

(No Model.)

A. BERNEY.  
Furnace.

No. 239,307.

Patented March 29, 1881.

FIG. 1.

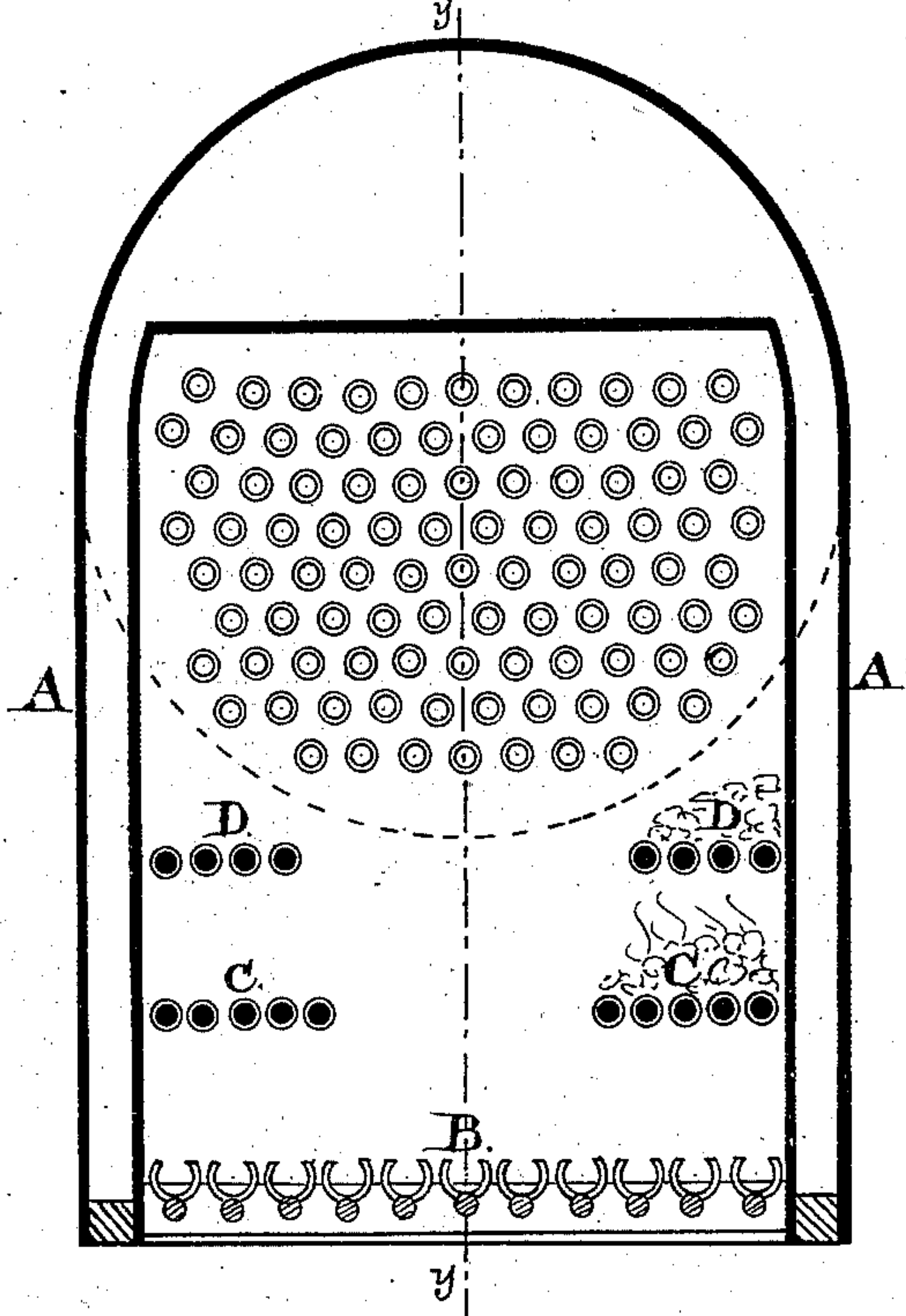
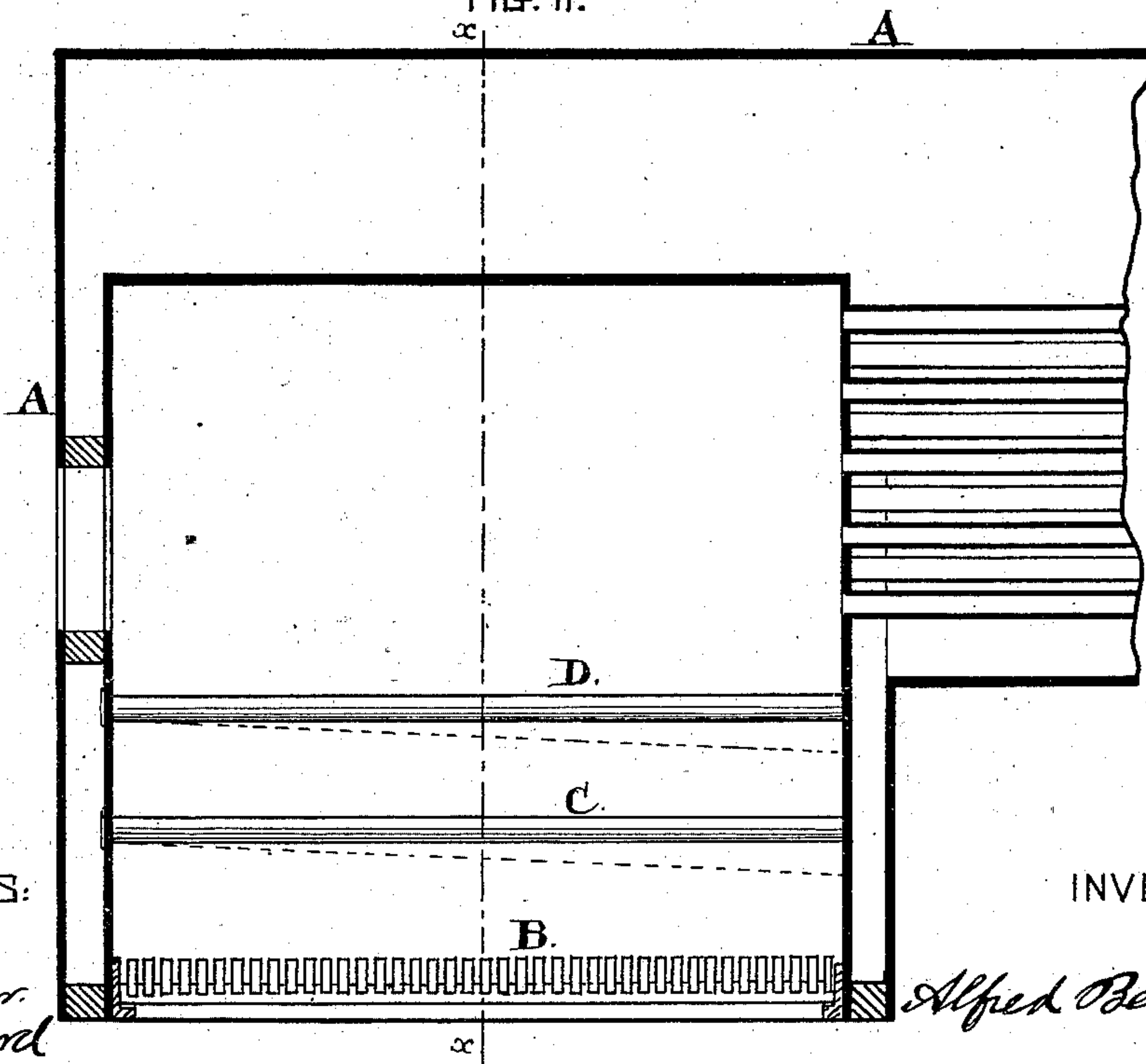


FIG. II.



WITNESSES:

*James Miller*  
*Robert Guard*

INVENTOR:

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# UNITED STATES PATENT OFFICE.

ALFRED BERNEY, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO NATHIEL A. DUTTON, OF SAME PLACE.

## FURNACE.

SPECIFICATION forming part of Letters Patent No. 239,307, dated March 29, 1881.

Application filed September 28, 1880 (No model.)

*To all whom it may concern:*

Be it known that I, ALFRED BERNEY, a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Furnaces; 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, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

My invention relates to improvements in furnaces; and the object is to coke the coal and produce better combustion of the fuel than has been done heretofore to my knowledge.

The invention consists in arranging above the ordinary grate-bars two or more tiers or shelves or water-bars, upon which the fuel is to be fed and coked, and finally dumped onto the lower grate-bars to be consumed, all of which will be more fully described herein-after, reference being had to the accompanying drawings, in which—

Figure I is a vertical cross-section of a furnace having my improvement attached, on line *x x*. Fig. II is a longitudinal section of the same on line *y y*.

In the drawings, A represents the furnace of a locomotive, portable, stationary, or other boiler, having in its lower part the ordinary grate, B. A short distance above the grate B are arranged, on each side of the furnace, two or more tiers or shelves, C D, composed of tubular or water bars, extending from the front to the rear water-spaces, so that the water can freely circulate through them, and they are therefore slightly inclined, as shown by the dot-

ted lines in Fig. II. The coal or fuel is fed upon water-bars C D, and, by the fire from the lower or ordinary bars, ignited and coked. After the coal or fuel has been thoroughly coked, in which condition it also assists in burning the gases and products of combustion from the lower grate, it is dumped onto said lower grate, and finally consumed thereon. It will thus be seen that a much better result of combustion of the fuel can be obtained, while at the same time the water is heated in the water-bars and a better generation of steam is produced.

I am aware that water-bars in tiers have been used in boilers extending, however, from side to side of the furnace, and also in connection with ordinary grate-bars; but in such cases a separate door is used to introduce the coal or fuel upon the tiers of bars, while with my construction only one door is required, and the coked fuel can be easily dumped upon the ordinary grate from the tiers or shelves. I therefore do not broadly claim a series of tiers of water-bars; but,

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a furnace, two or more tiers or shelves of water-bars arranged over the ordinary grate-bars, substantially as specified.

2. In a furnace, the combination of two or more tiers or shelves, composed of a series of water-bars, with the ordinary grate, all arranged substantially as shown and herein described.

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

ALFRED BERNEY.

Witnesses:

W. F. HELLEN,

AUG. A. NICHOLSON.