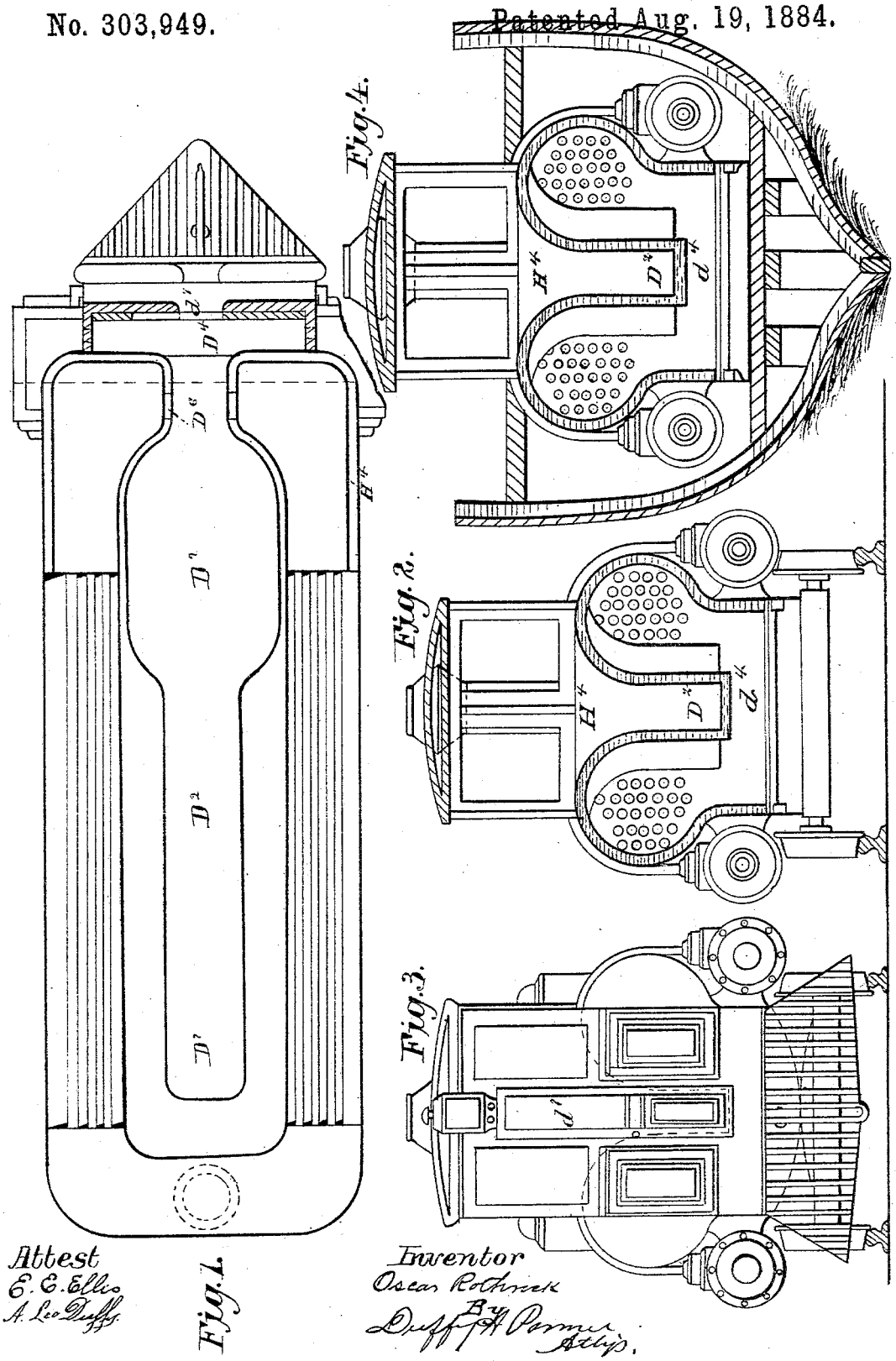
(No Model.)

O. ROTHROCK.

LOCOMOTIVE OR STEAMBOAT BOILER.

No. 303,949. Patented Aug. 19, 1884.



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OSCAR ROTHROCK, OF BEECH CREEK, PENNSYLVANIA.

LOCOMOTIVE OR STEAMBOAT BOILER.

SPECIFICATION forming part of Letters Patent No. 303,949, dated August 19, 1884.

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To all whom it may concern:

Be it known that I, OSCAR ROTHROCK, of Beech Creek, in the county of Clinton and State of Pennsylvania, have invented certain new and useful Improvements in Locomotive and Steamboat Boilers; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form part of this specification.

This invention relates, essentially, to locomotive-boilers, but is applicable to portable or stationary engines generally, and peculiarly applicable to small steam-yachts, where space is of great value, and where the space designated as "living-rooms," is to be kept neat and clean, and, as far as possible, from contact with the fuel, which heretofore in such vessels has been very annoying.

A further object of constructing my boiler in the manner shown is to overcome the difficulty of ballasting small steam navigating vessels. In the old way the weight is periodically changed, as in the case where the fuel is all consumed and loaded up again, which causes a displacement in one end portion of the vessel, the boiler and operating machinery being in the other, thus causing an unevenness of the set of the boat in the water. With my construction of boiler all the machinery may be centrally located in the vessel, the central depression between the twin boilers (see Fig. 2) forming the fuel-space, so that as the fuel is gradually used up the boat becomes lighter, but its evenness or set in the water is not changed. Thus I combine with my construction of boiler the manifold advantages of so arranging all the machinery, the boiler, and its fuel as to occupy but little space, which is an important consideration in many cases.

A further object of my invention is to economize fuel by enlarging the heating-surface and fire-chamber of the boiler, all of which will be hereinafter more fully described.

Referring to the drawings hereunto annexed, Figure 1 represents a horizontal longitudinal section of my boiler, with a depression and passage on its top (shown in plan) leading to the engine-room, and also a plan view of the fire-box. Fig. 2 is a vertical transverse section taken on a line through the fire-box, showing the water-jacket fitted thereon, and the downwardly-projecting water-legs on each side of the fire-box, and also the pendent double water-partition, which divides the fire-box nearly to the grate-bars and forms a part of the fuel-reservoir D^2, extending longitudinally nearly the length of the boiler.

The grate d^4 extends from side to side of the fire-box beneath the reservoir D^2 and back to the tube-sheets of the respective boilers.

Instead, as heretofore, of securing the cylinders to the engine-frame or to the smoke-box, I secure the cylinders to the water-legs of the boiler, by means of which much heat heretofore lost by radiation is saved by the close proximity of the steam-cylinder to the fire-box, where the air is constantly of high temperature. The platform D^4, Fig. 1, is located immediately in front of the boiler fire-box, and from which access may be had to the engine-room, fuel-reservoir, or passage between the boilers. The pendent double water-partition may extend to the grate, but I prefer the form shown.

Fig. 3 is a front elevation showing the cab or housing extending down upon a platform located in front of the fire-box, and provided with an entrance-door. The cab extends in front of the fire-box, and incloses the platform D^4, which increases the size of the engine-room, and is provided with front and side doors, d^7, so as to enable the engine attendants to have ready access to the engine-room and between the boilers, and to the working machinery generally. The top, front, and sides of the passage in the fire-box are formed by a water-jacket, H^4, which may communicate either with the water or steam space of the boiler, but preferably with the water-space, whereby the well-known effects of water-circulation are taken advantage of. The boilers run parallel to each other, and are provided with tubes, which either lead to a smoke-box common to both, or they may be provided with separate smoke-stacks. The upper portion of the fire-box being divided into two

chambers, each chamber must have separate fuel-doors D^6, and which may be fired or stoked alternately.

Fig. 4 is a vertical cross-section of my boiler as applied to a vessel or boat, the arrangement of which will be readily understood.

The advantages of enlarged fire-space and heating-surface, as compared with narrow and contracted fire-boxes, are too well known to require much amplification; but it may be said, generally, that when a bed of fuel is very deep, and the atmospheric air to support combustion is supplied from below the grate, the oxygen of the air is nearly all consumed before it reaches the fuel on the surface of the fire; hence the layers of fuel lying in the upper portion of the fire-box are not supplied with oxygen, and thus the gases generated from them pass into the open atmosphere unconsumed; but with the enlarged fire-space shown in my drawings, and with the fuel evenly spread over the grate-surface to the required depth, the air has full access to all the fuel alike, and thus an even fire is maintained, all the gases are consumed, and the great annoyance of smoke is obviated. Therefore it will be seen that with a perfect combustion we have an economy of fuel and a more intense heat. The heat being uniform, expansion and contraction of the boiler-seams are prevented. The circulation of water between the boilers through the chambered pendent partition is so great that all parts of the boiler are of even temperature. The currents of water are so rapid that sediment has no time to settle, and thus incrustation is prevented. Should it be necessary to blow off the boiler, the water in the jacket surrounding the fire-box will be found sufficient to supply the boilers until steam is again raised to work the pump or injector. The pendent partition is flaring from its front to the rear of the fire-box. The flaring or diverging sides retard to a considerable extent the gases arising from the green fuel fed at the front of the furnace, and by this retardation time is given them for ignition. By this means the escape of unconsumed gases is largely prevented.

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

1. A boiler provided with a fire-box having a pendent double water-partition forming a chamber located between twin boilers, said chamber forming a fuel-reservoir extending entirely through the fire-box, substantially as described.

2. In a boiler, the combination of a fire-box having a longitudinal passage or depression in its top, with a twin boiler having a longitudinal passage or space communicating with the passage in the fire-box, substantially as described.

3. In a boiler such as described, the combination of a fire-box having a passage or depression in its top, and a water-jacket forming the sides and floor of said passage, with a twin boiler having a longitudinal passage or space communicating with the passage in the fire-box, as set forth.

4. In a boiler-furnace, the combination of the pendent double water-partition having a chamber between its walls, with the side water-legs, the said water-partition diverging from the front to the rear of the fire-box at both of its sides in such manner as to cause the gases generated from the fresh fuel in the front of the fire-box to be retarded therein until ignited, substantially as shown.

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

OSCAR ROTHROCK.

Witnesses:

JNO. T. BEARDSLEY,

J. R. YOUNGMAN.