

## **Improvements in smoke consuming furnaces / [Edward Thornton].**

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COMPLETE SPECIFICATION.

**"Improvements in Smoke Consuming Furnaces"**

We, EDWARD THORNTON, of Coitsville, in the County of Mahoning, and State of Ohio, United States of America Mechanic, and GEORGE SAMUEL SMITH of Coitsville, in the County of Mahoning, and State of Ohio, United States of America, Mechanic, do hereby declare the nature of this invention and in what  
5 manner the same is to be performed to be particularly described and ascertained in and by the following statement:

A furnace constructed in accordance with our invention is particularly adapted to consume all the combustibles contained in the fuel thereby increasing the temperature of heat and obtaining a considerable saving of the consumption of fuel.  
10

The object of our invention is to construct a furnace of this character with means to supply air and steam to the fire box, from beneath the grate-bars, causing the fire to burn more evenly and increasing the temperature of the same without an additional charge of fuel for obtaining this purpose, or in  
15 other words, thoroughly consuming all the combustibles contained in the fuel, thereby obtaining this increased temperature and generating steam more rapidly at a considerable saving in the consumption of fuel.

A further object of the invention is to provide the bridge wall of the furnace with a series of steam and air channels for projecting air and steam against  
20 the flame as it crosses the bridge-wall of the furnace, thereby arresting the smoke and combustibles as the same are drawn towards the fuel and causing the consumption of the same; furthermore, arranging at the top of the bridge-wall, in alinement with the steam and air channels, a perforated pipe, through which air is projected and meets the air and steam as they leave the channels  
25 of the bridge-wall, this assisting materially in the consuming of the fuel and combustibles as the same are drawn towards the fuel, furthermore, forcing the same to a great extent back upon the fire, which also assists in the consumption of the combustibles contained in the fuel.

A further object of our invention is to construct a furnace of this character  
30 which will be extremely simple in construction, strong, durable, efficient in its operation, and comparatively inexpensive to manufacture.

With the above and other objects in view, the invention finally consists in the novel construction, combination and arrangement of parts to be hereinafter more fully described and specifically pointed out in the claims.

35 In describing the invention in detail, reference is had to the accompanying drawings, forming a part of this specification, and wherein like numerals of reference indicate corresponding parts throughout the several views, in which:—

Figure 1, is a side view, partly in section, of a furnace equipped with our improved device.

40 Figure 2, is a cross sectional view, partly in section, taken on the line 2—2 of Figure 1.

Referring to the drawings by reference numerals 1 indicates the side walls of a furnace, 2 the rear walls, and 3 the front walls. The reference numerals 5 indicates the door to the fire box, and 6 the door to the ash pit. The furnace  
45 is provided with a series of suitable grate-bars 7, a bridge wall 8, and a boiler 9 secured therein in any desirable manner.

[Price 8d.]



*Thornton and Smith's Improvements in Smoke Consuming Furnaces.*

Arranged within the bridge wall 8 is a series of vertical steam and air channels 10, connected to a supply pipe 11, which in turn is connected by means of a union 12, to a steam feed pipe 13, and air supply 14. The union 12 and its connections is provided with a suitable cut off 15. The vertical steam and air channels terminate at the top of the bridge wall as shown, and arranged 5 above the same and extending transversely across the furnace, is an air pipe 16, connected to a suitable source of air supply, not shown, and which is provided with a series of perforations 17, to permit of the projecting of air therefrom against the steam and air as they leave the vertical channels 10.

Arranged beneath the grate-bars of the furnace is a steam and air pipe 18, 10 connected by a union 19, to the air pipe 14, and steam supply pipe 13. The union 19 and its connections being provided with a cut off 20. The air and steam pipe 18, has arranged therein a series of perforations 21, to permit of the projecting therefrom of the steam and air up through the grate-bars, and through the fire, this materially causing the fire to burn more evenly and 15 increasing the temperature of the same without an additional charge of fuel for obtaining such purpose.

The operation of the device is as follows: Assuming that the fire is arranged upon the grate, the smoke combustibles and flame as they are drawn towards the flue, are arrested by means of the steam and air from the vertical channels 20 11, and the air from the air pipe 17, this creating a means for forcing the combustibles back upon the fire, as well as consuming the same.

It is thought that the many advantages of our improved construction, as to the consumption of combustibles contained in the fuel, thereby obtaining a considerable saving of fuel, can be readily understood from the appliances used 25 in connection with the furnaces, as set forth in the foregoing description, and illustrated in the accompanying drawings, and it will be noted that various changes may be made in the details of construction without departing from the general spirit of our invention.

Having now particularly described and ascertained the nature of our said 30 invention, and in what manner the same is to be performed, we declare that what we claim, is:

The combination with the bridge-wall and combustion-chamber of a furnace, of a perforated pipe 18 extending across the ash-pit beneath the grate-bars for feeding steam to said combustion-chamber, a pipe 11 extending through the 35 bridge-wall with a series of channels connected thereto with their outlets at the top of the bridge-wall, said pipe 11 and the pipe 18 connected to a common steam supply, an air supply for said pipes 11 and 18, and a perforated pipe 16 located above the bridge-wall for supplying coil air to the steam and hot air emitted from the channels in the bridge-wall, as and for the purpose described. 40

Dated this 4th day of Sept A.D., 1900.

EDWARD THORNTON  
GEORGE S SMITH

In the presence of:

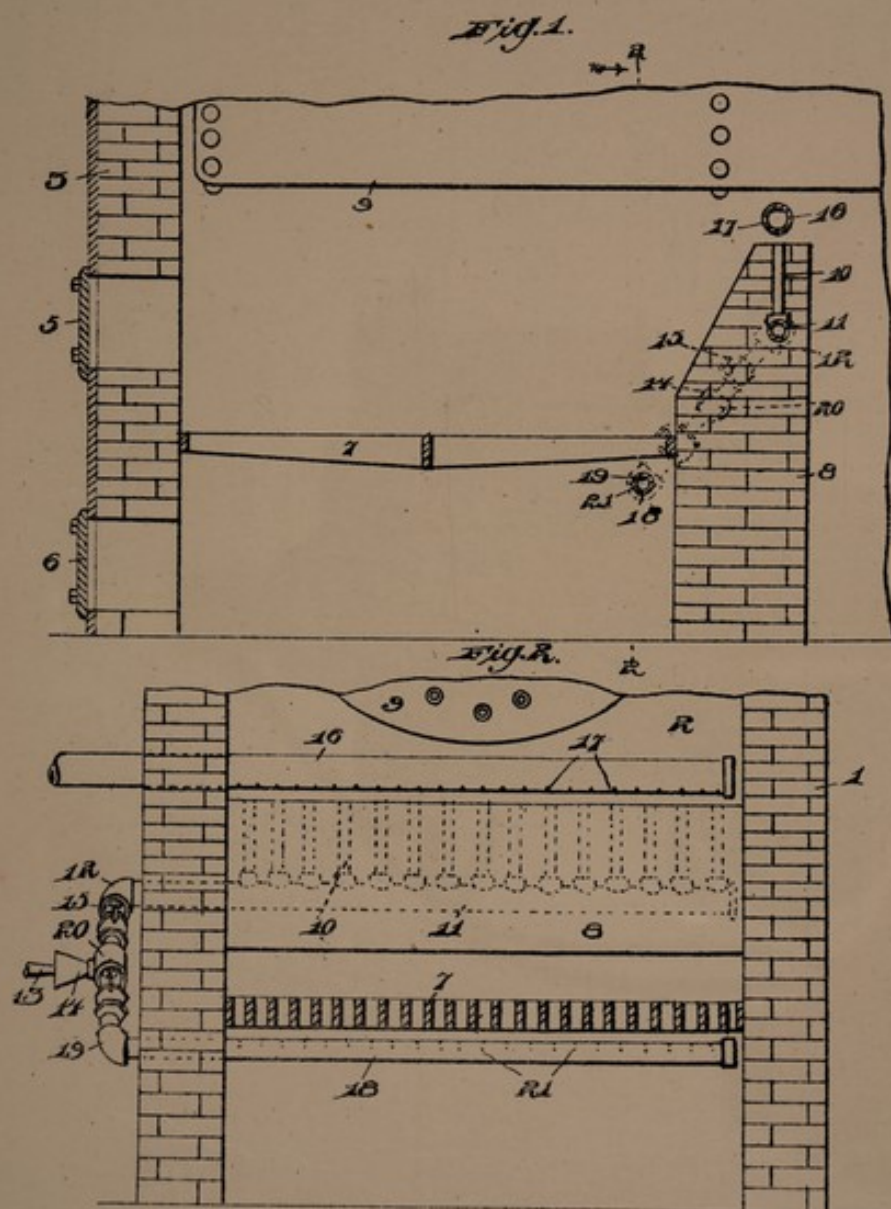
E. E. POTTER  
J. P. TEPELMAN,

45

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[This Drawing is a reproduction of the Original on a reduced scale.]

