walls, and fire-chambers, of the ash-pit inclosures M, formed of cast-iron boxes and having flanges along their upper edges, upon which the walls of the boiler rest, substantially as set forth.

3. The combination, with the steam-boiler, inclosing-walls, and fire-chambers, of the ash-pit inclosures M, formed of cast-iron boxes and having flanges along their upper edges, upon which the walls of the boiler rest, and the grates O, supported at one side by the hinges 10 within the ash-pit inclosures, and the pins 11, passing through the ash-pit inclosures and upon which the free end of the grate-bars rest, substantially as set forth.

4. The ash-pit inclosures M, formed of cast-iron boxes having flanges at their upper edges, in combination with the grates O, supported at one edge by hinges within the ash-pit inclosures, the outer walls, P, supported on the flanges of the ash-pit inclosures, the central wall, R, and partition S, the tiles T, forming a partition above the fire-chamber, the steam-boilers A and B and the supports for the same, and the damper 4 in the flue D between the said steam-boilers, substantially as set forth.

Signed by me this 24th day of February, 1888.

MATTHEW L. RITCHIE.

Witnesses:

WM. J. VINCENT,

THOS. H. MCLEAN.