Specification of Arthur Vandeleur : furnaces, &c.;

A.D. 1857, 28th NOVEMBER. N° 2961.

SPECIFICATION

OF

ARTHUR VANDELEUR.

FURNACES, &c.

LONDON:
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A.D. 1857, *28th November.* N° 2961.

Furnaces, &c.

LETTERS PATENT to Arthur Vandeleur, of the Royal Arsenal, Woolwich, in the County of Kent, Major in the Royal Artillery, for the Invention of "IMPROVEMENTS IN THE CONSTRUCTION OF FIRE-PLACES AND PASSAGES FOR AIR OF AIR FURNACES, BY WHICH (WITHOUT MACHINERY) THE INTENSITY OF THE FIRE IS INCREASED, A SAVING OF FUEL EFFECTED, AND THE SMOKE CONSUMED."

Sealed the 25th May 1858, and dated the 28th November 1857.

PROVISIONAL SPECIFICATION left by the said Arthur Vandeleur at the Office of the Commissioners of Patents, with his Petition, on the 28th November 1857.

I, ARTHUR VANDELEUR, of the Royal Arsenal, Woolwich, in the County of Kent, Major in the Royal Artillery, do hereby declare the nature of the said Invention for "IMPROVEMENTS IN THE CONSTRUCTION OF FIRE-PLACES AND PASSAGES FOR AIR OF AIR FURNACES, BY WHICH (WITHOUT MACHINERY) THE INTENSITY OF THE FIRE IN INCREASED, A SAVING OF FUEL EFFECTED, AND THE SMOKE CONSUMED," to be as follows:—

I propose to alter the fire-places of the present air furnaces and the parts adjacent thereto, whether such furnaces be reverberatory, puddling, reheating, scrap, or of other description. The fire grate I propose to leave in its present position and of its usual size, but instead of allowing the roof to run horizon-

tally or to have a single reverberator, as at present, the whole length of the furnace, I intend it to take a curve from above the bridge in a circular direction towards the fire grate till it reaches about six inches below the level of the bridge; the distance of the lowest point of this curve from the bridge will be somewhat greater than the space between the bridge and the roof. The height of this point from the fire grate will vary from twelve to twenty-four inches, from thence the roof will incline upwards at an angle of some sixty-five degrees or thereabouts, and again curve over (when about its former height) to abut on the end wall of the furnace. Instead of enclosing the fire-place with quite perpendicular walls, I propose to incline that furthest from the bridge at fifty degrees or thereabouts; near the centre of this wall the firing hole is usually situated, or it may be placed in a line with the centre of the sloping wall, but in one of the side walls an air passage will be constructed, taking from the lowest convenient level to the roof of the furnace above the aforesaid sloping wall; such passage to be of proportionate size to the rest of the furnace, and to be regulated by a damper. A damper will be also fitted to the ordinary ash-pit, through which latter the chief part of the air necessary to assist the combustion of the fuel will pass. The action of the furnace constructed on my plan will be as follows:—The fire being lighted, should at first be fed with half burnt coal or coke till a thorough hot fire up to the reverberatory arch (before mentioned) is maintained, coal or other ordinary fuel is then thrown on to some ten inches depth. The damper which closes the air passage being opened, a double current of air will instantly rush through the fire, both from the ash-pit up through the red fire, and from the air passage down through the green coal (the smoke and heated gases from the green coal) being thus forced or drawn through the red fire which will retain and consume the solid particles of carbon which would otherwise escape, and yet will allow the gaseous products to pass which are converted into flame before they reach the bridge; care should be taken never to allow the fire to fall below the reverberatory arch, as otherwise the furnace will smoke. The sloping wall will urge the fresh fuel gently forward to supply the place of that which shall have been consumed in the reverberator, and between it and the bridge, so as to save the labour of constantly urging the fuel forward with a stoking rod. With certain modifications I propose to apply my improvements to the furnaces of marine and locomotive engines.

SPECIFICATION in pursuance of the conditions of the Letters Patent, filed by the said Arthur Vandeleur in the Great Seal Patent Office on the 27th May 1858.

TO ALL TO WHOM THESE PRESENTS SHALL COME, I, ARTHUR VANDELEUR, of the Royal Arsenal, Woolwich, in the County of Kent, Major in the Royal Artillery, send greeting.

WHEREAS Her most Excellent Majesty Queen Victoria, by Her Letters Patent, bearing date the Twenty-eighth day of November, in the year of our Lord One thousand eight hundred and fifty-seven, in the twenty-first year of Her reign, did, for Herself, Her heirs and successors, give and grant unto me, the said Arthur Vandeleur, Her special licence that I, the said Arthur Vandeleur, my executors, administrators, and assigns, or such others as I, the said Arthur Vandeleur, 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 Islands, and Isle of Man, an Invention for "IMPROVEMENTS IN THE CONSTRUCTION OF FIRE-PLACES AND PASSAGES FOR AIR OF AIR FURNACES, BY WHICH (WITHOUT MACHINERY) THE INTENSITY OF THE FIRE IS INCREASED, A SAVING OF FUEL EFFECTED, AND THE SMOKE CONSUMED," upon the condition (amongst others) that I, the said Arthur Vandeleur, my executors or administrators, by an instrument in writing under my, or their, or one of their hands and seals, 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 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 Arthur Vandeleur, 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 statement, reference being had to the Sheet of Drawings hereunto annexed, on which Figure 1 shews a side elevation of my improved furnace; Figure 2 a longitudinal section; Figure 3 an end elevation; Figure 4 a plan in section; and Figure 5, cross section through firing door. *a* being the bridge of the furnace; *b* the roof; *c* the feeding hole; *d* the damper; and *e* the sloping wall (similar letters of reference are used to denote corresponding parts at each of the above-mentioned Figures respectively). I alter the fire-places and parts adjacent thereto of air furnaces of the ordinary description, whether such

furnaces be reverberatory, reheating, scrap, or of other description, as follows:—The fire grate of small furnaces, that is to say, of those which have a fire grate area of not more than nine square feet, I leave in its ordinary position and of its usual size, but those which have an area of more than nine square feet, I alter according to the plan shewn in the Drawing hereunto annexed, namely, by making the lower portion of the fire grate, or that nearest to the bridge *a*, to run in a horizontal direction or nearly so, the centre to be inclined at an angle of forty-five degrees, and the upper portion to be also horizontal or nearly so; then instead of allowing the roof to run horizontally the whole length of the furnace, or to have a single reverberator, as at present, I allow the roof to take a curve from above the bridge *a*, till it reaches about six inches below the level of the bridge. The distance of the lowest point of this curve from the bridge *a*, should be somewhat greater than the distance between the bridge and the roof *b*. The height of this point of the reverberatory arch from the fire grate will vary from twelve to eighteen inches, which latter it should not exceed; from thence the roof should incline upwards at an angle of forty-five degrees or thereabouts for about fifteen inches, it should then take a perpendicular direction upwards for about twelve inches, and then curve over to abut on the end wall of the furnace. Instead of enclosing the fire-place with four perpendicular walls, I encline the wall furthest from the bridge at fifty degrees or thereabouts. The firing hole *c* may be placed in either side wall with the sill about six inches above the level of the lower edge of the reverberatory arch. An air passage should be constructed from the lowest convenient level to the roof of the furnace above the aforesaid sloping wall *e*, such passage to be of proportionate size to the rest of the furnace (as shewn in the Drawing); it should be built of brick and regulated by a damper *d*. The ash-pit should be made to enter from the side and be of large size, as through this the chief part of the air necessary for the combustion of the fuel must pass. The action of furnaces constructed on this plan will be as follows:—The fire being lighted, should at first be fed with half burned coal or coke till a thorough hot fire up to the reverberatory arch is obtained, coal should then be thrown on to some ten inches in depth; the sloping wall *e* will urge the fuel gently forward to supply the place of that which shall have been consumed under the reverberator and between it and the bridge, so as to save the labor of constantly urging the fuel forward with a stoking rod; care should be taken never to allow the fire to fall below the reverberatory arch, as otherwise the furnace will smoke. The damper which closes the air passage being opened, a double current of air will immediately set in through the fire, namely, through the ash-pit up through the red fire, and from the air passage

down through that portion of the green coal adjacent to the reverberator. The latter in its passage downwards will draw the smoke and heated gasses from the green coal down with it through the red fire, which will retain the solid particles of carbon, which would otherwise escape, until consumed, and yet will allow the gaseous products to pass, which are converted into flame before reaching the bridge.

Having now described the nature of my Invention, and the manner in which the same is to be carried into practical effect, I would here observe that I do not intend to restrict myself to the exact arrangements shewn in the Drawing hereunto annexed, as the relative proportions and disposition of parts may be varied or modified without in any way departing from the principle of my Invention, which I declare to be and I claim the peculiar reverberatory arch above described and shewn in the Drawing. The air passage from the back of the furnace, the peculiar fire grate for large furnaces, and the general arrangement for making the air pass down through the green coal, causing the consumption of smoke and increasing the intensity of the fire as herein-before described and illustrated in the Sheet of Drawings hereunto annexed, and forming part of this my Specification.

In witness whereof, I, the said Arthur Vandeleur, have hereunto set my hand and seal this Twenty-fourth day of May, in the year of our Lord One thousand eight hundred and fifty-eight.

ARTHUR VANDELEUR. (L.S.)
Major Roy. Artill^{y}.

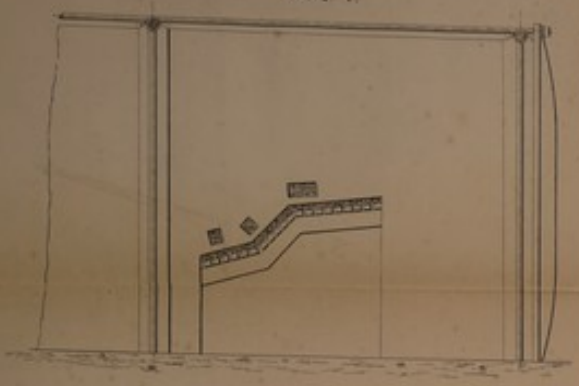
Witness,
THOMAS POWER,
Butler to James Molony, Esq^{r}.,
Kiltaccon.

LONDON:
Printed by GEORGE EDWARD EYRE and WILLIAM SPOTTISWOODE,
Printers to the Queen's most Excellent Majesty. 1858.

A.D. 1857, Nov 28. N° 2961.
VANDELEUR'S SPECIFICATION.

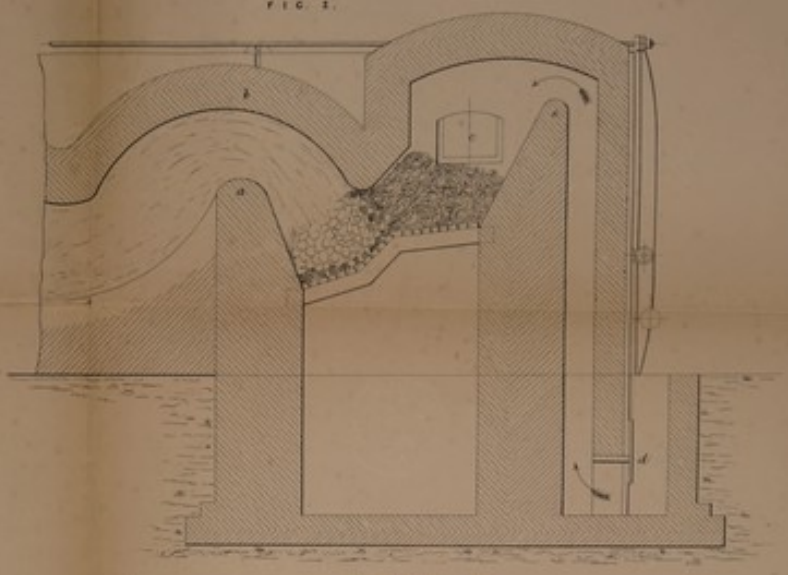
(1 SHEET.)

FIG. 1.



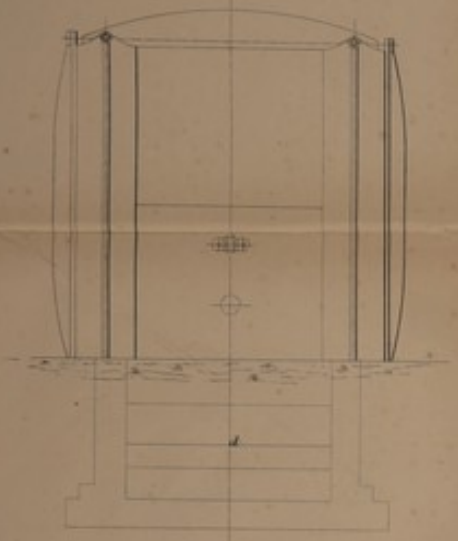
Side Elevation

FIG. 2.



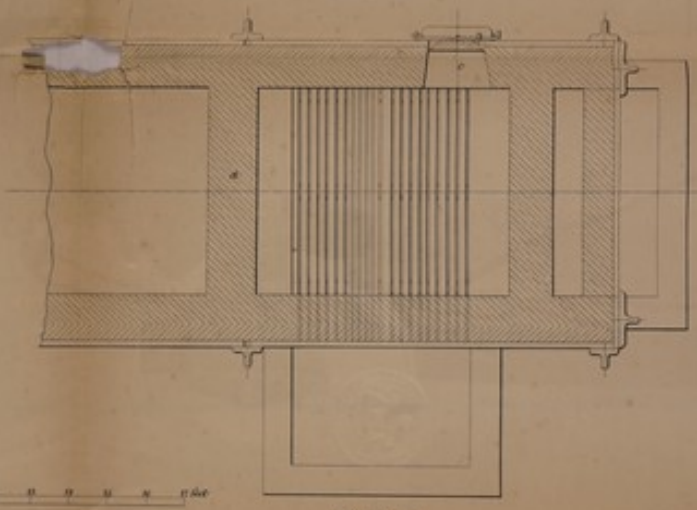
Longitudinal Section

FIG. 3.



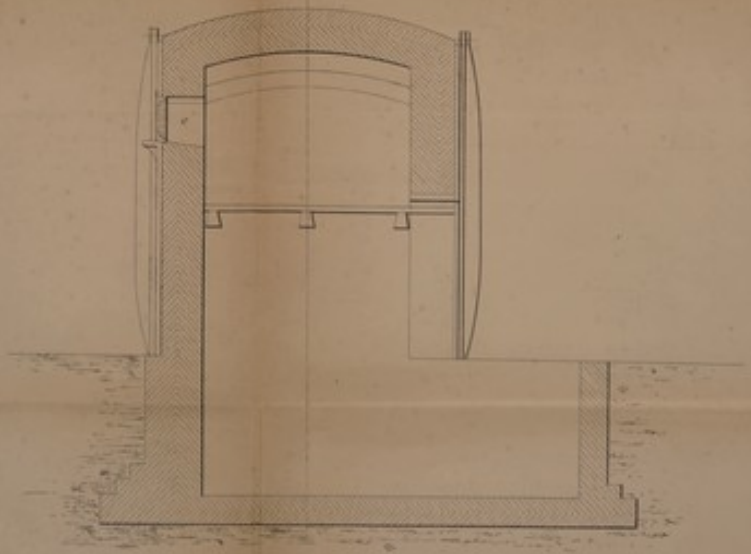
End Elevation

FIG. 4.



Sectional Plan

Cross Section thro' Firing Door FIG. 5.



The Black drawing is colored.

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