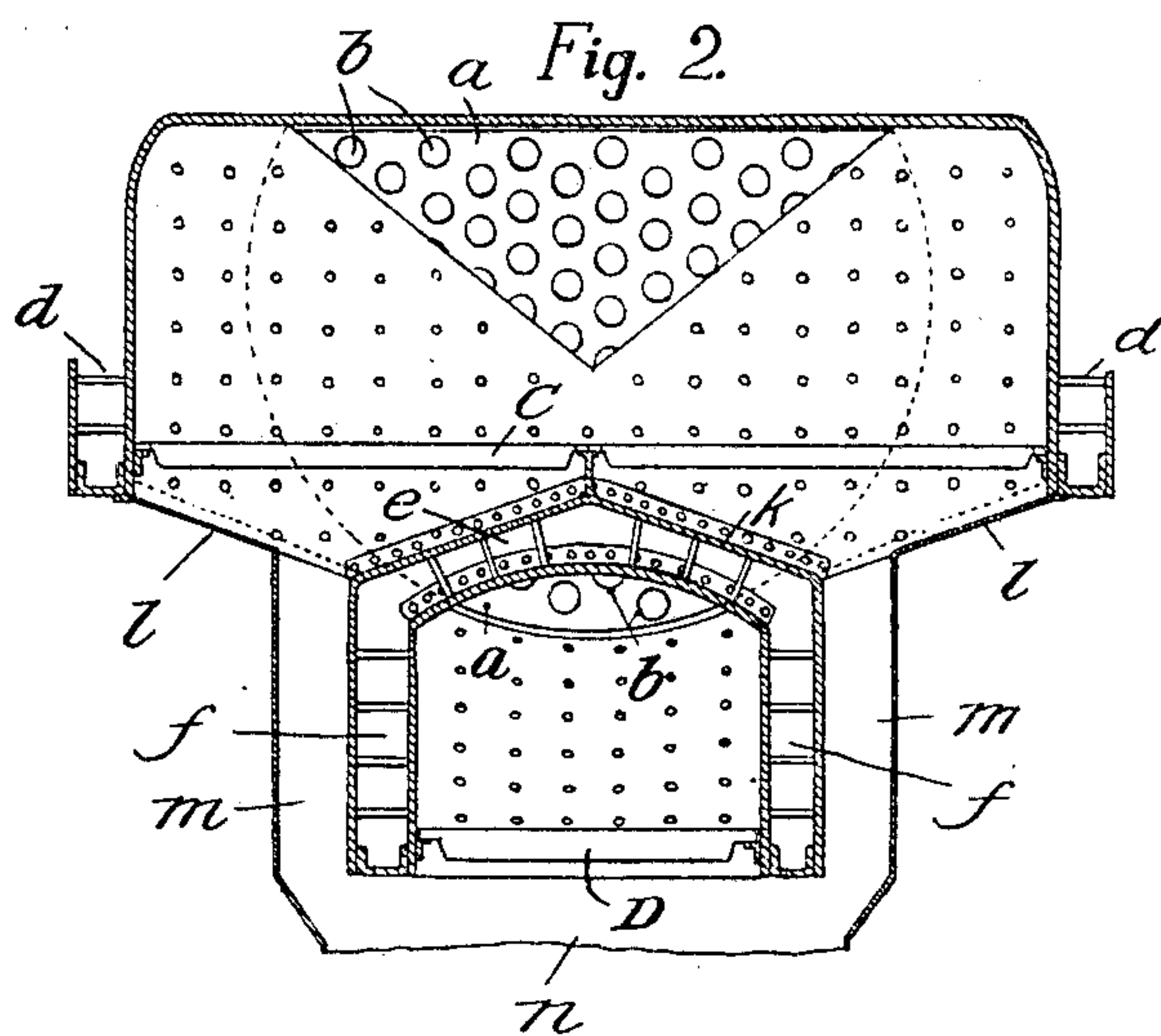
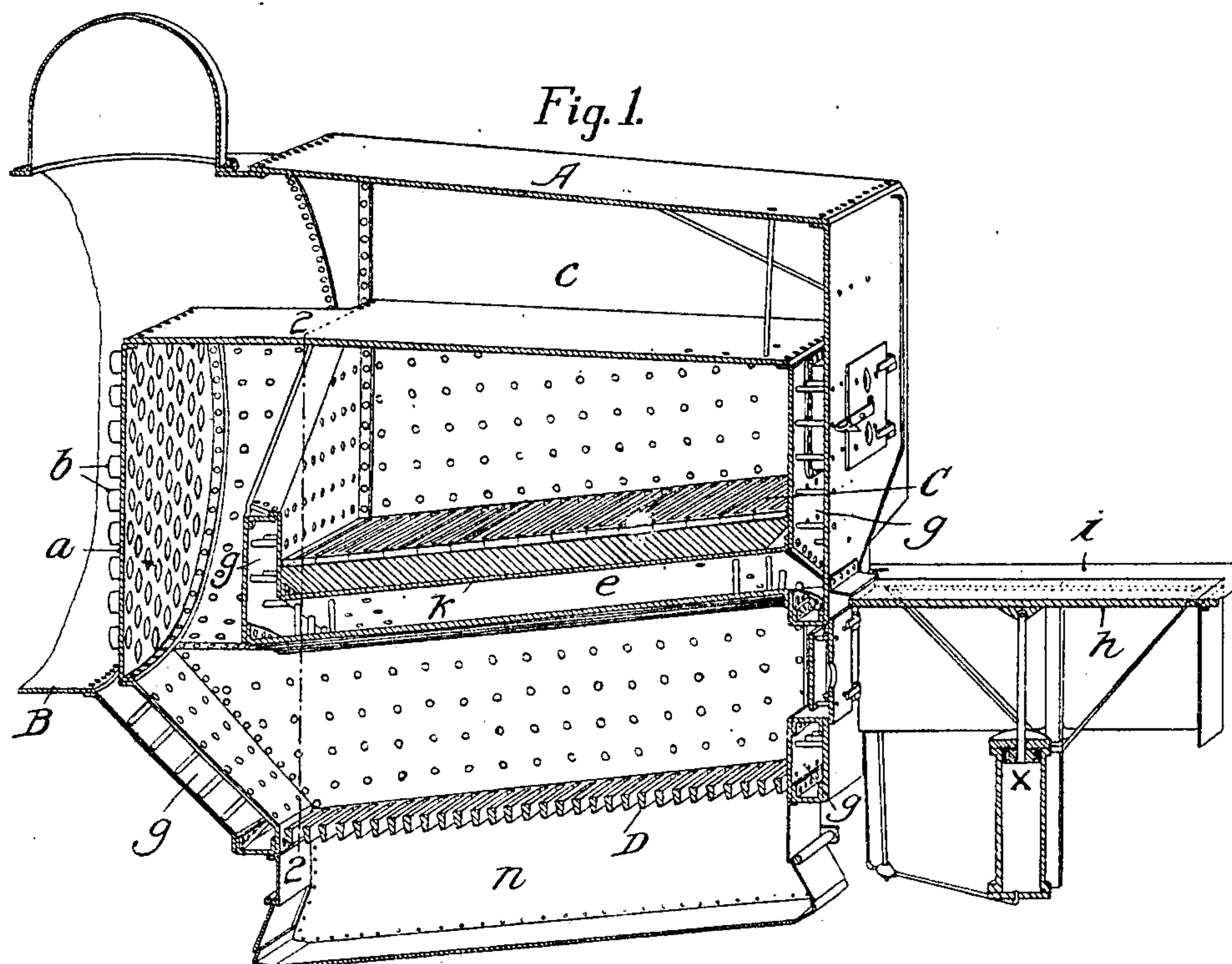


No. 799,116.

PATENTED SEPT. 12, 1905.

J. F. VAN TUYL.
FURNACE FOR STEAM BOILERS.
APPLICATION FILED SEPT. 14, 1903.



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JOHN F. VAN TUYL, OF SAWPIT, COLORADO.

FURNACE FOR STEAM-BOILERS.

No. 799,116.

Specification of Letters Patent.

Patented Sept. 12, 1905.

Application filed September 14, 1903. Serial No. 173,121.

To all whom it may concern:

Be it known that I, JOHN F. VAN TUYL, a citizen of the United States, residing at Sawpit, in the county of San Miguel and State of Colorado, have invented a new and useful Furnace for Steam-Boilers, of which the following is a specification.

This invention relates to an improved steam-boiler having two furnaces arranged one above the other, the general object of the invention being to afford increased grate and heating surface within limited space and weight and to provide a boiler that may readily be adapted to different space conditions. I secure this result by a furnace construction in which the side water-spaces of the upper furnace are terminated near the edges of the grate, so that the ashes from the upper grate may be delivered without using an ash-pan in the space between the two furnaces, thus permitting the upper and lower furnaces to be brought nearer together. In order to more fully utilize the available space, the roof of the water-jacket of the lower furnace preferably slopes from its middle line near the grate of the upper furnace toward each side, so as to throw off ashes falling thereon from the upper furnace.

In many cases—as, for instance, in locomotive-boilers—the conditions of available space make it desirable to use a narrow lower furnace, while a wider upper furnace is permitted. In such cases I preferably employ a casing inclined inward and downward from the side water-spaces of the upper furnace and extending downward at the sides of the lower furnace, but separated therefrom, so as to form ash-passages through which the ashes from the upper grate may be delivered at the side of or below the lower furnace.

In the accompanying drawings, forming a part of this specification, I have shown a portion of a steam-boiler embodying all the features of the invention as applied in their preferred form, and this construction will now be described in detail and the features forming the invention specifically pointed out in the claims.

In the drawings, Figure 1 is a vertical section taken centrally through the furnace portion of the boiler. Fig. 2 is a cross-section on the line 2 2 of Fig. 1.

Referring to said drawings, A is the outside boiler-casing; B, the barrel of the boiler, having the tube-sheet *a* and tubes *b*; C, the upper grate, and D the lower grate; *e*, the top water-space, and *d* the side water-spaces,

of the upper furnace; *e*, the top water-space, and *f* the side water-spaces, of the lower furnace. The end water-spaces of the upper and lower furnaces are lettered *g* and open, as usual, into the other water-spaces of the boiler, and the water-space *e* slopes toward one end, as shown, to insure circulation, as usual in boilers of this class. For convenient access to both furnaces a part *h* of the floor *i* may be movable vertically and operated by a piston and cylinder *x*, as shown, or by any other suitable means.

The two furnaces are water-jacketed furnaces of a common type, except as modified in accordance with the present invention, and the general type of boiler so far as above described is well known, and its operation will be understood from the above description.

Referring now to the features of the present invention, the side water-spaces *d* of the upper furnace terminate near the edges of the upper grate C, so that the space between the two furnaces is left uninclosed by the water-jacket, and the ashes may be delivered outside the boiler without an ash-pan between the two furnaces, and the roof *k* of the top water-space *e* of the lower furnace may thus be brought much nearer to the top grate, reducing largely the vertical dimensions of the boiler. The roof *k* is preferably sloped to opposite sides from the center, as shown, thus enabling the roof center to be brought nearer the top grate and the sloping roof acting to throw off ashes falling from the upper grate and more completely utilizing the available furnace-space.

The ashes from the upper grate may be delivered in any suitable manner within the broader features of the invention; but preferably ash-passages extending downward along the lower furnace are formed by casing *l*, which slopes inward from the bottom of the side water-spaces *d*, so as to carry the ashes toward the center, and downward extensions *m* of this casing continue the ash-passages to the ash-pan *n* below the bottom grate D, which thus receives the ashes from both grates.

The boiler illustrated is a locomotive-boiler, and the wide upper furnace with narrow lower furnace is an adaptation to the conditions of available space, the upper furnace being supposed to be in such case above the wheels and the lower furnace between the wheels, the barrel of the boiler thus extending below the level of the upper grate with-

out danger of becoming cold and enabling a low center of gravity to be maintained with a wide upper furnace. This feature of my boiler—that the two furnaces are independent
 5 of each other as to width, so that a narrow lower furnace can be used where conditions of available space make it desirable—is valuable; but it will be understood that the invention, broadly considered, is not limited to the
 10 furnaces of different widths, although certain combinations of features limited to such construction form more specific parts of the invention.

What I claim is—

15 1. In a steam-boiler, the combination of two water-jacketed furnaces arranged one above the other, the upper furnace having its side water-spaces terminating near the edges of its grate, whereby the space below the upper
 20 furnace is left uninclosed by the water-jacket.

2. In a steam-boiler, the combination of two water-jacketed furnaces arranged one above the other, the upper furnace having its side water-spaces terminating near the edges of
 25 the grate, whereby the space below the upper furnace is left uninclosed by the water-jacket, and the lower furnace having its top sloping toward the sides from its middle line.

3. In a steam-boiler, the combination of two
 30 water-jacketed furnaces arranged one above the other, the upper furnace having its side water-spaces terminating near the edges of its grate, and a casing sloping inward from said water-spaces to carry the ashes from the
 35 upper grate toward the center of the boiler.

4. In a steam-boiler, the combination of two water-jacketed furnaces arranged one above the other, with the upper furnace extending

beyond the lower furnace at the sides, the upper furnace having its side water-spaces terminating near the edges of its grate, a casing sloping inward from said water-spaces to carry the ashes from the upper grate toward the center of the boiler, and ash-passages extending from the inner edge of said casing down-
 45 ward outside the lower furnace.

5. In a steam-boiler, the combination of two water-jacketed furnaces arranged one above the other, the upper furnace having its side water-spaces terminating near the edges of
 50 its grate, and a casing sloping inward from said water-spaces to carry the ashes from the upper grate toward the center of the boiler, and the lower furnace having its top sloping toward the sides from its middle line.
 55

6. In a steam-boiler, the combination of two water-jacketed furnaces arranged one above the other, with the upper furnace extending beyond the lower furnace at the sides, the upper furnace having its side water-spaces terminating near the edges of its grate, a casing sloping inward from said water-spaces to carry the ashes from the upper grate toward the center of the boiler, and ash-passages extending from the inner edge of said casing down-
 60 ward outside the lower furnace, the lower furnace having its top sloping toward the sides from its middle line.
 65

In testimony whereof I have signed my name to this specification in the presence of two sub-
 70 scribing witnesses.

JOHN F. VAN TUYL.

Witnesses:

C. E. LOWE,

A. E. WARRINGTON.