

No. 660,661.

Patented Oct. 30, 1900.

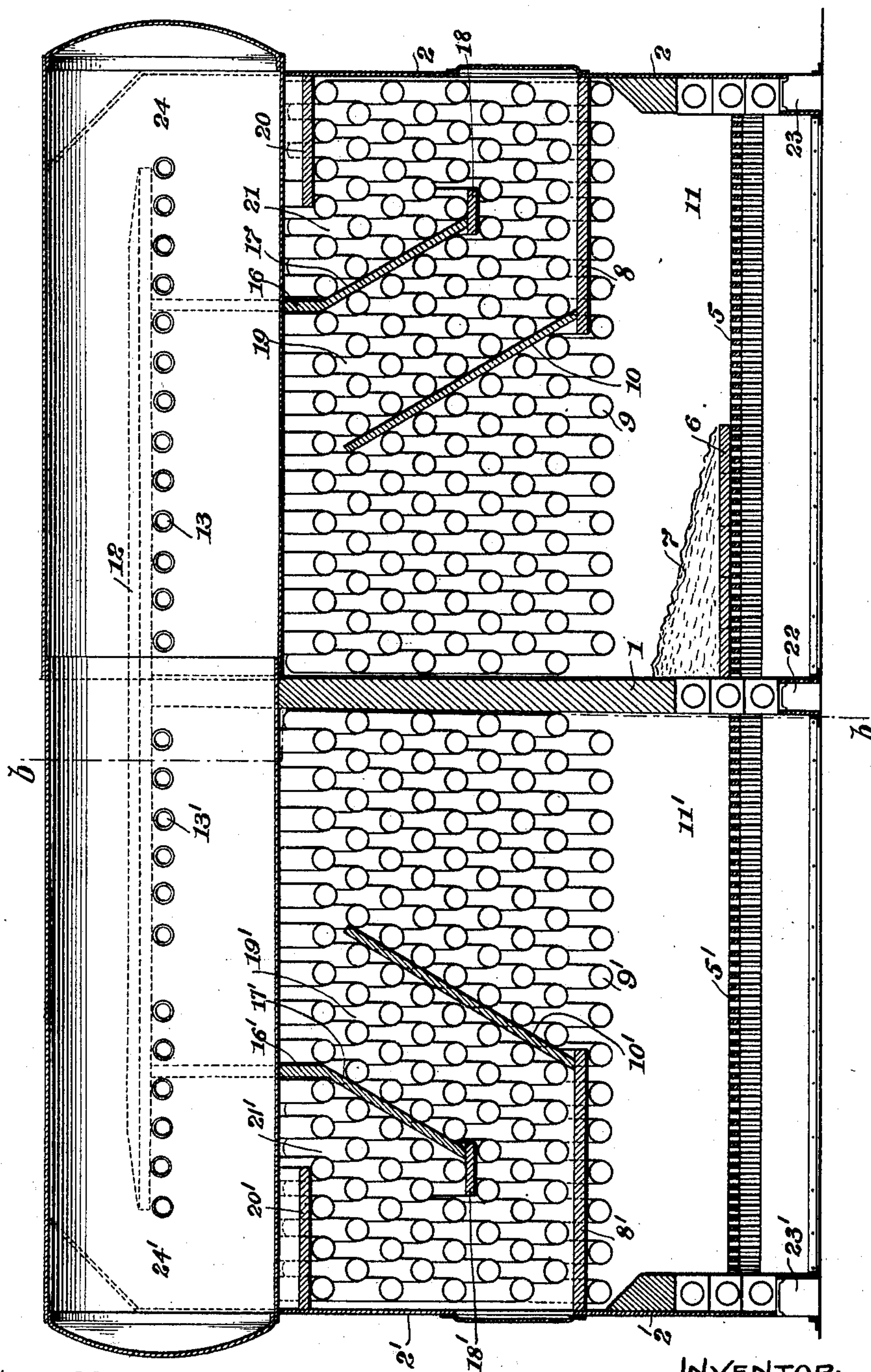
J. A. STEVENS.  
BOILER FURNACE.

(Application filed May 8, 1900.)

(No Model.)

2 Sheets—Sheet 1.

FIG. 1



•WITNESSES.

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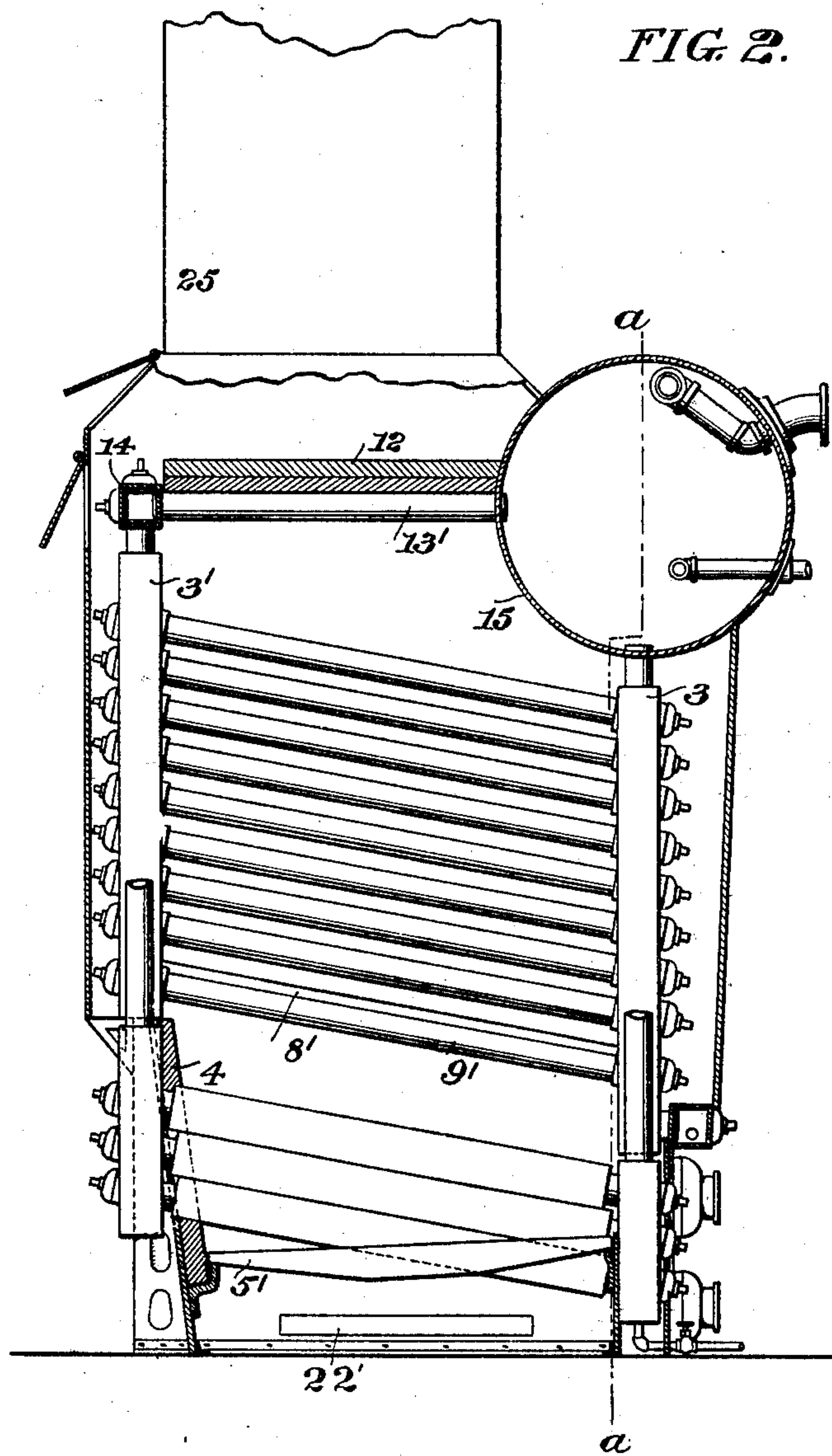
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WITNESSES.  
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# UNITED STATES PATENT OFFICE.

JOHN A. STEVENS, OF LOWELL, MASSACHUSETTS.

## BOILER-FURNACE.

SPECIFICATION forming part of Letters Patent No. 660,661, dated October 30, 1900.

Application filed May 8, 1900. Serial No. 15,882. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN A. STEVENS, residing at Lowell, in the county of Middlesex and State of Massachusetts, have invented an Improvement in Boiler-Furnaces, of which the following is a specification.

This invention relates to a furnace provided with a system of baffling so arranged that the passages through which the heated products of combustion travel are gradually reduced in order that as their volume decreases owing to the decrease of temperature their distribution over the area of heating-surfaces in such passages will be equalized, the baffles being arranged to direct the heated products of combustion so as to avoid short-circuiting or cutting out of the track of the heated gases portions of the heating-surfaces and the grate extending under all of the baffles for the purpose of providing a large grate area.

In the accompanying drawings, Figure 1 is a longitudinal sectional view of a furnace embodying my improvements, taken on the line *a a* of Fig. 2; and Fig. 2 is a transverse sectional view thereof, taken on the line *b b* of Fig. 1.

As shown in the accompanying drawings, the furnace is divided by the wall 1 into two distinct combustion-chambers inclosed by the end walls 2 2', the front and rear headers 3 3', and the grate-back 4. The grates 5 5' extend under the entire combustion-chambers, affording large grate areas, which may be reduced as desired by covering portions of the same with refractory tiles 6, made air-tight by a covering of asbestos or other suitable material 7. Baffles 8 8', extending horizontally from the respective ends of the furnace-chambers toward the division-wall and supported upon the lower row of the tubes 9 9', which connect the front and rear headers 3 3', combine with diagonal baffles 10 10', supported by the tubes 9 9', to form contracting primary passes 11 11'. Extending from the top of the division-wall toward the end walls, above the combustion-chambers, is a roof-baffle 12, supported upon the tubes 13 13', which connect the water-box 14 of the rear headers with the steam-and-water drum 15, attached to the front headers. Vertical baffles 16 16' extend downward from the roof-baffle 12 and combine with the inclined baffles 17 17' and

the baffles 18 18', extending horizontally, all supported by the tubes 9 9', to form contracting secondary passes 19 19'. Baffles 20 20', extending horizontally from the respective ends of the furnace-chambers toward the baffles 16 16', form contracting tertiary passes 21 21'. The escapes from the respective chambers are through the passages 24 24', between the end walls and the ends of the roof-baffle, and thence through the stack 25.

The middle and end walls 1 and 2 2' are provided with the respective air ducts or channels 22 and 23 23', having openings, as 22', for admitting air beneath the grates to furnish the necessary draft.

In operation, when the maximum power of the furnace is required, the fire is spread over the entire grate areas and air may be blown under the grates through the channels in the furnace-walls. The hot gaseous products of combustion, rising in the first instance under the entire structure to be heated, are gradually contracted by the baffles and conducted through the respective passes by easy courses transversely to the direction of the tubes. This arrangement of the baffles secures economy of construction, together with a high degree of efficiency.

The ability to use either one or both compartments of the furnace, to adjust the grate areas, and to adjust the baffles renders the regulation and repair of the furnace and the boiler employed therewith free from difficulty.

It will be understood that the features described may be employed in a single furnace as well as in the compound furnace illustrated.

Having thus described my invention, I claim—

1. In a boiler-furnace, a combustion-chamber comprising a primary pass having a horizontal baffle and an inclined baffle for confining and contracting the gaseous products passing therethrough, in combination with water-tubes arranged transversely to said combustion-chamber and so disposed as to support the baffles in both the horizontal and inclined positions, said baffles being adjustable and said horizontal baffle being adapted to support said inclined baffle, substantially as described.



2. In a boiler-furnace, a combustion-chamber comprising a primary pass, a secondary pass and a tertiary pass, a roof-baffle therefor, an adjustable horizontal baffle and an adjustable inclined baffle adapted to be supported thereby between said primary and secondary passes, an adjustable vertical baffle and an adjustable inclined baffle adapted to support said vertical baffle between said secondary and tertiary passes, in combination with water-tubes arranged transversely to said combustion-chamber and so disposed as to support said baffles, substantially as specified.

3. In a boiler-furnace, a combustion-chamber comprising a primary pass, a secondary pass and a tertiary pass, a grate extending beneath all of said passes, a roof-baffle for

said passes, a horizontal baffle and an inclined baffle adapted to be supported thereby between said primary and secondary passes, a vertical baffle and an inclined baffle adapted to support said vertical baffle between said secondary and tertiary passes, in combination with water-tubes arranged transversely to the combustion-chamber and so disposed as to support said baffles and permit them to be adjusted, substantially as specified.

In testimony whereof I have hereunto set my hand, in the presence of the subscribing witnesses, this 4th day of May, 1900.

JNO. A. STEVENS.

Witnesses:

GEO. M. STEVENS,  
WALTER SLADER.