(No Model.)

L. H. ROSEBURRY.

STEAM BOILER.

No. 484,463. Patented Oct. 18, 1892.

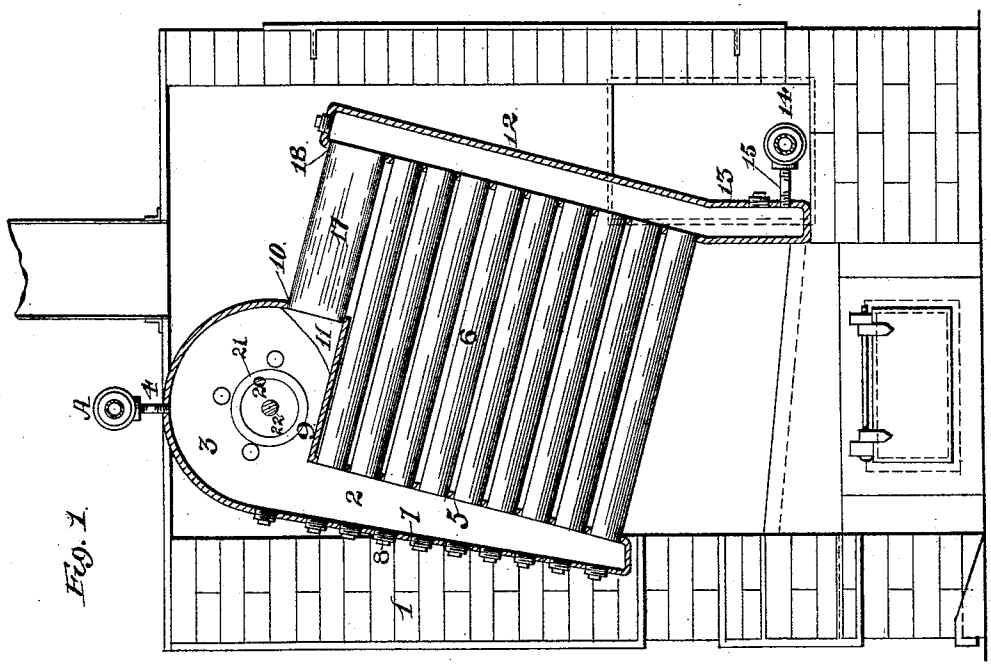

Fig. 1.

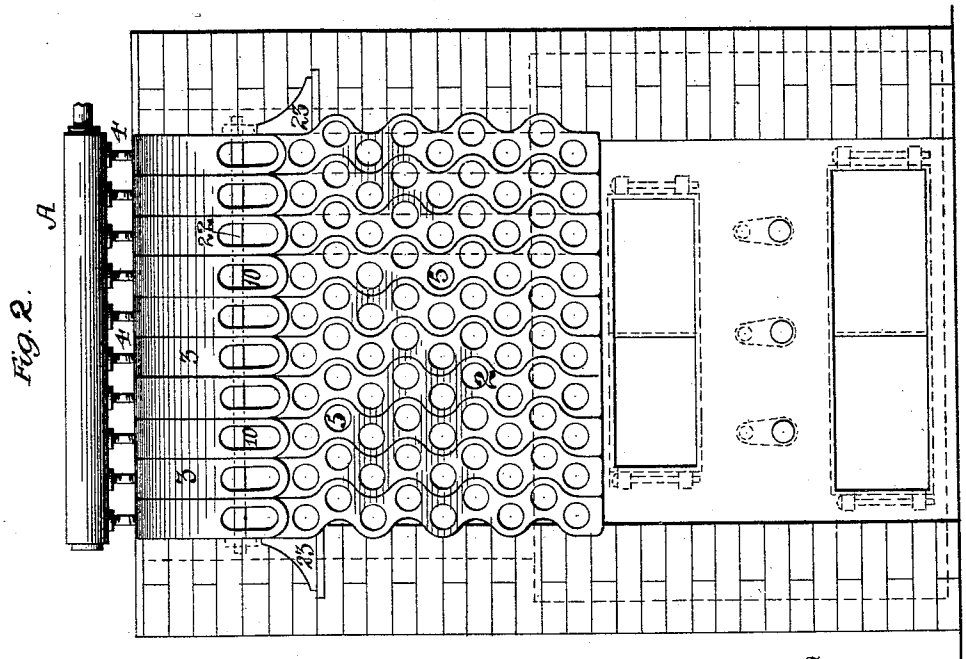

Fig. 2.

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UNITED STATES PATENT OFFICE.

LEWIS H. ROSEBURRY, OF PHILADELPHIA, PENNSYLVANIA.

STEAM-BOILER.

SPECIFICATION forming part of Letters Patent No. 484,463, dated October 18, 1892.

Application filed March 1, 1892. Serial No. 423,417. (No model.)

To all whom it may concern:

Be it known that I, LEWIS H. ROSEBURRY, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Steam-Boilers; and I do declare the following to be a full, clear, and exact description of the invention, such as 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 and figures of reference marked thereon, which form a part of this specification.

My invention relates to steam boilers or generators.

The objects of my improvements are to provide a steam-boiler adapted for any purpose for which it may be found applicable—such as steam or hot-water heating or for power purposes—and which shall be simple and efficient in operation.

To attain these objects my invention consists in the following construction and combination of parts, which will be first fully described in detail, and the features of novelty then set forth in the claim.

Figure 1 is a central longitudinal vertical section of a boiler embodying my improvements. Fig. 2 is a back view of the front shell with the water-tubes removed.

In the drawings, 1 represents the brick-work or boiler-casing, provided with the usual fire-doors, furnace, ash-pit, cleaning-doors, stack-regulators, dampers, water-gage, &c.

2 represents the front shell of the boiler, which is composed of a series of sectional, sinuous, or corrugated headers, by means of which the water-tubes are staggered, so as to comminute the products of combustion from the furnace to obtain the maximum efficiency of the heat. I may, however, use sectional headers having vertical sides, as shown in dotted lines in Fig. 2, or I may make the header 1 in a single shell.

3 are enlarged heads or sectional steam-domes integral or cast with the sectional headers 2, having vertical sides and abutting one against another. The tops of these domes are pierced for the insertion and connection of a series of short pipes 4, which communicate with a manifold A, from which live steam is taken, either for steam or hot water, according to the uses to which the boiler is put. Where the front shell is made in one piece, I prefer to corrugate the bottom wall 9 thereof, and provide a series of braces 11, formed or cast on the interior of the dome 3 between the pipe connections 10 in the rear wall thereof.

5 are the openings made in the rear of the front headers 2, within which take the boiler-tubes 6.

7 is a series of openings in the outer side of the headers, closed by screw-plugs 8. These holes are slightly larger and are each opposite one of the boiler-tube holes 5, whereby the tubes may be expanded into the shell or may be screwed into the shell, and through which access may also be had for cleaning or repairs.

The upper portion 3 or domes of the headers is preferably twice the depth or more of the lower portion, and I may, when desired, make the headers 2 wedge-shaped, Fig. 1, for the more complete and easy separation of the water in the circulation-boiler.

12 are the rear or back headers, having water-leg extensions 13.

14 is a manifold which extends horizontally along the lower ends of the headers 12 and is connected to each header by a short pipe 15. This manifold serves as a return-pipe in steam or hot-water heating or for the introduction of feed-water or for other purposes.

15 are the boiler-tube holes in the inner side of the headers 12 for the tube 6, similar to holes 5 in headers 2.

16 are screw-plugs in the rear headers, similar to plugs 8 and for the same purpose.

17 are a series of larger boiler-tubes above the main tube 6, which are received into the openings 10 in the steam-domes and into the openings 18 in the upper ends of the rear headers 12.

23 are brackets for supporting the front headers. The front and rear shells are preferably inclined at about an angle of fifteen degrees and the water-leg extension of the rear headers stands vertically. The boiler-tubes 6 and headers 2 and 12 are given the inclination shown to facilitate the circulation of water. The water is fed into the water-legs of the rear headers at the back of the furnace and the great heat causes the water to flow very

rapidly through the headers and tubes into the steam-domes with a velocity in each tube varying as its distance from the fire-bed, those tubes nearest the furnace giving the greatest velocity in the circulating system. Owing to the peculiar construction of the headers, steam-domes, and water-tubes, the separation of the steam and water is facilitated in its passage through the tubes and headers and a complete separation effected in the steam-dome for the reason that the series of large upper return-tubes afford a more than ample passage for the return of the watery portion of the bursted steam-bubbles back through and down the rear headers, thus securing an even circulation and an absence of foaming hitherto unattained in boilers of this type.

The boiler may be made of any practical dimensions or of any horse-power.

The enlarged heads or domes of the front headers I consider of great importance in the effective capabilities of my boiler. It affords a complete means for the speedy and complete separation of the steam from the watery particles and the consequent absence of priming, and which is due, also, to the active co-operation of the large tube 17, entering the headers in the manner shown. To make this construction and arrangement a practicable one in the relative dimensions shown, I prefer to make these tubes 17 of substantially-oval form in cross-section in order to get the requisite area within the limits of each header. I may secure the joints of these pipes to the headers in any approved manner. Where the header is made in one piece the entire width of the boiler, it is necessary to corrugate the bottom wall of the dome 3 and introduce the interior brackets 11 therein to provide the requisite strength and compactness, in which case I use round tubes 17 and secure them in any known way. It will be noticed that the domes are connected below the water-line. I may, if desired, use much longer tubes, introduce an intermediate fire-wall, or provide for a return-draft in any of the well-known ways. I prefer to make the headers of cast-iron and the tubes of wrought-iron, screwed or expanded into the header.

Each separate section (including the tubes, headers, whether corrugated or straight, water-leg, dome, and return-circulating tube) may be all cast or formed in one piece. Each section thus formed is arranged side by side within the brickwork or casing and connected by means of the upper and lower manifolds along the domes and water-legs.

In addition to the pipes 4 and manifold A for connecting the domes 3, I may provide lateral openings 20 in axial line throughout the width of the boiler and registering with one another. These openings may have ground or packed seats 21, and a bolt 22, traversing the domes centrally of the openings, may unite all the joints together.

I claim, furthermore—

In a steam-boiler, the combination of front and rear headers, substantially as described, having enlarged heads or steam-domes extending rearwardly to facilitate the separation of the water and steam, a series of boiler-tubes connecting the headers, an upper larger series of tubes for the same purpose as the enlarged heads, connecting the dome or domes at their rear with the rear headers, a manifold connecting the domes, and a manifold connecting the rear headers, substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

LEWIS H. ROSEBURRY.

Witnesses:

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