

## **Specification of James Biden : furnaces.**

### **Contributors**

Biden, James.

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A.D. 1854 . . . . . N° 2538.

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S P E C I F I C A T I O N

OF

JAMES BIDEN.

—  
FURNACES.  
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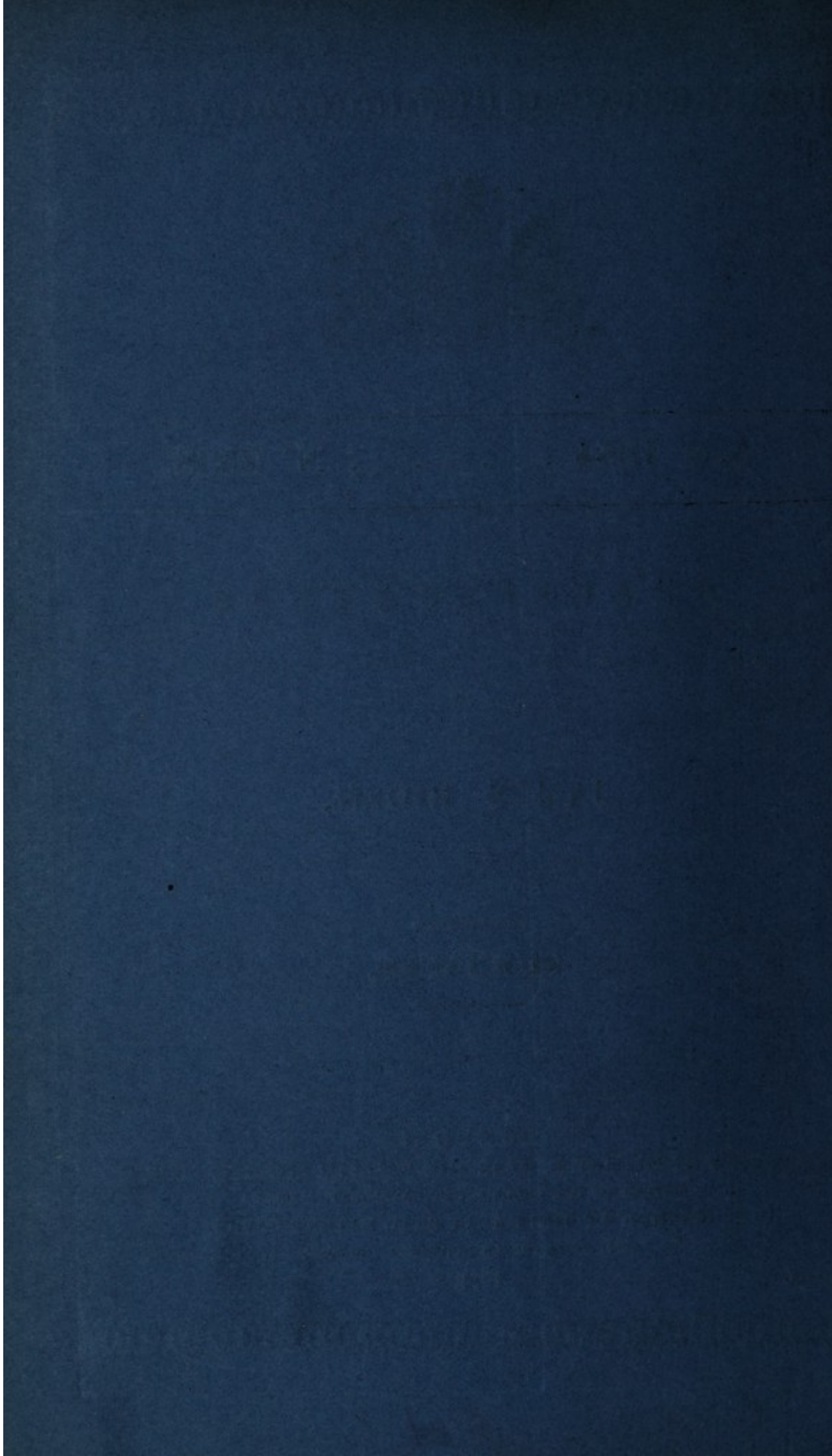
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1855.





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A.D. 1854 . . . . . N° 2538.

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**Furnaces.**

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**LETTERS PATENT** to James Biden, of Gosport, in the County of Hants, England, for an Invention for "**THE PREVENTION OF SMOKE FROM FURNACES.**"

Sealed the 8th May 1855, and dated the 2nd December 1854.

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**PROVISIONAL SPECIFICATION** left by the said James Biden at the Office of the Commissioners of Patents, with his Petition, on the 2nd December 1854.

I, **JAMES BIDEN**, of Gosport, Hants, England, do hereby declare the nature  
5 of the said Invention for "**THE PREVENTION OF SMOKE FROM FURNACES**" to be as follows:—

The furnace to be long in proportion to the amount of fire needed. The red-hot coals to be pushed on towards the end of furnace. The fresh coals supplied & kept at the mouth of furnace. In addition to an ample supply  
10 of air in front, an opening or openings to be made at sides of ash-pit, to admit a sufficiency of air to pass through the red-hot fire, or through a narrow opening made at the end of fire bars, so that when heated it shall consume the smoke evolved at the mouth of furnace. The openings made at the sides of ash-pit to be straight or otherwise, so as to admit cold air from sides or  
15 front, or back of furnace, as may be most convenient.

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*Biden's Improvements in the Prevention of Smoke from Furnaces.*

**SPECIFICATION** in pursuance of the conditions of the Letters Patent, filed by the said James Biden in the Great Seal Patent Office on the 2nd June 1855.

**TO ALL TO WHOM THESE PRESENTS SHALL COME, I, JAMES BIDEN**, of Gosport, in the County of Hants, England, send greeting. 5

**WHEREAS** Her most Excellent Majesty Queen Victoria, by Her Letters Patent, bearing date the Second day of December, in the year of our Lord One thousand eight hundred and fifty-four, in the eighteenth year of Her reign, did, for Herself, Her heirs and successors, give and grant unto me, the said James Biden, Her special licence that I, the said James Biden, 10 my executors, administrators, and assigns, or such others as I, the said James Biden, my executors, administrators, and assigns, should at any time agree with, and no others, from time to time and at all times thereafter during the term therein expressed, should and lawfully might make, use, exercise, and vend, within the United Kingdom of Great Britain and Ireland, the Channel 15 Islands, and Isle of Man, an Invention for "**THE PREVENTION OF SMOKE FROM FURNACES,**" upon the condition (amongst others) that I, the said James Biden, by an instrument in writing under my hand and seal, should particularly describe and ascertain the nature of the said Invention, and in what manner the same was to be performed, and cause the same to be filed in the Great 20 Seal Patent Office within six calendar months next and immediately after the date of the said Letters Patent.

**NOW KNOW YE**, that I, the said James Biden, do hereby declare the nature of my said Invention, and in what manner the same is to be performed, to be particularly described and ascertained in and by the following 25 statement thereof, reference being had to the Drawings hereunto annexed, that is to say:—

My Invention consists in admitting a supply of air at the sides, at bottom, and in front of the ash-pit of furnaces, in addition to the ordinary supply of air. My Invention is applicable to furnaces generally, the arrangements 30 being modified to suit any particular construction of furnace. The manner of carrying out my Invention is as follows:—

The furnace is made sufficiently long from the front to the back to admit of the red-hot fuel occupying the back half of the fire bars, and the fresh or unburnt fuel the front half of the fire bars. The ash-pit is supplied with 35 a sufficient quantity of air to produce complete combustion by free admission in front, and by an opening or openings in the sides or the bottom of the ash-pit, which opening or openings is or are supplied with air from the front, or the

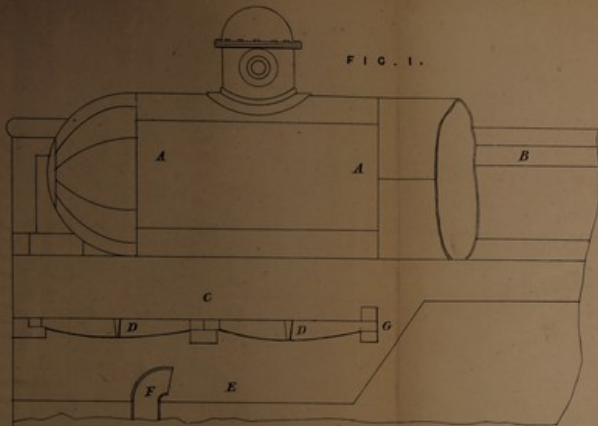


FIG. 1.

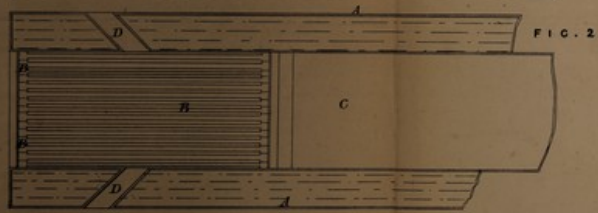


FIG. 2.

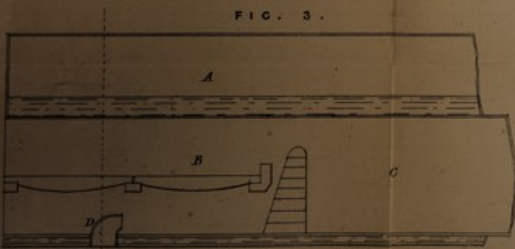


FIG. 3.

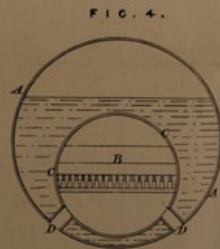


FIG. 4.

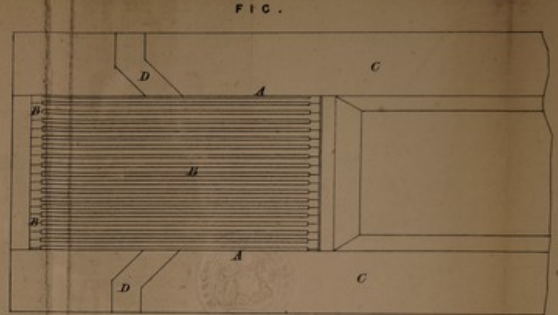


FIG. 5.

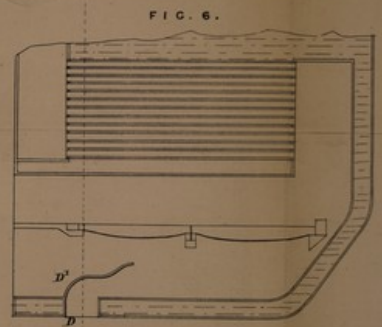


FIG. 6.

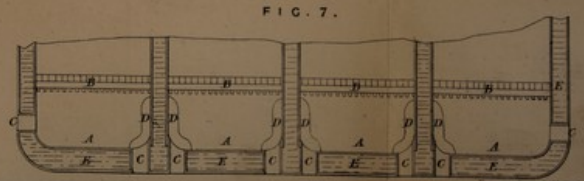


FIG. 7.

The fillet drawing is colored.

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*Biden's Improvements in the Prevention of Smoke from Furnaces.*

sides, or the back of the furnace by an air flue or flues. The air supplied by the aforesaid opening or openings is directed onwards from the part at which it enters towards the end of the ash-pit, either by arranging or constructing the opening or openings so as to direct the air to the required point, or by a  
5 metal tube or tubes, or a deflecting plate or plates. Provision is made for causing the air thus supplied to pass onward from the end of the ash-pit into the ascending flue to the chimney, either through the fire bars, or through or behind the bridge, or through an opening beyond the fire-bars and between them and the bridge. It will be generally advisable to adapt a tube or tubes  
10 or a deflecting plate or plates to the opening or openings through which air is supplied to the ash-pit, as before mentioned, in order to prevent any dust or ashes from entering into the air flue or flues, and thereby obstructing the admission of air.

In the Drawings hereunto annexed I have shewn the several methods I  
15 adopt for carrying my Invention into effect, and also its application to steam boiler furnaces. Figure 1 represents an ordinary cylindrical boiler, with my arrangement for admitting the air to the furnace applied thereto. A, A, is the boiler, set in the brickwork B; C is the furnace; and D, the fire bars; E is the ash-pit, which is open at front for the admission of air to the furnace;  
20 F is an air pipe, which is open to the external atmosphere, and conveys the air into the furnace below the fire bars. The position of this air pipe is before the back half of the fire bars, and it is so placed as to direct the air towards the fire bridge, in order to cause a current of air to mix with the gases and products of combustion at that part, so as to insure a more perfect and free  
25 consumption of them. A space G is left between the end of the fire bars and the bridge, to admit of a free passage of the air. Figure 2 represents a section in plan of a Cornish boiler, in which the air to the furnace is admitted through the sides of the boiler. A, A, is the boiler; B, the furnace; C, the flue; D, D, are the air passages, which are inclined at the angle  
30 shewn, in order to deflect the air towards the back end of the furnace. Figure 3 represents a longitudinal section, and Figure 4 a cross section, of a similar Cornish boiler, in which the air is admitted from the bottom and through the air tubes D, D. Figure 5 is a section in plan of a furnace with the air passages formed through the sides of the brickwork. A, A, is  
35 the furnace; B, the fire bars; and C, the brickwork; D, D, are the air passages which are inclined inwards, so that the air as it passes to the furnace becomes deflected towards the back end, where it commingles with the gases and products of combustion. Figure 6 is a section of a marine boiler, in which the air is caused to pass through the openings D, D, and by means of the deflect-

*Biden's Improvements in the Prevention of Smoke from Furnaces.*

ing plate D<sup>1</sup> the air is caused to impinge upon the back of the furnace, and there to unite with the products of combustion. Figure 7 represents a cross section of a set of furnaces for marine boilers. A, A, is the ash-pit; B, B, are the fire bars; C, C, air tubes or passages; D, D, deflecting plates, to keep the air passages free from ashes. The side air passages do not require 5 any protecting plates. E, E, are water spaces. I supply the air tubes or passages with air through a channel or channels made between the bottom of the furnaces and the stoker's floor, the air being introduced into such channels through some source or sources other than that which is usually employed for supplying the ash-pit. 10

And having now described the nature of my said Invention, and in what manner the same is to be performed, I declare that what I claim as my Invention for the prevention of smoke in furnaces is, the admission of air by means of an opening or openings in the side or sides or bottom of the ash-pit, which opening or openings is or are supplied with air derived from some 15 source outside of the ash-pit, the air thus supplied being directed onwards from the part at which it enters towards the end of the ash-pit either by the form of such opening or openings, or by means of a tube or tubes, or a deflecting plate or plates, all as herein-before described and represented in the Drawings hereunto annexed. 20

In witness whereof, I, the said James Biden, have hereunto set my hand and seal, this Twenty-second day of May, One thousand eight hundred and fifty-five.

JAS BIDEN. (L.S.)

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