

UNITED STATES PATENT OFFICE.

HENRY FRANCE AND CHARLES L. KNOWLES, OF SACRAMENTO, CAL.

IMPROVEMENT IN SETTING STEAM-BOILERS.

Specification forming part of Letters Patent No. 38,956, dated June 23, 1863.

To all whom it may concern:

Be it known that we, HENRY FRANCE and CHARLES L. KNOWLES, both of Sacramento city, in the county of Sacramento and State of California, have invented a new and useful Improvement in Setting Steam-Boilers; and we hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification, in which—

Figure 1 represents a longitudinal vertical section of our invention, the plane of section being indicated by the line *x x*, Fig. 3. Fig. 2 is a transverse vertical section of the same, the line *y y* Fig. 1, indicating the plane of section. Fig. 3 is a horizontal section of the same, taken in the plane indicated by the line *z z*, Fig. 1.

Similar letters of reference in the three views indicate corresponding parts.

This invention relates to an improvement in the bridge-walls under a boiler or a set of boilers, and in the disposition of the flues which pass through and around said boiler or boilers. By the ordinary mode bridge-walls are built up to within six or eight inches of the boiler for the purpose of forcing the draft up to it. Instead of this plan, we construct one or more arches in direct contact with the boiler, leaving the opening of each arch some two feet below the surface. The effect produced by this arrangement is to cut off the open and direct current of air under the boiler and create several chambers or pits in which the heated air is detained, and is consequently applied in the generation of steam.

Our improvement also relates to the mode of passing the draft through the flues in and on the sides of the boiler or boilers. With ordinary flue-boilers it has heretofore been usual to pass the draft under the boiler to the back end and forward through the flues to the chimney or stack in front. By our arrangement, as applied to a set of two boilers, the heated air passes under one boiler to the rear and forward through a flue on the side of the second boiler and back through the flues in said second boiler and forward again through the flues in the first boiler to the chimney or smoke-stack.

To enable others skilled in the art to make

and use our invention, we will proceed to describe it.

A A' represent two steam-boilers, which are set in a common brick wall and over a common grate, C. The boiler A is provided with one or more flues, B, and the boiler A' with a similar number of flues, B'.

F F represent bridge-walls, which support the boiler A, and which are provided with arched openings G at a certain distance below the surface, so that the heated air and products of combustion have to pass down and the open and direct current of air is cut off. By these bridge-walls pits H H' are created, in which the heated air is detained, and consequently applied with increased effect for the purpose of heating the boilers. In these pits ashes and cinders are collected and all combustible matter contained in the fuel is fully consumed. After passing through the arched opening in the last bridge-wall, the heated air escapes through an opening, *a*, in the rear end of the longitudinal wall D, which supports the boiler A', and between this wall and the outside brick wall a side flue, I, is formed, extending from the rear end of the boiler A' to its front end and through this side flue the heated air passes to the opening *b* in the jacket *c*, and through this jacket to the flue or flues B' on the boiler A'. After passing these flues, the heated air reaches the rear connecting-flue, L, which is formed by a plate, *d*, secured under the flues B B', at the rear end of the boilers, as clearly shown in Figs. 1 and 2 of the drawings. Through this flue the heated air passes to the flue or flues B in the boiler A, and after passing through the same it escapes into the chimney E. By these means the heated air is passed four times over the full length of the boilers, first from the grate in front under both boilers to the rear, thence on the side of the boiler A' through the side flue, I, to the front, and back again through the flue or flues B' in the boiler A' to the rear, and finally through the flue or flues B in the boiler A from the rear to the chimney in front. The heat is thus used to the best possible advantage and steam is produced with a considerable saving in fuel. Besides this advantage, the side flue, I, and the rear connecting-flue, L, are so arranged that they are above the water-line, and that by the

heated air passing through the same the steam is superheated and caused to act with increased effect.

What we claim as new, and desire to secure by Letters Patent, is—

1. The arrangement of two or more pits, H H', formed below a boiler, A, by means of one or more bridge walls, F, with an arched opening, G, at a certain distance below the surface, as and for the purpose described.

2. The horizontal plate *d* under the flue or flues B of a steam-boiler, A, in combination with the side flue, I, constructed and operating substantially as and for the purpose specified.

3. The arrangement and combination of the pits H H', side flue, I, flue or flues B' in the boiler A', rear connecting-flue, L, and flue or flues B in the boiler A, all constructed and operating substantially as and for the purpose set forth.

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