

No. 661,803.

Patented Nov. 13, 1900.

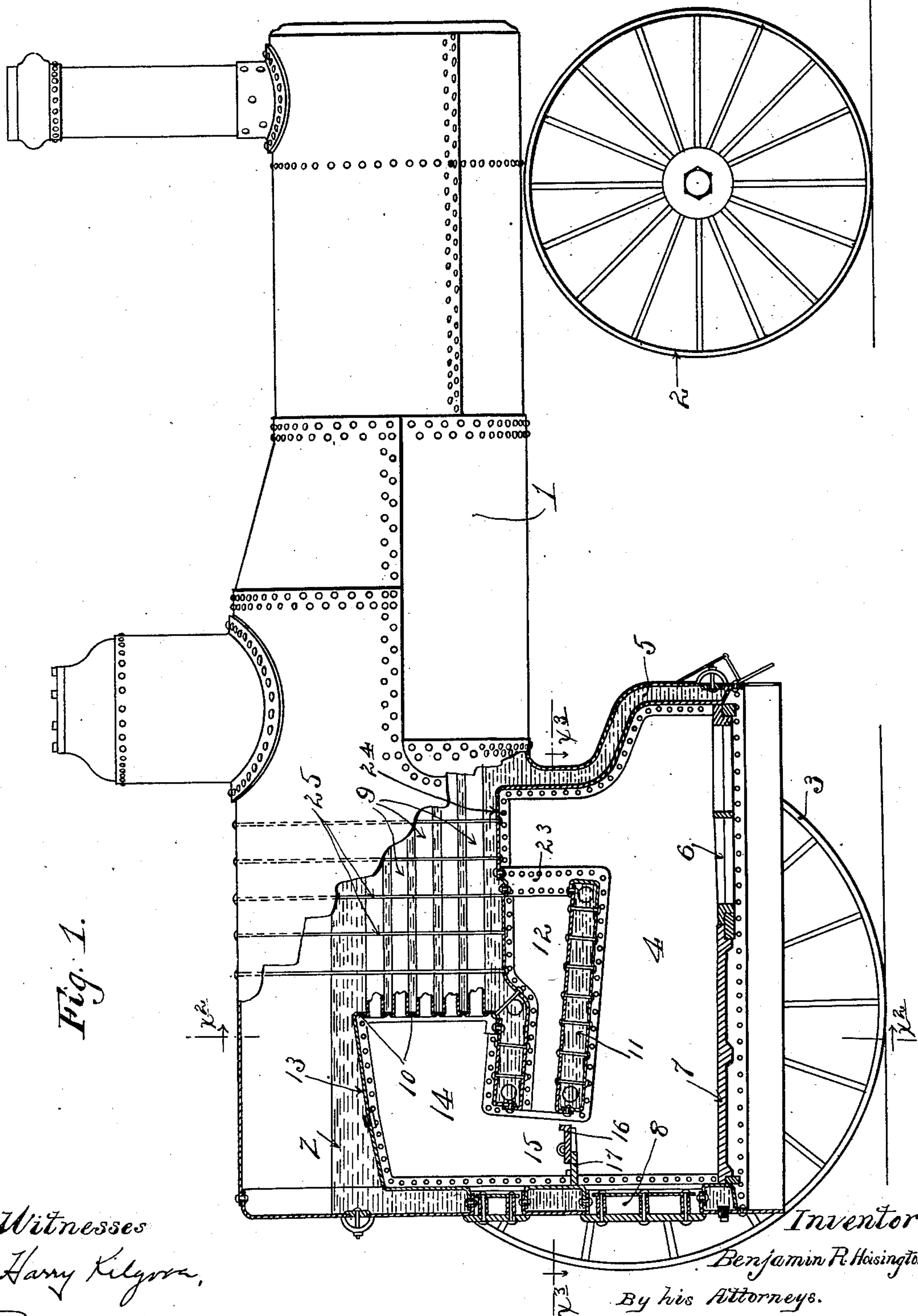
B. R. HOISINGTON.

FIRE BOX.

(Application filed May 5, 1900.)

(No Model.)

2 Sheets—Sheet 1.



Witnesses
Harry Kilgore,
Robert Otto

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2 Sheets—Sheet 2.

Fig. 2.

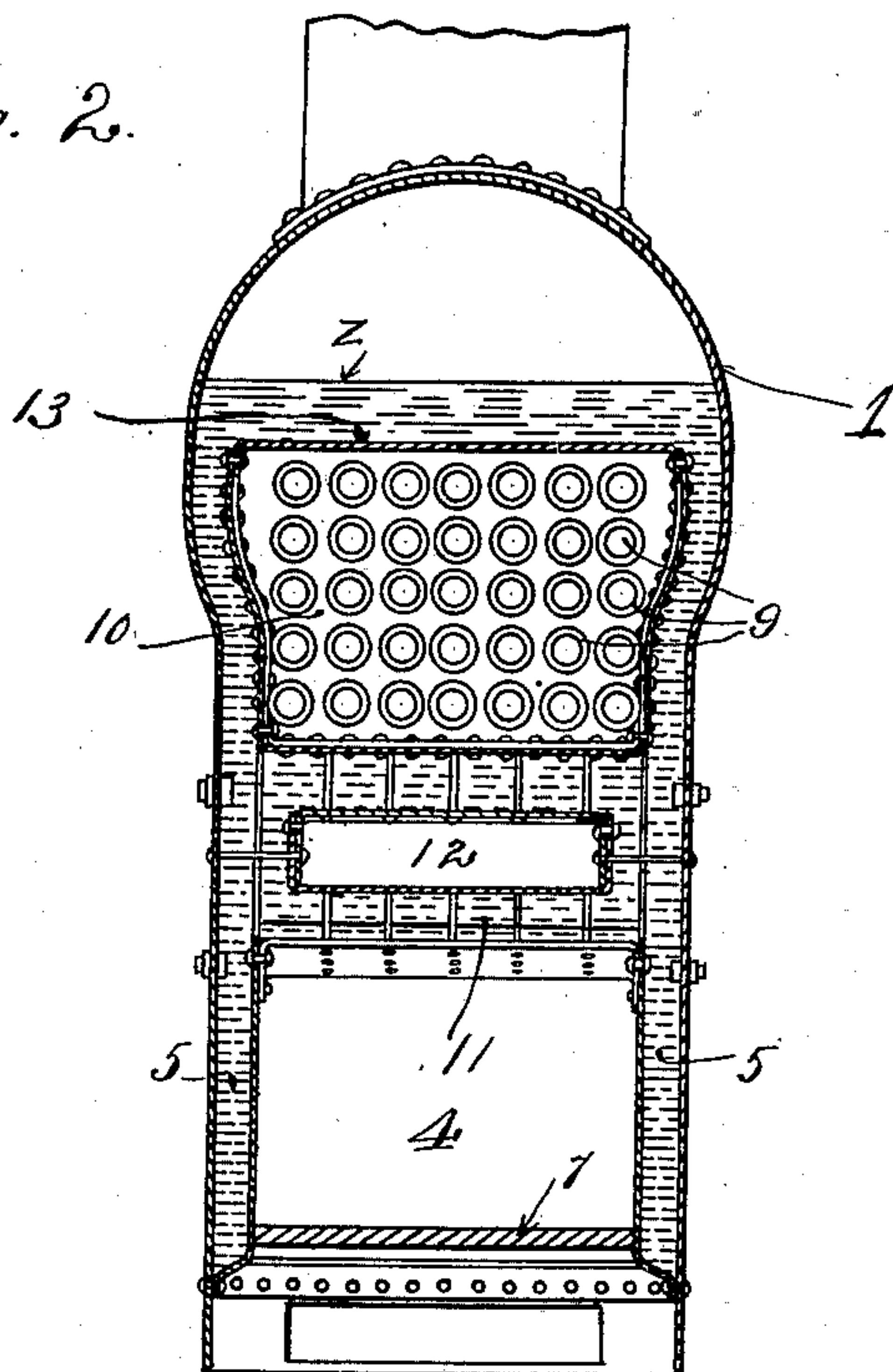
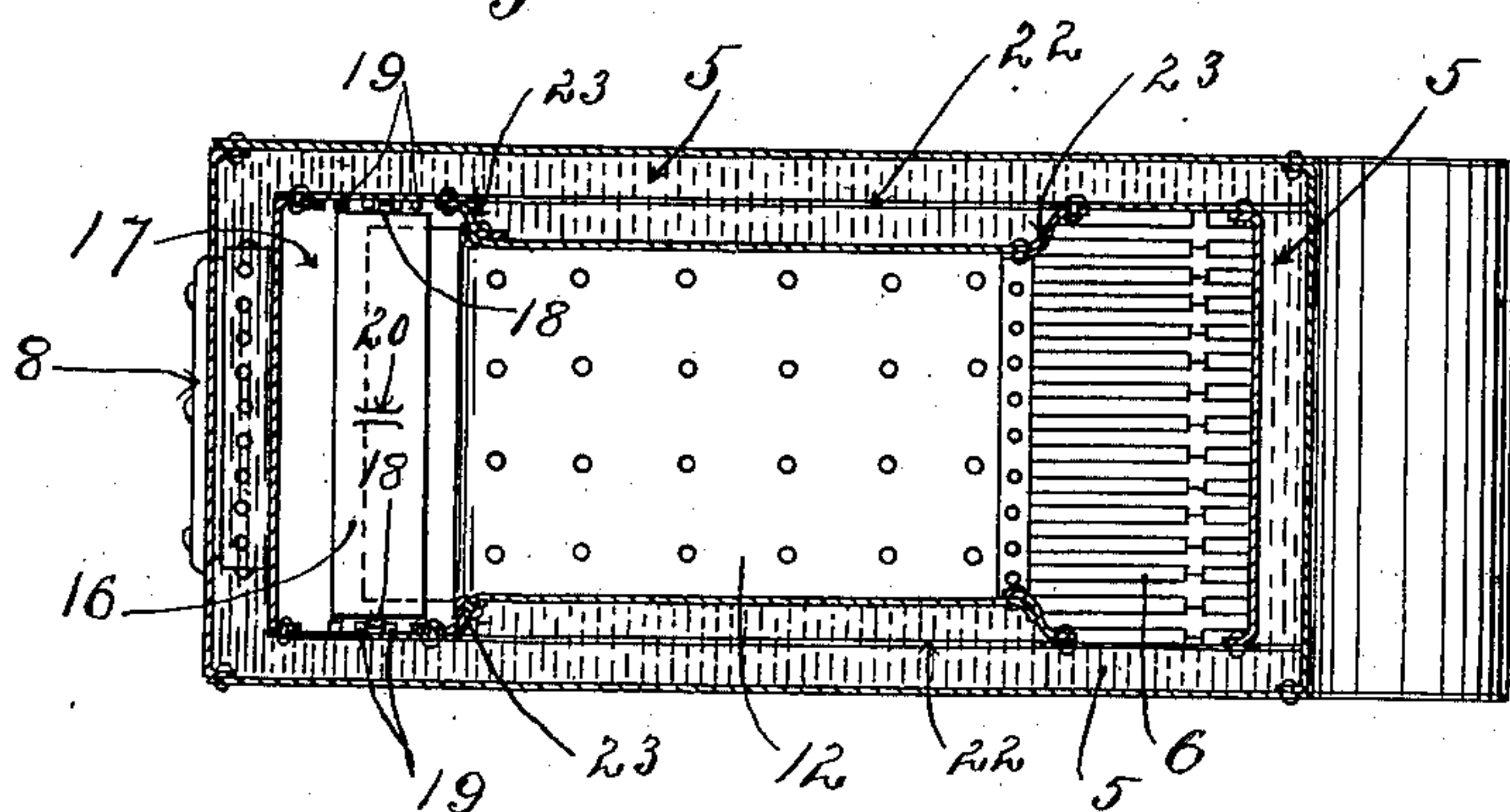


Fig. 3.



Witnesses

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UNITED STATES PATENT OFFICE.

BENJAMIN R. HOISINGTON, OF MINNEAPOLIS, MINNESOTA.

FIRE-BOX.

SPECIFICATION forming part of Letters Patent No. 661,803, dated November 13, 1900.

Application filed May 5, 1900. Serial No. 15,564. (No model.)

To all whom it may concern:

Be it known that I, BENJAMIN R. HOISINGTON, a citizen of the United States, residing at Minneapolis, in the county of Hennepin and State of Minnesota, have invented certain new and useful Improvements in Fire-Boxes; and I do hereby 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.

My present invention has for its object to improve the construction of boiler fire-boxes with a view of obtaining the maximum of heating-surface and hence the maximum of generating efficiency.

To this end the invention consists of the novel devices and combinations of devices hereinafter described, and defined in the claims.

The invention is illustrated in the accompanying drawings, wherein like characters indicate like parts throughout the several views—

Figure 1 is a view, partly inside elevation and partly in longitudinal vertical section, showing a boiler having a fire-box constructed in accordance with my invention. Fig. 2 is a transverse vertical section on the line $x^2 x^2$ of Fig. 1, and Fig. 3 is a horizontal section approximately on the line $x^3 x^3$ of Fig. 1.

In the drawings I have illustrated the features of my invention as incorporated in the fire-box construction of a traction-engine such as used in connection with threshing-machines. The numeral 1 indicates the body of the boiler, and the numerals 2 and 3 indicate, respectively, the front and rear wheels of the engine, certain parts of the engine being removed.

The main or primary portion 4 of the fire-box is formed between or within water-jacketed walls 5, and the bottom of said fire-box is shown as made up of an ordinary grate 6 and an imperforate bottom section 7. An ordinary fire-door 8 opens and closes an ordinary opening in the rear wall of the fire-box to afford means for supplying fuel into the primary chamber or fire-box proper, 4.

The boiler flues or tubes 9 extend backward, preferably, over more than half of the fire-box or primary chamber 4 and are secured at their

ends in the ordinary manner in suitable openings of a flue-sheet 10. A water-chamber 11, which communicates with the main body of the boiler, depends into the primary chamber 4, but terminates at its ends short of the front and rear walls of the said chamber 4, as best shown in Fig. 1. Extending longitudinally and approximately horizontally through the water-chamber 11 is a combustion-passage 12, which is preferably rectangular in cross-section and made thinner or contracted at its rear end. The rear inner wall of the fire-box 4 is extended upward and then forward, forming a crown-sheet, as shown at 13, and is connected at its forward edge to the upper edge of the flue sheet 10. Thus a supplemental or secondary combustion-chamber 14 is formed above the chamber 4 and between the said chamber 4 and the flues 9.

The products of combustion for the burning fuel may pass from the primary chamber 4 to the supplemental or secondary combustion-chamber 14 by either one or both of two routes, to wit: the one through the combustion-passage 12 and upward into the said chamber 14 and the other directly upward from the said chamber 4 through a contracted passage 15 and thence into the said chamber 14. The contracted passage 15 is adapted to be closed and opened more or less by a damper-plate 16, which rests upon a shelf 17, secured to the rear inner wall of the fire-box. To hold the damper-plate 16 where set, it is provided at its ends with lugs 18, adapted to fit between any two of a series of teeth or lugs 19 on the ends of the shelf 17. To provide for the adjustment of the said damper 16 from the exterior of the fire-box, it is shown as provided with an eye or perforated lug 20, with which the end of a poker or similar tool may be engaged. To provide for the insertion of the poker, the fire-box is provided with a small door above the shelf 17.

It will be noted that the crown-sheet 13 of the auxiliary chamber 14 is below the level of a column of water z , so that this sheet 13 serves also as a generating-surface. It will also be noted that the combustion-passage 12 is less in width than the combustion-chambers 4 and 14. To give free circulation of the water from the water-jacketed sides of the fire-box to the sides of the water-cham-

ber 11, the inner side walls of the fire-box are cut away opposite to the said water-chamber 11, as shown at 22, and water-tight joints are formed between the sides of the said water-chamber 11 and the said walls of the fire-box by means of riveted and calked strips 23. (Best shown in Fig. 3.) The horizontal crown-sheet 24 at the top of the primary combustion-chamber 4 and at the top of the passage 12 is preferably additionally supported from the top of the boiler by rods 25. Other rods and bolts are employed wherever desired to give additional strength and rigidity to the parts.

With a fire-box constructed as above described and with the passage 15 opened by the damper 16 the products of combustion or burning-fuel flames will divide, part passing through the return draft-passage 12 and from thence into the secondary combustion-chamber 14 and part passing under the bottom of the water-chamber 11 and upward through the passage 15 into the said secondary chamber 14. As the divided products reunite in the secondary combustion-chamber 14 the combustion will be again intensified by the intermingling of the flames or burning gases and from this chamber will be again divided and passed forward through the ordinary flues 9. By regulating the damper 16 more or less of the draft and burning products may be directed through the passages 12 and 15, so that in this way the best distribution of heat on the generating-surfaces may be attained.

From the above description it is obvious that a very large amount of generating or heating surface is exposed to the flame; also, by dividing the burning gases and reuniting them the combustion is rendered more complete, which of itself results in a saving of fuel and energy.

What I claim, and desire to secure by Letters Patent of the United States, is as follows:

1. In a fire-box, the combination with a primary combustion-chamber, of a secondary combustion-chamber above the same leading to the flues, a direct passage between said combustion-chambers, and an approximately horizontal water-jacketed return draft-passage leading from the said primary to said secondary chamber, substantially as described.

2. In a fire-box, the combination with a primary combustion-chamber 4, of the secondary combustion-chamber 14 between said chamber and the flue, the water-chamber 11 depending within said chamber 4 and provided with the return draft-passage 12, and the adjustable damper 16 for varying the passage 15 between said chambers 4 and 14, substantially as described.

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

BENJAMIN R. HOISINGTON.

Witnesses:

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