

S. L. HILL.
STEAM BOILER.

Patented July 18, 1882.



UNITED STATES PATENT OFFICE.

SAMUEL L. HILL, OF BROOKLYN, NEW YORK.

STEAM-BOILER.

SPECIFICATION forming part of Letters Patent No. 261,348, dated July 18, 1882.

Application filed October 5, 1881. (Model.)

To all whom it may concern:

Be it known that I, SAMUEL L. HILL, of Brooklyn, in the county of Kings and State of New York, have invented a new and Improved Steam-Boiler, of which the following is a full, clear, and exact specification.

The object of my invention is to economize fuel in a steam-boiler, and to provide an improved joint for connecting the several tubular parts of the boiler in such a manner that no leakage is likely to take place.

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 cross-sectional elevation of my improved steam-boiler. Fig. 2 is a longitudinal sectional elevation of part of the same. Fig. 3 is a detail sectional elevation of the pipe-joint used in my improved boiler.

The boiler A, which may be provided with fire tubes or flues or may be of any other suitable construction, is provided with a series of water-legs, B, which pass transversely under the boiler, alternately in opposite directions, and have their lower ends connected with the water-drums C, parallel with the boiler and below the same.

A water-leg, B, is made of cast-iron or other material, and it consists of two vertical pipes, D D, connected by one or more transverse pipes, E E, one of the pipes D projecting upward and the other downward, and the pipes E crossing below the boiler, so that one pipe D will be at each side of the boiler. At the connections and joints the pipes D and E are properly curved, so that corners in which sediments might be deposited are avoided. The pipes D and E may have any suitable cross-section; but I prefer to make them circular in cross-section, as shown.

The upper ends of the water-legs B are alternately arranged on opposite sides of the boiler, so that the several water-legs alternately pass under the boiler from right to left and from left to right.

A knee or elbow, F, provided with a top flange, F', and a bottom flange, F'', is riveted to the side of the boiler at or about the middle of the height of the same. One knee F is provided for each water-leg, and consequently

these knees must be arranged alternately on opposite sides of the boiler.

Each pipe D of the water-leg is provided at its end with a flange, G.

The water-drums C are provided with necks J or vertical tubular projections, having each a flange, K, at the upper end. Each drum C is provided with as many necks J as there are water-legs connected with this drum.

The apertures at the ends of the pipes D of the water-leg, at the lower ends of the knees F and upper ends of the necks J, are all provided with an internal bead, L, as shown in Fig. 3.

A short wrought-iron or other coupling-pipe, M, which is beveled or tapered from the middle toward the ends, thus forming a double wedge pipe, is inserted in the lower aperture of the knee F and in the corresponding upper aperture of the water-leg, and is pressed firmly in these openings by means of the screw-bolts N, which pass through the flanges F' and G.

The lower ends of the water-legs and the necks J of the water-drums C are connected in a like manner by a coupling-pipe M and bolts M N passing through the flanges G and K.

The beveled surfaces of the coupling-pipes M rest against the rounded surface of the beads L, and if there are any twisting or side strains on the water-legs or boiler, or if any parts warp, the coupling-pipes can turn slightly on the edge of the beads without causing a leak, and a much closer joint can be formed between the beveled surface of the coupling-pipe and the bead than between the coupling-pipe and a flat surface.

The grate O (shown in dotted lines) must be arranged below the transverse tubes E of the water-legs, but must be above the lower openings of the water-legs, so that none of the joints will be in the fire.

The boiler is supported by means of brackets in the ordinary manner; but these brackets are not shown, as they would make the drawings indistinct and confused.

The flames and products of combustion pass through the interstices between the tubes or pipes D E, and also strike the bottom of the boiler. The flames will thus act on a very large heating-surface before passing off through the smoke-stack, and large quantities of steam can be produced with a slow fire and small

grate, whereby there is a great economy in fuel, and the parts of the boiler will not be subjected to intense flames, as in ordinary boiler-fires. The joints cannot warp, as the bolts have a great leverage, and must give way a considerable distance before they can affect the joints. The number of water-legs can be varied according to the size of the boiler.

P is the bridge-wall.

10 The feed-water is to be conducted into the boiler at that point most distant from the fire. A pipe should connect the head of the boiler with each water-drum in such a manner that the water can pass freely from the boiler to the drums. Each drum should have a separate blow-off pipe, situated as low as possible.

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

20 1. The combination, with the boiler A, of the water-legs B, connected at the lower ends with

the water-drums C on opposite sides of grate O, and parallel to the boiler, as shown and described.

2. The combination, with the steam-boiler A, of the water-drums C and the water-legs B, alternately crossing in opposite directions under the boiler, substantially as herein shown and described, and for the purpose set forth.

3. A boiler water-leg, B, having its median or transverse portion over the grate formed of the hollow branches E, arranged one above another, as shown and described.

4. The combination, with the boiler A, pipes D, and crossing pipes E, connected by bolted flanges, of the coupling-pipes M, tapering from the middle to each end and fitting against beads L, as shown and described.

SAMUEL L. HILL.

Witnesses:

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