Specification of Toni Fontenay : smoke-consuming furnaces.

A.D. 1862, 22nd MARCH. N° 795.

SPECIFICATION

OF

TONI FONTENAY.

SMOKE-CONSUMING FURNACES.

LONDON:
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A.D. 1862, *22nd March.* N° 795.

Smoke-consuming Furnaces.

LETTERS PATENT to Toni Fontenay, of Grenoble, France, Civil Engineer, for the Invention of "IMPROVEMENTS IN SMOKE-CONSUMING FURNACES."

Sealed the 19th September 1862, and dated the 22nd March 1862.

PROVISIONAL SPECIFICATION left by the said Toni Fontenay at the Office of the Commissioners of Patents, with his Petition, on the 22nd March 1862.

I, TONI FONTENAY, of Grenoble, France, Civil Engineer, do hereby declare the nature of the said Invention for "IMPROVEMENTS IN SMOKE-CONSUMING FURNACES," to be as follows:—

The Invention relates to an improved construction of furnace for locomotive or other steam engine boilers, or other similar purposes, with the object of obtaining the complete consumption of the smoke and economizing fuel; and the same consists in constructing the furnace in such manner that the smoke arising from the fresh fuel with which the same is fed is caused to meet as much as possible at a right angle, the flame arising from the highly incandescent fuel, viz., that which does no more emit smoke. For this purpose the fire-bars are laid in a sloping position, so as to have their front end situated higher than their further end, and, if required, a similar incline may exist towards both side ends of the gate. The further end of the fire-bars rests on a fixed cross bar, and their front end on a moveable one, for allowing to cast down the fire; between the front end of the bars and the furnace door is pro-

vided a small separate grate, situated in a horizontal position, on which latter grate the fresh fuel is laid when feeding the furnace; above the grate, at such distance apart therefrom as to offer sufficient space for a suitable layer of fuel to be laid thereon, and for allowing the escape of the evolved gases, and underneath the boiler, evaporating pan, or other vessel to be heated by the furnace, a small flat boiler is situated in a sloping position, so as to incline towards the sloping grate, by which arrangement the gases emitted from the fresh fuel laid on a small horizontal grate are projected, as has been mentioned above, as much as possible at right angle into the bright flame arising from the highly incandescent fuel on the further end of the sloping grate, by which means these gases become entirely burned, so as not to offer any visible smoke. The small flat boiler is not quite so large as the fire-box when applied to a locomotive engine furnace, so as to allow space for expansion, to facilitate the placing of the apparatus in the furnace. The communication of this flat boiler with the locomotive or other steam boiler, evaporating pan, or other vessel to be heated by the furnace, takes place by the two tubes or tubular wings forming the upper part of the small flat boiler, between which tubes is situated a door of sheet iron, for allowing to examine the tubes of the locomotive. A steam jet is applied to the chimney for aiding the draught when the engine is not at work. If required, the small flat boiler may be replaced entirely or in part by a partition of fire-bricks.

SPECIFICATION in pursuance of the conditions of the Letters Patent filed by the said Toni Fontenay in the Great Seal Patent Office on the 22nd September 1862.

TO ALL TO WHOM THESE PRESENTS SHALL COME, I, TONI FONTENAY, of Grenoble, France, Civil Engineer, send greeting.

WHEREAS Her most Excellent Majesty Queen Victoria, by Her Letters Patent, bearing date the Twenty-second day of March, in the year of our Lord One thousand eight hundred and sixty-two, in the twenty-fifth year of Her reign, did, for Herself, Her heirs and successors, give and grant unto me, the said Toni Fontenay, Her special licence that I, the said Toni Fontenay, my executors, administrators, and assigns, or such others as I, the said Toni Fontenay, 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 SMOKE-CONSUMING FURNACES," upon the condition (amongst others) that I, the said Toni Fontenay, 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 Toni Fontenay, 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:—

These improvements relate to the construction of furnaces for locomotive or other steam engine boilers, evaporating pans, or other similar vessels, and they have for their object to obtain the complete combustion of the fuel, so as to do away with the visible products of smoke, and form what is called a smoke consuming furnace.

In my improved furnace the smoke evolved by the fresh fuel with which the furnace is fed while receiving a proper supply of air is caused to meet or mix (by preference, as much as possible at a right angle) with the bright flame arising from that part of the fuel already in a highly incandescent state and not emitting any visible smoke, by which means the undecomposed particles of carbon contained in the smoke arising from the fresh fuel will, while being mixed with the necessary quantity of atmospheric air, be brought to the degree of heat required for combining with the oxygen of this air, and thus be transformed into the gaseous state as carbonic acid or oxyde of carbon.

I now will describe more fully the general arrangement of my improved furnaces; and in order to make the nature of the improvements more easily understood, I will in this description refer to the annexed Drawings, in the various Figures of which corresponding parts are indicated by the same letters of reference.

I wish to add here at once, that as the construction of these furnaces (based on the above explained principles) will vary more or less, according to the room allotted for the fire-place, the shape and size of the boiler, or other similar circumstances, it must be distinctly understood that the arrangements represented in the annexed Drawings are to be considered only as illustrations of the modes of putting into practical effect the principles of construction above set forth.

In the Drawing, Fig. 1 represents a longitudinal vertical sectional view,

taken over the line x, y, of Fig. 3, of the fire-box of a locomotive engine, arranged according to my Invention; Fig. 2 shows a cross vertical sectional view over the line x^1, y^1, of Fig. 3; and Fig. 3, a plan or top view of the same. In this latter Figure various parts being represented as partly cut away. Fig. 4 represents a longitudinal sectional view of the fire-place or furnace for a stationary steam engine boiler, arranged according to my Invention.

In order to allow of better regulating the draught, it is preferable that the ash-pit or the lower part of the furnace by which the air is allowed to enter from below between the fire-bars may be either partly or entirely shut by a sliding door or other suitable means, so as to allow of regulating at pleasure the quantity of atmospheric air entering by this part of the furnace. Thus, for instance, in Fig. 1, the part A may be made to form an ash-pit, and be opened more or less at the front part by means of the rocking door D, E, fixed to the arm N of the bell-crank lever N, O, N^1, having its fulcrum in O, and worked by the rod N^2. J, K, L, are the fire-bars, situated in an inclined position, viz., with their front end situated higher than the further end for locomotive engines, with the object of increasing the surface of the grate; both side ends of this latter are made sloping towards the sides of the furnace, in the manner as shown in K^1, Fig. 1. The further end of each of the fire-bars J, K, L, rests on a fixed cross bar L^1, whereas the front end of the same lies on a trestle I, and between the front part of the fire-box and the front end of the bars J, K, L, is situated a small horizontal grate K^1, the further end of which also rests on the top or cross bar of the trestle I, which arrangement allows, by pulling down the trestle at once, to cast down the fire. For stationary engines, the trestle is replaced by a fixed cross bar a, as shown in Fig. 4.

Fig. 5 shows a longitudinal view of one of the lateral or side fire-bars of the grate J, K, L. The sloping position of the grate J, K, L, will allow of easily pushing through the furnace door M the incandescent fuel towards the bottom or further end of the grate J, K, L, before throwing through this door any fresh fuel on the small grate K^1 and on the front part of the large one J, K, L. The door M ought to be provided with a slide for regulating the quantity of atmospheric air to enter by this door into the furnace. The fire being well lighted before supplying the furnace with any fresh fuel, part of the coals already in full combustion are pushed down towards the further end of the large grate J, K, L, after which the fresh fuel is thrown on the small grate K^1, and partly on the front part of the large one J, K, L. F is a small flat boiler extending over the greater part of the width of the fire-box, leaving, however, space for the dilatation; this small boiler F is fixed in an inclined

position, by preference, parallel or nearly so to the large grate J, K, L, and at such distance apart from the latter as to leave room for the fuel on the grate and for the gases evolved by the fuel to pass freely, in the manner as represented in the Figs. 1 & 4. The small boiler F may be in direct communication with the main boiler B, or the same may be entirely separate therefrom and be replaced by an inclined iron screen, or even by a partition of fire-bricks, or other suitable material; by preference, however, the liquid in the small boiler F and that in the main boiler B should be in direct communication by the tubes or tubular wings G, and the small boiler duly fixed to the large one, and to the sides of the furnace, by means of screw bolts P, rivets or other suitable contrivance, allowing of easily replacing this small boiler F by another one. One of the tubular wings G is situated at each side of the door M, and they leave between them an opening H, provided with a sliding plate, folding door, or other suitable means for allowing either to shut this opening H, or by means of the same reach the under part of the main boiler B, evaporating pan, or other vessel to which the boiler F is attached, or even the fire tubes of the boiler of a locomotive engine, whilst for lighting the fire this sliding plate or folding door is opened, in order to allow the smoke arising at that moment easily to take its exit through the opening H.

In Fig. 3, one of the tubular wings G and the top plate U of the boiler F are represented as partly cut away. The lower end of the small boiler F should be provided with a screw plug *f*, for allowing to empty or clean the same. For stationary steam engine boilers, evaporating pans, or other similar fixed vessels, the opening H might entirely be dispensed with, and the small boiler F connected over its entire width to the lower part of the main boiler B. In this case it will be good that the sides of the small boiler F should project for a small distance through the lower part of the large one, so as to prevent any sediment to collect in this small boiler. As has been mentioned above, the small boiler F might be replaced by an inclined iron screen or partition plate, or by a wall of fire-bricks, or other suitable material, situated in a suitably sloping or even in the vertical position, in order to force the smoke emitted by the fresh fuel on the front part of the grate to pass through the flame of the highly incandescent fuel at the further end of this grate.

From what has been described may be inferred that as the fuel on the further end of the grate is constantly kept in a highly incandescent state, and as the smoke evolved by the fresh fuel on the front part of the grate is projected at right angles or nearly so in the flame of the highly incandescent part of the fuel, this smoke in the presence of a suitable quantity of atmospheric air will be fully decomposed into gaseous products, so as no more to be

visible, and consequently make the furnace what is called a smoke consuming furnace.

Having thus described and particularly ascertained the nature of my Invention, and the manner in which the same is or may be put into effect, I wish it to be understood that I do not intend to restrict or restrain myself to the precise details of the Invention here above described and illustrated in the annexed Drawings; but what I consider to be novel and original, and therefore claim as the Invention secured to me by the herein-before in part recited Letters Patent is, providing furnaces for locomotive or other steam engine boilers, evaporating pans, or other similar vessels with a sloping grate suitably inclining towards the bottom or further end of the furnace, and with a similarly inclined supplementary boiler, partition plate, or wall, for causing the smoke evolved by the fresh fuel to pass through the flames of the highly incandescent fuel towards the further end of the grate, in the manner as has been described and for the purpose of forming what may be called a smoke consuming furnace.

In witnesss whereof, I, the said Toni Fontenay, have hereunto set my hand and seal, this Seventeenth day of September, One thousand eight hundred and sixty-two.

TONI FONTENAY. (L.S.)

Witness,

G. PIOLLET.

LONDON:
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FIG. 1.

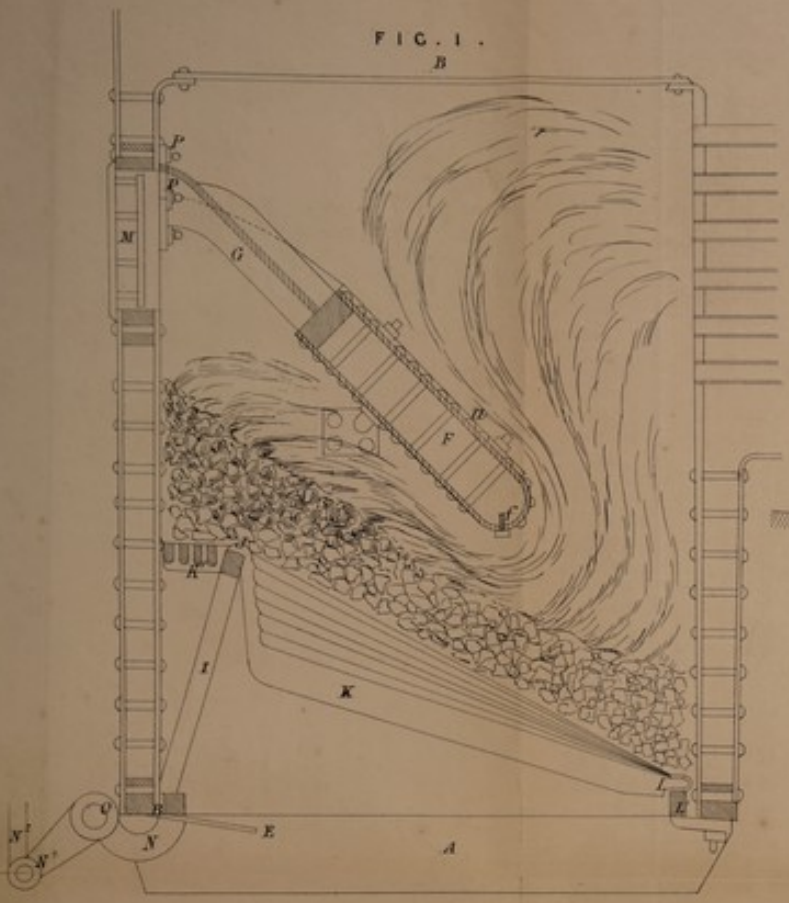


FIG. 4.

FIG. 2.

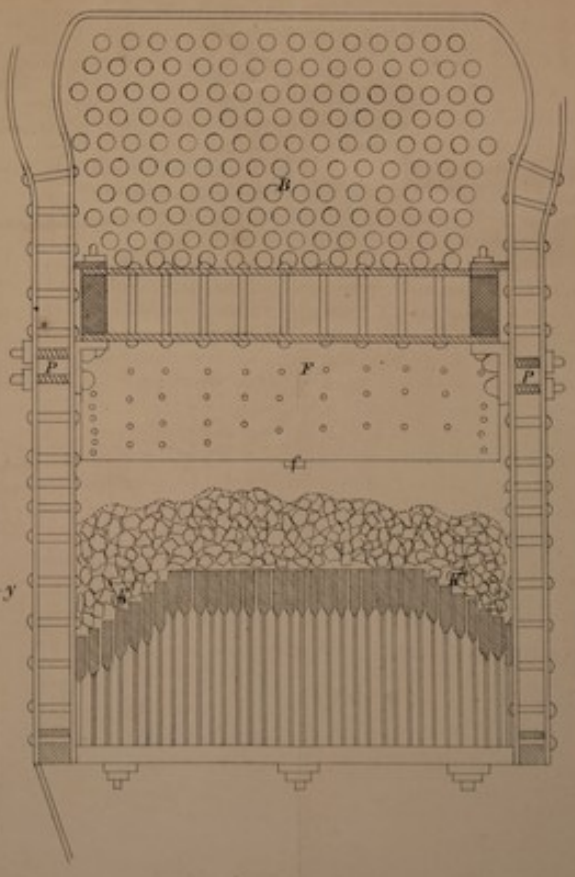
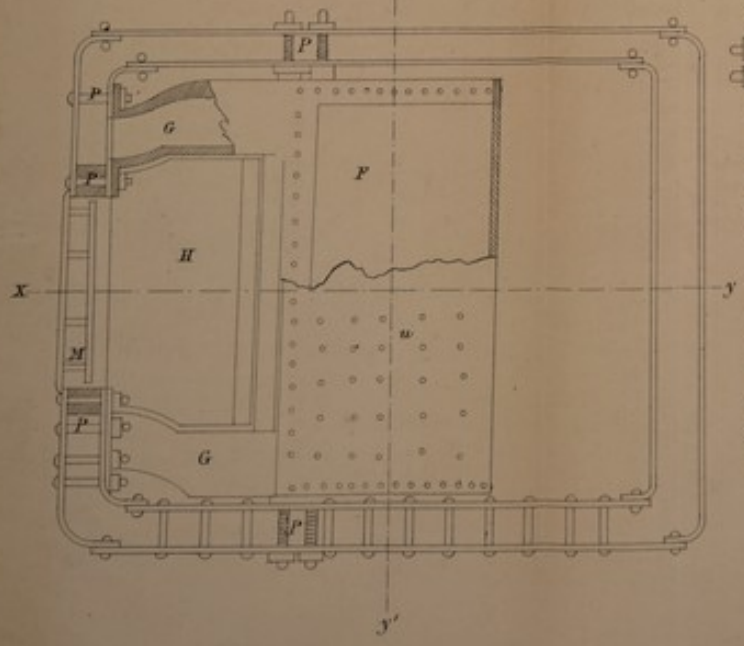


FIG. 5.

FIG. 3.



The filed drawing is partly colored

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