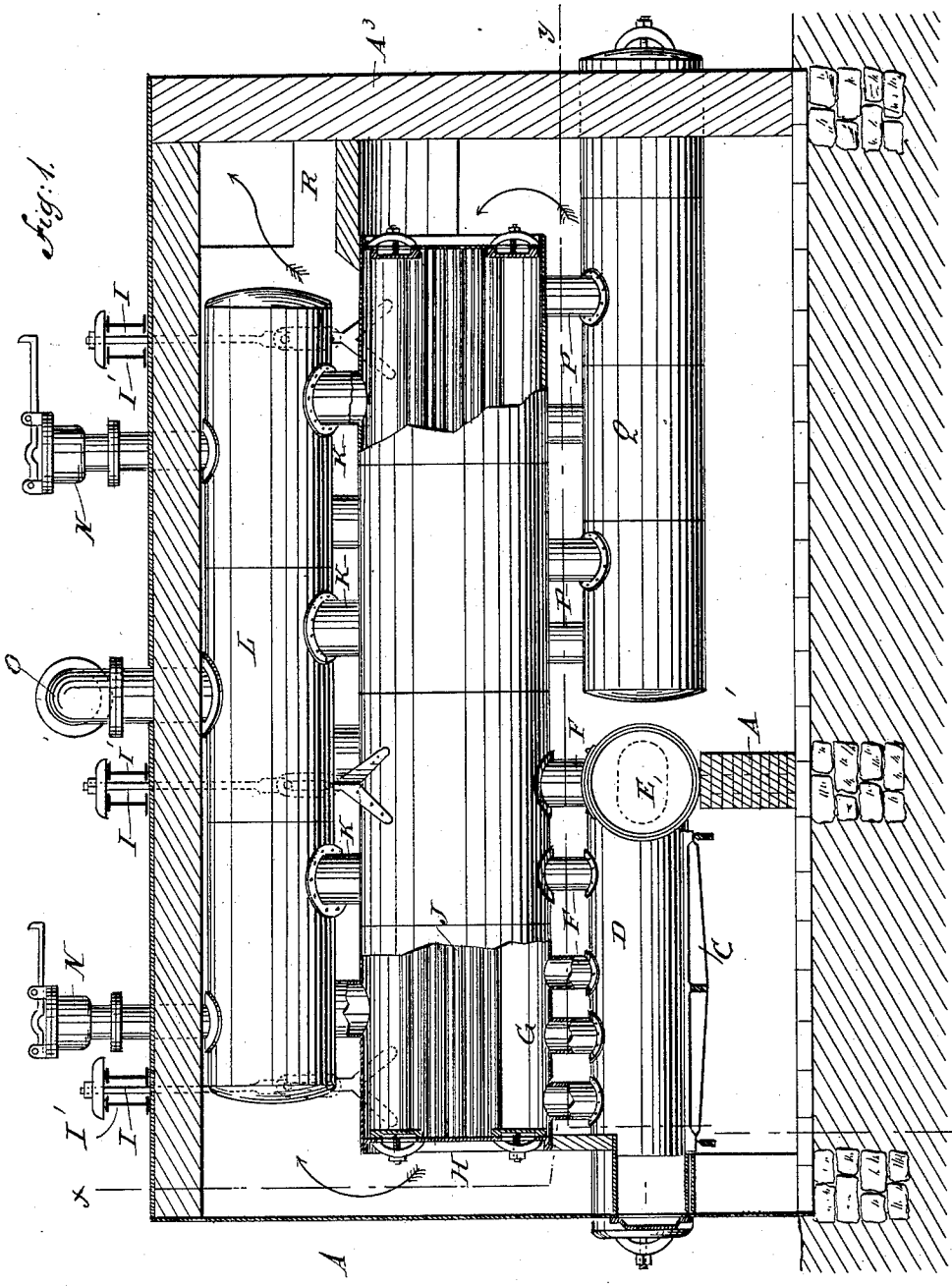
(No Model.) 3 Sheets—Sheet 1.

J. LEIGHTHAM.

BOILER.

No. 362,021. Patented Apr. 26, 1887.

Fig. 1.



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(No Model.) 3 Sheets—Sheet 2.

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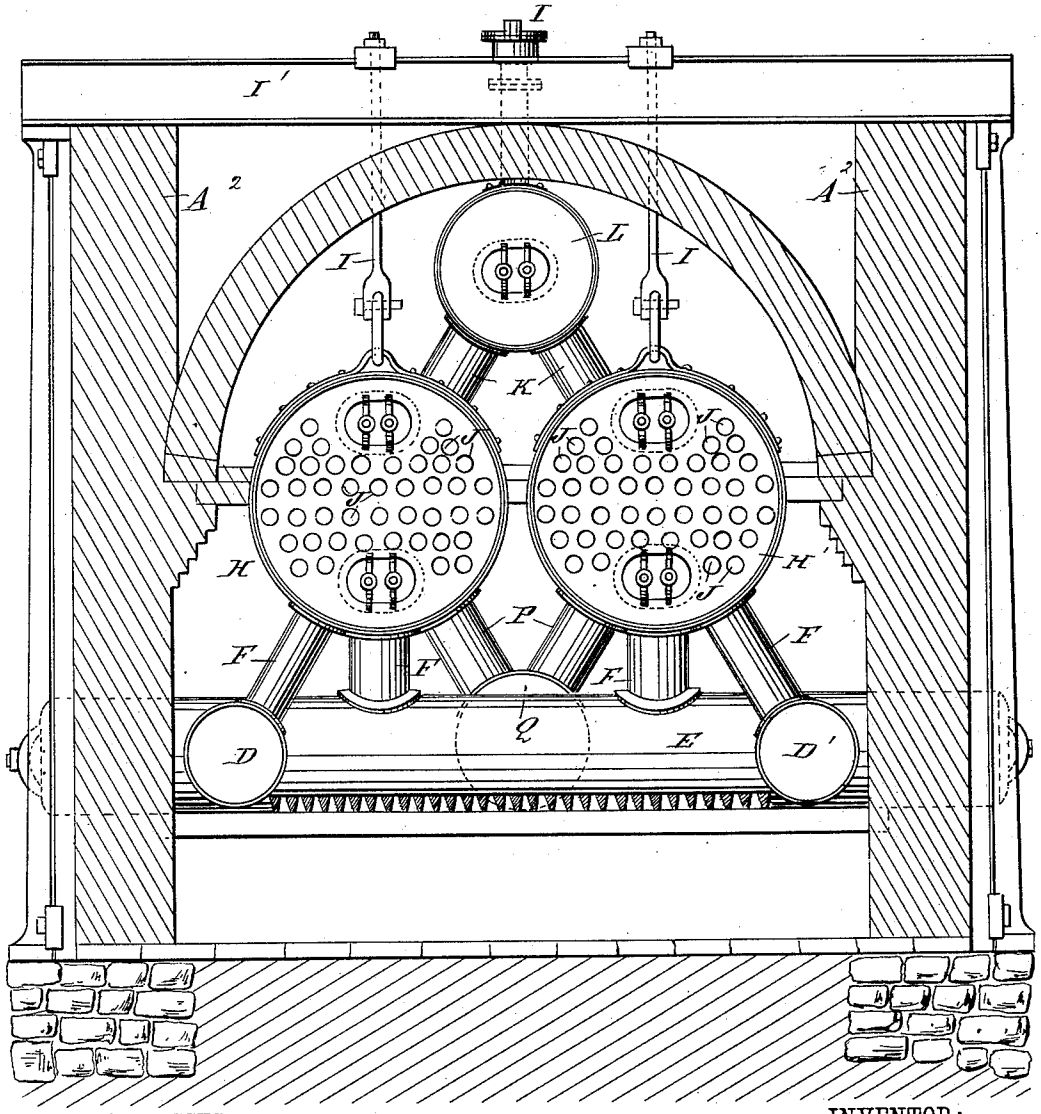
Fig. 2.



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(No Model.) 3 Sheets—Sheet 3.

J. LEIGHTHAM.

BOILER.

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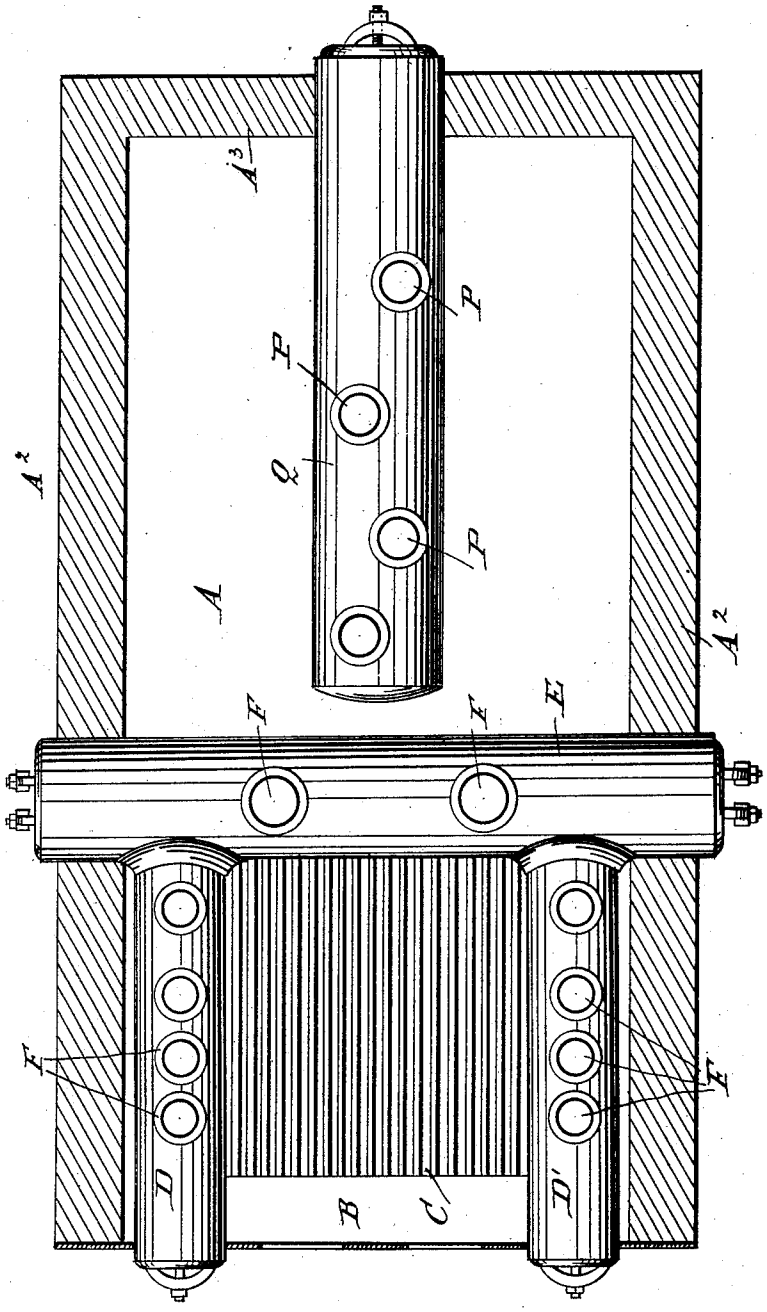
Fig. 3.



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UNITED STATES PATENT OFFICE.

JOSEPH LEIGHTHAM, OF LEBANON, PENNSYLVANIA, ASSIGNOR OF ONE-HALF TO JACOB H. GROVE, OF SAME PLACE.

BOILER.

SPECIFICATION forming part of Letters Patent No. 362,021, dated April 26, 1887.

Application filed January 7, 1887. Serial No. 223,670. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH LEIGHTHAM, of Lebanon, in the county of Lebanon and State of Pennsylvania, have invented a new and Improved Boiler, of which the following is a full, clear, and exact description.

The object of my invention is to provide a new and improved boiler in which the steam is quickly generated without any loss of fuel and the sediment in the water is prevented from settling in the main boiler.

The invention consists of a boiler or boilers suspended in the furnace and connected with flues placed below the boiler and surrounding the grate-bars, and of a mud-drum and a superheater connected with the boiler or boilers.

The invention also consists of various parts and details and combinations of the same, as will be fully described hereinafter, and then pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a sectional side elevation of my improvement. Fig. 2 is a vertical cross-section of the same on the line *x x* of Fig. 1, and Fig. 3 is a sectional plan view of the same on the line *y y* of Fig. 1.

The furnace A is provided with the usual fire-box, B, and the grate-bars C, inclosed on the sides by the tubes D and D′, closed at their outer ends and opening at their inner ends into a transverse tube or flue, E, extending along the inner ends of the grate-bars C and supported by a partition-wall, A′, and by the side walls, A^2, of the furnace A. From the tubes D, D′, and E the branch pipes F lead upward and connect with the front part of the water-space G in the main boilers H and H′, held partly suspended in the furnace A by means of the rods I, secured on the cross-beams I′, extending across the top of the furnace A.

Each boiler H and H′ is provided with the usual flues, J, passing through the ends of the boilers H and H′ and opening at each end into the interior of the furnace A. From the steam-spaces of the boilers H and H′ the branch tubes K lead upward and open into and support the superheater L, placed above and between the said boilers H and H′. The superheater L is provided with the usual safety-valves, N, and the steam-outlet pipe O.

From the rear part of the water-spaces G in the boilers H and H′ the branch pipes P extend downward and open into the mud-drum Q, which is supported partly by the said pipes P and partly by the end wall, A^3, of the furnace A, through which wall one end of the said mud-drum passes. The tubes D, D′, and E and the mud-drum Q are closed at their outer ends by suitable removable covers.

Each of the boilers H and H′ is provided with the usual man-holes at the ends and with the water-inlet pipes, which are not shown. The rear ends of the boilers H and H′ are covered by an arch, R, extending to the rear wall, A^3, of the furnace A. The furnace A is connected at its rear wall in the usual manner with a chimney. (Not shown.)

The heat from the grate-bars C heats the water in the tubes D, D′, and E, and at the same time passes beneath and around the main boilers H and H′ and toward the rear wall, A^3, of the furnace A, and then the heat passes through the flues J in the boilers H and H′ again to the front end of the furnace and around the superheater L, and then passes out of the chimney located at the rear end of the furnace. It will be seen that the arch R prevents the heat from passing directly through the chimney, and, in connection with the rear wall, A^3, forces the heat through the flues J of the boilers H and H′. Part of the heat from the grate-bars C passes up between the boilers H and H′ to the superheater and directly to the chimney.

The sediment contained in the water in the boilers H and H′ and in the tubes D, D′, and E settles in the mud-drum Q, and can be removed from the same from the outside of the furnace. The water, after being heated in the tubes D, D′, and E, rises and passes into the main boilers H and H′, while the cooler water in the said boilers descends, thus establishing a continuous circulation of water in the said tubes and in the boilers, and thereby preventing the settling of the sediment in the said tubes and boilers.

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

1. The combination, with a furnace, of boilers arranged in the said furnace, tubes surrounding the fire-chamber above the grate-bars of the said furnace and connected by branch pipes with the said boilers, and a superheater held above the said boilers and connected with the same by branch pipes, substantially as shown and described.

2. The combination, with a furnace, of boilers arranged in the said furnace and tubes surrounding the fire-chamber above the grate-bars of the said furnace and connected by branch pipes with the said boilers, and a mud-drum held below the said boilers and connected with the same by branch pipes, substantially as shown and described.

3. The combination, with a furnace, of boilers arranged in the said furnace, tubes surrounding the fire-chamber above the grate-bars of the said furnace and connected by branch pipes with the said boilers, a superheater held above the said boilers and connected with the same by branch pipes, and a mud-drum arranged below the said boilers and connected with the same by branch pipes, substantially as shown and described.

4. The furnace A, the partition-wall A′, formed in the said furnace, the grate-bars C, and the arch R, formed on the rear part of the said furnace, in combination with the boilers H and H′, provided with the flues J, the rods I, connecting the said boilers H and H′ with cross-beams above, the tubes D, D′, and E, surrounding the fire-chamber above the said grate-bars C and connected by the branch pipes F with the water-space of the said boilers H and H′, the mud-drum Q, held below the said boilers H and H′ and connected with the same by the branch pipes P, and the superheater L, placed above the said boilers H and H′ and connected with the same by the branch pipes K, substantially as shown and described.

JOSEPH LEIGHTHAM.

Witnesses:
R. R. UHLER,
S. H. BENTZ.