

(No Model.)

W. R. PARKS.
STEAM AND HOT WATER BOILER.

No. 364,848.

Patented June 14, 1887.

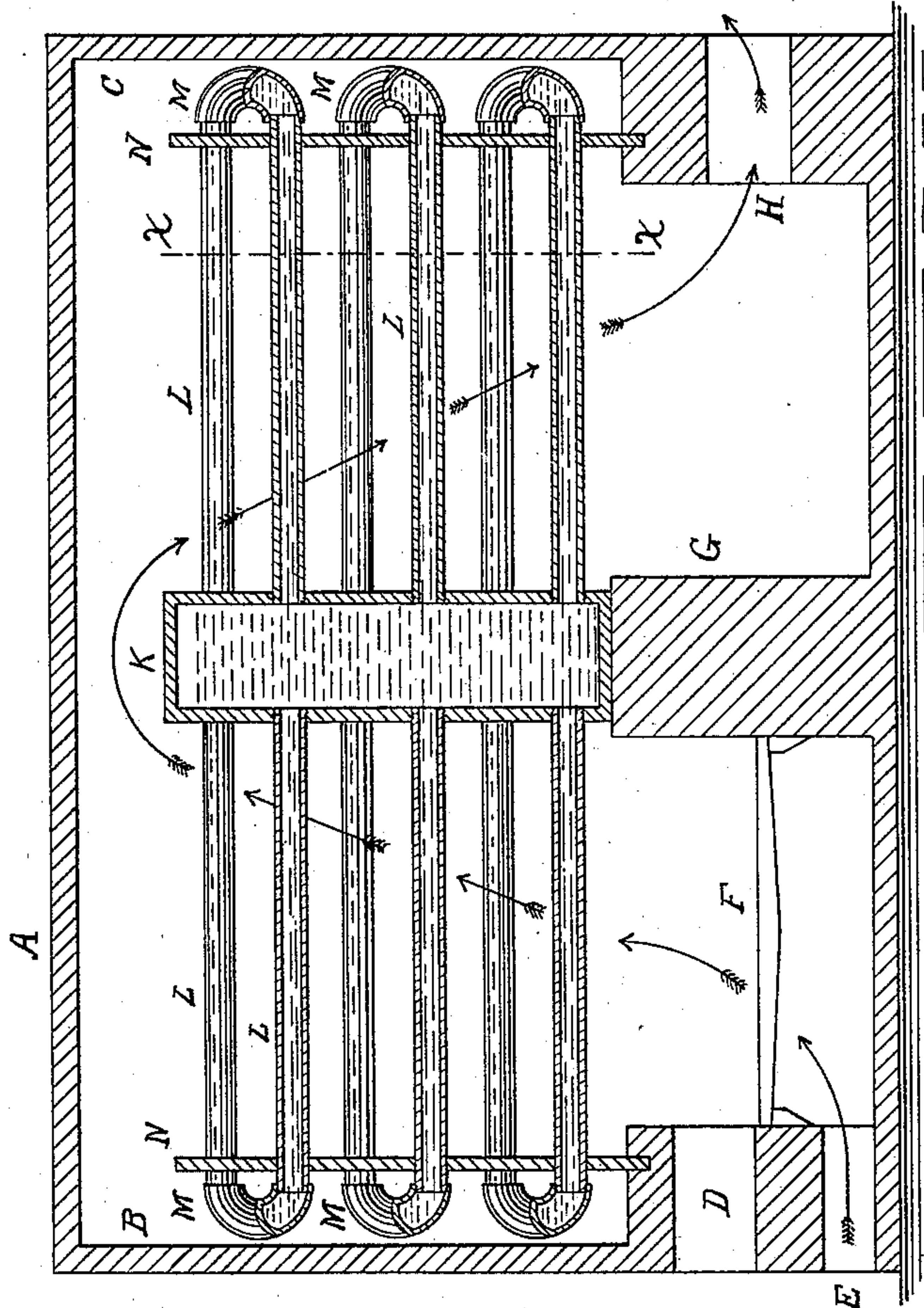


Fig. 1.

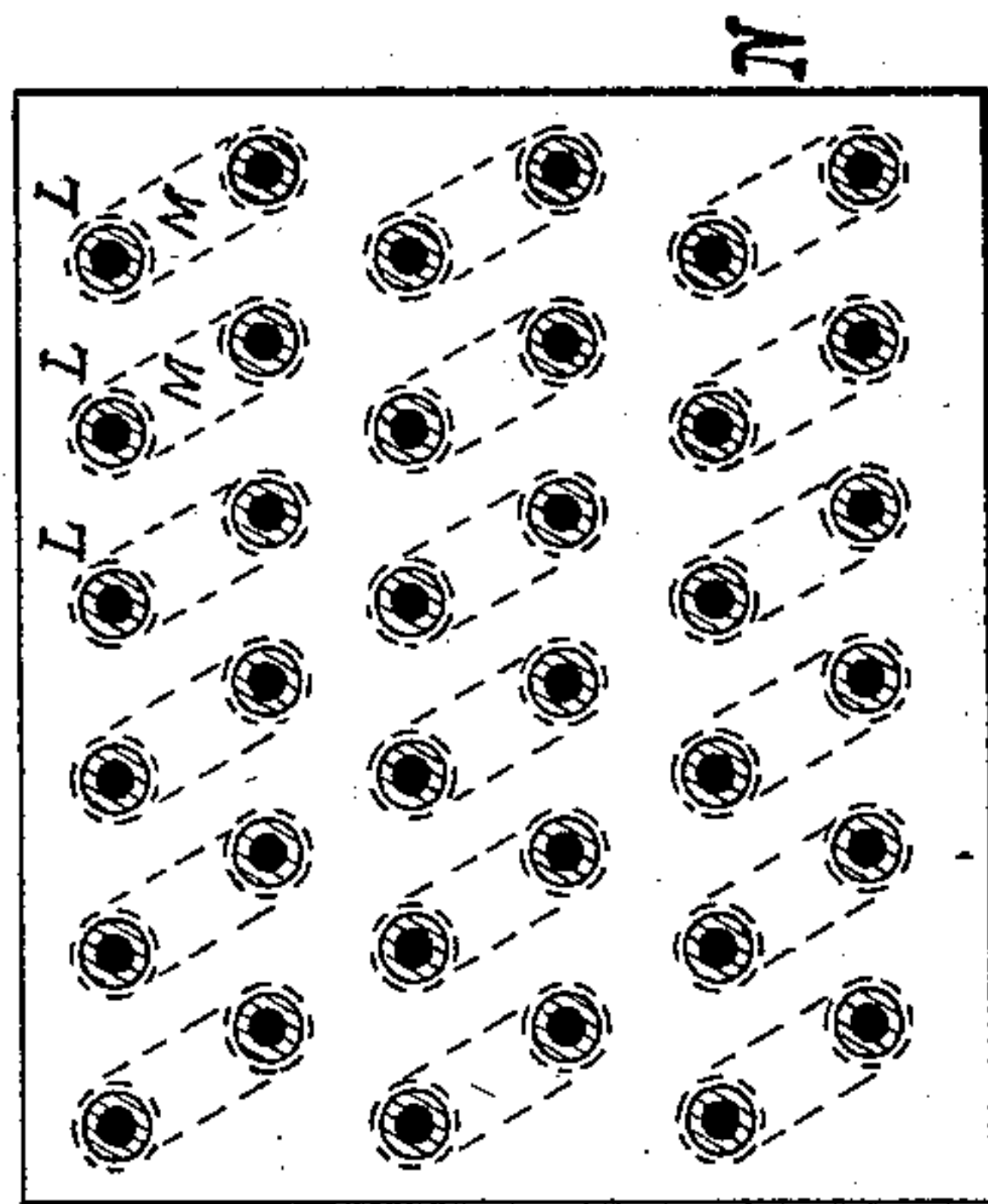


Fig. 2.

Witnesses—

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STEAM AND HOT-WATER BOILER.

SPECIFICATION forming part of Letters Patent No. 364,848, dated June 14, 1887.

Application filed November 3, 1886. Serial No. 217,866. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM R. PARKS, of Palmer, in the county of Hampden and Commonwealth of Massachusetts, have invented a new and useful Improvement in Steam and Hot-Water Boilers, of which the following is a specification, reference being had to the accompanying drawings, forming part thereof.

The object of my invention is to construct a boiler which will, owing to the novel arrangement of the water tank and tubes, expose an increased area of water to the direct action of the products of combustion when the boiler is located within the combustion-chamber of a furnace, and thus enable water to be heated, and, if desired, steam to be generated, more rapidly than is possible with boilers as heretofore constructed.

In Letters Patent heretofore granted to me—to wit, No. 229,173, dated June 22, 1880—I have shown and described a boiler upon which the present invention is an improvement. In the boiler covered by said Letters Patent the water-tank is supported by the front wall of the furnace, and leading from said tank are parallel water-tubes arranged in pairs, the outer end of each pair being connected by a return-coupling, and the said pairs of tubes are so arranged relatively to each other that each tube receives directly a portion of the current of heat in its passage through the combustion-chamber. The said current, moreover, is diverted by a transverse bridge-wall, so that it passes upward through the series of tubes upon one side, over the top of the bridge-wall, and downward through the series of tubes upon the rear side of said wall, and thence out at the escape-flue near the bottom of the furnace.

As a means of rapidly heating the water this boiler operates very successfully; but I have found that it is open to one objection—viz., that by mounting the tank in the front wall of the furnace and leading the tubes from its rear side only the great bulk of the water (which, of course, is that within the tank) is only partially subjected to the direct action of the products of combustion; and, again, that the circulation of the water within the tubes is retarded by the dispersion of the several currents as they contact with the front wall of the tank.

My present invention, while it retains certain features of that disclosed in my said Letters Patent, overcomes the objections thereto just mentioned.

To this end my invention consists in a boiler composed of a water-tank having parallel tubes extending from two of its opposite sides, said tubes being arranged in horizontal rows, the tubes in each row being located in a vertical plane midway between the tubes of the adjacent rows, and the tubes in each two rows being connected at their outer ends by return-couplings—the first row with the second, the third with the fourth, and so on.

My invention consists, further, in a boiler composed of a tank and tubes thus arranged, when combined with means for directing the products of combustion from a furnace upwardly around and between the tubes upon one side, over the top of the tank, and downwardly around and between the tubes upon the other side of the tank.

Referring to the drawings, in which like letters designate like parts in both the figures, Figure 1 is a longitudinal vertical section of so much of a boiler and its furnace as is necessary to be shown in order to fully illustrate my invention. Fig. 2 is a cross-section taken at the line *xx*, looking toward the outer end of the tubes.

The letters A, B, and C designate, respectively, the top, front, and rear walls of a furnace, which may be constructed of brick in the usual manner. This furnace in its fuel-duct D, draft-opening E, grate F, abutment G, and eduction-flue H does not differ from that shown in my said Letters Patent.

The letter K designates the water-tank, and L the water-tubes leading therefrom, said tubes being parallel and arranged in horizontal rows, the tubes in each row occupying a plane midway between those of the tubes in the adjacent rows, as clearly shown in Fig. 2. The tubes in each two rows, moreover, are united by return-couplings M, the first row with the second, the third with the fourth, and so on, as shown in Fig. 1 and indicated by dotted lines in Fig. 2. This arrangement of the tubes is the same as that shown in my said Letters Patent, the tubes therein, however, leading from but one side of the tank and the latter being supported by the front wall of the furnace, as

by reference thereto will more fully appear. In my present invention the tubes L lead from both the front and rear sides of the tank, and the latter is located, preferably supported by the abutment G, at or near the center of the furnace and transversely thereof, in such a manner as to leave a draft-flue between the tank and the roof of the furnace as the only communication between the front and rear portions of the combustion-chamber. The arrangement of the tubes is the same upon either side of the tank, and those upon one side are preferably in alignment with those upon the other side, for a purpose hereinafter set forth. The tubes at or near their outer ends are securely held in position by passing through brackets N, the latter being sustained by projecting parts of the masonry, as shown, or in any convenient manner. By this arrangement of the tank and tubes the former becomes the bridge-wall, by means of which the current of products of combustion is diverted, so that, as indicated by the arrows in Fig. 1, it passes upward, around, and between the tubes in front of the tank, over the top of the latter, downward, around, and between the tubes in the rear, and out through the eduction-flue H. It will be observed that the main body of water within the tank thus receives directly the action of the products of combustion upon two sides and the top, by means of which arrangement and by placing tubes upon both sides thereof the area of water constantly subjected to such direct action is doubled over that of my previous invention referred to. By placing the opposite tubes in alignment, as shown, moreover, I am enabled to secure an unobstructed circulation of the water within the tubes on both sides of the tank. The result of these changes in the construction and arrangement is a greatly-increased capacity for rapidly heating the water at a considerable saving of fuel.

My invention being applicable either to boilers for heating water simply or for the generation of steam, I have thought it unnecessary to complicate the drawings by showing steam-space; but it will be readily understood by those skilled in the art that steam-space can be secured by domes or cylinders suitably connected with the tank by eduction-pipes, and that the boiler, as shown in the drawings, is to be provided with the usual gage-cocks, safety-valve, &c. It will also be understood that the invention herein disclosed is equally applicable to portable as well as stationary boilers.

I do not wish to limit myself to the exact proportions of the several parts shown, as

modifications can be made therein without departing from the spirit of my invention. The tubes, for instance, could be made relatively longer or shorter than those shown; could be increased or diminished in number, and those upon one side could be of a different length from those on the other side, or opposite tubes could be placed out of alignment.

I claim—

1. In a steam and hot-water boiler, a tank having parallel water-tubes extending from opposite sides thereof, said tubes being arranged in horizontal rows, the tubes in each row being located in a vertical plane midway between the tubes of the adjacent rows, and the tubes in each two rows being connected together by return-couplings at their outer ends, the first row with the second, the third with the fourth, and so on, substantially as set forth.

2. A steam and hot-water boiler consisting of a tank having parallel water-tubes extending from its front and rear sides, said tubes being arranged in horizontal rows, the tubes in each row being located in a vertical plane midway between the tubes of the adjacent rows, and the tubes in each two rows being connected together by return-couplings at their outer ends, the first row with the second, the third with the fourth, and so on, said tank being arranged transversely of the combustion-chamber of a furnace in such manner as to serve as a bridge-wall to divert the products of combustion and compel the same to pass up the front side of said tank and down the rear side thereof, substantially in the manner set forth.

3. In a steam and hot-water boiler, the combination, with a furnace having the usual draft-flue in front and an eduction-flue near the bottom of its rear side, of a tank arranged transversely within said furnace and extending to within a short distance of the top thereof, thus forming a bridge-wall for the products of combustion, said tank having water-tubes extending from its front and rear sides, said tubes being arranged in horizontal rows, the tubes in each row being located in a vertical plane midway between the tubes of the adjacent rows, and the tubes in each two rows being connected at their outer ends by independent return-couplings, the first row with the second, the third with the fourth, and so on, substantially as and for the purpose set forth.

WILLIAM R. PARKS.

Witnesses:

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